

Chapter 5

Pollinators of *Tridax procumbens* L.: a conservation approach

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Abstract

Pollination is a crucial phenomenon that ensures the survival of one's race on the earth's surface. It is the transfer of pollen grains from the male stamens to the female stigma enabling fertilization and the production of seeds. The pollens from male anthers stick or rub on the body of the pollinators, and when they jump from one flower to another, they drop the pollens on the stigma of another flower facilitating pollination followed by fertilization and seed production. In the present study, the process of pollination was observed on the flowers of *Tridax procumbens* during the floral diversity study near the Mahanadi River areas in CDA-13, Cuttack, Odisha, and Beas River areas in Jawalamukhi tehsil of district Kangra, Himachal Pradesh. The authors observed 8 insects including 6 butterflies and 2 bees sucking nectar from the flowers of *T. procumbens* and concluded that the population of pollinators has decreased due to the decline in the population of *T. procumbens* due to the prevalence of invasive plants like *Cleome viscosa*, *Chromolaena odorata*, *Parthenium hysterophorus*, *Ageratum conyzoides*, *Ageratum houstonianum*, *Lantana camara*, etc.

Keywords: Bees, butterflies, conservation, nectar, pollination ecology

Introduction

Flowering plants do not have the means of transport so they depend on animals for the critical process of reproduction. The process of pollination helps the plants with the continuation of life on the planet Earth (Guchhait *et al.*, 2023). Pollination is a small act of transferring pollens from male flowers to female flowers which plays an important role in maintaining ecological balance (Sharma *et al.*, 2023). Pollination facilitates fertilization and is performed by several factors like air, water, insects, birds, mammals, etc. Several pollinators like birds, bees, butterflies, bats, and other animals participate in the process of pollination (Devi *et al.*, 2024). When the bees and butterflies, being the main pollinators, sit on the flowers to suck the nectar, the pollen grains get attached or dusted on their body. Then the bees hop on different flowers dropping the collected pollens on the flowers while sucking nectar facilitating the fertilization process. The same goes for the butterflies, when they are sucking nectar, they always flutter their wings which makes wings get dusted with pollen grains, thereby facilitating fertilization. Seeing these small actions of insects impact the whole process of life of several plants, it is necessary to protect these ignored species. Keeping this in mind, the pollinators of *T. procumbens* were documented during the floral diversity study near the Mahanadi River area in CDA-13, Cuttack, Odisha, and the Beas River in Jawalamukhi tehsil of district Kangra, Himachal Pradesh. The study highlights the importance of the protection of pollinators with the conservation of the native flowering plants.

Morphology of *Tridax procumbens*

Tridax procumbens is a procumbent hairy herb. Leaves rather distant, petiolate, ovate, or lanceolate, coarsely toothed or lobed, lobes serrate, acute or acuminate, hairy on both sides, base cuneate. Heads 7-12 mm diameter, peduncle upto 30 cm long. Outer involucral bracts ovate, hirsute, herbaceous, inner oblong, membranous. Ray florets 5-6, with a slender hairy tube and spreading deeply 3-lobed ligule, white or creamy-white (Figure 1). Achenes black, densely hairy or silky; pappus of ray florets of disc florets longer. It is a fairly common weed whose flowering and fruiting period is all year round (Saxena and Brahmam, 1995).

Methodology

During the floral diversity study near the Mahanadi River areas, insects were sighted flocking around the flowers of *T. procumbens* in CDA Sector-13, Cuttack, Odisha, and in areas near Beas River, Kangra, Himachal Pradesh in July 2024. Seeing several butterflies fluttering around the flowers of *T. procumbens* and sucking on the nectar from the flowers, the pollinators were recorded through direct observation. The senior author identified the insects with the help of available literature (Chandel, 2013; Chandel, 2014; Kehimkar, 2016; Garlani, 2024) and online platforms like Zookeys (<https://zookeys.pensoft.net/article/86413/>), Vermont Atlas of Life (<https://val.vtecostudies.org/projects/vtbees/augochloropsis-metallica/>), etc.

