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Isidro A. Chacón, Daniel H. Janzen and Winnie Hallwachs. 2022. Seventeen cryptic new species of *Nystalea* Guenée, 1852 (Notodontidae: Nystaleinae) from Costa Rica. *Tropical Lepidoptera Research* 32(Supplement 3): 1-104. DOI: 10.5281/zenodo.7418826.

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Front Cover - *Nystalea aequipars* (Notodontidae, Nystaleinae), Costa Rica, photo by Dan Janzen. Vouchers 94-SRNP-2185 (above) and 10-SRNP-71517 (below).

Back Cover - *Nystalea aequipars* (Notodontidae, Nystaleinae), Costa Rica, photo by Dan Janzen. Vouchers 94-SRNP-2184 (above) and 16-SRNP-31733 (below).

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Seventeen cryptic new species of *Nystalea* Guenée, 1852 (Notodontidae: Nystaleinae) from Costa Rica

Isidro A. Chacón¹, Daniel H. Janzen² and Winnie Hallwachs²

1. BioAlfa, Santo Domingo de Heredia, Apdo. 22-3100 Costa Rica; boconera@gmail.com. 2. Department of Biology, University of Pennsylvania, Philadelphia, PA 19104, USA; djanzen@sas.upenn.edu, whallwac@sas.upenn.edu

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Abstract: These new species are discovered and described based on the combination of their distinctive COI barcodes, Barcode Index Numbers (BIN), overall morphology, genitalia, and life histories. The genus *Nystalea* Guenée (Notodontidae, Nystaleinae) is reviewed as it occurs in Costa Rica, based on 5,121 reared and wild-collected specimens. All known Costa Rican species are described or redescribed and have adults and genitalia figured, including 17 new species: *N. phildevriesi* Chacón, *N. sylvieduranae* Chacón, *N. gustavoinduni* Chacón, *N. anamariamonge* Chacón, *N. roxanamadrigalae* Chacón, *N. aurachaconae* Chacón, *N. mailyngonzalezae* Chacón, *N. romanmacayai* Chacón, *N. intichaconi* Chacón, *N. torbjornekreimi* Chacón, *N. robertpuschendorfi* Chacón, *N. henrikekmani* Chacón, *N. erikabjerstromae* Chacón, *N. lorettafayecooperae* Chacón, *N. billalleni* Chacón, *N. jeremyhancei* Chacón, and *N. brookejarvisae* Chacón, as well as 12 newly recorded species (*N. marona* Schaus, 1905, *N. multiplex* Dognin, 1909, *N. porgana* Schaus, 1905, *N. corrusca* Schaus 1904, *N. idonea* Walker 1858, *N. inchoans* Walker 1857, *N. superciliosa* Guenée, 1852, *N. virgula* Felder & Felder, 1874, *N. nigritorquata* Dognin, 1900, *N. joanna* (Schaus, 1905), and *N. ocellata* Rothschild, 1917), and seven previously recorded species (*N. discalis* Schaus, 1910, *N. collaris* Schaus, 1910, *N. montana* Weller, 1990, *N. aequipars* Walker, 1858, *N. ebalea* (Stoll, 1780), *N. guzmani* Schaus, 1910 and *N. striata* Schaus, 1910). *Nystalea lineiplena* Walker, 1857, *N. malga* Schaus, 1904, *N. marmorea* Schaus, 1901 and *N. clotho* Thiaucourt, 2003 are mentioned but not redescribed. *Nystalea* adults, larvae, and host plants are recorded from Áreas de Conservación Guanacaste (ACG) in northwestern Costa Rica. The larvae of 18 species are illustrated.

Key words. Área de Conservación Guanacaste, cryptic species, cloud forest, DNA barcoding, dry forest, larvae, Museo Nacional de Costa Rica, rain forest.

Resumen: La mayoría de las especies nuevas se describen en función de sus códigos de barras COI distintivos, el Número de Índice de Código de Barras (BIN), los genitales y la historia natural. El género *Nystalea* Guenée (Notodontidae, Nystaleinae) se revisa para Costa Rica, con base en 5,121 especímenes criados y recolectados en el medio silvestre. Todas las especies están descritas o redescritas, adultos y genitales son ilustrados, incluidas 17 nuevas especies (*N. phildevriesi* Chacón, *N. sylvieduranae* Chacón, *N. gustavoinduni* Chacón, *N. anamariamonge* Chacón, *N. roxanamadrigalae* Chacón, *N. aurachaconae* Chacón, *N. mailyngonzalezae* Chacón, *N. romanmacayai* Chacón, *N. intichaconi* Chacón, *N. torbjornekreimi* Chacón, *N. robertpuschendorfi* Chacón, *N. henrikekmani* Chacón, *N. erikabjerstromae* Chacón, *N. lorettafayecooperae* Chacón, *N. billalleni* Chacón, *N. jeremyhancei* Chacón, *N. brookejarvisae* Chacón), 12 especies recién registradas (*N. marona* Schaus, 1905, *N. multiplex* Dognin, 1909, *N. porgana* Schaus, 1905, *N. corrusca* Schaus 1904, *N. idonea* Walker 1858, *N. inchoans* Walker 1857, *N. superciliosa* Guenée, 1852, *N. virgula* Felder & Felder, 1874, *N. nigritorquata* Dognin, 1900, *N. joanna* (Schaus, 1905) y *N. ocellata* Rothschild, 1917), y siete especies previamente registradas (*N. discalis* Schaus, 1910, *N. collaris* Schaus, 1910, *N. montana* Weller, 1990, *N. aequipars* Walker, 1858, *N. ebalea* (Stoll, 1780), *N. guzmani* Schaus, 1910 y *N. striata* Schaus, 1910). Se mencionan *N. lineiplena* Walker, 1857, *N. malga* Schaus, 1904, *N. marmorea* Schaus, 1901 y *N. clotho* Thiaucourt, 2003. Se revisan los adultos, larvas y plantas hospederas de *Nystalea* en el Área de Conservación Guanacaste (ACG) en el noroeste de Costa Rica. Se ilustran las larvas de 18 especies.

Palabras claves: Código de barras de ADN, especies crípticas, Área de Conservación Guanacaste, bosque lluvioso, bosque seco, bosque nuboso, larvas, Museo Nacional de Costa Rica.

INTRODUCTION

At present, the genus *Nystalea* Guenée, 1852, consists of 63 described species of medium to large-sized moths in

the New World (Schintlmeister, 2013). Becker (2014) lists 51 species. In this paper we follow Becker (2014) in nomenclature. Representatives of this genus have been found from Florida and Texas to Argentina (Weller, 1990). Here we describe 17 new

species that were “hiding” beneath centuries-old established names, bringing the total known species of *Nystalea* to 68 as revealed by the combination of DNA barcoding and an extensive country-wide inventory (Janzen *et al.*, 2009; Janzen & Hallwachs, 2016). Other studies using these same methods have produced similar results - a trove of cryptic species hiding within long established scientific names (Smith *et al.*, 2006, 2012; Janzen *et al.*, 2011, 2012; Phillips-Rodríguez *et al.*, 2014; Chacón *et al.*, 2017; Espinoza *et al.*, 2017).

MATERIALS AND METHODS

A total of 5,121 specimens were examined for this study: 3,241 reared from wild-caught caterpillars collected in Área de Conservación Guanacaste (ACG) in northwestern Costa Rica (Janzen *et al.*, 2009; Janzen & Hallwachs, 2016, 2020), 186 were collected by the ACG BioLep project using light traps, and 1,694 are in the Lepidoptera collection of Costa Rica’s Museo Nacional (formerly that of INBio) and were collected with light traps. Of these specimens, 1,547 were barcoded and can be viewed on the Barcode of Life Data System (BOLD) database (dx.doi.org/10.5883/DS-NYSTALEA). Thirty-seven specimens were dissected for comparison of genitalia morphology and 11 lectotype specimens from the USNM were dissected. Neighbor-joining (NJ) (nearest neighbor joining “trees” as in Fig. 490) trees were downloaded from BOLD (<http://www.boldsystems.org>). They are emphatically not presented as phylogenetic trees as this is not a phylogenetic paper for *Nystalea*. The NJ trees do, however, contain useful phylogenetic clues. Rather than use them to propose hypotheses about the phylogeny of *Nystalea*, we use them as a guide to identify specimens and detect crypticity throughout the insect biodiversity inventory of Costa Rica, underway since 1978 (Janzen & Hallwachs, 2016), along with all the other information available for integrated taxonomy. Species in the taxonomic accounts are arranged by morphological similarity.

The following protocol was used for the dissection of genitalia. Abdomens were prepared using a 10% solution of KOH. Chlorazol black (Sigma-Aldrich) dissolved in 20% ethanol was used as stain. The genitalia and abdominal tissue were subsequently stored in glycerol for examination (70% ethanol solution, 3:1). The genitalia and the abdominal tissue were slide mounted using Euparal. Genitalia dissections and measurements were made with an Olympus SZ51 stereomicroscope with a calibrated ocular micrometer. Genitalic slides were photographed using a Canon EOS 60D camera with a Tamron 90 mm F/2.8 lens; figures were edited with Adobe Photoshop CS6 Version 13.0 x 64.

Morphological terminology follows Klots (1970), Weller (1990) and Miller (1991). Forewing length measurements were made with an electronic digital caliper. Food plants and parasitoids mentioned in this paper were extracted from the ACG Lepidoptera inventory database (<http://janzen.sas.upenn.edu>); plant identifications were made by specialists, including Dr. Barry Hammel, Msc. Nelson Zamora, Dr. Daniel Janzen; parasitoid identifications were made by Dr. Daniel Janzen, Dr. Monty Wood, Dr. A. J. Fleming, Dr. José Fernández-Triana, Dr. Ian Gauld, Dr. David Wahl, Dr. M. J. Sharkey, Dr. J. B.

Whitfield, Dr. Alejandro Valerio, Dr. Christer Hansson, Dr. N. E. Woodley, Dr. Won-Young Choi (Janzen and Hallwachs, 2016, 2019).

Holotypes of the newly described species will be deposited in the collection of the Museo Nacional de Costa Rica (MNCR); paratypes will be distributed between (MNCR), the Muséum National d’Histoire Naturelle, Paris (MNHN), and the National Museum of Natural History, Washington, DC (USNM). The following abbreviations for morphological terms: FWL: Forewing length; FW: Forewing; HW: Hindwing. Abbreviations used for larval stages include: PPU: Third instar; PU: Penultimate instar; U: Ultimate instar; II: Second instar.

SYSTEMATICS

Nystalea Guenée, 1852

Nystalea Guenée, 1852; in Boisduval and Guenée: 122. Type-species: *Nystalea conchyfera* Guenée, 1852. Hist. nat. Ins. 6: 122. Type specimens: Type(s) [West Indies]: [Virgin Islands]. St Thomas Island (NHML - Natural History Museum, London); subsequent designation by Schaus 1901: 268. *Nystalea conchyfera* is a junior synonym of *Phalaena (Noctua) ebalea* Stoll, 1780.

Cyrrhesta Walker, 1857: 633. Type species: *Phalaena (Noctua) nyseus* Cramer, 1776; by original monotypy.

Eunystalea Grote, 1895: 47. Type species: *Nystalea indiana* Grote, 1884; by original monotypy.

Proelymiotis Schaus, 1901: 273. Type species: *Nystalea aequipars* Walker, 1858; by original designation.

Congruia Dyar, 1908: 45. Type species: *Congruia congrua* Dyar, 1908, by original monotypy.

Nye (1975) stated that *Nystalea* was originally placed in the Noctuidae. Watson *et al.* (1980) listed *N. conchyfera* as a junior subjective synonym of *Phalaena ebalea* Stoll, 1780. *Nystalea ebalea* does occur in Costa Rica but whether it is conspecific with *N. conchyfera* requires confirmation, so that island-dwelling *Nystalea* species is not treated further here. While *Nystalea* was originally described in the Noctuidae, Möschler (1878) placed it in the Notodontidae. *Nystalea* was included within the subfamily Nystaleinae Forbes by Kitching & Rawlins, as cited in Kristensen (1999).

Diagnosis: Adults - Large notodontid moths: FWL 20-70 mm, females larger than males; male antenna bifasciculate in basal half, simple beyond; female antenna short ciliate or with scattered short setae; antennal scape with long dorsal tuft of scales; labial palpus greatly elongate, porrect; maxillary palpus two-segmented; haustellum and pilifers well-developed in both sexes; ocelli rudimentary; eye lashed, smooth, round, dark. **Thorax:** Male prothoracic femur with two scent pockets (*sensu* Weller, 1990); FW elongate and narrow, ground color a mix of light and dark browns. **Abdomen:** Vestiture with short, shiny, smooth scales; a small dorsal tuft at base; male with a diffuse, down-curved tuft of long scales at abdominal apex. **Male genitalia:** Slender, sacculus sclerotized at base; valvae with corona-like structure at ventro-distal part, costa sclerotized for 0.75 its length, distal 0.25 membranous, costal process present; costulae highly variable in shape, usually long and robust; Barth’s organ heavily pleated; Weller 1990: “In *Nystalea*, the shape of the uncus is unique: the base projects ventrally in two, sclerotized lobes and slender, cued, often membranous uncus process extends dorsally”; socii present; aedeagus with a callosum; anterior end of aedeagus broad, distal portion expanded, much wider than middle, vesica tends to be bulbous, deciduous caltrop-shape cornuti are present. **Female genitalia:** Tergum heavily sclerotized, sternum trapezoidal usually with a pair of lateral projections, slightly narrower posteriorly, anterior margin with a broad, gently bifid apodeme, papillae anales may be membranous, lightly sclerotized or heavily sclerotized depending on the species; ductus bursae sclerotized and sometimes dorso-ventrally compressed; corpus bursae sometimes sclerotized

at junction of ductus bursae and surrounding area, one or two signa present. **Larvae:** Unusual in often having a series of large fleshy dorsal humps on A2-A5 (Miller *et al.*, 2021) as readily visible in the images.

Species accounts

The members of the *Collaris* complex are *N. phildevriesi*, *N. discalis*, *N. sylvieduranae*, *N. collaris*, *N. anamariamongeeae* and *N. clotho*. The adults of these species are morphologically similar.

Nystalea phildevriesi Chacón, new species (Figs. 1-9)

Description: MALE (Figs. 1, 2): FWL 23.7-29.6 mm (n = 4). **Head:** Antennal shaft cream dorsally, reddish-brown ventrally; scape bearing a long beige tuft, composed of cream and reddish-brown scales; frons mostly reddish brown with intermixed beige scales; labial palpus beige ventrally, reddish brown dorsally; vertex beige and reddish brown; patagium reddish brown. **Thorax:** Tegula cream, a mix of light and dark brown scales distally; mesoscutellum reddish brown; thoracic pleuron light brown; dorsal surface of metathorax with reddish and dark brown hair-like scales. **Legs:** Mostly beige and light brown with dark brown scales between segments and margins. **Wings:** Dorsal FW ground color light grey with black scales; subterminal line composed of small semicircular black marks; adterminal line composed of grey rectangular marks; terminal line composed of minute black marks, fringe alternating dark brown and light grey; reniform spot, oval light grey with margin black; dorsal HW beige with veins and distal margin dirty brown; fringe beige. Ventral FW ground color light grey with black and reddish-brown scales; ventral HW ground color light brown with veins and marginal shade dirty brown. **Abdomen:** Dorsum dirty brown, venter light brown with a dark brown line in middle.

Male genitalia: Abdominal pelt (Fig. 5) with tergum VIII rectangular, posterior margin sclerotized and slightly irregular, with a translucent triangular-shaped area; sternum VIII rectangular, posterior margin with deep, sclerotized medial invagination. Genitalia (Fig. 6) with valvae wide at base, ovate at apex; sacculus margin lightly sclerotized, costal margin well-sclerotized, with rounded, flattened and sclerotized costal process; midvalve sclerotization with irregular margin; costula wide and triangular at base, thin, flattened towards apex; uncus process curved, short, membranous and setose; uncus with two short, setose, sclerotized lobes at base; socii sclerotized, slender, setose, longer than uncus lobes. Aedeagus (Fig. 7) with bulbous and membranous vesica; cornuti deciduous, caltrop-shaped; callosum wide at base, phallus thin in anellar region, robust at apex, with rounded lateral projection and sclerotized, slightly serrate edge.

FEMALE: Similar to male but larger (Figs. 3, 4). FWL 27.2-28.8 mm (n = 2). **Female genitalia** (Figs. 8, 9): Papillae anales membranous, small, lightly sclerotized, covered with short, scattered setae, but some longer, inwardly curved setae; posterior apophyses long and slender; anterior apophyses sclerotized, shorter and wider than posterior apophyses; postvaginal plate invaginated, sclerotized, with irregular margin; ostium bursae wide; ductus bursae completely sclerotized; corpus bursae membranous and globular, with a sclerotized basal shield possessing a small, nipple-like projection; signum present as a small, diffuse sclerotized macula.

Etymology: This species is named in honor of Phil DeVries for his tenacity in field work and for his valuable contributions to understanding the ecology, behavior and natural history of tropical butterflies.

Type material: 4 ♂♂, 2 ♀♀.

HOLOTYPE, ♂: INB0003340747 Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Golfito, Est. El Bonito, 100 m, 8.680656, -83.227328, 23 July 2001, M. Moraga, (MNCR).

PARATYPES: 3 ♂♂, 2 ♀♀.

♂♂, INB0003300618 Costa Rica, Prov. Puntarenas, Golfito, P.N. Piedras Blancas, Est. El Bonito, 100 m, 8.680656 -83.227328, 31 July 2000, M. Moraga, (MNCR).

INBIOCRI001294839 Costa Rica, Prov. Puntarenas, Rancho Quemado, Península de Osa, 200 m, 8.679096, -83.566714, 1 May 1991, F. Quesada, (MNCR). INBIOCRI001410973 Costa Rica, Prov. Puntarenas, P. N. Manuel

Antonio, Quepos, 80 m, 9.387728 -84.132806, 1 July 1991, G. Varela, (MNCR). ♀♀, INBIOCRI001179030 Costa Rica, Prov. Puntarenas, Est. Esquinas, Península de Osa, 200 m, 8.759387, -83.283128, 1 November 1993, J. Quesada, (MNCR). INBIOCRI001317813 Costa Rica, Prov. Puntarenas, Parque Nacional Manuel Antonio, Quepos, 80 m, 9.387728, -84.132806, 1 August 1991, G. Varela, (MNCR).

Diagnosis: *Nystalea phildevriesi* is morphologically similar to *N. clotho* Thiaucourt, 2003, whose type locality is Olancha, Honduras at 1500 m altitude (Thiaucourt, 2003). The male genitalia of *Nystalea phildevriesi* have the costula wide and triangular at the base, thin, and flattened towards apex (Fig. 6). *Nystalea clotho* is not present in Costa Rica, but its male genitalia have the costula straight, with a middle process that ends in a membranous, disc-like formation.

Distribution: *Nystalea phildevriesi* has been collected with light traps in the rain forest of the Osa Peninsula and Pacific lowlands. The elevational range for the species is 80-200 m.

Natural history: The life history of *Nystalea phildevriesi* is unknown.

Remarks: BIN BOLD:ACL3955. (Fig. 490).

Genbank Accession: MT358265

DNA barcode: male holotype INB0003340747

ASARD7871-14|INB0003340747|(Nystalea phildevriesi)|(COI-5P

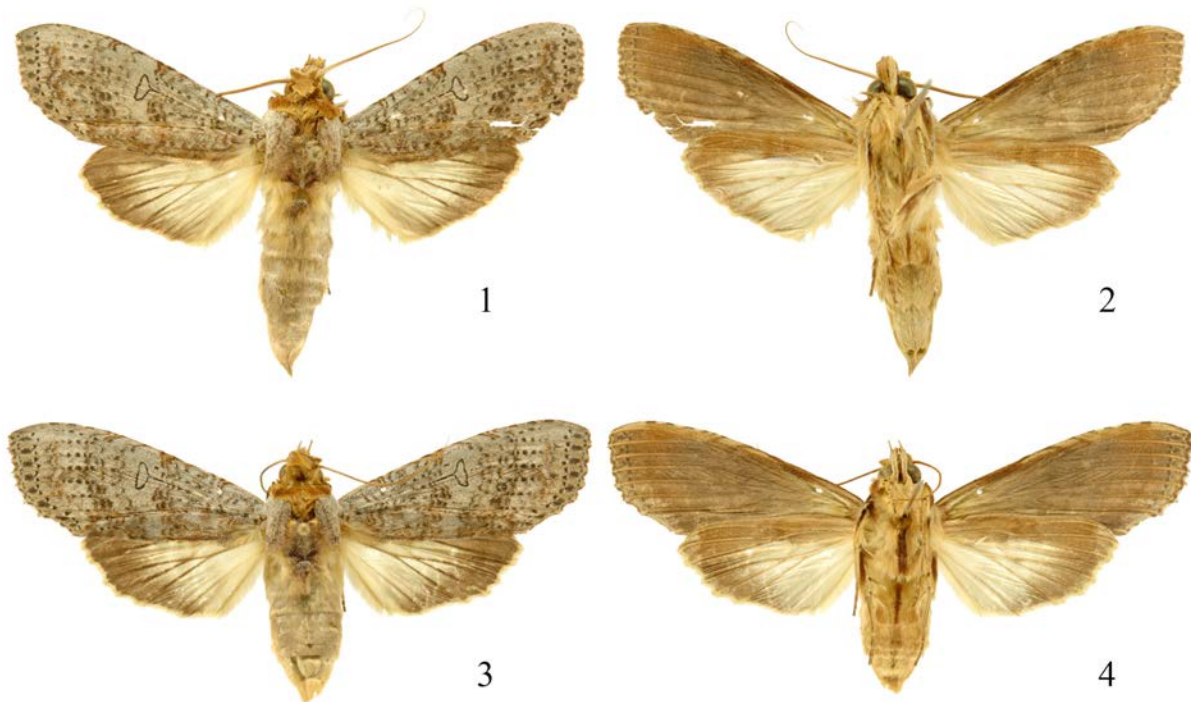
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Nystalea discalis Schaus, 1910 (Figs. 10-19)

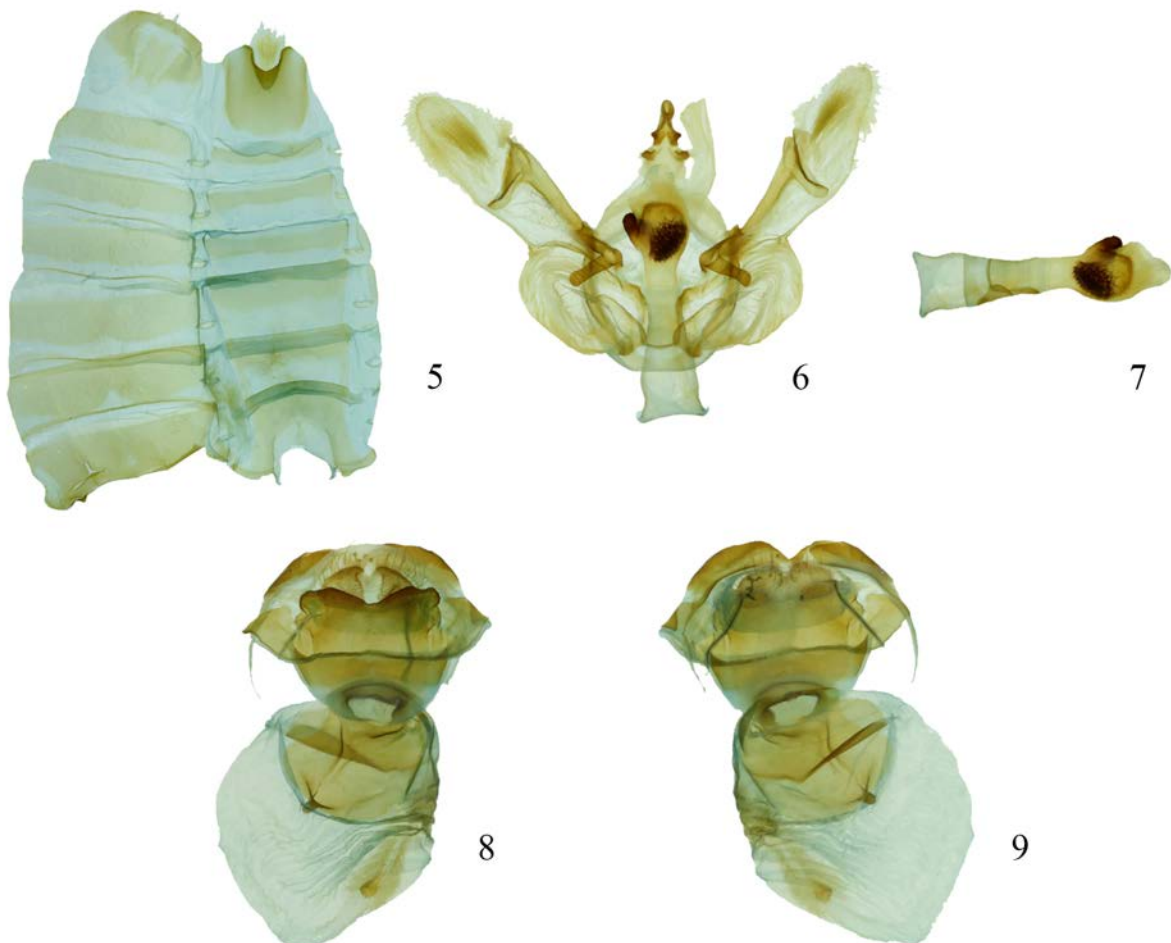
Redescription: MALE (Figs. 10, 11, 14-16, 19A): FWL 28.0-32.2 mm (n=8). **Head:** Similar to *N. phildevriesi*. **Thorax:** Tegula cream, a mix of light and dark brown scales distally; mesoscutellum reddish brown; thoracic pleuron light brown; dorsal area of metathorax with reddish and dark brown hair-like scales. **Legs:** mostly beige and light brown with dark brown scales between segments and margins. **Wings:** Dorsal FW ground color light grey with black scales covering veins; subterminal line formed by small quadrangular black marks, adterminal line gray rectangular marks, terminal line small black marks, fringe dark brown and light gray, area between 2A vein and posterior margin has dirty brown scales, reniform spot light gray with margin black, dorsal HW translucent light brown with veins and marginal shade dirty brown; fringe light brown. **Abdomen:** dorsum dirty brown, venter light brown with a dark brown line in middle.

Male genitalia: Abdominal pelt (Figs. 14, 19B) with tergum VIII rectangular, posterior margin sclerotized and irregular; sternum VIII rectangular, sclerotized with V-shaped medial invagination. Genitalia (Figs. 15, 19B) with sacculus sclerotized acutely at base. Valvae thin basally, apex rounded, sacculus margin sclerotized, costal margin sclerotized, with a rounded and sclerotized flattened costal process, midvalve sclerotization thin, acute distally near anellus, costula wide at base, pedipalp-shaped, heavily sclerotized and toothed ventrally; uncus process curved, thin, tubular membranous and setose, uncus with two, small, triangular, setose and sclerotized lobes; socii sclerotized, small and setose. Aedeagus (Figs. 16, 19B) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base, phallus short, robust and sclerotized, thin in anellar region.

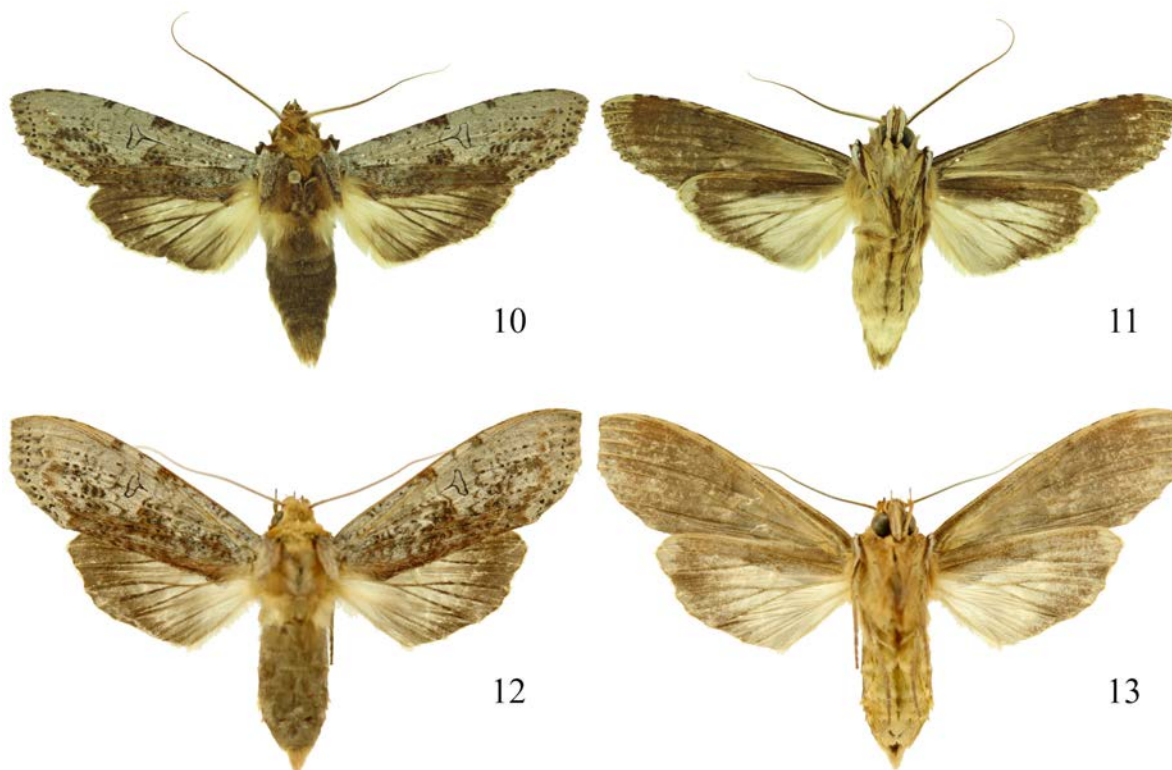
FEMALE: Similar to male but larger (Figs. 12, 13). FWL 29.8-34.2 mm (n = 2).



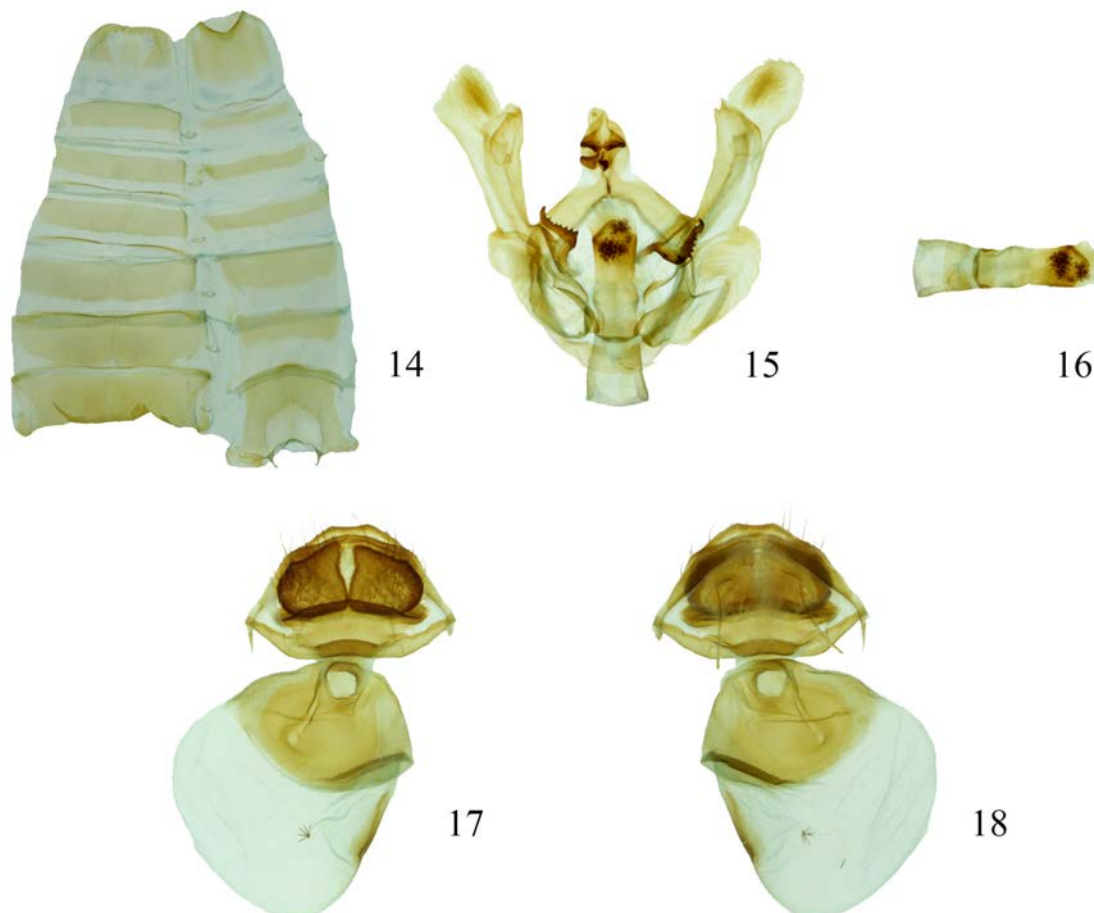
Figures 1-4. *Nystalea phildevriesi*, adults: 1. Paratype, ♂ dorsal. 2. Paratype, ♂, ventral (INBIOCRI001294839) FWL 23.4 mm; 3,4. Paratype ♀ dorsal and ventral (INBIOCRI001317813) FWL 27.8 mm.



Figures 5-9. *Nystalea phildevriesi*, genitalia: 5-7. Paratype, ♂ genitalia (INB0003300618) 5. ♂ sternum VIII 3.5 mm length. 6. ♂ genitalia 7.2 mm length. 7. phallus 4.5 mm length. 8-9. Paratype, ♀ genitalia 6.7 mm length (INBIOCRI001179030). 8. Ventral view. 9. Dorsal view.



Figures 10-13. *Nystalea discalis* Schaus, 1910: 10, 11. ♂ dorsal and ventral (INB0003015239) FWL 28.0 mm; 12, 13. ♀ dorsal and ventral (INB0004184716) FWL 29.8 mm.



Figures 14-18. *Nystalea discalis* Schaus, 1910: 14. ♂ sternum VIII 4 mm length, 15. ♂ genitalia 7.1 mm length, 16. phallus 4.2 mm (INBIOCRI001375709); 17, 18. ♀ genitalia 7.6 mm length (INBIOCRI002450787).

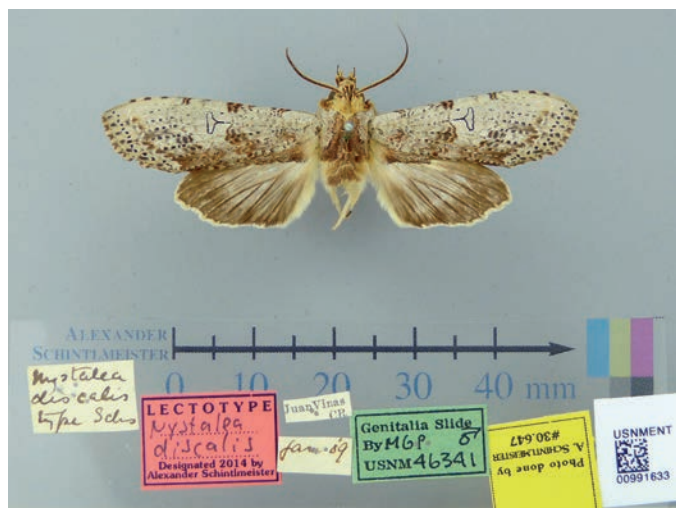


Figure 19A. *Nystalea discalis* Schaus, 1910. ♂ lectotype, figure borrowed from Schintlmeister (2016) with permission.



Figure 19B. *Nystalea discalis* Schaus, 1910. ♂ genitalia lectotype from Schintlmeister (2016).

Female genitalia (Figs. 17, 18): Papillae anales large, heavily sclerotized, covered with short setae, with longer, inwardly curved setae arising from the base; postvaginal plate sclerotized and emarginate; posterior apophyses long and slender; anterior apophyses short and sclerotized; ductus bursae sclerotized, short; corpus bursae globular, membranous, sclerotized shield present; signum slender and thin.

Material examined: 8 ♂♂, 1 ♀.

Lectotype, ♂: *Nystalea discalis* Schaus, 1910 (Fig. 19A). Designated by Schintlmeister (2016). Genitalia Slide MGP USNM 46341, USNMNT 00991633. Juan Viñas, Costa Rica. Deposited in USNM (Fig. 19B).

♂♂ (**COI Barcoded**): INB0003079824 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de la Muerte, al Costado de Casa Administrativa, 1200 m, 9.761676 -83.786507, 1 June 2000, L. Chavarría (MNCR). INB0003008799 Costa Rica, Prov. San José, Estación Zurquí (el Túnel), Par. Nac. Braulio Carrillo, 1500 m, 10.063063 -84.011307, 1 September 1985, I. & A. Chacón (MNCR). INB0003015239 Costa Rica, Prov. Cartago, Tapantí, Sect. La Represa, del puente del Río Porras 300 m S. 1660 m, 9.695214 -83.781156, 1 June 1998, R. Delgado (MNCR). INB0004184248 Costa Rica, Prov. Cartago, La Unión, Z.P. Cerro La Carpintera, El Tanque, 1600-1700 m, 9.890328 -83.975924, 4 December 2008, Moraga, Azofeifa, Zumbado, Hernández (MNCR). INB0004184726 Costa Rica, Prov. Cartago, La Unión, Z.P. Cerro Carpintera, Campo Esc. Istarú, 1750 m, 9.890548 -83.970909, 4 December 2008, Moraga, Azofeifa, Zumbado, Hernández (MNCR). INBIOCRI001323147 Costa Rica, Prov. Cartago, Quebrada Segunda, P. N. Tapantí, 1250 m, 9.76258 -83.786505, 1 Mar 1993. G. Mora (MNCR). INBIOCRI001375709 (dissected), Costa Rica, Prov. Puntarenas, Est. La Casona, Res. Biol. Monteverde, 1520 m, 10.298429 -84.792544, 1 March 1991, N. Obando (MNCR). INB0003983022 Costa Rica, Prov. Puntarenas, Buenos Aires, Biolley, P.N. La Amistad, Estación Altamira, 1400 m, 9.036111 -83.022222, 30 September 2005, R. Delgado (MNCR). ♀ (**COI Barcoded**): INB0004184716 Costa Rica, Prov. Cartago, La Unión, Z.P. Cerro La Carpintera, Campo Esc. Istarú, 1750 m, 9.890548 -83.970909, 4 December 2008, Moraga, Azofeifa, Zumbado, Hernández (MNCR).

Diagnosis: *Nystalea discalis* male genitalia with costula wide at base, heavily sclerotized and toothed ventrally (Fig. 15), which is completely different from the costula of *N. phildevriesi*. Forewings of *N. discalis* have a reddish-brown band between anal cell, posterior margin and tornus (Figs. 10, 12), and are narrower than forewings of *N. phildevriesi*.

Distribution: *Nystalea discalis* has been collected with light traps in rain forests and cloud forests on the eastern slopes of Cordillera de Tilarán, Cordillera Volcánica Central, and Cordillera de Talamanca. The elevational range for the species is 1200-1750 m.

Natural history: All specimens have been collected with light traps; the life history of *N. discalis* is unknown.

Remarks: BIN BOLD:ACL3956 (Fig. 490).

Genbank Accession: MT358261

DNA barcode of male INB0003079824

ASARD7365-14|INB0003079824|(Nystalea discalis)|COI-5P

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AACATTATATTTTATTTTGGAAATTTGAGCAGGAATAATTGGAACCTCTCTT
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AGGAGGAGATCCTATTTTATACCAACATTTATTT
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Nystalea sylvieduranae Chacón, new species (Figs. 20-28, 378-383)

Description: MALE (Figs. 20, 21): FWL 22.0-29.8 mm (n=11). **Head:** Antenna light brown, antennal shaft cream dorsally and light brown ventrally; scape with a long dark brown tuft, composed of cream and dirty-brown scales; frons mostly cream with dark brown intermixed scales; labial palpus cream ventrally, dark brown dorsally; vertex light and dark brown; patagium dark brown. **Thorax:** Tegula cream, a mix of light and dark brown scales distally; mesoscutellum light brown; thoracic pleuron light brown; dorsal area of metathorax with dirty and dark brown hair-like scales. **Legs:** Mostly cream, light brown and beige with black scales between segments. **Wings:** Dorsal FW ground color beige with black scales dotting veins in postmedial area; subterminal line formed by small quadrangular dark brown marks, adterminal line grey rectangular marks, terminal line small black marks, fringe dark brown and beige, area between 2A vein and posterior margin has reddish brown scales, dorsal HW translucent light brown with veins and marginal shade dark brown, fringe light brown. **Abdomen:** Dorsum dirty brown, venter light brown with a dark brown line medially.

Male genitalia: Abdominal pelt (Fig. 24) with tergum VIII rectangular, posterior margin sclerotized and mildly irregular, with two translucent areas separated by lightly sclerotized medial column; sternum VIII rectangular, sclerotized, with V-shaped medial notch, posterior margin heavily sclerotized. Genitalia (Fig. 25) with valvae wide and membranous basally, oval at apex; saccular margin sclerotized, costal margin lightly sclerotized, with costal process rounded and sclerotized, base of sacculus sclerotized and acute, midvalve sclerotization thin, triangular distally, costula ear-shaped basally, irregular margin with a hook-shaped projection distally; uncus slender, tubular and curved; uncus with sclerotized triangular lobes, socii with two tiny, setose and sclerotized projections. Aedeagus (Fig. 26) with membranous vesica, cornuti deciduous, caltrop-shaped, callosum wide basally, phallus robust, acute and sclerotized, with tiny lateral projection near distal part, thin in anellar region.

FEMALE: (Figs. 22, 23). FWL 24.9-32.4 (n=12) mm. **Head:** Antenna ciliate cream, antennal shaft cream dorsally; scape bearing a long dark brown tuft, composed of cream and dirty-brown scales. **Thorax:** Tegula dark brown at base, a mix of light, dark brown and white scales distally. **Wings:** Dorsal FW ground color whitish grey with black scales covering veins in postmedial area;



Figures 20-23. *Nystalea sylvieduranae*: 20, 21. ♂ dorsal and ventral (INBIOCRI000573810) FWL 22.9 mm; 22, 23. ♀ dorsal and ventral (01-SRNP-14874) FWL 24.8 mm.



Figures 24-28. *Nystalea sylvieduranae*: 24. ♂ sternum VIII 3.5 mm length, 25. ♂ genitalia 5.7 mm, 26. phallus 3.7 mm (08-SRNP-104482); 27, 28. ♀ genitalia 6.8 mm (INBIOCRI1937766).

subterminal line formed by small quadrangular black marks, adterminal line black rectangular marks, terminal line small black marks, fringe alternating brown and beige, area between 2A vein and posterior margin has reddish brown scales, dorsal HW translucent light brown with veins and marginal shade dark brown; fringe light brown. Ventral FW ground color light grey, subterminal area whitish grey, light brown serrated fringe; ventral HW ground color light brown with veins and marginal shade light grey, whitish grey macula at apex.

Female genitalia (Figs. 27, 28): Papillae anales membranous, sclerotized and triangular in shape, covered with short, scattered setae with longer, inwardly curved setae, posterior apophyses long and slender, lateral process of postvaginal plate thin, sclerotized, with straight sharp apices, postvaginal plate emarginate, ductus bursae sclerotized, corpus bursae globular, wrinkled surface, with sclerotized shield, signum slender diffuse.

Etymology: *Nystalea sylvieduranae* is named in honor of Ministra Silvie Durán Salvatierra of the Ministerio de Cultura y Juventud of Costa Rica, in recognition of her policy efforts to integrate Costa Rica's BioAlfa Project with the Museo Nacional de Costa Rica.

Type material: 85 ♂♂, 89 ♀♀.

HOLOTYPE, ♂: 07-SRNP-58454 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 8 August 2007, Mariano Pereira (MNCR).

PARATYPES: 84 ♂♂, 89 ♀♀.

♂♂ (**COI Barcoded**): 08-SRNP-6448 Costa Rica, Prov. Alajuela, Sector Buenos Aires, Finca Tomate, 360 m, 10.90353 -85.30916, 15 December 2008, Carolina Cano (USNM). 01-SRNP-22188 Costa Rica, Prov. Alajuela, Sector Buenos Aires, Buenos Aires, 400 m, 10.89565 -85.31227, 23 November 2001, Gloria Sihezar (USNM). 01-SRNP-18 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 4 February 2001, Gloria Sihezar (USNM). 00-SRNP-21901 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 5 December 2000, Gloria Sihezar (USNM). 00-SRNP-21902 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 3 December 2000, Gloria Sihezar (USNM). 00-SRNP-21905 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 3 December 2000, Gloria Sihezar (USNM). 01-SRNP-123 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 11 February 2001, Gloria Sihezar (USNM). 00-SRNP-21906 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 2 December 2000, Gloria Sihezar (USNM). 00-SRNP-21907 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 2 December 2000, Gloria Sihezar (USNM). 08-SRNP-5222 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Areño, 460 m, 10.91407 -85.38174, 14 October 2008, Gloria Sihezar (USNM). 01-SRNP-764 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 9 April 2001, Gloria Sihezar (USNM). 08-SRNP-1600 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 23 April 2008, Gloria Sihezar (USNM). 08-SRNP-1709 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 April 2008, Anabelle Córdoba (USNM). 08-SRNP-1144 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Huerta, 527 m, 10.9305 -85.37223, 6 April 2008, Anabelle Córdoba (USNM). 99-SRNP-5352 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 17 June 1999, Carolina Cano (USNM). 00-SRNP-553 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 15 March 2000, Carolina Cano (USNM). 02-SRNP-1269 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 20 March 2002, Carolina Cano (USNM). 00-SRNP-552 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 15 March 2000, Carolina Cano (USNM). 08-SRNP-6579 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 21 December 2008, Elda Araya (USNM). 08-SRNP-4767 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 15 September 2008, Elda Araya (USNM). 01-SRNP-1836 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Colón, 590 m, 10.96386 -85.41914, 6 June 2001, Freddy Quesada (USNM). 01-SRNP-211 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 17 February 2001, Freddy Quesada (USNM). 01-SRNP-127 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 12 February 2001, Freddy Quesada (USNM). 01-SRNP-16 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 8

February 2001, Freddy Quesada (USNM). 01-SRNP-17 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 6 February 2001, Osvaldo Espinoza (USNM). 08-SRNP-6847 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 11 January 2009, Osvaldo Espinoza (USNM). 08-SRNP-5223 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Areño, 460 m, 10.91407 -85.38174, 7 October 2008, Osvaldo Espinoza (USNM). 13-SRNP-77081 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Llanura, 135 m, 10.93332 -85.25331, 17 August 2013, Cirilo Umaña (USNM). 13-SRNP-77079 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Llanura, 135 m, 10.93332 -85.25331, 16 August 2013, Cirilo Umaña (USNM). 13-SRNP-77116 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Finca Esmeralda, 123 m, 10.93548 -85.25314, 21 August 2013, Cirilo Umaña (USNM). 01-SRNP-4607 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palmital, 420 m, 10.88264 -85.25164, 30 April 2001, Freyci Vargas (USNM). 01-SRNP-4606 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palmital, 420 m, 10.88264 -85.25164, 30 April 2001, Freyci Vargas (USNM). 01-SRNP-4604 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palmital, 420 m, 10.88264 -85.25164, 30 April 2001, Freyci Vargas (USNM). 01-SRNP-4605 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palmital, 420 m, 10.88264 -85.25164, 30 April 2001, Freyci Vargas (USNM). 02-SRNP-6435 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe, 415 m, 10.90187 -85.27495, 26 February 2002, José Pérez (USNM). 08-SRNP-40771 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Laureles, 95 m, 10.93319 -85.25335, 18 April 2008, José Pérez (USNM). 08-SRNP-41491 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Venado, 420 m, 10.89678 -85.27001, 18 August 2008, Anabelle Córdoba (USNM). 07-SRNP-32674 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Carica, 660 m, 10.99284 -85.42936, 1 August 2007, Petrona Ríos (USNM). 05-SRNP-31667 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 May 2005, Petrona Ríos (USNM). 08-SRNP-72043 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.39666, 11 September 2008, Leonel Sieszar (USNM). 10-SRNP-72629 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 9 September 2010, Ricardo Calero (USNM). 07-SRNP-102374 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 400 m, 11.02666 -85.41026, 19 March 2007, R. Franco & S. Ríos (MNCR). 08-SRNP-22146 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Ayotal, 326 m, 11.00954 -85.51125, 5 August 2008, Roster Moraga (USNM). 07-SRNP-22439 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 31 July 2007, Roster Moraga (USNM). 07-SRNP-22438 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 29 July 2007, Roster Moraga (USNM). 07-SRNP-23388 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 9 September 2007, Lucía Ríos (USNM). 10-SRNP-35438 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 30 July 2010, Dunia García (USNM). 04-SRNP-48140 Costa Rica, Prov. Guanacaste, Sector Cacao, Gongsora Bananal, 600 m, 10.88919 -85.47609, 9 September 2004, Dunia García (USNM). 07-SRNP-45038 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Otilio, 550 m, 10.88996 -85.47966, 31 January 2007, Dunia García (USNM). 10-SRNP-35439 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 30 July 2010, Manuel Pereira (USNM). 04-SRNP-48656 Costa Rica, Prov. Guanacaste, Sector Cacao, Cuesta Caimito, 640 m, 10.89080 -85.47192, 28 September 2004, Manuel Pereira (USNM). 99-SRNP-1890 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Maritza, 760 m, 10.93644 -85.47764, 3 November 1999, Mariano Pereira (USNM). 10-SRNP-112151 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 9 August 2010, S. Ríos & R. Franco (MNCR). 07-SRNP-107268 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 557 m, 10.88449 -85.47306, 11 August 2007, R. Franco & S. Ríos (MNCR). 05-SRNP-58846 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 21 August 2005, José Cortéz (USNM). 07-SRNP-59505 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 3 September 2007, Dieksderik Campos (USNM). 07-SRNP-58536 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 7 August 2007, José Alberto Sánchez (USNM). 07-SRNP-58449 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 2 August 2007, Mariano Pereira (USNM). 07-SRNP-55794 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 15 April 2007, Mariano Pereira (USNM). 09-SRNP-56749 Costa Rica, Prov. Guanacaste,

- Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 25 July 2009, Mariano Pereira (USNM). 11-SRNP-56598 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 23 September 2011, Mariano Pereira (USNM). 05-SRNP-57281 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 2 July 2005, Mariano Pereira (USNM). 08-SRNP-103187 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, La Perla (Tajo), 394 m, 10.76734 -85.43014, 10 June 2008, H. Cambroneró & F. Quesada (MNCR). 08-SRNP-104482 (dissected), Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, La Perla (Tajo), 394 m, 10.76734 -85.43014, 4 July 2008, H. Cambroneró & F. Quesada (USNM). 98-SRNP-4793 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 8 June 1998, Lucía Ríos (USNM). 98-SRNP-5825 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 28 August 1998, Lucía Ríos (USNM). 97-SRNP-3737 Costa Rica, Prov. Guanacaste, Sector Pocosal, Vado Terciopelo, 170 m, 10.90756 -85.56914, 10 September 1997, Gusaneros (USNM). 94-SRNP-5295 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 2 August 1994, Gusaneros (USNM). 90-SRNP-1920.3 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 7 September 1990, Gusaneros (USNM). 01-SRNP-15541 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 4 August 2001, Gusaneros (USNM). 01-SRNP-14874 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 16 July 2001, Gusaneros (USNM). 01-SRNP-14873 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 16 July 2001, Gusaneros (USNM). 86-SRNP-529 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, 300 m, 10.85362 -85.60942, 5 January 1987, Gusaneros (USNM). 02-SRNP-11252 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 13 July 2002, Gusaneros (USNM). 02-SRNP-11253 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 9 July 2002, Gusaneros (USNM). 08-SRNP-13635 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Quebrada Costa Rica, 275 m, 10.82745 -85.63652, 30 June 2008, Guillermo Pereira (USNM). 08-SRNP-14384 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 15 August 2008, Lucía Vargas (USNM). 07-SRNP-15265 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764 -85.61871, 5 September 2007, Guillermo Pereira (USNM). 00-SRNP-6002 Costa Rica, Prov. Guanacaste, Puerto Soley, Playa Papaturro, 22 January 2000, Guillermo Pereira (USNM). INBIOCRI001947861 Costa Rica, Prov. Alajuela, R.N.V.S Caño Negro, Playuelas, 20 m, 10.95534 -84.74959, 3 October 1993, K. F. Flores (MNCR). INBIOCRI000573810 Costa Rica, Prov. Guanacaste, Refugio Fauna Silvestre R. L. Rodríguez, Est. Palo Verde, 10 m, 10.34911 -85.35234, 1 August 1991, G. Dauphin (MNCR). INB0004127746 Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Área Administrativa, 47 m, 8.54608 -83.39780, 29 November 2007, J. A. Azofeifa (MNCR). INBIOCRI001294528 Costa Rica, Prov. Puntarenas, Península de Osa, Rancho Quemado, 200 m, 8.67909 -83.56671, 1 October 1990, J. F. Quesada (MNCR). ♀♀ (COI Barcoded): 08-SRNP-6445 Costa Rica, Prov. Alajuela, Buenos Aires, Finca Tomate, 360 m, 10.90353 -85.30916, 17 December 2008, Carolina Cano (USNM). 01-SRNP-22194 Costa Rica, Prov. Alajuela, Buenos Aires, 400 m, 10.89565 -85.31227, 24 November 2001, Carolina Cano (USNM). 01-SRNP-22198 Costa Rica, Prov. Alajuela, Buenos Aires, Buenos Aires, 400 m, 10.89565 -85.31227, 29 November 2001, Carolina Cano (USNM). 01-SRNP-22187 Costa Rica, Prov. Alajuela, Buenos Aires, Buenos Aires, 400 m, 10.89565 -85.31227, 20 November 2001, Gloria Sihezar (USNM). 01-SRNP-124 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 12 February 2001, Gloria Sihezar (USNM). 01-SRNP-125 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 13 February 2001, Gloria Sihezar (USNM). 00-SRNP-21903 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 30 November 2000, Gloria Sihezar (USNM). 01-SRNP-1237 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 30 April 2001, Gloria Sihezar (USNM). 02-SRNP-3102 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 1 July 2002, Gloria Sihezar (USNM). 00-SRNP-21904 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 3 December 2000, Gloria Sihezar (USNM). 02-SRNP-1274 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Melina Búfalo, 560 m, 10.88400 -85.38600, 20 March 2002, Carolina Cano (USNM). 01-SRNP-22308 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 3 December 2001, Gloria Sihezar (USNM). 02-SRNP-551 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Camino San Ramón, 660 m, 10.88354 -85.40974, 28 February 2002, Carolina Cano (USNM). 07-SRNP-1241 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Tajo Ángeles, 540 m, 10.86472 -85.41531, 3 April 2007, Carolina Cano (USNM). 08-SRNP-5227 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Areno, 460 m, 10.91407 -85.38174, 16 October 2008, Carolina Cano (USNM). 08-SRNP-2069 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 15 May 2008, Carolina Cano (USNM). 08-SRNP-6337 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 1 December 2008, Carolina Cano (USNM). 08-SRNP-6673 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 25 December 2008, Elda Araya (USNM). 08-SRNP-4769 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 11 September 2008, Elda Araya (USNM). 09-SRNP-3213 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 20 July 2009, Elda Araya (USNM). 08-SRNP-1145 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Huerta, 527 m, 10.9305 -85.37223, 5 April 2008, Anabelle Córdoba (USNM). 01-SRNP-126 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 11 February 2001, Freddy Quesada (USNM). 01-SRNP-14 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 5 February 2001, Freddy Quesada (USNM). 01-SRNP-15 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 4 February 2001, Freddy Quesada (USNM). 01-SRNP-12 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 5 February 2001, Osvaldo Espinoza (USNM). 01-SRNP-128 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 7 February 2001, Osvaldo Espinoza (USNM). 01-SRNP-25201 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 31 December 2001, Freddy Quesada (USNM). 01-SRNP-25355 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 16 January 2002, Freddy Quesada (USNM). 08-SRNP-41376 1241 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Laureles, 95 m, 10.93319 -85.25335, 6 August 2008, Anabelle Córdoba (USNM). 13-SRNP-77078 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Lanura, 135 m, 10.93332 -85.25331, 13 August 2013, Cirilo Umaña (USNM). 13-SRNP-77351 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Finca Esmeralda, 123 m, 10.93548 -85.25314, 12 August 2013, Cirilo Umaña (USNM). 03-SRNP-11483 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Juntas, 400 m, 10.90661 -85.28784, 14 July 2003, José Pérez (USNM). 02-SRNP-12128 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Llano, 400 m, 10.90276 -85.28996, 29 October 2002, José Pérez (USNM). 08-SRNP-40657 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Tucán, 410 m, 10.90424 -85.2712, 31 March 2008, José Pérez (USNM). 02-SRNP-6438 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe, 415 m, 10.90187 -85.27495, 26 February 2002, José Pérez (USNM). 02-SRNP-6436 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe, 415 m, 10.90187 -85.27495, 26 February 2002, José Pérez (USNM). 03-SRNP-11485 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Juntas, 400 m, 10.90661 -85.28784, 14 July 2003, José Pérez (USNM). 02-SRNP-6437 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe, 415 m, 10.90187 -85.27495, 26 February 2002, José Pérez (USNM). 07-SRNP-42101 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Laureles, 95 m, 10.93319 -85.25335, 8 August 2007, Minor Carmona (USNM). 10-SRNP-72628 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 13 September 2010, Ricardo Calero (USNM). 13-SRNP-71444 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 380 m, 11.01602 -85.38053, 23 September 2013, Ricardo Calero (USNM). 13-SRNP-71243 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.39666, 21 August 2013, Ricardo Calero (USNM). 05-SRNP-31668 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 19 May 2005, Petrona Ríos (USNM). 05-SRNP-31666 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 May 2005, Petrona Ríos (USNM). 06-SRNP-30422 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 10 February 2006, Petrona Ríos (USNM). 08-SRNP-72044 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.39666, 9 September 2008, Leonel Siezar (USNM). 07-SRNP-23534 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 12 September 2007, Roster Moraga (USNM). 07-SRNP-22231 Costa Rica, Prov.

Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 17 July 2007, Roster Moraga (USNM). 07-SRNP-22232 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 21 July 2007, Roster Moraga (USNM). 07-SRNP-22234 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 19 July 2007, Roster Moraga (USNM). 08-SRNP-22145 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Ayotal, 326 m, 11.00954 -85.51125, 31 July 2008, Roster Moraga (USNM). 07-SRNP-22235 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 22 July 2007, Roster Moraga (USNM). 94-SRNP-10183 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 570 m, 10.88700 -85.47443, 12 December 1994, Gusaneros (USNM). 94-SRNP-10188 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 570 m, 10.88700 -85.47443, 15 December 1994, Gusaneros (USNM). 94-SRNP-10186 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 570 m, 10.88700 -85.47443, 9 December 1994, Gusaneros (USNM). 04-SRNP-48141 Costa Rica, Prov. Guanacaste, Sector Cacao, Góngora Bananal, 600 m, 10.88919 -85.47609, 5 September 2004, Dunia García (USNM). 08-SRNP-45050 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Otilio, 550 m, 10.88996 -85.47966, 7 March 2008, Dunia García (USNM). 08-SRNP-45049 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Otilio, 550 m, 10.88996 -85.47966, 7 March 2008, Dunia García (USNM). 08-SRNP-45052 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Otilio, 550 m, 10.88996 -85.47966, 8 March 2008, Manuel Pereira (USNM). 04-SRNP-47703 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Otilio, 550 m, 10.88996 -85.47966, 16 August 2004, Mariano Pereira (USNM). 04-SRNP-45797 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 570 m, 10.88700 -85.47443, 1 July 2004, Mariano Pereira (USNM). 99-SRNP-1891 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Maritza, 760 m, 10.93644 -85.47764, 3 November 1999, Mariano Pereira (USNM). 04-SRNP-48658 Costa Rica, Prov. Guanacaste, Sector Cacao, Cuesta Caimito, 640 m, 10.89080 -85.47192, 2 December 2004, Manuel Pereira (USNM). 10-SRNP-109998 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 8 July 2010, H. Cambronero & S. Ríos (MNCR). 10-SRNP-112151 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 9 September 2010, S. Ríos & R. Franco (USNM). 07-SRNP-106920 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 557 m, 10.88449 -85.47306, 10 August 2007, H. Cambronero & F. Quesada (USNM). 07-SRNP-106919 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Góngora, 557 m, 10.88449 -85.47306, 10 August 2007, H. Cambronero & F. Quesada (USNM). 05-SRNP-58933 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Portón Rivas, 570 m, 10.75864 -85.37269, 21 August 2005, Mariano Pereira (USNM). 11-SRNP-55950 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Punta Plancha, 420 m, 10.74160 -85.42734, 25 July 2011, Mariano Pereira (USNM). 09-SRNP-56751 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 25 July 2009, Mariano Pereira (USNM). 07-SRNP-58433 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 2 August 2007, José Cortéz (USNM). 07-SRNP-55876 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 9 May 2007, José Cortéz (USNM). 07-SRNP-57973 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Cerro Góngora Pelado, 740 m, 10.76307 -85.41332, 3 August 2007, José Alberto Sánchez (USNM). 10-SRNP-109067 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Mona, 1055 m, 10.79235 -85.34891, 13 June 2010, F. Quesada & S. Ríos (MNCR). 94-SRNP-5761 Costa Rica, Prov. Guanacaste, Sector Pocosal, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 8 August 1994, Gusaneros (USNM). 91-SRNP-1753 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Laguna Escondida, 285 m, 10.84867 -85.63046, 3 August 1991, Gusaneros (USNM). 01-SRNP-17277 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Sendero Carbonal, 7 m, 10.77594 -85.65799, 16 October 2001, Gusaneros (USNM). 91-SRNP-1815 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Cafetal, 280 m, 10.85827 -85.61089, 11 August 1991, Gusaneros (USNM). 91-SRNP-1566 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Quebrada Costa Rica, 275 m, 10.82745 -85.63652, 6 August 1991, Gusaneros (USNM). 90-SRNP-1132 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Cafetal, 280 m, 10.85827 -85.61089, 26 July 1990, Gusaneros (USNM). 90-SRNP-1275 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764 -85.61871, 29 June 1990, Gusaneros (USNM). 81-SRNP-1145 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 2 September 1981, Daniel H. Janzen (USNM). 81-SRNP-906.1 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764

-85.61871, 13 August 1981, Daniel H. Janzen (USNM). 81-SRNP-906 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764 -85.61871, 6 August 1981, Daniel H. Janzen (USNM). 81-SRNP-1145.2 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 29 August 1981, Daniel H. Janzen (USNM). 05-SRNP-60294 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Cafetal, 280 m, 10.85827 -85.61089, 27 September 2005, Freddy Quesada (USNM). 08-SRNP-13103 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 22 June 2008, Guillermo Pereira (USNM). 03-SRNP-25115 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764 -85.61871, 23 August 2003, Guillermo Pereira (USNM). 01-SRNP-18119 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Vado Río Calera, 10 m, 10.80274 -85.67423, 1 December 2001, Manuel Pereira (USNM). 01-SRNP-15297 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Área Administrativa, 295 m, 10.83764 -85.61871, 15 July 2001, Eric Olson (USNM). 03-SRNP-13716 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 20 July 2003, Guillermo Pereira (USNM). INB0004091410 Costa Rica, Prov. Guanacaste, Cañas, Laguna La Vieja, Finca M. Campos, 600-700 m, 10.64920 -85.05446, 13 June 2007, J. A. Azofeifa, M. Campos (MNCR). INB0004169510 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 4: Cerro Montezuma, 1510 m, 10.69515 -85.02760, 21 September 2008, J.A. Azofeifa (MNCR). INBIOCRI001937766 (dissected), Costa Rica, Prov. Alajuela, Los Chiles, Caño Negro, 20 m, 10.89381 -84.78884, 1 October 1993, K. F. Flores (MNCR).

Diagnosis: Male genitalia with costula ear-shaped basally, with irregular margin with a hook-shaped projection distally (Fig. 25), differing from *N. phildevriesi*, *N. discalis*, *N. collaris* Schaus, 1910, *N. anamariamongae* and *N. clotho*.

Distribution: In Costa Rica, *N. sylvieduranae* has been collected in dry forest and rain forest on both slopes of the Cordillera Volcánica de Guanacaste and on the Osa Peninsula. The elevational range for the species is 0-1510 m.

Natural history: (Figs. 378-383). 525 rearing records: ACG locations: Sector Brasilia (n=1), Sector Buenos Aires (n=18), Sector Cacao (n=83), Sector Del Oro (n=15), Sector El Hacha (n=10), Sector Mundo Nuevo (n=63), Sector Pitilla (n=23), Sector Pocosal (n=2), Sector Puerto Soley (n=1), Sector Rain Forest (n=60), Sector San Cristóbal (n=160), Sector Santa Elena (n=4), Sector Santa Rosa (n=85).

Food plants: Combretaceae: *Conocarpus erectus* L. (n=3), Malpighiaceae: *Byrsonima crassifolia* (L.) Kunth (n=1), Melastomataceae: *Tibouchina longifolia* (Vahl) Baill. (n=2), Myrtaceae: *Calyptanthus chytraculia* (L.) Sw. (n=1), *Eugenia acapulcensis* Steud. (n=3), *E. carthagenensis* Jacq. (n=6), *E. hypargyrea* Standl. (n=2), *E. monticola* (Sw.) DC. (n=3), *E. oerstediana* O. Berg (n=3), *E. salamensis* Donn. Sm. (n=81), *E. truncata* O. Berg (n=14), *Myrcia splendens* (Sw.) DC. (n=1), *Psidium friedrichsthalium* (O. Berg) Nied. (n=2), *P. guajava* L. (introduced) (n=368), *P. guineense* Sw. (n=15), *P. sartorianum* (O. Berg) Nied. (n=1), *Syzygium jambos* (L.) Alston (introduced) (n=3), Vochysiaceae: *Vochysia guatemalensis* Donn. Sm. (n=1).

Parasitoids: Braconidae: (n=14), *Glyptapanteles garygibsoni* (n=5), *Hypomicrogaster OVRGDHJ03* (n=8), *Hypomicrogaster OVRGDHJ06* (n=1); Ichneumonidae (n=1) unidentified 06-SRNP-57975; Tachinidae: (n=23), *Argyrochaetona Janzen02* (n=1), *Ceromya Wood03DHJ05* (n=1), *Houghia delospilota* (n=1), *Patelloa xanthuraDHJ01* (n=3), unidentified (n=1) 82-SRNP-498, *Winthemia Wood16DHJ01* (n=16).

Remarks: BIN BOLD:AAA2510 (Fig. 490).

Genbank Accession JF1564

DNA barcode of male holotype 07-SRNP-58454

MHMXU391-08 |07-SRNP-58454|(Nystalea sylvieduranae)|COI-5P

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AACATTATATTTTATTTTGGTATTTGAGCAGGAATAATTGGAACCTCTCTT
AGTTTATTAATTCGAGCAGAATTAGGAAATCCTGGATTTTAAATTGGAGATG
ATCAAATTTATACTATTGTAACAGCTCATGCTTTTATTATAATTTT
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GATTATTACCCCTTCATTAATTTCTTTAATTTCTAGAAGTATTGTAGAAA
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TCTCTTCTATTTTAGGAGCTATTAATTTTATTACAACAATTATTAATATACG
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 CGATACCTTTTAACAGATCGAAATTTAATACTTCATTTTGTGATCCTGCTGGA
 GGAGGAGATCCTATTTTATATCAACATTATTT

Nystalea collaris Schaus, 1910
 (Figs. 29-38, 384-387)

Redescription: MALE (Figs. 29, 30, 38): FWL 22.9-30.4 mm (n=6). **Head:** Antenna light brown, antennal shaft cream dorsally and light brown ventrally; scape bearing dirty brown long tuft, cream, light-brown, and dark brown scales; frons mostly cream with dark brown intermixed scales; labial palpus cream ventrally, dark brown dorsally; vertex light brown and dark brown; patagium light brown and dark brown. **Thorax:** Tegula cream, a mix of light brown and dark brown scales distally; mesoscutellum dark brown; thoracic pleuron light brown; dorsal area of metathorax light brown with dark brown intermixed scales. **Legs:** Mostly cream and light brown and beige with black scales between segments and margins. **Wings:** Dorsal FW ground color dirty beige with black scales covering veins; claviform spot black, subterminal line formed by cuadrangular black marks, adterminal line black rectangular marks, fringe dirty brown and beige, area between 2A vein and posterior margin has dirty brown scales, dorsal HW translucent white with veins and marginal shade dark brown; fringe light brown. **Abdomen:** Dorsum segments 1 and 2 light brown, other segments dirty brown, venter light brown with a dark brown line in middle.

Male genitalia: Abdominal pelt (Figs. 33, 38B) tergum VIII rectangular, posterior margin sclerotized and mildly irregular, with two translucent areas separated by lightly sclerotized column medially; sternum VIII rectangular, sclerotized, with V-shaped invagination medially, posterior margin heavily sclerotized. Genitalia (Figs. 34, 38B) with valvae wide and membranous basally, ovoid at apex, saccular margin sclerotized, costal margin lightly sclerotized, with costal process rounded and sclerotized, saccular base sclerotized and acute, midvalve sclerotization thin, triangular in distal part, costula ear-shaped basally, irregular margin with a hook-shaped projection distally; uncus process small, slender, tubular and curved, uncus with sclerotized triangular lobes, socii with two tiny setose and sclerotized projections. Aedeagus (Figs. 35, 38B) with membranous vesica, deciduous caltrop-shape cornuti present, callosus wide basally, phallus robust, acute and sclerotized, with tiny lateral projection near distal part, thin in anellar region.

FEMALE: (Figs. 31, 32). FWL 25.6-32.5 mm (n=9). **Head:** Antenna ciliate cream, antennal shaft brown dorsally; scape bearing a long cream tuft, composed of cream and reddish brown scales. **Thorax:** Tegula dark brown at base, a mix of light and white scales distally; mesoscutellum cream with reddish brown intermixed scales. **Wings:** Dorsal FW ground color whitish grey with black dots covering veins in postmedial and medial area; postmedial band reddish brown, subterminal line formed by small rectangular black marks, adterminal line black rectangular marks, terminal line small black marks, fringe alternating black and whitish, dorsal HW translucent yellowish with veins and marginal shade dark brown; fringe yellowish. Ventral FW ground color dark brown, yellowish and dark brown serrated fringe; ventral HW ground color yellowish with veins and marginal shade dark brown, fringe yellowish.

Female genitalia (Figs. 36, 37): Papillae anales membranous, sclerotized and triangular in shape, covered with short, scattered setae with longer, inwardly curved setae, posterior apophyses long and slender, lateral process of postvaginal plate thin, sclerotized, with curved sharp apices, postvaginal plate with small invagination in the middle of posterior margin, ductus bursae sclerotized, corpus bursae globular, with sclerotized shield, signum elongated and thin.

Lectotype, ♂ (Fig. 38 A):

Nystalea collaris Schaus, 1910. Designated by Schintlmeister (2016). Genitalia on slide, July 1958 E.L.T. 848. Genitalia Slide By ELT USNM 43,410. USNMMENT 00991584. Type #16999 USNM. Juan Viñas, Costa Rica. Deposited in USNM.

Additional material examined: 6 ♂♂, 9 ♀♀.

♂♂ (COI Barcoded): 07-SRNP-57838 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Ficus, 375 m, 10.77090 -85.42455, 24 July 2007, José Cortéz (MNCR). 13-SRNP-77080 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Llanura, 135 m, 10.93332 -85.25331, 19 August 2013, Cirilo Umaña (USNM). 06-SRNP-20551 Costa Rica, Prov. Guanacaste,

Sector Del Oro, Quebrada Trigoal, 290 m, 11.02681 -85.49547, 20 February 2006, Elieth Cantillano (USNM). 09-SRNP-56750 (dissected), Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 25 July 2009, Mariano Pereira (USNM). INB0003852811 (dissected), Costa Rica, Prov. Guanacaste, Jabilla, Río Ciego, 50 m, 9.82849 -85.29687, 19 June 2004, B. Gamboa, W. Porras, D. Briceño, M. Moraga, Y. Cárdenas (MNCR). 11-SRNP-76167 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Quebrada Bambú, 109 m, 10.9301 -85.25205, 18 December 2011, Keiner Aragón (USNM). ♀♀ (COI Barcoded): INBIOCRI000281139 (dissected), Costa Rica, Prov. San José, Pérez Zeledón, San Gerardo Rivas, 1300 m, 9.46758 -83.59836, 1 August 1990, R. Zuñiga, G. Mora & M. M. Chavarría (MNCR). 11-SRNP-76166 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Quebrada Bambú, 109 m, 10.9301 -85.25205, 16 December 2011, Keiner Aragón (USNM). 01-SRNP-22671 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 December 2001, Gloria Sihezar (USNM). 08-SRNP-4766 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 September 2008, Elda Araya (USNM). 08-SRNP-4765 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 13 September 2008, Elda Araya (USNM). 08-SRNP-4770 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 13 September 2008, Elda Araya (USNM). 00-SRNP-374 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 27 February 2000, Freddy Quesada (USNM). 07-SRNP-57842 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Ficus, 375 m, 10.77090 -85.42455, 23 July 2007, José Cortéz (USNM). INB0003125573 Costa Rica, Prov. Puntarenas, Golfito, Pque Nal Piedras Blancas, Estación El Bonito, 100 m, 8.68065 -83.22732, 1 January 2001, M. Moraga (MNCR). INB0004204341 Costa Rica, Prov. Puntarenas, Buenos Aires, Alto Jalisco, 900-1000 m, 8.99583 -83.45555, 26 February 2009, E. Ulate, J. A. Azofeifa, M. Moraga (MNCR).

Diagnosis: Male genitalia of *N. collaris* are almost identical to those of *N. sylvieduranae*, but those of *N. collaris* are slightly smaller. This is evident in the size of the uncus, socii and costula (Fig. 34).

Distribution: In Costa Rica, *N. collaris* has been collected in rain forest on both slopes of Cordillera Volcánica de Guanacaste, the west slope of Cordillera de Talamanca and on the Osa Peninsula. The elevational range for the species is 100-1300 m.

Natural history: (Figs. 384-387) 20 rearing records: ACG locations: Sector Del Oro (n=1), Sector Mundo Nuevo (n=9), Sector Rincón Rain Forest (n=3), Sector San Cristóbal (n=7).

