

DIVERSITY OF MANTIDS (MANTODEA: INSECTA) IN AND AROUND SELOO CITY, MAHARASHTRA, WITH A SYNOPSIS OF THE RECORDED MANTID FAUNA OF THE VIDARBHA REGION IN INDIA

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ABSTRACT

The present study was carried out to document the mantid diversity in Seloo city and its surrounding area in Maharashtra, central India. During the study period of 2015 to 2022, a total of 23 species of mantids belonging to 18 genera and 8 families, with 11 subfamilies were recorded. Out of these, the species *Gonypteryllis semuncialis*, *Odontomantis pulchra*, *Didymocorypha lanceolata*, *Dysaules himalayanus*, *Dysaules longicollis*, *Mantis religiosa religiosa*, *Hierodula membranacea*, *Hierodula coarctata*, *Hierodula ventralis*, *Deiphobe infuscata*, *Deiphobe mesomelas*, *Toxoderopsis taurus*, *Aethalochroa ashmoliana*, *Empusa guttula* and *Gongylus gongyloides* are reported for the first time from Vidarbha region of Maharashtra. The Family Mantidae is represented by the greatest number of species. Mantidae is represented by 6 species, Gonyptetidae (2 species), Hymenopodidae (3 species), Eremiaphilidae (4 species), Nanomantidae

(1 species), Rivetinidae (2 species), Toxoderidae (3 species) and Empusidae (2 species). The present study also includes an updated list of mantid species from Vidarbha region of Maharashtra. This list includes 32 species belonging to 22 genera, 14 subfamilies and 8 families. The mantid fauna of the Vidarbha region is comparatively less studied than that of the northern Western Ghats in Maharashtra. The study supports the value of an urban area in providing suitable habitat for mantids.

Key words: Mantodea, Mantid, Diversity, Vidarbha, Central India

INTRODUCTION

Mantids are predatory insects known as "Praying mantids" that play an important role in terrestrial ecosystems. Praying mantids are a fascinating group of raptoria or snatchers. Mantids have been around since the Paleocene period (Roy, 1996).

The name praying mantis is derived from the habit of holding the front legs up in a praying posture while waiting for the prey. They keep a close eye on and stalk their prey. They are carnivorous and feed almost entirely on insects, which can range from moths to caterpillars, flies, grasshoppers, and aphids. Their triangular head swivels freely atop, with large compound eyes and chewing mouthparts, and an array of spines on the forelegs. Their cryptically coloured body adds to their resemblance to bark, twigs, leaves, or flowers. To summarize, these highly evolved ambush predators, with specific prey capture, camouflage, and reproductive habits, play an important role in the natural control of insect pests. They are found in almost all tropical and semitropical habitats, but are less common in colder climates (Mukherjee *et al.*, 1995). Mantids exhibit intriguing behavioural patterns. They groom themselves frequently, wiping their eyes and heads with their forelegs and cleaning their forelegs with their mouths. When threatened, most species attempt to run or fly away. They are good fliers, but movement is restricted in species with reduced wing venation and awkward body structure.

Mantids are generalist feeders that can catch and eat arthropods of equal or smaller size. Mantid nymphs typically feed on sedentary insects such as aphids that are easily accessible. Mantids can remain motionless for hours on end, only moving their heads to observe flying insects that serve as food. They have a neck that allows them to rotate their heads 180° while waiting for a meal to pass by. Mantid's camouflage colouring allows

them to blend in with the environment as they sit on twigs and stems waiting to ambush prey. They use their front legs to attack and capture their prey. Long, sharp spines on the insides of their legs allow them to grip their prey tightly. While being eaten, the impaled prey is held firmly in place. Mantids are cannibals and will consume each other if given the chance.

India has a diverse mantid fauna, with 169 species of mantids under 69 genera in 13 families and 7 superfamilies known from the entire country (Kamila & Sureshan, 2022). There are over 2500 species of mantids worldwide, classified into 436 genera and 31 families (Otte *et al.*, 2021). Ghate *et al.* (2012) reported 56 species of mantids belonging to 18 genera and 13 families from Maharashtra. Moreover, mantid fauna of Maharashtra part of Western Ghats are fairly well studied (Chaturvedi & Hegde, 2000; Chaturvedi *et al.*, 2005; Ghate & Ranade, 2002; Jadhav, 2008, 2009; Mukherjee & Ghate, 2007, 2010; Sureshan *et al.*, 2006a) as compared to Vidarbha region of Maharashtra (Sureshan *et al.*, 2004 a, b, 2006 b; Jadhav *et al.* 2006). The present study was undertaken to understand the diversity of mantids in and around Seloo city, since there was no known published work on mantids of the Seloo, Wardha district of Maharashtra. The research is based on collections made between 2015 to 2022. This resulted in the identification of 23 species from 18 genera, 11 subfamilies, and 8 families. In addition, a list of mantid species known from the Vidarbha region is provided.