Observations

In the present study, several insects, mainly small butterflies were observed perched on the flowers of *T. procumbens* sucking on the nectar from the flowers. While sucking on the nectar, their bodies get dusted with pollen grains of the plant facilitating pollination and fertilization maintaining the species richness of the plant. The population of *T. procumbens* is declining day by day, due to the declining population of pollinators and the spreading of invasive plants decreasing the population of native plants. The present study reveals 8 insects found sucking nectar from the flowers of *T. procumbens*, among which 6 insects belong to the order Lepidoptera which are all butterflies, and 2 insects belong to the order Hymenoptera which are bees (Table 1). The presence of honeybee *Apis cerana*, among insects identifies *T. procumbens* as an important bee floral resource (Saklani and Sharma, 2024). From the enumerated 8 insects found on *T. procumbens*, 3 insects belonged to the family Lycaenidae, 2 species belonged to the family Nymphalidae, and 1 insect each belonged to the family Apidae, Halictidae, and Pieridae.

Table 1: Insects pollinating *Tridax procumbens*

Scientific name	Common name	Order	Family
<i>Acraea terpsicore</i> (Figure 4)	Tawny coster butterfly	Lepidoptera	Nymphalidae

<i>Apis cerana</i> (Figure 8)	Asian honey bee	Hymenoptera	Apidae
<i>Augochloropsis metallica</i> (Figure 2)	Green metallic sweat bee	Hymenoptera	Halictidae
<i>Chilades lajus</i> (Figure 3)	Lime blue butterfly	Lepidoptera	Lycaenidae
<i>Euchrysops cnejus</i>	Gram blue butterfly	Lepidoptera	Lycaenidae
<i>Eurema hecabe</i> (Figure 5)	Common grass yellow butterfly	Lepidoptera	Pieridae
<i>Junonia almana</i> (Figure 6)	Peacock pansy	Lepidoptera	Nymphalidae
<i>Luthrodes pandava</i> (Figure 7)	Plains cupid butterfly	Lepidoptera	Lycaenidae