Food plants: Myrtaceae: *Eugenia acapulcensis* (n=1), *Psidium guajava* (introduced) (n=19).

Remarks: BIN BOLD:ACF5441 (Fig. 490).

Genbank Accession JQ541934.

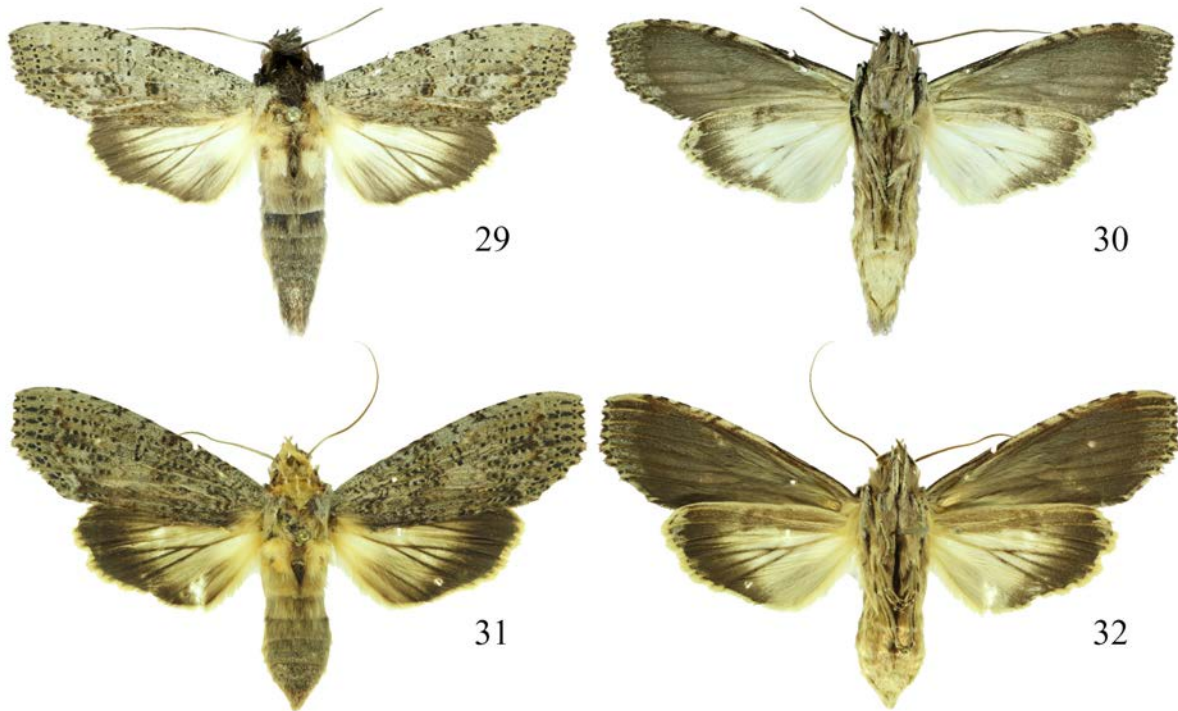
DNA barcode of male 06-SRNP-20551

MHMXA676-06 |06-SRNP-20551|(Nystalea collaris)|COI-5P

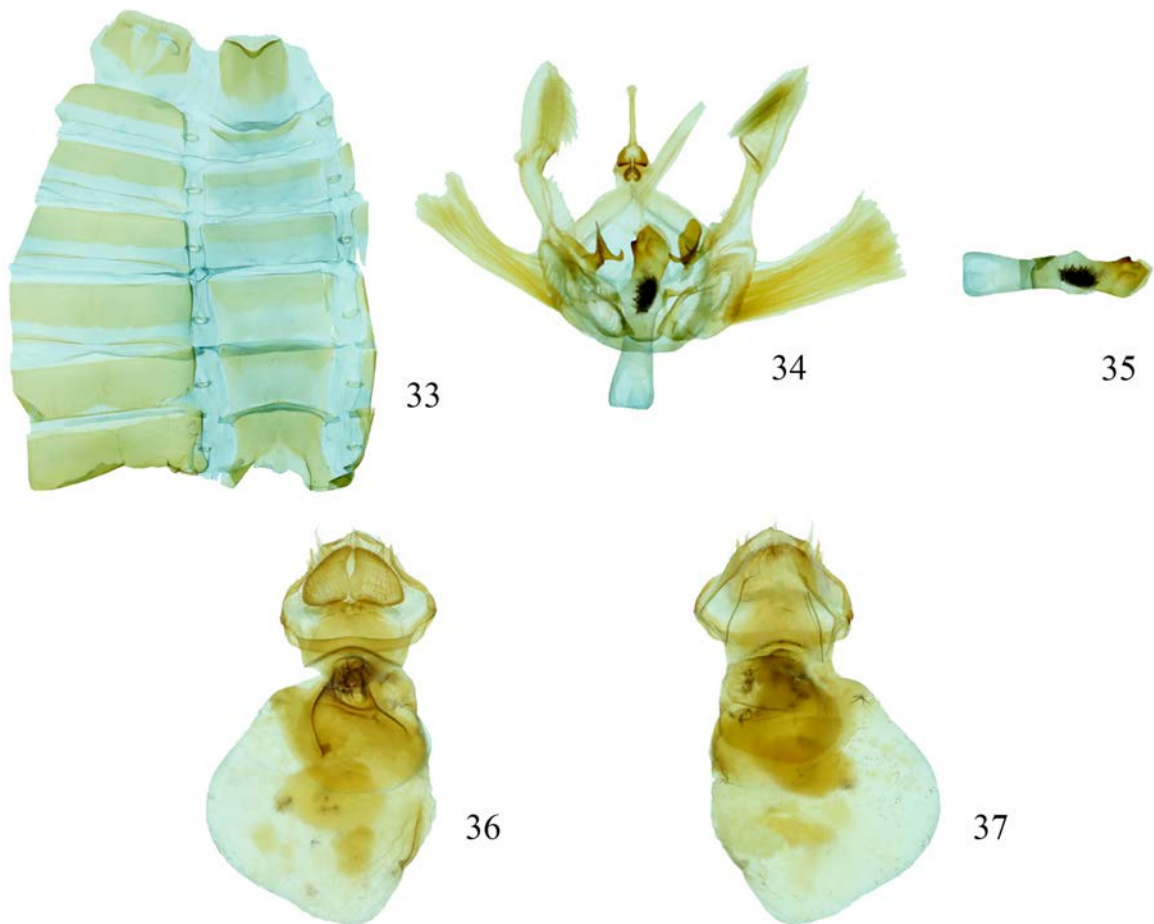
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 ATTACAGCATTATTTATTACTTTTTCATACCAGCTTAGCAGGAGCAATTA
 CAATACCTTTTAACAGATCGAAATTTAATACTTCATTTTGTGATCCTGCTGG
 AGGAGGAGATCCTATTTTATATCAACATTATTT

Nystalea gustavoinduni Chacón, new species
 (Figs. 39-47, 372-377)

Description: MALE (Figs. 39, 40): FWL 22.1-31.6 mm (n=13). **Head:**



Figures 29-32. *Nystalea collaris*: 29, 30. ♂ dorsal and ventral (07-SRNP-57838) FWL 22.0 mm; 31, 32. ♀ dorsal and ventral (08-SRNP-4766) FWL 24.6 mm.



Figures 33-37. *Nystalea collaris*: 33 ♂ sternum VIII 3.4 mm length, 34. ♂ genitalia 5.8 mm length, 35. phallus 3.6 mm length (09-SRNP-56750); 36, 37. ♀ genitalia 6.8 mm length (INBIOCRI000281139).



Figure 38A. *Nystalea nysaeus collaris* Schaus, 1910. ♂ adult lectotype from Schintlmeister (2016).



Figure 38B. *Nystalea nysaeus collaris* Schaus, 1910. ♂ genitalia lectotype from Schintlmeister (2016).

Antenna light brown, antennal shaft cream dorsally light brown ventrally; scape bearing a long dark brown tuft, composed of cream and light brown scales; frons mostly cream with dark brown intermixed scales; labial palpus cream ventrally, dark brown dorsally; vertex light brown and dark brown; patagium light brown and reddish brown. **Thorax:** Tegula whitish grey with a mixture of reddish-brown and light brown scales distally; mesoscutellum reddish brown, light brown and whitish grey; dorsal area of metathorax light brown with whitish grey intermixed scales; thoracic pleuron light brown. **Legs:** Mostly cream and reddish brown with black scales between segments. **Wings:** Dorsal FW ground color whitish grey with black dots covering veins; claviform spot black, postmedial line reddish brown; subterminal line formed by rectangular black marks, adterminal line as black marks, terminal line black, fringe beige, area between vein 2A and posterior margin has reddish brown scales, dorsal HW translucent yellowish with veins and marginal shade dark brown; fringe yellowish. Ventral FW ground color dark brown with reddish brown scales; ventral HW ground color yellowish with veins and marginal shade dirty brown. **Abdomen:** Abdominal dorsum dirty brown with reddish brown intermixed scales, venter light brown.

Male genitalia: Abdominal pelt (Fig. 43) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, with two translucent rectangular areas wide in posterior margin, narrow and sharp in anterior margin, separated by a narrow column sclerotized, sternum VIII rectangular, sclerotized, with V-shaped invagination medially. Genitalia (Fig. 44) with valvae wide and membranous basally, ovoid at apex, saccular margin sclerotized, costal margin smooth and sclerotized, costal process sclerotized with notch in middle, midvalve sclerotization thin inverted L shape, costula with rounded and elongated base, distal part tubular and thin; uncal process thin, tubular, and curved, uncus with two sclerotized, setose triangular lobes, socii with two tiny, setose and sclerotized lobes. Aedeagus (Fig. 45) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally, phallus robust, acute and sclerotized with small, sclerotized, acute lateral projection near distal part, thin in anellar region.

FEMALE: Similar to male but larger (Figs. 41, 42). FWL 25.2-33.7 mm (n=7).

Female genitalia (Figs. 46, 47): Papillae anales membranous, sclerotized and triangular in shape, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, sclerotized, with curved sharp apices, postvaginal plate with uniform, straight posterior margin, anterior

apophyses short and sclerotized, posterior apophyses long; ductus bursae sclerotized, corpus bursae globular, with sclerotized shield; signum spearhead-shaped.

Etymology. *Nystalea gustavoinduni* is named in honor of Sr. Gustavo Induni Alfaro of the research division of SINAC, the Sistema Nacional de Areas de Conservación, Ministerio de Ambiente y Energía, in recognition of his years of dedication to fostering the inclusion of science in Costa Rica's national park management system.

Type material. 13 ♂♂, 7 ♀♀.

HOLOTYPE, ♂: 03-SRNP-27173 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 2 December 2003. Freddy Quesada (MNCR).

PARATYPES: 12 ♂♂, 7 ♀♀.

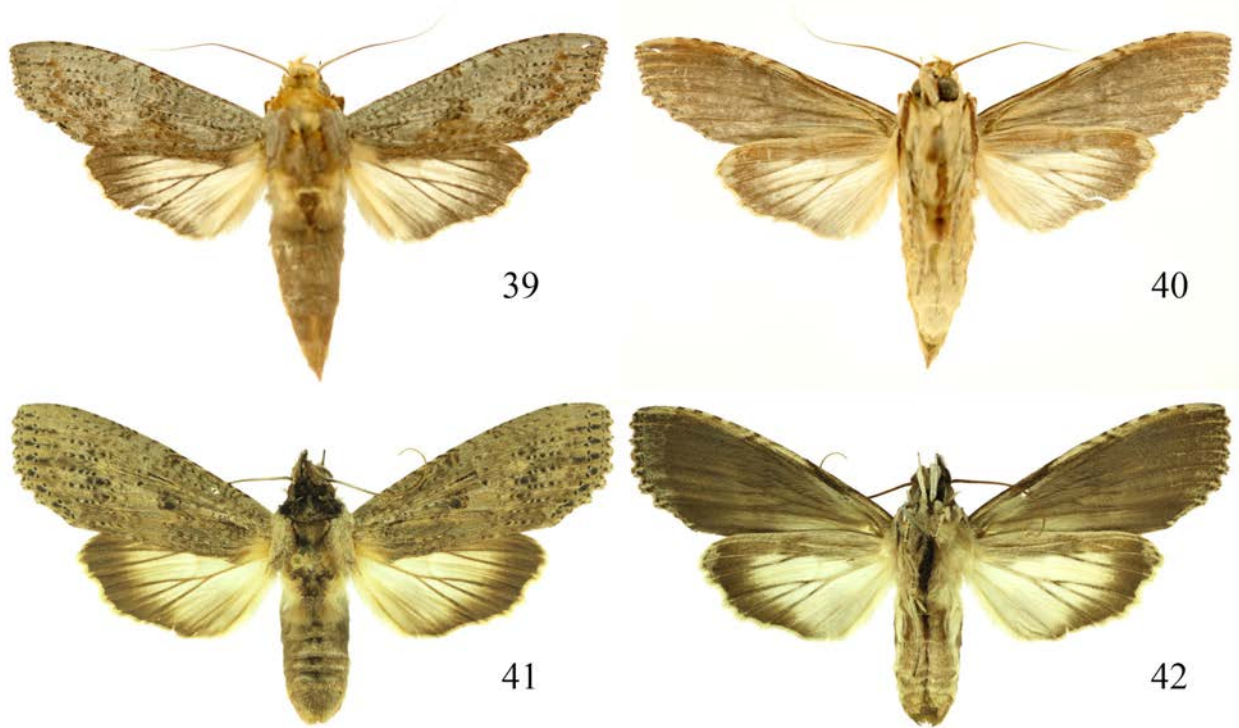
♂♂ (**COI Barcoded**): 11-SRNP-65446 Costa Rica, Prov. Alajuela, Brasilia, Morales, 440 m, 10.96952 -85.38258, 21 July 2011, Duvalier Briceno (USNM). 08-SRNP-106388 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Botarrama, Manta Portón, 147 m, 10.96048 -85.28237, 27 August 2008, F. Quesada (MNCR). 08-SRNP-106389 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Botarrama, Manta Portón, 147 m, 10.96048 -85.28237, 27 September 2008, F. Quesada (MNCR). INB0004210358 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.20136 -84.48510, 25 April 2009, R. Rojas (MNCR). INB0004160965 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.20136 -84.48510, 10 August 2008, R. Rojas (MNCR). INBIOCRI001985280 Costa Rica, Prov. Alajuela, Caño Negro, Playuelas, 20 m, 10.95534 -84.74959, 1 September 1993, K. Martínez (MNCR). 12-SRNP-103861 Costa Rica, Prov. Guanacaste, Sector Santa María, Mirador Santa María, 920 m, 10.76631 -85.30099, 20 June 2012, S. Ríos & R. Franco (USNM). 01-SRNP-18116 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Vado Río Calera, 10 m, 10.80274 -85.67423, 10 November 2001, Ruth Franco (USNM). 03-SRNP-27079 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 21 November 2003, Freddy Quesada (USNM). INBIOCRI001374726 (dissected), Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 80 m, 9.38772 -84.13280, 1 May 1991, G. Varela (MNCR). INB0004137799 Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Centro Operativo, 3 m, 8.739863 -83.293143, 7 March 2008, J. A. Azofeifa (MNCR). INB0004202528 Costa Rica, Prov. Puntarenas, Buenos Aires, Térraba. 300-400 m, 9.08144 -83.30037, 25 February 2009, Personal Gira Diquís (MNCR). ♀♀ (**COI Barcoded**): 08-SRNP-40424 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Laureles, 95 m, 10.93319 -85.25335, 3 March 2008, José Pérez (USNM). 03-SRNP-27178 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 1 December 2003, Guillermo Pereira (USNM). 03-SRNP-27404 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Trino Dávila, 7 m, 10.78891 -85.66257, 11 December 2003, Guillermo Pereira (USNM). 00-SRNP-6001 Costa Rica, Prov. Guanacaste, Puerto Soley, Playa Papaturo, 10 m, 22 January 2000, Guillermo Pereira (USNM). INBIOCRI001727295 (dissected), Costa Rica, Prov. Puntarenas, Est. Q. Bonita, R. B. Carara, 9.76745 -84.608119, 50 m, 1 December 1993, R. Guzmán (MNCR). INBIOCRI001678705 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, 9.77423 -84.60812, 50 m, 12 March 1994, J. Corrales (MNCR).

Diagnosis: Male genitalia with costula rounded and elongated basally, distal part tubular and thin (Fig. 44). The shape of the costula of this species is characteristic and different from the other species of the *Collaris* complex.

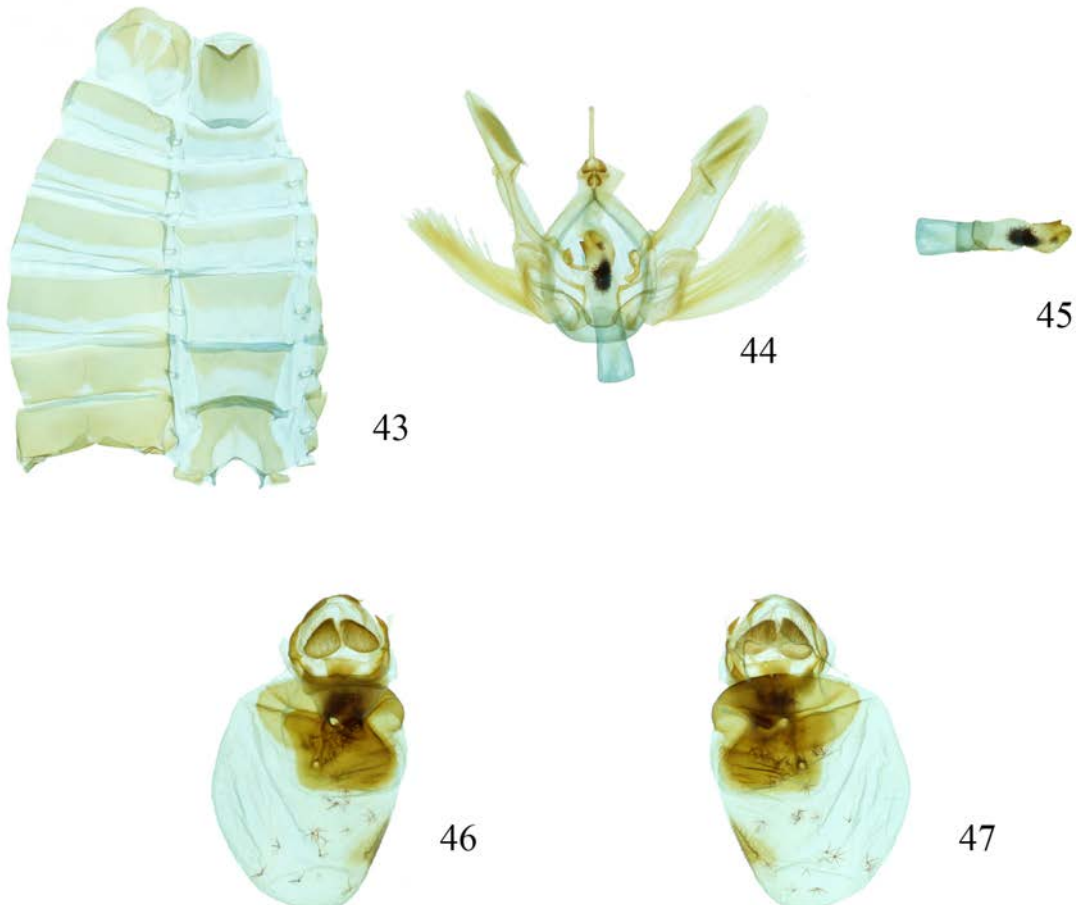
Distribution: In Costa Rica *N. gustavoinduni* has been collected in dry forest and rain forest on both slopes of the Cordillera Volcánica de Guanacaste, Cordillera Volcánica Central, Llanuras de los Guatuso, Pacific lowlands, and the Osa Peninsula. The elevational range for the species is 2-1115 m.

Natural history: (Figs. 372-377) 14 rearing records: ACG locations: Sector Brasilia (n=1), Sector Puerto Soley (n=1), Sector Rincón Rain Forest (n=1), Sector Santa Rosa (n=11).

Food plants: Combretaceae: *Conocarpus erectus* (n=10), *Laguncularia racemosa* (L.) C.F. Gaertn. (n=12), Vochysiaceae: *Vochysia guatemalensis* (n=1).



Figures 39-42. *Nystalea gustavoinduni*: 39, 40. ♂ dorsal and ventral (INB0004160965) FWL 27.3 mm; 41, 42. ♀ dorsal and ventral (00-SRNP-6001) FWL 30.1 mm.



Figures 43-47. *Nystalea gustavoinduni*: 43. ♂ sternum VIII 3.5 mm length, 44. ♂ genitalia 6.7 mm length, 45. phallus 3.9 mm length (INBIOCRI001374726); 46, 47. ♀ genitalia 9 mm length (INBIOCRI001727295).

Remarks: BIN BOLD:ACE6799 (Fig. 490).

Genbank Accession: GU160104

DNA barcode of male holotype 03-SRNP-27173

MHANC581-06 |03-SRNP-27173|(Nystalea gustavoindumi)|COI-5P

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ATTAAATGGTATATCTTTTGTATCAAATACCTTTATTGTATGAGCTGTGGA
ATTACAGCATTTTTATTATTACTTTTATTACCAGTTTATAGCAGGAGCAATTA
CAATACCTTTTAAACAGATCGAAATTTAAATACCTTCAATTTTGTATCCTGCTGG
AGGAGGTGATCCTATTTTATATCAACATTTATTT

Nystalea anamariamongee Chacón, new species

(Figs. 48-56)

Description: MALE (Figs. 48, 49): FWL 21.7-23.2 mm (n=2). **Head:** Antenna light brown, antennal shaft cream dorsally and light brown ventrally; scape bearing a long dark brown tuft, composed of cream and light brown scales; frons mostly cream with dark brown intermixed scales; labial palpus cream ventrally, dark brown dorsally; vertex light brown and dark brown; patagium dark brown. **Thorax:** Tegula whitish grey, a mix of light brown and dark brown scales distally; mesoscutellum dark brown; dorsal surface of metathorax with light brown and dark brown intermixed scales; thoracic pleuron light brown. **Legs:** Mostly cream and light brown with beige and black scales between segments. **Wings:** Dorsal FW ground color whitish grey with black dots covering veins; claviform spot black, subterminal line formed by rectangular black marks, adterminal line black marks, terminal line black, fringe black and whitish, dorsal HW translucent yellowish with veins and marginal shade dark brown; fringe yellowish. Ventral FW dark brown ground color, a whitish grey band from the subterminal area to the terminal; ventral HW ground color yellowish, veins and marginal shade dark brown (Figs. 48, 49). **Abdomen:** Dorsum dirty brown, venter light brown with a dark brown line in middle.

Male genitalia: Abdominal pelt (Fig. 52) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas separated by a sclerotized column in the middle; sternum VIII rectangular sclerotized, posterior margin with V-shaped invagination medially. Genitalia (Fig. 53) with valvae wide and membranous basally, oval at apex, saccular margin sclerotized, costal margin smooth and sclerotized, costal process sclerotized, with rounded notch in middle, midvalve sclerotization thin, costula wide at base, thin and elongated with finger-shaped distally; uncus process small, thin, tubular, and curved, uncus with sclerotized and setose lobes, socii with two tiny, setose and sclerotized lobes. Aedeagus (Fig. 54) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally, phallus robust, large, rounded and sclerotized, with serrated and sclerotized lateral projection near distal part, thin in anellar region.

FEMALE: Similar to male but larger (Figs. 50, 51). FWL 25.7 mm (n=1).

Female genitalia (Figs. 55, 56): Papillae anales membranous, sclerotized with triangular shaped, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, sclerotized with curved sharp apices, postvaginal plate emarginate, anterior apophyses short and sclerotized, posterior apophyses long and slender; ductus bursae sclerotized, corpus bursae globular, wrinkled surface, sclerotized shield present, signum elongated.

Etymology: *Nystalea anamariamongee* is named in honor of Sra. Ana María Monge Ortiz in recognition of her dedicated interface activities between SINAC of MINAE of Costa Rica and the public, both national and international.

Type material: 2 ♂♂, 1 ♀

HOLOTYPE, ♂: 03-SRNP-27174 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 30 November 2003, Freddy Quesada (MNCR).

PARATYPES: 1 ♂, 1 ♀.

♂ **COI Barcoded:** 03-SRNP-27076 (dissected), Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 25 November 2003, Guillermo Pereira (USNM).

♀ **COI Barcoded:** 03-SRNP-27175 (dissected), Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Estero Naranjo, 2 m, 10.80426 -85.68285, 4 December 2003, Guillermo Pereira (USNM).

Diagnosis: Male genitalia with costula thin and elongated with finger-shaped flattened distally. Phallus with serrated and sclerotized lateral projection near distal part (Fig. 53, 54). The shape of the costula and the serrated lateral projection of the phallus are not present in the other species of the Collaris complex.

Distribution: In Costa Rica *N. anamariamongee* has been collected only in Pacific coastal mangroves of the edge of ACG dry forest at 0-2 m elevation.

Natural history: Three rearing records: ACG locations: Sector Santa Rosa (n=3).

Food plants: Combretaceae: *Conocarpus erectus* (n=1), *Laguncularia racemosa* (n=2).

Remarks: BIN BOLD:ACE6799 (Fig. 490).

In (Fig. 490) only *N. gustavoindumi* appears in BIN BOLD:ACE6799, because the BOLD algorithm does not create an NJ BIN tree (as opposed to a NJ tree for all specimens) with more than one representative species name in the BIN. However, BIN BOLD:ACE6799 does indeed contain both *N. gustavoindumi* and *N. anamariamongee*, a case that is occasional throughout Costa Rican barcoded genera, subfamilies and families of Lepidoptera, as well as in Diptera and Hymenoptera. As a specific example, five of the originally cryptic sister species to *Astraptus "fulgerator"* (Hesperiidae) (Hebert *et al.*, 2004) group in the same BIN BOLD:AAA1584, but in distinct clusters and different ecologies within that BIN, because they differ by less than about 2% in their DNA COI barcodes. This pair of sibling *Nystalea* is the only known case of cohabiting a BIN in this genus within Costa Rica.

Genbank Accession: GU33402

DNA barcode of male paratype 03-SRNP-27076

MHANA501-05 |03-SRNP-27076|(Nystalea anamariamongee)|COI-5P

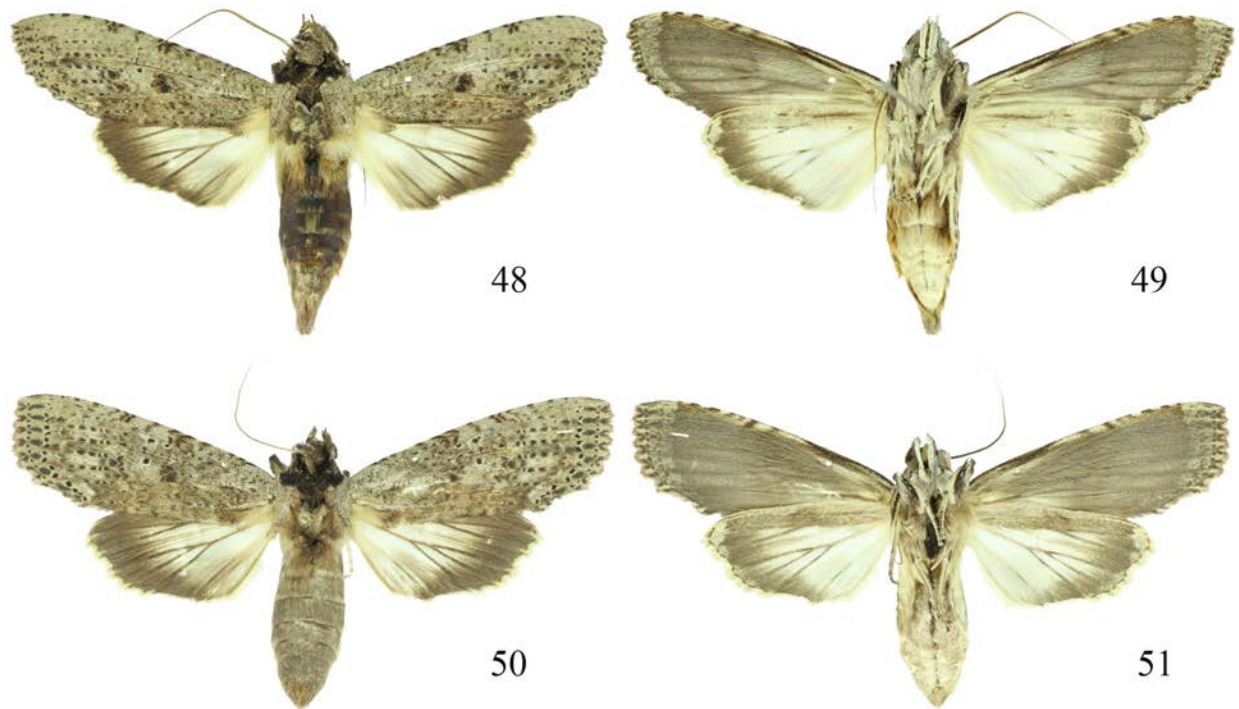
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TTTATAGTTATACCTATCATAATTGGAGGATTTGGTAATTGATTAATTCCTT
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CTGATTATTACCCCTTCTTTAATTTCTTTAATTTCTAGAAGCATTGTAGAA
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GAATTACAGCATTTTTATTATTACTTTTATTACCAGTTTATAGCAGGAGCAAT
TACAATACTTTTAAACAGATCGAAATTTAAATACCTTCAATTTTGTATCCTGCT
GGAGGAGGAGATCCTATTTTATATCAACATTTATTT

Adults of the members of the Marmorea complex, *N. roxanamadrigalae*, *N. aurachaconae*, and *N. mailyngonzalezae*, are morphologically similar.

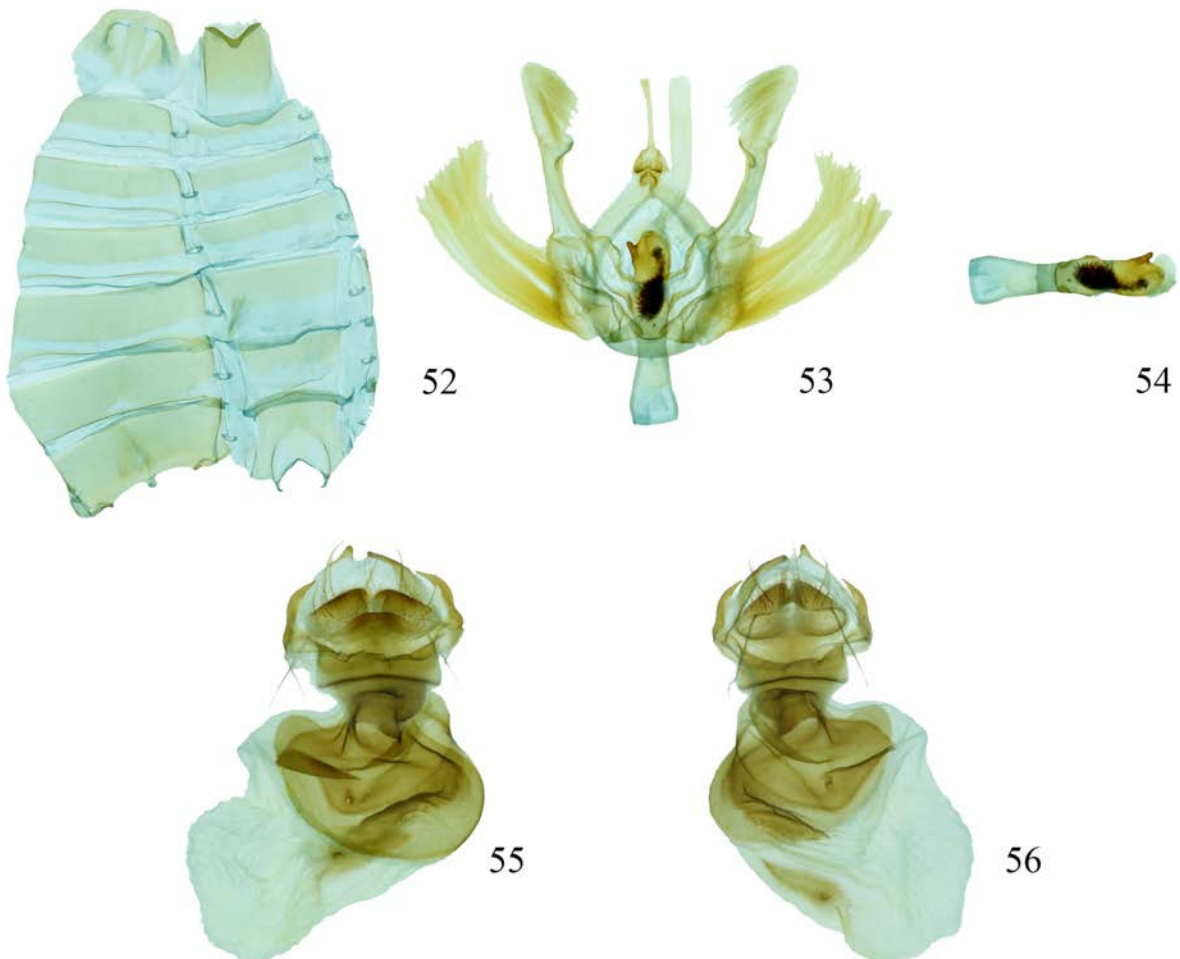
Nystalea roxanamadrigalae Chacón, new species

(Figs. 57-65)

Description: MALE (Figs. 57, 58): FWL 24.9-30.9 mm (n=6). **Head:** Antennal shaft cream dorsally reddish-brown ventrally; scape bearing a long cream and beige tuft; frons cream; labial palpus cream ventrally, brown dorsally; vertex cream; patagium cream and dark brown. **Thorax:** Tegula black, a mix of light brown and dark brown scales distally; mesoscutellum black, a mix of cream light brown and dark brown scales; thoracic pleuron cream; dorsal area of metathorax black with light brown and cream scales intermixed. **Legs:** Mostly cream, dark brown and beige, with white and black scales between segments. **Wings:** Dorsal FW ground color dirty brown with black and white scales covering veins; a dirty white macula between apex and postmedial line; basal dash black; reniform spot white, horseshoe-shaped subreniform spot yellowish bordered with black scales, subterminal line black with dirty beige scales;



Figures 48-51. *Nystalea anamariamongae*: 48, 49. ♂ dorsal and ventral (03-SRNP-27174) FWL 23.26 mm; 50, 51. ♀ dorsal and ventral (03-SRNP-27175) FWL 25.7 mm.



Figures 52-56. *Nystalea anamariamongae*: 52. ♂ sternum VIII 3.6 mm length, 53. ♂ genitalia 6.1 mm length, 54. phallus 4 mm length (03-SRNP-27076); 55, 56. ♀ genitalia 6.6 mm length (03-SRNP-27175).

terminal line black, fringe dirty brown and dirty beige, area between vein 2A and posterior margin with dirty light and brown scales; tornus with a dirty beige macula; dorsal HW translucent white; with veins and marginal shade dirty brown; fringe light brown and whitish. Ventral FW dark brown ground color, a whitish grey band from the subterminal area to the terminal area; ventral HW ground color whitish, terminal line dark brown, fringe whitish (Figs. 57, 58).

Abdomen: Dorsum dirty brown; venter cream.

Male genitalia: Abdominal pelt (Fig. 61) with tergum VIII rectangular, posterior margin simple, sclerotized, with a translucent U-shaped area in the middle; sternum VIII rectangular, posterior margin with two sclerotized cuspids, with a deep sclerotized invagination medially. Genitalia (Fig. 62) with valvae wide and membranous basally, thin and oval-shaped at apex, sacculus margin sclerotized, costal margin smooth and sclerotized, midvalve sclerotization thin, setose; costula wide at base, thin, tubular, elongated distally, cornet-shaped with a narrow and tiny bell; this costula is smaller than in *N. aurachaconae*; uncus with tiny, sclerotized setose lobes, uncal process small, thin and tubular, socii larger than uncus, with two membranous and setose lobes; aedeagus (Fig. 63) with membranous vesica, deciduous cornuti present, callosum wide and rounded at base, thin in anellar region, proximal part of phallus thin, distal portion elongate and rounded, with a heavily sclerotized and acute lateral projection.

FEMALE: Similar to male but larger (Figs. 59, 60). FWL 24.5-33.7 mm (n=4).

Female genitalia (Figs. 64, 65): Papillae anales membranous, covered with short, scattered setae with longer, inwardly curved setae; anterior apophyses short and thin, posterior apophyses long and slender; lateral process of postvaginal plate sclerotized, short, with acute apices, postvaginal plate slightly emarginate posterior margin; ductus bursae tubular, narrow and sclerotized; corpus bursae globular, surface smooth, with a sclerotized shield; signum small, Y-shaped.

Etymology: *Nystalea roxanamadrigalae* is named in honor of Roxana Madrigal in recognition for dedicating most of her life to the care, organization and maintenance of Isidro Chacón. Without her support and patience, few of these discoveries would have been made.

Type material: 6 ♂♂, 4 ♀♀.

HOLOTYPE, ♂: INBIOCRI000628703 (COI Barcoded), Costa Rica, Prov. Puntarenas, Fca. Cafrosa, Est. Las Mellizas, P. N. Amistad, 1300 m, 8.891473 -82.792936, 1 June 1990, M. Ramírez & G. Mora (MNCR).

PARATYPES: 5 ♂♂, 4 ♀♀.

♂♂ **COI Barcoded:** INBIOCRI000163489 (dissected), Costa Rica, Prov. Puntarenas, Fca. Cafrosa, Est. Las Mellizas, P. N. Amistad, 1300 m, 8.891473 -82.792936, 1 March 1990, M. Ramírez & G. Mora (MNCR). INBIOCRI001885701 Costa Rica, Prov. Cartago, Quebrada Segunda, P. N. Tapantí, A. C. Amistad, 1150 m, 9.762583 -83.788328, 1 July 1994, G. Mora (MNCR). INBIOCRI002012719 Costa Rica, Prov. Puntarenas, Buenos Aires, PILA, Sector Altamira, A. C. Amistad, 1150-1400 m, 9.032987 -83.010887, 1 May 1994, R. Delgado (MNCR). INBIOCRI002447167 Costa Rica, Prov. Puntarenas, Finca Cafrosa, Embalse, 800 m. NO. de Tigra, 1280 m, 8.906843 -82.79199, 15 July 1996, L. Angulo (MNCR). INBIOCRI001619538 Costa Rica, Prov. Puntarenas, Est. Altamira, Buenos Aires, 1340 m, 9.032987 -83.010887, 14 October 1993, R. Delgado (MNCR).

♀♀ **(COI Barcoded):** INBIOCRI000809703 (dissected), Costa Rica, Prov. Cartago, Turrialba, Chirripó, Grano de Oro, 1120 m, 9.818357 -83.459163, 1 October 1992, P. Campos (MNCR). INB0003169860 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de la Muerte, 1300 m. 9.775254 -83.795598, 12 November 1999, J. Corrales (MNCR). INB0004046540 Costa Rica, Prov. Puntarenas, P.I. La Amistad, Est. Altamira, 1300-1400 m, 9.033891 -83.01088, 1 July 2006, R. Delgado (MNCR). INB0003052619 Costa Rica, Prov. Puntarenas, Estación Altamira, 1 Km. S del Cerro Biolley, 1300 -1450 m, 9.032987 -83.010887, 10 August 1998, R. Villalobos (MNCR).

Diagnosis: Male genitalia with phallus in the proximal part thin, elongate and rounded distally, with heavily sclerotized and acute lateral projection. This projection is the sharpest and longest of all the species that make up the Marmorea complex (Fig. 63).

Distribution: *Nystalea roxanamadrigalae* has been collected in rain forest and cloud forest, on both slopes of the Cordillera de Talamanca. The elevational range for the species is 1150-1400 m.

Natural history: All specimens have been collected with light traps; the life history of *N. roxanamadrigalae* is unknown.

Remarks: BIN BOLD: AAY8192 (Fig. 490).

Genbank Accession: MT358268

DNA barcode of male holotype INBIOCRI000628703

ASARD10351-14|INBIOCRI000628703|(Nystalea roxanamadrigalae)|COI-5P

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AACATTATATTTTATTTTGGAAATTTGAGCAGGAATAATTGGAACCTCTTTA
AGTTTATTAATTCGAGCAGAATTAGGAAATCCTGGATCTTTAATTGGAGATG
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TATAGTTATACCTATTATAAATGGAGGATTTGGTAATTGATTAATTCCTTTA
ATATTAGGAGCCCTGATATAGCTTTCCCCCGAATAAATAAATAAGTTTTT
GATTATTACCCCTCTTTAATCCTTTTAAATTTCAAGAAGTATTGTAGAAAA
TGGAGCTGGAACCTGGATGAACAGTATATCCCCACTGTCTAATATTGCC
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TTTCTTCAATCTTAGGAGCTATTAATTTTACTACAATTATTAATATACG
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ATTACAGATTCTTACTTCTACTTTCTTTACCCGTTTTAGCTGGAGCAATTA
CAATACTTTTACAGATCGAAATCTTAATACTTCAATTTTTGACCCCTGCTGG
AGGAGGAGATCCTATTTTATATCAACATTTATTT
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Nystalea aurachaconae Chacón, new species

(Figs. 66-74)

Description: **MALE** (Figs. 66, 67): FWL 25.6 mm (n=1). **Head:** Antennal shaft cream dorsally and reddish brown ventrally; scape bearing a long beige tuft, composed of cream and light brown scales; frons mostly cream with light brown intermixed scales; labial palpus cream ventrally, brown dorsally; vertex dirty cream; patagium cream and dark brown. **Thorax:** Tegula light brown, a mix of dirty, dark brown and cream scales distally; mesoscutellum dirty light brown with dark brown and cream intermixed scales; dorsal area of metathorax dark brown with dirty brown and light brown intermixed scales; thoracic pleuron cream. **Legs:** Mostly cream, dark brown and beige, with white and black scales between segments. **Wings:** Dorsal FW ground color dirty brown with black scales covering the veins; dirty white macula present between the apex and the postmedial line, basal dash black, reniform spot white with black border, subterminal line black with dirty beige scales, terminal line black, fringe dirty brown and dirty beige, dirty beige macula in tornus, dorsal HW translucent white with veins and marginal shade dirty brown; fringe whitish (Figs. 66, 67). **Abdomen:** Dorsum dirty brown, venter cream.

Male genitalia: Abdominal pelt (Fig. 70) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, a translucent U-shaped area in the middle, antecostal apodeme robust and acute; sternum VIII rectangular, posterior margin with two sclerotized cuspids, with a narrow and short invagination medially. Genitalia (Fig. 71) with valvae wide and membranous basally, thin and oval at apex, sacculus margin sclerotized, costal margin smooth and sclerotized, midvalve sclerotization thin with setae, costula wide at base, thin, tubular, elongated distally, looks like a small cornet with wide bell, this costula is bigger than in *N. roxanamadrigalae*; uncal process small, thin and tubular, uncus with sclerotized, setose, tiny lobes, socii larger than uncus with two oval, membranous and setose lobes. Aedeagus (Fig. 72) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide and rounded at base, thin in anellar region, proximal part of phallus thin, rounded and robust distally, with thin, sclerotized, rounded and laminate lateral projection.

FEMALE: Similar to male but larger (Figs. 68, 69). FWL 26.9-28.3 mm (n=2), dorsal FW with reniform spot white and macula in tornus white, HW translucent dirty brown, with veins dirty brown; fringe dirty brown.

Female genitalia (Fig 73, 74): Papillae anales triangular, membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate short, sclerotized, with acute apices, postvaginal plate straight posterior margin, anterior apophyses short, sclerotized and slightly curved, posterior apophyses long and slender; ductus bursae tubular, wide and sclerotized, corpus bursae globular, surface smooth, with sclerotized shield, triangular signum.

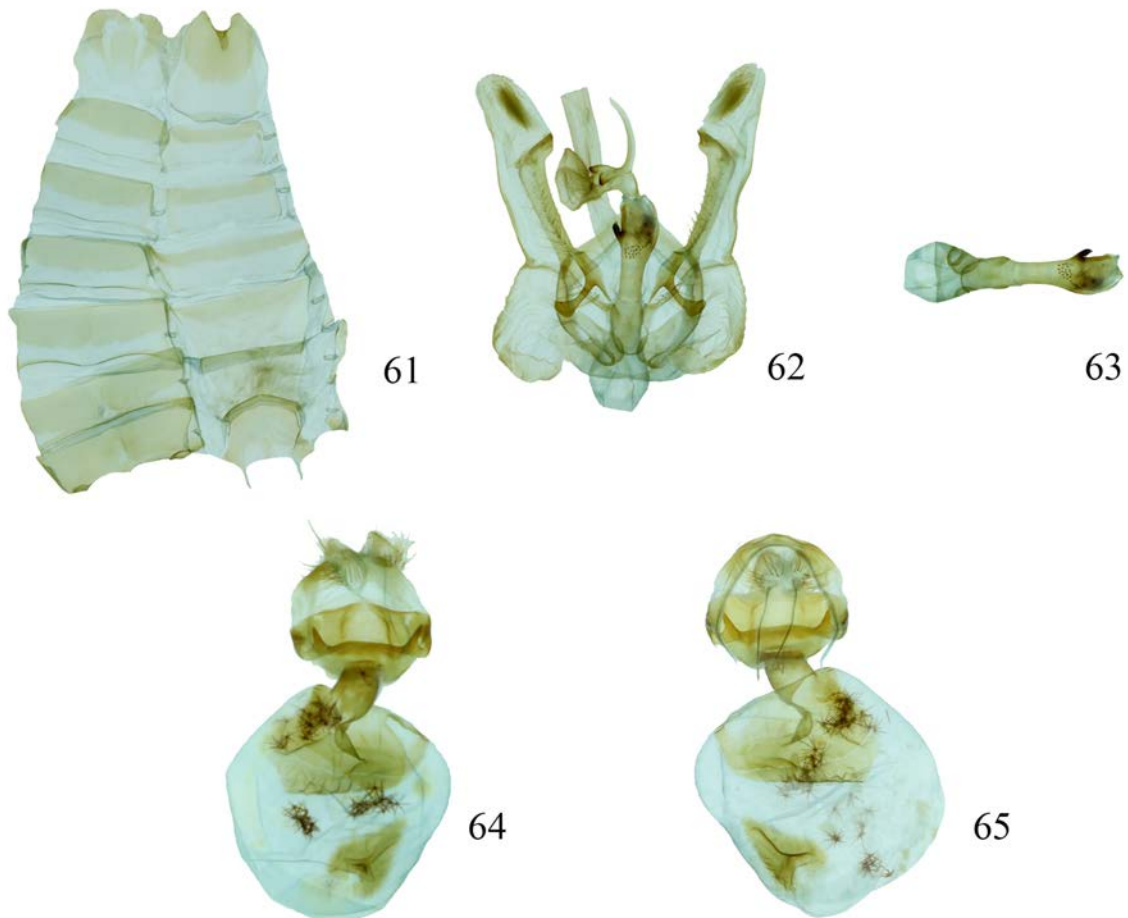
Etymology: *Nystalea aurachaconae* is named in honor of Aura Chacón Madrigal for her dedication and commitment to women heads-of-household in extreme poverty.

Type material: 1 ♂ 2 ♀♀.

HOLOTYPE, ♂: **COI Barcoded:** INB0003008821 (dissected), Costa Rica,



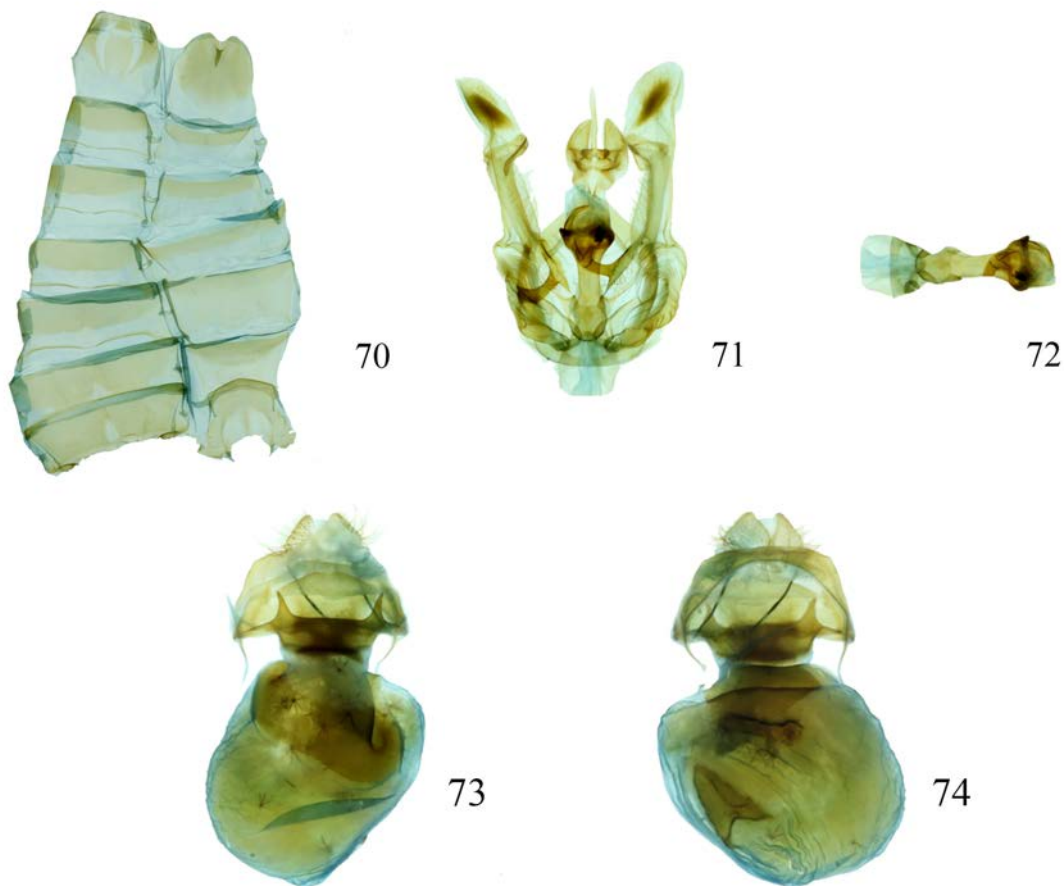
Figures 57-60. *Nystalea roxanamadrigalae*: 57, 58. ♂ dorsal and ventral (INBIOCRI002012719) FWL 25.0 mm; 59, 60. ♀ dorsal and ventral (INB0003052619) FWL 25.8 mm.



Figures 61-65. *Nystalea roxanamadrigalae*: 61. ♂ sternum VIII 5 mm length, 62. ♂ genitalia 7.7 mm length, 63. phallus 4.9 mm length (INBIOCRI000163489); 64, 65. ♀ genitalia 7.4 mm length (INBIOCRI000809703).



Figures 66-69. *Nystalea aurachaconae*: 66, 67. ♂ dorsal and ventral (INB0003008821) FWL 25.6 mm; 68, 69. ♀ dorsal and ventral (INBIOCRI000954789) FWL 27.2 mm.



Figures 70-74. *Nystalea aurachaconae*: 70. ♂ sternum VIII 4.9 mm length, 71. ♂ genitalia 7.9 mm length, 72. phallus 5.1 mm length (INB0003008821); 73, 74. ♀ genitalia 7 mm length (INBIOCRI000954789).

Prov. Cartago, Moravia de Chirripó, 1000 m. 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR).

PARATYPES: 2 ♀♀.

♀♀ **COI Barcoded:** INBIOCRI000954789 Costa Rica, Prov. Cartago, Turrialba, Chirripó, Grano de Oro, 1120 m, 9.818357 -83.459163, 1 September 1992, P. Campos (MNCR). INB0003527491 (dissected), Costa Rica, Prov. Cartago, P.N. Tapantí - Macizo de La Muerte, Quebrada Segunda, 1300 m, 9.76258 -83.786505, 1 August 2002, R. Delgado (MNCR).

Diagnosis: Male genitalia with costula wide at base, thin, tubular, elongated distally, looks like a small cornet with a wide bell. This costula is larger than in *N. roxanamadrigalae* (Fig. 71).

Distribution: *Nystalea aurachaconae* has been collected on the Caribbean slope of the Cordillera de Talamanca. The elevational range for the species is 1000-1300 m elevation.

Natural history: All specimens have been collected with light traps; the life history of *N. aurachaconae* is unknown.

Remarks: BIN BOLD:ACL3563 (Fig. 490).

Genbank Accession: MT358269

DNA Barcode of female paratype INBIOCRI000954789

ASARD10644-14|INBIOCRI000954789|(Nystalea aurachaconae)|COI-5P
AACATTACTTCATTTTTGGAATTTGAGCAGGAATAATTGGAACCTCTTTA
AGTTTATAAATTCGAGCAGAAATTAGGAAATCCTGGATCTTTAATTGGAGATG
ATCAAATTTATAATACTATTGTAAACAGCTCATGCTTTTTATTATAATTTTTTT
TATAGTTATACCTATTATAAATTTGGAGGATTTGGTAATTGATTAATTCCTTTA
ATATTAGGAGCTCCTGATATAGCTTTCCCCGAATAAACAATATAAGTTTTT
GATTATTACCCCATCTTTAATCCTTTAATTTCAAGAAGTATTGTAGAAAA
TGGAGCTGGAACCTGGATGAACAGTATATCCCCACTGTCATCCAATATTGCC
CATAGAGGAAGATCTGTAGATTTAGCTATTTTTTCCCTTCATTAGCTGGAA
TTTCTTCAATTTTAGGAGCTATTAATTTCAATACCACAATTATTAATATACG
ACTTAATAATATGTCTTTTGGATCAAATACCTTATTTGTGTGAGCAGTTGGA
ATTACAGCATTTTTACTTTTACTTTCTTTACCTGTTTTAGCTGGAGCAATTA
CAATACTTTTAAACAGATCGAAATCTTAATACATCATCTTTGACCCGTGCTGG
AGGGGGAGATCCTATTTTATATCAACATTTATTT

Nystalea mailyngonzalezae Chacón, new species

(Figs. 75-83)

Description: **MALE** (Figs. 75, 76): FWL 22.3-29.2 mm (n=10). **Head:** Antennal shaft cream and dark brown dorsally reddish brown ventrally; scape bearing a long dark brown tuft, composed of light brown and dark brown scales; frons cream; labial palpus cream ventrally, brown dorsally; vertex cream with some light brown scales; patagium cream and dark brown intermixed scales. **Thorax:** Tegula dark brown, a mix of light brown and dark brown scales distally; mesoscutellum light brown; thoracic pleuron cream; dorsal area of metathorax dirty brown. **Legs:** Mostly cream, dark brown and beige, with white and black scales between segments. **Wings:** Dorsal FW ground color dark brown with black scales covering veins; between apex and postmedial line a beige macula, basal dash black, reniform spot beige, subterminal line black with beige dirty scales, terminal line black, fringe alternating dark brown and beige, tornus with macula beige, dorsal HW translucent white with veins and marginal shade dark brown; fringe alternating white and dark brown (Figs. 75, 76). **Abdomen:** Dorsum dirty brown, venter cream with a dark brown line in middle.

Male genitalia: Abdominal pelt (Fig. 79) with tergum VIII rectangular, posterior margin regular, sclerotized, translucent area U-shaped in the middle; sternum VIII rectangular, posterior margin with two cusps sclerotized, with a small deep conical shape invagination sclerotized medially. Genitalia (Fig. 80) with valvae wide and membranous basally, thin and ovoid at apex, saccular margin sclerotized, costal margin smooth and sclerotized, midvalve sclerotization thin, costula wide at base with a thin and sharp projection, tubular, elongated distally, looks like a small cornet; uncus process small, thin, tubular and curved, uncus with sclerotized and setose, tiny lobes, socii larger than uncus with two membranous, sclerotized and setose lobes. Aedeagus (Fig. 81) with membranous vesica, deciduous caltrop-shape cornuti present, callosus wide and rounded basally, thin in anellar region, proximal part of phallus thin, globular distally, with two tiny sclerotized and acute lateral projections.

FEMALE: (Figs. 77, 78). FWL 25.4-30.9 mm (n=5). Similar to male but larger, and dorsal FW ground color dark brown with black scales covering veins; between apex and postmedial line macula whitish, reniform spot whitish, fringe dark brown, tornus with macula whitish.

Female genitalia (Figs. 82, 83): Papillae anales membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate sclerotized, short with acute apices, postvaginal plate straight posterior margin, apophyses anterior short and sclerotized, posterior apophyses long and slender; ductus bursae tubular, wide and sclerotized, corpus bursae globular, sclerotized shield with heavily serrated anterior margin, bifurcate signum.

Etymology: *Nystalea mailyngonzalezae* is named in honor of Sra. Mailyn Adriana González of Bogota, Colombia, in recognition of her 2020 efforts to introduce Colombian biodiversity conservationists to Costa Rica's experiences in the same endeavor.

Type material: 10 ♂♂, 4 ♀♀.

HOLOTYPE, ♂: **COI Barcoded:** 09-SRNP-110652 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Manta, 610 m, 10.99689 -85.45679, 16 November 2009, R. Franco & S. Ríos (MNCR).

PARATYPES: 9 ♂♂, 4 ♀♀.

COI Barcoded: 06-SRNP-109737 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Manta, 610 m, 10.99689 -85.45679, 20 December 2006, H. Cambronero & R. Franco (MNCR). 06-SRNP-108504 Costa Rica, Prov. Guanacaste, Sector Del Oro, Serrano, 585 m, 11.00023 -85.45621, 19 November 2006, F. Quesada & S. Ríos (MNCR). 06-SRNP-103058 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 12 April 2006, H. Cambronero & S. Ríos (MNCR). 06-SRNP-102159 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 1 March 2006, S. Ríos & R. Franco (MNCR). 06-SRNP-109723 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Manta, 610 m, 10.99689 -85.45679, 19 December 2006, H. Cambronero & S. Ríos (MNCR). 07-SRNP-101678 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 March 2007, R. Franco & F. Quesada (MNCR). 08-SRNP-102615 (dissected), Costa Rica, Prov. Guanacaste, Sector Del Oro, Bosque Aguirre, 571 m, 11.00404 -85.44125, 7 June 2008, S. Ríos & F. Quesada (MNCR). 08-SRNP-104266 Costa Rica, Prov. Guanacaste, Sector Del Oro, Bosque Aguirre, 571 m, 11.00404 -85.44125, 3 July 2008, S. Ríos & F. Quesada (MNCR). INB0003852688 (dissected), Costa Rica, Prov. Guanacaste, Nicoya, Ostional, Río Montaña, 0-100 m, 9.984868 -85.682682, 15 June 2004, B. Gamboa, D. Briceño, M. Moraga, Y. Cárdenas (MNCR). ♀♀ **(COI Barcoded):** INB0003527491 (dissected), Costa Rica, Prov. Cartago, P.N. Tapantí - Macizo de La Muerte, Quebrada Segunda, 1300 m, 9.76258 -83.786505, 1 August 2002, R. Delgado (MNCR). INB0003010162 Costa Rica, Prov. Guanacaste, Nandayure, W. of Carmona Nicoya, 600-700 m, 9.996735 -85.274583, 19 August 1982, D. H. Janzen & W. Hallwachs (MNCR). 06-SRNP-108804 (dissected), Costa Rica, Prov. Guanacaste, Sector Del Oro, Serrano, 585 m, 11.00023 -85.45621, 19 November 2006, F. Quesada & S. Ríos (MNCR). 07-SRNP-109718 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Manta, 610 m, 10.99689 -85.45679, 7 November 2007, H. Cambronero & R. Franco (MNCR).

Diagnosis: The phallus of *N. mailyngonzalezae* is thinner than that of *N. aurachaconae*, and the lateral projections on the distal part are smaller than in *N. aurachaconae* (Fig. 81).

Distribution: *Nystalea mailyngonzalezae* has been collected with light traps on the Caribbean slope of the Cordillera Volcánica de Guanacaste and its dry rain forest intergrade, and the montane Nicoya Peninsula. The elevational range for the species is 100-700 m.

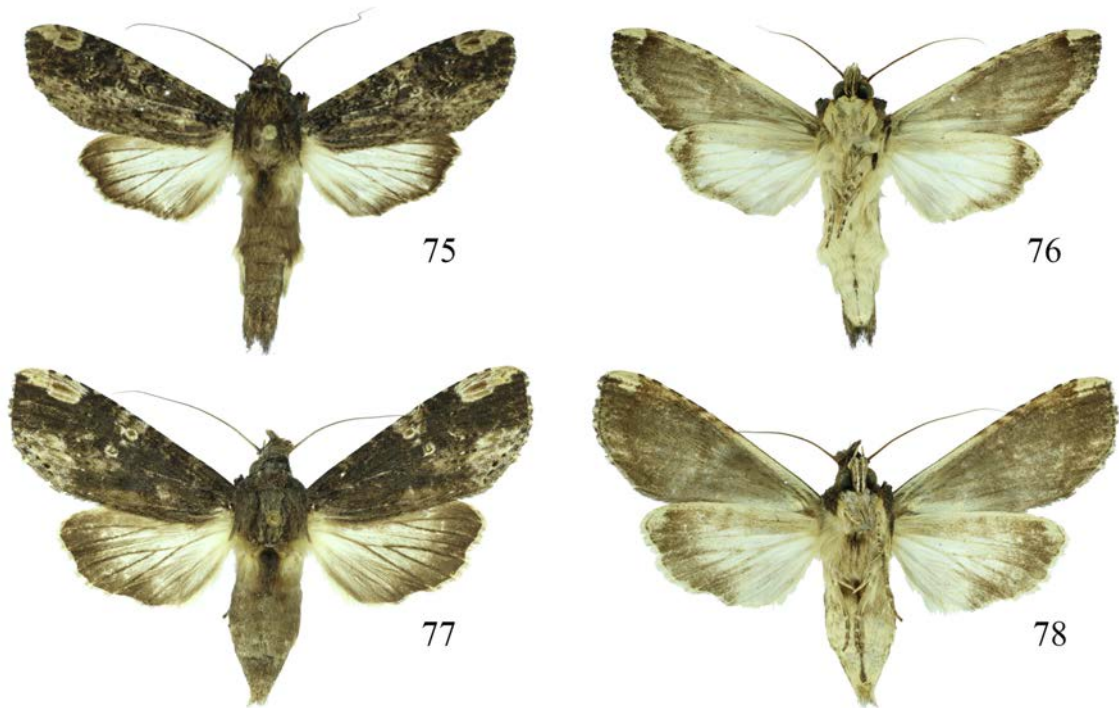
Natural history: All specimens have been collected with light traps; the life history of *N. mailyngonzalezae* is unknown.

Remarks: BIN BOLD:AAC4756 (Fig. 490).

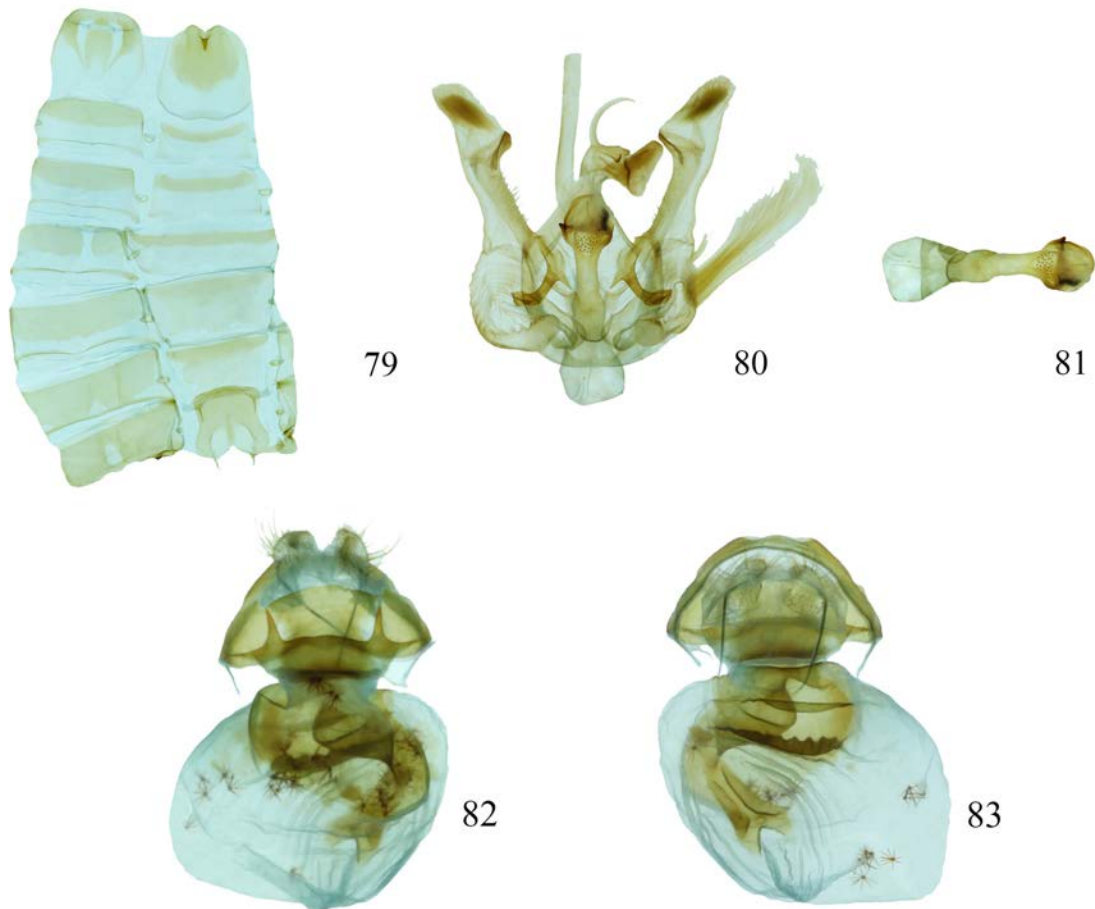
Genbank Accession: HM410103

DNA barcode of male holotype 09-SRNP-110652

BLPBB721-07|09-SRNP-110652|(Nystalea mailyngonzalezae)|COI-5P



Figures 75-78. *Nystalea mailyngonzalezae*: 75, 76. ♂ dorsal and ventral (INB0003352261) FWL 22.4 mm; 77, 78. ♀ dorsal and ventral (INB0003527491) FWL 21.41 mm.



Figures 79-83. *Nystalea mailyngonzalezae*: 79. ♂ sternum VIII 4.9 mm, 80. ♂ genitalia 7.3 mm length, 81. phallus 5.1 mm length (08-SRNP-102615); 82, 83. ♀ genitalia 6.3 mm length (06-SRNP-108804).

AACATTATACTTTATTTTTGGAATTTGAGCAGGAATAATTGGAACCTCTTTA
 AGTTTATAAATTCGAGCAGAATTAGGAAATCCTGGATCTTTAATTGGAGATG
 ATCAAATTTATAACTATTGTAAACAGCTCATGCTTTTATTATAAATTTTTT
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 CAATACTTTTAAACAGATCGAAATCTTAATACTTCATTTTTTCGATCCTGCTGG
 AGGAGGAGATCCTATTTTATATCAACATTTATTT

Nystalea marmorea Schaus, 1901
 (Figs. 84-89)

Female genitalia (Figs. 85-89): Papillae anales membranous, small, triangular shaped, covered with short, scattered setae with longer, inwardly curved setae, lateral processes of postvaginal plate sclerotized, with acute apices, are the shortest of all species that make up the Marmorea complex, postvaginal plate with straight posterior margin, anterior apophyses short and sclerotized, posterior apophyses long and slender; ductus bursae tubular, wide and sclerotized, corpus bursae globular, surface wrinkled, sclerotized shield with anterior margin serrated, thin signum.

Lectotype, ♀ (Fig. 84). *Nystalea marmorea* Schaus, 1901. Trinidad, collection William Schaus, USNMNT 00991897, Type #11183 (USNM). Lectotype designated by Schintlmeister (2016). Genitalia (Figs. 85-87) on slide, July 2018, by I. A. Chacón #USNM 127,367.

Note: Schintlmeister (2016) mistakenly called the lectotype a male.

Nystalea marmorea is not found in Costa Rica because the genitalia of the lectotype is different from that of the all known Costa Rican species. We include this species because it is part of this complex, it shares phenotypic and morphological characteristics with *N. roxanamadrigalae*, *N. aurachaconae* and *N. mailyngonzalezae*. The specimens of these three new species had been identified as *N. marmorea* before being barcoded.

The members of the Marona complex are *N. romanmacayai* and *N. marona* Schaus, 1905. Adults of these species are morphologically similar.



Figure 84. *Nystalea marmorea* Schaus, 1901. ♀ lectotype from Trinidad, designated by Schintlmeister (2016).

Nystalea romanmacayai Chacón, new species
 (Figs. 96-104)

Description: MALE (Figs. 96, 97) FWL 23.5-28.7 mm (n=5). **Head:** Antennal shaft light brown dorsally reddish brown ventrally; scape bearing a long cream tuft, composed of cream and dark brown scales; frons dark brown; labial palpus light brown ventrally, dark brown dorsally; vertex dark brown; patagium dark brown. **Thorax:** Tegula dark brown and whitish grey basally, a mix of dirty and dark brown scales distally; mesoscutellum dark brown and whitish grey; thoracic pleuron dark brown; dorsal area of metathorax dark brown and whitish grey and black intermixed scales; thorax reddish brown ventrally. **Legs:** Mostly white, black, dark brown and beige, with black and light brown scales between segments. **Wings:** Dorsal FW ground color dark brown with light brown scales covering veins; between apex and postmedial band, two maculae of different shape and size, color beige and greenish grey with black scales on the margin, subterminal line black, terminal line black, irregular; fringe alternating dark brown and beige, in tornus a dirty beige macula, medial line black, irregular; dorsal HW translucent light yellow with veins and marginal shade dark dirty brown; fringe light yellow. Ventral FW dark brown ground color, a whitish band from the subterminal area to the terminal area; ventral HW ground color yellowish, with whitish macula at apex (Figs. 96, 97). **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 100) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas in the middle; sternum VIII rectangular, posterior margin sclerotized, with a small deep invagination sclerotized medially. Genitalia (Fig. 101) with valvae wide and membranous basally, thin and oval at apex, saccular margin sclerotized, costal margin smooth and sclerotized, ribbed costal process sclerotized, midvalve sclerotization thin, costula wide with short and sharp projection at base, thin, tubular, elongated and flattened with discal shaped towards apex; uncus process thin, tubular and curved, uncus with sclerotized, elongated lobes, socii larger than the uncus with two lobes elongated, acute, sclerotized and with setose apices. Aedeagus (Fig. 102) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide and square at base, phallus thin proximally, acute distally, with a sclerotized tiny and pointy lateral projection, thin in anellar region.

FEMALE: Similar to male but larger (Figs. 98, 99). FWL 25.1 mm (n=1). Dorsal FW ground color grey whitish with light brown scales covering veins; between apex and postmedial band, two maculae of different shape and size beige and greenish grey with black scales on the margin. Ventral FW with ground color dark brown, ventral HW ground color yellowish, with whitish macula at apex, thorax dirty brown ventrally with prominent dark brown line in the middle. **Abdomen:** Venter dirty yellow with thin dark brown line medially. **Female genitalia** (Figs. 103, 104): Papillae anales ovoid, membranous, covered with short, scattered setae with longer, inwardly curved setae, posterior margin of postvaginal plate emarginated with a tiny invagination in the middle, anterior apophyses short and sclerotized, posterior apophyses long and slender; ductus bursae sclerotized, elongated, wide distally, narrow and tubular basally, corpus bursae globular, surface wrinkled and folded with triangular sclerotized shield, small and rectangular signum.

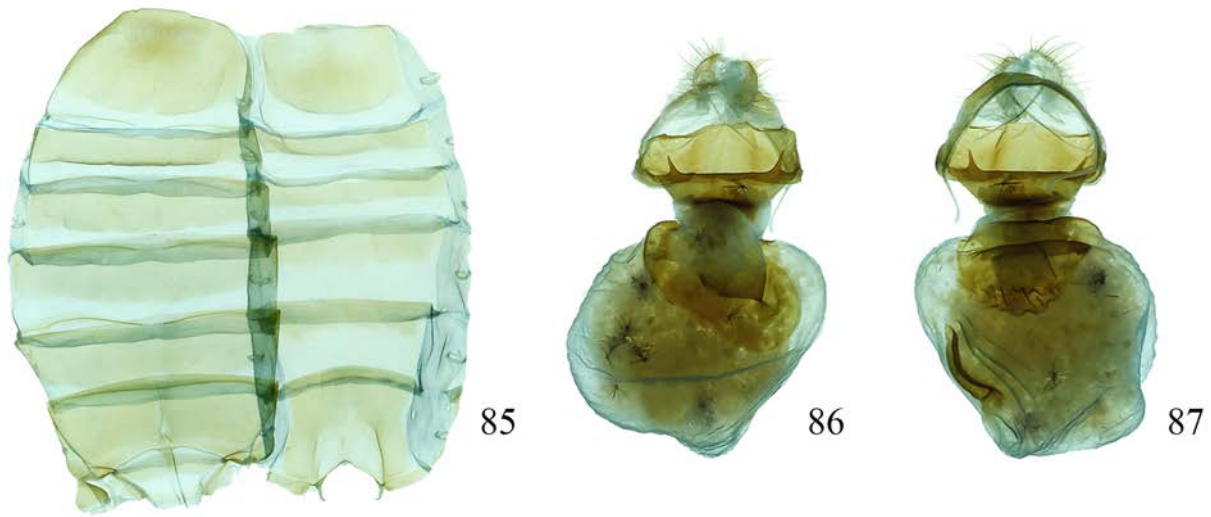
Etymology: *Nystalea romanmacayai* is named in honor of Dr. Román Macaya Hayes in recognition of his instant enthusiasm for and understanding of DNA barcoding for the conservation of tropical biodiversity, while he was the Costa Rican ambassador to the United States of America, an understanding continuing to this day.

Type material: 5 ♂♂, 1 ♀.