MATERIAL AND METHOD

Seloo city (20083°73"N; 78070°70"E; 265 m) is located close to the Bor Wildlife Sanctuary on the bank of the river Bor. There is dense natural vegetation and the insects feeding on this vegetation attract the mantis species. Seloo has a tropical dry climate with an average annual rainfall of 1,205 mm (June to September); summertime highs can reach 48.9°C, and wintertime lows can reach 10°C to 6.9°C. The range of the annual relative humidity is 22% to 80% (Tiple, 2011; Tiple *et al.*, 2013).

The collection was made from 2015 to 2022 using insect net or specimens were captured by hand. Species preferring dense shrubby, bushes in plains were collected during late evening and at night. The collected specimens were preserved by dry preservation method. The specimens were measured in mm and identified according to Mukherjee *et al.* (1995) and Vyjayandi (2007). The material studied is kept in the Department of Zoology at Dr. R.G. Bhojar ASC College Seloo, District Wardha, Maharashtra (Registration Numbers VBCS, DZ/ 30 to 53; 01.V.2018). The total length of the body is measured from the tip of the vertex to the end of the abdomen, pronotum, metazona, width of the pronotum, fore wing and hind wing; fore legs - length of coxa, femur, and tibia; vertex protuberance, if present, is also measured; and the spines on the femora and tibia were counted. All scientific names follow by Ehrmann & Roy (2002), Ehrmann (2002) and Roy (2004).

RESULT AND DISCUSSIONS

A total of 23 species of mantids belonging to 18 genera and 8 families with including 11 subfamilies were recorded (Fig.1, 2). The greatest number of mantids belong to the families Mantidae (6 species), followed by Eremiaphilidae (4 species), Hymenopodidae (3 species), Toxoderidae (3 species), Gonypetidae (2 species), Rivetinidae (2 species), Empusidae (2 species) and Nanomantidae (1 species). Out of these, the species *Gonypetyllis semuncialis* Wood-Mason, 1891, *Odontomantis pulchra* (Fabricius, 1787), *Didymocorypha lanceolata* (Fabricius, 1798), *Dysaules himalayanus* Wood-Mason, 1889, *Dysaules longicollis* Stål, 1877, *Mantis religiosa religiosa* (Linne, 1758), *Hierodula membranacea* Burmeister, 1838, *Hierodula coarctata* Saussure, 1869, *Hierodula ventralis* Giglio-Tos, 1912, *Deiphobe infuscata* (Saussure, 1870), *Deiphobe mesomelas* Olivier, 1792, *Toxoderopsis taurus* Wood-Mason, 1889, *Aethalochroa ashmoliana* (Westwood, 1841), *Empusa guttula* (Thunberg, 1815) and *Gongylus gongylodes* (Linne, 1758) are reported for the first time from Vidarbha region of Maharashtra (See Table 1 and Fig.2).

Members of the genera *Hierodula* Burmeister, 1838 and *Statilia* Stål, 1877 are most abundant during monsoon and post-monsoon periods as a result of mass emergence. The bark-dwelling species of *Humbertiella* Saussure, 1869 and some species of *Odontomantis* Saussure, 1871 are widely distributed (Mukherjee *et al.*, 1995). Preference to specific ecological niches may help grouping of mantids. For example, species of *Schizocephala*

Serville, 1831 are restricted to the plains or grassy meadows or sometimes to the adjoining field crops and herbaceous vegetation. The small and medium size mantis *Statilia* Stål, 1877 and *Creobroter* Audinet- Serville, 1839 prefer dense shrubby bushes on plains and hillsides. The larger species prefer trees and densely forested areas. The bark-dwellers live on or underneath the bark.

