

Insect visitors in Indian Mustard [*Brassica juncea* (L.) Czern and Coss]: Diversity and their Role

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ABSTRACT: The investigation on diversity of insect visitors and their role on Indian mustard was conducted at Agronomy Farm, S.K.N. College of Agriculture, Jobner during Rabi, 2023-24. During the study a total 20 insect species were found visiting mustard inflorescence, which belonged to 18 families of 8 different orders and further based on categorization, 5 insects were found as only nectar foragers, 6 as both pollen and nectar foragers, while 9 as casual visitors.

Keywords: Indian mustard, diversity, pollen foragers, nectar foragers.

INTRODUCTION

Indian mustard (*Brassica juncea*) is an important oilseed crop in India, known for its seeds rich in oil content. Rajasthan leads the country in rapeseed-mustard production, contributing approximately 46 per cent of the total output. Alongside Rajasthan, states like Uttar Pradesh, Haryana and Madhya Pradesh play significant roles, collectively accounting for 77 per cent of the cultivation area and 82 per cent of production (Bansal and Kukkar 2020). In the 2023-24 period, rapeseed-mustard cultivation spanned 9,183 hectares, yielding 13,259 tonnes with a productivity rate of 1,444 kg/ha (Anonymous, 2024). Common insect pests affecting mustard crops include mustard aphid, leaf webber, flea beetle, painted bug and mustard sawfly (Srija *et al.*, 2024). Although primarily self-pollinating, *B. juncea* benefits from insect-assisted cross-pollination, which can significantly improve both seed yield and quality. Understanding the diversity and behaviour of insect pollinators is essential for optimizing mustard cultivation. Effective pollinator identification and promotion can lead to enhanced crop productivity. A study recorded 88 insect species from 63 genera across 31 families and nine orders visiting mustard blooms. Among these, insects from the Hymenoptera order were predominant, with *Apis cerana* and *A. mellifera* showing higher abundance through scan sampling methods (Devi *et al.*, 2017).

MATERIAL AND METHODS

An attempt was made in identifying other insect visitors (apart from mustard aphid) and their role in Indian mustard (variety-Giriraj) inflorescence during Rabi, 2023-24 in five selected plots ($3 \times 2.4 \text{ m}^2$). Weekly observations were recorded from the flower initiation

phase and continued till 90 per cent flowering on 10 randomly selected plants from each experimental plot at two hours interval from 08:00 hrs to 16:00 hrs. Based on the activity these insects were further categorized into pollen foragers, nectar foragers and casual visitors, respectively.

RESULT AND DISCUSSION

Table 1 illustrates the distribution of insect species from eight different orders observed visiting mustard inflorescences. Hymenoptera was the most prevalent order, accounting for 30 per cent of the total insect population with six species, followed by Diptera at 25 per cent with five species. Hemiptera constituted 15 per cent with three species, while Coleoptera represented 10 per cent with two species. Thysanoptera, Odonata, Neuroptera and Lepidoptera each contributed 5 per cent with one species, reflecting a diverse assemblage of insect visitors. These results are consistent with previous studies conducted by Neha *et al.* (2014); Pudasaini *et al.* (2015); Nagpal (2016); Abrol and Bajiya (2017); Devi *et al.* (2017); Giri *et al.* (2018); Das and Jha (2018); Poonam *et al.* (2022); Rao *et al.* (2022); Bijarniya *et al.* (2024); Prajula *et al.* (2024), who also identified Hymenoptera as the most dominant insect order in mustard ecosystems.

A total of 20 insect species from 18 families and 8 different orders were observed (Table 2). Among them, six species (Rock bee, little bee, syrphid fly, bumble bee, sweat bee and green lacewing) were identified as both pollen foragers (PF) and nectar foragers (NF). Five species, which include one Lepidoptera and four species from order Diptera as only nectar foragers (NF). Casual visitors (CV) included nine species, such as ladybird beetle, wasp, tingid bug, sap beetle, banded

thrips, dusky cotton bug, black ant, shield bug and dragonfly. Sankarsan *et al.* (2014) findings revealed that four out of six hymenopteran species that visit mustard flowers feed for both pollen and nectar, whereas two species only forage for nectar. Three species of dipterans and all lepidopterans were found to be exclusively nectar foragers. The remaining orders, Coleoptera, Odonata and Hemiptera, were described as casual visitors to the mustard inflorescence; these findings are consistent with the present findings.