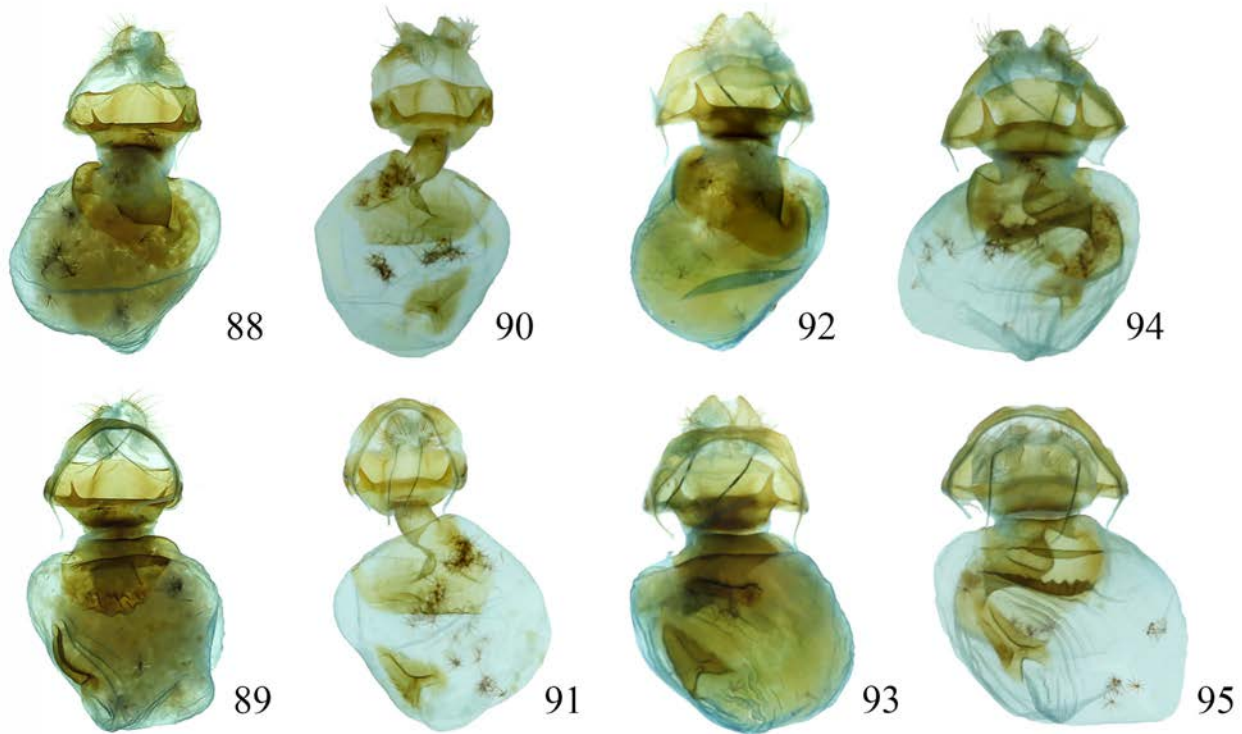
HOLOTYPE, ♂: 15-SRNP-21293 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Puertas, 400 m, 11.010870 -85.488169, 1 October 2015. Roster Moraga (MNCR).

PARATYPES: 4 ♂♂, 1 ♀.

♂♂ (**COI Barcoded**): 99-SRNP-13636 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Palo Alto, 570 m, 10.88186 -85.38221, 30 November 1999, Osvaldo Espinoza (USNM). 13-SRNP-1503 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 20 April 2013, Elda Araya (USNM). 05-SRNP-23157 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 23 August 2005, Lucía Ríos (USNM). 96-SRNP-252 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Portón Perros, 340 m, 10.85991 -85.65396, 22 February 1996, Gusneros (USNM). ♀ (**COI Barcoded**): 15-SRNP-21294 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Puertas, 400 m, 11.010870 -85.488169, 1 October 2015, Roster Moraga (USNM).



Figures 85-87. *Nystalea marmorea* Schaus, 1901, ♀ lectotype USNMNT 00991897, 85. ♀ Sternum 3.1 mm length, 86, 87. ♀ genitalia 6.7 mm length.



Figures 88-95. 88, 89. ♀ genitalia lectotype *Nystalea marmorea* Schaus, 1901 (USNMNT 00991897), 90, 91. ♀ genitalia *Nystalea roxanamadrigalae* (INBIOCRI000809703), 92, 93. ♀ genitalia *Nystalea aurachaconae* (INBIOCRI000954789), 94, 95. ♀ genitalia *Nystalea mailyngonzalezae* (06-SRNP-108804).

Diagnosis: Male genitalia with phallus thinner proximally and narrower in distally than in *N. marona* (Fig. 101).

Distribution: *Nystalea romanmacayai* has been reared in dry forest and rain forest on both slopes of the Cordillera Volcánica de Guanacaste. The elevational range for the species is 290-620 m.

Natural history: Six rearing records: ACG locations: Sector Del Oro (n=3), Sector Santa Elena (n=1), Sector San Cristóbal (n=2).

Food plants: Clusiaceae: *Garcinia intermedia* (Pittier) Hammel (n=5), *Symphonia globulifera* L. F. (n=1).

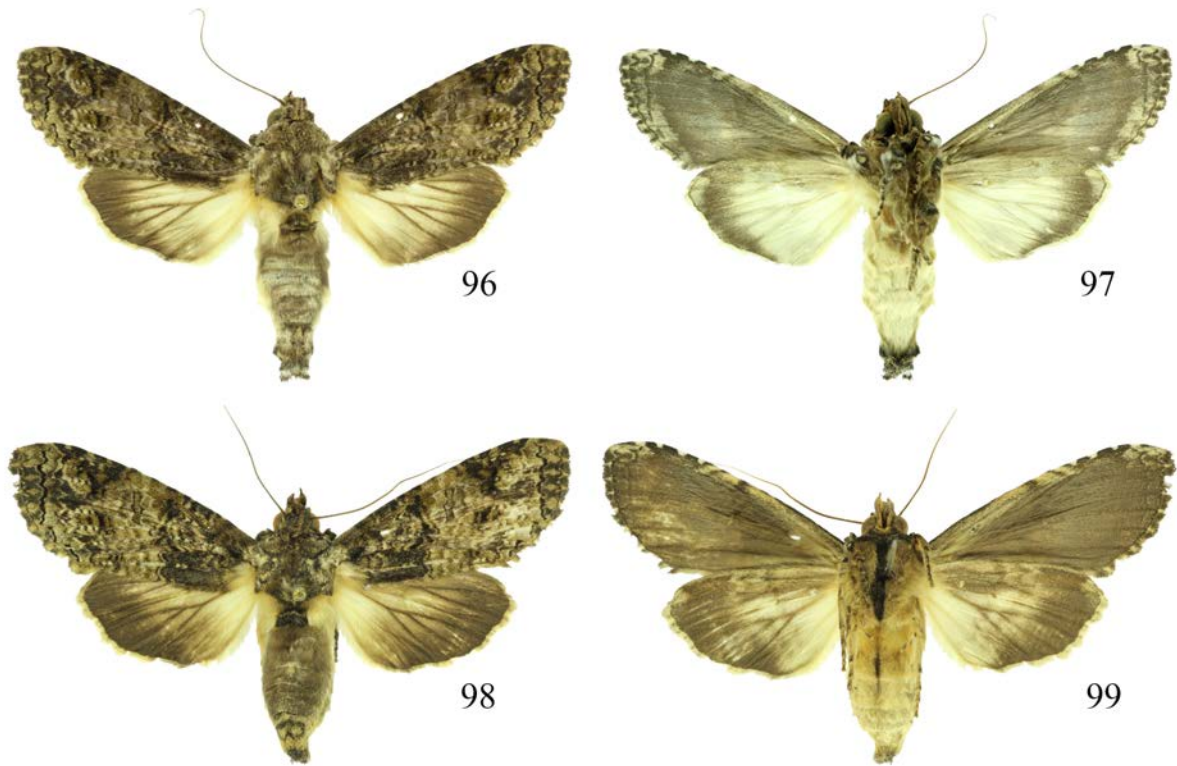
Remarks. BIN BOLD:AAF2890 (Fig. 490).

Genbank Accession: OM387218

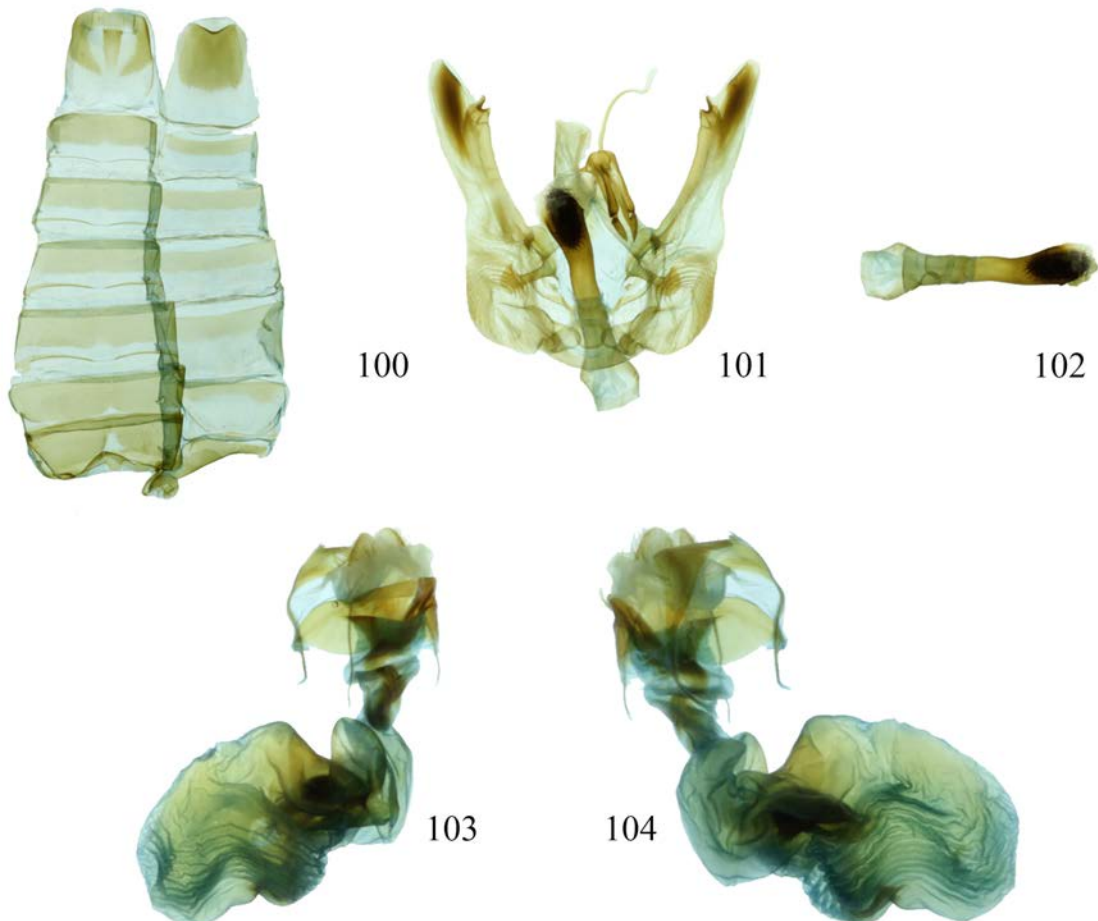
DNA barcode of male holotype 15-SRNP-21293

MNHMYL8160-16|15-SRNP-21293|(*Nystalea romanmacayai*)|COI-5P

AACATTATATTTTATTTTGGTATTGAGCAGGAATAATTGGAACTCCCTT
AGTTTATTAATTCGAGCTGAATTAGGAAATCCCGGCTCTTAAATTGGAGATG
ATCAAATTTATAACTATTGTAACAGCTCATGCTTTTATTATAATTTTTTT
TATAGTAATACCTATTATAATTGGAGGATTTGGAACTGATTAGTACCTTTA
ATACTAGGAGCCCTTGATATAGCTTTCCCCGAATAAATAATATAAGATTTT
GATTATTACCCCTTCTTTAACCTTTTAACTCAAGAAGTATTGTAGAAAA
TGGAGCAGGAACTGGATGAACAGTTTATCCCCACTTTTCATCAAATATTGCC
CATAGAGGAAGATCAGTAGATCTAGCTATTTTTTCCCTTCATTAGCGGGAA



Figures 96-99. *Nystalea romanmacayai*: 96, 97. ♂ dorsal and ventral (96-SRNP-252) FWL 23.57 mm; 98, 99. ♀ dorsal and ventral (05-SRNP-23157) FWL 25.10 mm.



Figures 100-104. *Nystalea romanmacayai*: 100. ♂ sternum VIII 4.5 mm length, 101. ♂ genitalia 7.2 mm length, 102. phallus 5.2 mm (96-SRNP-252); 103, 104. ♀ genitalia 6.9 mm length (05-SRNP-23157).

TTTCCTCTATTTTAGGTGCTATTAATTTTATTACAACAATTATTAACATACG
 ACTTAATAATATATCATTTTGGATCAAATGCCTTTATTTTGGGCTGTTGGT
 ATTACAGCATTTTATTATTATATCTTTTACCAGTTTTTACGGGAGCAATTA
 CTATACTTTTAACTGATCGAAATCTTAATACTTCTTTTGTGATCCTGCTGG
 AGGAGGGGATCCAATCTTATATCAACATTTATTT

Nystalea marona Schaus, 1905
 (Figs. 105-117, 415-425)

Redescription: MALE (Figs. 105, 106, 114) FWL 23.4-29.4 mm (n=10). **Head:** Antennal shaft light brown dorsally and reddish brown ventrally; scape bearing long cream tuft and dark brown scales; frons dark brown; labial palpus light brown ventrally, dark brown dorsally; vertex dark brown; patagium dark brown. **Thorax:** Tegula black and white at the base, a mix dirty and dark brown scales distally; mesoscutellum black; dorsal area of metathorax black with dirty brown and straw color intermixed scales; thoracic pleuron black; thorax reddish brown ventrally. **Legs:** Mostly white, black, dark brown and beige, with black and light brown scales between segments and margins. **Wings:** Dorsal FW ground color dirty brown with light brown scales covering veins; between the apex and postmedial band, three maculas of different shape and size of beige, subterminal line black, terminal line black, fringe black and beige, in tornus a macula dirty beige, dorsal HW translucent light yellow with veins and marginal shade dark dirty brown; fringe light yellow (Figs. 105, 106, 114). **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Figs. 109, 115) with tergum VIII rectangular, posterior margin irregular, sclerotized, a translucent area U-shaped medially; sternum VIII rectangular, posterior margin sclerotized, slightly invaginated medially. Genitalia (Figs. 110, 116) with valvae wide and membranous basally, thin and oval at apex, saccular margin sclerotized, costal margin smooth and sclerotized, costal process sclerotized with rounded, serrated notch, midvalve sclerotization thin, costula wide at base, thin, elongated and rounded area distally; uncus process small, thin, tubular and curved, uncus with sclerotized, elongated and oval lobes, socii larger than the uncus with two acute sclerotized lobes with setose apices. Aedeagus (Figs. 111, 117) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide and square at base, phallus thin proximally, thin in anellar region, acute distally, with a sclerotized and small lateral projection.

FEMALE: Similar to male but larger (Figs. 107, 108). FWL 24.7-34.1 mm (n=10).

Wings: Dorsal FW ground color dark dirty brown with grey scales covering veins; between the apex and postmedial band, macula of grey, dorsal HW dark dirty brown; with small area light yellow at basal band, fringe dark grey, venter FW dark brown, fringe alternating gray and black, venter HW dark brown, fringe gray. **Abdomen:** Dorsum dark brown, dirty brown.

Female genitalia (Figs. 112, 113): Papillae anales membranous, covered with short, scattered setae with longer, inwardly curved setae, postvaginal plate posterior margin emarginated with a tiny invagination in the middle, anterior apophyses short and sclerotized, posterior apophyses long and slender; ductus bursae sclerotized, wide distally, narrow and tubular basally, corpus bursae elongated and globular, surface wrinkled, with small sclerotized shield with pouch-shaped lateral appendage, signum shaped like vertebrae.

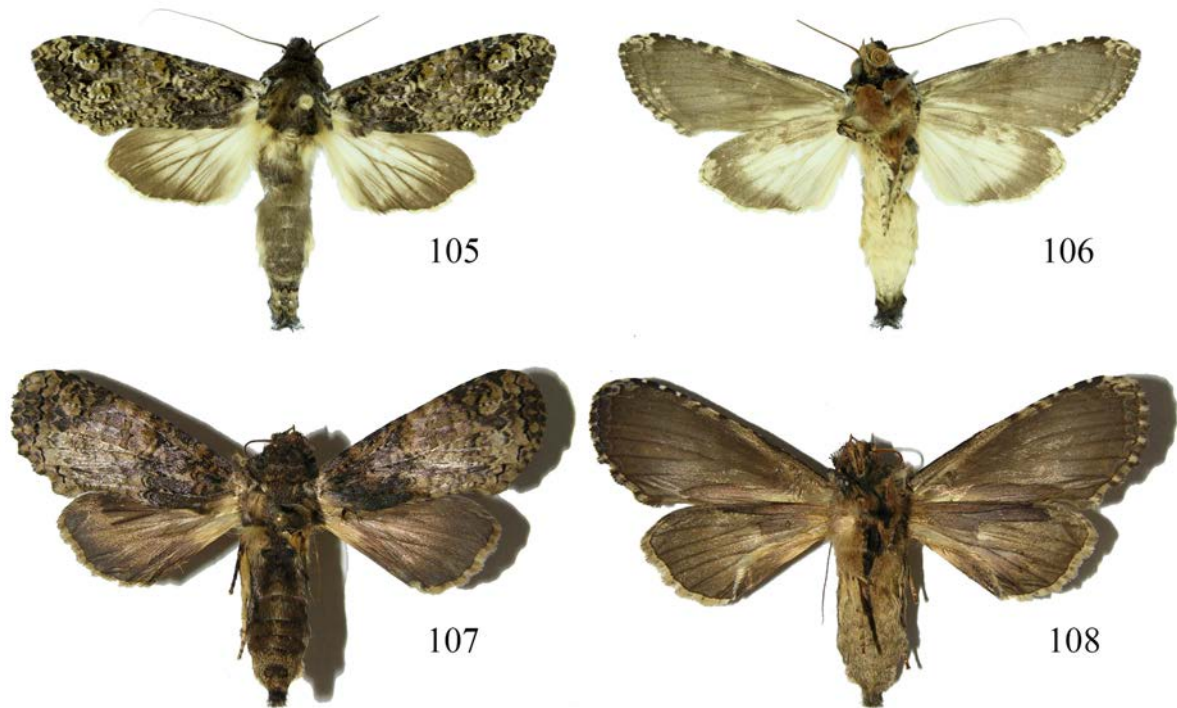
Lectotype, ♂ (Fig. 114).

Nystalea marona Schaus, 1905. Designated by Schintlmeister (2016). Genitalia on slide August 2017 I.A. Chacón USNM #2081211 127,580. USNMMENT 00991898. Type #2642 USNM. St. Jean Maroni, F. Guiana. Deposited in USNM (Figs. 115-117).

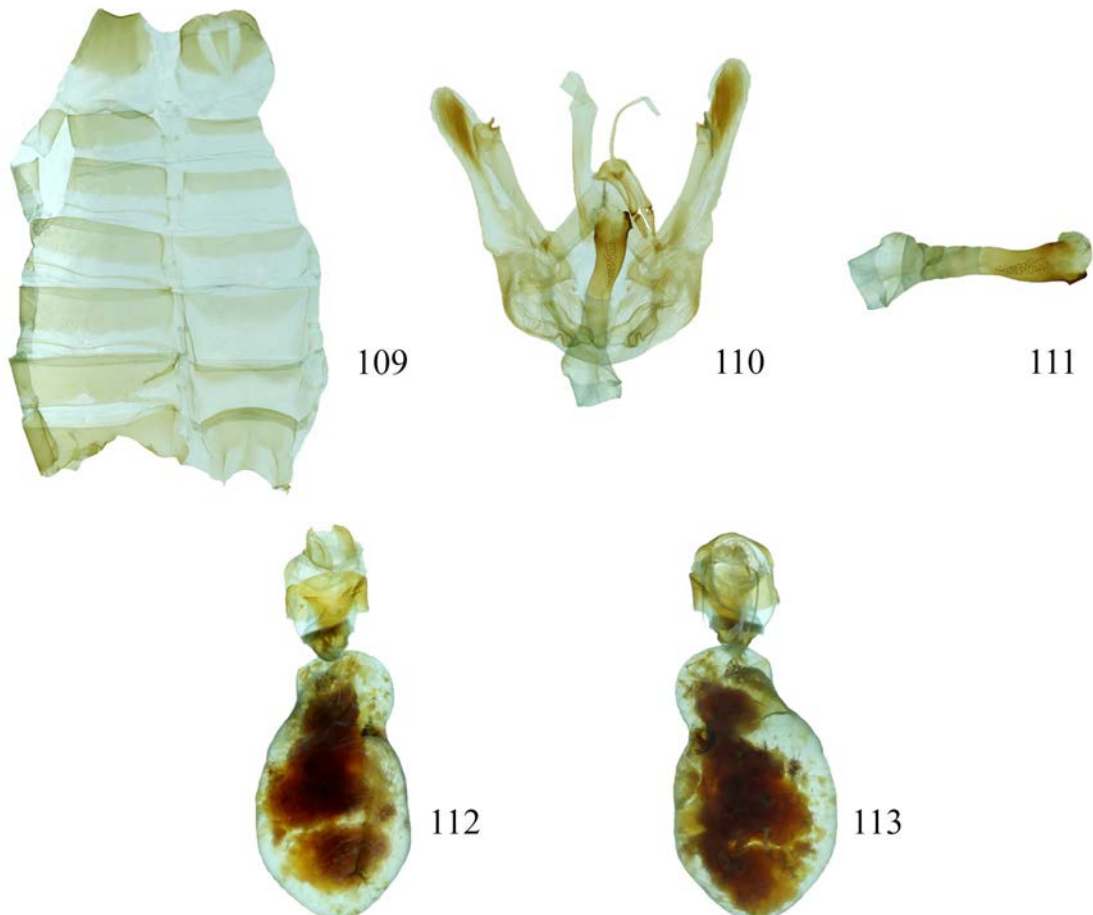
Material examined: 102 ♂♂, 69 ♀♀

♂♂ (COI Barcoded): 03-SRNP-5008 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 8 February 2003, Carolina Cano (USNM). 06-SRNP-22 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 February 2006. Gloria Sihezlar (USNM). 11-SRNP-3137 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Tajo Ángeles, 540 m, 10.86472 -85.41531, 1 September 2011, Gloria Sihezlar (USNM). 01-SRNP-2091 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 15 July 2001, Gloria Sihezlar (USNM). 99-SRNP-13778 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 30 November 1999, Gusaderos (USNM). 02-SRNP-20020 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 25 December 2002, Gloria Sihezlar (USNM). 08-SRNP-2399 Costa Rica, Prov. Alajuela, Sector San

Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 4 June 2008, Elda Araya (USNM). 01-SRNP-196 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 10 February 2001, Carolina Cano (USNM). 05-SRNP-1749 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 27 April 2005, Gloria Sihezlar (USNM). 02-SRNP-19839 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 29 November 2002, Osvaldo Espinoza (USNM). 02-SRNP-597 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 1 March 2002, Freddy Quesada (USNM). 99-SRNP-5201 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Bosque Trampa Malaise, 815 m, 10.86280 -85.38460, 14 July 1999, Gusaderos (USNM). 06-SRNP-109458 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 22 November 2006, R. Franco & S. Ríos (MNCR). 02-SRNP-1117 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 24 March 2002, Osvaldo Espinoza (USNM). 02-SRNP-18800 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 10 September 2002, Andrea Vincent (USNM). 02-SRNP-20107 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 24 December 2002, Carolina Cano (USNM). 06-SRNP-2195 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 15 April 2006, Gloria Sihezlar (USNM). 08-SRNP-4840 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada García, 495 m, 10.86069 -85.42558, 24 September 2008, Gloria Sihezlar (USNM). 02-SRNP-20228 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 29 December 2002, Gloria Sihezlar (USNM). 04-SRNP-3113 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 20 July 2004, Anabelle Córdoba (USNM). 03-SRNP-7708 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 31 August 2003, Carolina Cano (USNM). 05-SRNP-2800 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 20 June 2005, Gloria Sihezlar (USNM). 06-SRNP-4189 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Tajo Ángeles, 540 m, 10.86472 -85.41531, 18 June 2006, Carolina Cano (USNM). 02-SRNP-123 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 12 February 2002, Freddy Quesada (USNM). 02-SRNP-2141 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 29 March 2002, Osvaldo Espinoza (USNM). 98-SRNP-14862 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 21 November 1998, Gloria Sihezlar (USNM). 12-SRNP-65335 Costa Rica, Prov. Alajuela, Brasilia, Moga, 320 m, 11.01227 -85.34929, 23 June 2012, Duvalier Briceño (USNM). 07-SRNP-65950 Costa Rica, Prov. Alajuela, Brasilia, Brisanta, 290 m, 11.02738 -85.33679, 5 December 2007, Duvalier Briceño (USNM). 09-SRNP-65102 Costa Rica, Prov. Alajuela, Brasilia, Moga, 320 m, 11.01227 -85.34929, 6 February 2009, Duvalier Briceño (USNM). 09-SRNP-65059 Costa Rica, Prov. Alajuela, Brasilia, Moga, 320 m, 11.01227 -85.34929, 30 January 2009, Duvalier Briceño (USNM). 12-SRNP-67335 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palomo, 96 m, 10.96187 -85.28045, 11 March 2012, Cirilo Umaña (USNM). 10-SRNP-81554 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jacobo, 461 m, 10.94076 -85.3177, 11 January 2011, Edwin Apú (USNM). 05-SRNP-40931 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Anonas, 405 m, 10.90528 -85.27882, 5 May 2005, José Pérez (USNM). 08-SRNP-101229 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jabalina, Manta Pizote, 288 m, 10.97325 -85.31542, 29 March 2008, F. Quesada & R. Franco (MNCR). INBIOCRI002473937 Costa Rica, Prov. Alajuela, Sector San Ramón de Dos Ríos, 1.5 Km NO. Hda. Nueva Zelandia, 620 m, 10.883267 -85.413544, 29 July 1996, D. Briceño. INB0004073160 Costa Rica, Prov. Alajuela, Guatuso, Sitio Catarata Río Buenavista, 700-800 m, 10.706992 -84.983685, 20 March 2007, J. A. Azofeifa (MNCR). INBIOCRI000882287 Costa Rica, Prov. Alajuela, Caño Negro, R.N.V.S., Caño Negro, 20 m, 10.893812 -84.788847, 2 August 1992, K. Martínez (MNCR). INB0003010926 Costa Rica, Prov. Heredia, Puerto Viejo de Sarapiquí, La Selva, 40 m, 10.439193 -84.010919, 1 October 1987, M. M. Chavarria (MNCR). 94-SRNP-4979 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 12 July 1994, Gusaderos (USNM). 85-SRNP-69 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 21 March 1985, Gusaderos (USNM). 92-SRNP-4077 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 20 August 1992, Gusaderos (USNM). 07-SRNP-14181 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 7 July 2007, Guillermo Pereira



Figures 105-108. *Nystalea marona*: 105, 106. ♂ dorsal and ventral (INB0004173199) FWL 23.45 mm; 107, 108. ♀ dorsal and ventral (02-SRNP-18603) FWL 24.78 mm.



Figures 109-113. *Nystalea marona*: 109. male sternum VIII 4.7 mm length, 110. male genitalia 7.3 mm length, 111. phallus 4.9 mm length (08-SRNP-105789); 112, 113. female genitalia 9.5 mm length (INB0004054573).

(USNM). 84-SRNP-965 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 11 July 1984, Daniel H. Janzen (USNM). 91-SRNP-3004 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 23 September 1991, Gusaneros (USNM). 78-SRNP-111 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 13 July 1978, Daniel H. Janzen (USNM). 01-SRNP-15662 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 6 August 2001, Manuel Pereira (USNM). 99-SRNP-2389 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 2 April 1999, Lucía Ríos (USNM). 01-SRNP-24357 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 1 January 2002, Roster Moraga (USNM). 98-SRNP-14305 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 18 January 1999, Lucía Ríos (USNM). 01-SRNP-24350 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 1 January 2002, Roster Moraga (USNM). 98-SRNP-14090 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 20 December 1998, Lucía Ríos (USNM). 98-SRNP-14086.01 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 6 December 1998, Lucía Ríos (USNM). 01-SRNP-24355 Costa Rica, Prov. Guanacaste, Sector El

Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 1 January 2002, Roster Moraga (USNM). 02-SRNP-27595 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Tigre, 280 m, 11.03172 -85.52615, 9 August 2002, Lucía Ríos (USNM). 12-SRNP-21118 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 8 July 2012, Elieth Cantillano (USNM). 98-SRNP-13981 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 30 November 1998, Lucía Ríos (USNM). 98-SRNP-13982 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 5 December 1998, Lucía Ríos (USNM). 02-SRNP-29970 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 10 October 2002, Lucía Ríos (USNM). 98-SRNP-14055 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 30 November 1998, Roster Moraga (USNM). 02-SRNP-31135 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 9 November 2002, Manuel Pereira (USNM). 98-SRNP-13625 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 14 October 1998, Roster Moraga (USNM). 02-SRNP-28100 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 31 August 2002, Roster Moraga (USNM). 02-SRNP-4472 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 12 February 2002, Manuel Pereira (USNM). 01-SRNP-24351 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 30 December 2001, Roster Moraga (USNM). 01-SRNP-24352 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 1 January 2002, Roster Moraga (USNM). 95-SRNP-7675 Costa Rica, Prov. Guanacaste, Sector El Hacha, Laguna Agua Buena, 220 m, 11.03239 -85.57545, 24 August 1995, Gusaneros (USNM). 98-SRNP-13932 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 30 November 1998, Roster Moraga (USNM). 98-SRNP-5364 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 27 July 1998, Roster Moraga (USNM). 08-SRNP-105789 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Manta Calera, 342 m, 10.86576 -85.65112, 31 August 2008, S. Ríos & R. Franco (MNCR). 07-SRNP-14802 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 23 August 2007, Johan Vargas (USNM). 03-SRNP-27 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Descanso, 70 m, 10.86336 -85.72535, 26 January 2003, Guillermo Pereira (USNM). 95-SRNP-6461 Costa Rica, Prov. Guanacaste, Sector Murciélagos, Estación Murciélagos, 40 m, 10.90092 -85.72902, 24 July 1995, Gusaneros (USNM). 05-SRNP-46745 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Heliconia, 390 m, 10.88585 -85.49222, 13 August 2005, Harry Ramírez (USNM). 00-SRNP-10365 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Arenales, 1080 m, 10.92471 -85.46738, 25 September 2000, Manuel Pereira (USNM). 05-SRNP-35895 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Derrumbe, 1220 m, 10.92918 -85.46426, 21 September 2005, Harry Ramírez (USNM). 10-SRNP-

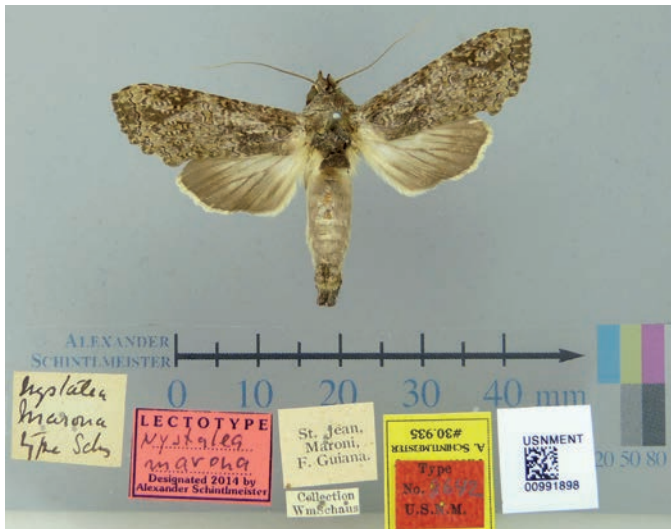


Figure 114. *Nystalea marona* Schaus, 1905. ♂ lectotype from Schintlmeister (2016).



Figures 115-117. *Nystalea marona* Schaus, 1905. lectotype: 115. ♂ sternum VIII 4.5 mm length, 116. ♂ genitalia 7.1 mm length, 117. phallus 4.7 mm length (00991898 USNM).

- 31897 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Nacho, 710 m, 10.98445 -85.42481, 17 September 2010, Calixto Moraga (USNM). 10-SRNP-31995 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Mismo, 680 m, 10.98758 -85.41967, 14 September 2010, Manuel Ríos (USNM). 10-SRNP-71405 Costa Rica, Prov. Guanacaste, Sector Pitilla, Manguera, 470 m, 10.99590 -85.39842, 2 May 2010, Ricardo Calero (USNM). 02-SRNP-4741 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tángelo, 410 m, 11.01823 -85.45024, 21 February 2002, Lucía Ríos (USNM). 02-SRNP-4727 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tángelo, 410 m, 11.01823 -85.45024, 21 February 2002, Lucía Ríos (USNM). 03-SRNP-16675 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Lajosa, 400 m, 11.03306 -85.42876, 29 July 2003, Lucía Ríos (USNM). 04-SRNP-23842 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 29 August 2004, Elieth Cantillano (USNM). 08-SRNP-24745 Costa Rica, Prov. Guanacaste, Sector Del Oro, Puente Mena, 280 m, 11.04562 -85.45742, 17 January 2009, Lucía Ríos (USNM). 09-SRNP-22585 Costa Rica, Prov. Guanacaste, Sector Del Oro, Metereológico, 590 m, 11.00199 -85.46166, 15 September 2009, Lucía Ríos (USNM). 10-SRNP-20299 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 12 March 2010, Lucía Ríos (USNM). 05-SRNP-23159 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 28 August 2005, Lucía Ríos (USNM). 05-SRNP-23069 Costa Rica, Prov. Guanacaste, Sector Del Oro, Margarita, 380 m, 11.03234 -85.43954, 13 August 2005, Roster Moraga (USNM). 03-SRNP-18793 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 9 August 2003, Manuel Pereira (USNM). 01-SRNP-11839 Costa Rica, Prov. Guanacaste, Sector Del Oro, Mena Central, 345 m, 11.02991 -85.45364, 22 November 2001, Tonny Lara (USNM). 02-SRNP-27672 Costa Rica, Prov. Guanacaste, Sector Del Oro, Camino Mangos, 480 m, 11.00766 -85.47926, 18 August 2002, Roster Moraga (USNM). 03-SRNP-16210 Costa Rica, Prov. Guanacaste, Sector Del Oro, Río Chon, 320 m, 11.04118 -85.44170, 13 July 2003, Lucía Ríos (USNM). 02-SRNP-33275 Costa Rica, Prov. Guanacaste, Sector Del Oro, Puente Mena, 280 m, 11.04562 -85.45742, 21 December 2002, Manuel Pereira (USNM). 05-SRNP-19550 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Quebrada Clusia, 310 m, 10.85877 -85.66120, 28 August 2005, Guillermo Pereira (USNM). 07-SRNP-58534 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Miramonte, 305 m, 10.77175 -85.43400, 6 August 2007, José Alberto Sánchez (USNM). 07-SRNP-58832 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Sendero Aguacate, 335 m, 10.76901 -85.43465, 28 August 2007, José Alberto Sánchez (USNM). 09-SRNP-57851 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 1 December 2009, Mariano Pereira (USNM). 11-SRNP-56178 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 18 August 2011, Mariano Pereira (USNM). INB0004173199 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, 1100 m, 10.7131819 -85.146941, 1 October 2008, J. Azofeifa, E. Méndez, B. Hernández (MNCR). INBIOCRI000018023 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, R. B. Carara, 50 m, 9776494 -84608126, 1 April 1989, R. Zuñiga (MNCR). INBIOCRI000707455 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, R. B. Carara, 50 m, 9776494 -84608126, 1 Jun 1992, J. C. Saborio (MNCR). INB0003010947 Costa Rica, Prov. Puntarenas, Sirena, Corcovado, Nat. Pk. Osa Península, 1-100 m, 8.480171 -83.591289, 1 May 1984, D. H. Janzen & W. Hallwachs (MNCR). INB0003010946 Costa Rica, Prov. Puntarenas, Sirena, Corcovado, Nat. Pk. Osa Península, 1-100 m, 8.480171 -83.591289, 1 May 1984, D. H. Janzen & W. Hallwachs (MNCR). INBIOCRI000198813 Costa Rica, Prov. Puntarenas, Est Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 January 1990, G. Fonseca (MNCR). INBIOCRI000997435 Costa Rica, Prov. Limón, Manzanillo, R.N.F.S. Gandoca y Manzanillo, 0-100 m, 9.632582 -82.659053, 27 January 1993, K. Taylor (MNCR).
- ♀♂ (COI Barcoded): 05-SRNP-40930 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Anonas, 405 m, 10.90528 -85.27882, 5 April 2005, José Pérez (USNM). 02-SRNP-21407 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Anonas, 405 m, 10.90528 -85.27882, 16 December 2002, José Pérez (USNM). 14-SRNP-46171 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Pochote, 150 m, 10.952959 -85.269779, 13 July 2014, Keiner Aragón (USNM). 12-SRNP-41951 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Rincón, 430 m, 10.8962 -85.27769, 1 June 2012, Pablo Umaña Calderón (USNM). 02-SRNP-21408 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Anonas, 405 m, 10.90528 -85.27882, 16 December 2002, José Pérez (USNM). 02-SRNP-1115 Costa Rica, Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 22 March 2002, Osvaldo Espinoza (USNM). 02-SRNP-21409 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 23 March 2002, Tom Prescott (USNM). 02-SRNP-18602 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 9 September 2002, Carolina Cano (USNM). 02-SRNP-20021 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 22 December 2002, Osvaldo Espinoza (USNM). 08-SRNP-492 20021 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Colegio, 520 m, 10.89296 -85.3788, 27 February 2008, Carolina Cano (USNM). 04-SRNP-61139 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 30 December 2004, Yessenia Mendoza (USNM). 05-SRNP-839 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 March 2005, Carolina Cano (USNM). 02-SRNP-20022 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 21 December 2002, Osvaldo Espinoza (USNM). 04-SRNP-60431 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 13 November 2004, Carolina Cano (USNM). 03-SRNP-5144 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 25 February 2003, Carolina Cano (USNM). 99-SRNP-13689 Costa Rica, Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 8 December 1999, Freddy Quesada (USNM). 05-SRNP-4285 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 14 September 2005, Osvaldo Espinoza (USNM). 02-SRNP-18603 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 7 September 2002, Carolina Cano (USNM). 04-SRNP-2035 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 14 May 2004, Carolina Cano (USNM). 02-SRNP-19838 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 27 November 2002, Osvaldo Espinoza (USNM). 05-SRNP-2624 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 8 June 2005, Elda Araya (USNM). 99-SRNP-13275 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 13 November 1999, Freddy Quesada (USNM). 08-SRNP-2165 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 20 May 2008, Gloria Sihezar (USNM). 02-SRNP-1116 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 20 March 2002, Osvaldo Espinoza (USNM). 05-SRNP-1720 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 27 April 2005, Osvaldo Espinoza (USNM). 05-SRNP-5960 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 23 October 2005, Carolina Cano (USNM). 03-SRNP-8666 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Palo Alto, 570 m, 10.88186 -85.38221, 15 October 2003, Gloria Sihezar (USNM). 05-SRNP-2754 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 10 July 2005, Carolina Cano (USNM). 05-SRNP-3428 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Colegio, 520 m, 10.89296 -85.3788, 4 July 2005, Elda Araya (USNM). 02-SRNP-20106 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 22 December 2002, Osvaldo Espinoza (USNM). 98-SRNP-14861 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 24 November 1998, Gloria Sihezar (USNM). 01-SRNP-24353 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 31 January 2001, Roster Moraga (USNM). 02-SRNP-31504 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 11 November 2002, Roster Moraga (USNM). 01-SRNP-24354 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 31 December 2001, Roster Moraga (USNM). 02-SRNP-29965 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 12 October 2002, Manuel Pereira (USNM). 98-SRNP-13646 Costa Rica, Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 14 October 1998, Lucía Ríos (USNM). 00-SRNP-3688 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 31 August 2000, Lucía Ríos (USNM). 98-SRNP-14091 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 17 December 1998, Lucía Ríos (USNM). 99-SRNP-2388 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 2 April 1999, Lucía Ríos (USNM). 99-SRNP-3306 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Tigre, 280 m, 11.03172 -85.52615, 22 August 1999, Roster Moraga (USNM). 98-SRNP-5375 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Tigre, 280 m, 11.03172 -85.52615, 6 August 1998, Lucía Ríos

(USNM). 02-SRNP-29973 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 6 October 2002, Lucía Ríos (USNM). 10-SRNP-20127 Costa Rica, Prov. Guanacaste, Sector El Hacha, Piedra Duende, 450 m, 11.01100 -85.54459, 29 January 2010, Lucía Ríos (USNM). 02-SRNP-29971 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 6 October 2002, Lucía Ríos (USNM). 98-SRNP-13626 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 13 October 1998, Roster Moraga (USNM). 94-SRNP-6437 Costa Rica, Prov. Guanacaste, Sector El Hacha, Quebrada Jorco, 280 m, 10.97853 -85.54628, 7 September 1994, Gusaneros (USNM). 02-SRNP-13587 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Calliandra, 290 m, 10.86318 -85.66322, 23 September 2002, Gusaneros (USNM). 03-SRNP-13743 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 23 July 2003, Guillermo Pereira (USNM). 07-SRNP-12037 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 6 February 2007, Lucía Vargas (USNM). 84-SRNP-2059 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 26 November 1984, Daniel H. Janzen (USNM). 90-SRNP-932 Costa Rica, Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 18 July 1990, Gusaneros (USNM). 04-SRNP-49701 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Heliconia, 390 m, 10.88585 -85.49222, 11 November 2004, Manuel Pereira (USNM). 02-SRNP-27674 Costa Rica, Prov. Guanacaste, Sector Del Oro, Camino Mangos, 480 m, 11.00766 -85.47926, 17 August 2002, Roster Moraga (USNM). 10-SRNP-20298 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 12 March 2010, Lucía Ríos (USNM). 02-SRNP-27673 Costa Rica, Prov. Guanacaste, Sector Del Oro, Camino Mangos, 480 m, 11.00766 -85.47926, 23 August 2002, Roster Moraga (USNM). 03-SRNP-18928 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 25 August 2003, Manuel Pereira (USNM). 07-SRNP-21198 Costa Rica, Prov. Guanacaste, Sector Del Oro, Río Chon, 320 m, 11.04118 -85.44170, 25 April 2007, Lucía Ríos (USNM). 08-SRNP-23651 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar 560 m, 11.00217 -85.46337, 26 October 2008, Elieth Cantillano (USNM). 03-SRNP-16792 Costa Rica, Prov. Guanacaste, Sector Del Oro, Camino Mangos, 480 m, 11.00766 -85.47926, 3 August 2003, Manuel Pereira (USNM). 02-SRNP-27427 Costa Rica, Prov. Guanacaste, Sector Del Oro, Puente Mena, 280 m, 11.04562 -85.45742, 12 October 2002, Dunia García (USNM). 10-SRNP-20300 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 13 March 2010, Lucía Ríos (USNM). 10-SRNP-20303 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 9 March 2010, Lucía Ríos (USNM). 10-SRNP-20301 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 12 March 2010, Lucía Ríos (USNM). 10-SRNP-20302 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 17 March 2010, Lucía Ríos (USNM). 11-SRNP-56177 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 27 October 2011, Mariano Pereira (USNM). 11-SRNP-56183 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 24 October 2011, Mariano Pereira. 06-SRNP-47878 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Pajarito, 600 m, 10.88989 -85.47427, 17 November 2006, Harry Ramírez (USNM). 10-SRNP-109997 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 8 July 2010, H. Cambroner & S. Ríos (MNCR). 10-SRNP-71124 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Suspiro, 10.98394 -85.38853, 439 m, 24 March 2010, Manuel Ríos (USNM).

Diagnosis: In the male genitalia, the phallus of *Nystalea marona* is wider in the proximal part and thicker in the distal part than in *N. romanmacayai* (Figs. 111, 116).

Distribution: *Nystalea marona* has been reared and collected with light traps in dry forest and rain forest on both slopes of the Cordillera Volcánica de Guanacaste, and in the Caribbean and Pacific lowlands. The elevational range for the species is 0-1220 m.

Natural history: (Figs. 415-425) 165 Rearing records: ACG locations: Sector Pocosol (n=1), Sector Santa Rosa (n=9), Sector El Hacha (n=37), Sector Santa Elena (n=7), Sector Murciélagos (n=1), Sector Cacao (n=6), Sector Pitilla (n=4), Sector Del Oro (n=26), Sector Mundo Nuevo (n=6), Sector San Cristóbal (n=55), Sector Brasilia (n=2), Sector Rincón Rain Forest (n=10), Sector San Ramón (n=1).

Food plants: Clusiaceae: *Garcinia intermedia* (n=134), *G. madruno* (Kunth) Hammel (n=7), *Symphonia globulifera* (n=24).

Parasitoids: Braconidae: (n=1), *Hypomicrogaster* OVRGDHJ03 (n=1), Tachinidae: *Patelloa xanthura*DHJ01 (n=1).

Remarks: BIN BOLD:AAA2706 (Fig. 490).

Genbank Accession: GU3334227

DNA barcode of male 04-SRNP-3113

MHANA|04-SRNP-3113|*Nystalea marona*|COI-5P

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NNAACATGATATATTTATTTTGGTATTGGAGCGGGAATAGTTGGAACCTCTC
TTAGTTTATTAATTCGAGCTGAATTAGGAAATCCTGGATCTTTAATTTGGAGA
TGATCAAATTTATAAATACTATTGTAACAGATCATGCTTTTATTAATTTT
TTTATAGTAATACCTATTATAATTTGGGGGATTGGAACTGATTAGTACCTT
TAATATTAGGAGCCCTGATATAGCTTTTCCACGAATAAATAATAAGATT
TTGATTATACCCCCCTCTAACCCTTTAATTTCAAGAAGTATTGTAGAA
AATGGAGCAGGAAGCTGGATGAACAGTTTATCCCCACTTTTCATCAAATATTG
CCATAGAGGAAGCTCAGTAGATTAGCTATTTTCTTCTTCATTTAGCTGG
AATTTCTCTATTTTAGTGCTATTAATTTTATTACAACAATTATTAATATA
CGACTTAATAATATGTCATTCGATCAAATACCTTTATTTATTTGAGCGGTTG
GTATTACAGCATTTTATTATTATTATCCTTACCTGTTTTAGCTGGAGCAAT
TACTATACTTTTAACTGATCGAAATCTTAATACTTCTTTTTTTGATCTCTGCT
GGAGGAGGTGATCCAATTTTATATCAACATTTATTT
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The members of the *Aequipars* complex are *N. intichaconi* and *N. montana*. Adults of these species are morphologically similar.

Nystalea aequipars Walker, 1858

(Figs. 118-126, 368-371)

Nystalea aequipars Walker, 1858: 1742. Holotype, male. Brazil.

Nystalea divisa Möscher, 1882. 44, plate 18, fig. 32. Holotype, female.

Surinam

Heterocampa seminivea Walker, 1869. 17. Holotype, female. [Colombia]

Limas.

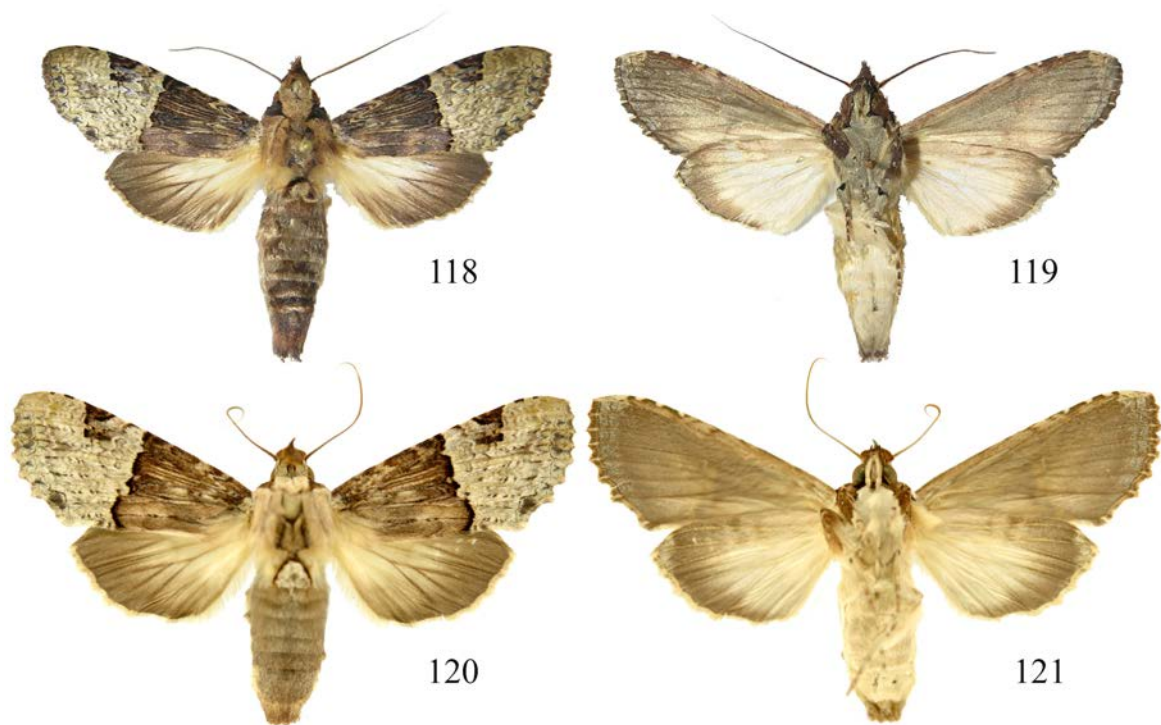
Redescription: MALE (Figs. 118, 119): FWL 23.8-28.1 mm (n=15). **Head:** Antennal shaft dark brown dorsally and reddish brown ventrally; scape bearing beige long tuft yellow-brown and grey scales, frons beige; labial palpus dark brown ventrally, dark brown dorsally; vertex dark brown; patagium beige. **Thorax:** Tegula dark brown at the base, a mix light, dark brown and yellow-brown scales distally; mesoscutellum beige; dorsal area of metathorax black with dirty brown and straw color intermixed scales; thoracic pleuron light brown and dirty brown; thorax light brown ventrally. **Legs:** Mostly black, dark brown and beige, with black and light brown scales between segments and margins. **Wings:** Dorsal FW coloration basal two-thirds dark brown; outer half either greyish white with grey and brown mottling, subterminal line black triangular marks, fringe brown and greyish, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe light yellow (Figs. 118, 119).

Abdomen: Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 122) with tergum VIII rectangular, posterior margin irregular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with deep invagination medially. Genitalia (Fig. 123) with sacculus sclerotized basally, valvae membranous and wide basally, oval at apex, costal margin smooth and sclerotized, thin and flattened midvalve sclerotization, costula flattened at base, width in middle, wide, rounded and flattened projection distally; uncal process thin, tubular, slightly setose and curved at apex, uncus lobes rectangular and setose, socii elongated, oval, sclerotized, setose slightly curved apex projections. Aedeagus (Fig. 124) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thick, distal part sclerotized, robust and acute, with small, rounded sclerotized projection in dorsal margin, middle part of phallus robust and elongated.

FEMALE: Similar to male but larger (Figs. 120, 121). FWL 26.9-30 mm (n=12).

Female genitalia (Figs. 125-126): Papillae anales ovoid and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, short, sclerotized and acute cusps, postvaginal



Figures 118-121. *Nystalea aequipars* Walker, 1858: 118, 119. ♂ dorsal and ventral (09-SRNP-22184) FWL 23.8 mm; 120, 121. ♀ dorsal and ventral (INB0003341396) FWL 26.9 mm.



Figures 122-126. *Nystalea aequipars* Walker, 1858: 122. ♂ sternum VIII 5.4 mm length, 123 ♂ genitalia 8 mm, 124. phallus 5.7 mm (06-SRNP-103177); 125, 126. ♀ genitalia 7.1 mm (01-SRNP-11011).

plate sclerotized with two short cusps, apophyses anteriores shorter than posterior; ductus bursae robust and heavily sclerotized; corpus bursae globular, wrinkled surface, with sclerotized shield, signum rounded and concave.

Material examined: 63 ♂♂, 32 ♀♀.

♂♂ (**COI Barcoded**): 06-SRNP-5632 Costa Rica, Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 6 August 2006, Osvaldo Espinoza (USNM). 97-SRNP-7159 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Rio Cucaracho, 640 m, 10.8702 -85.39153, 9 January 1998, Osvaldo Espinoza (USNM). 09-SRNP-1157 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 18 April 2009, Gloria Sihezar (USNM). 11-SRNP-3867 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 27 October 2011, Elda Araya (USNM). 03-SRNP-9995 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 4 December 2003, Carolina Cano (USNM). 06-SRNP-103177 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 24 April 2006, S. Ríos & H. Cambronero (MNCR). 08-SRNP-102524 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jabalina, Manta Pizote, 288 m, 10.97325 -85.31542, 6 June 2008, S. Ríos & R. Franco (MNCR). 13-SRNP-76796 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Llanura, 135 m, 10.93332 -85.25331, 3 August 2013, Cirilo Umaña (USNM). 11-SRNP-71623 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Cafecito, 455 m, 10.94404 -85.31738, 23 February 2011, Edwin Apu (USNM). 09-SRNP-107141 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Protrero Chaves, 433 m, 10.93868 -85.32167, 18 August 2009, R. Franco & S. Ríos (MNCR). 08-SRNP-107662 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Botarrama, Manta Loma, 200 m, 10.95897 -85.28527, 28 October 2008, H. Cambronero & F. Quesada (MNCR). 14-SRNP-42565 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Río Francia Arriba, 400 m, 10.896660 -85.290030, 4 June 2014, Jorge Hernández (USNM). INB0004211300 Costa Rica, Prov. Alajuela, Upala, Bijagua, Finca Inti - Aura, 320 m, 10.759255 -85.011339, 27 April 2009, J. A. Azofeifa (MNCR). INB0004211285 Costa Rica, Prov. Alajuela, Upala, Bijagua, Finca Inti - Aura, 320 m, 10.759255 -85.011339, 27 April 2009, J. A. Azofeifa (MNCR). INB0004211299 Costa Rica, Prov. Alajuela, Upala, Bijagua, Finca Inti - Aura, 320 m, 10.759255 -85.011339, 27 April 2009, J. A. Azofeifa (MNCR). INB0003971136 Costa Rica, Prov. Alajuela, Estación Caño Negro, 49 m, 10.89347 -84.789921, 3 September 2005, J. Azofeifa, Y. Cárdenas, M. Moraga (MNCR). INBIOCRI001336305 Costa Rica, Prov. Heredia, Est. Magsasay, P. N. Braulio Carrillo, 200 m, 10.401256 -84.050228, 1 June 1991, A. Fernández (MNCR). INB0003008587 Costa Rica, Prov. Heredia, La Selva Biol. Sta. Puerto Viejo de Sarapiquí, 40 m, 10.439193 -84.010919, 1 September 1986, M. M. Chavarría (MNCR). INB0003008599 Costa Rica, Prov. Heredia, La Selva Biol. Sta. Puerto Viejo de Sarapiquí, 40 m, 10.431958 -84.0091, 1 September 1986, M. M. Chavarría (MNCR). INB0004027728 Costa Rica, Prov. Heredia, Sarapiquí, Cecafor, 50 m, 10.38878 -83.971554, 4 August 2006, J. A. Azofeifa, B. Gamboa, M. Moraga (MNCR). INB0004178749 Costa Rica, Prov. Heredia, Sarapiquí, La Virgen, Est. Biol. La Tirimbina, 167 m, 10.416556 -84.120167, 28 October 2008, I. Chacón (MNCR). INB0004243298 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, 167 m, 10.416556 -84.120167, 9 August 2010, I. Chacón, A. Barrientos (MNCR). INB0004027884 Costa Rica, Prov. Heredia, Sarapiquí, Cecafor, 50 m, 10.38878 -83.971554, 4 August 2006, J. A. Azofeifa, B. Gamboa, M. Moraga (MNCR). INB0004027733 Costa Rica, Prov. Heredia, Sarapiquí, Cecafor, 50 m, 10.38878 -83.971554, 4 August 2006, J. A. Azofeifa, B. Gamboa, M. Moraga (MNCR). 08-SRNP-23846 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 26 October 2008, Lucía Ríos (USNM). 08-SRNP-23710 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 30 October 2008, Lucía Ríos (USNM). 09-SRNP-22184 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 5 September 2009, Lucía Ríos (USNM). 11-SRNP-23051 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 19 November 2011, Roster Moraga (USNM). 00-SRNP-3880 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 10 September 2000, Lucía Ríos (USNM). 08-SRNP-23737 Costa Rica, Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 9 November 2008, Elieth Cantillano (USNM). 05-SRNP-47640 Costa Rica, Prov. Guanacaste, Sector Cacao, Puente Gongora, 540 m, 10.88489 -85.47203, 5 January 2006, Harry Ramírez (USNM). 06-SRNP-65679 Costa Rica, Prov. Guanacaste, Sector Pitilla, Cabrera, 500 m, 11.00891 -85.40977, 21 January 2007, Manuel Ríos

(USNM). 95-SRNP-6070 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 21 July 1995, Gusaderos (USNM). 95-SRNP-6069 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 21 July 1995, Gusaderos (USNM). 08-SRNP-23708 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 5 November 2008, Lucía Ríos (USNM). 09-SRNP-22126 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 21 August 2009, Lucía Ríos (USNM). 10-SRNP-113680 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Copelares, 1478 m, 10.81692 -85.34679, 8 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-21982 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 30 September 2010, Lucía Ríos (USNM). 10-SRNP-31737 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaiciga, 445 m, 11.01983 -85.41342, 22 August 2010, Calixto Moraga (USNM). 11-SRNP-21308 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 17 July 2011, Lucía Ríos (USNM). INBIOCRI002438593 Costa Rica, Prov. Puntarenas, Albergue Cerro de Oro, 150 - 170 m, 8.562878 -83.499073, 25 March 1996, L. Angulo (MNCR). 14-SRNP-21151 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 17 November 2014, Lucía Ríos (USNM). 15-SRNP-72502 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.996969 -85.396659, 5 January 2016, Ricardo Calero (USNM). 11-SRNP-70892 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 15 May 2011, Ricardo Calero (USNM). 14-SRNP-103471 Costa Rica, Prov. Guanacaste, Sector Rincón Rain Forest, Wege Palmeras, 369 m, 10.96869 -85.31965, 22 September 2014, R. Franco & S. Ríos (MNCR). 14-SRNP-104026 Costa Rica, Prov. Guanacaste, Sector Rincón Rain Forest, Wege Palmeras, 369 m, 10.96869 -85.31965, 25 September 2014, H. Cambronero & R. Franco (MNCR). 11-SRNP-21505 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 15 August 2011, Lucía Ríos (USNM). 10-SRNP-71517 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 18 May 2010, Manuel Ríos (USNM). 10-SRNP-72259 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 22 August 2010, Manuel Ríos (USNM). 08-SRNP-103768 Costa Rica, Prov. Guanacaste, Sector Del Oro, Bosque Aguirre, 571 m, 11.00404 -85.44125, 2 July 2008, R. Franco & S. Ríos (MNCR). 05-SRNP-47460 Costa Rica, Prov. Guanacaste, Sector Cacao, Puente Gongora, 540 m, 10.88489 -85.47203, 20 September 2005, Manuel Pereira (USNM). 94-SRNP-5999 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 22 August 1994, Gusaderos (USNM). 14-SRNP-31648 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.019259 -85.40997, 21 December 2014, Calixto Moraga (USNM). 09-SRNP-22125 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 20 September 2009, Lucía Ríos (USNM). INB0003459588 Costa Rica, Prov. Puntarenas, Manglar Rincón, 0 - 100 m, 8.688097 -83.471299, 14 April 2002, M. Moraga (MNCR). INBIOCRI001689893 Costa Rica, Prov. Fila Guerra, Península de Osa, 1-100 m, 8.750088 -83.611228, 1 March 1991, J. Quesada (MNCR). INB0003722726 Costa Rica, Prov. Puntarenas, Montaña Grande, Reserva Priv. Karen Mogensen, 300 - 500 m, 9.867095 9.867095, 9 July 2003, I. Chacón (MNCR). INB0004137801 Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Centro Operativo, 3 m, 8.739863 -83.293143, 7 March 2008, J. A. Azofeifa (MNCR). INB0003326850 Costa Rica, Prov. Puntarenas, Golfito, P. N. Piedras Blancas, Est. El Bonito, 100 m, 8.680656 -83.227328, 23 March 2001, M. Moraga (MNCR). INBIOCRI000625680 Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 80 m, 9.387728 -84.132806, 1 February 1991, R. Zuñiga (MNCR). INBIOCRI001394247 Costa Rica, Prov. Puntarenas, P. N. Manuel Antonio, Quepos, 80 m, 9.387728 -84.132806, 1 April 1992, G. Varela (MNCR). INBIOCRI000707471 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, Res. Biol. Carara, 50 m, 9.767453 -84.608119, 1 June 1992, J. C. Saborío (MNCR). INBIOCRI000981790 Costa Rica, Prov. Limón, Manzanillo, RNFS Gandoca y Manzanillo, 0-100 m, 9.632582 -82.659053, 27 January 1993, K. Taylor (MNCR). INBIOCRI000265676 Costa Rica, Prov. Limón, Cerro Tortuguero, P. N. Tortuguero, 0 - 100 m, 10.584815 -83.529205, 1 May 1990, J. Solano (MNCR). ♀♀ (**COI Barcoded**): 95-SRNP-6072 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 20 July 1995, gusaneros (USNM). 10-SRNP-70841 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.39666, 23 March 2010, Ricardo Calero. 95-SRNP-6071 Costa Rica, Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 22 July 1995, Gusaderos. 13-SRNP-76797 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Llanura, 135 m,

10.93332 -85.25331, 4 August 2013, Cirilo Umaña. 02-SRNP-11255 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 18 July 2002, Gusaneros. 06-SRNP-12196 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Quebrada Clusia, 310 m, 10.85877 -85.66120, 1 February 2006, Eilyn Camacho (USNM). 01-SRNP-11891 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 22 November 2001, Lucía Ríos (USNM). 01-SRNP-9924 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 9 September 2001, Lucía Ríos (USNM). 02-SRNP-11254 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 16 July 2002, Gusaneros (USNM). 96-SRNP-9272 Costa Rica, Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 20 September 1996, Gusaneros (USNM). 10-SRNP-72986 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 16 October 2010, Ricardo Calero (USNM). 11-SRNP-69349 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Cafecito, 455 m, 10.94404 -85.31738, 23 February 2011, Edwin Apu (USNM). 11-SRNP-70009 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.39666, 24 January 2011, Ricardo Calero (USNM). 11-SRNP-21597 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 14 August 2011, Lucía Ríos (USNM). INB0003741148 Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Sector El Pilón, 700 - 800 m, 31 July 2003, J. Azofeifa (MNCR). INB0003341396 Costa Rica, Prov. Puntarenas, Golfito, R. V. S. Golfito, El tajo, 150 m, 8.680656 -83.227328, 20 April 2001, Jimmy Jiménez (MNCR). 95-SRNP-9969 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Gongora, 570 m, 10.88700 -85.47443, 1 September 1995, Gusaneros (USNM). 14-SRNP-72033 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Quica, 470 m, 10.99697 -85.396659, 23 November 2014, Ricardo Calero (USNM). 11-SRNP-69350 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Cafecito, 455 m, 10.94404 -85.31738, 21 February 2014, Edwin Apu (USNM). 11-SRNP-103068 Costa Rica, Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 2 May 2011, R. Franco & S. Ríos (MNCR). 10-SRNP-80257 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jacobo, 10.94076 -85.3177, 461 m, 29 August 2010, Duvalier Briceño (USNM). 08-SRNP-102525 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jabalina, Manta Pizote, 288 m, 10.97325 -85.31542, 6 June 2008, S. Ríos & R. Franco (MNCR). 01-SRNP-11009 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 19 September 2001, Lucía Ríos (USNM). 95-SRNP-9360 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Gongora, 570 m, 10.88700 -85.47443, 8 October 1995, Gusaneros (USNM). 99-SRNP-2987 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Tigre, 280 m, 11.03172 -85.52615, 25 July 1995, Roster Moraga (USNM). 01-SRNP-11011 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 21 September 2001, Lucía Ríos (USNM). 94-SRNP-2185 Costa Rica, Prov. Guanacaste, Sector Pocosol, Quebrada Aserradero, 160 m, 10.89857 -85.56419, 31 May 1994, Gusaneros (USNM). 99-SRNP-15419 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Tigre, 280 m, 11.03172 -85.52615, 22 December 1999, Lucía Ríos (USNM). INB0003971143 Costa Rica, Prov. Alajuela, Estación Caño Negro, 49 m, 10.89347 -84.789921, 3 September 2005, J. Azofeifa, Y. Cárdenas, M. Moraga (MNCR). 10-SRNP-42892 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Juntas, 400 m, 10.90661 -85.28784, 30 August 2010, Pablo Umaña Calderón (USNM). 02-SRNP-12614 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 18 July 2002, Gusaneros (USNM). 08-SRNP-22018 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tangelo, 410 m, 11.01823 -85.45024, 27 July 2008, Roster Moraga (USNM).

Diagnosis: Male genitalia with costula flattened basally, wide in the center, wide and round with flattened projection distally (Fig. 123). The costula of this species is the largest and most sclerotized of the species that make up this complex.

Distribution: *Nystalea aequipars* has been reared and collected with light traps in the rain forest and cloud forest, on both slopes of Cordillera Volcánica de Guanacaste, east slope of Cordillera Volcánica Central and Cordillera de Talamanca, Caribbean and Pacific lowlands. The elevational range for the species is 1-1100 m.

Natural history: (Figs. 368-371) 88 rearing records: ACG locations: Sector El Hacha (n=29), Sector Pitilla (n=21), Sector San Cristóbal (n=10), Sector

Pocosol (n=10), Sector Rincón Rain Forest (n=9), Sector Cacao (n=4), Sector Santa Elena (n=4), Sector Del Oro (n=1).

Food plants: Clusiaceae: *Clusia rosea* (n=48), *C. cylindrica* (n=26), *C. minor* (n=7), *C. croatii* (n=2), *C. palmana* (n=1).

Remarks: BIN BOLD:AAB5463 (Fig. 490).

Genbank Accession: GU160097

DNA barcode of male 05-SRNP-47640.

MHANC429-06(05-SRNP-47640)(*Nystalea aequipars*)(COI-5P

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NNAACATTATATTTATTTTGGGATTGAGCAGGAATAGTAGGAACCTCTC
TTAGATTATTAATTCGAGCTGAATTAGGAAATCCTGGATCTTTAATTTGGAGA
TGATCAAATTTATAACTATTGTAACAGCTCATGCTTTTATTATAAATTTT
TTTATAGTTATACCTATTATAATTTGGAGGATTTGGAACTGATTAATCCCTT
TAATATTAGGAGCTCCTGATATAGCTTTCCCCCGTATAAATAATAAGTTT
TTGATTATACCCCTTCATTAACCTTTTAATTTCAAGAAGTATTGTAGAA
AATGGAGCAGGAACAGGATGAACAGTTTACCCCTTACCTGTCATCTAATATTG
CTCATAGAGGAAGTTTCAGTAGATTAGCTATCTTTTCCCTTACATCTCGTGG
TATTTCTTCTATTTTAGGAGCTATTAATTTTATTACAACAATTATTAATATA
CGACTTAATAATATATCTTTTGACCAAAATACCTTTATTTGTTTGGCGGTAG
GAATTACAGCATTTTACTTTTACTTTTCTTTTACTGTTTGTAGCAGGCAAT
TACTATACTTTTAACTGATCGAAATCTTAATACATCATTTTTTGACCCAGCA
GGAGGTGGAGATCCAATTTTATATCAACATTTATTT
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Nystalea intichaconi Chacón, new species

(Figs. 127-135, 145, 146)

Description: MALE (Figs. 127, 128) FWL 27.4-34.9 mm (n=14). **Head:** Antennal shaft dark brown and beige dorsally, reddish brown ventrally; scape bearing a long beige tuft, composed of reddish brown and dark brown scales; frons beige and black; labial palpus dark brown and beige ventrally, black dorsally; vertex dark brown; patagium beige. **Thorax:** Tegula black basally, a mix light, dark brown and beige scales distally; mesoscutellum beige and black; thoracic pleuron light brown and dirty brown; dorsal area of metathorax black with dirty brown and straw colored intermixed scales; thorax light grey ventrally. **Legs:** Mostly black, dark brown and beige, with black and light brown scales between segments. **Wings:** Dorsal FW ground color two-thirds dark brown; outer half either greyish white with grey and brown mottling, subterminal line irregular line black, adterminal line black triangular marks, terminal line black, fringe alternating brown and greyish, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe light yellow (Figs. 127, 128). **Abdomen:** Dorsum dirty brown, venter light yellow and light brown with dark brown line in middle.

Male genitalia: Abdominal pelt (Fig. 131) tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with invagination medially. Genitalia (Figs. 132, 145) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization thin and curved, costula puffed and rounded basally, narrow, elongated and tubular in middle part, wide and round distally with thin finger-shaped process; curved uncus with two drop-shaped sclerotized lobes, socii with two sclerotized, elongated and setose projections. Aedeagus (Fig. 133, 146) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally, proximal part of phallus thick, distal part sclerotized, robust and rounded, with small straight, sclerotized, rounded protuberance in dorsal margin.

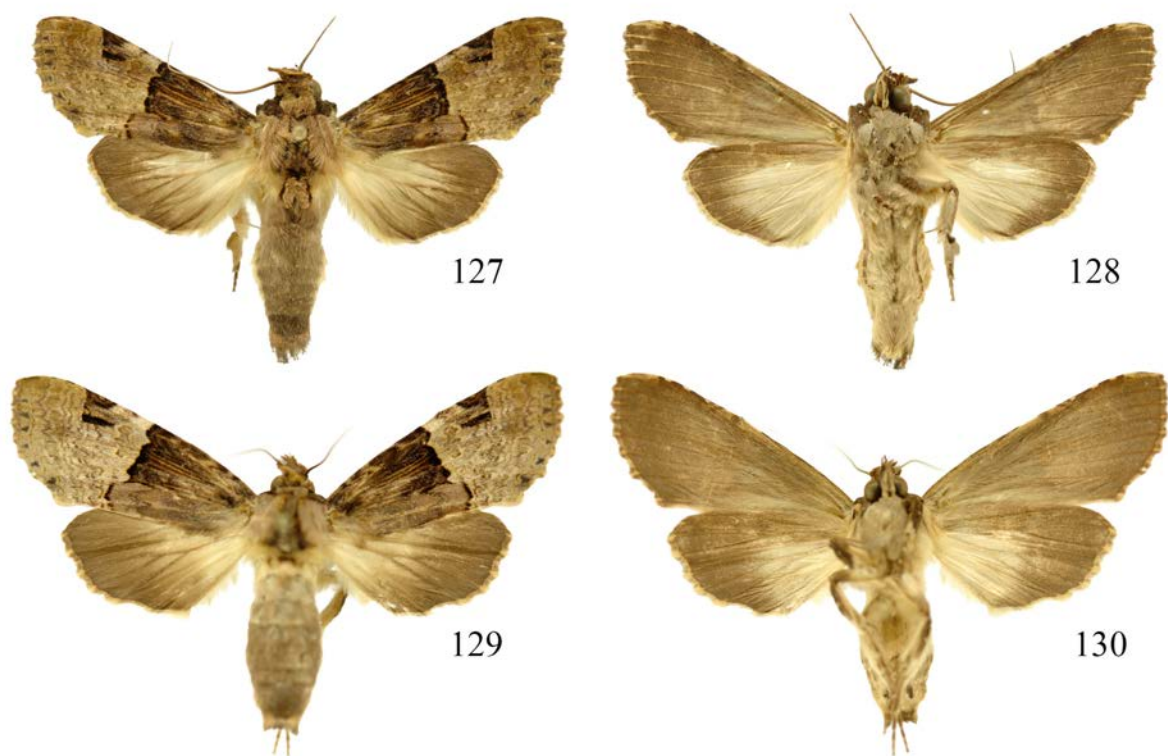
FEMALE: Similar to male but larger (Figs. 129, 130). FWL 27.5-35.8 mm (n=2).

Female genitalia (Figs. 134-135): Papillae anales membranous, covered with short, scattered setae, anterior apophyses short and sclerotized, posterior apophyses long, lateral process of postvaginal plate sclerotized with short and sharp apices, postvaginal plate posterior margin with two cusps rounded and small invagination in the middle; ductus bursae sclerotized, wide distally, narrow and tubular basally, corpus bursae globular, surface wrinkled, signum ovoid with two tiny depressions.

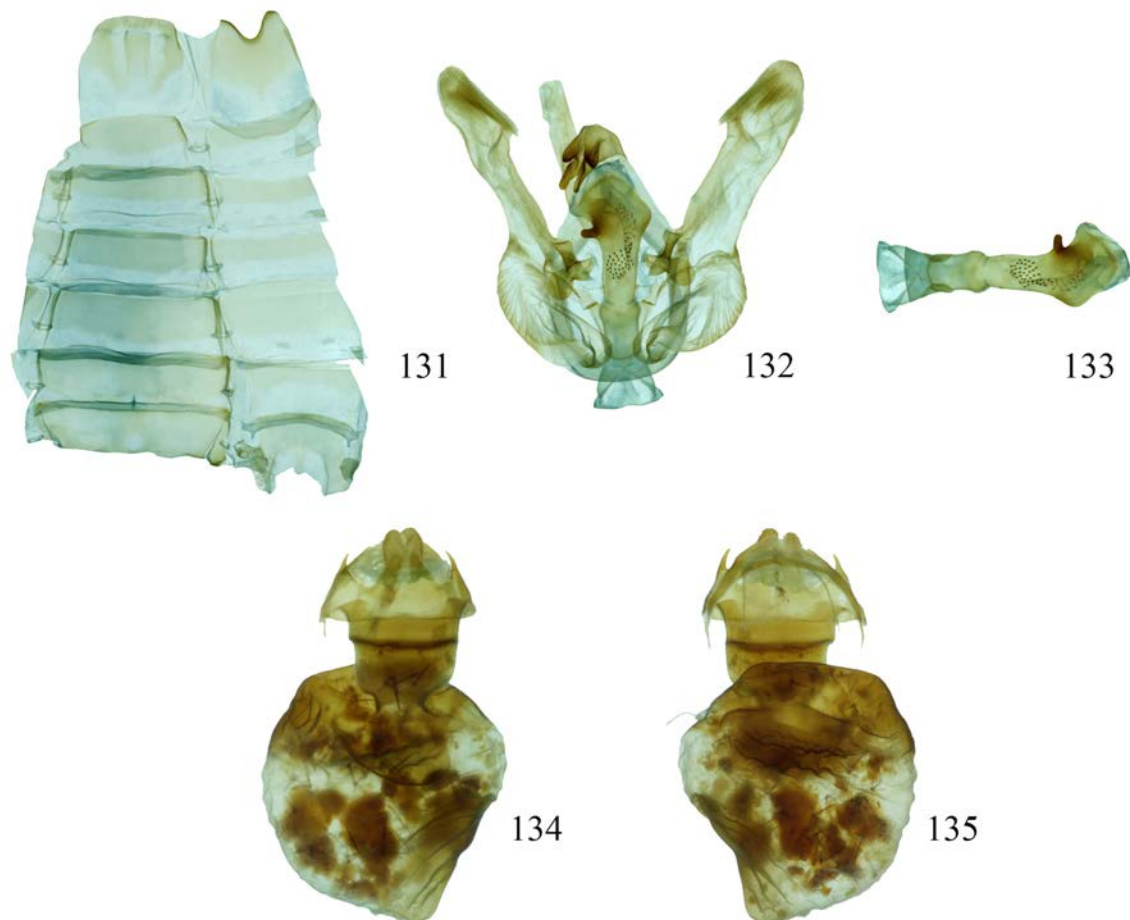
Etymology: *Nystalea intichaconi* is named in honor of Inti Chacón Madrigal, for their understanding, support and invaluable help.

