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Observation of paper wasp nests in holy ghost church campus, Bengaluru, Karnataka**Aaromal E., M. S. Supriya, Abhishek Mishra, and M. Jayashankar****Department of Zoology, School of Life Sciences,
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The family Vespidae consisting of mostly social wasps is divided into three distinct sub families viz., Stenogastrinae, Vespinae and Polistinae (Richards, 1971). There are more than 180 species belonging to the genus *Ropalidia* of which, 27 are documented in the Indian subcontinent, with 16 of them being endemic (Kojima, *et al.*, 2007). Nests built by social wasps independently can be initiated by a lone female (haplometrosis) or by a group of females working together (pleometrosis) (Suzuki *et al.*, 1992). In *Ropalidia marginata*, nests founded by a lone female, the sole foundress builds the nest, performs all protective and nursing functions by herself until the young ones become adults capable of helping the queen with the subsequent brood whereas in nests founded by multiple females, only one female remains the queen and the rest act as worker bees and undertake other responsibilities of building nests and tending to the offspring (Shakarad, *et al.*, 1995).

In this paper, two species belonging to *Ropalidia* were observed (*Ropalidia cyathiformis* and *Ropalidia marginata*). These are two old world primitively eusocial polistine wasps that occur widely in peninsular

India (Kardile *et al.*, 2002). A primitive nest appears to have been a solitary, open comb hanging by a peduncle or stalk (Richards, 1971). The nest of the aforementioned species is generally found on leaves, concrete wall, and metallic poles (Mishra *et al.*, 2023). Generally, in primitive eusocial colonies, the queens are distinctive because of their dominance behaviour, in order to maintain reproductive monopoly, but *R. marginata* is unique in the way that the queens don't exhibit dominance behaviour but are docile and use pheromones to control the reproductive activities of worker wasps. This is something that is peculiar in highly eusocial colonies thereby making it very unique (Unnikrishnan *et al.*, 2023). Hence, in *R. marginata*, the queens are always sitters whereas in *R. cyathiformis*, the queens are always fighters (Kardile *et al.*, 2002).

The present study was undertaken in Holy Ghost Church (12.9887669, 77.5932716), located in Bengaluru (Map 1 and Map 2). Holy Ghost Church keeps the history of 70 years, and with its historical walls it also supports the immense biodiversity. The area covered for the observation of the nest is marked as Point A to Point H (Table no. 1). This short-term study was made in the month

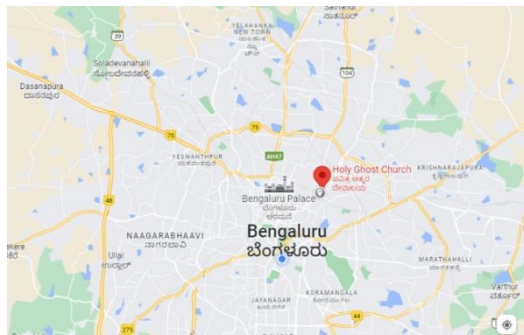
of October 2023. I phone 12, DSLR Camera and Adcome lens Attachment (12 X and 24 X) devices were used to capture geotagged images

of the nests and wasps. Mapping apps, GPS Map Camera, Google Maps were used.

Table 1. Points in the study area covered along with GPS coordinates

Area covered	GPS coordinates
Point A	13.006021°, 77.617170°
Point B	13.005944°, 77.617475°
Point C	13.006326°, 77.617447°
Point D	13.006289°, 77.617850°

Area covered	GPS coordinates
Point E	13.006259°, 77.618206°
Point F	13.005917°, 77.618425°
Point G	13.005644°, 77.618244°
Point H	13.005905°, 77.617853°



Map 1: Holy Ghost Church in Bengaluru Map (Source: Google Maps)



Map 2: Satellite Map of Holy Ghost church with the points (in red dots) observed for wasp nests

During the present observations, a total of 37 nests of *R. marginata* and *R. cyathiformis* were counted among which total nest count with active individuals were 13 (4 of *R. marginata* and other 9 of *R. cyathiformis*) (Figs.1 and 2) and on other 24 nests no individuals were found. In the active nests, total count of Individuals, number of cells per nest, larvae, pupae and eggs was noted (Fig. 3).