This diversity highlights the significant roles played by various insect families in pollination and their interactions with plants, with Hymenoptera being dominant among both pollen and nectar foragers.

Table 1: Predominant insect orders present in Indian mustard ecosystem.

Order	Count	Percentage (%)
Hymenoptera	6	30.0%
Diptera	5	25.0%
Hemiptera	3	15.0%
Coleoptera	2	10.0%
Thysanoptera	1	5.0%
Odonata	1	5.0%
Neuroptera	1	5.0%
Lepidoptera	1	5.0%
Total	20	100.0%

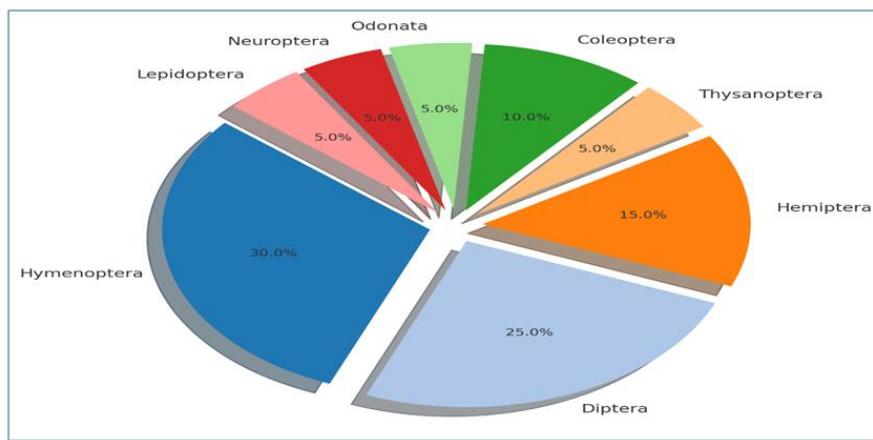


Fig. 1. Distribution of insect orders visiting Indian mustard inflorescence.

Table 2: Insect species (Pollen foragers, Nectar foragers and Casual visitors) present in Indian mustard ecosystem.

Sr. No.	Common name	Scientific name	Family	Order	PF	NF	CV
1.	Little bee	<i>Apis florea</i>	Apidae	Hymenoptera	PF	NF	
2.	Rock bee	<i>Apis dorsata</i>	Apidae	Hymenoptera	PF	NF	
3.	Bumble bee	<i>Bombus</i> spp.	Apidae	Hymenoptera	PF	NF	
4.	Sweat bee	<i>Halictus</i> spp.	Halictidae	Hymenoptera	PF	NF	
5.	Shield bug	Unidentified species	Pentatomidae	Hemiptera			CV
6.	Banded thrips	<i>Aeolothrips</i> spp.	Aeolothripidae	Thysanoptera			CV
7.	Ladybird beetle	<i>C. septumpunctata</i>	Coccinellidae	Coleoptera			CV
8.	Handmaiden moth	<i>Amata cyssea</i>	Erebidae	Lepidoptera		NF	
9.	Green lacewing	<i>Chrysoperla carnea</i>	Chrysopidae	Neuroptera	PF	NF	
10.	Syrphid fly	<i>Episyrphus</i> spp.	Syrphidae	Diptera	PF	NF	
11.	House fly	<i>Musca domestica</i>	Muscidae	Diptera		NF	
12.	Blow fly	<i>Chrysomya megacephala</i>	Calliphoridae	Diptera		NF	
13.	Wasp	<i>Perlissus</i> spp.	Ichneumonidae	Hymenoptera			CV
14.	Leaf miner	<i>Phytomyza horticola</i>	Agromyzidae	Diptera		NF	
15.	Black ant	<i>Camponotus compressus</i>	Formicidae	Hymenoptera			CV
16.	Cluster fly	<i>Pollenia</i> spp.	Polleniidae	Diptera		NF	
17.	Tingid bug	Unidentified species	Tingidae	Hemiptera			CV
18.	Dusky cotton bug	<i>Oxycarenus hyalinipennis</i>	Lygaeidae	Hemiptera			CV
19.	Sap beetle	Unidentified species	Nitidulidae	Coleoptera			CV
20.	Dragonfly	Unidentified species	Libellulidae	Odonata			CV