Type material: 27 ♂♂, 2 ♀♀.

HOLOTYPE, ♂ INB0004211667 Costa Rica, Prov. Heredia, Sarapiquí, Est.



Figures 127-130. *Nystalea intichaconi*: 127, 128. ♂ dorsal and ventral (INBIOCRI001670304) FWL 24.6 mm; 129, 130. ♀ dorsal and ventral (INB0004110908) FWL 24.9 mm.



Figures 131-135. *Nystalea intichaconi*: 131. ♂ sternum VIII 5 mm length, 132. ♂ genitalia 7.7 mm length, 133. phallus 5.9 mm length (INB0004127588); 134, 135. ♀ genitalia 9.1 mm length (INB0004162597).

Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 24 April 2009, I. Chacón, A. Barrientos (MNCR).

PARATYPES: 26 ♂♂, 2 ♀♀.

♂♂ (**COI Barcoded**): INB0004211712 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 24 April 2009, I. Chacón, A. Barrientos (MNCR). INB0004207855 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 26 March 2009, I. Chacón, A. Barrientos (MNCR). INB0004215676 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 24 May 2009, I. Chacón, A. Barrientos (MNCR). INBIOCRI001925695 Costa Rica, Prov. Finca Naranjo Valenciana, 2 km sur Pueblo Nuevo, Sarapiquí, 90 m, 10.466407 -84.116393, 31 January 1993, M. Ortiz (MNCR). INBIOCRI000676669 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0 - 100 m, 8.480171 -83.591289, 1 November 1990, J. C. Saborío (MNCR). INBIOCRI000672660 Costa Rica, Prov. Puntarenas, Rancho Quemado, Pen. Osa, 200 m, 8.679096 -83.566714, 1 December 1990, F. Quesada (MNCR). INBIOCRI000579685 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0 - 100 m, 8.480171 -83.591289, 1 October 1990, J. C. Saborío (MNCR). INB0004127588 (dissected) Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Área Administrativa, 47 m, 12 November 2007, J. A. Azofeifa (MNCR). INB0004137574 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, 47 m, 8.546089 -83.397802, 27 February 2008, J. A. Azofeifa (MNCR). INB0004191609 Costa Rica, Prov. Puntarenas, Osa, R. F. Golfo Dulce, Cerro Brujo, 612 m, 8.662821 -83.583982, 25 January 2009, J. A. Azofeifa, A. Chamorro (MNCR). INB0004191609 Costa Rica, Prov. Puntarenas, Osa, R. F. Golfo Dulce, Cerro Brujo, 612 m, 8.662821 -83.583982, 24-25 January 2009, J. A. Azofeifa, A. Chamorro (MNCR). INB0004191629 Costa Rica, Prov. Puntarenas, Osa, R. F. Golfo Dulce, Cerro Brujo, 612 m, 8.662821 -83.583982, 25 January 2009, J. A. Azofeifa, A. Chamorro (MNCR). INBIOCRI001670304 Costa Rica, Prov. Puntarenas, Est. Esquinas, Pen. de Osa, 1 October 1993, J. Quesada (MNCR). INBIOCRI001205108 Costa Rica, Prov. Puntarenas, Est. Sirena, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 May 1993, G. Fonseca (MNCR). INBIOCRI001201281 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 Jun 1993, G. Fonseca (MNCR). INBIOCRI001376980 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 March 1990, G. Fonseca (MNCR). INBIOCRI001689902 Costa Rica, Prov. Puntarenas, Fila Guerra, Península de Osa, 1-100 m, 8.750088 -83.611228, 1 March 1991, J. Quesada (MNCR). INBIOCRI002364318 Costa Rica, Prov. Puntarenas, Albergue Cerro de Oro, 150-170 m, 8.562878 -83.499073, 8 October 1995, L. Angulo (MNCR). INB0004204358 Costa Rica, Prov. Puntarenas, Buenos Aires, Alto Jalisco, 900-1000 m, 8.99583 -83.455555, 26 February 2009, E. Ulate, J. A. Azofeifa, M. Moraga (MNCR). INBIOCRI000153040 Costa Rica, Prov. Est. El Ceibo, P. N. Braulio Carrillo, 400-600 m, 10.328044 -84.080424, 1 March 1990, C. Chaves (MNCR). INBIOCRI001632042 Costa Rica, Prov. Limón, Río Sardinias, R.N.F.S. Barra del Colorado, 10 m, 10.64405 -83.742005, 19 October 1993, F. Araya (MNCR). INB0003103652 Costa Rica, Prov. Limón, Reserva Biol. Hitoy Cerere, 2 Km S de Estación, 200 m, 9.667248 -83.028632, 12 October 1999, R. Barton (MNCR). INB0004210861 Costa Rica, Prov. Limón, Veragua Rainforest, Campamento, 400-440 m, 9.92573 -83.191405, 27 April 2009, R. Villalobos (MNCR). INB0004213150 Costa Rica, Prov. Limón, Veragua Rainforest, Restaurant, 400-440 m, 9.92573 -83.191405, 28 May 2009, R. Villalobos (MNCR). INBIOCRI000957667 Costa Rica, Prov. Limón, Río Sardinias, R.N.F.S. Barra del Colorado, 10 m, 10.64405 -83.742005, 14 October 1992, F. Araya (MNCR). INBIOCRI001358985 Costa Rica, Prov. Limón, Est. Cuatro Esquinas, P.N. Tortuguero, 0 m, 10.539549 -83.506481, 1 March 1993, R. Delgado (MNCR). ♀♀ (**COI Barcoded**): INB0004110908 Costa Rica, Prov. Puntarenas, R.F. Golfo Dulce, P.N. Corcovado, Est. Agujas, 200-300 m, 8.536614 -83.425512, 10-12 October 2007, J. A. Azofeifa (MNCR). INB0004162597 (dissected) Costa Rica, Prov. Limón, Veragua Rainforest, Restaurant, 400-440 m, 9.92573 -83.191405, 1-8 September 2008, R. Villalobos (MNCR).

Diagnosis: The male genitalia of *N. intichaconi* is smaller than the male genitalia of *N. montana*, compare Figs. 145, 146 to Figs. 147, 148. The uncus is curved with two drop-shaped sclerotized lobes, socii with two sclerotized, elongated and setose projections (Fig. 132).

Distribution: *Nystalea intichaconi* has been collected with light traps in rain forest in the Caribbean and Pacific lowlands. The elevational range for the species is 0-612 m.

Natural history: All specimens have been collected with light traps; the life history of *N. intichaconi* is unknown.

Remarks: BIN BOLD:ACL2867 (Fig. 490).

Genbank Accession: MT358264

DNA barcode of male holotype INB0004213150.

ASARD9675-14[INB0004213150](*Nystalea intichaconi*)|COI-5P

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AACGTTATATTTTATTTTGGTATTTGGAGCAGGAATAGTAGGAACCTTCTCTT
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ATCAAATTTATAACTATTGTAAACAGCACATGCTTTTATTATAATTTTTTTT
TATAGTTACACCTATTATAATTGGAGGATTTGGAAATGATTAAATTCCTCTA
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GGTTATTACCCTCATAACTCTTTTAAATTTCAAGAGATTTAGAGAAA
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CTATACTTTTAACTGATCGAAATCTTAATACATCATTTTTTTGACCCAGCAGG
AGGTGGAGATCCAATTTTATACCAACATTTATTT
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Nystalea montana Weller, 1990

(Figs. 136-144, 147, 148, 426-437)

MALE (Figs. 136, 137) FWL 26.7-37.6 mm (n=18).

Male genitalia: Abdominal pelt (Fig. 140) with tergum rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum rectangular, posterior margin slightly irregular, sclerotized with invagination medially. Genitalia (Fig. 141) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotized thin and curved, costula puffed and rounded at base, narrow, elongated and tubular in the middle, distal part wide and round saucer-like disk with elongated, thin finger-shaped projection, uncus process tiny, thin, tubular and curved, uncus with two drop-shaped sclerotized lobes, socii with two ovoid, sclerotized, elongated and setose projections. Aedeagus (Fig. 142) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base. proximal part of phallus thick, distal part sclerotized, robust and rounded, with small sclerotized, rounded protuberance in dorsal margin, bent towards distal part.

FEMALE: Similar to male but larger (Figs. 138, 139). FWL 31-41.1 mm (n=10).

Female genitalia (Figs. 143, 144): Papillae anales membranous, covered with short, scattered setae, anterior apophyses short and sclerotized, posterior apophyses long, lateral process of postvaginal plate sclerotized with short and sharp apices, postvaginal plate posterior margin sclerotized with two cusps and small invagination in the middle; ductus bursae sclerotized, wide distally, narrow and tubular basally, corpus bursae globular, surface wrinkled, signum ovoid with two tiny depressions.

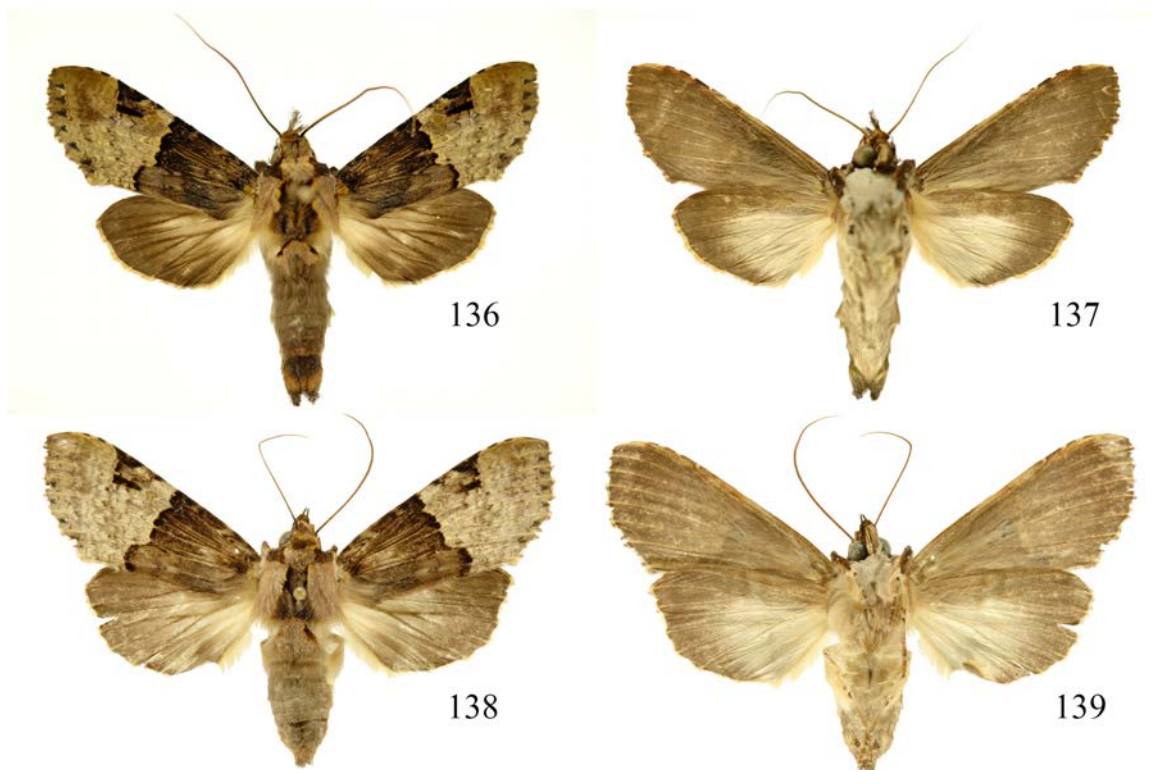
Material examined: 76 ♂♂, 23 ♀♀.

PARATYPES (not barcoded): 7 ♂♂, 1 ♀.

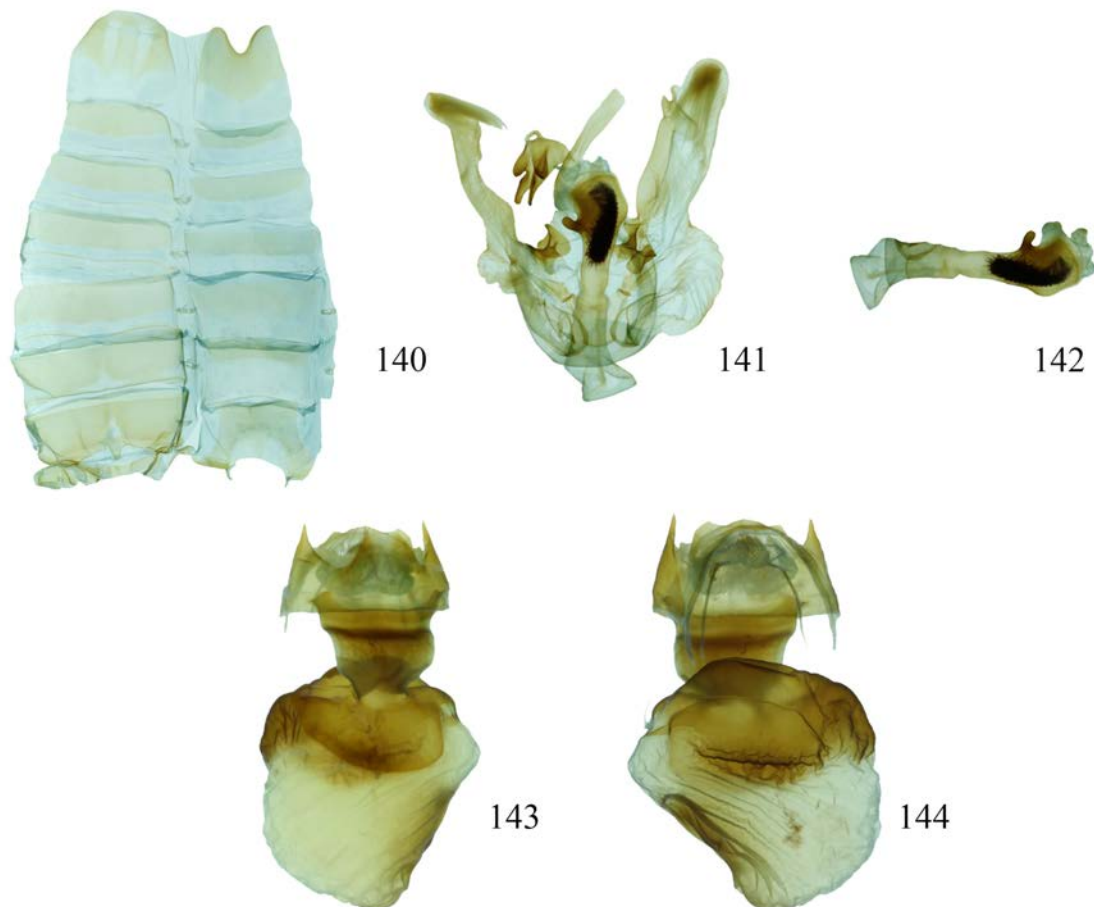
♂♂ Prov. San José, Carrillo Nat. Pk., La Montura Braulio Carrillo, 1,100 m, 17 Dec 1981. D.H. Janzen (MNCR). ♀ Cartago Prov., Moravia de Chirripo, 1,000 m, May 1983 D.H. Janzen (MNCR).

Additional material examined. 69 ♂♂, 22 ♀♀.

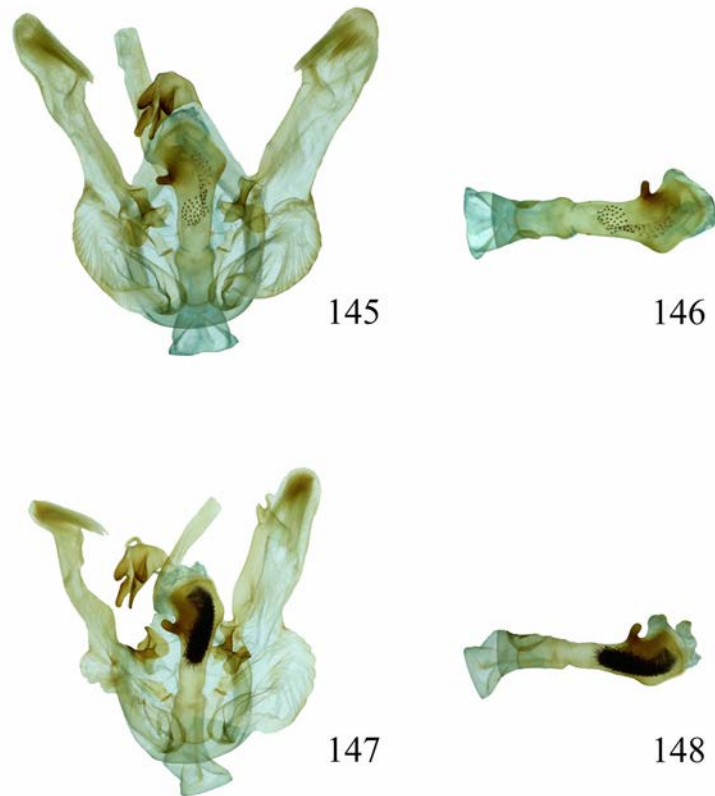
♂♂ (**COI Barcoded**): INB0003008696 Costa Rica, Prov. San José, Estación Zurquí (el Túnel) Par. Nac. Braulio Carrillo, 1500 m, 10.063063 -84.011307, 1 November 1985, I. A. Chacón (MNCR). INB0004427846 Costa Rica, Prov. San José, Estación Zurquí (el Túnel). Par. Nac. Braulio Carrillo, 1500 m, 10.063063 -84.011307, 1 August 1985, I. & A. Chacón (MNCR). INBIOCRI002437097 Costa Rica, Prov. San José Est. Santa Elena, El Tajo, 1210 m, 9.395701 -83.595652, 20 January 1996, E. Alfaro (MNCR). INBIOCRI002437180 Costa Rica, Prov. San José, Est. Santa Elena, El Tajo, 1210 m, 9.395701 -83.595652, 20 January 1996. E. Alfaro (MNCR). 07-SRNP-110205 (COI Barcoded) Costa Rica, Alajuela, Sector Rincón Rain Forest, Estación Caribe (melina), 391 m, 10.89560 -85.29558, 9 November 2007, F. Quesada & R. Franco (MNCR). 09-SRNP-103595 Costa Rica, Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Manta Trocha, 719 m, 10.86623 -85.32693, 26 March 2009. H. Cambronero & F. Quesada (MNCR). 01-SRNP-1840 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Colón, 590 m,



Figures 136-139. *Nystalea montana* Weller, 1990: 136, 137. ♂ dorsal and ventral (INB0004169637) FWL 28.7 mm; 138, 139. ♀ dorsal and ventral (INBIOCRI002404207) FWL 31.40 mm.



Figures 140-144. *Nystalea montana* Weller, 1990: 140. ♂ sternum VIII 5.1 mm length, 141. ♂ genitalia 8.1 mm length, 142. phallus 5.7 mm length (06-SRNP-102139); 143, 144. ♀ genitalia 8 mm length (INB00041700002).



Figures 145-148. Comparison of ♂♂ genitalia structure. *Nystalea intichaconi*: 145. ♂ genitalia 7.7 mm length, 146. phallus 5.9 mm length, *Nystalea montana* Weller, 1990: 147. ♂ genitalia 8.1 mm length, 148. phallus 5.7 mm length.

10.96386 -85.41914, 17 June 2001, Gloria Sihezar (USNM). 03-SRNP-6695 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco, 500 m, 10.90037 -85.37254, 22 July 2003, Gloria Sihezar (USNM). 04-SRNP-2682 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 7 October 2004, Elda Araya (USNM). 04-SRNP-2683 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 7 October 2004, Elda Araya (USNM). 05-SRNP-131 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 19 February 2005, Yessenia Mendoza (USNM). 06-SRNP-782 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 4 February 2006, Carolina Cano (USNM). 06-SRNP-103432 Costa Rica, Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 25 April 2006, R. Franco & S. Ríos (MNCR). 06-SRNP-103897 Costa Rica, Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 30 April 2006, S. Ríos & F. Quesada (MNCR). 11-SRNP-102967 Costa Rica, Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 1 May 2011, H. Cambronero & S. Ríos (MNCR). 11-SRNP-103179 Costa Rica, Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 3 May 2011. S. Ríos & H. Cambronero (MNCR). INB0003008691 Costa Rica, Prov. Alajuela, San Ramón, R.B. Alberto Manuel Brenes, Río San Lorencito, 5 km N de Colonia Palmareña, 800-900 m, 10.219533 -84.600758, 5 July 1986, A. Chacón & I. Chacón (MNCR). INB0003087735 Costa Rica, Prov. Alajuela, San Carlos, Reserva Ftal Arenal, Send Pilón, 650 m, 10.442743 -84.71649, 1 October 1999, G. Rodríguez (MNCR). INB0003485535 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Sector El Pilón, 700 - 800 m, 10.704603 -84.992304, 1 May 2002, G. Rodríguez (MNCR). INB0004169637 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 2, Falda N Cerro Montezuma, 1160 m, 10.698113 -85.018467, 22 September 2008, J. A. Azofeifa (MNCR). INB0004175206 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 30 September 2008, R. Rojas (MNCR). INB0004208176 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 29 October 2008. R. Rojas (MNCR). INB0004208606 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 25 November 2008, R. Rojas (MNCR).

INB0004078874 Costa Rica, Prov. Cartago, Turrialba, M.N. Guayabo, Est. Guayabo, 1100-1200 m, 9.97216 -83.692198, 8 May 2007, M. Moraga, J. A. Azofeifa, R. González, E. Navarro (MNCR). INB0003173844 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Estación Barbilla, 500 m, 9.981348 -83.454259, 1 April 2001, L. Chavarría (MNCR). INB0003008704 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D.H. Janzen & W. Hallwachs (MNCR). INBIOCRI000809418 Costa Rica, Prov. Cartago, Grano de Oro, Chirripó, Turrialba, 1120 m, 9.8183571 -83.459163, 1 October 1992, P. Campos (MNCR). INB0003935046 Costa Rica, Prov. Cartago, Pejibaye, Reserva Biol. Copal, 1040 m, 9.783407 -83.751929, 7 April 2005, J. Azofeifa, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INB0003935092 Costa Rica, Prov. Cartago, Pejibaye, Reserva Biol. Copal, 1040 m, 9.783407 -83.751929, 7 April 2005, J. Azofeifa, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INB0004054854 Costa Rica, Prov. Cartago, P.N. Tapantí, Mirador, 2500-2600 m, 9.705735 -83.862232, 24 January 2007. J. A. Azofeifa (MNCR). INB0003116603 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de La Muerte, Del Mirador 0.300 Km N, 0.100 Km S, 1380 m, 9.73635 -83.780628, 1 November 2000, R. Delgado (MNCR). INB0003079836 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de la Muerte, Al Costado de Casa Adm, 1200 m, 9.761676 -83.786507, 1 June 2000, L. Chavarría (MNCR). INB0003027624 Costa Rica, Prov. Heredia, A.C.C.V.C, La Virgen, Sarapiquí, 220 m, 10.401321 -84.136986, 6 February 1986, I. A. Chacón (MNCR). 99-SRNP-15300.01 Costa Rica, Guanacaste, Sector Del Oro, Quebrada Serrano, 585 m, 11.00025 -85.45614, 2 December 1999, Lucía Ríos (USNM). 10-SRNP-35182 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Cima, 1460 m, 10.93328 -85.45729, 30 June 2010, Manuel Pereira (USNM). 10-SRNP-36599 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 15 November 2010, Harry Ramírez (USNM). 10-SRNP-36602 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 17 November 2010, Manuel Pereira (USNM). 07-SRNP-107786 Costa Rica, Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 07-SRNP-107787 Costa Rica, Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 07-SRNP-107788 Costa Rica,

Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 09-SRNP-32982 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 December 2009, Calixto Moraga (USNM). 09-SRNP-33115 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Laguna, 680 m, 10.9888 -85.42336, 22 November 2009, Manuel Ríos (USNM). 09-SRNP-33440 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Carica, 660 m, 10.99284 -85.42936, 31 December 2009, Calixto Moraga (USNM). 09-SRNP-33497 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 25 February 2010, Manuel Ríos (USNM). 10-SRNP-30345 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 3 March 2010, Manuel Ríos (USNM). 10-SRNP-30346 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 3 March 2010, Manuel Ríos (USNM). 15-SRNP-30215 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 1 March 2015, Manuel Ríos (USNM). 07-SRNP-101915 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931, -85.42581, 17 March 2007. R. Franco & F. Quesada (MNCR). 06-SRNP-101930 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 28 February 2006, S. Ríos & H. Cambronero (MNCR). 06-SRNP-102139 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931, -85.42581, 675 m, 1 March 2006, S. Ríos & R. Franco (MNCR). 06-SRNP-102140 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931, -85.42581, 1 March 2006, S. Ríos & R. Franco (MNCR). 06-SRNP-102668 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 2 March 2006, R. Franco & F. Quesada (MNCR). 07-SRNP-102229 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 18 April 2007, H. Cambronero & S. Ríos (MNCR). 07-SRNP-103345 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 16 May 2007, F. Quesada & S. Ríos (MNCR). INB0003496042 Costa Rica, Prov. Guanacaste, Z.P. Tenorio, Sector Alto Los Masís, 1100 m, 10.614089 -84.992689, 14 June 2002, M. Moraga (MNCR). INB0003772630 Costa Rica, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100 m, 10.718333 -85.144722, 28 September 2003, B. Hernández (MNCR). INB0003772682 Costa Rica, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100 m, 10.718333 -85.144722, 28 September 2003, B. Hernández (MNCR). INB0004173416 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, Represa ICE, 1000 m, 10.716779 -85.154264, 10 October 2008, J. Azofeifa, B. Hernández, E. Méndez (MNCR). INB0004173497 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, Represa ICE, 1000 m, 10.716779 -85.154264, 10 October 2008, J. Azofeifa, B. Hernández, E. Méndez (MNCR). INBIOCRI001078658 Costa Rica, Prov. Puntarenas, Las Cruces Biol. Sta. San Vito, 1200 m, 8.795974 -82.955868, 18 May 1988, I. Chacón (MNCR). INBIOCRI002468149 Costa Rica, Prov. Puntarenas, Fila Cruces, Paraguas, 1400 m, 8.789737 -83.005417, 23 June 1995. I. A. Chacón (MNCR). INBIOCRI002025748 Costa Rica, Prov. Puntarenas, San Luis, Monteverde, A. C. Arenal, 1000-1350 m, 10.276723 -84.79662, 1 July 1994, Z. Fuentes (MNCR). INBIOCRI002432362 Costa Rica, Prov. Puntarenas, Estación Altmira, 1 Km. S del Cerro Biolley, 1450 m, 9.032987 -83.010887, 25 April 1996, R. Villalobos (MNCR). INB0003030991 Costa Rica, Prov. Limón, Pococí, Reserva Ftal. Cord. Vol. Central, Quebrada Molinet, 500 m, 10.178693 -83.922666, 28 August 1986, I. A. Chacón (MNCR). INB0004067359 Costa Rica, Prov. Limón, P.I. La Amistad Caribe, Camp. 1, Río Lori, Transecto 2, 1800-1900 m, 9.354167 -83.234444, 17 February 2007, B. Gamboa, M. Moraga (MNCR). ♀♀ (COI Barcoded): 97-SRNP-6495 Costa Rica, Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 18 August 1997, Osvaldo Espinoza (MNCR). 97-SRNP-6495 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 18 August 1997, Osvaldo Espinoza (USNM). 99-SRNP-5690 Costa Rica, Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 8 July 1999, Freddy Quesada (MNCR). 99-SRNP-5690 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 7 August 1999, Osvaldo Espinoza (USNM). 04-SRNP-2752 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 20 July 2004, Carolina Cano (USNM). 15-SRNP-1701 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.880089 -85.38886, 8 July 2015, Elda Araya (USNM). INB0004153867 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Punto 2, Falda N Cerro Montezuma, 1160 m, 10.698113 -85.018467, 27 June 2008, J. A. Azofeifa (MNCR). INB0004153988 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 4, Cerro Montezuma, 1510 m, 10.695154 -85.027602, 28 June 2008, J. A. Azofeifa (MNCR). INB0004170002 Costa Rica, Prov. Alajuela, Guatuso,

P.N. Volcán Tenorio, Punto 4, Cerro Montezuma, 1510 m, 10.695154 -85.027602, 27 August 2008, J. A. Azofeifa (MNCR). INB0003943159 Costa Rica, Prov. Cartago, P.N. Barbilla, Turrialba, Tayutic, Campamento 2, 1200 m, 9.936859 -83.414306, 9 May 2005, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). 04-SRNP-35257 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Ponderosa, 1060 m, 10.91460 -85.46262, 16 abril 2004, Isabella Burke (USNM). 10-SRNP-35183 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Cima, 1460 m, 10.93328 -85.45729, 30 June 2010, Manuel Pereira (USNM). 10-SRNP-36598 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 10 November 2010, Harry Ramírez (USNM). 10-SRNP-36600 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 10 November 2010, Harry Ramírez (USNM). 10-SRNP-36727 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 19 November 2010, Manuel Pereira (USNM). 10-SRNP-30152 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 18 February 2010, Calixto Moraga (USNM). 10-SRNP-30347 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 26 February 2010, Manuel Ríos (USNM). 10-SRNP-32136 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 1 November 2010, Calixto Moraga (USNM). 10-SRNP-32137 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 11 December 2010, Calixto Moraga (USNM). 10-SRNP-32417 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 31 December 2010, Manuel Ríos (USNM). INB0003968409 Costa Rica, Prov. Guanacaste, P.N. Miravalles, Volcán Miravalles, 1500 m, 10.747491 -85.165316, 4 July 2005, J. Azofeifa, I. López, H. Aguilar (MNCR). INBIOCRI002404207 Costa Rica, Prov. Puntarenas, Estación Altmira, 1 Km. S del Cerro Biolley, 1300-1450 m, 9.032987 -83.010887, 7 August 1995, R. Villalobos (MNCR).

Diagnosis: Male genitalia of *N. montana* are bigger than male genitalia of *N. intichaconi*. Uncal process tiny, thin, tubular and curved, uncus with two drop-shaped sclerotized lobes, socii with two ovoid, sclerotized, elongated and setose projections (Figs. 147, 148).

Distribution: *Nystalea montana* has been reared, and collected with light traps in rain forest and cloud forest, on both slopes of Cordillera Volcánica de Guanacaste, Cordillera de Tilarán, Cordillera Volcánica Central, Cordillera de Talamanca and Fila Costeña. The elevational range for the species is 200-2500 m.

Natural history: (Figs. 426-437) 51 rearing records: ACG locations: Sector Cacao (n=7), Sector Del Oro (n=1), Sector Pitilla (n=27), Sector Rincón Rain Forest (n=2), Sector San Cristóbal (n=14).

Food plants: Clusiaceae: *Clusia cylindrica* Hammel (n=6), *C. minor* L. (n=8), *C. palmana* Standl. (n=20), *C. quadrangula* Bartlett (n=1), *C. rosea* Jacq. (n=8), *C. stenophylla* Standl. (n=8).

Parasitoids: Braconidae: *Hypomicrogaster* OVRGDHJ03 (n=10), Tachinidae: *Houghia spathulata* (n=1).

Remarks: BIN BOLD:AAB4260 (Fig. 490).

GenBank Accession: JQ541933

DNA barcode of male 06-SRNP-782.

MHMXA674-06[06-SRNP-782](*Nystalea montana*)|COI-5P

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AACATTATATTTTTATTTTTGGTATTTTGAGCAGGAATAAGTAGGAACCTCTCTT
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AGGTGGAGATCCAATTCTATATCAACACTTATTT
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The members of the Multiplex complex are *N. multiplex* and *N. torbjornekremsi*. Adults of these species are morphologically similar.

Nystalea multiplex Dognin, 1909
(Figs. 149-161)

Redescription: MALE (Figs. 149, 150, 158) FWL 23.1-25.3 mm (n=9). **Head:** Antennal shaft gray dorsally and reddish brown ventrally; scape bearing long beige tuft with dark brown scales; frons dark brown with beige scales; labial palpus dark brown with some beige scales ventrally; vertex dark brown; patagium dark brown. **Thorax:** Tegula dark brown at base, a mix light, dark brown and reddish brown scales distally; mesoscutellum dark brown; dorsal area of metathorax dark brown with black and beige colored intermixed scales; thoracic pleuron beige; thorax dark brown and black ventrally. **Legs:** Mostly dark brown and black intermixed scales, with light brown scales between segments and margins. **Wings:** Dorsal FW coloration basal dark brown; in postmedial band two orbicular spots with black margin greyish green, subterminal line irregular black, terminal line gray, fringe gray and beige, dorsal HW translucent light yellow with veins and marginal shade dark-brown; fringe light yellow. **Abdomen:** Dorsum dirty brown, venter light yellow, terminal scale tuft black and gray.

Male genitalia: Abdominal pelt (Figs. 153, 159) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular and concave. Genitalia (Figs. 154, 160) with sacculus sclerotized basally. Valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization thin, costula wide basally, globular and flattened distally; uncus process thin, tubular, recurved at apex, slightly setose, uncus lobes thin, elongated, with setose apices, socii with two thin, acute and setose projections. Aedeagus (Figs. 155, 161) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base, proximal part of phallus thin, distal part thin and sclerotized with, middle part of phallus elongated and thin.

FEMALE: Similar to male but larger (Figs. 151, 152). FWL 24.4-25.6 mm (n=2).

Female genitalia (Figs. 156, 157): Papillae anales oval, membranous, small, lightly sclerotized, covered with short, scattered setae, but some longer, inwardly curved setae; postvaginal plate sclerotized, emarginate slightly invaginated in the middle, anterior apophysis shorter than posterior; ductus bursae tubular, elongate and heavily sclerotized; corpus bursae elongated, globular, wrinkled surface, small, sclerotized plate with elongated nipple-shaped lateral projection, elongated signum shaped like a spine.

Material examined: 15 ♂♂, 2 ♀♀.

♂♂ (**COI Barcoded**): INB0004265189 Costa Rica, Prov. Puntarenas, Osa, Los Charcos, 1 km E del pueblo de Banegas, 50 m, 8.671665 -83.504718, 6 October 2010, I. Chacón (MNCR). INBIOCRI002209250 Costa Rica, Prov. Puntarenas, Est. Pittier, 1670 m, 9.025664 -82.962695, 26 January 1995, M. Chinchilla (MNCR). INBIOCRI001328738 Costa Rica, Prov. Puntarenas, Península de Osa, Rancho Quemado, 200 m, 8.679096 -83.566714, 1 August 1991, F. Quesada (MNCR). INBIOCRI001407052 Costa Rica, Prov. Puntarenas, Península de Osa, Rancho Quemado, 200 m, 8.679096 -83.566714, 1 July 1991, F. Quesada (MNCR). INBIOCRI002595280 Costa Rica, Prov. Puntarenas, Est. Biológica Las Alturas, 100 m de la Est. Bosque Primario, 1540 m, 8.942209 -82.835553, 30 October 1997, B. Gamboa (MNCR). INBIOCRI000213699 Costa Rica, Prov. Puntarenas, Fca. Cafrosa, Est. Las Mellizas, P. N. Amistad, 1300 m, 8.891473 -82.792936, 1 Apr 1990, M. Ramírez & G. Mora (MNCR). INBIOCRI002413380 Costa Rica, Prov. Puntarenas, Sector Altamira, 1 Km S.O. del Cerro Biolley, Buenos Aires, 1150-1350 m, 9.031184 -83.014528, 30 January 1998, M. Moraga (MNCR). INB0003300600 Costa Rica, Prov. Puntarenas, Golfito, P.N. Piedras Blancas, Est El Bonito, 100 m, 8.680656 -83.227328, 31 July 2000, M. Moraga (MNCR). INB0004127499 Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Área Administrativa, 47 m, 8.54608 -83.397802, 9 November 2007, J. A. Azofeifa (MNCR). INB0004111055 Costa Rica, Prov. Puntarenas, Golfito, Jiménez, R.F. Golfo Dulce, P.N. Corcovado, Est. Agujas, 200-300 m, 8.536614 -83.425512, 12 October 2007, J. A. Azofeifa (MNCR). INB0004110995 Costa Rica, Prov. Puntarenas, Golfito, Jiménez, R.F. Golfo Dulce, P.N. Corcovado, Est. Agujas, 200-300 m, 8.536614 -83.425512, 12 October 2007, J. A. Azofeifa (MNCR). INBIOCRI002414006 Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est.

Agujas, Sen. Purruja, 300 m, 8.534815 -83.426667, 29 March 1998, J. A. Azofeifa (MNCR). INB0004103679 Costa Rica, Prov. Puntarenas, Golfito, R.F. Golfo Dulce, Fila Pizota, 8.512633 -83.404182, 100-200 m, 13 August 2007, J. A. Azofeifa (MNCR). INB0003880747 Costa Rica, Prov. Puntarenas, R.V.S. Río Piro, Golfito, Finca Catalino, 200 m, 8.426231 -83.343497, 17 September 2004, Y. Cardenas, M. Moraga, D. Briceño, B. Gamboa (MNCR). INB0003880748 (COI Barcoded) Costa Rica, Prov. Puntarenas, R.V.S. Río Piro, Golfito, Finca Catalino, 200 m, 8.426231 -83.343497, 17 September 2004, Y. Cardenas, M. Moraga, D. Briceño, B. Gamboa (MNCR). ♀♀ (**COI Barcoded**): INBIOCRI000428546 Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 140 m, 9.393161 -84.126895, 1 October 1990, G. Varela & R. Zuñiga (MNCR). INB0004170060 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 4: Cerro Montezuma, 1510 m, 10.695154 -85.027602, 27 August 2008, J. A. Azofeifa (MNCR).

Diagnosis: The socii of *N. multiplex* are longer and thinner than those of *N. torbjornekremsi* (Figs. 154, 167).

Distribution: *Nystalea multiplex* has been collected with light traps in rain forest and cloud forest, on the east slope of the Cordillera Volcánica de Guanacaste, the west slope of the Cordillera de Talamanca, and in the Pacific lowlands. The elevational range for the species is 0-1300 m.

Natural history: All specimens have been collected with light traps; the life history of *N. multiplex* is unknown.

Remarks: BIN BOLD:ACL3561 (Fig. 490).

Genbank Accession: MT358262

DNA barcode of male INB0004265189.

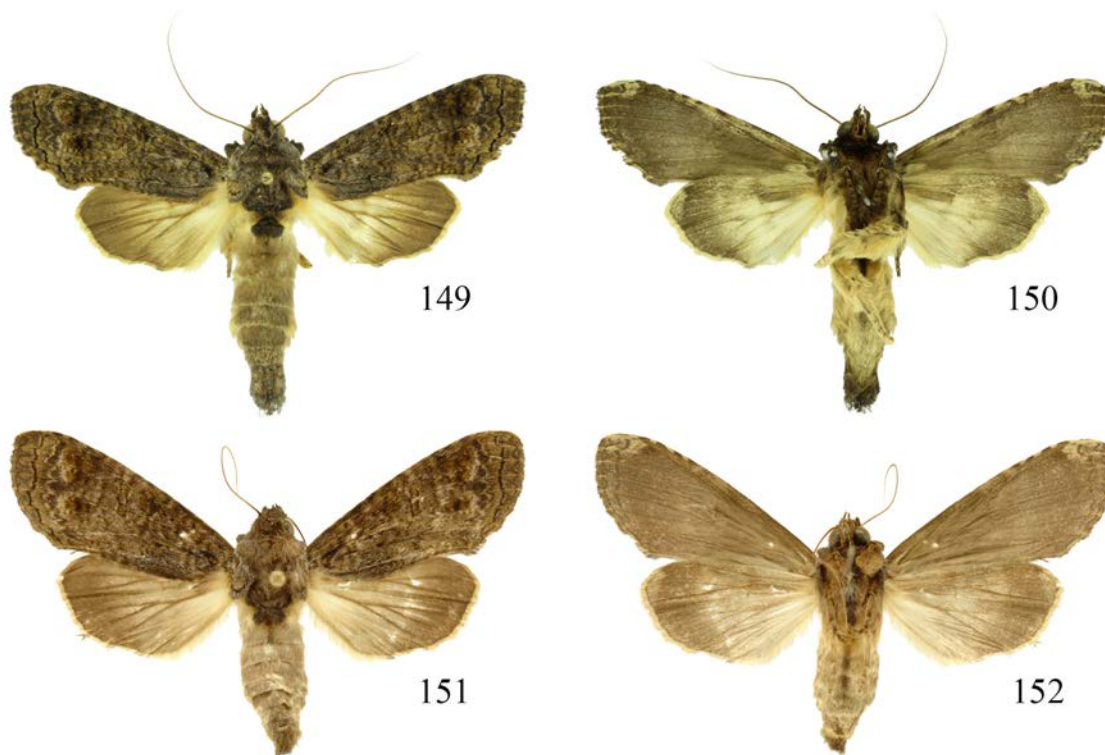
ASARD9839-14|INB0004265189|(Nystalea multiplex)|COI-5P

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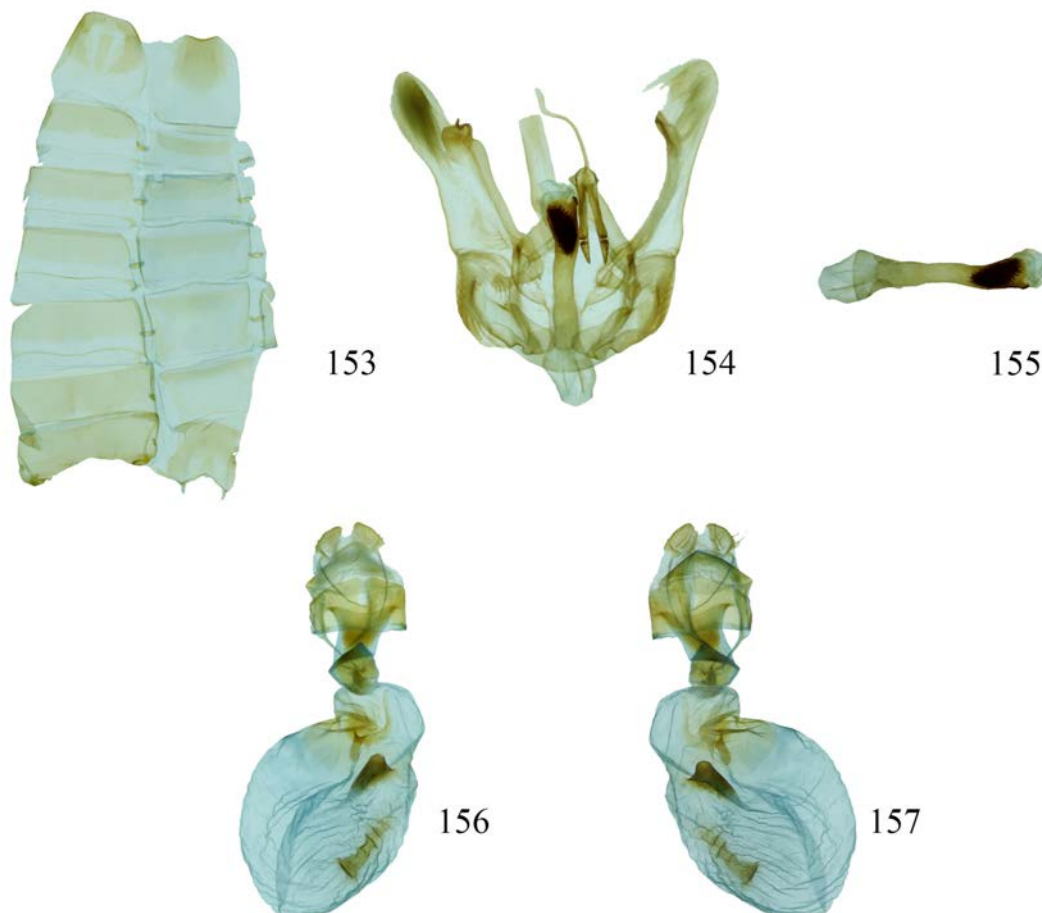
Nystalea torbjornekremsi Chacón, new species
(Figs. 162-170, 438-443)

Description: MALE (Figs. 162, 163) FWL 22.9-24.4 mm (n=10). **Head:** Antennal shaft grey dorsally and reddish brown ventrally; scape bearing a long beige tuft, composed of beige and dark brown scales; frons mostly dark brown with beige intermixed scales; labial palpus dark brown with some beige scales ventrally; vertex dark brown; patagium dark brown. **Thorax:** Tegula dark brown basally, a mix of light, dark brown and black scales distally; mesoscutellum dark brown; thoracic pleuron beige; dorsal surface of metathorax dark brown with black and beige intermixed scales; thorax dark brown and black ventrally. **Legs:** Mostly dark brown and black intermixed scales, with light brown scales between segments. **Wings:** Dorsal FW ground color dark brown; postmedial band with two orbicular spots black and greyish, green margin, subterminal line irregular black, terminal line grey, fringe alternating grey and beige; dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe light yellow. **Abdomen:** Dorsum dirty brown, venter light yellow, terminal scale tuft black and grey.

Male genitalia: Abdominal pelt (Fig. 166) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin sclerotized, slightly irregular and concave. Genitalia (Fig. 167) with sacculus sclerotized basally. Valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, costula wide basally, fan-shaped and flattened toward apex; uncus process curved, slender, setose, with tiny cup-shaped apex, uncus lobes slender, elongated, setose at apex, socii with two long projections with acute apices, sclerotized and setose, these projections are smaller than in



Figures 149-152. *Nystalea multiplex*: 149, 150. ♂ dorsal and ventral (INB0004127499) FWL 25.4; 151, 152. ♀ dorsal and ventral (INBIOCRI001407052) FWL 24.4 mm.



Figures 153-157. *Nystalea multiplex*: 153. ♂ sternum VIII 5 mm length, 154. ♂ genitalia 8.1 mm length, 155. phallus 4.9 mm length (INB0004111055); 156, 157. ♀ genitalia 9.4 mm length (INBIOCRI000428546).

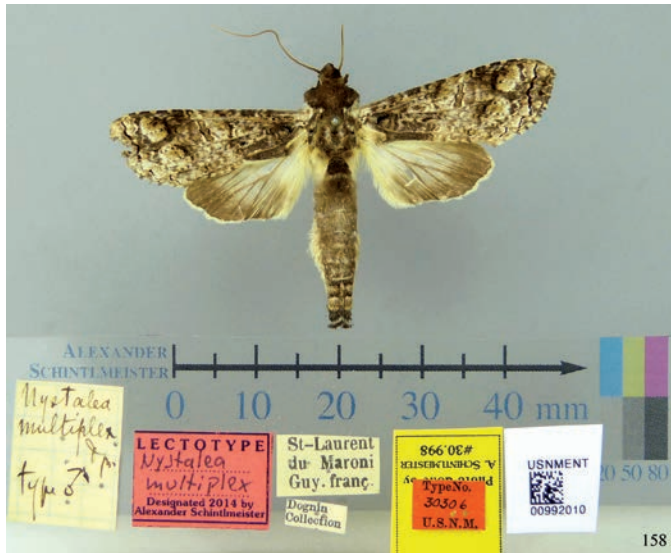


Figure 158. *Nystalea multiplex* Dognin, 1909. ♂ Lectotype designated by Schintlmeister (2016).

N. multiplex. Aedeagus (Fig. 168) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base. Proximal part of phallus thin, distal part sclerotized with two tiny lateral projection, similar to a thorn with serrated margin, middle part of phallus long and thin.

FEMALE: Similar to male but larger, dorsal HW dark brown, basal surface light yellow (Figs. 164, 165). FWL 25.1-26.1 mm (n=10).

Female genitalia (Figs. 169, 170): Papillae anales oval, covered in short, scattered setae, but some longer, inwardly curved setae, postvaginal plate sclerotized, emarginate, slightly invaginated in the middle, anterior apophysis shorter than posterior; ductus bursae tubular and heavily sclerotized; corpus bursae elongated globular, wrinkled surface, sclerotized shield with elongated nipple-shaped lateral projection, signum elongated with conical shape.

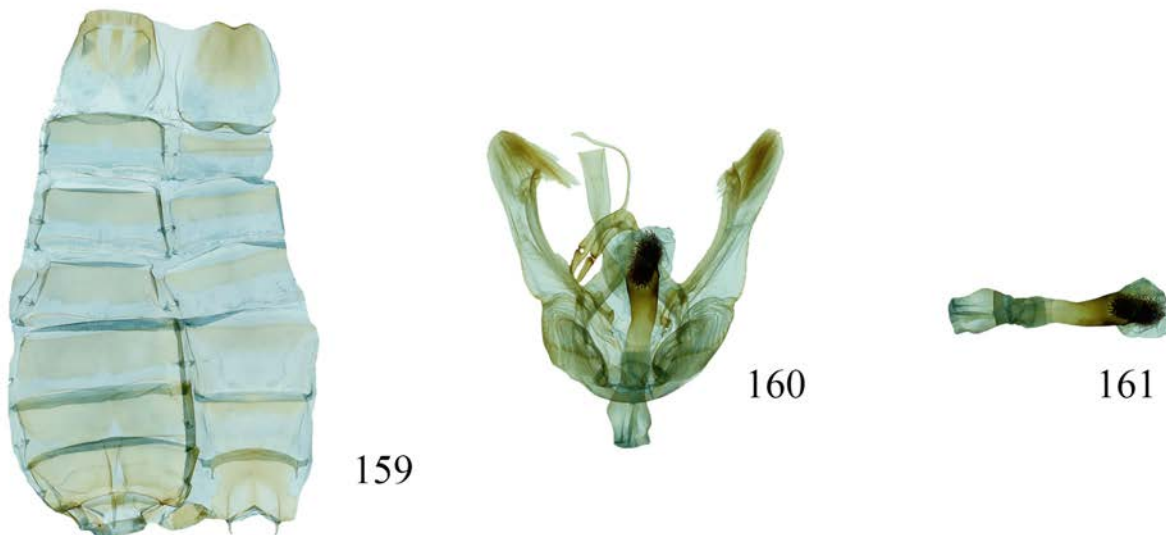
Etymology: *Nystalea torbjornekremsi* is named in honor of Dr. Torbjorn Ekrem of the NTNU University Museum, Trondheim, Norway in recognition of his enthusiastic support and facilitation of the growth and development of global DNA barcoding.

Type material: 39 ♂♂, 32 ♀♀.

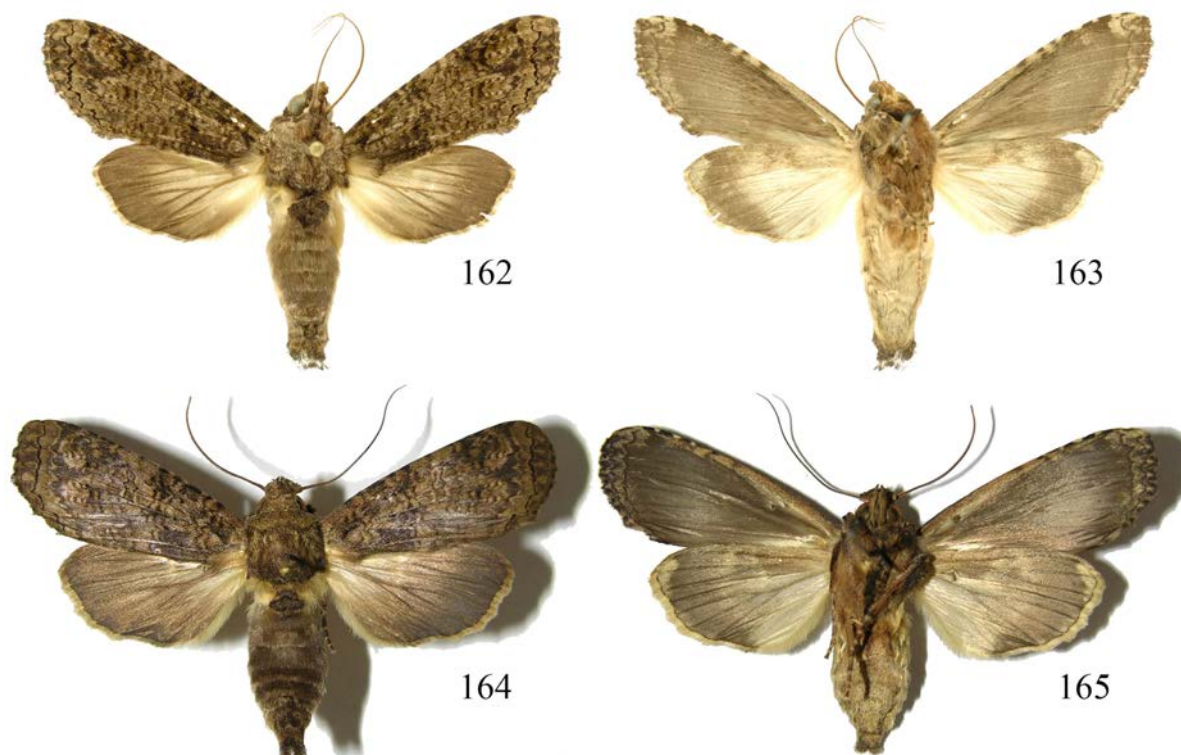
HOLOTYPE, ♂: INBIOCRI000193213 Costa Rica, Prov. Heredia, Est. El Ceibo, P. N. Braulio Carrillo, 400-600 m, 10.328044 -84.080424, 1 February 1990, C. Chaves & R. Aguilar (MNCR).

PARATYPES: 38 ♂♂, 32 ♀♀.

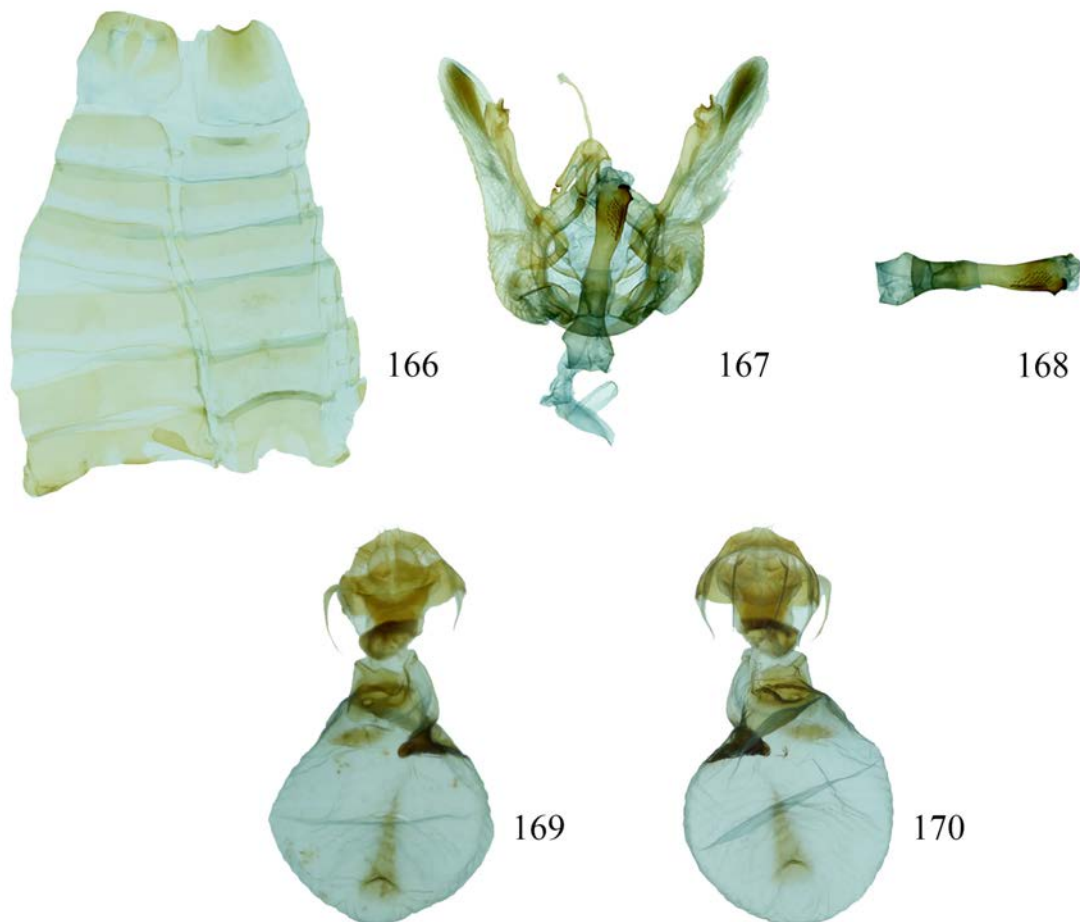
♂♂ (**COI Barcoded**): 06-SRNP-22400 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 29 August 2006, Roster Moraga (USNM). 05-SRNP-23350 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 23 August 2005, Elieth Cantillano (USNM). 03-SRNP-19520 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 13 August 2003, Elieth Cantillano (USNM). 06-SRNP-107225 Costa Rica, Guanacaste, Hotel Borinquen, Canopy Tours, 700 m, 10.81262 -85.40248, 21 August 2006. H. Cambronero & F. Quesada (MNCR). 10-SRNP-113678 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Copelares, 1478 m, 10.81692, -85.34679, 8 September 2010. S. Ríos & R. Franco (MNCR). 10-SRNP-113306 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Copelares, 1478 m, 10.81692 -85.34679, 7 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-113075 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Río Blanco, 790 m, 10.77464 -85.35001, 6 September 2010, S. Ríos & R. Franco (MNCR). 00-SRNP-3144 Costa Rica, Prov. Guanacaste, Sector El Hacha, Casa Hacha Vieja, 290 m, 10.98050 -85.54429, 19 July 2000, Lucía Ríos (USNM). 06-SRNP-57746 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Portón Rivas, 570 m, 10.75864 -85.37269, 4 September 2006, José Alberto Sánchez (USNM). 09-SRNP-109364 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Manta Cañón, 700 m, 10.77042 -85.37254, 16 October 2009, H. Cambronero & F. Quesada (USNM). 09-SRNP-109970 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Pozo # 3, 634 m, 10.76833 -85.37243, 18 October 2009. R. Franco & S. Ríos (MNCR). 07-SRNP-58436 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Sendero Aguacate, 335 m, 10.76901 -85.43465, 3 August 2007, José Cortéz (USNM). 06-SRNP-57987 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agria, 560 m, 10.75876 -85.37543, 18 September 2006, José Alberto Sánchez (USNM). 07-SRNP-58250 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Sendero Sainos, 397 m, 10.77059 -85.42443, 3 August 2007, José Alberto Sánchez (USNM). 06-SRNP-57976 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Portón Rivas, 570 m, 10.75864 -85.37269, 31 August 2006, Mariano Pereira (USNM). 94-SRNP-6258 Costa Rica, Prov. Guanacaste, Sector Pocosol, Vado Terciopelo, 170 m, 10.90756 -85.56914, Gusaneros (USNM). 08-SRNP-16960 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 4 January 2009, Johan Vargas (USNM). 05-SRNP-19942 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 24 August 2005, Ruth Franco (USNM). 05-SRNP-19968 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801,



Figures 159-161. *Nystalea multiplex* Dognin, 1909 Lectotype: 159. ♂ sternum VIII 4.5 mm length, 160. ♂ genitalia 7.1 mm length, 161. phallus 4.7 mm length (00992010 USNM).



Figures 162-165. *Nystalea torbjornekremit*: 162, 163. ♂ dorsal and ventral (INBIOCRI000193213) FWL 23.4 mm; 164, 165. ♀ dorsal and ventral (02-SRNP-29972) FWL 26.1 mm.



Figures 166-170. *Nystalea torbjornekremit*: 166. ♂ sternum VIII 4.3 mm length, 163. ♂ genitalia 7.1 mm length, 164. phallus 4.5 mm length (06-SRNP-107225); 165, 166. ♀ genitalia 8.7 mm length (06-SRNP-106919).

26 August 2005, Ruth Franco (USNM). 05-SRNP-19897 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 25 August 2005, Eilyn Camacho (USNM). 02-SRNP-29960 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 10 October 2002, Manuel Pereira (USNM). 03-SRNP-13748 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 17 July 2003, Freddy Quesada (USNM). 09-SRNP-104825 Costa Rica, Prov. Guanacaste, Sector Santa Elena, La Angostura, 300 m, 10.85592 -85.67017, 26 May 2009, S. Ríos & R. Franco (MNCR). 05-SRNP-19540 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Quebrada Clusia, 310 m, 10.85877 -85.66120, 29 August 2005, Eilyn Camacho (USNM). 03-SRNP-13738 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 22 July 2003, Mariano Pereira (USNM). 02-SRNP-13020 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 16 August 2002, Gusaneros (USNM). 03-SRNP-13736 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 22 July 2003, Mariano Pereira (USNM). 02-SRNP-12956 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Draga, 280 m, 10.87974 -85.65374, 7 August 2002, Guillermo Pereira (USNM). 03-SRNP-14179 Costa Rica, Prov. Guanacaste, Sector Cacao, Mata Redonda, 445 m, 10.94106 -85.50822, 31 July 2003, José Cortéz (USNM). 05-SRNP-47206 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Pajarito, 600 m, 10.88989 -85.47427, 7 September 2005, Manuel Pereira (USNM). 10-SRNP-112177 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 9 August 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-110727 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 11 July 2010, R. Franco & S. Ríos (MNCR). 10-SRNP-110730 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 11 July 2010, R. Franco & S. Ríos (MNCR). 10-SRNP-113679 Costa Rica, Prov. Guanacaste, Sector Cacao, Derrumbe, 1310 m, 10.93110 -85.46194, 10 July 2010, S. Ríos & H. Cambronero (MNCR). 07-SRNP-107269 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Gongora, 557 m, 10.88449 -85.47306, 11 August 2007, R. Franco & S. Ríos (MNCR). INBIOCRI000193209 Costa Rica, Prov. Heredia, Est. El Ceibo, P. N. Braulio Carrillo, 400-600 m, 10.328044 -84.080424, 1 February 1990, C. Chaves & R. Aguilar (MNCR). INBIOCRI000623996 Costa Rica, Prov. Puntarenas, P. Internac. La Amistad, Fca. Cafrosa, Est. Las Mellizas, 1300 m, 8.891473 82.792936, 1 July 1991, M. Ramírez (MNCR). INBIOCRI000660895 Costa Rica, Prov. Puntarenas, P. Internac. La Amistad, Fca. Cafrosa, Est. Las Mellizas, 8.891473 82.792936, 1300 m, 1 May 1991, M. Ramírez (MNCR). ♀♀ (COI Barcoded): 03-SRNP-13731 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013, -85.67463, 17 July 2003, Ruth Franco (USNM). 03-SRNP-13747 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 17 July 2003, Dunia García (USNM). 03-SRNP-13717 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Vado Quebrada Calera, 305 m, 10.86677 -85.6465, 16 July 2003, Guillermo Pereira (USNM). 03-SRNP-13740 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 17 July 2003, Mariano Pereira (USNM). 03-SRNP-13739 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 17 July 2003, Mariano Pereira (USNM). 03-SRNP-13739 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Cañón Mairena, 135 m, 10.89013 -85.67463, 17 July 2003, Mariano Pereira (USNM). 05-SRNP-19541 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Quebrada Clusia, 310 m, 10.85877 -85.66120, 25 August 2005, Eilyn Camacho (USNM). 05-SRNP-19541 Costa Rica, Prov. Guanacaste, Sector Santa Elena, Quebrada Clusia, 310 m, 10.85877 -85.66120, 25 August 2005, Eilyn Camacho (USNM). 05-SRNP-19975 Costa Rica, Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 28 August 2005, Ruth Franco (USNM). 84-SRNP-1519 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 17 July 1984, Daniel H. Janzen (USNM). 84-SRNP-1349 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145 -85.60801, 22 July 1984, Daniel H. Janzen (USNM). 02-SRNP-28023 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 26 August 2002, Manuel Pereira (USNM). 02-SRNP-29972 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 7 October 2002, Lucía Ríos (USNM). 98-SRNP-14307 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 18 January 1999, Lucía Ríos (USNM). 06-SRNP-56927 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agria, 560 m, 10.75876 -85.37543, 18 July 2006, José Alberto Sánchez (USNM). 06-SRNP-106916 Costa Rica, Prov. Guanacaste, Hotel Borinquen, Canopy Tours, 700 m, 10.81262 -85.40248, 29 August 2006, H. Cambronero & F. Quesada (MNCR).

10-SRNP-108754 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Mona, 1055 m, 10.79235 -85.34891, 12 June 2010, F. Quesada & H. Cambronero (MNCR). 07-SRNP-58107 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agria, 560 m, 10.75876 -85.37543, 4 October 2007, José Alberto Sánchez (USNM). 09-SRNP-105625 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Manta Cañón, 700 m, 10.77042 -85.37254, 22 June 2009, F. Quesada & S. Ríos (MNCR). 05-SRNP-66236 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agria, 560 m, 10.75876 -85.37543, 20 December 2005, Mariano Pereira (USNM). 03-SRNP-18701 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 24 August 2003, Lucía Ríos (USNM). 03-SRNP-18701 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 24 August 2003, Lucía Ríos (USNM). 05-SRNP-23505 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 7 September 2005, Elieth Cantillano (USNM). 05-SRNP-5959 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 26 October 2005, Carolina Cano (USNM). 02-SRNP-705 Costa Rica, Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 2 March 2002, Gloria Sihezar (USNM). 02-SRNP-428 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 1 March 2002, Freddy Quesada (USNM). 07-SRNP-110521 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe (melina), 391 m, 10.89560 -85.29558, 10 November 2007, F. Quesada & R. Franco (MNCR). 10-SRNP-113070 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Río Blanco, 790 m, 10.77464 -85.35001, 6 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-110308 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 9 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-110309 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 9 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-110612 Costa Rica, Prov. Guanacaste, Sector Cacao, Derrumbe, 1310 m, 10.93110 -85.46194, 10 July 2010, S. Ríos & H. Cambronero (MNCR). 94-SRNP-9831 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Gongora, 570 m, 10.88700 -85.47443, 25 November 1994, Gusaneros (USNM). INBIOCRI000241268 Costa Rica, Prov. Puntarenas, Res. Biol. Carara, Est. Quebrada Bonita, 50 m, 9.767453 -84.608119, 1 July 1990, E. Bello & E. Rojas (MNCR).

Diagnosis: The socii of *N. torbjornekremi* are shorter and more robust than those of *N. multiplex* (Figs. 154, 167).

Distribution: *Nystalea torbjornekremi* has been reared, and collected with light traps in dry forest, rain forest and cloud forest on both slopes of Cordillera Volcánica de Guanacaste as well as the Pacific slope of Cordillera de Talamanca. The elevational range for the species is 50-1478 m.

Natural History: (Figs. 438-443) 138 rearing records: ACG locations: Sector Cacao (n=7), Sector Del Oro (n=13), Sector Pitilla (n=1), Sector San Cristóbal (n=48), Sector El Hacha (n=17), Sector Mundo Nuevo (n=11), Sector Orosi (n=1), Sector Pocosol (n=1), Sector Santa Elena (n=16), Sector Santa Rosa (n=23).

Food plants: Clusiaceae: *Garcinia intermedia* (n=95), *G. madruno* (n=1), *Symphonia globulifera* (n=28).

Parasitoids. Braconidae: (n=19), *Hypomicrogaster* OVRGDHJ03 (n=18), *Aleiodes* (n=1), Chalcididae: unidentified (n=1), Tachinidae: (n=4), *Houghia delospilota* (n=1), *Houghia spathulata* (n=1), *Hyphantrophaga guillermopereira* (n=1), *Patelloa xanthura*DHJ01 (n=1).

Remarks: BIN BOLD:AAA7420 (Fig. 490).

Genbank Accession: GU333418

DNA barcode of male paratype 02-SRNP-29960.

MHANA584-05[02-SRNP-29960]*Nystalea torbjornekremi* |COI-5P

NNAACATTATATTTTATTTTGGTATTTGAGCAGGAATAGTTGGAACCTTCTC
TTAGATTATTAATTCGAGCTGAATTAGGAATCCTGGATCTTTAATTGGAGA
CGATCAAATTTATAACTATTGTAACAGCTCACGCTTTTATTATAATTTTT
TTCATAGTTATACCTATTATAAATGGAGGATTTGGAAATGATTAGTACCTT
TAATATTAGGTGCCCTGATATAGCTTTCCCTCGAATAAATAATATAAGTTT
TTGATTATTGCCCCCTCTTTAACCTTTCTAATTTCAAGAAGTATTGTAGAA
AATGGAGCAGGAACTGGATGAACAGTTTATCCCCCTTCATCTAATATTG
CCCATGGAGGAAGTCTGTGGATCTAGCTATTTTCTCTTCAATTTAGCAGG
AATTTCTTCTATTTTAGGTGCTATTAATTTTATTACTACAATTTAATAATA

CGACTTAATAGTATATCATTTGATCAAATACCCTTATTATTGAGCAGTGG
GTATTACAGCATTTTTATTGCTATTATCTCTACCTGTTTTAGCGGGAGCAAT
TACAATACTTTAACTGACCGAAATCTTAATACTTCATTTTTTGATCCAGCA
GGAGGAGGTGATCCAATTTTATACCAACATTTATTT

The members of the *Porgana* complex are *N. porgana* and *N. robertpuschendorfi*. Adults of these species are morphologically similar.

Nystalea porgana Schaus, 1905
(Figs. 171-183, 458-464)

Redescription: MALE (Figs. 171, 172, 180) FWL 29-33 mm (n=12). **Head:** Antennal shaft dark brown dorsally and reddish brown ventrally; scape bearing long beige tuft and dark brown scales; frons beige with dark brown scales; labial palpus beige with some dark brown scales ventrally; vertex dark brown; patagium beige. **Thorax:** Tegula dirty dark brown at the base, a mix of light brown, dark brown and reddish brown scales distally; mesoscutellum dark brown; dorsal area of metathorax beige with dirty brown and straw color intermixed scales; thoracic pleuron beige; thorax beige ventrally. **Legs:** Mostly beige and dark brown, with light brown scales between segments and margins.

Wings: Dorsal FW coloration basal dark brown; in apical area from postmedial band to adterminal line an irregular beige spot with dirty beige and black scales, subterminal line black rectangular marks, terminal line beige with black spots, fringe dark brown and beige, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe light yellow (Figs. 171, 172, 180). **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Figs. 175, 181) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with invagination in the middle. Genitalia (Figs. 176, 182) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, costal process flattened and sclerotized, with a small notch at costal margin, midvalve sclerotization flattened with small bowl shape when joining with anellus, costula slightly forked in the proximal

part, narrow, elongated, curved, thin and flattened distally; uncal process thin, tubular, setose and slightly curved at apex, uncus lobes short and setose, socii elongated with oval sclerotized and very setose projections. Aedeagus (Figs. 177, 183) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base, proximal part of phallus wide, distal part sclerotized, robust and rounded, middle part of phallus long and thin.

FEMALE: Similar to male but larger (Figs. 173, 174). FWL 30.5-32.2 mm (n=3).

Female genitalia (Figs. 178, 179) Papillae anales triangular with short, scattered setae, but some longer, inwardly curved setae; lateral process of postvaginal plate sclerotized, two acute cusps with irregular margin, postvaginal plate sclerotized with two cusps with invagination in the middle, anterior apophysis shorter than posterior; ductus bursae wide, tubular and heavily sclerotized; corpus bursae elongated globular, wrinkled surface, with sclerotized shield and wavy posterior margin strongly sclerotized, signum elongated and concave.

Material examined: 14 ♂♂, 3 ♀♀.

♂♂ (COI Barcoded): 00-SRNP-21986 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 30 November 2000, Gloria Sihezar (USNM). 04-SRNP-2267 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 17 June 2004, Elda Araya (USNM). 06-SRNP-101091 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 26 February 2006, R. Franco & F. Quesada (MNCR). INB0004153909 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Punto 2: Falda N Cerro Montezuma, 1160 m, 10.698113 -85.018467, 27 June 2008, J. A. Azofeifa (MNCR). INB0003011828 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, DH Janzen & W. Hallwachs (MNCR). INBIOCRI000198084 Costa Rica, Prov. Heredia, Est. El Ceibo, P. N. Braulio Carrillo, 400 - 600 m, 10.328044 -84.080424, 1 December 1989, R. Aguilar & M. Zumbado (MNCR). 07-SRNP-57803 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 30 July 2007, José Alberto Sánchez (USNM). 07-SRNP-57802 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Quebrada Tibio Perla, 330 m, 10.76261 -85.42979, 30 July 2007, José Alberto Sánchez (USNM). 09-SRNP-106445 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 21 July 2009, R. Franco & S. Ríos (MNCR). 07-SRNP-107785 Costa Rica,



Figures 171-174. *Nystalea porgana* Schaus, 1905: 171, 172. ♂ dorsal and ventral (INB0004110862) FWL 31.7 mm; 173, 174. ♀ dorsal and ventral (INBIOCRI002192159) FWL 32.3 mm.



Figures 175-179. *Nystalea porgana* Schaus, 1905: 175. ♂ sternum VIII 6 mm length, 176. ♂ genitalia 10 mm length, 177. phallus 6.9 mm length (06-SRNP-101091); 178, 179. ♀ genitalia 8.4 mm length (07-SRNP-5784).