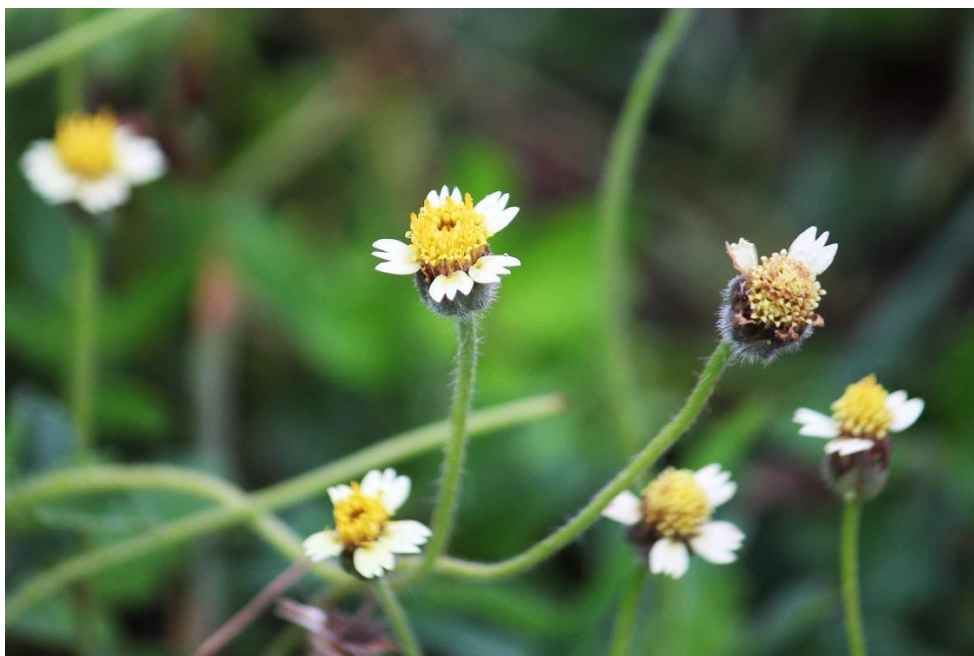


Figure 1: Flowers of *Tridax procumbens*

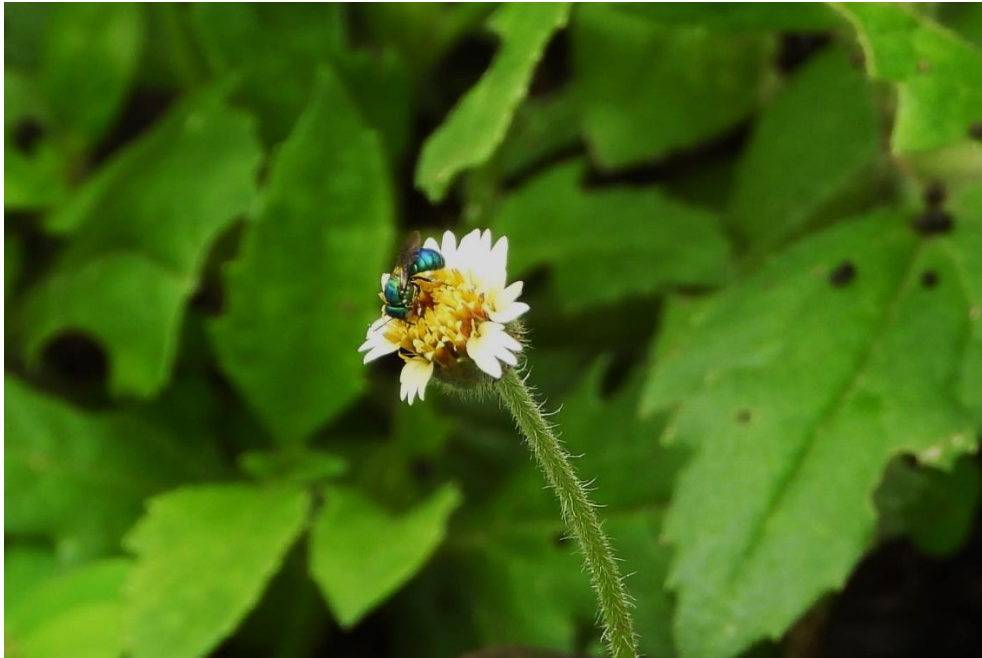


Figure 2: Green metallic sweat bee sucking nectar from the flowers of *Tridax procumbens*



Figure 3: Lime blue butterfly on flowers of *Tridax procumbens*



Figure 4: Tawny coster butterfly sucking nectar from *Tridax procumbens* flowers



Figure 5: Common grass yellow butterfly on flowers of *Tridax procumbens*



Figure 6: Peacock pansy butterfly sucking nectar from *Tridax procumbens* flowers



Figure 7: Plains cupid butterfly on the flowers of *Tridax procumbens*



Figure 8: Asian honeybee sucking nectar from *Tridax procumbens* flowers

Conclusion

From the present study, it was concluded that pollination is a necessary process in the life cycle of the flowering plants which is carried out by several small pollinators like butterflies and bees. The population of pollinators were seen declining which mainly due to the decline in the population of flowering plants. The declining population of flowering plants is due to some factors like climate change, grazing, spreading of invasive plants, etc. Therefore, it is necessary to slowly decrease the population of invasive plants in our environment and plant more native plants that will thereby increase the population of pollinators and keep the cycle of life continuing. Thus, protecting the native plants will indirectly conserve the population of pollinators.

References

- Chandel S, Kumar V, Sharma BP and Patiyal R. (2013). Butterfly species diversity of Bir-Billing area of Dhauladhar range of western Himalayas in northern India. *Journal of Entomology and Zoology Studies*. 1(5): 53-57.
- Chandel S, Kumar V, Sharma BP and Patiyal R. (2014). Butterfly fauna of Shiwalik hills areas of Kangra and Hamirpur districts of Himachal Pradesh in India. *Life Sciences Leaflets*. 55: 25-38.
- Devi R, Das K, Rout S and Rath SK. (2024). *Animal-Plant Interaction, Volume 3*. APRF Publishers, India.
- Garlani L. (2024). *Butterflies of Himachal Pradesh: annotated checklist*. Anonymous publication, India.
- Guchhait KC, Saradar B, Behera B, Rout S and Kumar S. (2023). *Animal-Plant interaction*. APRF Publishers, India.
- Kehimkar I. (2016). *Butterflies of India*. Bombay Natural History Society, Mumbai, India. pp xii + 528.
- Saklani S and Sharma BP. (2024). Some lesser known, bee floral resources around the Jawalamukhi area of district Kangra in Himachal Pradesh, India. In: *Environment conservation and sustainable development. Proceedings of International conference*. Bluerose Publishers, NewDelhi, London.
- Saxena HO and Brahmam M. (1995). *The Flora of Orissa*. Regional Research Laboratory, Bhubaneswar, Odisha & Orissa Forest Development Corporation Limited, Bhubaneswar, Odisha. 2: 964-964.
- Sharma BP, Das A, Jaiswal A, Rout S and Rath SK. (2023). *Animal-Plant Interaction, Volume 2*. APRF Publishers, India.