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Investigation on the impact of Invasive Alien Species upon local fauna

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Invasive Alien Species (IAS) refers to species introduced and successfully established outside their native range by overcoming or outcompeting pre-existing native species. For the last centuries, the number of invasive alien species belonging to multiple taxonomic groups has increased. The intensification of transport and global trade has been particularly driven the trend of biological invasions (Hulme, 2009). Besides being a result of globalization, biological invasion is also considered a major factor of global biodiversity change (IPBES, 2019). These species can have negative impact on agriculture, forestry, plants, animals and cause irreparable harm to local or global economics and the ecosystems in which they invade. The worldwide estimated damage by invasive species is more than \$1.4 trillion, about 5% of the global economy (Pimentel *et. al.* 2001). In India about \$ 91 billion per year economic damage is estimated due to invasion of invasive species to forestry and agricultural commodities (The wire, 2016). The changing climate, increasing trade due to globalization has aggravated the introduction of new insect pest species as well as their range expansion in

the introduced areas. In recent years, scientists have documented multiple species shifting their range be it at local or at global level due to either climate change or due to adaptation to new climatic regime. In recent draft of the post-2020 global biodiversity framework convention on biological diversity also fixed the target to manage the introduction pathway of invasive alien species and or reducing the rate to introduction and establishment of invasive alien species (CBD/WG2020/REC/2/1). An average cost to control weeds and invasive insects is about 35% of the agricultural budget. Which includes labor costs and insecticide treatment. The continuous introduction and establishment of IAS is harmful for soil health also. Till now in India, there are no existing policies to address the emerging issue of IAS while there is a big gap in assessment of impacts emerging due to establishment and introduction of IAS on biodiversity, economy and agricultural commodities is remain unsolved. Thus, a detailed informative data about invasive alien Species dynamics is of great significance for science and local fauna of Bihar.

	
<p>Figure 1. <i>Spodoptera frugiperda</i> caterpillar infesting on tassel tube of maize</p>	<p>Figure 2. <i>Perillus bioculatus</i> adult feeding on <i>Zygotypha bicolorata</i></p>
	
<p>Figure 3. <i>Bagrada hilaris</i> adults and nymphs sucking the sap of sunflower.</p>	

Thereby, documenting, listing, locating, identifying, eradicating and preventing them before they become widespread and problematic for endemic species and biodiversity is need of the hour. The Invasive species pests has been recorded infesting over 80 different types of agricultural crops which has high potential and also showing competition with native species of

local fauna. It also has an impact on the yield and thus the economy of local farmer.

This the known fact that, the fundamental role of introduction of new IAS in new environmental fauna happen due to accidental transportation or human-mediated deliberation (Russo, 2016). Complex introduction and different biotic network for newly introduced species and their new hosts

in new environmental fauna pose multiple competition with native species and the current and future establishment or invasion of that introduced IAS is mandatory to predict and manage.

In some cases, intercontinental spread of species happened in very short time and the range expansion is ongoing in introduced area, where the invasion was most recent (not clear, may explain, which species and in which regions) (Bila Dubaić *et. al.*, 2021). The successful establishment and invasion of some IAS species may be correlated with their social traits and have potential to rapid spread, high population, well established dispersal and in general horrifying competitors (Russo *et. al.*, 2021). Invasive alien species are a primary threat to specific as well as global level and resulting great loss of productivity and species extinction due to serious invasion. In some cases, flood driven introduction of alien species from illegal aquaculture also reported in recent years. Most of the IAS which introduced or established their population in India are due to ornamental use of species and thereafter by releasing or escaping in new non-native habitat.

According to CBD 40% of floral species in India are alien, of which 25% are invasive. A total of 37 species including tree, plant, shrubs, insects, bird, fish and mollusc having status of major invasive alien species and about 28 species native to India have been reported to be invasive in other geographical

zones around the globe. (can discuss about insects) Among all the reported invasive alien species *Lissachatina fulica*, *Spodoptera frugiperda*, *Citripestis eutriphera*, *Perillus bioculatus* *Parthenium hysterophorus*, *Lantana camara* and some others possess multiple impact on the major crops and endemic species of Bihar (reference and quantification of the data). In the view of seriousness, we consider it as a priority and started to investigate the actual impact and distribution range of IAS in Magadh division (may mention the results of the investigation).

In order to prevent them in distribution range expansion and management as well as nature of impact according to ecological relation on major crops, need to be investigated. The government bodies along with NGO's and scientist working on the similar issue should be on a single platform and the gap among them need to filled. There is an urgent need to understand the pathways of introduction along with the factors triggering introduction and establishment of IAS in Bihar as well as India.

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