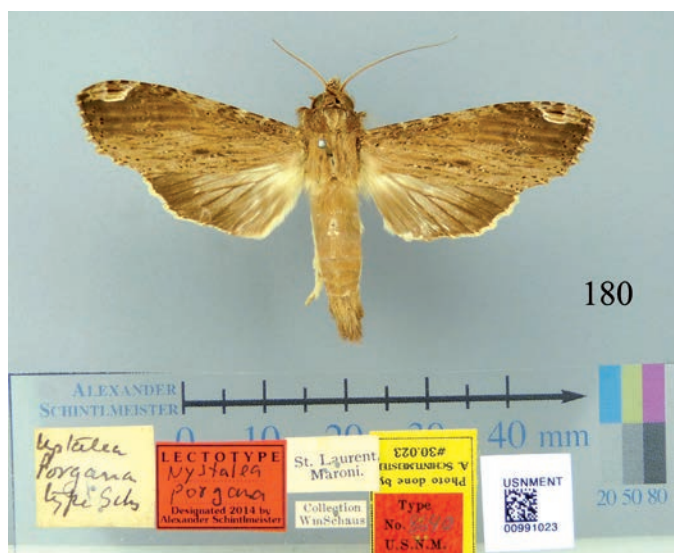


Figure 180. *Nystalea porgana* Schaus, 1905. ♂ lectotype from Schintlmeister (2016).

Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 12-SRNP-104121 Costa Rica, Prov. Guanacaste, Sector Santa María, Mirador Santa María, 920 m, 10.76631 -85.30099. 21 June 2012, R. Franco & H. Cambroner (MNCR). 05-SRNP-59088 Costa Rica, Guanacaste, Prov. Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 3 September 2005, Mariano Pereira (USNM). INB0004110862 Costa Rica, Prov. Puntarenas. Golfito, Est. Tigre, 47 m,

8.54608 -83.397802, 1 October 2007, J. A. Azofoifa (MNCR). INB0004161227 Costa Rica, Prov. Limón, Veragua Rainforest, Restaurant, 400-440 m, 9.92573 -83.191405, 24 August 2008, B. Hernández, J. Mata (MNCR). ♀♀ (COI Barcoded): 07-SRNP-57874 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Cerro Gongora Pelado, 740 m, 10.76307 -85.41332, 26 July 2007, José Alberto Sánchez (USNM). 07-SRNP-58261 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Sendero Sainos, 397 m, 10.77059 -85.42443, 4 August 2007, José Alberto Sánchez (USNM). INBIOCR1002192159 Costa Rica, Prov. Limón, Sardinias, Barra del Colorado, 15 m, 10.647646 -83.73103, 3 April 1995, F. Araya (MNCR).

Diagnosis: The phallus is slightly thicker in the proximal part and more robust in the distal part than the phallus of *N. robertpuschendorfi* (Figs. 177, 183).

Distribution: *Nystalea porgana* has been collected with light traps in rain forest and cloud forest, on both slopes of Cordillera Volcánica de Guanacaste, on the west slope of Cordillera de Talamanca, and on the Osa Peninsula. The elevational range for the species is 40-1160 m.

Natural history: (Figs. 458-464) eight rearing records: ACG locations: Sector Pitilla (n=1), Sector San Cristóbal (n=2), Sector Mundo Nuevo (n=5).

Food plants: Myrtaceae: *Eugenia truncata* (n=2), *Marlierea mesoamericana* (n=1), *Myrcia splendens* (n=1), *Psidium guajaba* (n=3).

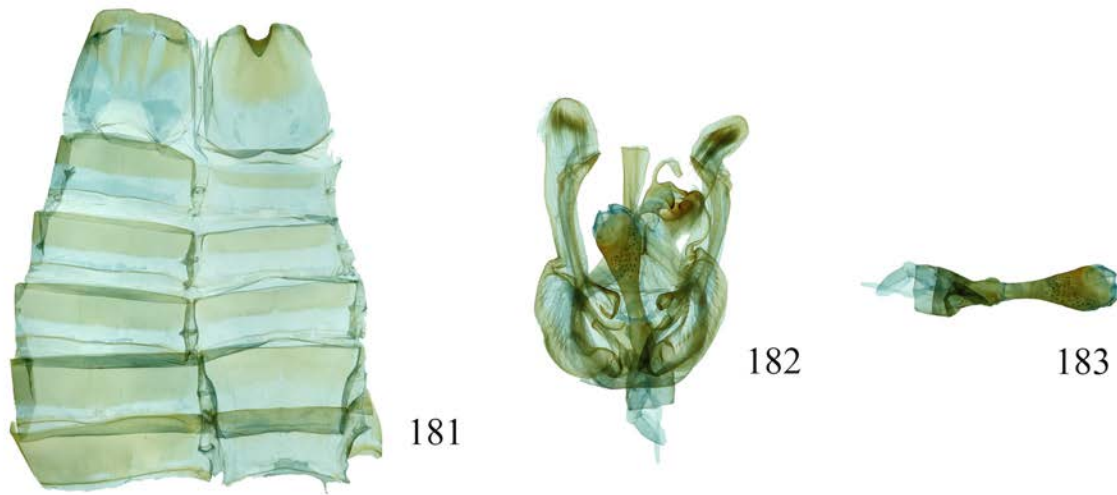
Remarks: BIN BOLD: AAC639 (Fig. 490).

Genbank Accession: GU160227

DNA barcode of male 05-SRNP-59088.

MHANC588-06|05-SRNP-59088(*Nystalea porgana*)|COI-5P

NNAACATATATATTTTCATTTTGGAAATTTGAGCAGGAATAAATGGAACTTCTC
TTAGTTTATTAATTCGAGCAGAATTAGGAAATCCCGGATCTTTAATTGGAGA



Figures 181-183. *Nystalea porgana* Schaus, 1905. ♂ lectotype: 181. ♂ sternum VIII 5.9 mm length, 182. ♂ genitalia 9.2 mm length, 183. phallus 6.7 mm length (USNMMENT 00991023).

TGATCAAATTTATAACTATTGTAACAGCTCATGCTTTTATATAATTTTT
 TTTATAGTTATACCTATTATAAATGGAGGATTTGGAAATGATTAATCCCTT
 TAATATTAGGAGCCCCTGATATAGCTTTCCCGAATAAATAATATAAGCTT
 TTGATTACTACCCCCCTCCCTAATTCCTTTAATTTCAAGTAGAATCGTAGAA
 AATGGAGCTGGAAGCTGGATGAACAGCTCTATCCCCCTGTCTAATATTG
 CCCATAGAGGAAGCTCTGTAGATTTAGCCATTTTCTTTACATTTAGCTGG
 AATTTCTTCTATTTAGGAGCTATTAATTTTATTACAACAATTTAATATA
 CGACTTAATAATATATCTTTTGATCAAATACCTTTATTTATTTGAGCTGTTG
 GAATTACAGCATCTTTATTACTACTTTCTTTACCTGTTTGTAGCTGGAGCAAT
 TACTATACTTTTAAACAGATCGAAATCTTAATACTTCTTTTGTATCCCGCT
 GGTGGAGTGATCCTATTTTATATCAACATTTATTT

***Nystalea robertpuschendorfi* Chacón, new species**
 (Figs. 184-192)

Description: MALE (Figs. 184, 185) FWL 28.1-32.9 mm (n=10). **Head:** Antennal shaft grey dorsally reddish brown ventrally; scape bearing a long beige tuft, composed of beige and dark brown scales; frons mostly beige with dark light brown intermixed scales; labial palpus beige with some light brown scales ventrally; vertex light brown; patagium light brown. **Thorax:** Tegula dark brown basally, a mix of light and reddish-brown scales distally; mesoscutellum dark brown; thoracic pleuron beige; dorsal surface of metathorax beige with dirty brown and straw intermixed scales; thorax beige ventrally. **Legs:** Mostly beige and brown, with light brown scales between segments. **Wings:** Dorsal FW ground color dark brown; irregular beige macula with dirty brown, greenish scales and cream margin at apical area, subterminal line with black rectangular marks, terminal line beige with black spots, fringe alternating dark brown and beige, dorsal HW translucent, light yellow with veins and marginal shade dark brown; fringe light yellow (Figs. 184, 185). **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 188) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with invagination medially. Genitalia (Fig. 189) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, costal process sclerotized, with notch in costal margin, midvalve sclerotization thin with small spoon shape when joining with anellus, costula forked in proximal part, narrow, elongated and curved, with a flattened thin projection distally, uncal process thin, tubular, setose slightly curved at apex, uncus lobes short and setose, socii elongated, sclerotized and setose projections. Aedeagus (Fig. 190) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base, proximal part of phallus thin, distal part sclerotized, robust and rounded, middle part of phallus long and thin. **FEMALE:** Similar to male but larger (Figs. 186, 187). FWL 32.4-34.7 mm (n=6).

Female genitalia (Figs. 191, 192): Papillae anales ovoid with covered short, scattered setae, but some longer, inwardly curved setae; lateral process of postvaginal plate sclerotized two acute cusps with irregular margin, postvaginal plate sclerotized with two cusps with invagination in the middle, anterior apophysis shorter than posterior; sclerotized shield with wavy posterior margin, ductus bursae wide, tubular and heavily sclerotized; corpus bursae globular, smooth surface, signum elongated and concave.

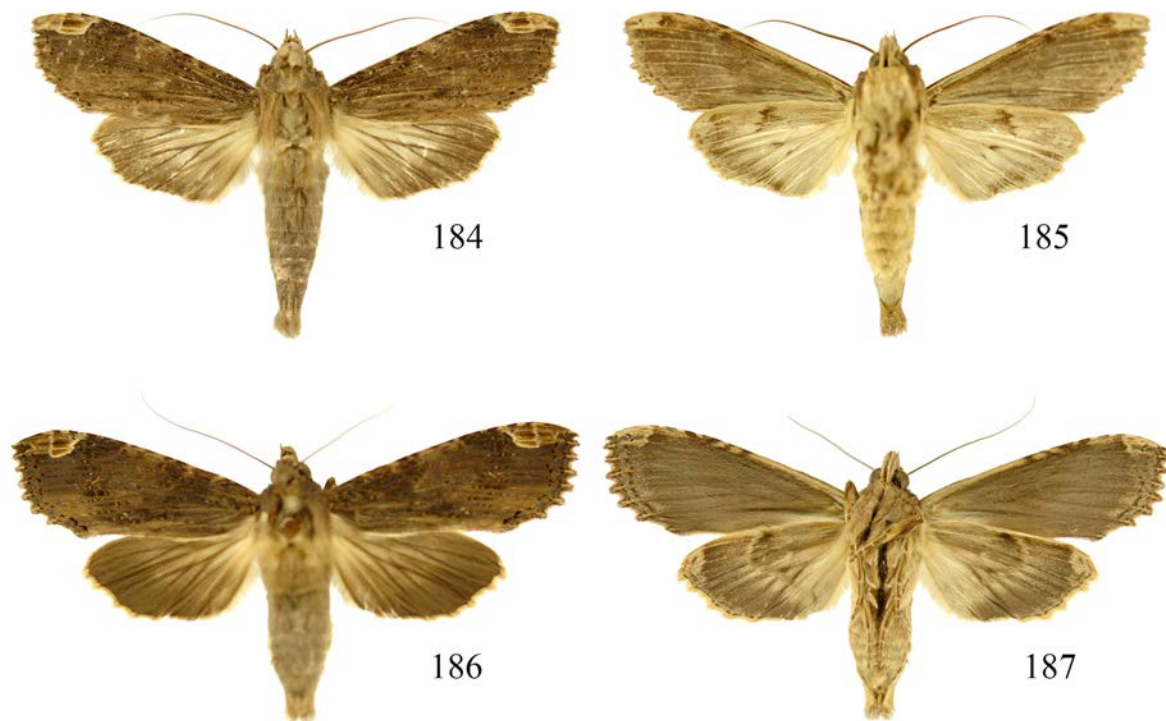
Etymology: *Nystalea robertpuschendorfi* is named in honor of Dr. Robert Puschendorf of Costa Rica and the United Kingdom, a devoted explorer of Costa Rican forests and promoter of their conservation.

Type material: 23 ♂♂, 6 ♀♀.

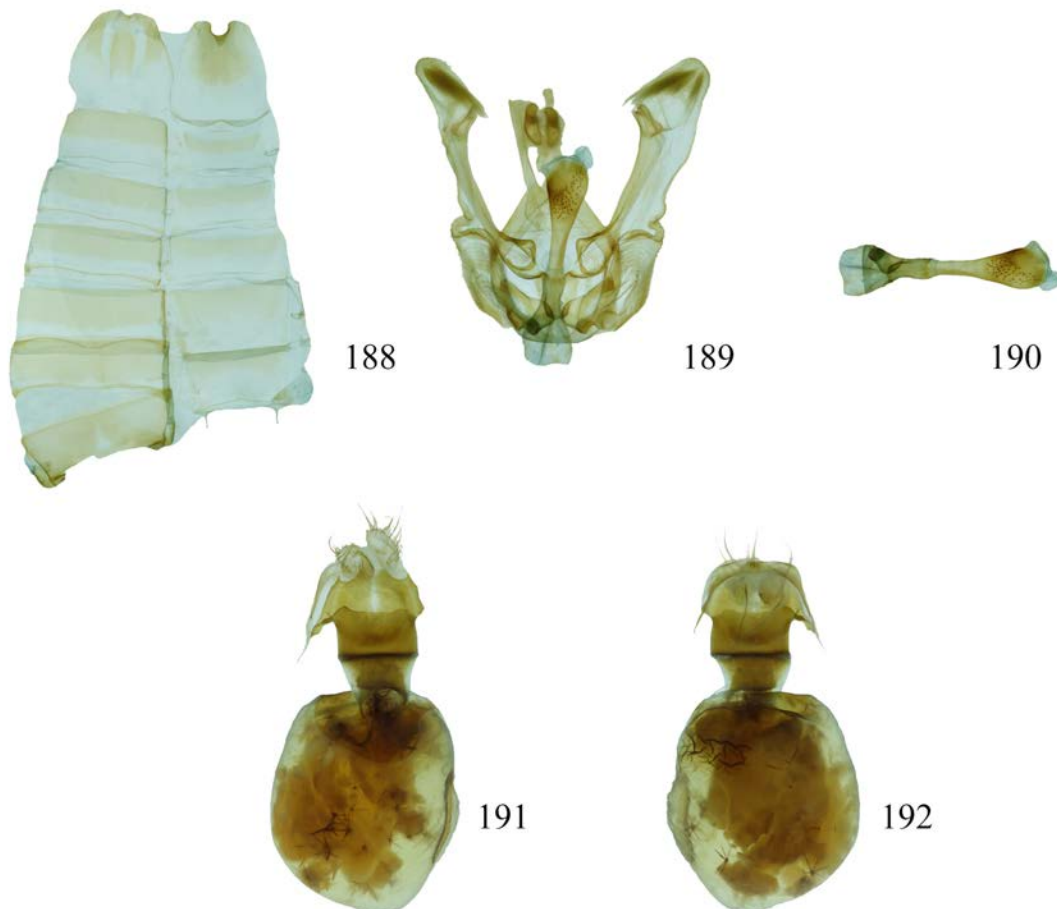
HOLOTYPE, ♂: INB0004216580 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 24 May 2009. I. Chacón, A. Barrientos (MNCR).

PARATYPES: 22 ♂♂, 6 ♀♀.

♂♂ (**COI Barcoded**): INB0003008726 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.148893 -83.951906, 1 March 1985, I. & A. Chacón (MNCR). INBIOCRI002557952 Costa Rica, Prov. San José, Est. Santa Elena, Las Nubes, 1210 m, 9.395701 -83.595652, 10 April 1997, E. Alfaro (MNCR). INB0003008719 Costa Rica, Prov. Alajuela, El Angel waterfall 8.2 Km downhill Vara Blanca, 1350 m, 10.260295 -84.178152, 22 April 1984, D. H. Janzen & W. Hallwachs (MNCR). INB0004217496 Costa Rica, Prov. Alajuela, Guatuso. P.N. Volcán Tenorio. Punto 1: Catarata Río Buenavista, 800 m, 10.706123 -84.992889, 26 May 2009, J. A. Azofeifa (MNCR). 06-SRNP-5797 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, B. Sullivan & B. Espinoza (MNCR). 09-SRNP-107762 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Protrero Chaves, 433 m, 10.93868 -85.32167, 19 August 2009, F. Quesada & H. Cambronero (MNCR). INB0003008716 Costa Rica, Prov. Cartago, Moravia de Chirripó Cartago Prov. 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INB0003008721 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INB0003935383 Costa Rica, Prov. Cartago, Pejibaye, Reserva Biol. Copal, 1040 m, 9.783407 -83.751929, 7 April 2005, J. Azofeifa, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INBIOCRI000954857 Costa Rica, Prov. Cartago, Turrialba, Grano de Oro, Chirripó, 1120 m, 9.818357 -83.459163, September 1992, P. Campos (MNCR). INBIOCRI001376150 Costa Rica, Prov. Heredia, Est. Magasay, P. N. Braulio Carrillo, 200 m, 10.401256 -84.050228, 1 May 1991, A. Fernandez (MNCR). INB0004280460 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.120167, 14 February 2010. I. Chacón (MNCR). INB0004216581 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, Mirador, 167 m, 10.416556 -84.12016724, May 2009, I. Chacón, A. Barrientos (MNCR). INB0004243305 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol.



Figures 184-187. *Nystalea robertpuschendorfi*: 184, 185. ♂ dorsal and ventral (INB0004216580) FWL 32.1 mm; 186, 187. ♀ dorsal and ventral (INB0003873302) FWL 33.41 mm.



Figures 188-192. *Nystalea robertpuschendorfi*: 188. ♂ sternum VIII 6.4 mm length, 189. ♂ genitalia 10.5 mm length, 190. phallus 7.4 mm length (INBIOCRI002557952); 191, 192. ♀ genitalia 10.3 mm length (08-SRNP-102523).

La Tirimbina, 167 m, 10.416556 -84.12016724, 9 August 2010, I. Chacón, A. Barrientos (MNCR). INBIOCRI001336271 Costa Rica, Prov. Heredia, Est. Magasay, P. N. Braulio Carrillo, 200 m, 10.401256 -84.050228, 1 June 1991, A. Fernández (MNCR). 07-SRNP-32131 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Evangelista, 660 m, 10.98680 -85.42083, 16 May 2007, Duvalier Briceño (USNM). INB0003008715 Costa Rica, Prov. Limón, 9.4 Km. W. de Bribri, Suretka, 200 m, 9.622929 -82.772958, 11 June 1983, D.H. Janzen & W. Hallwachs (MNCR). INB0003040248 Costa Rica, Prov. Limón, Reserva Biol Hitoy Cerere, Est. Hitoy Cerere, Send Bobócara, 740 m, 9.676878 -83.062304, 12 July 1999, R. Barton (MNCR). INB0004175786 Costa Rica, Prov. Limón. Veragua Rainforest, Campamento. 400-440 m, 9.92573 -83.191405, 23 October 2008. B. Hernández (MNCR). INB0003040249 Costa Rica, Prov. Limón, Reserva Biol Hitoy Cerere, Est Hitoy Cerere, Send Bobócara, 740 m, 9.676878 -83.062304, 12 July 1999, R. Barton (MNCR). INB0004162925 Costa Rica, Prov. Limón, Veragua Rainforest, Restaurant. 400-440 m, 9.92573 -83.191405, 8 September 2008, R. Villalobos (MNCR). INBIOCRI000703413 Costa Rica, Prov. Limón, Est. Cuatro Esquinas, P. N. Tortuguero, 10 m, 10.539549 -83.506481, 1 July 1990, E. Quesada (MNCR). INBIOCRI000217605 Costa Rica, Prov. Puntarenas, Rancho Quemado, Pen. Osa, 200 m, 8.679096 -83.566714, 1 February 1991, F. Quesada (MNCR). ♀♀ (COI Barcoded): 08-SRNP-102523 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jabalina, Manta Pizote, 288 m, 10.97325 -85.31542, 6 June 2008, S. Ríos & R. Franco (MNCR). 08-SRNP-102523 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jabalina, Manta Pizote, 288 m, 10.97325 -85.31542, 6 June 2008, S. Ríos & R. Franco (MNCR). INB0003301067 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Est. Barbilla, 500 m, 9.981348 -83.454259, 25 May 2001, L. Chavarría (MNCR). INB0003351655 Costa Rica, Prov. Cartago, R.F. Río Pacuare, Turrialba, P.N. Barbilla, Est. Barbilla, 500 m, 9.981348 -83.454259, 1 August 2001, L. Chavarría (MNCR). INB0003873302 Costa Rica, Prov. Heredia, Corredor Fronterizo Costa Rica-Nicaragua, 1 Km S. de Laguna a la par de Río San Juan, 50 m, 10.783333 -84.155556, 23 July 2004, B. Hernández (MNCR). 07-SRNP-32131 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Evangelista, 660 m, 10.98680 -85.42083, 16 May 2007, Duvalier Briceño (MNCR).

Diagnosis: The phallus is thinner in the proximal part and narrower in the distal part than the phallus of *N. porgana* (Fig. 190).

Distribution: *Nystalea robertpuschendorfi* has been collected with light traps in rain forest and cloud forest on the east slopes of Cordillera Volcánica de Guanacaste and Cordillera Volcánica Central and both slopes of Cordillera de Talamanca and Osa Peninsula. The elevational range for the species is 50-1350 m.

Natural history: All specimens have been collected with light traps; the life history of *N. robertpuschendorfi* is unknown.

Remarks: BIN BOLD:AAE6037 (Fig. 490).

Genbank Accession: JQ543241

DNA barcode of male paratype 06-SRNP-5797.

MHMXE010-06|06-SRNP-5797|*Nystalea robertpuschendorfi* |COI-5P

AACATTATATTTTCATTTTTGGAACTGAGCAGGAATAATTGGAACCTCTCTT
AGTTTATTAATTCGAGCAGAATTAGGAAATCCTGGATCTTTAATTGGAGATG
ATCAAATTTATAACTATTGTAACAGCTCATGCTTTTCATTATAAATTTTTTT
TATAGTTATACCTATTATAATTGGAGGATTTGGAAATTGATTAATCCCTTTA
ATATTAGGAGCCCTGATATAGCTTTCCCCCGAATAAATAATATAAGTTTTT
GATTATTACCCCTCTCTAATTTCTTTAATTTCAAGTAGAATCGTAGAAAA
TGGAGCTGGAACCTGGATGAACAGTCTATCCCCCTGTCATCTAATATTGCC
CACAGGGAAGCTCTGTAGATTTAGCTAATTTTTCTTTACATTTAGCTGGAA
TTCTCTTATTATTAGGAGCTATTAAATTTTATCAACAATAATTAATATACG
ACTTAATAATATATCTTTGATCAAATACCTTTTATTCAATTTGAGCTGTTGGA
ATTACAGCATTTTTATTATTACTTTCTTTACCTGTTTTAGCTGGAGCAATCA
CTATACTTTTAAACAGATCGAAATCTTAATACTTTCTTTTTTGATCCTGCTGG
TGGAGGTGATCCTATTTTATATCAACATTTATTT

The members of the Squamosa complex are *N. squamosa*, *N. henrikekmani* and *N. erikabjerstromae*. Adults of these species are morphologically similar.

Nystalea henrikekmani Chacón, new species

(Figs. 193-201, 465-472)

Description: MALE (Figs. 193, 194): FWL 26.3-28.2 mm (n=11). **Head:** Antennal shaft grey dorsally and reddish brown ventrally; scape bearing a long beige tuft, composed of dark brown and whitish grey scales; frons brown; labial palpus brown dorsal and ventrally; vertex brown; patagium brown. **Thorax:** Tegula dark brown with some whitish grey scales; mesoscutellum dark brown; thoracic pleuron light yellow; dorsal area of metathorax dark brown with some whitish grey scales; thorax dark brown ventrally. **Legs:** Mostly dark brown, with whitish grey scales between segments. **Wings:** Dorsal FW ground color dark brown; basal band black, medial line two wavy lines of black color, postmedial band two irregular black lines, subterminal line whitish grey marks, in tornus an irregular black mark, terminal line whitish grey spots, fringe dark brown, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe dark brown (193, 194). **Abdomen:** Dorsum dirty brown, venter dirty brown.

Male genitalia: Abdominal pelt (Fig. 197) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with invagination medially. Genitalia (Fig. 198) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization flattened and wide, costula triangular proximally, with flattened, thin, and short projection distally; uncus process short, thin, tubular, setose and slightly curved at apex, uncus lobes rectangular, short and setose, socii elongated with oval, sclerotized, bent and setose projections. Aedeagus (Fig. 199) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally; proximal part of phallus thin, distal part sclerotized, robust, rounded and slightly curved, middle part of phallus thick.

FEMALE: Similar to male but larger (Figs. 195, 196). FWL 25.6-32.2 mm (n=10).

Female genitalia (Figs. 200, 201): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate sclerotized with acute, irregular and bent inward apices, postvaginal plate sclerotized with two short cusps, anterior apophysis shorter than posterior; ductus bursae long, tubular and heavily sclerotized; corpus bursae elongated, globular, surface wrinkled, with sclerotized shield and strongly sclerotized wavy posterior margin, signum rounded, concave with two tiny depressions.

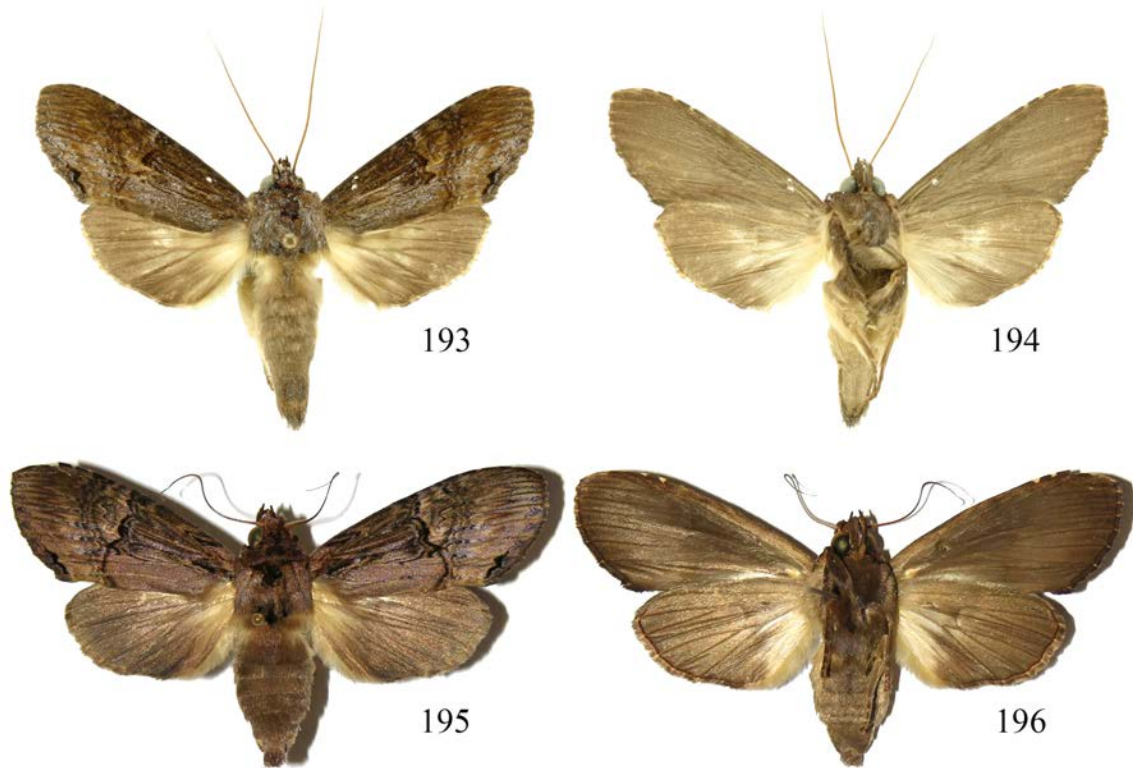
Etymology: *Nystalea henrikekmani* is named in honor of Mr. Henrik Ekman, a Swedish science reporter who in the late 1980's came to ACG and aided heavily in publicizing the initiation of ACG in Sweden; he has continued this interest today with a long examination of what ACG has grown into.

Type material: 35 ♂♂, 20 ♀♀.

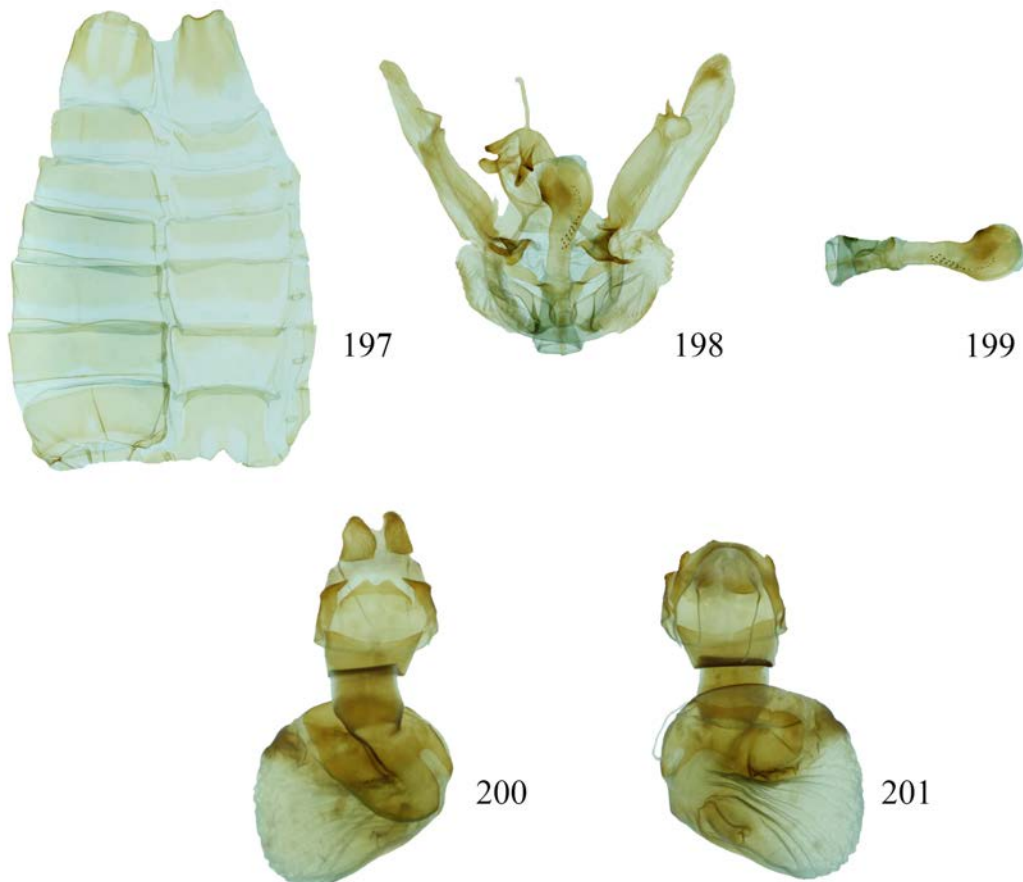
HOLOTYPE, ♂: INB0003007018 Costa Rica, Prov. San José, P. N. Braulio Carrillo, Est. Carrillo, 700 m, 10.165174 -83.957361, 1 October 1984. I. A. Chacón (MNCR).

PARATYPES: 34 ♂♂, 20 ♀♀.

♂♂ (COI Barcoded): INB0003007004 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.148893 -83.951906, 1 May 1985, I. & A. Chacón (MNCR). INB0004217644 Costa Rica, Prov. Alajuela, Upala, P.N. Volcán Tenorio, Cerro La Carmela, 1033 m, 10.710155 -84.997541, 26 June 2009, J. A. Azofoifa (MNCR). INB0004080956 Costa Rica, Prov. Alajuela, Guatuzo, Sitio Catarata, Río Buenavista, 700-800 m, 10.706992 -84.983685, J. A. Azofoifa (MNCR). INBIOCRI001965025 Costa Rica, Prov. Alajuela, Virgen del Socorro, 800 m, 10.258484 -84.171763, 6 February 1987, D.H. Janzen & W. Hallwachs (MNCR). 10-SRNP-105678 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Túnel, 708 m, 10.86835 -85.32711, 14 February 2010, S. Ríos & F. Quesada (MNCR). 10-SRNP-104514 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Casa, 725 m, 10.86627 -85.32605, 14 January 2010, F. Quesada & S. Ríos (MNCR). INB0004146842 Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Punto 2: Falda N Cerro Montezuma, 1000-1100 m, 10.698113 -85.018467, 31 May 2008, J. A. Azofoifa (MNCR). 05-SRNP-40264 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Juntas, 400 m, 10.90661 -85.28784, 24 February 2005, Minor Carmona (USNM). 06-SRNP-7176 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886



Figures 193-196. *Nystalea henrikekmani*: 193, 194. ♂ dorsal and ventral (INB0003007018) FWL 26.4 mm; 195, 196. ♀ dorsal and ventral (00-SRNP-1185) FWL 29.1 mm.



Figures 197-201. *Nystalea henrikekmani*: 197. ♂ sternum VIII 5.8 mm length, 198. ♂ genitalia 8.8 mm length, 199. phallus 5.7 mm length (11-SRNP-101921); 200, 201. ♀ genitalia 8.1 mm length (05-SRNP-921).

-85.3281, 27 September 2006, Carolina Cano (USNM). 10-SRNP-104132 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Termaltes, 694 m, 10.86390 -85.32429, 12 January 2010, F. Quesada (USNM). 08-SRNP-4534 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 28 August 2008, Elda Araya (USNM). INB0004091071 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Laguna La Carmela, Finca Juan Jarquín, 700-800 m, 10.705362 -85.010713, 18 June 2007, J. A. Azofeifa (MNCR). 06-SRNP-5254 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 24 June 2006, Elda Araya (USNM). 06-SRNP-5255 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 24 July 2006, Elda Araya (USNM). 00-SRNP-35 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 15 February 2000, Osvaldo Espinoza (USNM). 02-SRNP-19314 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670 m, 10.87621 -85.38632, 17 October 2002, Carolina Cano (USNM). 02-SRNP-19313 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670 m, 10.87621 -85.38632, 16 October 2002, Carolina Cano (USNM). 02-SRNP-19315 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670 m, 10.87621 -85.38632, 18 October 2002, Carolina Cano (USNM). 01-SRNP-351 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 12 March 2001, Carolina Cano (MNCR). 08-SRNP-4369 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 19 August 2008, Carolina Cano (USNM). 02-SRNP-18151 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 4 August 2002, Carolina Cano (USNM). 15-SRNP-2778 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.880089 -85.388869, 13 January 2016, Carolina Cano (USNM). 15-SRNP-1639 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 1 July 2015, Donald Martocello (USNM). 15-SRNP-1643 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 3 July 2015, Donald Martocello (USNM). INBIOCRI001819777 Costa Rica, Prov. Cartago, Quebrada Segunda, P.N. Tapantí, 1150 m, 9.762583 -83.788328, 1 May 1994, G. Mora (MNCR). INB0003007007 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D.H. Janzen & W. Hallwachs (MNCR). INB0004192930 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina, El Mirador, 167 m, 10.416556 -84.120167, 26 January 2009, I. Chacón, A. Barrientos (MNCR). INB0004090932 Costa Rica, Prov. Guanacaste, Cañas, P.N. Volcán Tenorio, Río Martirio, La Rejolla, 1000-1100 m, 10.654218 -85.038479, 15 June 2007, J. A. Azofeifa, M. Campos (MNCR). INB0004091455 Costa Rica, Prov. Guanacaste, Cañas, P.N. Volcán Tenorio, Río Martirio, La Rejolla, 1000-1100 m, 10.654218 -85.038479, 15 June 2007, J. A. Azofeifa (MNCR). 11-SRNP-101921 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Memo, 774 m, 10.98518 -85.42811, 2 April 2011, R. Franco & F. Quesada (MNCR). 07-SRNP-103668 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 May 2007, H. Cambronero & S. Ríos (MNCR). 06-SRNP-33862 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Laguna, 680 m, 10.9888 -85.42336, 20 September 2006, Petrona Ríos (USNM). 06-SRNP-102136 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 1 March 2006, S. Ríos & R. Franco (MNCR). 06-SRNP-108805 Costa Rica, Prov. Guanacaste, Sector Del Oro, Serrano, 585 m, 11.00023 -85.45621, 19 November 2006, F. Quesada & S. Ríos (MNCR). ♀♀ (COI Barcoded): 07-SRNP-2273 Costa Rica, Prov. Alajuela, Buenos Aires, Finca Tomate, 360 m, 10.90353 -85.30916, 21 June 2007, Gloria Sihezar (USNM). 06-SRNP-8170 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886 -85.3281, 1 November 2006, Carolina Cano (MNCR). 06-SRNP-1482 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 18 March 2006, Gloria Sihezar (USNM). 04-SRNP-4161 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 13 September 2004, Carolina Cano (USNM). 99-SRNP-13831 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 27 December 1999, Carolina Cano (USNM). 00-SRNP-1185 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 April 2000, Osvaldo Espinoza (USNM). 99-SRNP-12388 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 11 August 1999, Freddy Quesada (USNM). 00-SRNP-1186 Costa Rica, Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 April 2000, Osvaldo Espinoza (USNM). 02-SRNP-2443 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 6 May 2002,

Osvaldo Espinoza (MNCR). 01-SRNP-316 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 20 March 2001, Carolina Cano (USNM). 04-SRNP-60504 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 22 November 2004, Carolina Cano (USNM). 04-SRNP-4162 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 16 September 2004, Carolina Cano (USNM). 05-SRNP-921 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 31 March 2005, Gloria Sihezar (USNM). 05-SRNP-2540 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada San Francisco, 690 m, 10.87247 -85.37933, 7 June 2005, Yessenia Mendoza (USNM). 14-SRNP-5596 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.87020 -85.39153, 17 January 2015, Carolina Cano (USNM). 15-SRNP-1300 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.878679 -85.389629, 23 May 2015, Yelba Vega (USNM). 14-SRNP-3862 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Jardín Estrada, 722 m, 10.86546 -85.39694, 18 September 2014, Gloria Sihezar (USNM). INB0003416918 Costa Rica, Prov. Cartago, Turrialba, Tayutic, P.N. Barbilla, Sector Cerro Tigre, 1617 m, 9.921705 -83.398685, 1 January 2002, L. Chavarría (MNCR). INBIOCRI000198090 Costa Rica, Prov. Heredia, Est. El Ceibo, P. N. Braulio Carrillo, 400 - 600 m, 10.328044 -84.080424, 1 December 1989, R. Aguilar & M. Zumbado (MNCR). 15-SRNP-35815 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Nayo, 1090 m, 10.92446 -85.46953, 10 February 2016, Harry Ramírez (USNM). 10-SRNP-35079 Costa Rica, Prov. Guanacaste, Sector Cacao, Naranjales, 1030 m, 10.92268 -85.46405, 16 May 2010, Dunia García (USNM).

Diagnosis: The male genitalia of this species is different from that of *N. erikabjertromae* as the costula is triangular, more flattened, larger and sclerotized; and the distal part of the phallus is more robust (Figs. 198, 199).

Distribution: *Nystalea henrikekmani* has been reared and collected with light traps in rain forest and cloud forest on the east slopes of Cordillera Volcánica de Guanacaste, Cordillera Volcánica Central, and Cordillera de Talamanca. The elevational range for the species is 167-1030 m.

Natural history: (Figs. 465-472) 38 rearing records: ACG locations: Sector San Cristóbal (n=31), Sector Rincón Rain Forest (n=3), Sector Cacao (n=2), Sector Pitilla (n=1), Buenos Aires (1).

Food plants: Clusiaceae: *Chrysochlamys glauca* (n=35), *C. psychotriifolia* (n=2).

Remarks: BIN BOLD:AAB1269 (Fig. 490).

Genbank Accession: GU337723.

DNA barcode of male paratype 02-SRNP-19313.

MHANB213-05[02-SRNP-19313](*Nystalea henrikekmani*)[COI-5P

NNAACACTATATTTTATTTTGGTATTTGGGCAGGAATAGTAGGCCTCTCTC
TTAGATTATTAATTCGGGCAGGAATTAGGAAATCCAGGATCTTTAATTGGAGA
TGATCAAAATTTATAATACCATTGTAACAGCTCATGCTTTTATTATAATTTT
TTATAGTAATAACCTATTATAATTGGAGGAAATTTGAAATGATTAGTTCCAT
TAATATTAGGAGCCCTGATATAGCCTTCCCCGTATAAATAATATAAGTTT
TTGATTATTACCCCTCTCTAACTCTTTAATTTCAAGAAGTATTGTAGAA
AATGGAGCCGGCACAGGATGAACAGTTTATCCCCACTTTCATCAAAATATCG
CACATAGAGGGAAGTTTCAGTAGATCTAGCTATTTTCTTTACATTTAGCTGG
TATTTCTTCTATTAGGAGCAATTAATTTTACTACAATTAATTAATG
CGACTTAATAATATATCTTTTGTCAAAATACCTTTATTATTGAGCAGTAG
GAATTACAGCATTTCTTACTTCTTTCCTTACCAGTTTGTAGCTGGAGCAAT
TACAATATTATTAACAGATCGAAATCTTAATACATCATTTCTTTGACCCAGCT
GGAGGAGGAGATCCTATTTTATACCAACATTTATT

Nystalea erikabjertromae Chacón, new species

(Figs. 202-210, 473-474)

Description: MALE (Figs. 202, 203): FWL 23.4-26.8 mm (n=12). **Head:** Antennal shaft grey dorsally and reddish brown ventrally; scape bearing a long beige tuft, composed of dark brown and whitish grey scales; frons brown; labial palpus brown dorsally and ventrally; vertex brown; patagium brown. **Thorax:** Tegula dark brown with some whitish grey scales; mesoscutellum dark brown;

thoracic pleuron light yellow; dorsal area of metathorax dark brown with some whitish grey scales; thorax dark brown ventrally. **Legs:** Mostly dark brown, with whitish grey scales between segments and margins. **Wings:** Dorsal FW ground color dark brown; basal band black, two medial lines wavy of black color, postmedial band two irregular black lines, subterminal line as whitish grey marks, an irregular black mark in tornus, terminal line as whitish grey spots, fringe dark brown, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe dark brown. **Abdomen:** Dorsum and venter dirty brown.

Male genitalia: Abdominal pelt (Fig. 206) with tergum VIII rectangular, posterior margin regular, sclerotized, with two translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with invagination medially. Genitalia (Fig. 207) with valvae membranous and wide basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization flattened and wide, costula triangular and narrower proximally than in *N. henrikekmani*, with flattened, thin, and short projection distally; uncal process short, thin and tubular, uncus lobes rectangular and setose, socii shaped like a shoe, elongated, sclerotized, slightly curved and setose projections. Aedeagus (Fig. 208) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized, less robust than in *N. henrikekmani*, rounded and slightly curved, middle part of phallus thin and long.

FEMALE: Similar to male but larger (Figs. 204, 205). FWL 24.3-27.9 mm (n=7).

Female genitalia (Figs. 209, 210): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate sclerotized with acute, short irregular apices, postvaginal plate sclerotized with two small cusps, anterior apophysis shorter than posterior; ductus bursae wide, tubular and heavily sclerotized; corpus bursae globular, surface wrinkled, with sclerotized shield and strongly sclerotized wavy posterior margin, signum rounded and concave with two tiny depressions.

Etymology: *Nystalea erikabjerstromae* is named in honor of Ms. Erika Bjerstrom, a Swedish reporter who in 1984 asked D. H. Janzen what he was doing for conservation, thereby initiating the process that has led to ACG where most of these species of *Nystalea* live.

Type material. 21 ♂♂, 7 ♀♀.

HOLOTYPE, ♂: INBIOCRI000069691 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 December 1990, C. Saborío (MNCR).

PARATYPES: 20 ♂♂, 7 ♀♀.

♂♂ (**COI Barcoded**): INBIOCRI002539167 Costa Rica, Prov. San José, Est. Santa Elena, Las Nubes, 1210 m, 9.395701 -83.595652, 10 April 1997, E. Alfaro (MNCR). INBIOCRI002330396 Costa Rica, Prov. San José, Est. Santa Elena, Viejo, Las Nubes, Send. Río #2, 1210 m, 9.395701 -83.595652, 27 October 1995, A. M. Maroto (MNCR). INBIOCRI002354743 Costa Rica, Prov. San José, Est. Santa Elena, Viejo, Las Nubes, 1210 m, 9.395701 -83.595652, 29 September 1995, A. M. Maroto (MNCR). 07-SRNP-2798 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 19 July 2007, Carolina Cano. 08-SRNP-4521 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 7 September 2008, Carolina Cano. INB0003007012 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INB0003934973 Costa Rica, Prov. Cartago, Pejibaye, Reserva Biol. Copal, 1040 m, 9.783407 -83.751929, 7 April 2005, J. Azofeifa, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INB0003433854 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Estación Barbilla, 500 m, 9.981348 -83.454259, 1 February 2002, L. Chavarria (MNCR). INBIOCRI000954788 Costa Rica, Prov. Cartago, Grano de Oro, Chirripó, Turrialba, 1120 m, 9.818357 -83.459163, 1 September 1992, P. Campos (MNCR). 04-SRNP-34376 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Cuestona, 640 m, 10.99455 -85.414609, 7 September 2004, Petrona Ríos. INBIOCRI000515335 Costa Rica, Prov. Puntarenas, Rancho Quemado, Pen. Osa, 200 m, 8.679096 -83.566714, 1 Nov 1990, F. Quesada (MNCR). INB0003006999 Costa Rica, Prov. Puntarenas, Sirena, Corcovado Nat. Pk., Osa Penin., 20 m, 8.479267 -83.588565, 23 March 1984, DH Janzen & W. Hallwachs (MNCR). INBIOCRI000790429 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 April 1992, G. Fonseca (MNCR). INBIOCRI000669622 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1

June 1991, G. Fonseca (MNCR). INBIOCRI000515535 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 November 1990, C. Saborío (MNCR). INBIOCRI000810024 Costa Rica, Prov. Puntarenas, Rancho Quemado, Península de Osa, 200 m, 8.679096 -83.566714, 1 October 1992, M. Segura (MNCR). INBIOCRI000116627 Costa Rica, Prov. Puntarenas, Est. Bijagual, 500 m, 9.747145 -84.563354, Res. Biol. Carara, 1 November 1989, R. Zuñiga (MNCR). INBIOCRI000016830 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, R.B. Carara, 50 m, 9.774233 -84.608124, 1 August 1989, R. Zuñiga (MNCR). INB0003103654 Costa Rica, Prov. Limón, Reserva Biol. Hitoy Cerere, 2 Km S de Estación, 200 m, 9.667248 -83.028632, 12 October 1999, R. Barton (MNCR). INB0003007024 Costa Rica, Prov. Limón, 9.4 Km. W. de Bribri, Suretka, 200 m, 9.622299 -82.772958, 9-11 Jun 1983. D. H. Janzen & W. Hallwachs (MNCR). ♀♀ (**COI Barcoded**): 15-SRNP-1981 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.878679 -85.389629, 9 August 2015, Osvaldo Espinoza. 09-SRNP-41430 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Rincón, 430 m, 10.8962 -85.27769, 19 September 2009, José Pérez. 01-SRNP-257 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 1 March 2001, Carolina Cano. 07-SRNP-2799 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 16 July 2007, José Manuel Pérez. 05-SRNP-31718 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Memos, 740 m, 10.98171 -85.42785, 4 July 2005, Manuel Ríos. INB0003855733 Costa Rica, Prov. Puntarenas, P.I.L.A., Buenos Aires, Est. Altamira, Mirador, 1400 m, 9.029379 -83.016351, 1 June 2004, R. Delgado, D. Rubi, R. González (MNCR). INBIOCRI000118764 Costa Rica, Prov. Puntarenas, Fca. Cafrosa, Est. Las Mellizas, P. N. Amistad, 1300 m, 8.891473 -82.792936, 1 November 1989, M. Ramirez & G. Mora (MNCR).

Diagnosis: Male genitalia with costula triangular and narrower proximally than in *N. henrikekmani*, with flattened, thin, and short projection distally; aedeagus distally sclerotized, rounded and slightly curved, less robust than in *N. henrikekmani* (Figs. 207, 208).

Distribution: *Nystalea erikabjerstromae* has been reared and collected with light traps in rain forest and cloud forest on the east slope of Cordillera Volcánica de Guanacaste, on both slopes of Cordillera de Talamanca, in addition to the Pacific lowlands and on the Osa Peninsula. The elevational range for the species is 167-1030 m.

Natural history: (Figs. 473, 474) eight rearing records: ACG locations: Sector Pitilla (n=2), Sector San Cristóbal (n=5), Sector Rincón Rain Forest (n=1).

Food plants: Clusiaceae: *Chrysochlamys glauca* (n=8).

Remarks: BIN BOLD:AAC6402 (Fig. 490).

Genbank Accession: GU160244

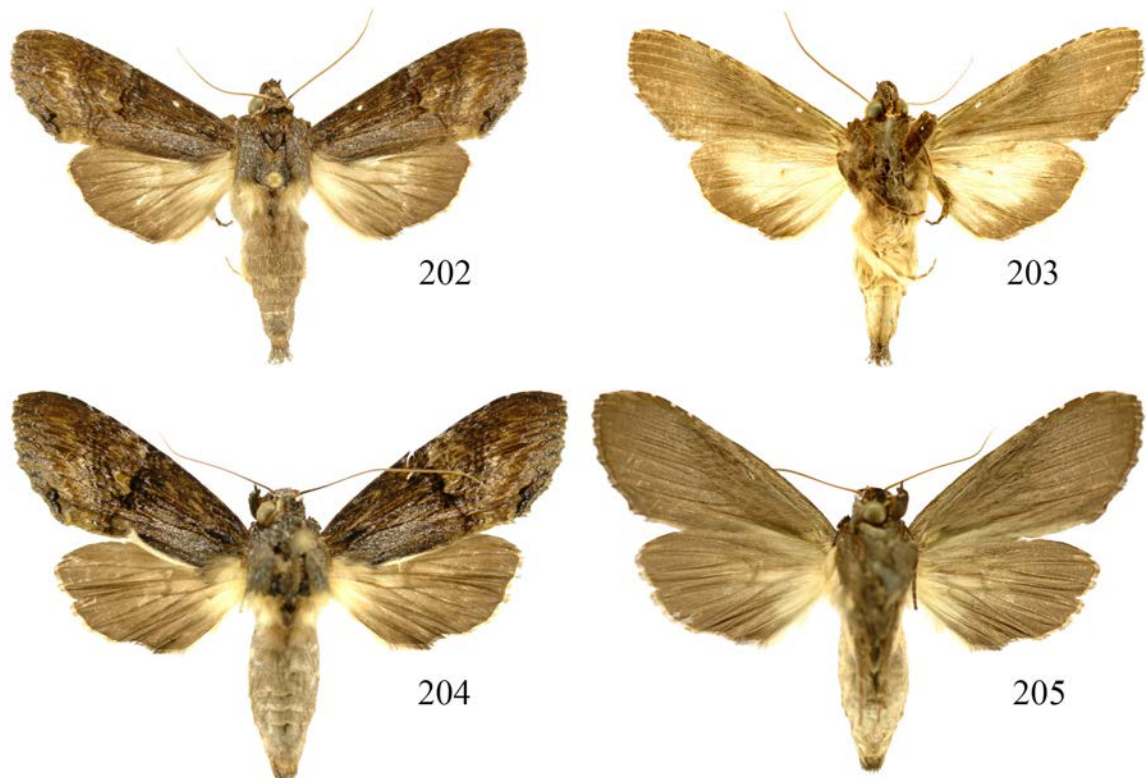
DNA barcode of male paratype 04-SRNP-34376.

MHANC033-05[04-SRNP-34376](*Nystalea erikabjerstromae*)COI-5P
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 TTAGATTATTAATTCGAGCAGAAATTAGGTAATCCAGGATCTTTAATTTGGAGA
 TGATCAAATTTAATAACTATTGTAACAGCTCATGCTTTTACTTATTAATTTTT
 TTTATAGTTATACCTATTATAATTTGGAGGGTTTGGAAATGATTAGTTCCAT
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 TTGATTATTACCCCTTCTTTAACTCTCTTAATTTCAAGAAGTATTGTAGAA
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 CGACTTAATAATATCTTTTGTCAAATACCTTTATTTTGGAGCTGTAG
 GAATTACAGCATTTTATTACTTCTTTTACCAGTTTGTAGCTGGAGCAAT
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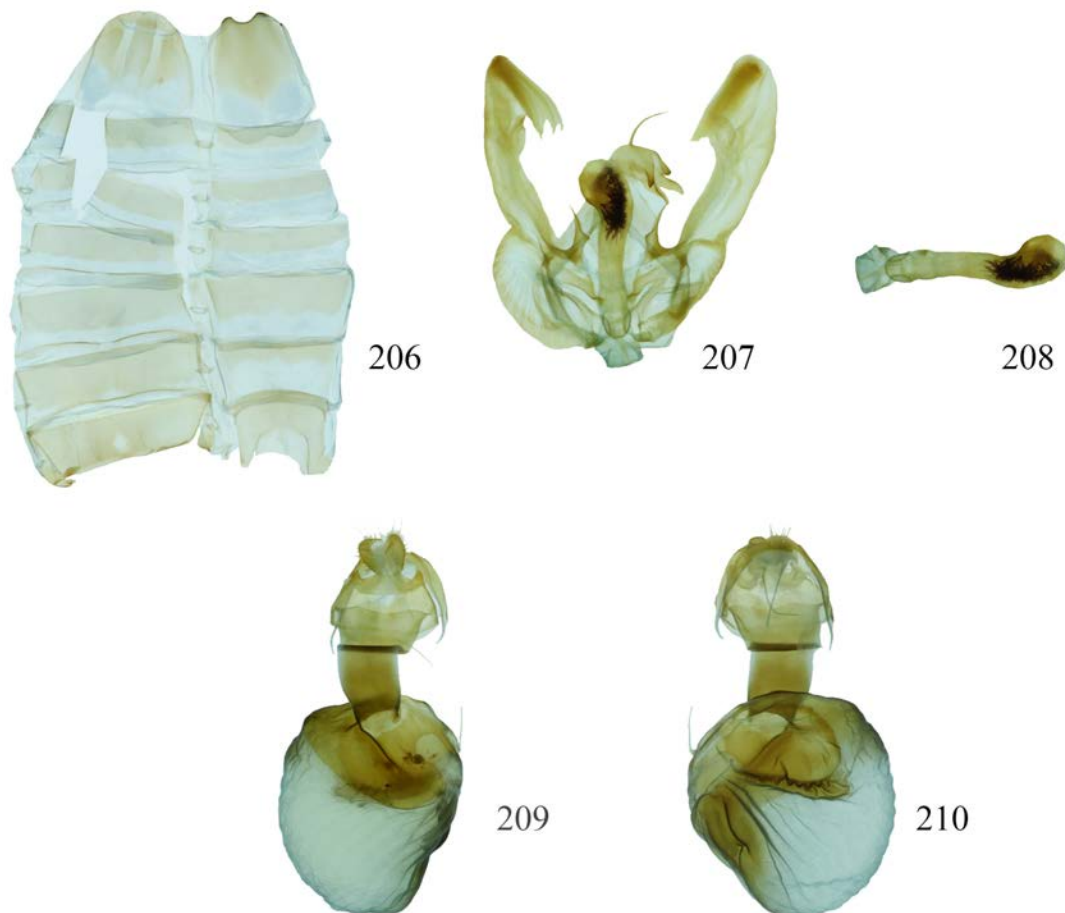
Nystalea corrusca Guenée, 1852

(Figs. 211-219)

Redescription: **MALE** (Figs. 211, 212): FWL 22.6-28.0 mm (n=5). **Head:** Antennal shaft cream dorsally and gray ventrally; scape bearing a long cream tuft, composed of gray and whitish grey scales; frons cream; labial palpus cream



Figures 202-205. *Nystalea erikabjerstromae*: 202, 203. ♂ dorsal and ventral (INBIOCRI000069691) FWL 23.6 mm; 204, 205. ♀ dorsal and ventral (INB0004217724) FWL 27.4 mm.



Figures 206-210. *Nystalea erikabjerstromae*: 206. ♂ sternum VIII 5.8 mm length, 207 ♂ genitalia 8.4 mm length, 208 phallus 5.6 mm length (07-SRNP-113969); 209, 210 ♀ genitalia 8 mm length (INB0003855733).

dorsal and ventrally; vertex cream; patagium gray. **Thorax:** Tegula gray with some whitish grey scales; mesoscutellum whitish grey; thoracic pleuron cream; dorsal area of metathorax cream with some black and gray scales; thorax cream ventrally. **Legs:** Mostly cream, with black and light brown. **Wings:** Dorsal FW ground color grey black; basal band black, postmedial area dirty beige, macula beige with brown and black scales near apex, fringe alternating gray and beige, dorsal HW light yellow with veins and marginal shade dark gray; fringe light yellow. **Abdomen:** Dorsum gray venter light yellow.

Male genitalia: Abdominal pelt (Fig. 215) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with deep, bag-like, rounded invagination medially. Genitalia (Fig. 216) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, thin and flattened midvalve sclerotization, costula flattened and thin at base, bifurcated with two sclerotized projections, one short and thin, other wide and trumpet-shaped distally; uncus process thin, tubular, slightly setose and curved at apex, uncus with small lobes rectangular and setose, socii elongated with two membranous and setose projections with disc shape. Aedeagus (Fig. 217) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized, robust and acute, with small, thin and acute sclerotized protuberance in dorsal margin, middle part of phallus elongated.

FEMALE: (Figs. 213, 214). FWL 29.5 mm (n=1).

Female genitalia (Figs. 218-219): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, long, with sclerotized and acute apices, postvaginal plate sclerotized and slightly convex, anterior apophysis shorter than posterior; ductus bursae robust and heavily sclerotized; corpus bursae globular, wrinkled surface, with sclerotized shield, spearhead shaped signum.

Material examined: (COI Barcoded): 5 ♂♂, 1 ♀.

♂♂ (**COI Barcoded**): INBIOCRI001073572 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.148893 -83.951906, 1 January 1985, A. Chacón (MNCR). INB0004217768 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Lag. La Carmela, Fca. Juan Jarquín, 700-800 m, 10.705362 -85.010713, 30 May 2009, J. A. Azofeifa, E. Méndez (MNCR). INBIOCRI002192164 Costa Rica, Prov. Limón, Sardinias, Barra del Colorado, 15 m, 10.647646 -83.73103, 3 April 1995, F. Araya (MNCR). INB0003011956 Costa Rica, Prov. Limón 9.4 Km. W. de Bribri, Suretka, 200 m, 9.622929 -82.772958, 11 June 1983, D. H. Janzen & W. Hallwachs (MNCR). INBIOCRI002609473 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR).

♀ (**COI Barcoded**): INB0004073269 Costa Rica, Prov. Alajuela, Guatuso, Sitio Catarata Río Buenavista, 700-800 m, 10.706992 -84.983685, J. A. Azofeifa (MNCR).

Additional material examined (not barcoded): 18 ♂♂, 1 ♀.

♂♂: INB0004217768 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Lag. La Carmela, Fca. Juan Jarquín, 700-800 m, 10.705362 -85.010713, 30 May 2009, J. A. Azofeifa, E. Méndez (MNCR). INB0004341807 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 800 m, 10.706123 -84.992889, 15 November 2012, J. A. Azofeifa (MNCR). INB0004436061 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 16 November 2014, J. A. Azofeifa (MNCR). INB0004331006 Costa Rica, Prov. 800 m, A. Azofeifa (MNCR). INB0004294985 Costa Rica, Prov. Alajuela, Upala, Z.P. Miravalles, Alto Los Brenes, 700 m, 10.716665 -85.090563, 30 August 2011, J. A. Azofeifa (MNCR). INB0004436355 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 800 m, 10.706123 -84.992889, 19 December 2014, J. A. Azofeifa (MNCR). INB0004387537 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 16 November 2013, J. A. Azofeifa (MNCR). INB0004436058 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 16 November 2014, J. A. Azofeifa (MNCR). INB0004423073 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 9 August 2014, J. A. Azofeifa (MNCR). INB0004436059 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 16 November 2014, J. A. Azofeifa (MNCR). INB0004436424 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio,

Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 19 December 2014, J. A. Azofeifa (MNCR). INB0004436359 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 19 December 2014, J. A. Azofeifa (MNCR). INB0004436360 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 700-800 m, 10.706123 -84.992889, 19 December 2014, J. A. Azofeifa (MNCR). INB0004341348 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 800 m, 10.706123 -84.992889, 7 November 2012, J. A. Azofeifa (MNCR). INBIOCRI001073572 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.148893 -83.951906, 1 January 1985 coll. A. Chacón (MNCR). INBIOCRI002609473 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INB0003011956 Costa Rica, Prov. Limón, 9.622929 -82.772958, 9.4 Km. W. de Bribri, Suretka, 200 m, 9.622929 -82.772958, 11 June 1983, D. H. Janzen & W. Hallwachs (MNCR). INBIOCRI002192164 Costa Rica, Prov. Limón, Sardinias, Barra del Colorado, 15 m, 10.647646 -83.73103, 3 April 1995, F. Araya (MNCR). ♀: INB0004436359 Costa Rica, Prov. Puntarenas, Osa, Ciudad Pto Cortés, Camino Alto Buena Vista, 860 m, 9.022889 -83.496231, 8 June 2005, B. Gamboa, J. Gutiérrez, Moraga, J. Azofeifa, Y. Cárdenas (MNCR).

Diagnosis: *Nystalea corrusca* in Costa Rica cannot be confused with the other species of this genus due to the external morphology of the adults and the male genitalia. Dorsal FW ground color grey black; basal band black, postmedial area dirty beige, macula beige with brown and black scales near apex, fringe alternating gray and beige, dorsal HW light yellow with veins and marginal shade dark gray; fringe light yellow (Figs. 211, 212). Costula flattened and thin at base, bifurcated with two sclerotized projections, one short and thin, other wide and trumpet-shaped distally (Fig. 216).

Distribution: *Nystalea corrusca* has been collected with light traps in rain forest and cloud forest on the east slopes of Cordillera Volcánica de Guanacaste, Cordillera Volcánica Central, and Cordillera de Talamanca, as well as the Caribbean and Pacific lowlands. The elevational range for the species is 50-1115 m.

Natural history: All specimens have been collected with light traps; the life history of *N. corrusca* is unknown.

Remarks: BIN BOLD:ACL5284 (Fig. 490).

Genbank Accession: MT358266

DNA barcode of male INB0004073269.

ASARD8894-14|INB0004073269|(*Nystalea corrusca*)|COI-5P
AACATTATATTTTATTTTGGAAATTGAGCAGGAATAATTGGAACCTCTTTA
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CAATACTTTAACAGATCGAAATCTCAACCTATTTTGTATCCTGCTGG
AGGAGGAGATCCTATTTTATATCAACATTTATTT

Nystalea ebalea (Stoll, 1780)

(Figs. 220-228, 388-392)

MALE (Figs. 220, 221): FWL 23.6-25.3 mm (n=10).

Male genitalia: Abdominal pelt (Fig. 224) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with wide and deep rounded invagination medially. Genitalia (Fig. 225) with valvae wide and membranous basally, oval



Figures 211-214. *Nystalea corrusca* Schaus, 1904: 211, 212 ♂ dorsal and ventral (INBIOCRI002192164) FWL 28.0 mm; 213, 214 ♀ dorsal and ventral (INB0004073269) FWL 29.5 mm.



Figures 215-219. *Nystalea corrusca* Schaus, 1904: 215 ♂ sternum VIII 5.9 mm length, 216 ♂ genitalia 9.2 mm, 217 phallus 6.8 mm (INBIOCRI002192164); 218, 219 ♀ genitalia 8.2 mm (INB0004073269).

at apex, costal margin smooth and sclerotized, thin and flattened midvale sclerotization, costula flattened, wide at base, elongated, thin, flattened, paddle-shaped distally; uncus process thin, tubular, slightly curved at apex, uncus lobes rectangular and slightly setose, socii elongated with two sclerotized, bent out, flattened and setose projections. Aedeagus (Fig. 226) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized, thin and acute, with two small, thin and acute sclerotized protuberance in dorsal margin, middle part of phallus sclerotized and elongated.

FEMALE: (Figs. 222, 223). FWL 24.3-26.7 mm (n=10).

Female genitalia (Figs. 227-228): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, short, sclerotized with acute apices, postvaginal plate sclerotized, slightly convex, anterior apophysis shorter than posterior; ductus bursae robust and heavily sclerotized; corpus bursae globular, surface wrinkled, sclerotized shield with slightly jagged and depressed anterior margin, L-shaped signum.

Material examined: 21 ♂♂, 23 ♀♀.

♂♂ (**COI Barcoded**): INB0004225106 Costa Rica, Prov. Alajuela, Upala, Z.P. V. Miravallés, Falda N. Catarata R. Bijagua, 500-600 m, 10.727917 -85.081889, 31 July 2009, J. A. Azofeifa, W. Porras (MNCR). 15-SRNP-45047 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Casa Keyner, 121 m, 10.956440 -85.266109, 29 January 2015, Keiner Aragón (USNM). 02-SRNP-972 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 14 March 2002, Gloria Sihezlar (USNM). 15-SRNP-45048 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Casa Keyner, 121 m, 10.956440 -85.266109, 1 February 2015, Keiner Aragón (USNM). 15-SRNP-45049 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Casa Keyner, 121 m, 10.956440 -85.266109, 2 February 2015, Keiner Aragón (USNM). 10-SRNP-112646 Costa Rica, Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956, -85.46512. 10 August 2010. S. Ríos & F. Quesada (MNCR). 14-SRNP-71871 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 380 m, 11.016019 -85.380529, 5 November 2014, Ricardo Calero (USNM). 05-SRNP-57772 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 17 July 2005, Yerlyng Campos (USNM). 14-SRNP-71870 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 380 m, 11.016019 -85.380529, 3 November 2014, Ricardo Calero (USNM). 14-SRNP-100005 Costa Rica, Guanacaste, Sector Pailas Dos, PDL#5, 825 m, 10.76273 -85.33398, 2 January 2014, R. Franco & H. Cambronero (MNCR). 06-SRNP-102135 Costa Rica, Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 1 March 2006, S. Ríos & R. Franco (MNCR). INB0003743247 Costa Rica, Prov. Guanacaste, Macizo Miravallés, Estación Cabro Muco, 1100 m, 10.718333 -85.144722, 2 July 2003, B. Hernández (MNCR). INB0003047992 Costa Rica, Prov. Guanacaste, A.C.T. Bagaces, Pque Nal Palo Verde, Sector Palo Verde, 0-50 m, 10.366668 -85.383266, 15 October 1999, H. Méndez (MNCR). 10-SRNP-71946 Costa Rica, Prov. Guanacaste, Sector Pitilla, Quebradona, 475 m, 10.99102 -85.39539, 20 July 2010, Ricardo Calero (USNM). INB0004104191 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0-100 m, 8.54608 -83.397802, 10 August 2007, J. A. Azofeifa (MNCR). INB0004137798 Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Centro Operativo, 3 m, 8.739863 -83.293143, 7 March 2008, J. A. Azofeifa (MNCR). INBIOCRI001629012 Costa Rica, Prov. Puntarenas, Estación Sirena, 1-100 m, 8.480171 -83.591289, 1 September 1993, G. Fonseca (MNCR). INBIOCRI001375692 Costa Rica, Prov. Puntarenas, Est. La Casona, Res. Biol. Monteverde, 1520 m, 10.298429 -84.792544, 1 March 1991, N. Obando (MNCR). INBIOCRI000672610 Costa Rica, Prov. Puntarenas, Rancho Quemado, Pen. Osa, 200 m, 8.679096 -83.566714, 1 December 1990, F. Quesada (MNCR). INB0004104142 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0-100 m, 8.54608 -83.397802, 10 August 2007, J. A. Azofeifa (MNCR). INB0004104136 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa. 0-100 m, 8.54608 -83.397802, 10 August 2007, J. A. Azofeifa (MNCR). ♀♀ (**COI Barcoded**): INB0004166196 Costa Rica, Prov. Alajuela, San Ramón. Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 10 August 2008, R. Rojas (MNCR). INB0004157851 Costa Rica, Prov. Alajuela, Guatuso. P.N. Volcán Tenorio, Punto 4: Cerro Montezuma, 1510 m, 10.695154 -85.027602, 27 July 2008, J. A. Azofeifa (MNCR). 11-SRNP-65183 Costa Rica, Prov. Alajuela, Brasilia, Gallinazo, 360 m, 11.01825 -85.37199, 12 May 2011, Duvalier Briceño (USNM). INB0003351658 Costa Rica, Prov. Cartago, R.F. Río Pacuare, Turrialba, P.N. Barbilla, Est. Barbilla, 500 m, 9.981348 -83.454259, 1 August 2001, L. Chavarría (MNCR). INBIOCRI001881449 Costa Rica, Prov. Cartago, Monumento Nacional Guayabo, A. C. Amistad, 1100 m, 9.973979 -83.694936, 1 June 1994, G.

Fonseca (MNCR). INBIOCRI000206693 Costa Rica, Prov. Heredia, Estación Barva, Braulio Carrillo, N. P. Heredia, 2500 m, 10.119213 -84.121652, 1 January 1990, G. Rivera (MNCR). INB0003956274 Costa Rica, Prov. Guanacaste, Nandayure, Manglar Playa Caletas, 5 m, 9.737311 -85.234423, 12 July 2005, B. Gamboa, J. Azofeifa, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). 08-SRNP-16358 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 10.84389 -85.61384, 300 m, 17 November 2008, Guillermo Pereira (USNM). 12-SRNP-71939 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 11.01602 -85.38053, 380 m, 21 August 2012, Ricardo Calero (USNM). 05-SRNP-57774 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 17 July 2005, Yerlyng Campos (USNM). 05-SRNP-57773 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Estación La Perla, 325 m, 10.76737 -85.43313, 17 July 2005, Yerlyng Campos (USNM). INBIOCRI002474495 Costa Rica, Prov. Guanacaste, P.N. Barra Honda, 100 m, 10.171015 -85.347201, 1 August 1996, M. Reyes (MNCR). 11-SRNP-71986 Costa Rica, Prov. Guanacaste, Sector Pitilla, Leonel, 510 m, 10.99637 -85.40195, 30 September 2011, Ricardo Calero (USNM). 11-SRNP-71793 Costa Rica, Prov. Guanacaste, Sector Pitilla, Leonel, 510 m, 10.99637 -85.40195, 27 September 2011, Ricardo Calero (USNM). 11-SRNP-21439 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Congos, 290 m, 11.02097 -85.52531, 27 July 2011, Roster Moraga (USNM). 11-SRNP-21440 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Congos, 290 m, 11.02097 -85.52531, 27 July 2011, Roster Moraga (MNCR). INBIOCRI000674299 Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 120 m, 9.387739 -84.123702, 1 December 1990, G. Varela & R. Zuñiga (MNCR). INBIOCRI001078733 Costa Rica, Prov. Puntarenas, Las Cruces Biol. Sta. San Vito, 1200 m, 8.795974 -82.955868, 18 May 1988, I. Chacón (MNCR). INB0003971205 Costa Rica, Prov. Puntarenas, Isla San Lucas, Puesto Isla San Lucas, alrededores del puesto, 0-100 m, 9.946523 -84.905566, 15 September 2005, J. Azofeifa, B. Gamboa, A. Picado, M. Moraga (MNCR). INBIOCRI002534817 Costa Rica, Prov. Puntarenas, Estación Altmira, 1 Km. S del Cerro Biolley, 1300-1450 m, 9.032987 -83.010887, 31 January 1997, R. Villalobos (MNCR). INBIOCRI001756890 Costa Rica, Prov. Puntarenas, San Luis, Monteverde, 1000-1350 m, 10.276723 -84.79662, 1 March 1994, Z. Fuentes (MNCR). INB0004110880 Costa Rica, Prov. Puntarenas, Golfito, Est. Tigre, 47 m, 8.54608 -83.397802, 1 October 2007, J. A. Azofeifa (MNCR). INB0003860672 Costa Rica, Prov. Puntarenas, Camino a Bijagual, 400 m, 9.7625 -84.6, 20 July 2004, W. Porras, B. Gamboa, J. Mata, D. Briceño, M. Moraga, Y. Cárdenas (MNCR).

Diagnosis: *Nystalea ebalea* in Costa Rica cannot be confused with the other species of this genus due to the external morphology of the adults and the male genitalia. Costula flattened, wide at base, elongated, thin, flattened, paddle-shaped distally (Fig. 225).

Distribution: *Nystalea ebalea* has been reared and collected with light traps in dry forest, the rain forest and cloud forest, on both slopes of the Cordillera Volcánica de Guanacaste, east slope of Cordillera de Tilarán, Cordillera Volcánica Central and Cordillera de Talamanca, llanuras del norte, Península de Nicoya, Península de Osa, Caribbean and Pacific lowlands. The elevational range for the species is 0-2500 m.

Natural history: (Figs. 388-392) 550 rearing records: ACG locations: Sector Santa Rosa (n=212), Sector Del Oro (n=95), Sector Mundo Nuevo (n=77), Sector El Hacha (n=74), Sector Pitilla (n=28), Sector San Cristóbal (n=23), Sector Rincón Rain Forest (n=13), Sector Cacao (n=13), Sector Orosi (n=7), Sector Brasilia (n=3), Sector Santa Elena (n=2), Sector Buenos Aires (n=1), Sector Pailas (n=1), Sector Marino (n=1).

Food plants: Anacardiaceae: *Anacardium excelsum* (Bertero & Balb. Ex Kunt) Skeels (n=9), *A. occidentale* L. (introduced) (n=30), *Astronium graveolens* Jacq. (n=3), *Mosquitoxylum jamaicense* Krug & Urb. (n=15), *Spondias dulcis* G. Forst. (n=1), *S. mombin* L. (n=440), *S. purpurea* L. (introduced) (n=33), *Tapirira brenesii* Standl. (n=2), *T. mexicana* (n=9), Burseraceae: *Bursera simaruba* (n=2), *Protium costarricense* (n=5).