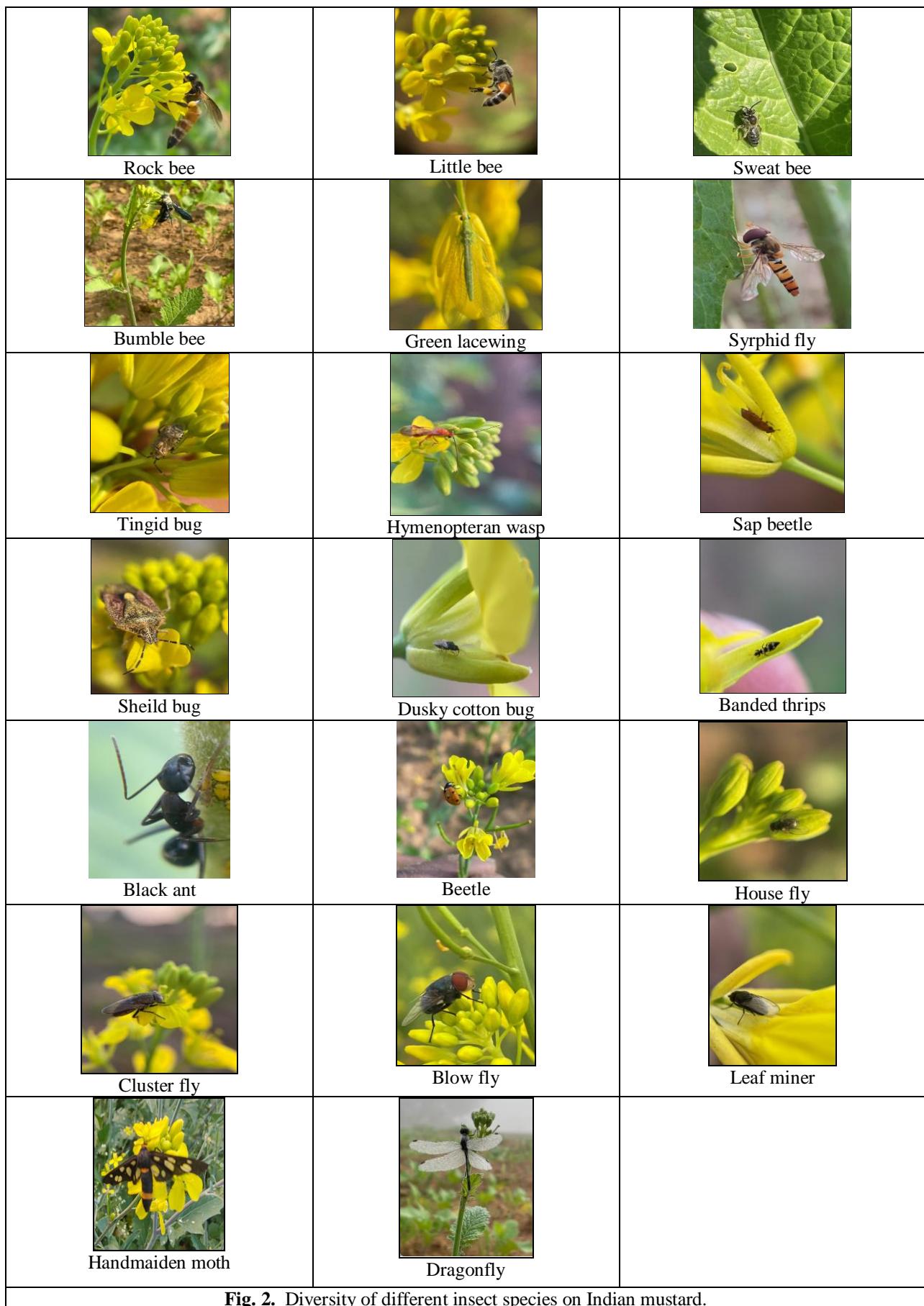


Fig. 2. Diversity of different insect species on Indian mustard.

CONCLUSIONS

The mustard crop attracts a diverse range of insects from various orders, including Hymenoptera, Diptera, Coleoptera, Lepidoptera, Thysanoptera, Odonata and Hemiptera, with Hymenoptera being the most dominant group. A closer examination shows that some species visit the crop primarily for nectar, while certain species forage for both pollen and nectar. Additionally, some insects are casual visitors without a specific foraging purpose.

FUTURE SCOPE

The study highlights the importance of insect visitors in Indian mustard cultivation. Future research should focus on enhancing pollinator conservation, evaluating pollination efficiency and developing eco-friendly pest management strategies. Additionally, studies on climate impacts and insect behaviour can help optimize crop productivity and promote sustainable agricultural practices.

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Conflict of Interest. None.

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