Records of 23 species of mantids from Seloo, Wardha district of Maharashtra, belonging to 18 genera, 8 families, and 11 subfamilies. 14 species and one subspecies of the *Mantis religiosa* species, out of the 23 reported species from the Seloo region, were recorded for the first time in Vidarbha region of Maharashtra. *Gonypteryllis semuncialis* Wood-Mason, 1891 is one of the smallest species of praying mantis. According to the characteristics listed by Mukherjee *et al.* in 1995, we have determined the species to be *Cheddikulama straminea* Henry, 1932, but Mukherjee *et al.* in 2014 misidentified it as *Heterochaetula fissispinis* Wood-Mason, 1889. According to the characteristics listed by Mukherjee *et al.* in 1995, we had treated the species as *Euantissa pulchra* (Fabricius, 1787), but the species has recently been treated as *Odontomantis pulchra* (Fabricius, 1787) (Svenson *et al.*, 2015). According to the characteristics listed by Mukherjee *et al.* in 1995, we have named the species *Deiphobe incisa* Werner, 1933 as *Deiphobe mesomelas* Olivier, 1792 (Schwarz *et al.*, 2018). According to the characteristics listed by Mukherjee *et al.* in 1995, we have named the species *Ephestiasula pictipes* (Wood-Mason, 1879), but (Schwarz *et al.*, 2018) have

synonymized it with *Ephestiasula rogenhoferi* (Saussure, 1872).

Updated list of mantid species from Vidarbha region of Maharashtra is also included. 9 species of mantids were reported from Pench National Park by Sureshan *et al.* (2004). Following that, Sureshan *et al.* (2006) reported 10 species of mantids from the Tadoba Andhari Tiger Reserve. In addition, Jadhav *et al.* (2006) reported 5 species of mantids from Pench National Park. The compilation of all these studies in Vidarbha region and stray records resulted in the enumeration of 32 species belonging to 22 genera representing 8 families. The highest number of mantids recorded belonged to the family Mantidae (8), followed by Hymenopodidae (6), Gonypteryllidae (5), Eremiaphilidae (4), Toxoderidae (3), Rivetiniidae (3), Empusidae (2) and Nanomantidae (1)

Chapekar *et al.* (2021) reported 9 species from Gorewada reserve forest, Nagpur, Vidarbha region. The paper incorrectly identifies the genus *Paraoxypilus* Saussure, 1870 actually not found in India. Since it appeared that these reports could possibly be based on a misidentified mantis, it was thought better to not include these in the checklist of Vidarbha.

The list of Mantids so far known from Vidarbha region of Maharashtra
SYSTEMATIC ACCOUNT
 (Classification after Schwarz and Roy, 2019)

Class INSECTA
 Order MANTODEA Latreille, 1802

Superfamily GONYPETOIDEA

Westwood, 1889

Family Gonypetidae Westwood, 1889**Subfamily Gonypetinae** Westwood, 1889**Tribe Gonypetini** Westwood, 1889**Subtribe Gonypetyllina**Genus *Gonypetyllis* Wood-Mason, 18911. *Gonypetyllis semuncialis* Wood-Mason, 1891**Subtribe Humbertiellina** Brunner de Wattenwyl, 1893Genus *Humbertiella* Saussure, 18692. *Humbertiella indica* Saussure, 18693. *Humbertiella ceylonica* Saussure, 18694. *Humbertiella affinis* Giglio-Tos, 1917**Subfamily Iridopteryginae** Giglio-Tos, 1915**Tribe Amantini**Genus *Amantis* Giglio-Tos, 19155. *Amantis saussurei* (Bolivar, 1897)**Superfamily HYMENOPOIDEA** Giglio-Tos, 1915**Family Empusidae** Burmeister, 1838**Subfamily Empusinae** Burmeister, 1838**Tribe Empusini** Burmeister, 1838**Subtribe Empusina** Burmeister, 1838Genus *Empusa* Illiger, 17986. *Empusa guttula* (Thunberg, 1815)Genus *Gongylus* Thunberg, 18157. *Gongylus gongylodes* (Linne, 1758)**Family Hymenopodidae** Giglio-Tos, 1915**Subfamily Oxypilinae** Saussure, 1871**Tribe Hestiasulini** Giglio-Tos, 1915Genus *Hestiasula* Saussure, 18718. *Hestiasula brunneriana* Saussure, 1871Genus *Ephestiasula* Giglio-Tos, 19159. *Ephestiasula rogenhoferi* (Saussure, 1872)**Subfamily Hymenopodinae** Giglio-Tos, 1915**Tribe Anaxarchini** Giglio-Tos 1919Genus *Odontomantis* Saussure, 187110. *Odontomantis pulchra* (Fabricius, 1787)**Tribe Hymenopodini** Giglio-Tos, 1915**Subtribe Pseudocreobotrina** Brunner de Wattenwyl, 1893Genus *Creobroter* Audinet- Serville, 183911. *Creobroter apicalis* Saussure, 186912. *Creobroter laevicollis* (Saussure, 1870)**Subfamily Phyllothelyinae** Brunner de Wattenwyl, 1893**Tribe Phyllothelyini** Brunner de Wattenwyl, 1893Genus *Phyllothelys* Wood-Mason, 187713. *Phyllothelys westwoodi* (Wood-Mason, 1876)**Superfamily EREMIAPHILOIDEA** Saussure, 1869**Family Eremiaphilidae** Saussure, 1869**Subfamily Iridinae** (Westwood, 1889)**Tribe Didymocoryphini**