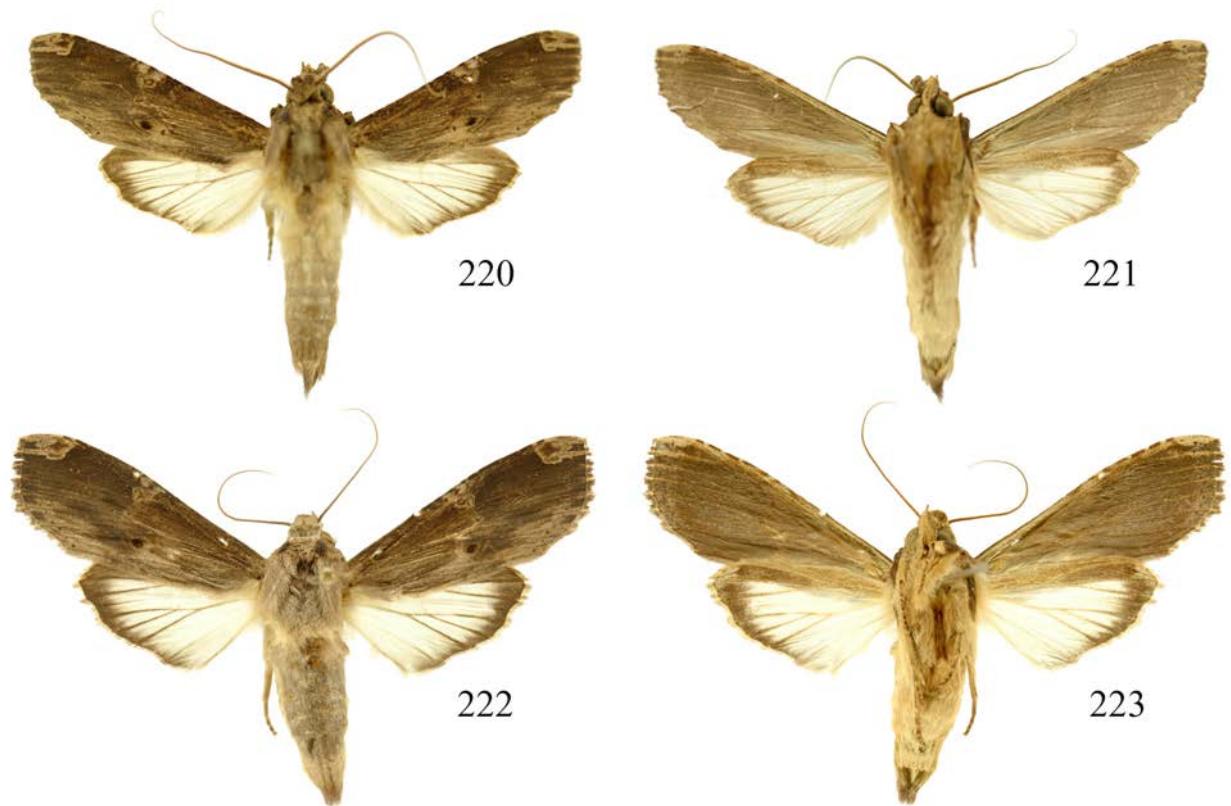
Remarks: BIN BOLD:AAA8098 (Fig. 490).

Genbank Accession: GU333409

DNA barcode of male 03-SRNP-12280.1

MHANA445-05[03-SRNP-12280.1](*Nystalea ebalea*)|COI-5P

NNAACATTATATTTTATTTTGGTATTGAGCAGGAATAGTTGGGACTTCTC



Figures 220-223. *Nystalea ebalea* (Stoll, 1780): 220, 221 ♂ dorsal and ventral (INB0004104136) FWL 23.6 mm; 222, 223 ♀ dorsal and ventral (INBIOCRI000206693) FWL 25.4 mm.



Figures 224-228. *Nystalea ebalea* (Stoll, 1780): 224 ♂ sternum VIII 3.9 mm length, 225 ♂ genitalia 8.2 mm length, 226 phallus 6.2 mm length (07-SRNP-107021); 227, 228 ♀ genitalia 9.1 mm length (10-SRNP-112173).

TTAGTTTTATTAATTCGAGCAGAATTAGGAAATCCTGGATCTTTAATTTGGAGA
 TGATCAAAATTTACAATACTATTGTTACAGCTCATGCTTTTATTATAATTTTT
 TTTATAGTTATACCTATTATAAATTTGGAGGATTTGGTAATTGATTAATCCCT
 TAATATTAGGAGCCCTGATATAGCTTTCCCCCGAATAAATAATATAAGTTT
 TTGATTATTACCCCTTCATTAATCTTTAATTTCAAGAAGTATTGTAGAA
 AATGGAGCTGGTACAGGATGAACGGTTTATCCCCCTTTCATCTAATATTG
 CCCATAGAGGTAGCTCTGTAGATCTAGCTATTTTCCCTTCATTTAGCTGG
 AATTTCCCAATTTTAGGAGCTATCAATTTTATTACTACAATATTAACATA
 CGTCTCAATAATATATCTTTTGATCAAATACCTCTATTGTTTGGAGCAGTAG
 GAATTACAGCATTTTTATTATTAGTTTCCCTTACCTGTGTAGCTGGAGCAAT
 TACCATACTTTTAAACAGATCGAAATCTTAATACTTCAATTTTTTGATCTGCT
 GGAGGAGGTGATCCTATTTTATACCAACATTTATTC

Nystalea guzmani Schaus, 1910

(Figs. 229-241, 393-398)

Redescription: MALE (Figs. 229, 230, 238A): FWL 23.5-24.8 mm (n=7).

Head: Antennal shaft light brown dorsally and dark brown ventrally; scape bearing a long dark brown tuft, composed of cream and grey scales; frons cream; labial palpus cream dorsal and ventrally; vertex cream; patagium gray. **Thorax:** Tegula gray with some whitish grey scales; mesoscutellum whitish grey; thoracic pleuron cream; dorsal area of metathorax cream with some black and grey scales; thorax cream ventrally. **Legs:** Mostly cream, with black and light brown. **Wings:** Dorsal FW ground color grey black; basal band black, postmedial area dirty beige, macula beige with brown and black scales near apex, fringe alternating gray and beige, dorsal HW light yellow with veins and marginal shade dark gray; fringe light yellow. **Abdomen:** Dorsum gray venter light yellow.

Male genitalia: Abdominal pelt (Figs. 233, 239) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with narrow and deep sclerotized invagination medially. Genitalia (Figs. 234, 240) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization very thin and flattened, costula proximally flattened, wide at base, with thin and acute projection, distal part elongated, thin, rounded and bulky shaped; uncal process tubular, elongated, thin, curved and setose, uncus with lobes rectangular, small and setose, socii long with two pads sclerotized, acute and very setose projections. Aedeagus (Figs. 235, 241) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized, robust and rounded, with two tiny nipple-shaped projection, middle part of phallus sclerotized and elongated.

FEMALE: Similar to male but larger (Figs. 231, 232, 238B). FWL 24.3-26.3 mm (n=6).

Female genitalia (Figs. 236, 237): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate thin, sclerotized and acute, postvaginal plate sclerotized slightly emarginate, anterior apophysis shorter than posterior; ductus bursae robust and heavily sclerotized; corpus bursae globular, smooth surface, sclerotized shield, triangular shape signum.

Specimens examined: 7 ♂♂, 6 ♀♀.

♂♂ (**COI Barcoded**): 07-SRNP-110312 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Estación Caribe (melina), 391 m, 10.89560 -85.29558, 9 November 2007, F. Quesada & R. Franco (MNCR). 99-SRNP-3280 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 15 August 1999, Lucía Ríos (USNM). 07-SRNP-60517 Costa Rica, Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 1 December 2007, José Alberto Sánchez (USNM). 07-SRNP-60518 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 1 December 2007, José Alberto Sánchez (USNM). 07-SRNP-58853 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Licanía, 470 m, 10.77222 -85.41225, 21 August 2007, José Cortéz (USNM). 07-SRNP-60224 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, Mariano Pereira (USNM). INBIOCRI001373317 Costa Rica, Prov. Limón, P. N. Tortuguero, Cerro Tortuguero, 0-120 m, 10.584815 -83.529205, 1 June 1991, R. Delgado (MNCR). ♀♀ (**COI Barcoded**): INB0004157684 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 2: Falda N Cerro Montezuma, 1160 m, 10.698113 -85.018467, 7 August 2008, J. A. Azofeifa (MNCR). 11-SRNP-21663 Costa Rica, Prov. Guanacaste, Sector El Hacha,

Estación Los Almendros, 290 m, 11.03226 -85.52776, 14 August 2011, Elieth Cantillano (USNM). 10-SRNP-112642 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 10 August 2010. S. Ríos & F. Quesada (MNCR). 95-SRNP-8991 Costa Rica, Prov. Guanacaste, Sector El Hacha, Laguna Agua Buena, 220 m, 11.03239 -85.57545, 25 September 1995, Gusneros (USNM). 99-SRNP-16133 Costa Rica, Prov. Guanacaste, Sector El Hacha, Laguna Agua Buena, 220 m, 11.03239 -85.57545, 15 November 1999, Gusneros (USNM). 07-SRNP-60222 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 13 October 2007, Mariano Pereira (USNM).

Diagnosis: In *N. guzmani* the uncus and socii are more robust than in *N. idonea* (Fig. 234).

Distribution: *Nystalea guzmani* has been reared and collected with light traps in dry forest, rain forest, and cloud forest on both slopes of the Cordillera Volcánica de Guanacaste and on the east slope of the Cordillera de Tilarán, as well as the Caribbean and Pacific lowlands. The elevational range for the species is 0-1400 m.

Natural history: (Figs. 393-398) 31 rearing records: ACG locations: Sector Del Oro (n=2), Sector Mundo Nuevo (n=8), Sector El Hacha (n=21).

Food plants: Exclusively Myrtaceae: *Syzygium jambos* (introduced) (n=1), *Calyptanthus guanacastensis* (n=20), *Myrcia splendens* (n=1), *Eugenia siggersii* (n=1).

Remarks: BIN BOLD: AAC9233 (Fig. 490).

Genitalia examinations of the ACG populations match the LT designated in Schintlmeister (2016) (USNMENT 00991750).

Genbank Accession: JF751574

DNA barcode of male 07-SRNP-60517

MHMXU348-08|07-SRNP-60517|(Nystalea guzmani)|COI-5P

AACACTATAATTTTATTTTGGAAATTTGAGCAGGAATAAATGGAAATCATTAA
 AGTTTATAATTCGAGCAGCAAAATAGGAAATCCCTGGATCTTTAATTTGGAGATG
 ATCAAATTTATAATACTATTGTAACAGCTCATGCTTTTTGTTAATTTTTTTT
 TATAGTTATACCTATCATAATTTGGAGGATTTGGTAATTGATTAGTCCCTTTA
 ATATTAGGAGCCCTGATATAGCTTTCCCCCGAATAAATAATAAAGTTTTT
 GATTATTACCCCTCTCTAATTTTATAAATTTCAAGAAGTATCGTAGAAAA
 TGGAGCCGGTACTGGATGAACCTGTGTATCCCCCTTTTCATCTAACATTGCT
 CATAGAGGAAGATCAGTAGATTTAGCTATTTTTTCACTTCACTTAGCTGGAA
 TTTCTTCTATTTTAGGAGCTATTAATTTTATTACCACAATTATTAATATACG
 ACTAAATAATATATCTTTTGATCAAATACCATTATTTGTATGAGCTGTTGGA
 ATTACAGCATCTTATTATTAATTTCTTACCTGTTTTAGCAGGAGCTATTA
 CTATACCTTTTAAACAGATCGTAATCTTAAACACTTCTTTTTTTGATCCTGCCG
 AGGAGGAGATCCTATTTTATACCAACATTT

Nystalea idonea Walker, 1858

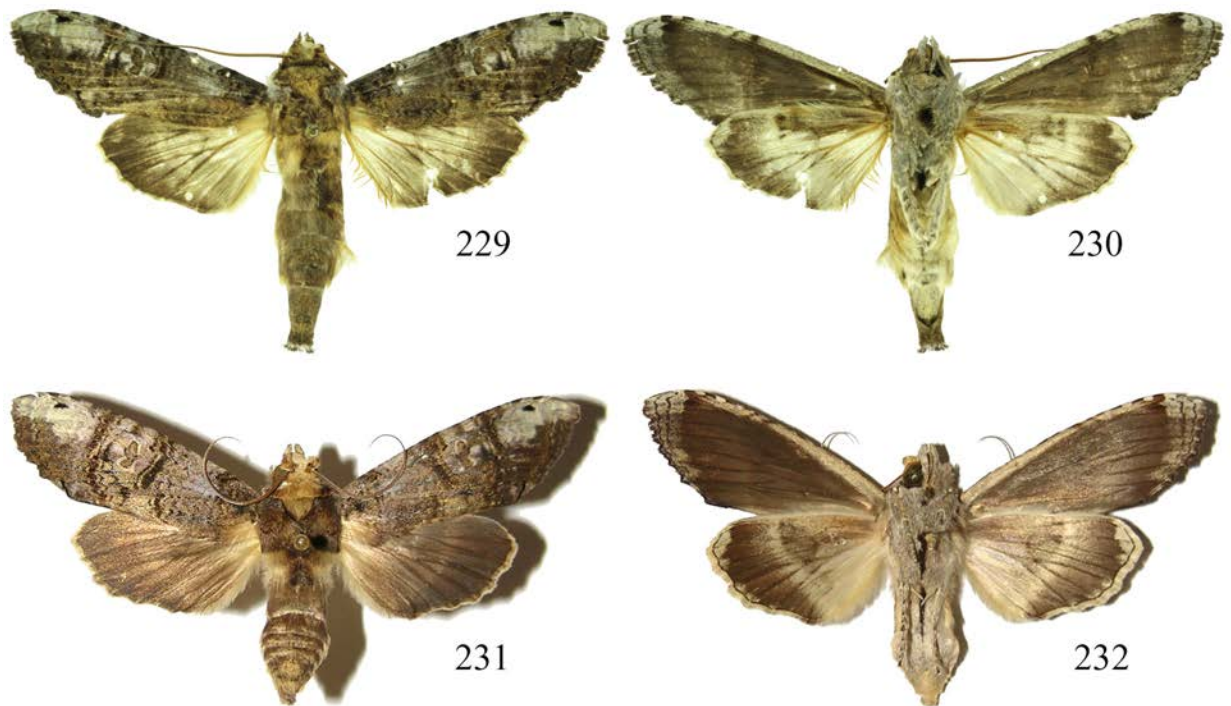
(Figs. 242-250, 399-404)

Redescription: MALE (Figs. 242, 243): FWL 21.8-24.5 mm (n=10).

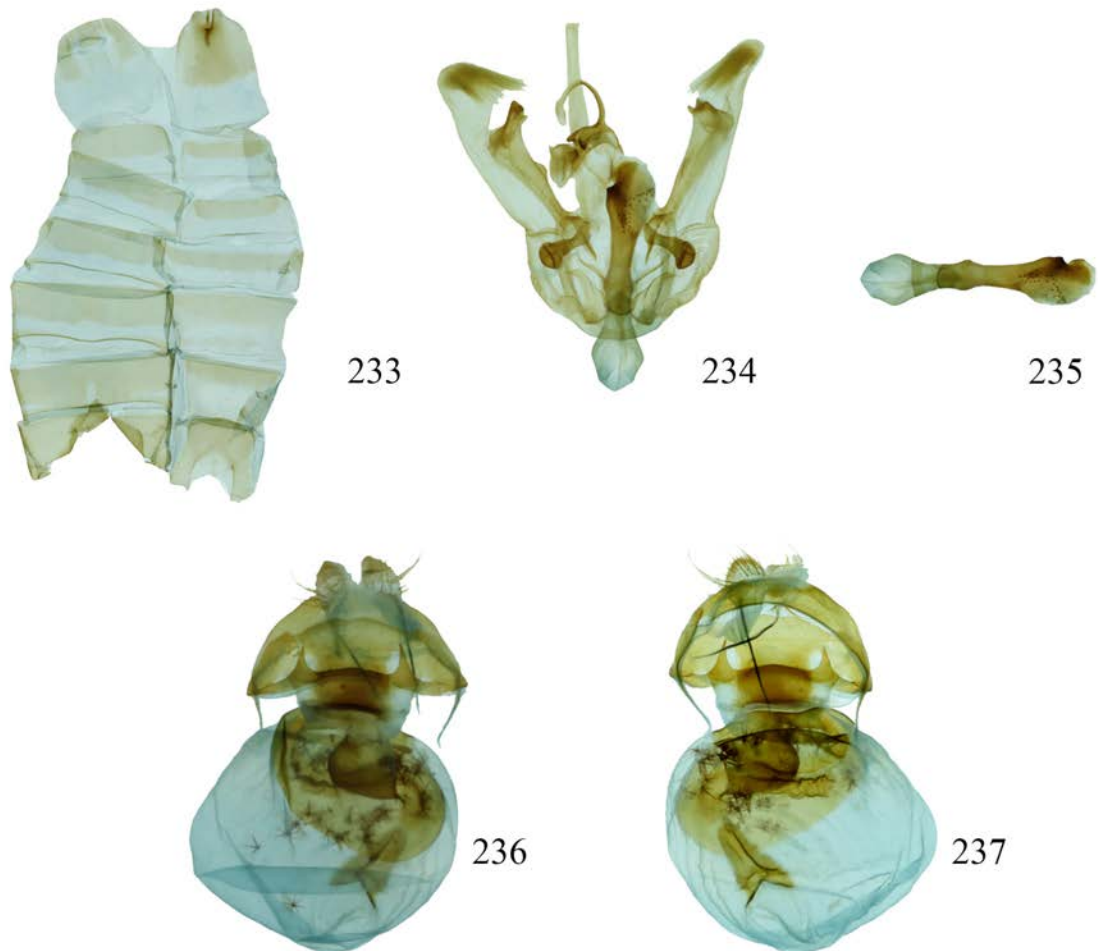
Head: Antennal shaft purple-brown dorsally and reddish brown ventrally; scape bearing a long reddish brown tuft, composed of light brown and grey scales; frons light brown; labial palpus dark brown dorsally and gray ventrally; vertex dark brown with some reddish brown scales; patagium reddish brown.

Thorax: Tegula reddish brown with some grey scales; mesoscutellum dark brown; thoracic pleuron cream; dorsal area of metathorax dark brown with some cream and grey scales; thorax dark brown ventrally. **Legs:** Mostly dark brown, with black. **Wings:** Dorsal FW ground color bright gray; basal band black, orbicular spot beige with some scales white, medial line black, reniform spot beige surrounded by purple-brown scales outlined with black, postmedial band black, macula beige with purple brown scales near apex, subterminal line irregular black, fringe alternating gray and beige, dorsal HW dirty brown; fringe alternating gray and beige. Ventral FW dirty brown, costal margin cream, outer margin cream, ventral HW light yellow shade dirty brown. **Abdomen:** Dorsum gray venter light yellow.

Male genitalia: Abdominal pelt (Fig. 246) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin slightly irregular, sclerotized with narrow and deep sclerotized invagination in the middle of two cusps. Genitalia (Fig. 247) with valvae wide



Figures 229-232. *Nystalea guzmani* Schaus, 1910: 229, 230 ♂ dorsal and ventral (07-SRNP-60518) FWL 24.0 mm; 231, 232 ♀ dorsal and ventral (99-SRNP-16133) FWL 25.2 mm.



Figures 233-237. *Nystalea guzmani* Schaus, 1910: 233 ♂ sternum VIII 5.8 mm length, 234 ♂ genitalia 8.2 mm length, 235 phallus 6 mm length (07-SRNP-110312); 236, 237 ♀ genitalia 7.5 mm length (INBIOCRI001001079096).



Figure 238A-B. *Nystalea guzmani* Schaus, 1910. ♂ lectotype (USNMMENT 00991750) and ♀ paralectotype ♀ paralectotype (USNMMENT 00992157) from Schintlmeyer (2016).

and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization very thin and flattened, costula proximally flattened, wide at base, with thin and acute projection, distal part elongated, flattened and rounded; uncal process tubular, elongated, thin, curved and setose at apex, uncus with lobes rectangular, small and setose, socii with two concave pads with projections sclerotized and setose. Aedeagus (Fig. 248) with membranous

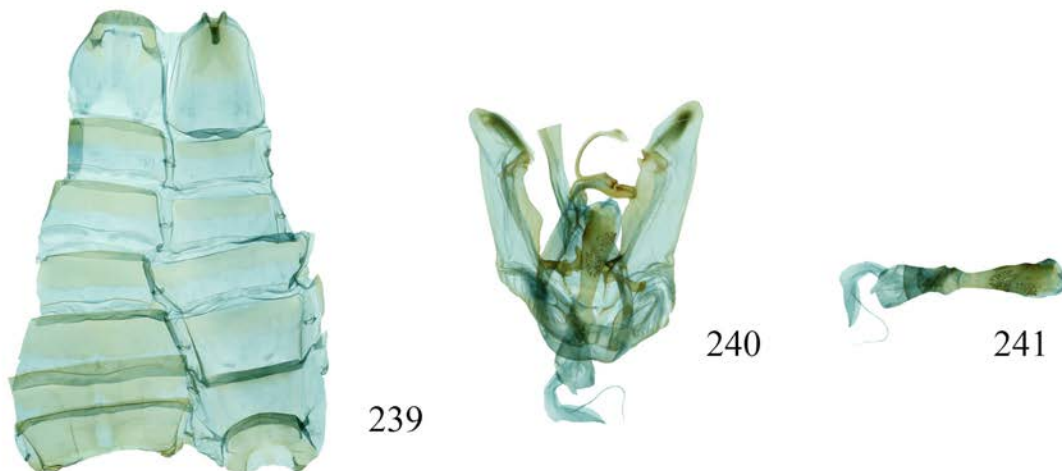
vesica, deciduous caltrop-shape cornuti present, callosum wide at base, proximal part of phallus thin, distal part sclerotized, robust and rounded, with one small, thin, flattened, rounded and sclerotized protuberance in dorsal margin, middle part of phallus sclerotized and elongated.

FEMALE: (Figs. 248, 249). FWL 24.1-25.5 mm (n=3). Dorsal FW ground color light brown; basal band black, medial line dark brown and yellowish brown, reniform spot yellowish brown surrounded by whitish outlined with black, postmedial band black, macula whitish near apex, subterminal line irregular black, fringe alternating gray and yellowish brown, dorsal HW dirty brown; fringe alternating yellowish and beige.

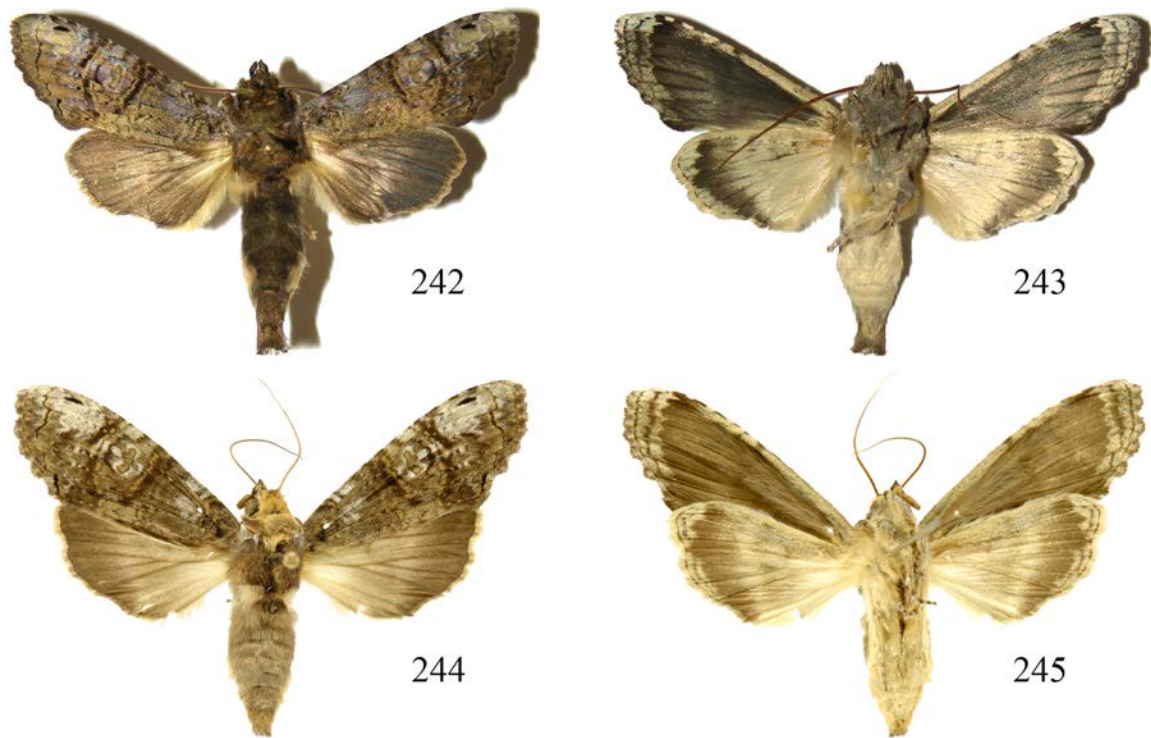
Female genitalia (Figs. 249, 250): Papillae anales triangular and membranous, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate with thin, short, tiny and sclerotized cusps, postvaginal plate with sclerotized and wavy margin, anterior apophysis shorter than posterior; ductus bursae elongated and heavily sclerotized; corpus bursae globular and with smooth surface, sclerotized shield with anterior margin with small shaped nipple projection, signum thin and elongated.

Specimens examined: 23 ♂♂, 3 ♀♀.

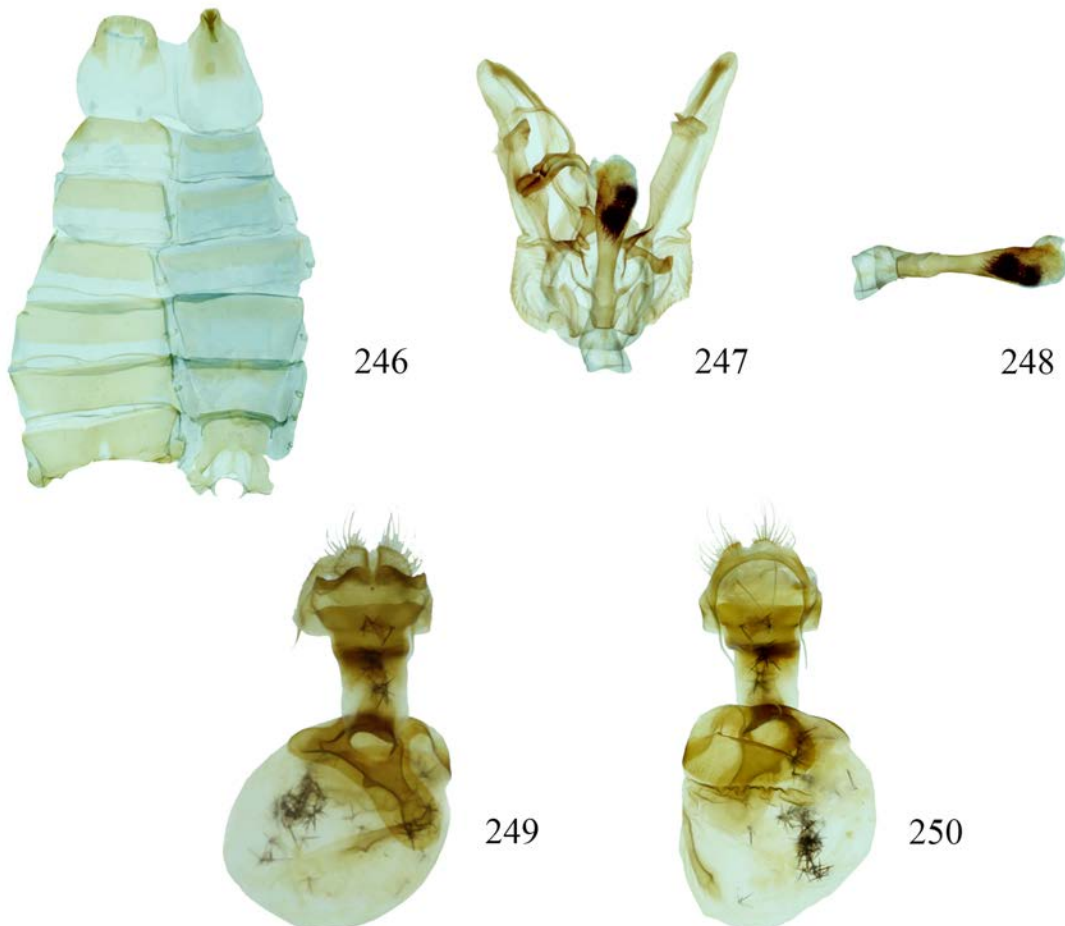
♂♂ (COI Barcoded): 10-SRNP-112641 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 10 August 2010, S. Rios & F. Quesada (MNCR). 07-SRNP-107774 Costa Rica, Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (USNM). 07-SRNP-35011 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 8 February 2007, Manuel Pereira (USNM). 10-SRNP-110307 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 9 July 2010, S. Rios & R. Franco. 10-SRNP-109595 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Mona, 1055 m, 10.79235 -85.34891, 14 June 2010, F. Quesada & R. Franco (MNCR). 07-SRNP-60223 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 12 October 2007, Mariano Pereira (USNM). 07-SRNP-60221 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 12 October 2007, Mariano Pereira (USNM). 07-SRNP-60433 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 22 November 2007, José Alberto Sánchez (USNM). 07-SRNP-58111 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agría, 560 m, 10.75876 -85.37543, 31 July 2007, José Alberto Sánchez (USNM). 07-SRNP-58065 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Portón Rivas, 570 m, 10.75864 -85.37269, 7 August 2007, Mariano Pereira (USNM). 07-SRNP-60520 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Zanja Tapada, 550 m, 10.76480 -85.38445, 6 December 2007, José Alberto Sánchez (USNM). 07-SRNP-107947 Costa Rica, Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 07-SRNP-107773 Costa Rica, Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 07-SRNP-106918 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Gongora, 557 m, 10.88449 -85.47306, 10 August 2007, H. Cambronero & F. Quesada (MNCR). 06-SRNP-107419 Costa Rica, Prov. Guanacaste, Hotel Borinquen, Canopy Tours, 700 m, 10.81262 -85.40248, 22



Figures 239-241. *Nystalea guzmani* Schaus, 1910. ♂ lectotype: 239. male sternum VIII 5.2 mm length, 240. ♂ genitalia 7.8 mm length, 241 phallus 5.5 mm length (USNMMENT 00991750).



Figures 242-245. *Nystalea idonea* Walker, 1858: 242, 243. ♂ dorsal and ventral (05-SRNP-20140) FWL 23.6 mm; 244, 245. ♀ dorsal and ventral (INBIOCRI001839908) FWL 24.1 mm.



Figures 246-250. *Nystalea idonea* Walker, 1858: 246. ♂ sternum VIII 5.6 mm length, 247 ♂ genitalia 8.1 mm length, 248. phallus 5.5 mm length (07-SRNP-107773); 249, 250. ♀ genitalia 8.3 mm length (10-SRNP-109595).

September 2006, R. Franco & S. Ríos (MNCR). 06-SRNP-107151 Costa Rica. Prov. Guanacaste, Hotel Borinquen, Canopy Tours, 700 m, 10.81262 -85.40248. 21 September 2006, H. Cambronero & F. Quesada (MNCR). 05-SRNP-65550 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Portón Rivas, 570 m, 10.75864 -85.37269, 22 November 2005, José Cortéz (USNM). 05-SRNP-20142 Costa Rica, Prov. Guanacaste, Sector Del Oro, Guácimos, 380 m, 11.01454 -85.47492, 22 January 2005, Lucía Ríos (USNM). 05-SRNP-20141 Costa Rica, Prov. Guanacaste, Sector Del Oro, Guácimos, 380 m, 11.01454 -85.47492. 22 January 2005, Lucía Ríos (USNM). 03-SRNP-22558 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Arenales, 1080. 10.92471 -85.46738, 5 October 2003, Mariano Pereira (USNM). 99-SRNP-1224 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Toma Agua, 1140 m, 10.92847 -85.46680, 29 August 1999, Mariano Pereira (USNM). 05-SRNP-20140 Costa Rica, Prov. Guanacaste, Sector Del Oro, Guácimos, 380 m, 11.01454 -85.47492, Lucía Ríos (USNM). 10-SRNP-110723 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 11 July 2010, R. Franco & S. Ríos (MNCR). INB0004173222 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, 1100 m, 10.7131819 -85.146941 October 2008, J. Azofeifa, E. Méndez, B. Hernández (MNCR). ♀♀ (COI Barcoded): INBIOCRI001839908 Costa Rica, Prov. Cartago, Grano de Oro, Chirripó, Turrialba, A. C. Amistad, 9.818357 -83.459163, 1120 m. 1 October 1993, P. Campos (USNM). 00-SRNP-3044 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776. 20 July 2000, Lucía Ríos (USNM). 03-SRNP-22557 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Arenales, 1080 m, 10.92471 -85.46738, 2 October 2003, Mariano Pereira (USNM).

Diagnosis: In *N. idonea*, the uncus and socii are longer and thinner than those of *N. guzmani* (Fig. 247).

Distribution: *Nystalea idonea* has been reared and collected with light traps in rain forest and cloud forest, on both slopes of the Cordillera Volcánica de Guanacaste and on the east slope of the Cordillera de Talamanca. The elevational range for the species is 0-1500 m.

Natural history: (Figs. 399-404) 29 rearing records: ACG locations: Sector Del Oro (n=3), Sector Mundo Nuevo (n=16), Sector El Hacha (n=1), Sector Cacao (n=4), Sector Pitilla (n=5).

Food plants: Exclusively Myrtaceae: *Calyptanthus chytraculia* (n=2), *C. guanacastensis* (n=1), *C. pallens* (n=14), *Eugenia glandulosopunctata* (n=1), *E. hartshornii* (n=3), *Myrcia splendens* (n=3).

Remarks: BIN BOLD:AAB5641 (Fig. 490).

Genbank Accession: GU337699

DNA barcode of male 05-SRNP-20140

MHANB368-05[05-SRNP-20140](*Nystalea idonea*)(COI-5P

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Nystalea inchoans Walker, 1857

(Figs. 251-259, 405-410)

Redescription: MALE (Figs. 251, 252): FWL 23.5-25.8 mm (n=10). **Head:** Antennal shaft cream dorsally, dark brown ventrally; scape bearing a long beige tuft, composed of cream and dark brown scales; frons mostly dark brown with intermixed beige scales; labial palpus cream ventrally, dark brown dorsally; vertex beige and dark brown; patagium dark brown. **Thorax:** Tegula beige, a mix of light and dark brown scales distally; mesoscutellum dark brown; thoracic pleuron dark brown; dorsal surface of metathorax dark brown. **Legs:** Mostly beige and light brown with dark brown scales between segments and margins.

Wings: Dorsal FW ground color beige with black scales; subterminal line composed of small black marks; terminal line composed of black rectangular marks; fringe alternating dark brown and beige; three dark brown stripes in the postmedial area, these stripes decrease in length from the costal margin towards the middle of the wing; medial spot composed of thin dark brown semicircular markings; claviform spot composed of dark brown E-shaped markings; dorsal HW light yellow with veins and marginal shade dirty brown; fringe alternating light yellow and dirty brown. Ventral FW ground color dirty brown; ventral HW ground color light yellow with veins and marginal shade dirty brown.

Abdomen: Dorsum dirty brown, venter light yellow.

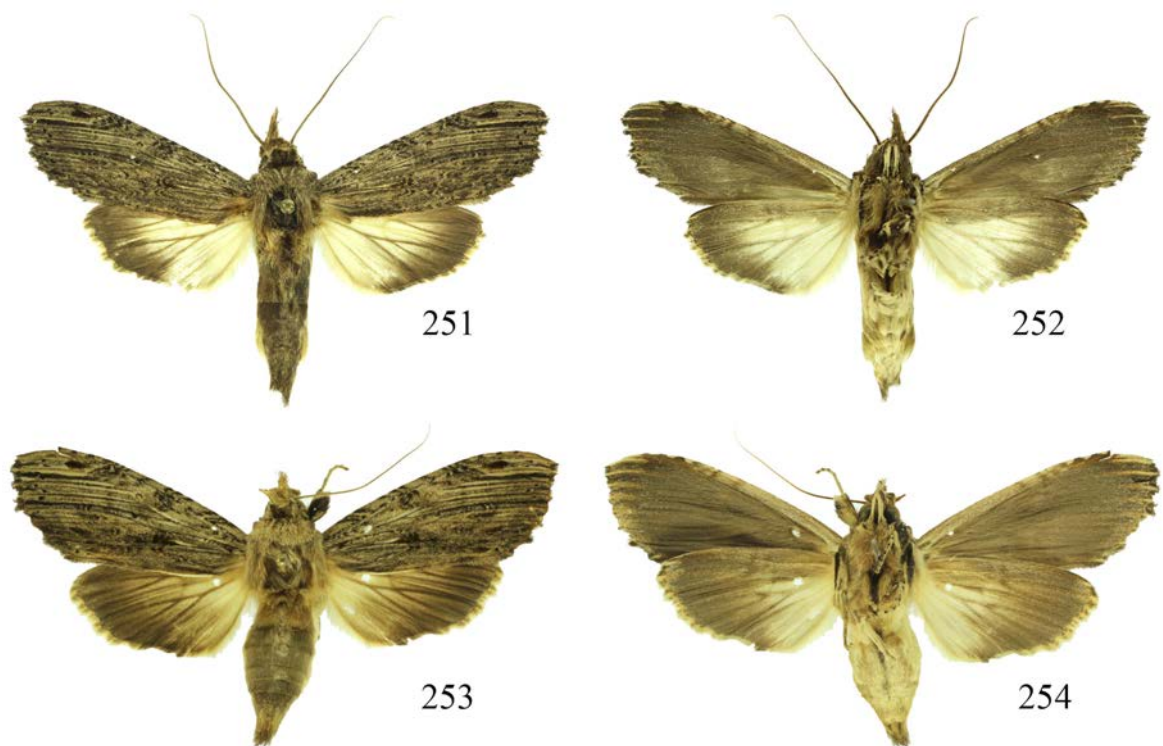
Male genitalia: Abdominal pelt (Fig. 255) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin irregular and sclerotized, with wide bag-shaped invagination sclerotized medially. Genitalia (Fig. 256) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization very thin and flattened but wider when attached to anellus, costula proximally flattened, wide at base, with very thin, flattened and sclerotized lateral projection, distal part elongated, thin, tubular and horn-shaped; uncal process tubular, elongated, thin, curved and setose at apex, uncus with lobes rectangular, small and setose, socii with two sclerotized pads, setose with acute apices. Aedeagus (Fig. 257) with membranous vesica, deciduous caltrop-shape comuti present, callosum wide basally, proximal part of phallus thin, distal part sclerotized, robust and rounded, with thin, acute, flattened and very sclerotized projection at dorsal margin, middle part of phallus sclerotized and elongated.

FEMALE: Similar to male but larger (Figs. 253, 254). FWL 25.8-27.0 mm (n=10).

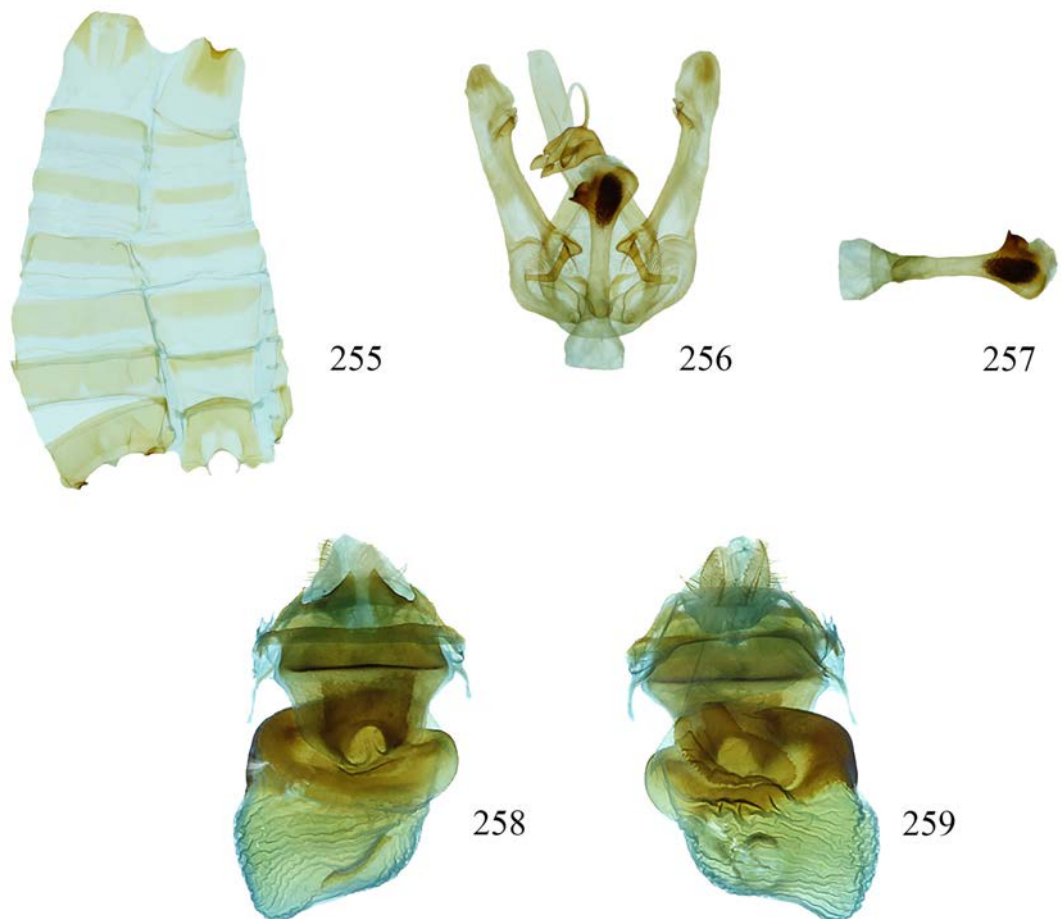
Female genitalia (Figs. 258, 259): Papillae anales ovoid, membranous, slightly serrated margin and covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate with sclerotized, short, acute cusps with irregular margin, postvaginal plate sclerotized with two acute cusps, anterior apophysis shorter than posterior; ductus bursae wide and short heavily sclerotized; corpus bursae globular, surface with many folds, sclerotized shield, signum thin and rectangular.

Specimens examined: (25 ♂♂, 21 ♀♀).

♂♂ (COI Barcoded): 02-SRNP-20154 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 31 December 2002, Gloria Sihezar (USNM). 02-SRNP-19755 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 29 November 2002, Gloria Sihezar (USNM). 03-SRNP-8153 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 26 September 2003, Gloria Sihezar (USNM). 02-SRNP-41 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 8 February 2002, Freddy Quesada (USNM). 08-SRNP-23631 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 31 October 2008, Roster Moraga (USNM). 08-SRNP-23811 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 5 November 2008, Roster Moraga (USNM). 08-SRNP-23972 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 30 October 2008, Roster Moraga (USNM). 08-SRNP-23601 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645. 28 October 2008, Roster Moraga. 08-SRNP-23598 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 27 October 2008, Roster Moraga (USNM). 08-SRNP-23808 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 29 October 2008, Roster Moraga (USNM). 08-SRNP-23602 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 28 October 2008, Roster Moraga (USNM). 11-SRNP-20518 Costa Rica, Prov. Guanacaste, Sector Del Oro, Bosque Aguirre, 571 m, 11.00404 -85.44125, 20 April 2011, Elieth Cantillano (USNM). 11-SRNP-70267 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Suspiro, 439 m, 10.98394 -85.38853, 8 March 2011, Duvalier Briceño (USNM). 10-SRNP-22296 Costa Rica, Prov. Guanacaste, Sector Del Oro, Meteorológico, 590 m, 11.00199 -85.46166, 1 November 2010, Lucía Ríos (USNM). 11-SRNP-23043 Costa Rica, Prov. Guanacaste, Sector El Hacha, Estación Los Almendros, 290 m, 11.03226 -85.52776, 24 November 2011, Lucía Ríos (USNM). 07-SRNP-30454 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaigiga, 445 m, 11.01983 -85.41342, 18 February 2007, Petrona Ríos (USNM). 09-SRNP-23345 Costa Rica, Prov. Guanacaste, Sector Del Oro, Río Chon, 320 m, 11.04118 -85.44170, 29 November 2009, Lucía Ríos (USNM). 15-SRNP-21788 Costa Rica, Prov. Guanacaste, Sector Del Oro, Cañon Río Mena, 560 m, 10.99616 -85.45562, 21 December 2015, Roster Moraga (USNM). 05-SRNP-30247 Costa Rica, Prov. Guanacaste,



Figures 251-254. *Nystalea inchoans* Walker, 1857: 251, 252. males dorsal and ventral (INBIOCRI001078741) forewing length 23.58 mm; 253, 254. female dorsal and ventral (14-SRNP-30690).



Figures 255-259. *Nystalea inchoans* Walker, 1857: 255. ♂ sternum VIII 4.6 mm length, 256. ♂ genitalia 7.3 mm length, 257. phallus 5.3 mm length (INBIOCRI00107874); 258, 259. ♀ genitalia 6.3 mm length (05-SRNP-30005).

Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 26 February 2005, Petrona Ríos (USNM). 05-SRNP-22146 Costa Rica, Prov. Guanacaste, Sector Del Oro, Sendero Puertas, 400 m, 11.01087 -85.48817, 5 July 2005, Elieth Cantillano (USNM). 00-SRNP-19760 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Quebrada Cebollines, 270 m, 10.82224 -85.64338, 16 November 2000, Gusaderos (USNM). 08-SRNP-23807 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 31 October 2008, Roster Moraga (USNM). 09-SRNP-71635 Costa Rica, Prov. Guanacaste, Sector Pitilla, Leonel, 510 m, 10.99637 -85.40195, 20 August 2009, Ricardo Calero (USNM). 10-SRNP-20308 Costa Rica, Prov. Guanacaste, Sector Del Oro, Puente Mena, 280 m, 11.04562 -85.45742, 17 March 2010, Lucía Ríos (USNM). INBIOCRI001078741 Costa Rica, Prov. Guanacaste, Estac. Pitilla, 9 Km S. Santa Cecilia, 700 m, 10.990357 -85.427182, 1 March 1988, GNP Biodiversity Survey (MNCR). ♀♀ (**COI Barcoded**): 08-SRNP-2661 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 5 July 2008, Elda Araya (USNM). 03-SRNP-5232 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sitio San Gerónimo, 680 m, 10.87303 -85.38145, 4 March 2003, Gloria Sihezar (USNM). 99-SRNP-5732 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Vado Río Cucaracho, 640 m, 10.8702 -85.39153, 6 July 1999, Gloria Sihezar (USNM). 02-SRNP-19641 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 November 2002, Gloria Sihezar (USNM). 06-SRNP-6786 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 18 September 2006, Gloria Sihezar (USNM). 06-SRNP-2238 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 13 April 2006, Carolina Cano (USNM). 06-SRNP-31029 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 14 April 2006, Petrona Ríos (USNM). 08-SRNP-23634 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 31 October 2008, Roster Moraga (USNM). 07-SRNP-30453 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaiciga, 445 m, 11.01983 -85.41342, 16 February 2007, Petrona Ríos (USNM). 08-SRNP-30291 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 29 February 2008, Calixto Moraga (USNM). 11-SRNP-20171 Costa Rica, Prov. Guanacaste, Sector Del Oro, Meteorológico, 590 m, 11.00199 -85.46166, 1 March 2011, Lucía Ríos (USNM). 05-SRNP-33928 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 27 October 2005, Calixto Moraga (USNM). 08-SRNP-23810 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 6 November 2008, Roster Moraga (USNM). 05-SRNP-30005 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 9 February 2005, Calixto Moraga. 04-SRNP-56606 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 31 December 2004, Petrona Ríos (USNM). 04-SRNP-34555 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Laguna, 680 m, 10.9888 -85.42336, 17 September 2004, Petrona Ríos (USNM). 02-SRNP-4774 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tangelo, 410 m, 11.01823 -85.45024, 4 March 2002, Dunia García (USNM). 03-SRNP-1736 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tangelo, 410 m, 11.01823 -85.45024, 19 March 2003, Lucía Ríos (USNM). 08-SRNP-23599 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 23 October 2008, Roster Moraga (USNM). 08-SRNP-23632 Costa Rica, Prov. Guanacaste, Sector El Hacha, Vuelta Peligrosa, 280 m, 11.03534 -85.53645, 23 October 2008, Roster Moraga (USNM). 15-SRNP-31364 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.019259 -85.409970, 21 August 2015, Petrona Ríos (USNM).

Diagnosis: *Nystalea inchoans* in Costa Rica cannot be confused with the other species of this genus due to the external morphology of the adults and the male genitalia. Costula proximally flattened, wide at base, with very thin, flattened and sclerotized lateral projection, distal part elongated, thin, tubular and horn-shaped (Fig. 256). Proximal part of phallus thin, distal part sclerotized, robust and rounded, with thin, acute, flattened and very sclerotized projection at dorsal margin (Fig. 257).

Distribution: *Nystalea inchoans* has been reared and collected with light traps in rain forest on both slopes of the Cordillera Volcánica de Guanacaste. The elevational range for the species is 280-740 m.

Natural history: (Figs. 405-410) 128 rearing records: ACG locations: Sector

San Cristóbal (n=74), Sector Pitilla (n=24), Sector El Hacha (n=16), Sector Del Oro (n=10), Sector Mundo Nuevo (4).

Food plants: Exclusively Myrtaceae: *Calyptanthus guanacastensis* (n=1), *Eugenia acapulcensis* (n=1), *E. siggersii* (n=2), *E. truncata* (n=4), *Myrcia leptoclada* (n=2), *M. splendens* (n=116).

Parasitoids: Braconidae: (n=13), *Hypomicrogaster* OVRGDHJ03 (n=12), Ichneumonidae: *Charops* GaulDFIDHJ02 (n=1).

Remarks: BIN BOLD:AAA9573 (Fig. 490).

Genbank Accession: GU333452

DNA barcode of male 03-SRNP-8153

MHANA878-05|03-SRNP-8153|(*Nystalea inchoans*)|COI-5P

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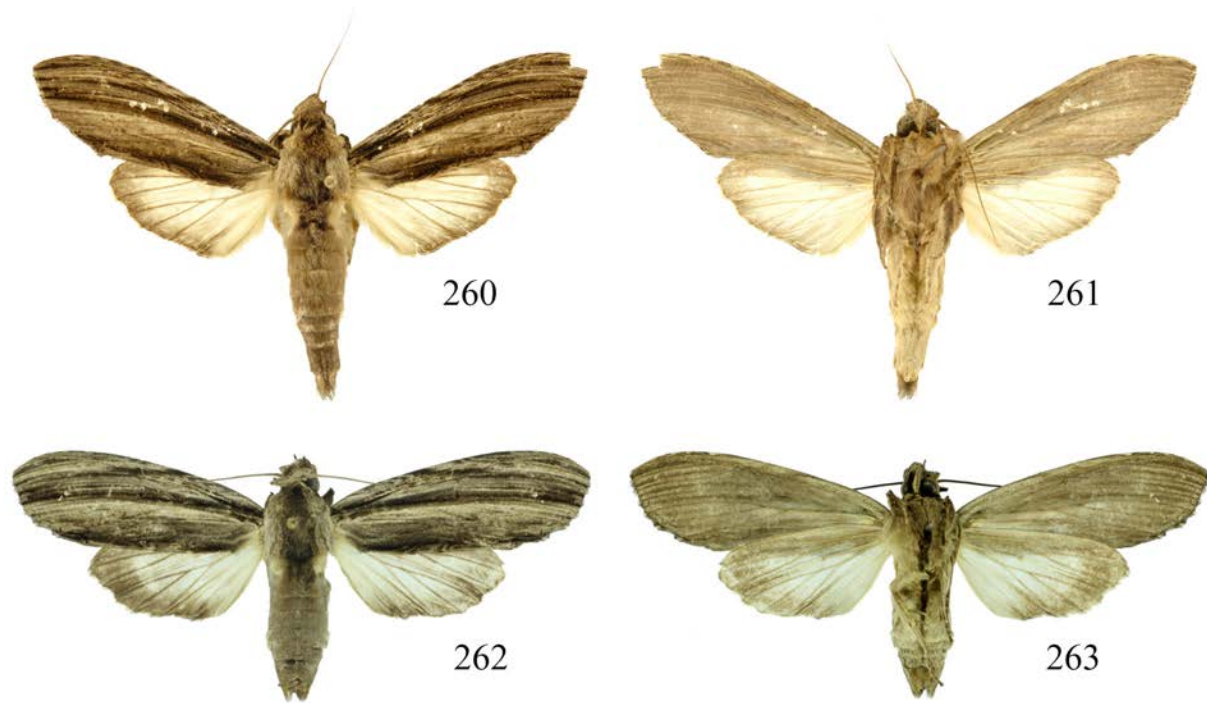
Nystalea billalleni Chacón, new species (Figs. 260-268)

Description: **MALE** (Figs. 260, 261) FWL 26.1-27.7 mm (n=2). **Head:** Antennal shaft cream dorsally reddish brown ventrally; scape bearing a long beige tuft, composed of beige and dark brown scales; frons mostly dark brown; labial palpus dark brown with some beige intermixed scales; vertex dark brown with beige scales; patagium dark brown. **Thorax:** Tegula dark brown basally, a mix of light and beige scales distally; mesoscutellum dark brown; thoracic pleuron beige and dirty brown; dorsal surface of metathorax dark brown with dirty brown and posterior margin light yellow; thorax dirty brown and beige ventrally. **Legs:** Mostly dirty brown and beige, with black and beige scales between segments. **Wings:** Dorsal FW ground color beige; with four parallel black stripes of different length and width, two extend from the base to the termen and the others from the costal margin to the termen near the apex, fringe alternating dark brown and black, dorsal HW translucent light yellow with veins and marginal shade dark brown; fringe light yellow. **Abdomen:** Dorsum dirty brown, venter light yellow.

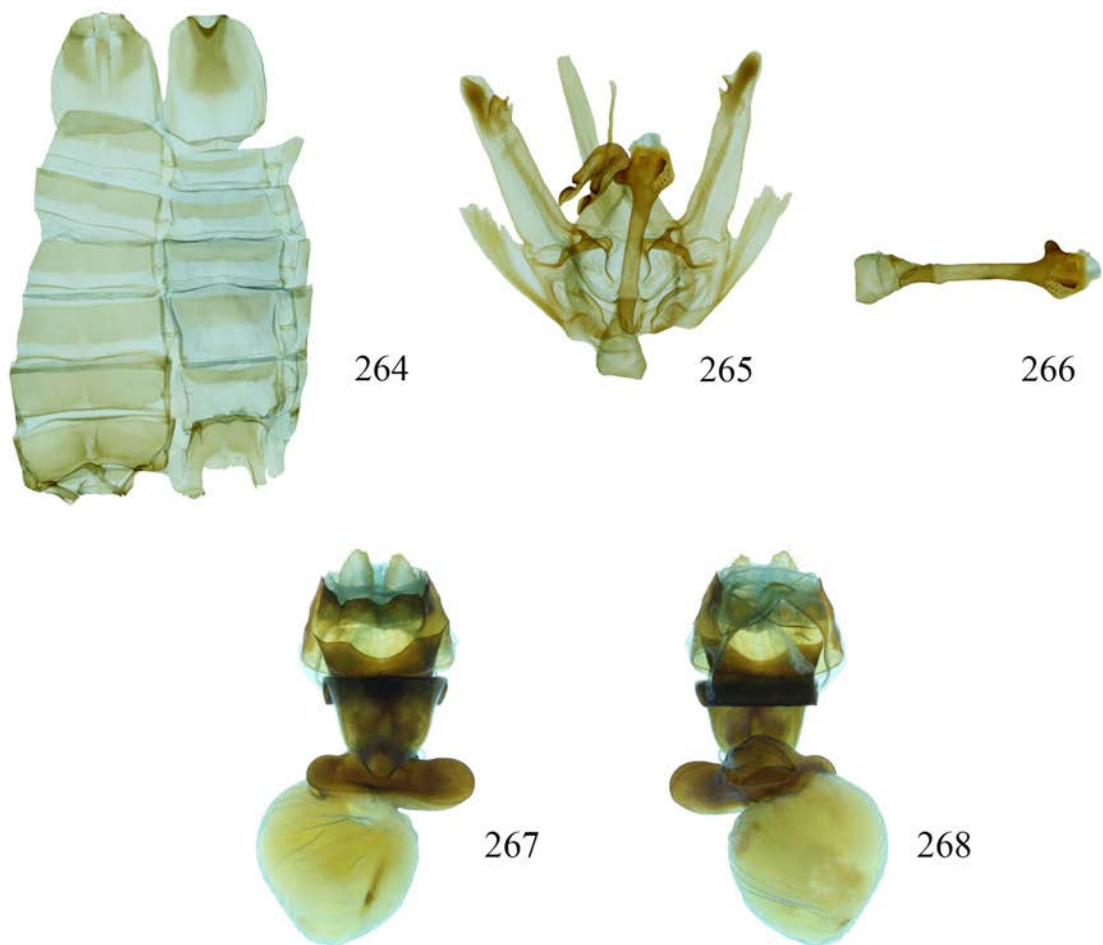
Male genitalia: Abdominal pelt (Fig. 264) with tergum VIII rectangular, posterior margin slightly irregular with stretch marks similar to vertical lines, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin irregular and sclerotized, with wide bag-shaped invagination sclerotized medially. Genitalia (Fig. 265) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization very thin and flattened, costula proximally flattened, with two lateral projections, thin and sclerotized at base, distal horn-shaped part elongated, thin and tubular; uncal process thin and tubular, uncus lobes rectangular and slightly setose, socii with two small and oval pads, sclerotized and setose. Aedeagus (Fig. 266) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally; proximal part of phallus thin, distal part sclerotized, robust and rounded, with rounded and sclerotized lateral projection, middle part of phallus thin, sclerotized and elongated.

FEMALE: Similar to male but larger (Figs. 262, 263). FWL 29.2-31.6 mm (n=2).

Female genitalia (Figs. 267, 268): Papillae anales ovoid, membranous, slightly serrated margin and covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate with irregular sclerotized margin, sclerotized, postvaginal plate with a small depression in the middle and irregular sclerotized margin, anterior apophysis shorter than posterior. Ductus bursae wide and long, heavily sclerotized cup-shaped; corpus bursae globular, sclerotized shield occupies half of corpus bursae, signum thin and flattened.



Figures 260-263. *Nystalea billalleni*: 260, 261. ♂ dorsal and ventral (INBIOCRI000434207) FWL 28.2 mm; 262, 263. ♀ dorsal and ventral (INB0003301069) FWL 31.6 mm.



Figures 264-268. *Nystalea billalleni*: 264. ♂ sternum VIII 6.4 mm length, 265. ♂ genitalia 10.1 mm length, 266. phallus 7.4 mm length (INBIOCRI000434207); 267, 268. ♀ genitalia 10.5 mm length (INBIOCRI000045856).

Etymology: *Nystalea billalleni* is named in honor of Mr. Bill Allen of St. Louis, Missouri, a science and biology writer who has blessed ACG with both a widely read descriptive history "Green Phoenix" but also scrutinized ACG trials and tribulations from its beginning to the present.

Type material. 7 ♂, 1 ♀.

HOLOTYPE, ♂: 09-SRNP-20898 (COI Barcoded), Costa Rica, Prov. Guanacaste, Sector Del Oro, Bosque Aguirre, 620 m, 11.00060 -85.43800, 16 April 2009, Lucía Ríos (MNCR).

PARATYPES: 6 ♂♂, 1 ♀.

♂♂ (**COI Barcoded**): INBIOCRI000434207 Costa Rica, Prov. Limón, Est. Hitoy Cerere, R. Cerere, Res. Biol. Hitoy Cerere, 100 m, 9.671765 -83.027702, 1 June 1991, G. Carballo (MNCR). INB0004104009 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0 -100 m, 8.54608 -83.397802, 21 July 2007, J. A. Azofeifa (MNCR). INBIOCRI000636410 Costa Rica, Prov. Puntarenas, Est. Quebrada Bonita, Res. Biol. Carara, 50 m, 9.767453 -84.608119, 1 June 1990, E. Rojas (MNCR). INBIOCRI000277906 Costa Rica, Prov. Puntarenas, Est. Sirena, P. N. Corcovado, 0 -100 m, 8.480171 -83.591289, 1 April 1991, G. Fonseca (MNCR). INBIOCRI000707467 Costa Rica, Prov. Puntarenas, Est. Queb. Bonita, Res. Biol. Carara, 50 m, 9.767453 -84.608119, 1 June 1992, J. C. Saborío (MNCR). INBIOCRI001202276 Costa Rica, Prov. Puntarenas, Est. Estación Sirena, P.N. Corcovado, 0-100 m, 8.480171 -83.591289, 1 April 1993, G. Fonseca (MNCR). ♀ (**COI Barcoded**): INB0003301069 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Est. Barbilla, 500 m, 9.981348 -83.454259, 25 May 2001, L. Chavarria (MNCR). ♀ specimen examined but not Barcoded: INBIOCRI000045856 Costa Rica, Prov. Limón, Valle La Estrella, Est. Hitoy Cerere, R. Cerere, Res. Biol. Hitoy Cerere, 100 m, 9.671765 -83.027702, 1 June 1991, G. Carballo (MNCR).

Diagnosis: *Nystalea billalleni* in Costa Rica cannot be confused with the other species of this genus due to the external morphology of the adults (Figs. 260, 261). Costula proximally flattened, with two lateral projections, thin and sclerotized at base, distal horn-shaped part elongated, thin and tubular (Fig. 265).

Distribution: *Nystalea billalleni* has been collected with light traps in rain forest on the east slope of the Cordillera Volcánica de Guanacaste and Cordillera de Talamanca. The elevational range for the species is 100-620 m.

Natural history: Three rearing records: ACG locations: Sector San Cristóbal (n=2), Sector Del Oro (n=1).

Food plants: Myrtaceae: *Myrcia splendens* (n=1), Clusiaceae: *Garcinia intermedia* (n=1), *Symphonia globulifera* (n=1).

Remarks: BIN BOLD:AAI3395 (Fig. 490).

Genbank Accession: HQ574193

DNA barcode of holotype male 09-SRNP-20898

[MHMYH1099-10|09-SRNP-20898(*Nystalea billalleni*)|COI-5P

AACACTATATTTTATTTTGGAAATTGGAGCAGGAATGTTAGGAACTTCCCTT
AGATTATTAATTCGAGCTGAACTTGGAAATCCTGGATCCTTAAATGGAGATG
ATCAAATTTATAACTATTGTAACAGCTCACGCTTTTATTATAATTTT
TATAGTTATACCCATTATAATTTGGAGGATTTGGAAATGATTAGTTCCATTA
ATATTAGGAGCCCTGATATAGCCTTCCCTCGAATAAATAATATAAGTTTCT
GATTATTACCCCATCTTAACTTTACTAATTTCAAGAAGTATTTGTAAGAAA
TGGAGCTGGAACAGGATGAACGTTTACCCCCCTTTTCATCTAATATTGCC
CATAGAGGAAGTTGAGTTGATTTAGCTATTTTTCCTTACACTTAGCTGGTA
TTCTTCTATCTTAGGAGCTATCAATTTTATTACTACAATTTAATATAACG
ACTAAATAATATATCTTTTGATCAAATACCATTATTTGTTGAGCTGTAGGT
ATTACAGATTTTATTATTACTATCACTACCAGTTTGTAGCAGGAGCAATTA
CTATACTTTTAAACAGATCGAAATTTAAATACTTCTTTTGTATCCTGCTGG
AGGAGGAGATCCTATTTTATATCAACATTTATTT

We suspect that the similar species *Nystalea lineiplena* Walker, 1857 does not exist in Costa Rica. After comparison with the 1908 holotype of *Congruia congrua* Dyar, 1908 (regarded as a junior synonym of *N. lineiplena* by Becker (2014)) from Brazilian lowland rainforest in Rio de Janeiro, we regard *N. billalleni* as an unequivocally new species. Although

the genitalia of the *N. lineiplena* holotype are similar to those of this Costa Rican species, they do not exactly match. The barcode for the Brazilian holotype is not available at this time. Our experience comparing look-alike Costa Rican species with holotypes of South American species is that they often turn out to be different species, once genetic information is available or until when a longer series is examined (e.g., Grishin *et al.*, 2013). Therefore, we decided to describe the Costa Rican species as new, aware that at some point in the future it might be necessary to synonymize *N. billalleni* with the South American *N. lineiplena* (Figs. 269-272).

Nystalea lorettafayecooperae, Chacón, new species

(Figs. 273-281)

Description: MALE (Figs. 273, 274): FWL 22.1-24.7 mm (n=7). **Head:** Antennal shaft cream dorsally dark brown ventrally; scape bearing a long beige tuft, composed of beige and dark brown scales; frons mostly dark brown; labial palpus dark brown with some cream intermixed scales; vertex dark brown with beige scales; patagium cream. **Thorax:** Tegula dark brown basally, a mix of light and beige scales distally; mesoscutellum light brown; thoracic pleuron beige and light yellow; dorsal surface of metathorax light brown; thorax dirty brown and beige ventrally. **Legs:** Mostly dark brown and beige, with black and cream scales between segments. **Wings:** Dorsal FW ground color beige; from the basal area to the outer margin a band composed of black brown marks, lines and dots, subterminal line composed by marks black, fringe alternating beige and cream, dorsal HW light yellow with veins and marginal shade dark brown; fringe light yellow. **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 277) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin irregular and sclerotized, with small sclerotized, medially rounded bag-shaped invagination. Genitalia (Fig. 278) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin and flattened, costula at the proximal part flattened, with one thin and acute lateral projection, distal part elongated, thin, with disk-shaped at end; uncus process elongated, very thin, short, curved at apex, uncus lobes tiny, rectangular and slightly setose, socii with two small, oval and concave pads, sclerotized and setose. Aedeagus (Fig. 279) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus wide, distal part sclerotized, with two tiny, acute projections heavily sclerotized in margin, middle part of phallus sclerotized and elongated.

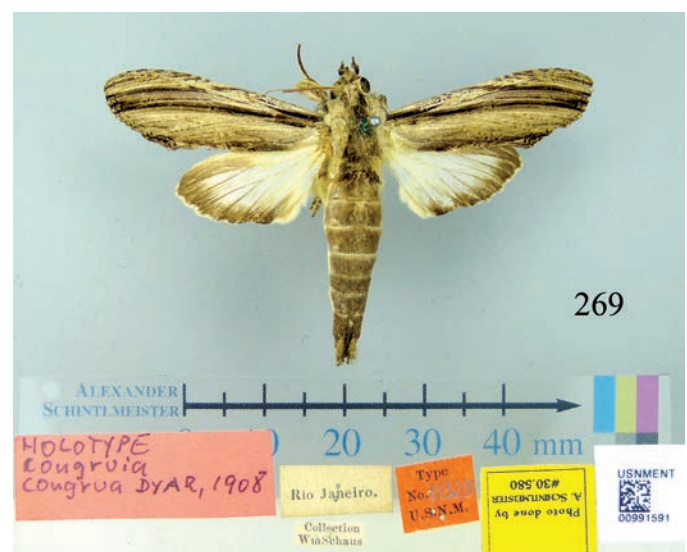


Figure 269. *Nystalea lineiplena* (Holotype ♂ of *Congruia congrua* Dyar, 1908 (USNM 00991591) from Schntlmeister (2016)).



Figures 270-272. *Nystalea lineiplena* (Holotype ♂ of *Congruia congrua* Dyar, 1908 (USNMENT 00991591)). 270. ♂ sternum VIII 6.7 mm length, 271. male genitalia 10.3 mm length, 272. phallus 7.8 mm length (USNMENT 00991591).

FEMALE: Similar to male but larger (Figs. 275, 276). FWL 24.7-25.6 mm (n=2).

Female genitalia (Figs. 280, 281): Papillae anales oval covered with short, scattered setae with longer, inwardly curved setae arising from base, lateral process of postvaginal plate with sclerotized acute projections, postvaginal plate sclerotized, emarginate with invagination in the middle, anterior apophysis shorter than posterior, ductus bursae heavily sclerotized, wide and short; corpus bursae globular, surface folded, sclerotized shield with serrated and heavily sclerotized margin, lamellar shaped signum.

Type material. 7 ♂♂, 2 ♀♀.

HOLOTYPE, ♂: 05-SRNP-2778 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Areno, 460 m, 10.91407 -85.38174, 12 June 2005, Yessenia Mendoza (MNCR).

PARATYPES: 6 ♂♂, 2 ♀♀.

♂♂ (**COI Barcoded**): 14-SRNP-690 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 8 March 2014, Gloria Sihezar (USNM). 16-SRNP-911 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Huerta, 527 m, 10.9305 -85.37223, 26 June 2016, Gloria Sihezar (USNM). 05-SRNP-5393 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 6 October 2005, Osvaldo Espinoza (USNM). 05-SRNP-134 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 21 February 2005, Elda Araya (USNM). 05-SRNP-2778 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Areno, 460 m, 10.91407 -85.38174, 12 June 2005, Yessenia Mendoza (USNM). 12-SRNP-71888 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 380 m, 11.01602 -85.38053, 31 August 2012, Ricardo Calero (USNM). INBIOCRI000645975 Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 80 m, 1 April 1991, G. Varela (USNM).

♀♀ (**COI Barcoded**): 08-SRNP-5788 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 13 November 2008, Gloria Sihezar (USNM). 06-SRNP-6585 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 17 September 2006, Gloria Sihezar.

Diagnosis: *Nystalea lorettafayecooperae* in Costa Rica cannot be confused with *N. malga* (Fig. 282) due to the external morphology of the adults (Figs. 273, 274). Also, the male genitalia of *Nystalea lorettafayecooperae* have the costula at the proximal part flattened, with one thin and acute lateral projection, and the distal part elongated, thin, and disk-shaped at end. The uncus process is elongated, very thin, short, and curved at the apex, the uncus lobes are tiny, rectangular and

slightly setose, the socii have two small, oval and concave pads (Figs. 278, 279). Compare with male genitalia of *N. malga* (Figs. 284, 285).

Distribution: *Nystalea lorettafayecooperae* has been collected with light traps in rain forest on the east slope of Cordillera Volcánica de Guanacaste and the Pacific lowlands. The elevational range for the species is 80 to 630 m.

Natural history: Eight rearing records: ACG locations: Sector San Cristóbal (n=7), Sector Pitilla (n=1).

Food plants: Myrtaceae: *Myrcia splendens* (n=8).

Remarks: BIN BOLD:AAE2778 (Fig. 490).

Genbank Accession: GU160127

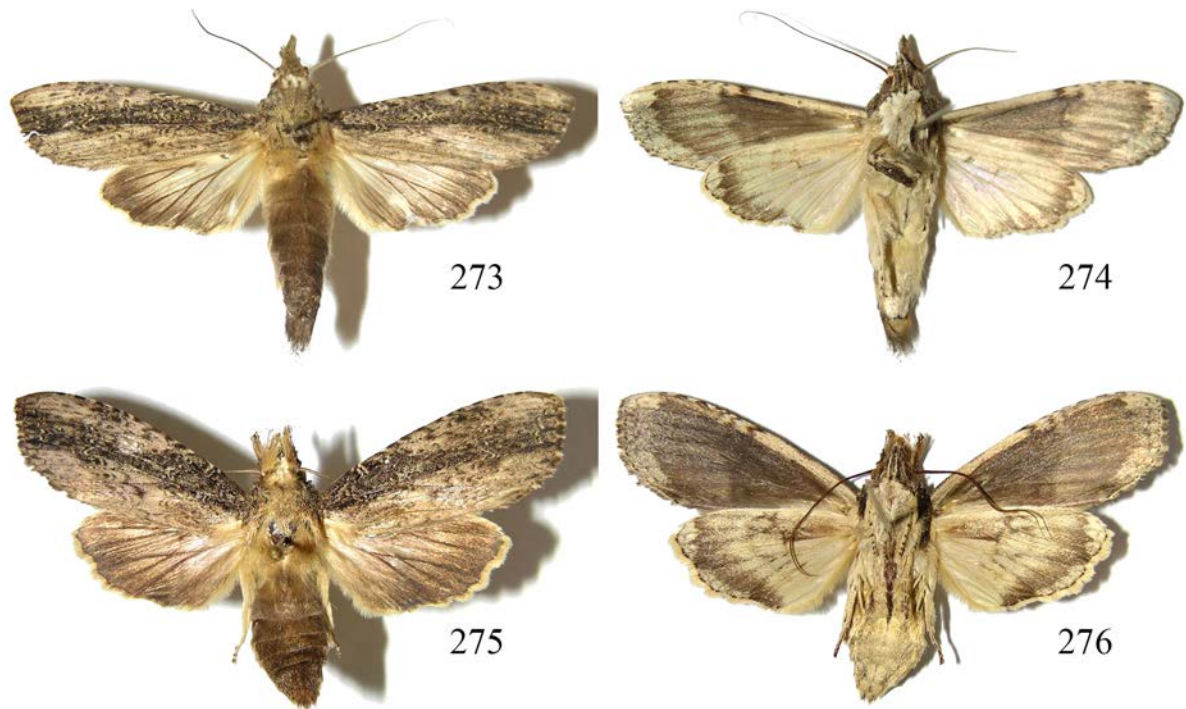
DNA barcode of male 05-SRNP-2778

[MHANC083-05|05-SRNP-2778|(*Nystalea lorettafayecooperae*)|COI-5P
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 TAAGTTTTATAATTCGAGCAGAATTAGGAAATCCTGGATCTTTAATTGGAGA
 TGATCAAAATTTATAATACCATTGTAACCGCTCATGCTTTTATTATAATTTTT
 TTTATAGTTATACCTATTATAAATGGAGGATTTGGTAATTGATTAATTCCTT
 TAATATTAGGAGCACCTGATATAGCTTTCCCGAATAAATAATATAAGTTTT
 TTGATTATTACCCCTCTTTAATTTTATTAATTTCAAGAAGTATTGTAGAA
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 GAATTACAGCATTCTTATTACTTTCTTTACCTGTATTAGCTGGAGCAAT
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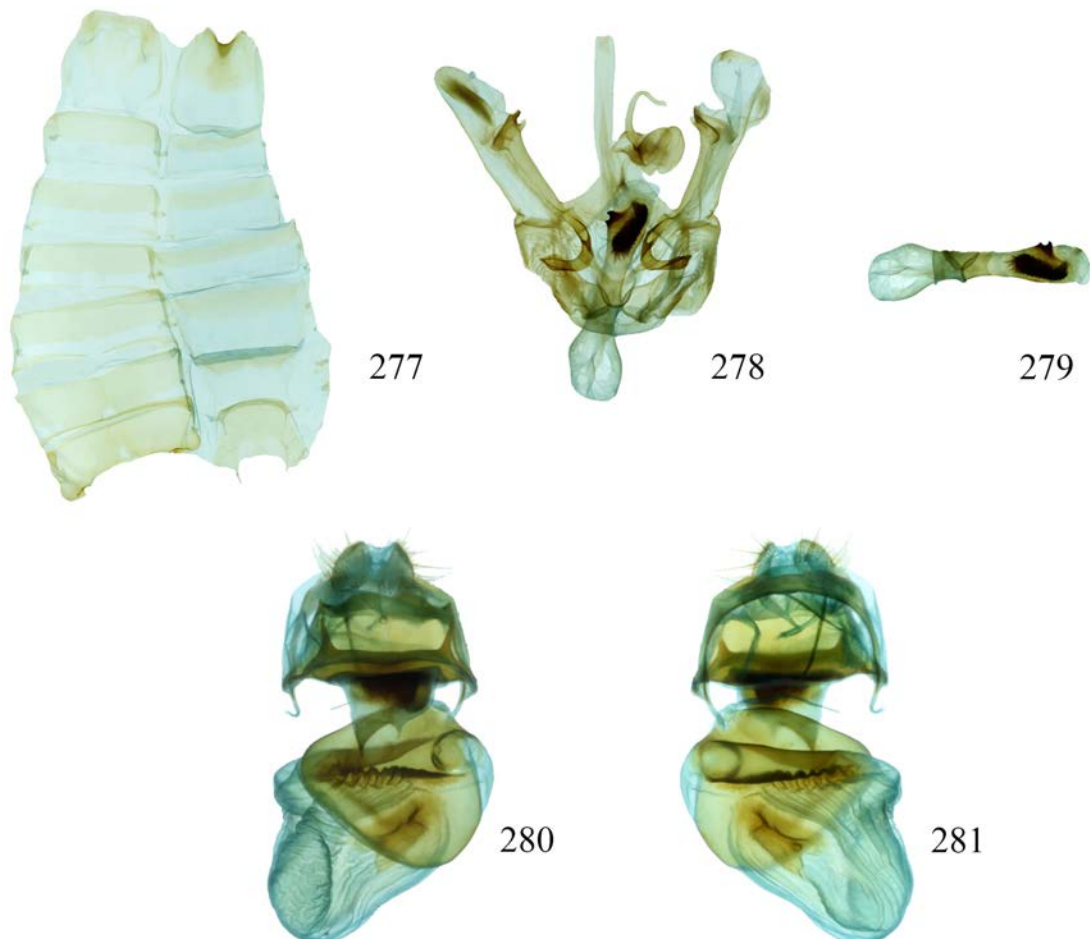
Nystalea jeremyhancei, Chacón, new species (Figs. 286-294)

Description: MALE (Figs. 286, 287): FWL 26.7-28.9 mm (n=12).