Among all the nest highest number of the cells was founded on *R. marginata* Nest (No.25) with 157 cells. Highest number of individuals was found on the nest number 22 and 40; highest count of individuals in a nest was noted to be 8 at the time of observation. The nests were mostly observed on the concrete wall. This is first time observation undertaken in this area.



Fig. 1: An active nest of *R. marginata*



Fig. 2: An active nest of *R. cyathiformis*

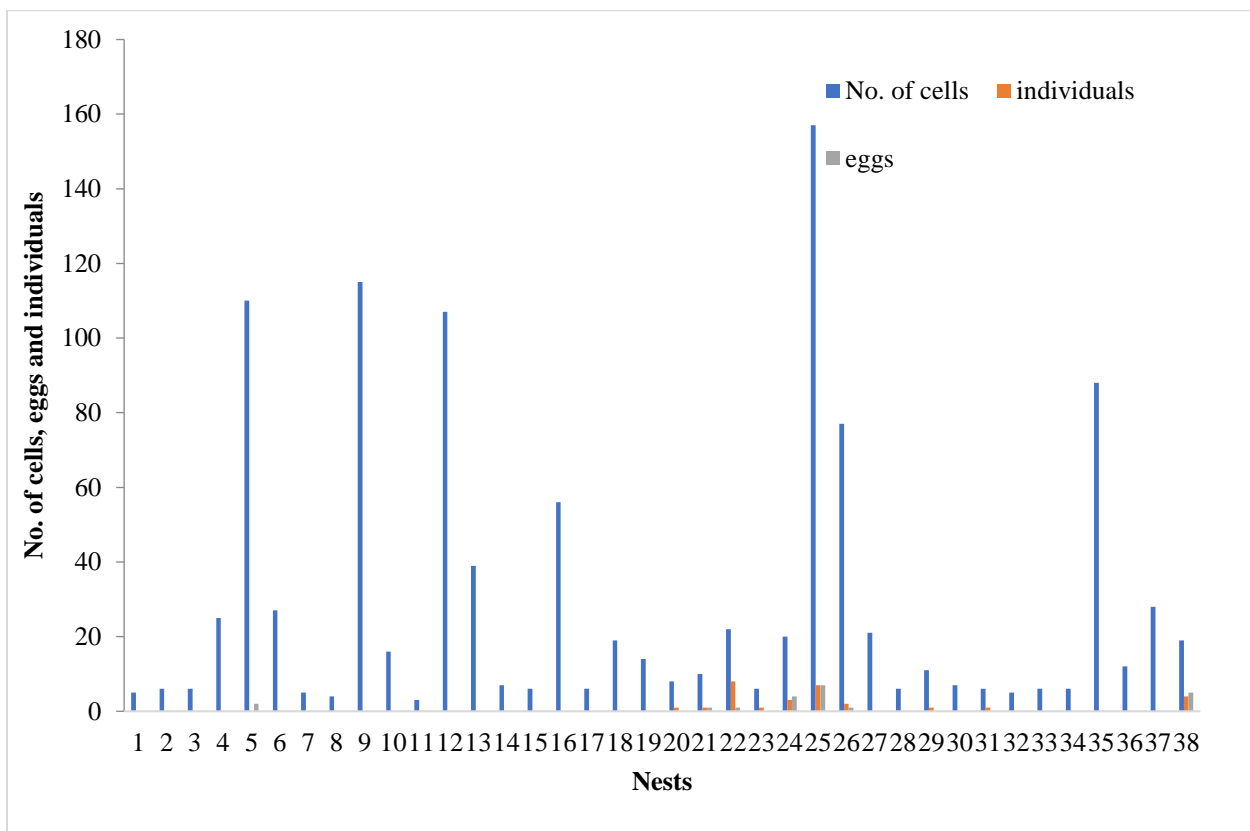


Fig. 3: Representation of nests with active individuals, eggs and cells during the observation

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