Genus *Didymocorypha* Wood-Mason, 1877

14. *Didymocorypha lanceolata* (Fabricius, 1798)

Tribe Dysaulini (Giglio-Tos, 1919)

Genus *Dysaules* Stål, 1877

15. *Dysaules himalayanus* Wood-Mason, 1889

16. *Dysaules longicollis* Stål, 1877

Tribe Schizocephalini Saussure, 1869

Genus *Schizocephala* Serville, 1831

17. *Schizocephala bicornis* (Linne, 1758)

Family Rivetiniidae Ehrmann & Roy, 2002

Subfamily Deiphobinae

Tribe Deiphobini

Genus *Deiphobe* Stål, 1877

18. *Deiphobe infuscata* (Saussure, 1870)

19. *Deiphobe mesomelas* (Olivier, 1792)

20. *Deiphobe indica* Giglio-Tos, 1916

Family Toxoderidae Saussure, 1869

Subfamily Toxoderinae Saussure, 1869

Tribe Toxoderopsini Ehrmann & Roy, 2002

Genus *Toxoderopsis* Wood-Mason, 1889

21. *Toxoderopsis taurus* Wood-Mason, 1889

Tribe Aethalochroini Giglio-Tos, 1914

Genus *Aethalochroa* Wood-Mason, 1877

22. *Aethalochroa ashmoliana* (Westwood, 1841)

Subfamily Oxyothespinae Giglio-Tos, 1916

Tribe Heterochaetulini n. trib.

Genus *Heterochaetula* Wood-Mason, 1889

23. *Heterochaetula fissispinis* Wood-Mason, 1889

Superfamily NANOMANTOIDEA

Brunner de Wattenwyl, 1893

Family Nanomantidae Brunner de Wattenwyl, 1893

Subfamily Tropicodromantinae Giglio-Tos, 1915

Tribe Tropicodromantini Giglio-Tos, 1915

Genus *Eomantis* Giglio-Tos, 1915

24. *Eomantis guttatipennis* (Stål, 1877)

Superfamily MANTOIDEA Latreille, 1802

Family Mantidae Latreille, 1802

Subfamily Mantinae Latreille, 1802

Genus *Statilia* Stål, 1877

25. *Statilia maculata* (Thunberg, 1784)

26. *Statilia nemoralis* (Saussure, 1870)

Genus *Mantis* Linne, 1758

27. *Mantis religiosa* Linne, 1758

Sub-species *Mantis religiosa religiosa* (Linne, 1758)

Sub-species *Mantis religiosa inornata* Werner, 1930

Subfamily Hierodulinae Brunner de Wattenwyl, 1893

Tribe Hierodulini Brunner de Wattenwyl, 1893

- Genus *Hierodula* Burmeister, 1838
 28. *Hierodula tenuidentata* Saussure, 1869
 29. *Hierodula coarctata* Saussure, 1869
 30. *Hierodula membranacea* Burmeister, 1838
 31. *Hierodula ventralis* Giglio-Tos, 1912