Head: Antennal shaft cream dorsally and reddish brown ventrally; scape bearing a long beige tuft, composed of beige and reddish brown scales; frons mostly reddish brown with beige intermixed scales; labial palpus cream ventrally, reddish brown dorsally; vertex reddish brown with cream intermixed scales; patagium reddish brown with some scales cream. **Thorax:** Tegula reddish brown; mesoscutellum reddish brown with beige and dark brown scales intermixed; thoracic pleuron light yellow and dirty brown; dorsal surface of metathorax reddish brown with dirty brown and posterior margin light yellow; thorax light yellow ventrally. **Legs:** Mostly light yellow, with black and dirty



Figures 273-276. *Nystalea lorettafayecooperae*: 273, 274. ♂ dorsal and ventral (INBIOCRI000645975) FWL 23.36 mm; 275, 276. ♀ dorsal and ventral (05-SRNP-5393) FWL 25.6 mm.



Figures 277-281. *Nystalea lorettafayecooperae*: 277. ♂ sternum VIII 4.6 mm length, 278. ♂ genitalia 7.1 mm length, 279. phallus 4.8 mm length (INBIOCRI000645975); 280, 281. ♀ genitalia 6.5 mm length (08-SRNP-5788).

brown scales between segments. **Wings:** Dorsal FW ground color dark brown with small spots and dirty cream-colored marks, subterminal line small black triangular markings, adterminal line dirty cream, fringe dark brown; macula dirty cream at apex, ventral FW dark brown with marginal shadow cream, dorsal HW dirty brown with veins black and marginal shade light yellow; fringe light yellow, ventral HW light yellow with marginal shade dirty brown. **Abdomen:** Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 290) with ternum rectangular, posterior margin slightly irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum rectangular, posterior margin irregular and sclerotized, with tiny, sclerotized medially rounded bag-shaped invagination. Genitalia (Fig. 291) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin and flattened, costula proximally flattened, with one thin lateral projection, distal part elongated, thin, flattened, semicircular shaped at apex; uncal process elongated, thin, tubular, short and curved at apex, uncus lobes tiny, rectangular and slightly setose, socii with two oval, membranous, concave and setose pads. Aedeagus (Fig. 292) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized and robust, with margin slightly sawn and sclerotized, middle part of phallus sclerotized and elongated.

FEMALE: Similar to male but larger (Figs. 288, 289). FWL 28.8-30.7 mm (n=4).

Female genitalia (Figs. 293, 294): Papillae anales ovoid, membranous covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate with two acute, sclerotized cusps, postvaginal plate sclerotized with two cusps with rounded apices, anterior apophysis anterior shorter than posterior; ductus bursae wide, short and heavily sclerotized; ostium bursae sclerotized and rounded, corpus bursae globular, surface slightly folded, sclerotized shield occupies third part of corpus bursae, signum Y-shaped thin.

Etymology: *Nystalea jeremyhancei* is named in honor of Jeremy Hance in recognition of his efforts to display Costa Rica's BioAlfa plan for conservation of its biodiversity through biodevelopment of what remains.

Type material. 24 ♂♂, 4 ♀♀.

HOLOTYPE ♂: INB0004205841 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Laguna La Carmela, Fca. Juan Jarquín, 700-800 m, 10.705362 -85.010713, 3 April 2009, J. A. Azofeifa (MNCR).

PARATYPES: 23 ♂♂, 4 ♀♀.

♂♂ (**COI Barcoded**): INBIOCRI002484317 Costa Rica, Prov. San José, Est. Santa Elena, Las Nubes, 1210 m, 9.395701 -83.595652, 14 November 1996, E. Alfaro (MNCR). INB0003008815 Costa Rica, Prov. San José, Estación Zurquí (el Túnel), Par. Nac. Braulio Carrillo, 1500 m, 10.063063 -84.011307, 1 September 1985, I. y A. Chacón (MNCR). 10-SRNP-104512 Costa Rica, Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Casa, 725 m, 10.86627 -85.32605, 14 January 2010, F. Quesada & S. Ríos (MNCR). 10-SRNP-103811 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Albergue Oscar, Túnel, 708 m, 10.86835 -85.32711, 12 January 2010, S. Ríos (USNM). INB0004163119 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 10 August 2008, R. Rojas (MNCR). INB0004169634 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 2: Falda N Cerro Montezuma, 1160 m, 22 September 2008, J. A. Azofeifa (MNCR). INB0004182584 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 1 November 2008, R. Rojas (MNCR). INB0004210998 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Laguna La Carmela, Finca Juan Jarquín, 700-800 m, 10.705362 -85.010713, 25 April 2009, J. A. Azofeifa (MNCR). INB0003008816 Costa Rica, Prov. Alajuela, Río San Lorencito, Res. For. de San Ramón, 5 Km N Col. Palmareña, 800 m, 10.219533 -84.600758, 27 January 1987, I. y A. Chacón (MNCR). INB0003008817 Costa Rica, Prov. Alajuela, Río San Lorencito, Res. For. de San Ramón, 5 Km N Col. Palmareña, 800 m, 27 January 1987, I. y A. Chacón (MNCR). INB0003058427 Costa Rica, Prov. Cartago, A.C.L.A.P. Paraíso, Pque Nal Tapantí, Sect La Represa, del Puente del Río Porras, 300 m S. 1660 m, 9.695214 -83.781156, 1 February 2000, L. Chavarría (USNM). INB0003079833 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de la Muerte, Al Costado de Casa Adm. 1200 m, 9.761676 -83.786507, 1 June 2000, L. Chavarría (USNM). 10-SRNP-112051 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 8 August 2010, H. Cambroner & R. Franco (MNCR).

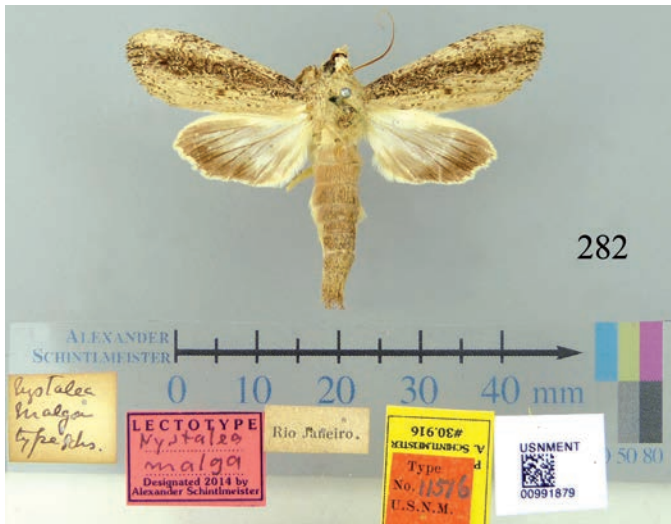
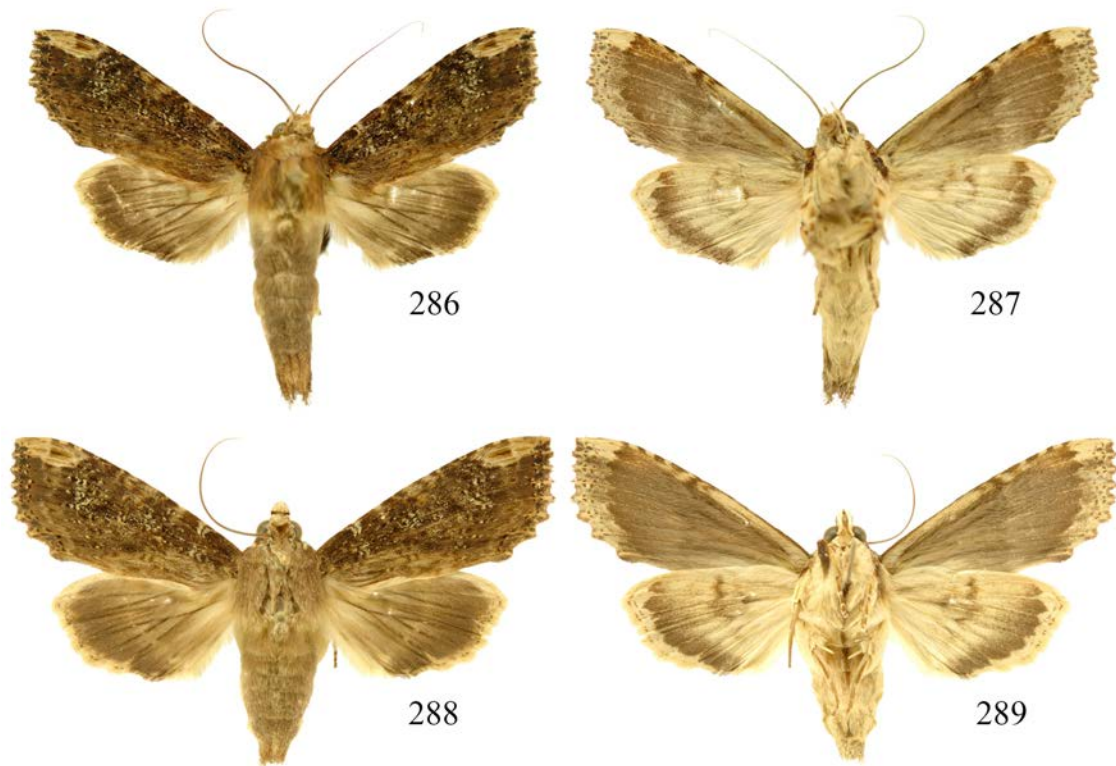


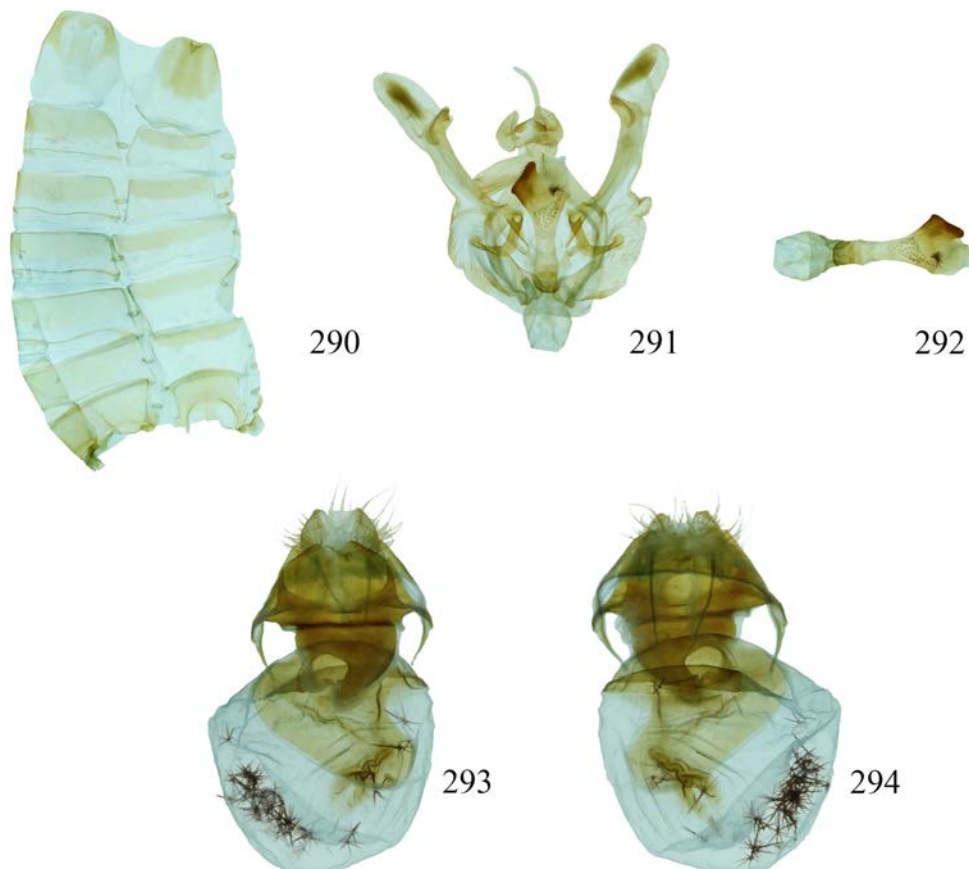
Figure 282. *Nystalea malga* Schaus, 1904. ♂ lectotype (USNMENT 00991879) from Schintlmeister (2016).



Figures 283-285. *Nystalea malga* Schaus, 1904. ♂ lectotype 283. male sternum VIII 4.1 mm length, 284. ♂ genitalia 5.7 mm length, 285. phallus 4.6 mm length (USNMENT 00991879).



Figures 286-289. *Nystalea jeremyhancei*: 286, 287. ♂ dorsal and ventral (INB0004205841) FWL 26.72 mm; 288, 289. ♀ dorsal and ventral (INBIOCRI000337825) FWL 28.83 mm.



Figures 290-294. *Nystalea jeremyhancei*: 290. ♂ sternum VIII 5.3 mm length, 291. ♂ genitalia 7.9 mm length, 292. phallus 5.4 mm length (07-SRNP-101903); 293, 294. ♀ genitalia 7.7 mm length (INB0003114829).

10-SRNP-111039 Costa Rica, Prov. Guanacaste, Sector Cacao, Derrumbe, 1310 m, 10.93110 -85.46194, 11 July 2010, R. Franco & F. Quesada (MNCR). 10-SRNP-110732 Costa Rica, Prov. Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 11 July 2010, R. Franco & S. Ríos (MNCR). 07-SRNP-101903 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 17 March 2007, R. Franco & F. Quesada (MNCR). 06-SRNP-102980 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 3 March 2006, H. Cambronero & F. Quesada (MNCR). 06-SRNP-102671 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 2 March 2006, R. Franco & F. Quesada (MNCR). 06-SRNP-101766 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 28 February 2006, S. Ríos & H. Cambronero (MNCR). 09-SRNP-106448 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 21 July 2009, R. Franco & S. Ríos (MNCR). 09-SRNP-106447 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 21 July 2009, R. Franco & S. Ríos (MNCR). INBIOCRI002197137 Costa Rica, Prov. Puntarenas, Est. Pittier, PILA-ACLA, 1670 m, 9.025664 -82.962695, 18 January 1995, E. Alfaro (MNCR). INB0003433928 Costa Rica, Prov. Guanacaste, Z.P. Tenorio, Sector Alto Los Masis, 900 - 1000 m, 10.614089 -84.992689, 1 February 2002, G. Rodríguez (MNCR). ♀♀ (COI Barcoded): INB0003114829 Costa Rica, Prov. Cartago, Paraíso, Pque Nal Tapantí, Del Mirador 300 N y 100 S, 1350 m, 9.73635 -83.780628, 1 October 1999, R. Delgado (MNCR). 10-SRNP-112169 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 9 August 2010, S. Ríos & R. Franco (MNCR). INBIOCRI000337825 Costa Rica, Prov. Puntarenas, Est. La Casona, Res. Biol. Monteverde, 1520 m, 10.298429 -84.792544, 1 July 1991, J. A. Ugalde (MNCR). INBIOCRI000658290 Costa Rica, Prov. Puntarenas, Est. La Casona, Res. Biol. Monteverde, 1520 m, 10.298429 -84.792544, 1 October 1990, N. Obando (MNCR).

Diagnosis: *Nystalea jeremyhancei* in Costa Rica cannot be confused with the other species of this genus due to the external morphology of the adults (Figs. 286, 287). Costula proximally flattened, with one thin lateral projection, distal part elongated, thin, flattened, semicircular shaped at apex (Fig. 291).

Distribution: *Nystalea jeremyhancei* has been collected with light traps in rain and cloud forests on both slopes of the Cordillera Volcánica de Guanacaste, Cordillera de Tilarán, Cordillera Volcánica Central, and Cordillera de Talamanca, as well as Caribbean lowlands. The elevational range for the species is 200-1800 m.

Natural history: All specimens have been collected with light traps; the life history of *N. jeremyhancei* is unknown.

Remarks: BIN BOLD:AAD7436 (Fig. 490).

The female genitalia of *N. jeremyhancei* is different from the female genitalia of lectotype of *N. parsoni* from South America, in size and morphology. Adults of *N. jeremyhancei* are morphologically different from adults of *N. parsoni*. Therefore *N. parsoni* is not known to occur in Costa Rica but is briefly treated below.

Genbank Accession: MT358267.

DNA barcode of male INB0004182584

[ASARD9394-14]INB0004182584(*Nystalea jeremyhancei*)[COI-5P

AACATTATATTTTATTTTGGAAATTGAGCAGGAATAATTGGAACCTCTTTA
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ATCAAAATTATAACTATTGTAACAGCTCATGCTTTTCGTTATAATTTT
TATGGTTATACCTATTATAATTGGAGGATTTGGTAATTGATTAATTCCTTTA
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CATAGAGGAAGATCTGTAGATTGCTATTTTCTCTCTCTTTAGCTGGAA
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AGGAGGAGATCTATTTTATATCAACATTTATTT

Nystalea parsoni Schaus, 1928

(Figs. 295-298)

MALE: (Fig. 295B) Paralectotype USNM 00992156. Locality: Incachaca, Cochabamba, Bolivia. Deposited in USNM.

FEMALE: (Fig. 295A) Lectotype USNM 00991072. Locality: Incachaca, Cochabamba, Bolivia. Deposited in USNM.

Female genitalia (Figs. 296-298): Papillae anales triangular and membranous covered with short, scattered setae with longer, inwardly curved setae, postvaginal plate emarginate and sclerotized, anterior apophysis shorter than posterior, ductus bursae narrow, long and sclerotized; ostium bursae sclerotized and rounded, corpus bursae globular, surface smooth, sclerotized shield rounded, signum thin.

Remarks: *Nystalea parsoni* is not known to occur in Costa Rica but is treated herein for comparative purposes.

Nystalea striata Schaus, 1910

(Figs. 299-311, 475-480)

Redescription: MALE (Figs. 299, 300, 308): FWL 26.1-28.4 mm (n=14).

Antennal shaft cream dorsally and light brown ventrally; scape bearing a long light brown tuft, composed of cream and reddish-brown scales; frons mostly reddish brown with beige intermixed scales; labial palpus cream ventrally, reddish brown dorsally; vertex reddish brown; patagium reddish-brown.

Thorax: Tegula reddish brown; mesoscutellum cream with beige and reddish-brown scales intermixed; thoracic pleuron beige and reddish brown; dorsal surface of metathorax beige with reddish brown and posterior margin light yellow; thorax beige ventrally. **Legs:** Mostly reddish brown, with light scales between segments. **Wings:** Dorsal FW ground color dark brown with small spots reddish brown marks, with tiny grayish-white spots distributed over the entire surface, subterminal line small reddish brown triangular markings, fringe light brown; macula cream at apex, dorsal HW dirty brown; fringe light yellow.

Abdomen: Dorsum dirty brown, venter light yellow.

Male genitalia: Abdominal pelt (Fig. 303) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin regular with tiny, sclerotized, medially rounded bag-shaped invagination. Genitalia (Fig. 304) with valvae wide and membranous basally, ovoid at the apex, costal margin smooth and sclerotized, midvalve sclerotization thin and flattened, costula proximally flattened with thin long projection, distal part elongated, flattened with sock shaped; uncus process elongated, thin, tubular, setose and curved at apex, uncus lobes long, rectangular and slightly setose, socii with two elongated pads, sclerotized, acute and setose. Aedeagus (Fig. 305) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide at base; proximal part of phallus thin, distal part sclerotized and robust, with acute and very sclerotized projection in margin, middle part of phallus sclerotized, thin and elongated.

FEMALE: (Figs. 301, 302). FWL 27.5-29.7 mm (n=10). **Wings:** Dorsal FW ground color gray brown with small spots of black and dark brown marks, with tiny purple spots distributed over the entire surface, subterminal line as small black triangular markings, fringe alternating black with reddish brown; macula light brown at apex, dorsal HW dirty brown; fringe alternating light yellow and dirty brown.

Female genitalia (Figs. 306, 307, 309-311): Papillae anales ovoid, membranous, covered with short, scattered setae with longer, inwardly curved setae, postvaginal plate sclerotized, irregular margin with four cusps, those sides with thin and sharp apices, anterior apophysis shorter than posterior, ductus bursae wide and elongated, heavily sclerotized with goblet-shaped; ostium bursae highly sclerotized and oval, corpus bursae globular, sclerotized shield with elongated frame, signum thin, concave and sclerotized.

Material examined. 68 ♂♂, 30 ♀♀.

♂♂ (COI Barcoded): INB0003008870 Costa Rica, Prov. San José, Estación Zurquí (el Túnel), Par. Nac. Braulio Carrillo, 1500 m, 10.063063 -84.011307, W 1 August 1985, I. y A. Chacón (MNCR). INB0003008868 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.160652 -83.956454, 1 June 1985, I. & A. Chacón (MNCR). 06-SRNP-2549 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 4 May 2006, Elda Araya (MNCR). 02-SRNP-872 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254,



Figure 295. A. *Nystalea parsoni* Schaus, 1928. ♀ lectotype (USNM 00991079) from Schintlmeister (2016). **B.** *Nystalea parsoni* Schaus, 1928. ♂ paralectotype (USNM 00992156) from Schintlmeister (2016).

14 March 2002, Gloria Sihezar (USNM). 06-SRNP-4076 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 17 June 2006, Gloria Sihezar (USNM). 08-SRNP-513 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 13 March 2008, Carolina Cano (USNM). 07-SRNP-2465 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 2 July 2007, Anabelle Córdoba (MNCR). 07-SRNP-658 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 18 March 2007, Carolina Cano (USNM). 06-SRNP-8341 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 3 November 2006, Gloria Sihezar (USNM). 06-SRNP-8122 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 October 2006, Carolina Cano (USNM). 06-SRNP-8983 Costa Rica, Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 4 December 2006. Gloria Sihezar (MNCR). 05-SRNP-7459 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 11 January 2006. Gloria Sihezar (USNM). 01-SRNP-22918 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 December 2001, Gloria Sihezar (USNM). 08-SRNP-562 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 10 March 2008, Carolina Cano (MNCR). 16-SRNP-239 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 1 March 2016, Gloria Sihezar (USNM). INBIOCRI002609406 Costa Rica, Prov. Alajuela, Fca. La Campana, El Ensayo, 7 Km NW Dos Ríos, 700 m, 10.94834 -85.420173, 17 March 1986, D. H. Janzen & W. Hallwachs (MNCR). 99-SRNP-12697 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Sucia, 660 m, 10.86877 -85.39343, 12 September 1999, Osvaldo Espinoza (USNM). INB0003008877 Costa Rica, Prov. Alajuela, Río San Lorencito, Res. For. de San Ramón, 5 km N Col. Palmareña, 800 m, 10.219533 -84.600758, 1 February 1986, I. Chacón. (MNCR). 02-SRNP-691 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 16 March 2002. Carolina Cano (MNCR). 02-SRNP-19852 Costa Rica, Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 8 December 2002, Gloria Sihezar (USNM). 01-SRNP-227 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 1 March 2001. Freddy Quesada (USNM). 01-SRNP-22919 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 29 December 2001, Gloria Sihezar (USNM). 00-SRNP-11200 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 3 July 2000, Freddy Quesada (USNM). 02-SRNP-690 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 11 March 2002, Carolina Cano (USNM). 03-SRNP-7570 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Cementerio Viejo, 570 m, 10.88111 -85.38889, 1 September 2003, Gloria Sihezar (MNCR). 03-SRNP-7571 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Cementerio Viejo, 570 m, 10.88111 -85.38889, 3 September 2003. Gloria Sihezar (USNM). 02-SRNP-19810 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 11 December 2002, Carolina Cano (USNM). 06-SRNP-6582 Costa Rica, Prov.



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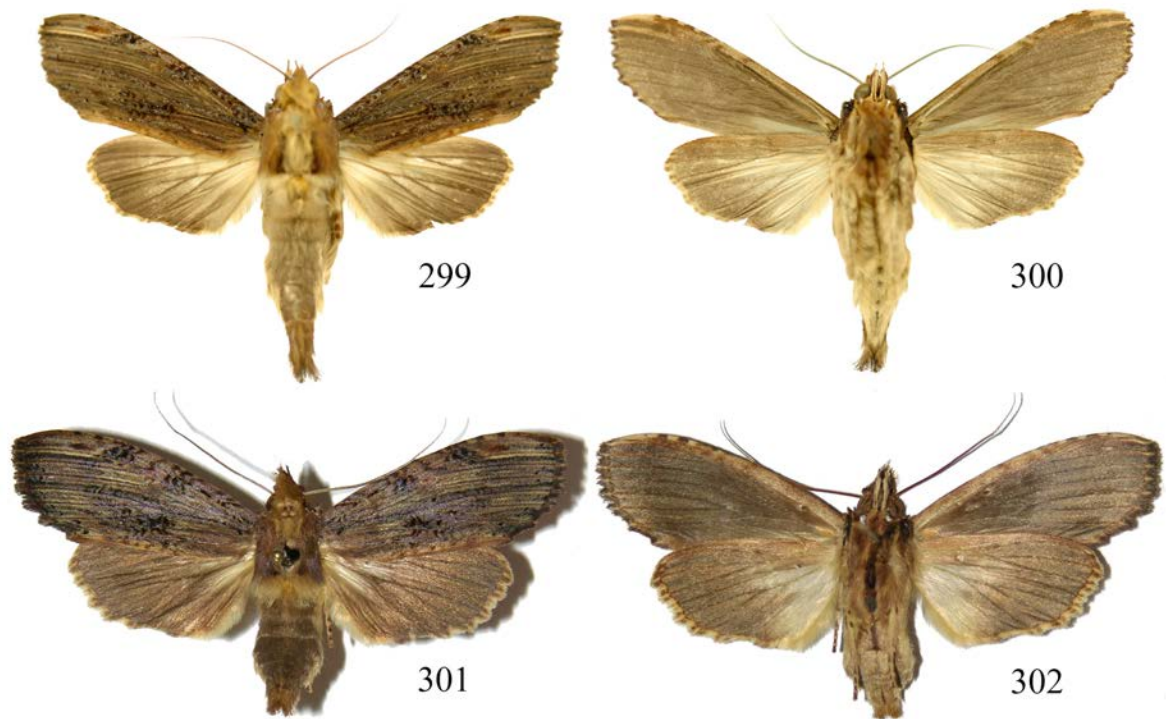


297

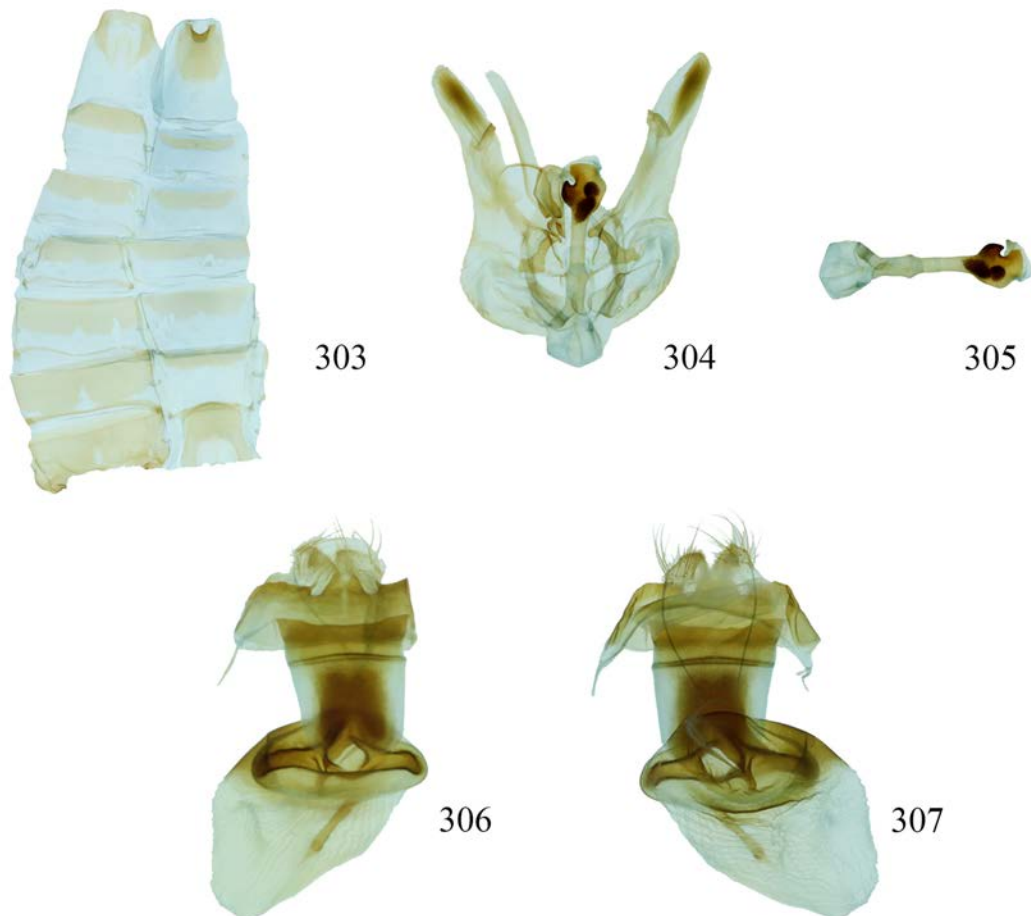


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Figures 296-298. *Nystalea parsoni* Schaus, 1910. ♀ lectotype: 296. ♀ sternum VIII 3.2 mm length, 297, 298. ♀ genitalia 7.6 mm length (USNM 00992156).



Figures 299-302. *Nystalea striata* Schaus, 1910: 299, 300. ♂ dorsal and ventral (INB0004217590) FWL 26.10 mm; 301, 302. ♀ dorsal and ventral (05-SRNP-2776) FWL 27.55 mm.



Figures 303-307. *Nystalea striata* Schaus, 1910: 303. ♂ sternum VIII 5.1 mm length, 304. male genitalia 8.3 mm, 305 phallus 5.5 mm length (07-SRNP-107784); 306, 307. ♀ genitalia 6.7 mm length (09-SRNP-106446).

Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 10 September 2006, Gloria Sihezar (USNM). 03-SRNP-6935 Costa Rica, Alajuela, Sector San Cristóbal, Sendero Palo Alto, 570 m, 10.88186 -85.38221, 1 August 2003, Carolina Cano. 02-SRNP-20051 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 28 December 2002, Gloria Sihezar (USNM). 05-SRNP-4443 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Cementerio, 700 m, 10.87124 -85.38749, 3 September 2005, Carolina Cano (USNM). 07-SRNP-526 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 27 February 2007, Carolina Cano (USNM). 07-SRNP-2981 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 1 August 2007, Gloria Sihezar (USNM). 02-SRNP-692 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 March 2002, Carolina Cano (USNM). 00-SRNP-22059 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 28 December 2000, Gloria Sihezar (MNCR). 02-SRNP-694 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 March 2002, Gloria Sihezar (MNCR). 02-SRNP-693 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 18 March 2002, Carolina Cano (USNM). 99-SRNP-5792 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Sucia, 660 m, 10.86877 -85.39343, 11 July 1999, Freddy Quesada (USNM). INB0004217590 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Lag. La Carmela, Fca. Juan Jarquín, 700-800 m, 10.705362 -85.010713, 30 May 2009, J. A. Azofeifa, E. Méndez (MNCR). 06-SRNP-2548 Costa Rica, Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500

m, 10.90037 -85.37254, 25 April 2006. Elda Araya (USNM). 07-SRNP-2466 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Vivero, 730 m, 10.86739 -85.38744, 10 July 2007, Anabelle Córdoba (USNM). 06-SRNP-8532 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670. 10.87621 -85.38632, 12 November 2006, Anabelle Córdoba (MNCR). INB0004147289 Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Punto 2: Falda N Cerro Montezuma, 1000-1100 m, 10.6981135 -85.018467, 1 June 2008, J. A. Azofeifa (MNCR). INB0004217608 Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Lag. La Carmela, Fca. Juan Jarquín, 700-800 m, 10.705362 -85.010713, 30 May 2009. J. A. Azofeifa, E. Méndez (MNCR). INB0003116468 Costa Rica, Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de La Muerte, Estación Quebrada Segundo, 1300 m, 9.762583 -83.788328, 1 November 2000, R. Delgado (MNCR). INB0003943270 Costa Rica, Prov. Cartago, P.N. Barbilla, Turrialba, Tayutic, Campamento 2, 1200 m, 9.936859 -83.414306, 9 May 2005, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INBIOCRI001907121 Costa Rica, Prov. Cartago, Quebrada Segunda, P. N. Tapantí, A. C. Amistad, 1150 m, 9.762583 -83.788328, 1 June 1994, G. Mora (MNCR). INBIOCRI002427600 Costa Rica, Prov. Cartago, R. Grande de Orosí, desde Puente R. Dos Amigos hasta la Represa, 1400-1800 m, 9.695643 -83.768399, 15 September 1995, R. Delgado (MNCR). INB0003008876 Costa Rica, Prov. Cartago Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INBIOCRI001830327 Costa Rica, Prov. Cartago, P.N. Tapantí, A. C. Amistad, 1150 m, 9.762583 -83.788328, 1 January 1994, G. Mora (MNCR). 04-SRNP-35603 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822. 28 July 2004, Dunia García (USNM). 07-SRNP-107784 Costa Rica, Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (USNM). INB0003772585 Costa Rica, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100 m, 10.718333 -85.144722, 28 September 2003, B. Hernández (MNCR). 14-SRNP-30883 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 3 August 2014, Freddy Quesada (USNM). 06-SRNP-106364 Costa Rica, Prov. Guanacaste, Hotel Borinquen, Canopy Tours, 700 m, 10.81262 -85.40248, 29 August 2006, H. Cambroner & F. Quesada (MNCR). 06-SRNP-106194 Costa Rica, Prov. Guanacaste, Sector Del Oro, Serrano, 585 m, 11.00023 -85.45621, 23 August 2006, S. Ríos & F. Quesada (MNCR). 99-SRNP-1585 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Arenales, 1080 m, 10.92471, -85.46738, 27 October 1999, Mariano Pereira (USNM). 08-SRNP-30344 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 21 March 2008, Manuel Ríos (USNM). 09-SRNP-106444 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 21 July 2009, R. Franco & S. Ríos (MNCR). 10-SRNP-113313 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Copelares, 1478 m, 10.81692 -85.34679, 7 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-115245 Costa Rica, Prov. Guanacaste, Sector Santa María, Estación Santa María, 832 m, 10.76461, -85.30321, 4 November 2010, F. Quesada & S. Ríos (MNCR). 10-SRNP-115488 Costa Rica, Prov. Guanacaste, Sector Santa María, Estación Santa María, 832 m, 10.76461 -85.30321, 5 November 2010, F. Quesada & S. Ríos (MNCR). 11-SRNP-101875 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Memo, 774 m, 10.98518 -85.42811, 2 April 2011. R.



Figure 308. *Nystalea striata* Schaus, 1910. ♀ lectotype (USNM 00991220) from Schintlmeister (2016).



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Figures 309-311. *Nystalea striata* Schaus, 1910. ♀ lectotype: 309. ♀ sternum VIII 3.6 mm length, 310, 311. ♀ genitalia 7.6 mm length (USNM 00991220).

Franco & F. Quesada (MNCR). 11-SRNP-32280 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 16 September 2011, Freddy Quesada (USNM). INBIOCRI000161909 Costa Rica, Prov. Puntarenas, Est. Sirena, Corcovado N. P., 0 - 100 m, 8.480171 -83.591289, 1 February 1990. G. Fonseca (MNCR). INBIOCRI000217656 Costa Rica, Prov. Puntarenas, Rancho Quemado, Pen. Osa, 200 m, 8.679096 -83.566714, 1 February 1991, F. Quesada (MNCR). INB0003374922 Costa Rica, Prov. Puntarenas, P. Int. La Amistad, Estación Altamira, 1450 m, 9.032987 -83.010887, 1 September 2001, R. Delgado (MNCR). INB0004193793 Costa Rica, Prov. Limón, Veragua Rainforest, Campamento, 400-440 m, 9.92573 -83.191405, 17 January 2009, R. Villalobos (MNCR). ♀♀ (COI Barcoded): 05-SRNP-602 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 7 March 2005. Elda Araya (USNM). 05-SRNP-6160 Costa Rica. Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 1 November 2005. Anabelle Córdoba (USNM). 08-SRNP-263 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 February 2008. Carolina Cano (USNM). 06-SRNP-2109 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 19 April 2006, Gloria Sihezar (USNM). 06-SRNP-3334 Costa Rica, Alajuela, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886 -85.3281, 24 May 2006, Yessenia Mendoza (USNM). 99-SRNP-12696 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Sucia, 660 m, 10.86877 -85.39343, 14 September 1999, Osvaldo Espinoza (USNM). 05-SRNP-7138 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Huerta, 527 m, 10.9305 -85.37223, 24 December 2005, Carolina Cano (USNM). 01-SRNP-25114 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 27 December 2001, Gloria Sihezar (USNM). 99-SRNP-5793 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Sucia, 660 m, 10.86877 -85.39343, 9 July 1999, Freddy Quesada (USNM). 00-SRNP-22182 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Corredor, 620 m, 10.87868 -85.38963, 29 December 2000. Gloria Sihezar (USNM). 02-SRNP-18505 Costa Rica, Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 31 August 2002, Gloria Sihezar (USNM). 05-SRNP-2776 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 12 June 2005, Anabelle Córdoba (USNM). 06-SRNP-1762 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Palo Alto, 570 m, 10.88186 -85.38221, 31 March 2006, Elda Araya (USNM). 03-SRNP-6262 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Potrero Argentina, 520 m, 10.89021 -85.38803, 25 June 2003, Gloria Sihezar (USNM). 02-SRNP-1171 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 26 March 2002. Gloria Sihezar (USNM). 99-SRNP-5791 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Quebrada Sucia, 660 m, 10.86877 -85.39343, 12 July 1999, Freddy Quesada (USNM). 06-SRNP-3335 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886 -85.3281, 26 May 2006, Yessenia Mendoza (USNM). 06-SRNP-3331 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886 -85.3281, 23 May 2006, Yessenia Mendoza (USNM). 08-SRNP-2490 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 19 June 2008, Gloria Sihezar (USNM). 08-SRNP-2228 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Piñal, 630 m, 10.87161 -85.39333, 27 May 2008, Carolina Cano (USNM). 09-SRNP-667 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 19 March 2009, Gloria Sihezar (USNM). 02-SRNP-337 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 24 February 2002, Carolina Cano (USNM). 08-SRNP-5455 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670 m, 10.87621, -85.38632, 26 October 2008, Gloria Sihezar (USNM). 08-SRNP-6770 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Huerta, 527 m, 10.9305 -85.37223, 9 January 2009, Gloria Sihezar (USNM). 09-SRNP-36683 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Derrumbe, 1220 m, 10.92918 -85.46426, 19 August 2009, Manuel Pereira (USNM). 10-SRNP-112048 Costa Rica, Guanacaste, Sector Cacao, Laboratorio, 1150 m, 10.92691 -85.46822, 8 August 2010, H. Cambronero & R. Franco (MNCR). 10-SRNP-21033 Costa Rica, Guanacaste, Sector Del Oro, Sendero Puertas, 400 m, 11.01087 -85.48817, 6 July 2010, Lucía Ríos (USNM). 11-SRNP-22159 Costa Rica, Prov. Guanacaste, Sector Del Oro, Meteorológico, 590 m, 11.00199 -85.46166, 12 September 2011, Lucía Ríos (USNM). 09-SRNP-106446 Costa Rica, Prov. Guanacaste, Sector Cacao, Estación Cacao, 1150 m, 10.92691 -85.46822, 21 July 2009, R. Franco & S. Ríos (MNCR). 03-SRNP-4378 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Segundo, 1180 m, 10.92679, -85.45332, 14 July 2003, Freddy Quesada (USNM).

Diagnosis: Male genitalia with distal part of phallus sclerotized and robust, with acute and heavily sclerotized projection in margin. *Nystalea striata* is easy to separate from the other *Nystalea* from Costa Rica by its external appearance. Dorsal FW ground color dark brown with small spots reddish-brown marks, with tiny grayish-white spots distributed over the entire surface, subterminal line small reddish-brown triangular markings, fringe light brown; macula cream at apex, dorsal HW dirty brown; fringe light yellow (Figs. 299, 300).

Distribution: *Nystalea striata* has been collected with light traps in rain and cloud forests on both slopes of Cordillera Volcánica de Guanacaste, the east slopes of the Cordillera de Tilarán, Cordillera Volcánica Central, and Cordillera de Talamanca, as well as the Pacific and Caribbean lowlands. The elevational range for the species is 1-1800 m elevation.

Natural history: (Figs. 475-480) 102 rearing records: ACG locations: Sector San Cristóbal (n=74), Sector Pitilla (n=14), Sector Del Oro (n=5), Sector Cacao (n=5), Sector Rincón Rain (n=3), Sector El Hacha (n=1).

Food plants: Myrtaceae: *Eugenia basilaris* (n=1), *Marlierea mesoamericana* (n=1), *Myrcia leptoclada* (n=2), *M. splendens* (n=98).

Remarks: BIN BOLD:AAA5324 (Fig. 490).

Genbank Accession: GU337726

DNA barcode of male 04-SRNP-35603

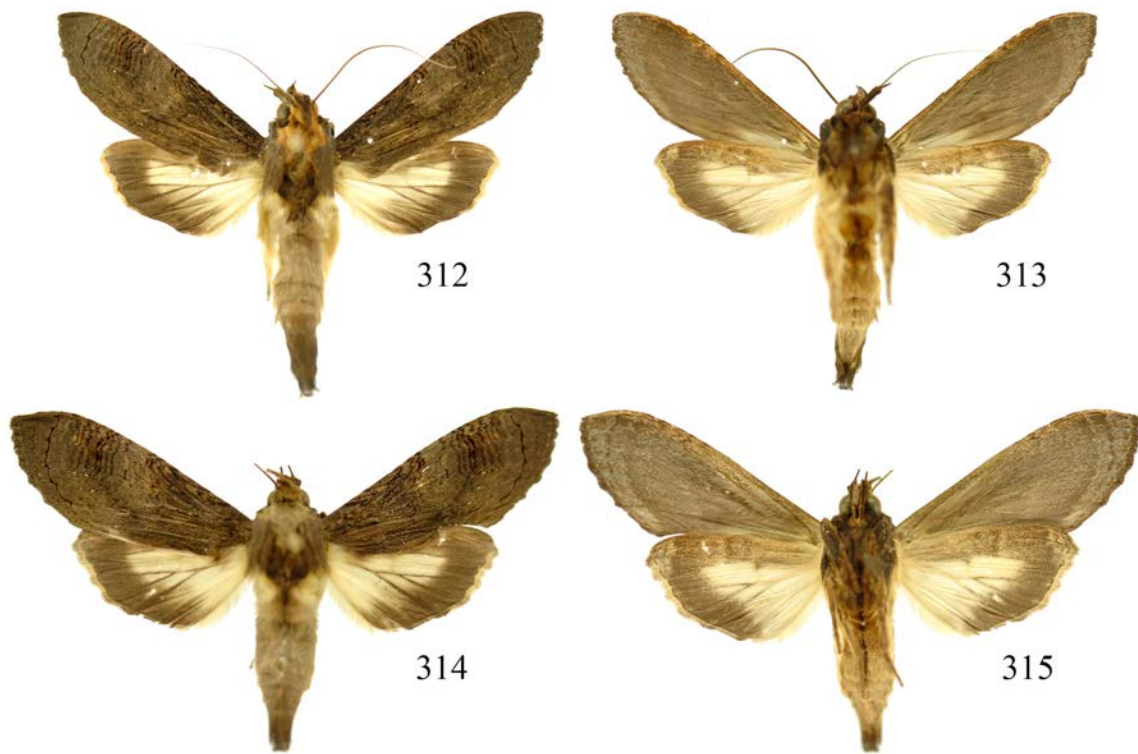
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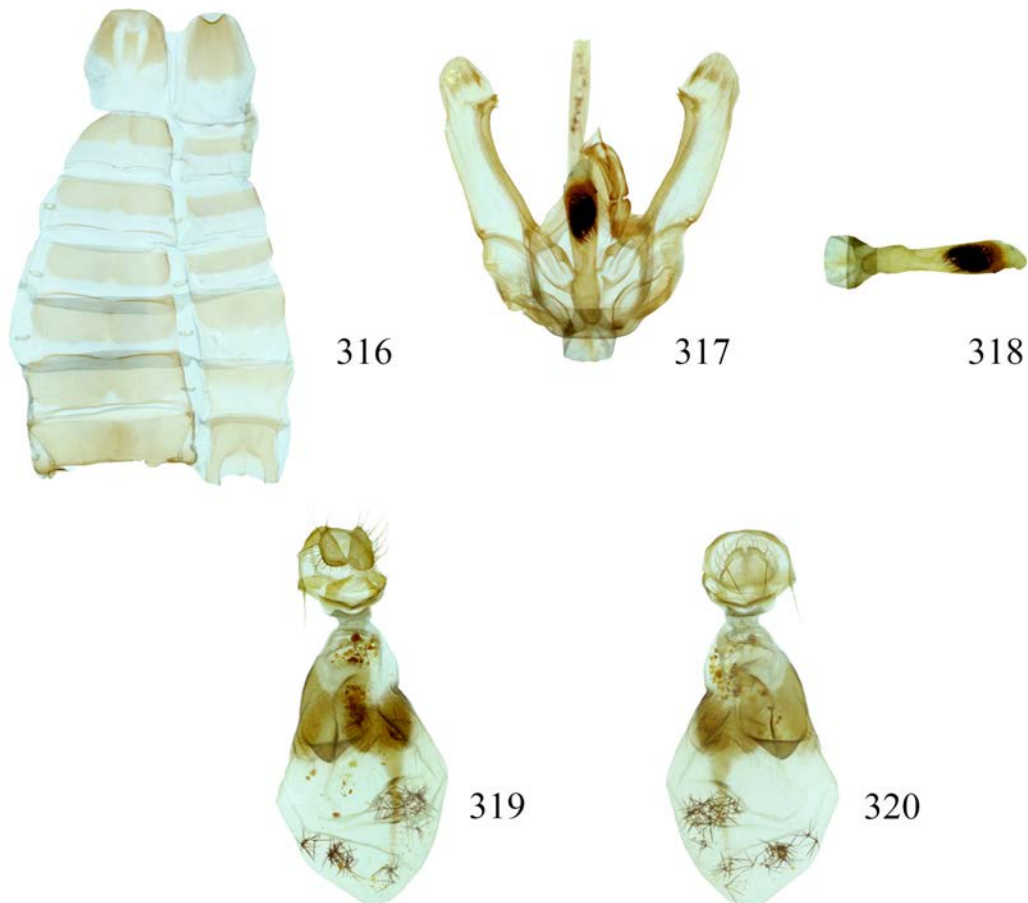
Nystalea superciliosa Guenée, 1852 (Figs. 312-320, 481-485)

Redescription: MALE (Figs. 312, 313): FWL 24.8-27.9 mm (n=15). Antennal shaft cream dorsally and reddish brown ventrally; scape bearing a long reddish-brown tuft, composed of beige and dark brown scales; frons mostly dark brown with beige intermixed scales; labial palpus cream ventrally, reddish brown dorsally; vertex reddish-brown; patagium reddish brown. **Thorax:** Tegula dark brown; mesoscutellum reddish-brown; thoracic pleuron reddish brown; dorsal surface of metathorax dark brown with reddish-brown and posterior margin light yellow; thorax reddish-brown ventrally. **Legs:** Mostly reddish-brown, with light brown scales between segments. **Wings:** Dorsal FW ground color brown gray with dark brown and black marks, irregular subterminal line black, fringe gray brown; dorsal HW light yellow; marginal shade brown gray, fringe light yellow. **Abdomen:** Dorsum and venter dirty brown.

Male genitalia: Abdominal pelt (Fig. 316) with tergum VIII rectangular, posterior margin slightly irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin with small invagination sclerotized medially. Genitalia (Fig. 317) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin and flattened, costula proximally thin and flattened, distal part elongated, tubular with recurved and very thin apices; uncus process short, elongated, thin, tubular, and setose, uncus lobes elongated, rectangular and slightly setose, socii with two elongated pads, sclerotized, acute and very setose. Aedeagus (Fig. 318) with membranous vesica, deciduous caltrop-shape cornuti present, callosum wide basally; proximal part of phallus thin slightly bulging, distal part sclerotized and elongated with thorn-shaped tiny, sclerotized projection, middle part of phallus sclerotized and elongated.



Figures 312-315. *Nystalea superciliosa* Guenée, 1852: 312, 313. ♂ dorsal and ventral (INB0004173415) FWL 33.0 mm; 314, 315. ♀ dorsal and ventral (INB0003375874) FWL 33.3 mm.



Figures 316-320. *Nystalea superciliosa* Guenée, 1852: 316. ♂ sternum VIII 4.9 mm length, 317. ♂ genitalia 7.5 mm length, 318. phallus 4.6 mm length (07-SRNP-107951); 319, 320. ♀ genitalia 10.2 mm length (INBIOCRI000134559).

FEMALE: Similar to male but larger (Figs. 314, 315). FWL 26.4-30.1 mm (n=7).

Female genitalia (Figs. 319, 320): Papillae anales ovoid, membranous, covered with short, scattered setae with longer, inwardly curved setae, postvaginal plate sclerotized with two cusps, anterior apophysis shorter than posterior, ductus bursae narrow, elongated, slightly sclerotized, corpus bursae globular, surface slightly folded, the sclerotized shield with elongated and bag-shaped end, signum sclerotized with pulmonary form.

Material examined: 81 ♂♂, 17 ♀♀.

♂♂ (**COI Barcoded**): INBIOCRI000198168 Costa Rica, Prov. San José, Est. El Ceibo, Braulio Carrillo, N. P. 400 - 600 m, 10.328044 -84.080424, 1 December 1989, R. Aguilar & M. Zumbado (MNCR). 08-SRNP-1736 Costa Rica, Prov. Alajuela, Sector San Cristóbal. Sendero Carmona, 670 m, 10.87621 -85.38632, 11 May 2008, Carolina Cano (USNM). 08-SRNP-66204 Costa Rica, Prov. Alajuela, Brasilia, Moga, 320 m, 11.01227 -85.34929, 12 November 2009, Duvalier Briceño (MNCR). INB0004208171 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 1 November 2008, R. Rojas (MNCR). INB0004217485 Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 1: Catarata Río Buenavista, 800 m, 10.706123 -84.992889, 26 May 2009, J. A. Azofeifa (MNCR). 04-SRNP-2652 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 2 July 2004, Carolina Cano (USNM). 04-SRNP-2059 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Bosque Trampa Malaise, 815 m, 10.86280 -85.38460, 22 May 2004, Elda Araya (USNM). 08-SRNP-66063 Costa Rica, Prov. Alajuela, Brasilia, Piedrona, 340 m, 11.01618 -85.35902, 4 December 2008, Duvalier Briceño (USNM). 13-SRNP-67855 Costa Rica, Alajuela, Sector Rincón Rain Forest, Palomo, 96 m, 10.96187 -85.28045, 14 April 2013, Keiner Aragón (USNM). 13-SRNP-1282 (COI Barcoded), Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 10.8794 -85.38607, 620 m, 17 April 2013, Gloria Sihazar (USNM). INBIOCRI001947833 Costa Rica, Prov. Alajuela, Playuelas, R.N.V.S Caño Negro, 20 m, 10.955344 -84.749598, 3 October 1993, K. F. Flores (MNCR). 10-SRNP-68142 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest. Palomo, 96 m, 10.96187 -85.28045, 20 January 2011, Petrona Ríos (USNM). 08-SRNP-1735 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Carmona, 670 m, 10.87621 -85.38632, 8 May 2008, Carolina Cano (USNM). 07-SRNP-1791 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Tajo Angeles, 540 m, 10.86472 -85.41531, 21 May 2007, Gloria Sihazar (USNM). 01-SRNP-1248 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Corrales Viejos, 495 m, 10.89974 -85.38085, 2 May 2001, Freddy Quesada (USNM). 07-SRNP-215 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 9 February 2007, Carolina Cano (USNM). 06-SRNP-3412 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 29 May 2006 Elda Araya (USNM). 06-SRNP-103759 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Estación San Gerardo, 575 m, 10.88009 -85.38887, 29 April 2006, H. Cambronero & S. Ríos (MNCR). 16-SRNP-75341 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Finca Esmeralda, 10.93548 -85.25314, 123 m, 30 April 2016, Cirilo Umaña (USNM). 05-SRNP-7839 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 22 January 2006, Yessenia Mendoza (USNM). INB0004208172 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 1 November 2008, R. Rojas (MNCR). INB0003173849 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Estación Barbilla, 500 m, 9.981348 -83.454259, 1 April 2001, L. Chavarría (MNCR). INB0003173849 Costa Rica, Prov. Cartago, Turrialba, P.N. Barbilla, Estación Barbilla, 500 m, 9.981348 -83.454259, 1 April 2001, L. Chavarría (MNCR). INB0004178752 Costa Rica, Prov. Heredia, Sarapiquí, La Virgen, Est. Biol. La Tirimbina, 167 m, 10.416556 -84.120167, 28 October 2008, I. Chacón (MNCR). INB0004178393 Costa Rica, Prov. Heredia, Sarapiquí, La Virgen, Est. Biol. La Tirimbina, 167 m, 10.416556 -84.120167, 28 October 2008, I. Chacón (MNCR). INB0004027642 Costa Rica, Prov. Heredia, Sarapiquí, Cecafor, 50 m, 10.38878 -83.971554, 4 August 2006, J. A. Azofeifa, B. Gamboa, M. Moraga (MNCR). INBIOCRI000134559 Costa Rica, Prov. Heredia, Est. El Ceibo, Braulio Carrillo, N. P. 400 - 600 m, 10.328044 -84.080424, 1 November 1989, R. Aguilar & M. Zumbado (MNCR). 10-SRNP-113076 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Río Blanco, 790 m, 10.77464 -85.35001, 6 September 2010, S. Ríos & R. Franco (MNCR). 10-SRNP-21955 Costa Rica, Prov. Guanacaste, Sector Del Oro, Río Chon, 320 m, 11.04118 -85.44170, 20 September 2010, Elieth Cantillano (USNM). 05-SRNP-25147 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Raíz, 280 m, 11.02865 -85.48669, 17 December 2005, Lucía Ríos (USNM). 02-SRNP-32015 Costa Rica, Prov.

Guanacaste, Potrerillos, Río Azufrado, 95 m, 10.81224 -85.54438, 10 October 2002, Guillermo Pereira (USNM). INBIOCRI000733795 Costa Rica, Prov. Guanacaste, 3 km NO de Nacaome, P. N. Barra Honda, 100 m, 10.168217 -85.373656, 25 August 1992, M. Reyes (MNCR). 06-SRNP-31717 Costa Rica, Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 8 June 2006, Calixto Moraga (USNM). 09-SRNP-30762 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 17 April 2009, Petrona Ríos (USNM). INB0004173490 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, Represa ICE, 1000 m, 10.716779 -85.154264, 10 October 2008, J. Azofeifa, B. Hernández, E. Méndez (MNCR). INB0004173415 Costa Rica, Prov. Guanacaste, Z.P. Miravalles, Est. Cabro Muco, Represa ICE, 1000 m, 10.716779 -85.154264, 10 October 2008, J. Azofeifa, B. Hernández, E. Méndez (MNCR). INB0004169787 Costa Rica, Prov. Guanacaste, Cañas, Reserva Leones, Naciente Quebrada Leones, 800-900 m, 10.641107 -85.038906, 26 September 2008, J.A. Azofeifa (MNCR). 12-SRNP-102733 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Laguna, 785 m, 10.46237 -85.20438, 21 May 2012, S. Ríos & R. Franco (MNCR). 11-SRNP-104377 Costa Rica, Prov. Guanacaste, Sector Santa Elena, La Angostura, 300 m, 10.85592 -85.67017, 26 September 2011, S. Ríos & R. Franco (MNCR). 10-SRNP-21800 Costa Rica, Prov. Guanacaste, Sector Del Oro, Tangelo, 410 m, 11.01823 -85.45024, 7 September 2010, Lucía Ríos (USNM). 09-SRNP-73524 Costa Rica, Prov. Guanacaste, Sector Pitilla, Medrano, 380 m, 11.01602 -85.38053, 27 November 2009, Ricardo Calero (USNM). 08-SRNP-16133 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque Húmedo, 290 m, 10.85145, -85.60801, 11 November 2008, Guillermo Pereira (USNM). 08-SRNP-30625 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 14 April 2008, Petrona Ríos (USNM). 08-SRNP-30729 Costa Rica, Prov. Guanacaste, Sector Pitilla, Estación Pitilla, 675 m, 10.98931 -85.42581, 7 April 2008, Petrona Ríos (USNM). 08-SRNP-30617 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 14 April 2008, Wilberth Araya Alegria (USNM). 05-SRNP-56533 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Huacas, 490 m, 10.75533 -85.39117, 23 June 2005, Mariano Pereira (USNM). 08-SRNP-30668 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 1 April 2008, Manuel Ríos (USNM). 08-SRNP-108473 Costa Rica, Prov. Guanacaste, Sector Santa María, Manta Potrero, 817 m, 10.76213 -85.30354, 28 November 2008, R. Franco & F. Quesada (MNCR). 08-SRNP-107447 Costa Rica, Prov. Guanacaste, Sector Santa Elena, La Angostura, 300 m, 10.85592 -85.67017, 27 October 2008, S. Ríos & H. Cambronero (MNCR). 07-SRNP-107951 Costa Rica, Prov. Guanacaste, Sector Cacao, Roca Verde, 835 m, 10.89354 -85.43603, 12 August 2007, R. Franco & F. Quesada (MNCR). 04-SRNP-23233 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Raíz, 280 m, 11.02865 -85.48669, 6 August 2004, Elieth Cantillano (USNM). 01-SRNP-18125 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Vado Río Calera, 10 m, 10.80274 -85.67423, 26 November 2001, Guillermo Pereira (USNM). 08-SRNP-30918 Costa Rica, Prov. Guanacaste, Sector Pitilla, Casa Roberto, 520 m, 11.01095 -85.42094, 15 April 2008, Calixto Moraga (USNM). 01-SRNP-18125 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Vado Río Calera, 10 m, 10.80274 -85.67423, 26 November 2001, Guillermo Pereira (USNM). 07-SRNP-45688 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Heliconia, 390 m, 10.88585 -85.49222, 30 August 2007, Dunia García (USNM). 02-SRNP-33031 Costa Rica, Prov. Guanacaste, Sector El Hacha, Finca Araya, 295 m, 11.01541 -85.51125, 7 January 2003, Dunia García (USNM). INBIOCRI000674325 Costa Rica, Prov. Guanacaste, Tierras Morenas, Bajo Los Cartagos, R Sn Lorenzo, Zona Prot. Tenorio. A. C. Arenal, 1050 m, 10.610459 -84.994966, 1 January 1991, C. Alvarado (MNCR). 07-SRNP-45687 Costa Rica, Prov. Guanacaste, Sector Cacao, Quebrada Heliconia, 390 m, 10.88585 -85.49222, 30 August 2007, Dunia García (USNM). 07-SRNP-113051 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, La Perla (Tajo), 394 m, 10.76734 -85.43014, 9 December 2007, R. Franco & F. Quesada (MNCR). 07-SRNP-111848 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, La Perla (Tajo), 394 m, 10.76734 -85.43014, 13 November 2007, H. Cambronero & F. Quesada (MNCR). 07-SRNP-56348 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Sendero Aguacate, 335 m, 10.76901 -85.43465, 4 June 2007, Jose Cortéz (USNM), INBIOCRI001374834 Costa Rica, Prov. Puntarenas, P. N. Manuel Antonio, Quepos, 80 m, 9.387728 -84.132806, 1 May 1991, G. Varela (MNCR). INBIOCRI000900789 Costa Rica, Prov. Puntarenas, Est. La Casona, Res. Biol. Monteverde, 1520 m, 10.298429 -84.792544, 1 December 1992, N. Obando (MNCR). INB0003766111 Costa Rica, Prov. Puntarenas, Lepanto, Montaña Grande, Estac. Karen Mogensen, 300 - 400 m, 9.867095 -85.059952, 30 September 2003, W. Porras (MNCR). INBIOCRI000212643 Costa Rica, Prov.

Puntarenas, Garabito, P.N. Carara, Est. Quebrada Bonita, 100 m, 9.767453 -84.608119, 1 October 1989, R. Zúñiga (MNCR). INBIOCRI000139504 Costa Rica, Prov. Puntarenas, R. B. Carara, Estac. Quebrada Bonita, 50 m, 9.767453 -84.608119, 1 November 1989, R. Zúñiga (MNCR). INB0004110996 Costa Rica, Prov. Puntarenas, R.F. Golfo Dulce, P.N. Corcovado, Est. Agujas, 200-300 m, 8.536614 -83.425512, 12 October 2007, J. A. Azofeifa (MNCR). INBIOCRI000645981 Costa Rica, Prov. Puntarenas, Quepos, P. N. Manuel Antonio, 80m, 9.387728 -84.132806, 1 April 1991, G. Varela (MNCR). INB0003766145 Costa Rica, Prov. Puntarenas, Lepanto, Montaña Grande, Estac. Karen Mogensen, 320 m, 9.867095 -85.059952, 30 September 2003, Y. Cardenas (MNCR). INB0003836936 Costa Rica, Prov. Puntarenas, Golfito, Camino a las Torres, 400 - 500 m, 8.649823 -83.16058, 23 April 2004, W. Porras, B. Gamboa, D. Briceño, M. Moraga (MNCR). INB0004183410 Costa Rica, Prov. Puntarenas, Garabito, Fca. Queb. Bonita-Garabu, La Catarata, 50-100 m, 9.572767 -84.591568, 25 November 2008, Zumbado, Hernández, Azofeifa, Moraga (MNCR). INBIOCRI001411061 Costa Rica, Prov. Puntarenas, P. N. Manuel Antonio, Quepos, 80 m, 9.387728 -84.132806, 1 July 1991, G. Varela (MNCR). INBIOCRI000808035 Costa Rica, Prov. Puntarenas, Est. Queb. Bonita, 50 m, Res. Biol. Carara, 9.767453 -84.608119, May 1992, J. C. Saborio (MNCR). INB0004204403 Costa Rica, Prov. Puntarenas, Buenos Aires, Alto Jalisco, 900-1000 m, 8.99583 -83.455555, 26 February 2009, E. Ulate, J. A. Azofeifa, M. Moraga (MNCR). INBIOCRI000161931 Costa Rica, Prov. Puntarenas, Est. Sirena, Corcovado N. P. 0 - 100 m, 8.480171 -83.591289, 1 February 1990, G. Fonseca (MNCR). INB0004202497 Costa Rica, Prov. Puntarenas, Buenos Aires, Paraíso, 100-200 m, 9.08352226 -83.303206, 1 February 2009, Personal Gira Diquis (MNCR). INB0004183404 Costa Rica, Prov. Puntarenas, Garabito, Fca. Queb. Bonita-Garabu, La Catarata. 50-100 m, 9.572767 -84.591568, 25 November 2008. Zumbado, Hernández, Azofeifa, Moraga (MNCR). INB0004104076 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0-100 m, 8.54608, -83.397802, 10 August 2007, J. A. Azofeifa (MNCR). INBIOCRI001684925 Costa Rica, Prov. Limón, Río Sardinas, R.N.F.S. Barra del Colorado, 10 m, 10.64405 -83.742005, 24 July 1993, F. Araya (MNCR). INB0003103655 Costa Rica, Prov. Limón, Reserva Biol Hitoy Cerere, 2 Km S de Estación, 200 m, 9.667248 -83.028632, 12 October 1999, R. Barton (MNCR). INB0004210935 Costa Rica, Prov. Limón, Veragua Rainforest, Campamento, 400-440 m, 9.92573 -83.191405, 27 April 2009, R. Villalobos (MNCR). ♀♀ (COI Barcoded): 13-SRNP-67856, Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palomo, 96 m, 10.96187 -85.28045, 15 April 2013, Keiner Aragón (USNM). 11-SRNP-80254 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Jacobo, 461 m, 10.94076 -85.3177, 6 June 2011, Edwin Apu (USNM). INB0004187579 Costa Rica, Prov. Heredia, Sarapiquí, Est. Biol. La Tirimbina-Mirador, 167 m, 10.416556 -84.120167, 27 November 2008, I. Chacón, A. Barrientos (MNCR). INB0003375874 Costa Rica, Prov. Guanacaste, B. N. Diría, C. Retallano, Alred. Torre de Control de Incendio, 600 - 700 m, 10.163234 -85.623224, 18 September 2001, H. Méndez (MNCR). 08-SRNP-30290 Costa Rica, Prov. Guanacaste, Sector Pitilla, Pasmompa, 440 m, 11.01926 -85.40997, 8 March 2008, Calixto Moraga (USNM). 08-SRNP-30626 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 4 December 2008, Petrona Ríos (USNM). 08-SRNP-30615 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 8 April 2008, Wilberth Araya Alegría (USNM). 08-SRNP-31146 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Naciente, 700 m, 10.98705 -85.42816, 8 June 2008, Petrona Ríos (USNM). 06-SRNP-2874 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 15 May 2006, Gloria Sihezlar (USNM). 02-SRNP-16359 Costa Rica, Prov. Guanacaste, Sector El Hacha, Sendero Bejuquilla, 280 m, 11.03004 -85.52699, 11 Julio 2002, Lucía Ríos (USNM). 03-SRNP-29643 Costa Rica, Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 27 October 2003, Lucía Ríos (USNM). 13-SRNP-21622 Costa Rica, Prov. Alajuela, Sector Rincón Rain Forest, Palomo, 96 m, 10.96187 -85.28045, 9 January 2013, Keiner Aragón (USNM). 04-SRNP-14677 Costa Rica, Prov. Guanacaste, Sector Santa Rosa, Bosque San Emilio, 300 m, 10.84389 -85.61384, 17 October 2004, Ruth Franco (MNCR). 07-SRNP-58732 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Agría, 560 m, 10.75876 -85.37543, 13 August 2007, Mariano Pereira (USNM). INB0004204405 Costa Rica, Prov. Puntarenas, Buenos Aires, Alto Jalisco, 900-1000 m, 8.99583 -83.455555, 26 February 2009, E. Ulate, J. A. Azofeifa, M. Moraga (MNCR). INB0004191680 Costa Rica, Prov. Puntarenas, Osa, R.F. Golfo Dulce, Cerro Brujo, 612 m, 8.662821 -83.583982, 25 January 2009, J. A. Azofeifa, A. Chamorro (MNCR).

Diagnosis: *Nystalea superciliosa* is easy to distinguish from the other *Nystalea* from Costa Rica by its external appearance. Dorsal FW ground color brown gray with dark brown and black marks, irregular subterminal line black, fringe gray brown; dorsal HW light yellow; marginal shade brown gray, fringe light yellow (Figs. 312, 313). Costula proximally thin and flattened, distal part elongated, tubular with recurved and very thin apices (Fig. 317).

Distribution: *Nystalea superciliosa* has been collected with light traps in dry, rain, and cloud forests on both slopes of Cordillera Volcánica de Guanacaste, the east slope of the Cordillera de Tilarán, Cordillera Volcánica Central, and Cordillera de Talamanca, as well as Pacific and Caribbean lowlands. The elevational range for the species is 1-1520 m.

Natural history: (Figs. 481- 485) 227 rearing records: ACG locations: Sector San Cristóbal (n=48), Sector Pitilla (n=19), Sector Del Oro (n=30), Sector Cacao (n=12), Sector Rincón Rain (n=9), Sector El Hacha (n=35), Sector Brasilia (n=2), Sector Potrerillos (n=10), Sector Horizontes (n=1), Sector Mundo Nuevo (n=14), Sector Pocosol (n=3), Sector Santa Rosa (n=44).

Food plants: Anacardiaceae: *Anacardium excelsum* (=1), *Spondias mombin* (n=3), *Tapirira brenesii* (n=2), *T. mexicana* (n=13); Burseraceae: *Bursera simaruba* (n=117), *B. tomentosa* (n=2), *Protium confuso* (n=5), *P. costarricense* (n=17), *P. ravenii* (n=7), *P. schippii* (n=44), *Tetragastris panamensis* (n=16) (Figs. 498-502).

Remarks: BIN BOLD:AAA8476 (Fig. 490).

Genbank Accession: GU337746

DNA barcode of male 04-SRNP-14677

[MHANB359-05]04-SRNP-14677 [(*Nystalea superciliosa*)]COI-5P

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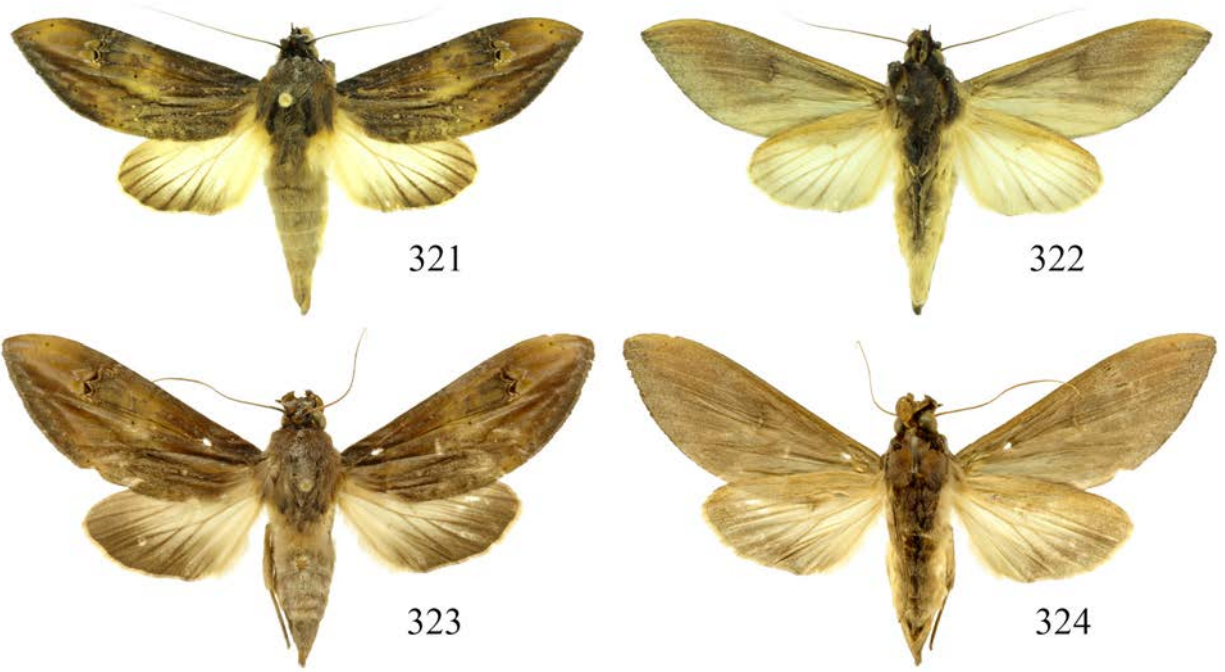
Nystalea virgula Felder & Felder, 1874

(Figs. 321-329, 486-489)

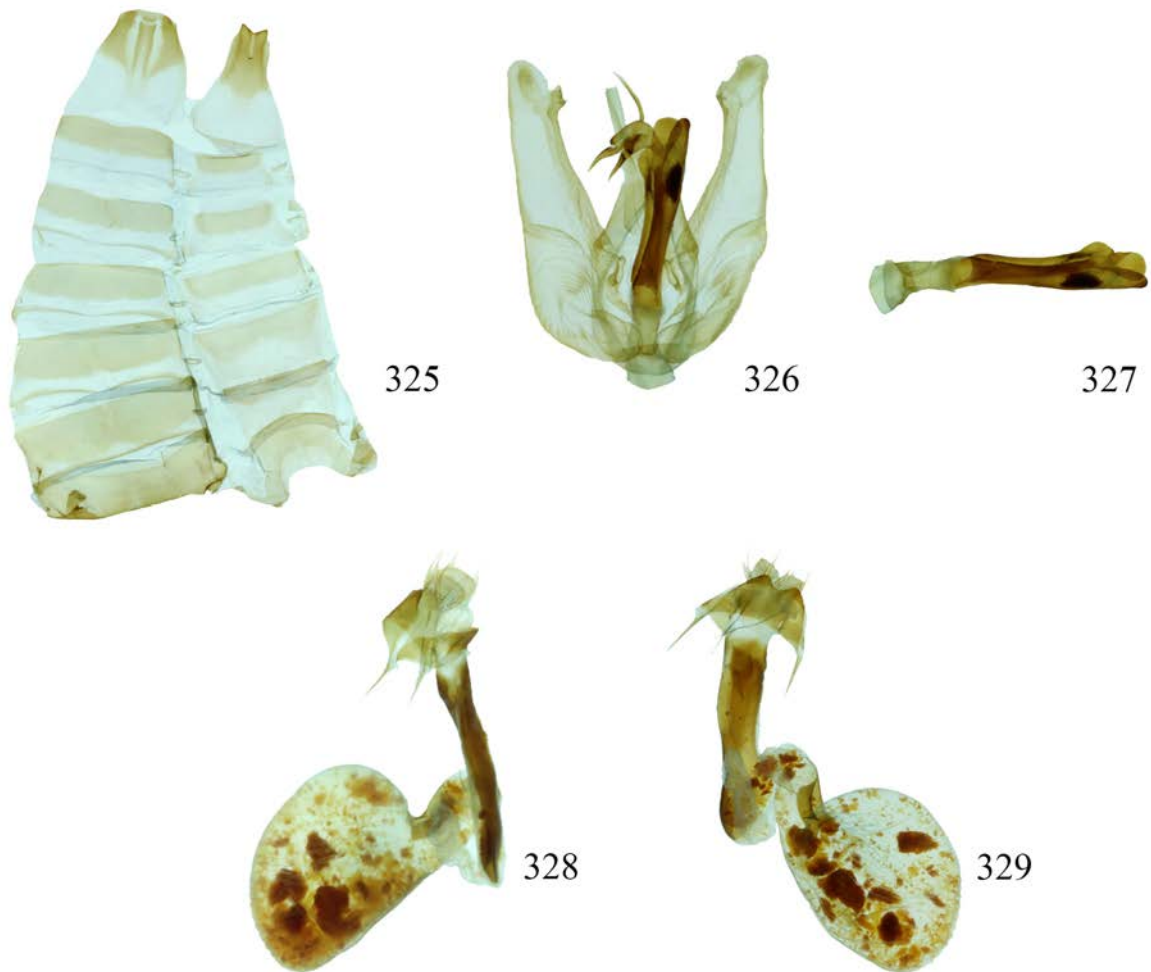
Becker, 2014. "*Nystalea virgula* Felder, 1874 Brazil (AM), *N. virgulea*; Schintlmeister, 2103, misspelled."

Redescription: MALE (Figs. 321, 322): FWL 25.3-28.2 mm (n=12). Antennal shaft cream dorsally and black ventrally; scape bearing a long black tuft, composed of dark brown and white scales; frons mostly black with beige and white intermixed scales; labial palpus beige ventrally, dark brown dorsally; vertex black; patagium black. **Thorax:** Tegula dark brown; mesoscutellum dark brown; thoracic pleuron light brown; dorsal surface of metathorax dark brown posterior margin light yellow; thorax dark brown ventrally. **Legs:** Mostly dark brown, with black scales between segments. **Wings:** Dorsal FW ground color beige with dark brown and black marks, reniform spot brown yellow with horseshoe-shaped black marks, subterminal line with reddish spots, fringe dirty brown; dorsal HW light yellow; marginal shade and veins dark brown, fringe light yellow. **Abdomen:** Dorsum dirty brown and venter light yellow.

Male genitalia: Abdominal pelt (Fig. 325) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin sclerotized with two acute cusps, in middle a very narrow and deep invagination. Genitalia (Fig 326) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin, short and flattened, costula ear-shaped flattened, thin, sclerotized and



Figures 321-324. *Nystalea virgula* Felder & Felder, 1874: 321, 322. ♂ dorsal and ventral (INB0003969832) FWL 27.63 mm; 323, 324. ♀ dorsal and ventral (INBIOCRI000853851) FWL 28.80 mm.



Figures 325-329. *Nystalea virgula* Felder & Felder, 1874: 325. ♂ sternum VIII 5.1 mm length, 326. ♂ genitalia 7.9 mm length, 327. phallus 6.5 mm length (INBIOCRI002206309); 328, 329. ♀ genitalia 9.6 mm length (INBIOCRI001374221).

very small; uncus process short, elongated, thin and tubular, uncus lobes tiny, rectangular and slightly setose, socii with two elongated pads, sclerotized and very acute. Aedeagus (Fig. 327) with membranous vesica, deciduous caltrop-shape cornuti present, callosus wide basally; proximal part of phallus thin, distal part sclerotized, elongated and acute, middle part of phallus sclerotized and elongated, with a flattened projection that starts near anellus and extends to distal part of phallus, and is similar to a sheath or stipule.

FEMALE: Similar to male but larger (Figs. 323, 324). FWL 27.2-29.2 mm (n=10).

Female genitalia (Figs. 328-329): Papillae anales ovoid covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate sclerotized with uniform edge, postvaginal plate sclerotized with two small round or blunt cusps, anterior apophysis anterior shorter than posterior, ductus bursae narrow, very elongated and sclerotized; corpus bursae globular, sclerotized shield small and concave, signum sclerotized, very thin and elongated.

Material examined: 24 ♂♂, 10 ♀♀.

♂♂ (**COI Barcoded**): INB0004073132 Costa Rica, Prov. Alajuela, Guatuso, Sitio Catarata Río Buenavista, 700-800 m, 10.706992 -84.983685, 20 March 2007. J. A. Azofeifa (MNCR). INB0003971137 Costa Rica, Prov. Alajuela, Estación Caño Negro, 49 m, 10.89347 -84.789921, 3 September 2005, J. Azofeifa, Y. Cárdenas (MNCR). INB0004225032 Costa Rica, Prov. Alajuela, Guatuso, P.N.V. Tenorio, Sitio Catarata, Send. Bambuza Vulgaris, 700-800 m, 10.703594 -84.991512, 21 August 2009, J. A. Azofeifa, E. Méndez (MNCR). 03-SRNP-8689 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 18 October 2003, Carolina Cano (USNM). 03-SRNP-8693 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 17 October 2003, Carolina Cano (USNM). 03-SRNP-8690 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 15 October 2003, Carolina Cano (USNM). INB0004187930 Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115 m, 10.201361 -84.485101, 1 November 2008, R. Rojas (MNCR). 03-SRNP-8993 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 2 November 2003, Gloria Sihezar (USNM). INBIOCRI001132148 Costa Rica, Prov. Cartago, Grano de Oro, Chirripó, Turrialba, 1120 m, 9.818357 -83.459163, 1 August 1993, P. Campos (MNCR). INBIOCRI002754123 Costa Rica, Prov. Cartago, Moravia de Chirripó, 1000 m, 9.837781 -83.453639, 10 May 1983, D. H. Janzen & W. Hallwachs (MNCR). INB0003943200 Costa Rica, Prov. Cartago, P.N. Barbilla, Turrialba, Tayutic, Campamento 2, 1200 m, 9.936859 -83.414306, 9 May 2005, B. Gamboa, D. Briceño, M. Moraga, J. Gutiérrez, Y. Cárdenas (MNCR). INBIOCRI000096119 Costa Rica, Prov. Heredia, Finca La Selva, Pto. Viejo Sarapiquí, 0 m, 10.431958 -84.0091, 1 December 1987, M. M. Chavarria (MNCR). INB0003772673 Costa Rica, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100 m, 10.718333 -85.144722, 28 September 2003, B. Hernández (MNCR). INB0003852538 Costa Rica, Prov. Guanacaste, R.M.V.S. Camaronal, Puesto MINAE, 0-5 m, 9.864164 -85.447869, 21 June 2004, Y. Cárdenas, W. Porras, B. Gamboa, M. Moraga, D. Briceño (MNCR). INB0003386423 Costa Rica, Prov. Guanacaste, R.F. Monte Alto, Sector Mirador, Send. La Ceiba, 750 m, 10.003128 -85.396375, 20 September 2001, H. Mendez (MNCR). INB0003544930 Costa Rica, Prov. Guanacaste, Z.P. Nosara, Sector el Mirador, 780 m, 10.003128 -85.396375, 10 October 2002, H. Méndez (MNCR). INBIOCRI002206309 Costa Rica, Prov. Puntarenas, Est. Bijagual, 600 m. N de Bijagualito, 500 m, 9.743089 -84.54476, 1 July 1995, J. C. Saborío (MNCR). INBIOCRI001631398 Costa Rica, Prov. Puntarenas, Est. Q. Bonita, 50 m, 9.774233 -84.608124, 1 October 1993, R. Guzman (MNCR). INBIOCRI000782820 Costa Rica, Prov. Puntarenas, P. N. Manuel Antonio, Quepos, 80 m, 9.387728 -84.132806, 1 September 1992, G. Varela (MNCR). INB0004202529 Costa Rica, Prov. Puntarenas, Buenos Aires, Térraba, 300-400 m, 9.08144 -83.30037 25 February 2009, Personal Gira Diquis (MNCR). INB0004104095 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0-100 m, 8.54608 -83.397802, 10 August 2007, J. A. Azofeifa (MNCR). INB0004104006 Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, 0-100 m, 8.54608 -83.397802, 21 July 2007, J. A. Azofeifa (MNCR). INB0003150362 Costa Rica, Prov. Puntarenas, Golfito, Proyecto Zamia, Playa Cacao, Punta Voladera, 130 m, 8.625444 -83.18424, 9 December 1999, M. Moraga (MNCR). INB0003969832 Costa Rica, Prov. Puntarenas, Buenos Aires, P.N. La Amistad, Est. Altamira, 1300-1400 m, 9.036111 -83.022222, 5 September 2005, R. Delgado (MNCR). ♀♀ (**COI Barcoded**): INBIOCRI002754124 Costa Rica, Prov. San José, Estación Carrillo, Pk. Nac. Braulio Carrillo, 700 m, 10.160652 -83.956454, 1 August 1984 coll. I. A. Chacón (MNCR). INB0004217921 Costa Rica, Prov. Alajuela, Upala, P.N. V. Tenorio, Fca. Jarquín, Mirador, 900 m, 10.71081

-84.999755, 20 June 2009, J. A. Azofeifa, E. Méndez (MNCR). 03-SRNP-8694 Costa Rica, Alajuela, Sector San Cristóbal, Puente Palma, 460 m, 10.9163 -85.37869, 21 October 2003, Carolina Cano (USNM). INBIOCRI001370753 Costa Rica, Prov. Heredia, Finca Naranjo Valenciana, 2 km sur Pueblo Nuevo, Sarapiquí, 90 m, 10.466407 -84.116393, 30 March 1993, M. Ortiz (MNCR). INB0003520107 Costa Rica, Prov. Guanacaste, Nandayure, Bellavista, Torres del ICE, 1050 m, 9.94944 -85.272625, 1 July 2002, H. Méndez (MNCR). INBIOCRI002754121 Costa Rica, Prov. Puntarenas, Las Cruces Biol. Sta., San Vito, 1200 m, 8.786944 -82.962248, 20 November 1987, I. Chacón (MNCR). INBIOCRI000853851 Costa Rica, Prov. Puntarenas, Rancho Quemado, Península de Osa, 200 m, 8.679096 -83.566714, 1 August 1992, F. Quesada (MNCR). INB0003736537 Costa Rica, Prov. Puntarenas, Lepanto, Montaña Grande, R. Priv. Karen Mogensen, 315m, 9.867095 -85.059952, 9 July 2003, Y. Cardenas (MNCR). INB0003738026 Costa Rica, Prov. Puntarenas, R. Priv. Karen Mogensen, Send. Cima, 300 - 400m, 9.86957 -85.053057, 9 July 2003, W. Porras (MNCR). INBIOCRI001374221 Dissected, Costa Rica, Prov. Puntarenas, Rancho Quemado, Península de Osa, 200 m, 8.679096 -83.566714, 1 October 1990, F. Quesada (MNCR).

Diagnosis: *Nystalea virgula* is easy to separate from the other *Nystalea* from Costa Rica by its external appearance. Dorsal FW ground color beige with dark brown and black marks, reniform spot brown yellow with horseshoe-shaped black marks, subterminal line with reddish spots, fringe dirty brown; dorsal HW light yellow; marginal shade and veins dark brown, fringe light yellow (Figs. 321, 322). Distal part sclerotized, elongated and acute, middle part of phallus sclerotized and elongated, with a flattened projection that starts near anellus and extends to distal part of phallus, and is similar to a sheath or stipule (Fig. 327).

Distribution: *Nystalea virgula* has been collected with light traps in rain and cloud forests on both slopes of the Cordillera Volcánica de Guanacaste and Cordillera de Talamanca, the east slopes of the Cordillera de Tilarán and the Cordillera Volcánica Central, as well as Pacific and Caribbean lowlands. The elevational range for the species is 1-1400 m.

Natural history: (Figs. 486-489) 13 rearing records: ACG locations: Sector San Cristóbal (n=8), Sector Pitilla (n=2), Sector Rincón Rain (n=2), Sector Brasilia (n=1).

Food plants: Euphorbiaceae: *Alchornea costaricensis* (n=1), *A. latifolia* (n=2), *Conceveiba pleiostemona* (n=9), Malvaceae: *Trichospermum galeottii* (n=1)

Remarks: BIN BOLD:AAE2715 (Fig. 490).

Genbank Accession: GU333465

DNA barcode of male 03-SRNP-8690

[MHANA476-05|03-SRNP-8690 (*Nystalea virgula*)|COI-5P

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NNAACATTATATTTTATTTTGGAAATTTGAGCAGGAATAGTTGGAACCTCAC
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Nystalea nigritorquata Dognin, 1900 (Figs. 330-338)

Redescription: **MALE** (Figs. 330, 331): FWL 23.9-25.9 mm (n=4). Antennal shaft black dorsally and white ventrally; scape bearing a long black tuft; frons mostly black with and white intermixed scales; labial palpus dark brown ventrally and dorsally; vertex black; patagium whitish. **Thorax:** Tegula white

with some black scales; mesoscutellum white; thoracic pleuron whitish and light brown; dorsal surface of metathorax white, posterior margin light yellow; thorax dark brown ventrally. **Legs:** Mostly dark brown, with black scales. **Wings:** Dorsal FW ground color whitish gray with some veins and marks black color, adterminal line with black rectangular spots, fringe alternating white and gray; dorsal HW white translucent; marginal shade and veins black, fringe white. **Abdomen:** Dorsum dirty brown, venter reddish brown with some scales whitish, in middle dark brown line.

Male genitalia: Abdominal pelt (Fig. 334) with tergum VIII rectangular, posterior margin regular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin sclerotized with a small invagination medially, shaped like a small bag. Genitalia (Fig. 335) with valvae wide and membranous basally, oval at apex, costal margin smooth and sclerotized, midvalve sclerotization thin, short and flattened, costula flattened and sclerotized in proximal part, elongated, thin, tubular and rounded distally; uncus process short, elongated, thin, tubular and slightly setose, uncus lobes small, rectangular and slightly setose, socii with two pads, sclerotized, acute and setose. Aedeagus (Fig. 336) with membranous vesica, deciduous caltrop-shape cornuti present, callosus wide basally; proximal part of phallus thin and slightly bulky, distal part very sclerotized, robust, wide, with two acute and very sclerotized lateral projections, middle part of phallus sclerotized and elongated, slightly wider and rounded after anellus.

FEMALE: (Figs. 332, 333). FWL 28.4 mm (n=1). **Wings:** Dorsal FW ground color light brown with some veins and marks dark brown color, adterminal line with black rectangular spots, fringe alternating beige and dark brown; dorsal HW white translucent; marginal shade and veins dark brown, fringe brown yellowish.

Female genitalia (Figs. 337, 338): Papillae anales ovoid, membranous, small, covered with short, scattered setae with longer, inwardly curved setae, lateral process of postvaginal plate sclerotized with two sclerotized cusps with margin regular, postvaginal plate with two sclerotized cusps in the middle of margin, anterior apophysis shorter than posterior, ductus bursae wide, elongated, and sclerotized; corpus bursae globular, smooth surface, sclerotized shield wide, rounded and with part of grooved and folded surface, signum sickle shaped, sclerotized, very thin, elongated and curved distally.

Specimens examined: 4 ♂♂, 1 ♀.

♂♂ (**COI Barcoded**): 09-SRNP-101352 Costa Rica, Prov. Guanacaste, Sector Pitilla, Manta Miranda, 539 m, 11.00778, -85.42085, 26 January 2009, R. Franco & S. Ríos (MNCR). 09-SRNP-101351 Costa Rica, Prov. Guanacaste, Sector Pitilla, Manta Miranda, 539 m, 11.00778 -85.42085, 26 January 2009, R. Franco & S. Ríos (MNCR). 10-SRNP-109596 Costa Rica, Prov. Guanacaste, Sector Pailas, Manta Mona, 1055 m, 10.79235 -85.34891, 14 June 2010, F. Quesada & R. Franco (MNCR). 10-SRNP-112171 Costa Rica, Prov. Guanacaste, Sector Cacao, Toma de Agua, 1160 m, 10.92956 -85.46512, 9 August 2010, S. Ríos & R. Franco (MNCR). ♀ (**COI Barcoded**): INBIOCRI001636833 Costa Rica, Prov. Puntarenas, R.B. Monteverde, 1520 m, 10.298429 -84.792544, 1 November 1993, N. Obando (MNCR).

Diagnosis: *Nystalea nigritorquata* is easy to separate from the other *Nystalea* from Costa Rica by its external appearance. Dorsal FW ground color whitish gray with some veins and marks black color, adterminal line with black rectangular spots, fringe alternating white and gray; dorsal HW white translucent; marginal shade and veins black, fringe white (Figs. 330, 331). Costula flattened and sclerotized in proximal part, elongated, thin, tubular and rounded distally (Fig. 335).

Distribution: *Nystalea nigritorquata* has been collected with light traps in dry, rain, and cloud forests on both slopes of the Cordillera Volcánica de Guanacaste, the east slope of the Cordillera de Tilarán, as well as Pacific lowlands. The elevational range for the species is 1-1520 m.

Natural history: All specimens have been collected with light traps. The life history of *N. nigritorquata* is unknown.

Remarks: BIN BOLD:AAI3359 (Fig. 490).

Genbank Accession: JF843979

DNA barcode of male 10-SRNP-109596

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[BLPDU174-11|10-SRNP-109596 (Nystalea nigritorquata)]COI-5P
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GATTACTACCCCATCATTAATTTTATAATTTCAAGAAGTATTGTGGAAAA
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ATTACAGCATTTTATTATAATTTCTCTACCTGTTTTAGCTGGAGCAATTA
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AGGAGGGGACCCATTTTATATCAACATCTATTT
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Nystalea joanna (Schaus, 1905) (Figs. 339-350, 411-414)

Redescription: MALE (Figs. 339, 340, 355): FWL 19.7-21.2 mm (n=6).

Head: Antennal shaft greyish white dorsally and dark brown ventrally; scape bearing a long greyish white tuft with some yellow brown scales distally; frons greyish white with two small groups of dark brown scales; labial palpus greyish white dorsally and ventrally; vertex greyish white; patagium greyish white with some scales black. **Thorax:** Tegula pale brown at the base, with some brown scales distally; mesoscutellum greyish white with some dark brown scales; dorsal area of metathorax dark brown with posterior margin yellowish; thoracic pleuron greyish white; thorax greyish white with some dark brown scales ventrally. **Legs:** Mostly greyish white with some dark brown scales ventrally. **Wings:** Dorsal FW ground color greyish white; from inner margin to Cu₂ a dirty brown strip with dark brown scales marks present, from the postmedial area to terminal line two whitish macula, one near apex and other near tornus. In medial area near costal margin a small irregular triangular area dirty brown and dark brown color, subterminal line and adterminal line dark brown, fringe dark brown, pale brown and whitish, dorsal HW dark brown, with translucent whitish basal area; fringe yellowish. **Abdomen:** Dorsum dirty brown, venter pale brown.

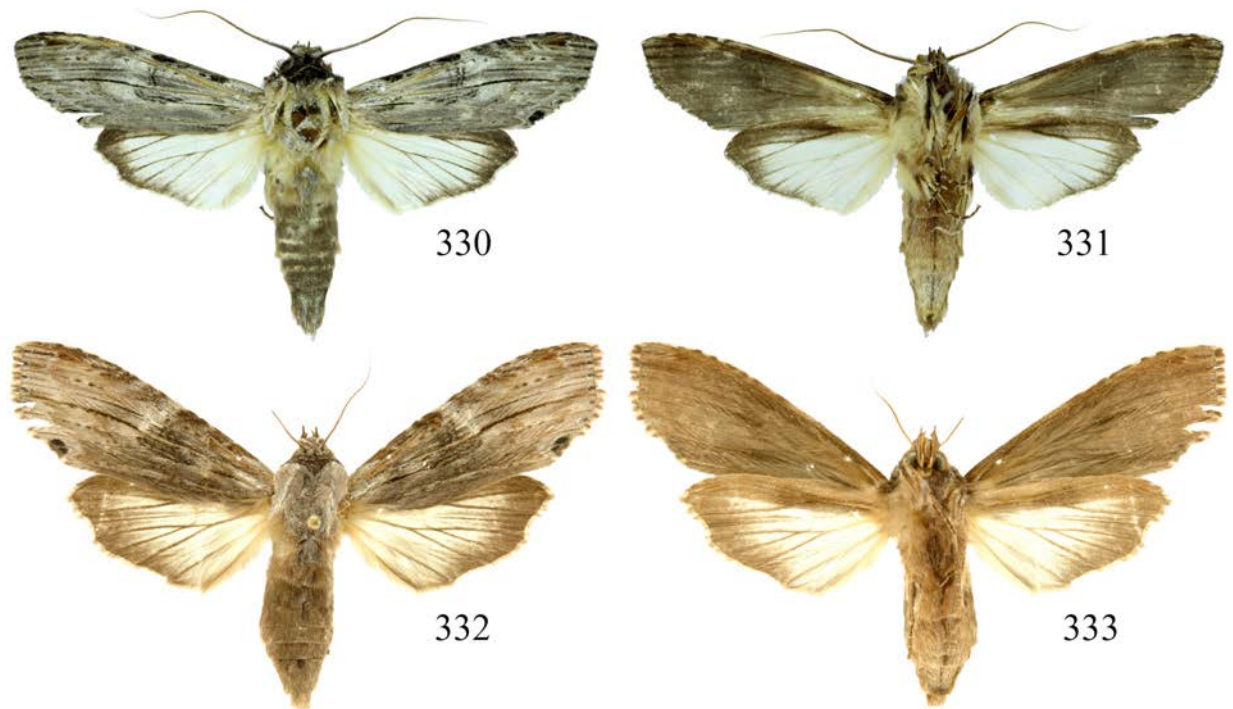
Male genitalia: Abdominal pelt (Figs. 343, 356) with rectangular, posterior margin irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum rectangular, posterior margin sclerotized with two cusps and small invagination medially. Genitalia (Fig. 344, 357) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin, short and flattened, costula flattened and sclerotized proximally, elongated, tubular, thin and forked on distal part; uncus process short, triangular and setose, uncus lobes tiny, rectangular and slightly setose, socii with two tiny pads, sclerotized and setose. Aedeagus (Fig. 345, 358) with membranous vesica, deciduous caltrop-shape cornuti present, callosus wide basally; proximal part of phallus thin, distal part sclerotized, elongated, and slightly curved, middle part of phallus sclerotized, thin and elongated.

FEMALE: Similar to male but larger (Figs. 341, 342). FWL 21.2 mm (n=1).

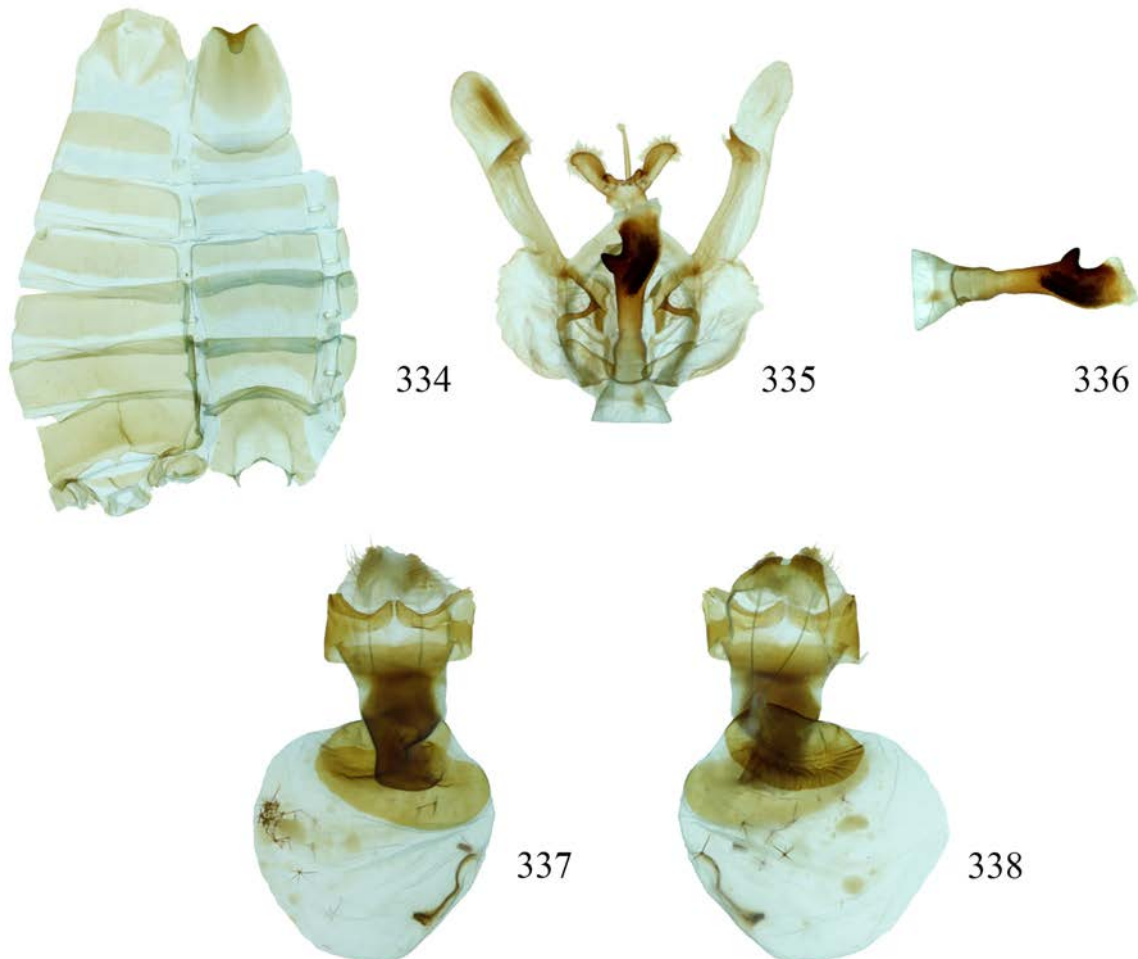
Female genitalia (Fig. 346): Papillae anales ovoid, membranous, covered with short, scattered setae, lateral process of postvaginal plate sclerotized with two small sclerotized cusp and irregular margin, postvaginal plate with two tiny sclerotized cusps, anterior apophysis shorter than posterior, ductus bursae elongated and sclerotized; corpus bursae globular, smooth, sclerotized shield wide, rounded and with thin, elongated and sclerotized lateral projection, signum very small, rounded and sclerotized.

Material examined. 6 ♂♂, 1 ♀.

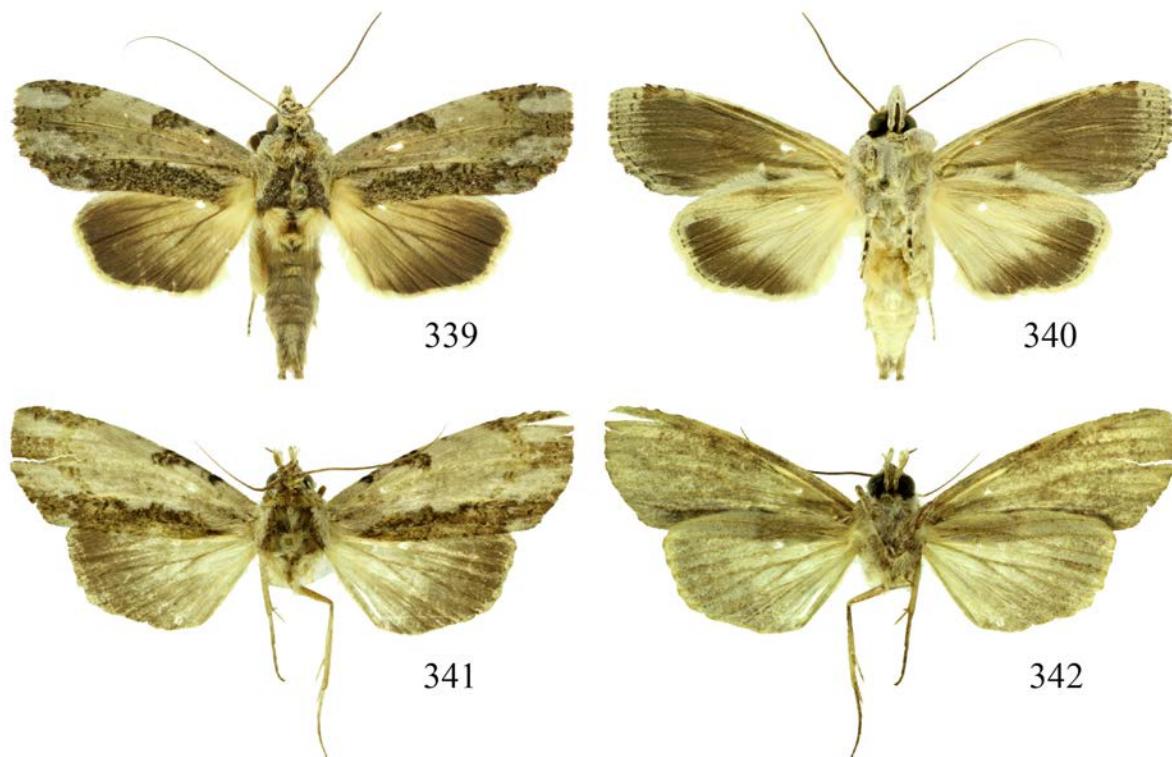
♂♂ (**COI Barcoded**): INBIOCRI001706069 Costa Rica, Prov. Alajuela, Caño Negro, R.N.V.S. Caño Negro, 20 m, 10.893812 -84.788847, 6 March 1993. K. Flores (MNCR). 08-SRNP-32069 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaiciga, 445 m, 11.01983 -85.41342, 20 September 2008, Calixto Moraga (MNCR). 08-SRNP-31398 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaiciga, 445 m, 11.01983 -85.41342, 22 July 2008, Calixto Moraga (MNCR). 08-SRNP-31399 Costa Rica, Prov. Guanacaste, Sector Pitilla, Loaiciga, 445 m, 11.01983 -85.41342, 23 July 2008, Calixto Moraga (USNM). 12-SRNP-22061 Costa Rica, Prov. Guanacaste, Sector El Hacha, Quebrada Carrizal, 200 m, 11.04798 -85.59393, 3 December 2012, Roster Moraga (USNM). 12-SRNP-21983 Costa Rica, Prov. Guanacaste, Sector El Hacha, Quebrada Carrizal, 200 m, 11.04798 -85.59393, 1 December 2012, Roster Moraga (USNM). ♀



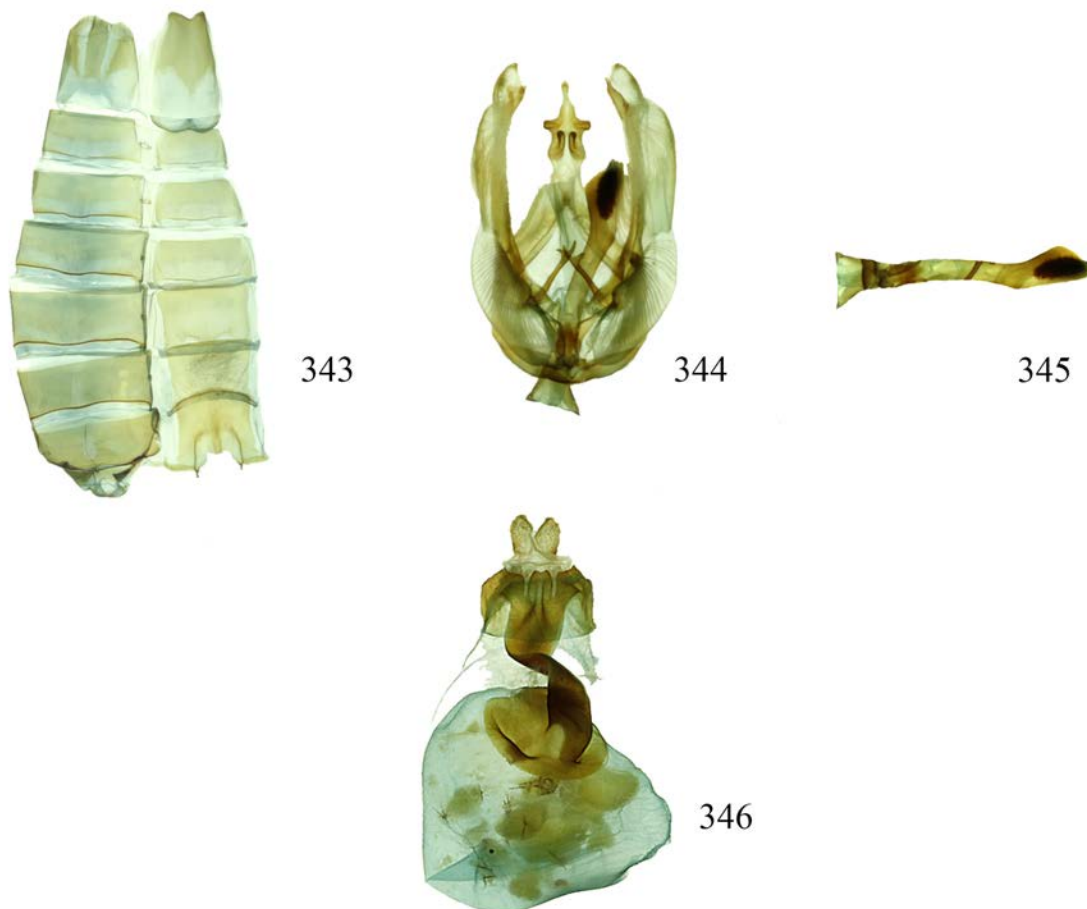
Figures 330-333. *Nystalea nigritorquata* Dognin, 1900: 330, 331. ♂ dorsal and (10-SRNP-109596) ventral FWL 24.8 mm; 332, 333. ♀ dorsal and ventral (INBIOCRI001636833) FWL 28.4 mm.



Figures 334-338. *Nystalea nigritorquata* Dognin, 1900: 334. ♂ sternum VIII 4.8 mm length, 335. male genitalia 7.8 mm length, 336. phallus 4.8 mm length (09-SRNP-101351); 337, 338. ♀ genitalia 8.1 mm length (INBIOCRI001636833).



Figures 339-342. *Nystalea joanna* Schaus, 1905: 339, 340. ♂ dorsal and ventral (08-SRNP-3398) FWL 24.9 mm; 341, 342. ♀ dorsal and ventral (INBIOCRI001947864) FWL 25.5 mm.



Figures 343-346. *Nystalea joanna* Schaus, 1905: 343. ♂ sternum VIII 4.5 mm length, 344. ♂ genitalia 6 mm length, 345. phallus 4.7 mm length (INBIOCRI001706069); 346. ♀ genitalia 6.7 mm length (INBIOCRI001947864).

(Barcoded COI): INBIOCRI001947864 Costa Rica, Prov. Alajuela, Playuelas, R.N.V.S Caño Negro, 20 m, 10.893812 -84.788847, 3 Oct 1993, K. F. Flores (MNCR).

Diagnosis: Male and female genitalia of *N. joanna* and *N. brookejarvisae* are almost identical, the only difference is that the genitalia of *N. brookejarvisae* are smaller than those of *N. joanna* (Fig. 358).

Distribution: *Nystalea joanna* has been reared and collected with light traps in the dry and rain forest on both slope of Cordillera Volcánica de Guanacaste and llanuras de los Guatusos. The elevational range for the species is 20-445 m.

Natural history: (Figs. 411-414) Seven rearing records: ACG locations: Sector Pitilla (n=5), Sector El Hacha (n=2).

Food plants: Euphorbiaceae: *Mabea montana* (n=4), *M. occidentalis* (n=2).

Remarks: BIN BOLD:ACF1333 (Fig. 490).

Genbank Accession: GU665782

DNA barcode of male 08-SRNP-31399

[08-MHMXZ1512-09][08-SRNP-31399](*Nystalea joanna*)(COI-5P

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Nystalea brookejarvisae Chacón, new species (Figs. 351-358)

Description: MALE (Figs. 347, 348): FWL 19.4-21.7 mm (n=4). **Head:** Antennal shaft white dorsally and reddish brown ventrally; scape bearing a long pale white tuft, composed of white and brown scales; frons white and pale brown intermixed scales; labial palpus white with some brown scales ventrally, pale brown dorsally; vertex white and pale brown; patagium white with some scales brown. **Thorax:** Tegula pale brown basally, brown and white scales distally; mesoscutellum pale brown, white and reddish brown; thoracic pleuron pale brown; dorsal area of metathorax pale brown with posterior margin yellowish; thorax whitish ventrally. **Legs:** Mostly pale brown with white scales ventrally, dark brown dorsally, with pale white scales between segments. **Abdomen:** Dorsum dirty brown, venter white with some reddish brown scales. **Wings:** Dorsal FW ground color whitish; inner margin with band of dirty yellow and dark brown marks, from the postmedial area to the termen, and the apex with a dirty yellow macula with dark brown marks. A small irregular triangular, dark brown macula present medially, subterminal line and adterminal line dark brown as marks, fringe alternating dark brown, pale brown and whitish, dorsal HW dark brown, with translucent yellowish basal area; fringe yellowish.

Male genitalia: Abdominal pelt (Fig. 355) with tergum VIII rectangular, posterior margin irregular, sclerotized, with two thin translucent areas one on each side of sclerotized central column; sternum VIII rectangular, posterior margin sclerotized with a small invagination medially. Genitalia (Fig. 356) with valvae wide and membranous basally, ovoid at apex, costal margin smooth and sclerotized, midvalve sclerotization thin, short and flattened, costula flattened and sclerotized proximally, elongated, tubular, thin and forked on distal part;

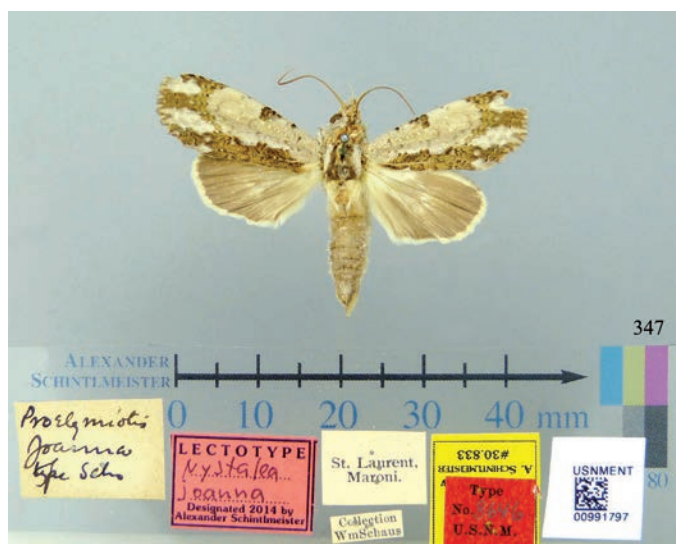
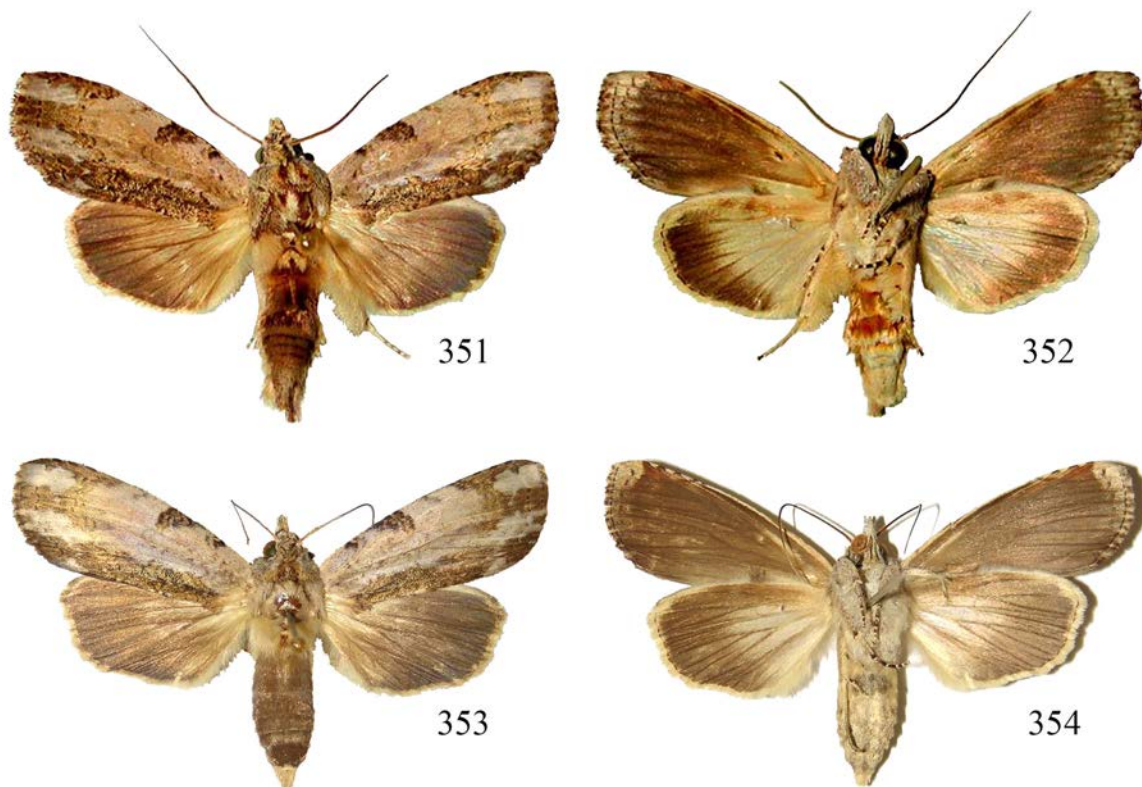


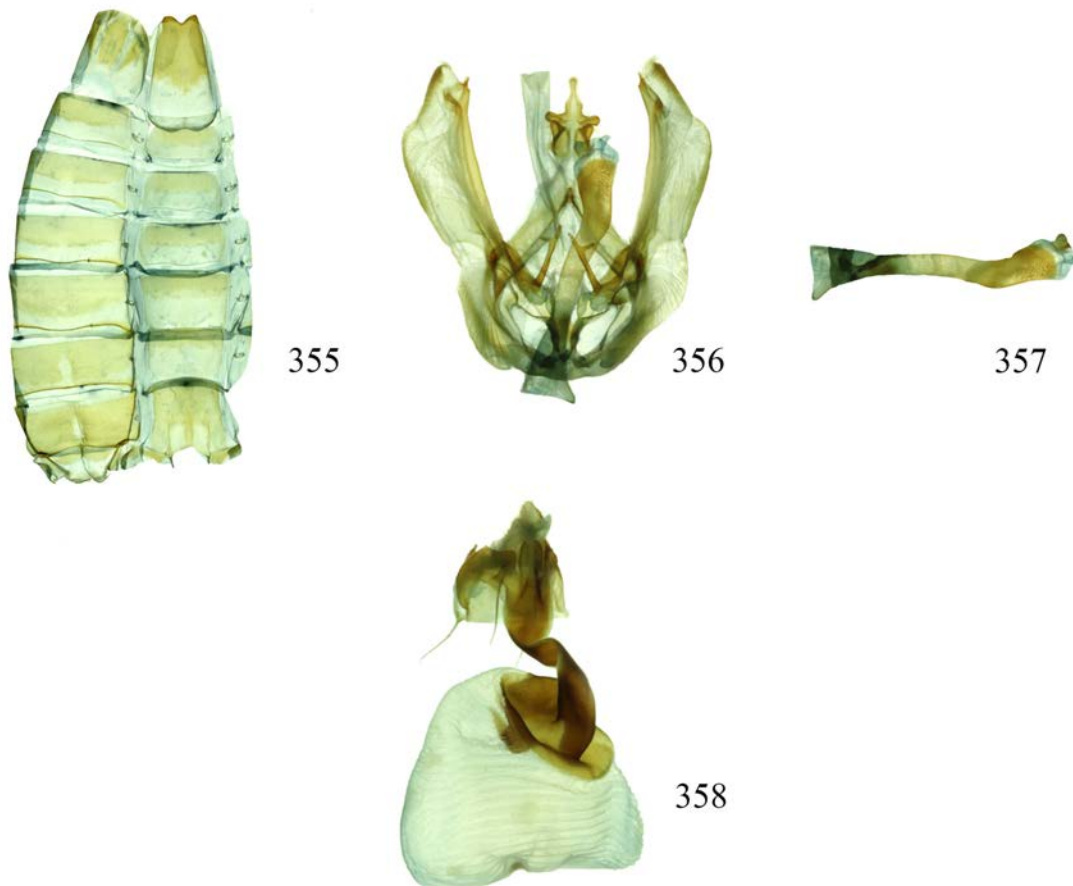
Figure 347. *Nystalea joanna* Schaus, 1905. ♂ lectotype (USNMNT 00991797) from Schintlmeister (2016).



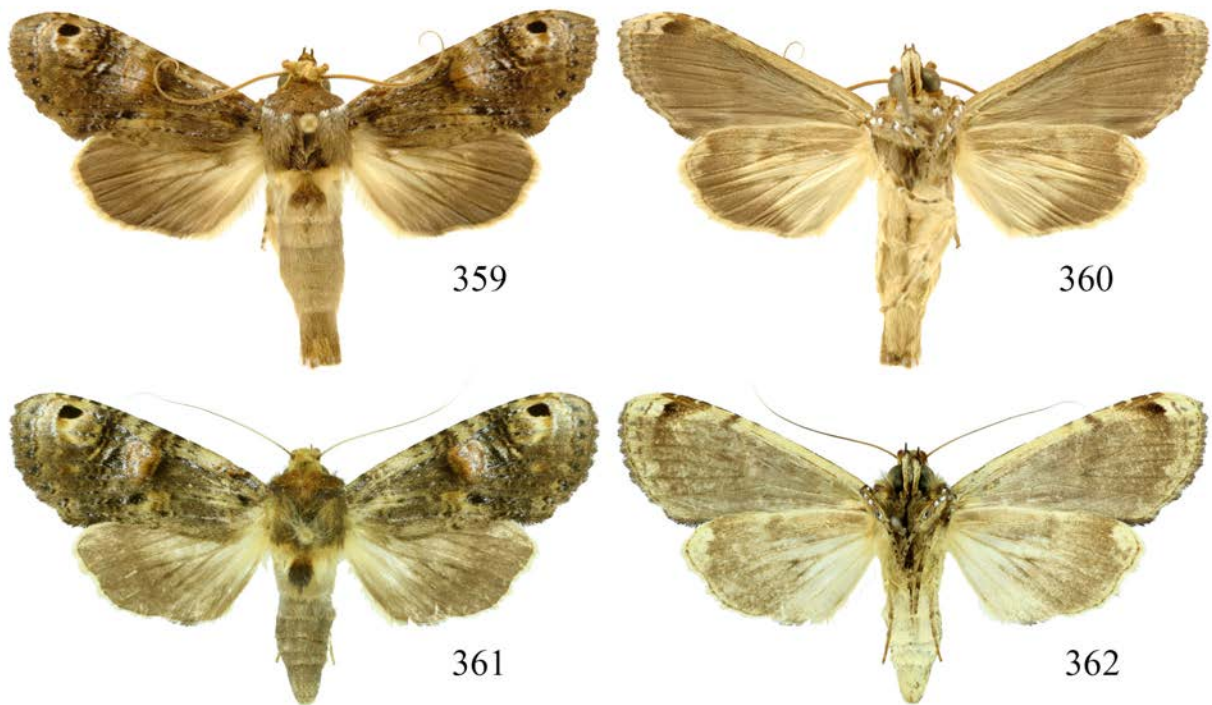
Figures 348-350. *Nystalea joanna* Schaus, 1905: 348. ♂ sternum VIII 4.8 mm length, 349. ♂ lectotype genitalia 6.6 mm length, 350. phallus 5.3 mm length (USNMNT 00991797).



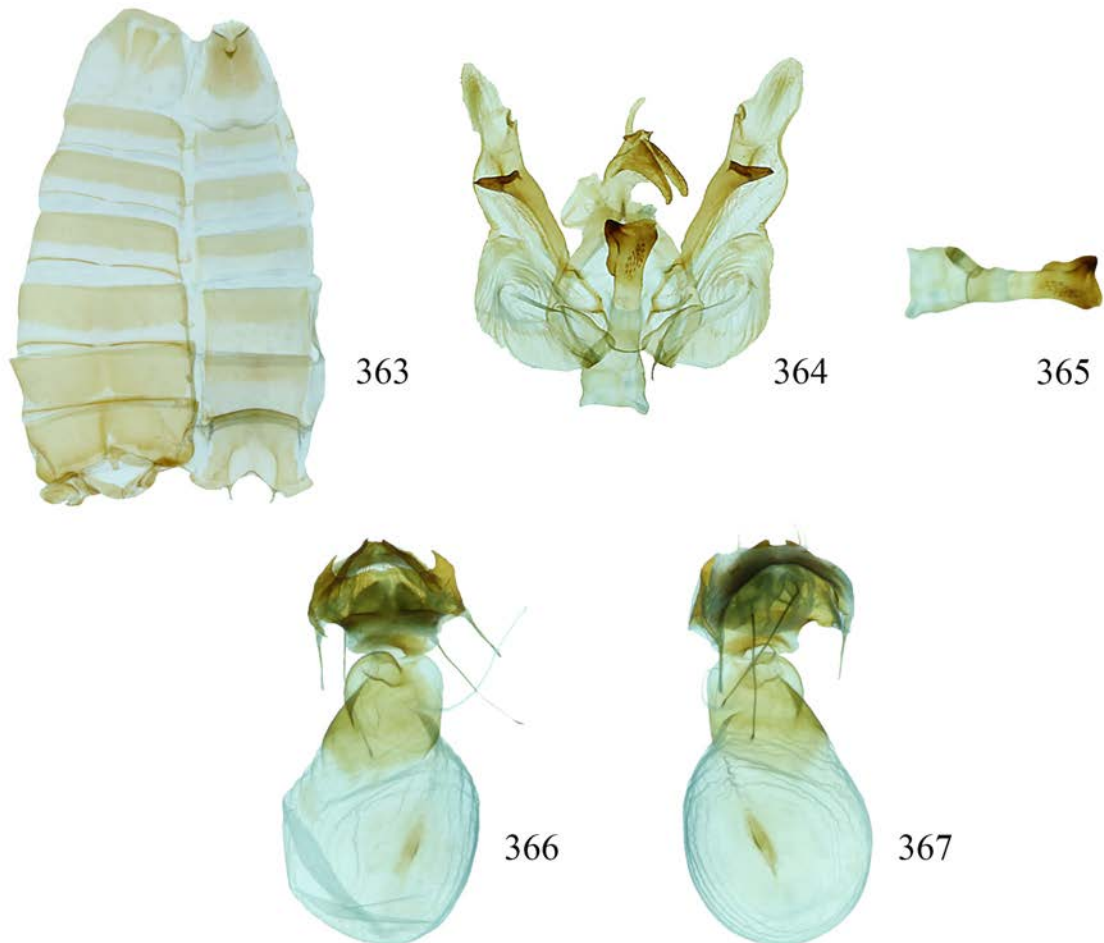
Figures 351-354. *Nystalea brookejarvisae*: 351, 352. ♂ dorsal and ventral (07-SRNP-110611) FWL 25.5 mm; 353, 354. ♀ dorsal and ventral (08-SRNP-106857) FWL 27.5 mm.



Figures 355-358. *Nystalea brookejarvisae*: 355. ♂ sternum VIII 4.3 mm length, 356. ♂ genitalia 5.7 mm length, 357. phallus 4.4 mm length (INB0003011946); 358. ♀ genitalia 6.3 mm length (93-SRNP-4900).



Figures 359-362. *Nystalea ocellata* Rothschild, 1917: 359, 360. ♂ dorsal and ventral (INB0004016331) FWL 20.6 mm; 361, 362. ♀ dorsal and ventral (INBIOCRI001675249) FWL 23.8 mm.



Figures 363-367. *Nystalea ocellata* Rothschild, 1917: 363. ♂ sternum VIII 3.6 mm length, 364. male genitalia 5.6 mm length, 365. phallus 3 mm length (INBIOCRI00345840); 366, 367. ♀ genitalia 6.3 mm length (INBIOCRI001830616).

Alajuela, Sector San Cristóbal, Sendero Perdido, 620 m, 10.8794 -85.38607, 3 January 2003, Carolina Cano (USNM). 03-SRNP-16662 Costa Rica, Prov. Guanacaste, Sector Del Oro, Puente Mena, 280 m, 11.04562 -85.45742, 2 August 2003, Manuel Pereira (USNM). INBIOCRI002592600 Costa Rica, Prov. Puntarenas, Est. Aguas. Send. Purruja. 200 m de la Est. 300 m, 8.534815 -83.426667, 2 December 1997, M. Lobo (MNCR). INBIOCRI001675249 Costa Rica, Prov. Puntarenas, Parque Nacional Manuel

Antonio, Quepos, P. N. Manuel Antonio, 80 m, 9.387728 -84.132806, 1 July 1991, R. Zúñiga (MNCR). 14-SRNP-57928 Costa Rica, Prov. Guanacaste, Sector Mundo Nuevo, Vado Licania, 470 m, 10.77222 -85.41225, 4 December 2014, Elieth Cantillano (USNM).

♀♀ (**Barcoded COI**): INB0003388663 Costa Rica. Prov. Puntarenas, Buenos Aires, P. Int. La Amistad, Send. Gigantes, 1450 m 9.033891 -83.010885, 1 September 2001, R. Delgado (MNCR). INB0004016331 Costa Rica. Prov. Puntarenas. P.I. La Amistad. Est. Altamira. Alrededor de la Estación. 1350-1450 m, 9.032987 -83.010887, 1 May 2006. R. Delgado (MNCR). 10-SRNP-32150 Costa Rica, Prov. Guanacaste, Sector Pitilla, Sendero Rótulo, 510 m, 11.01355 -85.42406, 29 October 2010, Petrona Ríos (USNM). 09-SRNP-22187 Costa Rica, Guanacaste, Sector Del Oro, Quebrada Salazar, 560 m, 11.00217 -85.46337, 23 August 2009, Elieth Cantillano (USNM). 07-SRNP-22664 Costa Rica, Prov. Guanacaste, Sector Del Oro, Quebrada Trigal, 290 m, 11.02681 -85.49547, 15 August 2007, Lucía Ríos (USNM). 06-SRNP-48066 Costa Rica, Prov. Guanacaste, Sector Cacao, Puente Góngora, 540 m, 10.88489 -85.47203, 12 December 2006, Dunia García (USNM). 04-SRNP-3504 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Finca San Gabriel, 645 m, 10.87766 -85.39343, 14 August 2004, Osvaldo Espinoza (USNM). 04-SRNP-4630 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 14 October 2004, Carolina Cano (USNM). 03-SRNP-4380 Costa Rica, Prov. Guanacaste, Sector Cacao, Sendero Arenales, 1080 m, 10.92471 -85.46738, 6 July 2003, Mariano Pereira (USNM). 02-SRNP-18579 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 2 September 2002, Gloria Sihezar (USNM). 06-SRNP-32120 Costa Rica, Prov. Alajuela, Sector San Cristóbal, Río Blanco Abajo, 500 m, 10.90037 -85.37254, 2 September 2002, Gloria Sihezar (USNM). INBIOCRI001830616 P.N. Tapantí, A. C. Amistad 1150 m, 9.762583 -83.788328, 1 January 1994, G. Mora (MNCR).

Diagnosis: *Nystalea ocellata* is easy to separate from the other *Nystalea* from Costa Rica by its external appearance. Dorsal FW ground color light brown with dark brown and black marks; postmedial area near the apex a macula black surrounded by a yellow and white halo, with three irregular black lines, subterminal line black and white, fringe light brown, dorsal HW dark brown, with yellowish basal area; fringe yellowish. (Figs. 359, 360). Cup-shaped costula with thin and sharp lateral projection (Fig. 364).

Distribution: *Nystalea ocellata* has been collected with light traps in the rain forest and cloud forest on both slope of the Cordillera Volcánica de Guanacaste, Cordillera de Talamanca and Caribbean and Pacific lowlands. The elevational range for the species is 1-1450 m.

Natural history: (Figs. 444-457) 369 rearing records: ACG locations: Sector Brasilia (n=5), Sector Buenos Aires (n=1), Sector Cacao (n=15), Sector Del Oro (n=35), Sector El Hacha (n=12), Sector Mundo Nuevo (n=1), Sector Orosi (n=1), Sector Pitilla (n=40), Sector Rincón Rain (n=8), Sector San Cristóbal (n=244), Sector Santa María (n=7).

Food plants: Anacardiaceae: *Anacardium excelsum* (n=19), *A. occidentale* (introduced) (n=4), *Mosquitoxylum jamaicense* (n=48), *Spondias mombin* (n=20), *S. radlkoferi* (n=4), *Tapirira brenesii* (n=85), *T. mexicana* (n=163); Burseraceae: *Protium confusum* (n=2), *P. costarricense* (n=20), *P. ravenii* (n=1), *P. schippii* (n=1), *Tetragastris panamensis* (n=1).

Parasitoids: Braconidae: (n=60), *Glyptapanteles garygibsoni* (n=1), *Hypomicrogaster OVRGDHJ03* (n=3), *Hypomicrogaster OVRGDHJ06* (N=54), *Hypomicrogaster OVRGDHJ02* (N=3), Eulophidae: eulophJanzen01 Janzen01 (n=1).

Remarks: BIN BOLD:AAB8668 (Fig. 490).

Genbank Accession: JQ534027

DNA barcode of male 10-SRNP-35291

[MHMYL2204-11|10-SRNP-35291|(Nystalea ocellata)|COI-5P

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AGGAGGAGATCCTATTTTATATCAACATTTATTT
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ACKNOWLEDGMENTS

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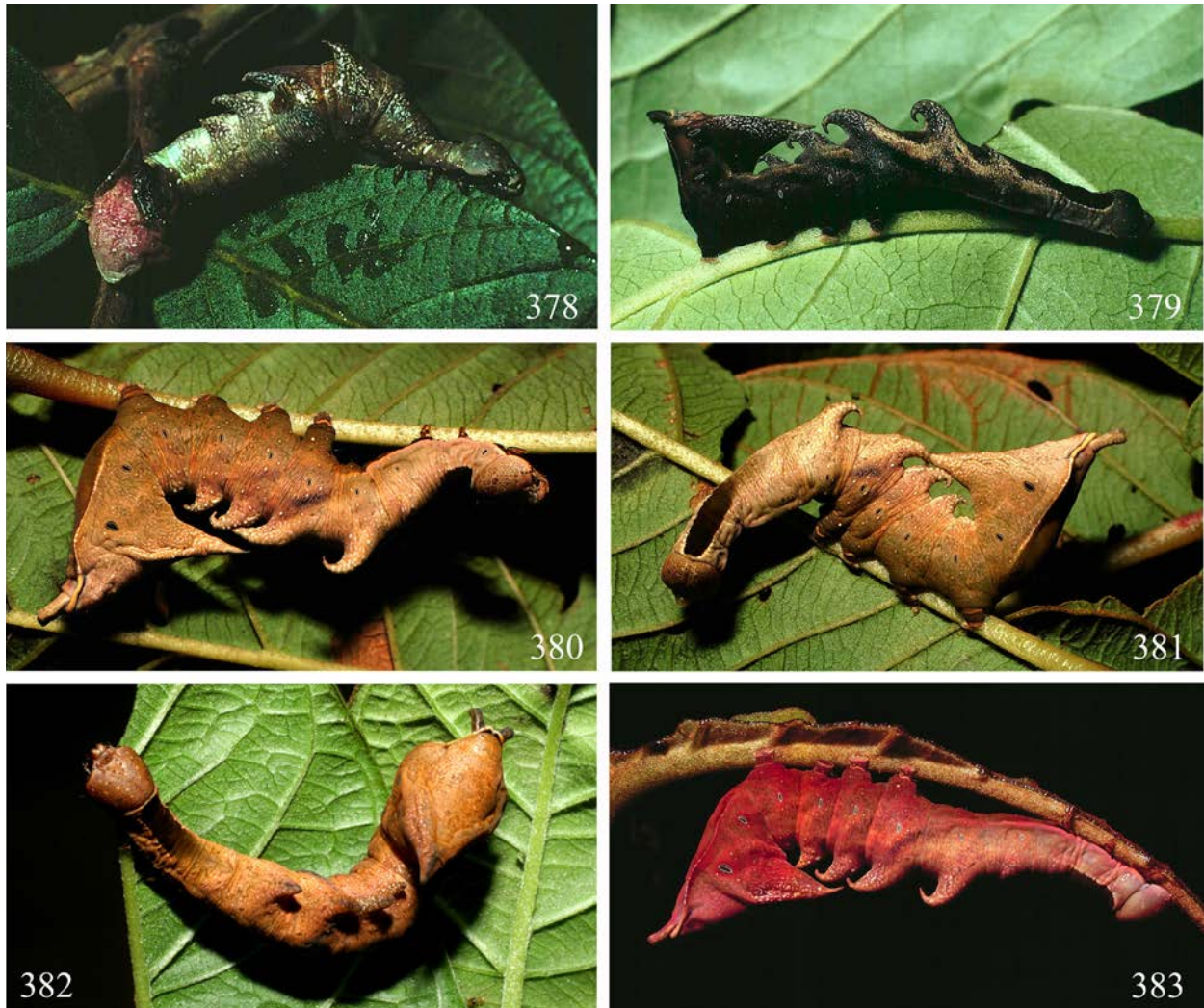
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Figures 368-371. Larvae of *Nystalea aequipars* 368. PPU 94-SRNP-2184, 369. U 94-SRNP-2185, 370. U 94-SRNP-2185, 371. U 94-SRNP-2185.



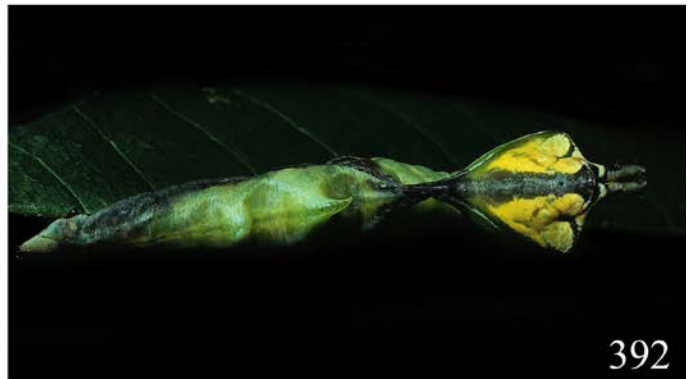
Figures 372-377. Larvae of *Nystalea gustavoinduni* 372. U 03-SRNP-27404, 373. U 03-SRNP-27404, 374. U 00-SRNP-6001, 375. U 00-SRNP-6001, 376. U 00-SRNP-6001, 377. U 00-SRNP-6001.



Figures 378-383. Larvae of *Nystalea sylvieduranae* 378. U 81-SRNP-385, 379. U 90-SRNP-723, 380. U 01-SRNP-126, 381. U 01-SRNP-126, 382. U 08-SRNP-40657, 383 U 80-SRNP-195.



Figures 384-387. Larvae of *Nystalea collaris* 384. U 00-SRNP-374, 385. U 00-SRNP-383, 386. U 00-SRNP-374, 387. U 00-SRNP-374.



Figures 388-392. Larvae of *Nystalea ebalea* 388. U 14-SRNP-70356, 389. U 14-SRNP-70356, 390. U 14-SRNP-70356, 391. U 06-SRNP-3915, 392. U 90-SRNP-2209.



Figures 393-398. Larvae of *Nystalea guzmani* 393. U 99-SRNP-16132, 394. U 99-SRNP-16136, 395. U 99-SRNP-16136, 396. U 99-SRNP-16132, 397. U 13-SRNP-21795, 398. U 13-SRNP-21795.



Figures 399-404. Larvae of *Nystalea idonea* 399. PPU 13-SRNP-31615, 400. PPU 13-SRNP-31615, 401. PU 13-SRNP-31615, 402. PU 13-SRNP-31728, 403. U 05-SRNP-65515, 404. U 05-SRNP-65515.



Figures 405-410. Larvae of *Nystalea inchoans* and parasitoid 405. PU 07-SRNP-32284, 406. PU 07-SRNP-32284, 407. PU 04-SRNP-17, 408 PU 04-SRNP-17, 409. U 05-SRNP-33928, 410. Pupa 06-SRNP-6583 *Charops* GauldF1 Campopleginae: Ichneumonidae.



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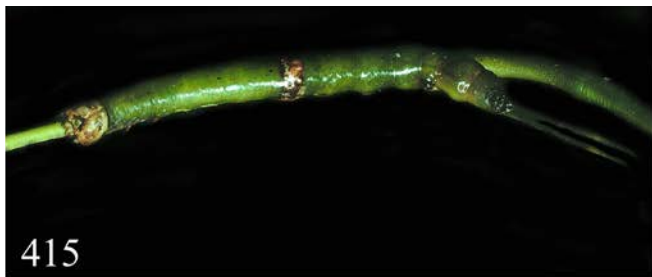


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Figures 411-414. Larvae of *Nystalea joanna* 411. II 08-SRNP-31397, 412. U 08-SRNP-31397, 413. U 08-SRNP-31397, 414. U 08-SRNP-31397.



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Figures 415-421. Larvae of *Nystalea marona* 415. PU 84-SRNP-1178, 416. U 05-SRNP-33017, 417. U 90-SRNP-931, 418. U 90-SRNP-931, 419. U 90-SRNP-931, 420. U 05-SRNP-23155, 421. U 05-SRNP-23155.



Figures 422-425. Larvae of *Nystalea marona* 422. PU 98-SRNP-14861, 423. U 98-SRNP-5375, 424. U 84-SRNP-2059, 425. U 84-SRNP-2059.



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Figures 426-433. Larvae of *Nystalea montana* 426. II 13-SRNP-31574, 427. PPU 14-SRNP-30131, 428. PPU 13-SRNP-31574, 429. PU 09-SRNP-32982, 430. PU 09-SRNP-32982, 431. U 09-SRNP-32982, 432. U 09-SRNP-33440, 433. U 09-SRNP-32982.



Figures 434-437. Larvae and pupa of *Nystalea montana* 434. U 09-SRNP-33440, 435. U 09-SRNP-33440, 436. pupa 13-SRNP-31574, 437. pupa 13-SRNP-31574.



Figures 438-443. Larvae of *Nystalea torbjornekremi* 438. U 02-SRNP-124, 439. U 02-SRNP-124, 440. U 84-SRNP-811, 441. U 02-SRNP-124, 442. U 84-SRNP-811, 443. U 84-SRNP-811.



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Figures 444-451. Larvae of *Nystalea ocellata* 444. PPU 14-SRNP-43516, 445. PPU 08-SRNP-30515, 446. PU 02-SRNP-18580, 447. U 08-SRNP-31643, 448. PU 02-SRNP-18580, 449. PU 02-SRNP-18580, 450. U 08-SRNP-31530, 451. U 09-SRNP-20237.



Figures 452-457. Larvae of *Nystalea ocellata* and parasitoid 452. U 09-SRNP-20237, 453. U 09-SRNP-20237, 454. U 14-SRNP-43516, 455. U 14-SRNP-43516, 456. PU parasitoid biology Braconidae 15-SRNP-70204, 457. pupa 14-SRNP-43516.



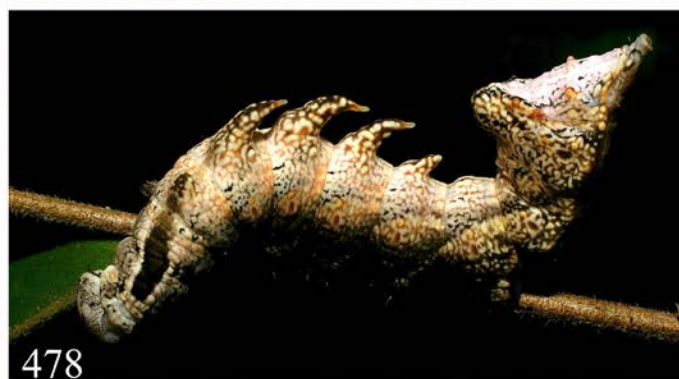
Figures 458-464. Larvae and pupa of *Nystalea porgana* 458. U 13-SRNP-31634, 459. U 13-SRNP-31634, 460. U 13-SRNP-31634, 461. U 13-SRNP-31634, 462. U 13-SRNP-31634, 463, 464. pupa 13-SRNP-31634.



Figures 465-472. Larvae and pupa of *Nystalea henrikekmani* 465. PU 01-SRNP-316, 466. PPU 13-SRNP-5619, 467. U 00-SRNP-1185, 468. U 00-SRNP-1185, 469. U 00-SRNP-1185, 470. U 10-SRNP-35079, 471. U 06-SRNP-33862, 472. Pupa 13-SRNP-5619.



Figures 473-474. Final instar of *Nystalea erikabjerstromae* 473, 474. U 04-SRNP-34376.



Figures 475-480. Larvae of *Nystalea striata* 475. PPU 09-SRNP-667, 476. U 13-SRNP-31697, 477. U 00-SRNP-11200, 478. U 06-SRNP-2548, 479. U 03-SRNP-4378, 480. U 06-SRNP-2548.



Figures 481-485. Larvae of *Nystalea superciliosa* 481. II 17-SRNP-30687, 482. PU 06-SRNP-31717, 483. PPU 08-SRNP-30290, 484. U 06-SRNP-31717, 485. U 83-SRNP-1333.



Figures 486-489. Larvae of *Nystalea virgula* 486. PPU 03-SRNP-8689, 487. U 03-SRNP-8690, 488, 489. U 12-SRNP-65336.

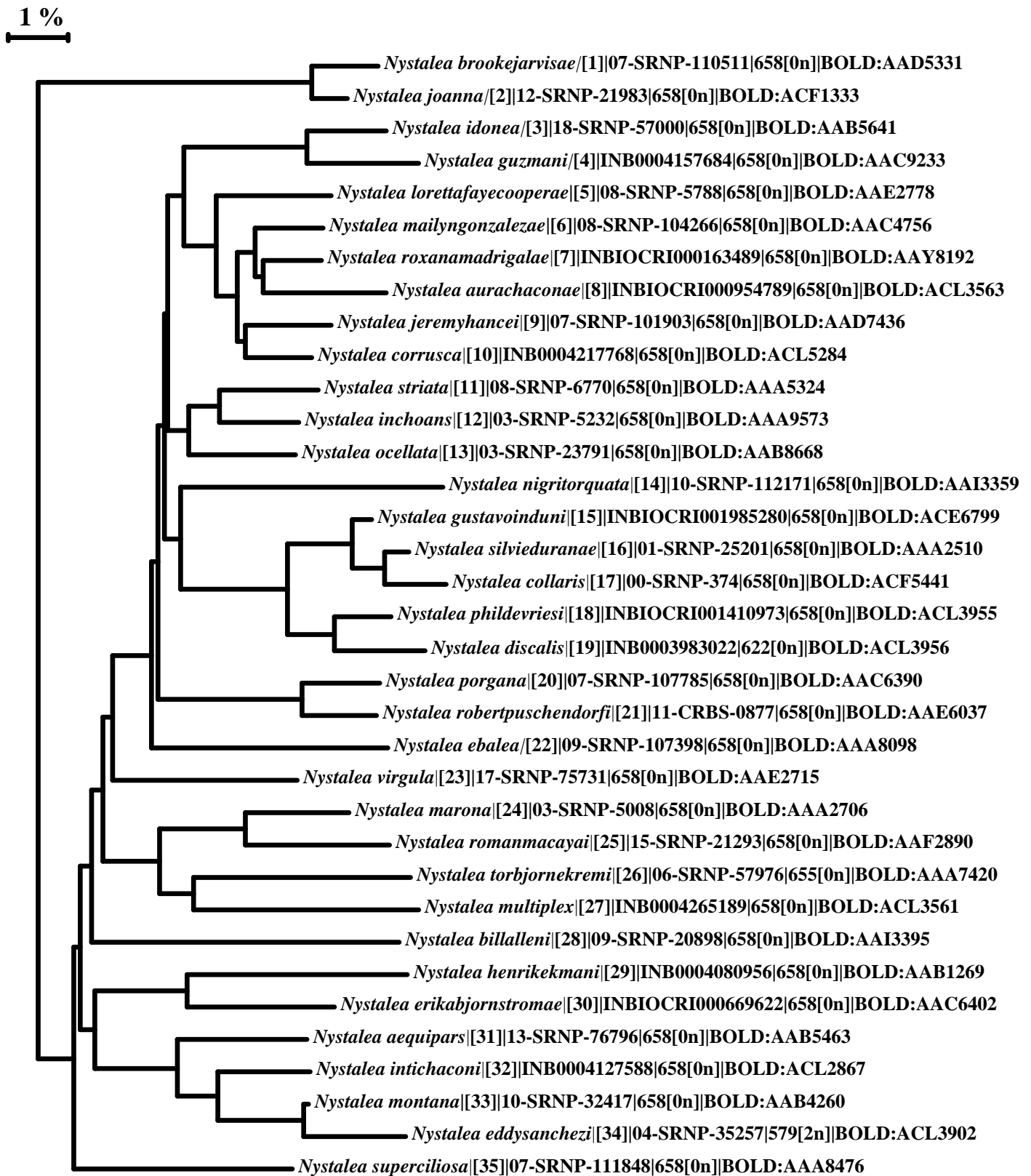


Figure 490. Degree of difference among the Costa Rican specimens and species of *Nystalea* treated here. NJ tree with a 1% horizontal scale bar for 600+ bp barcodes. Each specimen is recorded with its respective voucher code and BIN code as in the BOLD database in the Centre for Biodiversity Genomics at the University of Guelph, Guelph, Canada (<http://www.boldsystems.org>).