Subfamily Tenoderinae Brunner de Wattenwyl, 1893

Tribe Tenoderini Brunner de Wattenwyl, 1893

Subtribe Tenoderina

- Genus *Tenodera* Burmeister, 1838
 32. *Tenodera* sp. Burmeister, 1838

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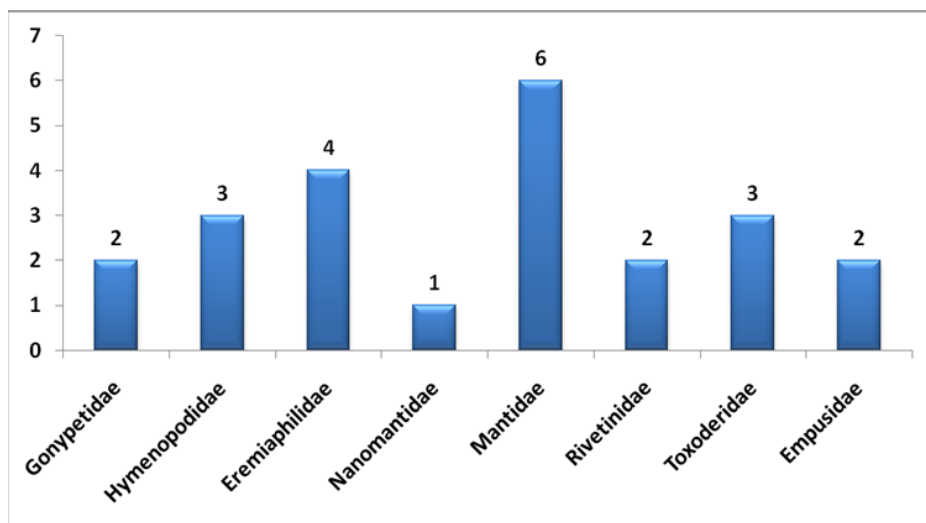
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Table 1: Mantis species of Seloo city and surroundings

| Sr. No. | Scientific Name |
|-------------------------------|---|
| Family: Gonypetidae | |
| 1. | <i>Humbertiella indica</i> Saussure, 1869 |
| 2. | <i>Gonypetyllis semuncialis</i> Wood-Mason, 1891 |
| Family: Hymenopodidae | |
| 3. | <i>Hestiasula brunneriana</i> Saussure, 1871 |
| 4. | <i>Ephestiasula rogenhoferi</i> (Saussure, 1872) |
| 5. | <i>Odontomantis pulchra</i> (Fabricius, 1787) |
| Family: Eremiaphilidae | |
| 6. | <i>Didymocorypha lanceolata</i> (Fabricius, 1798) |
| 7. | <i>Dysaules himalayanus</i> Wood-Mason, 1889 |
| 8. | <i>Dysaules longicollis</i> Stål, 1877 |
| 9. | <i>Schizocephala bicornis</i> (Linne, 1758) |
| Family: Nanomantidae | |
| 10. | <i>Eomantis guttatipennis</i> (Stål, 1877) |
| Family: Mantidae | |
| 11. | <i>Statilia maculata</i> (Thunberg, 1784) |
| 12. | <i>Mantis religiosa religiosa</i> (Linne, 1758) |
| 13. | <i>Hierodula tenuidentata</i> Saussure, 1869 |
| 14. | <i>Hierodula coarctata</i> Saussure, 1869 |

| | |
|-----------------------------|--|
| 15. | <i>Hierodula membranacea</i> Burmeister, 1838 |
| 16. | <i>Hierodula ventralis</i> Giglio-Tos, 1912 |
| Family: Rivetiniidae | |
| 17. | <i>Deiphobe infuscata</i> (Saussure, 1870) |
| 18. | <i>Deiphobe mesomelas</i> (Olivier, 1792) |
| Family: Toxoderidae | |
| 19. | <i>Toxoderopsis taurus</i> Wood-Mason, 1889 |
| 20. | <i>Aethalochroa ashmoliana</i> Westwood, 1841 |
| 21. | <i>Heterochaetula fissispinis</i> Wood-Mason, 1889 |
| Family: Empusidae | |
| 22. | <i>Empusa guttula</i> (Thunberg, 1815) |
| 23. | <i>Gongylus gongyloides</i> (Linne, 1758) |

Figure 1: Family wise distribution of species





Humbertiella indica



Schizocephala bicornis



Mantis religiosa



Hierodula tenuidentata



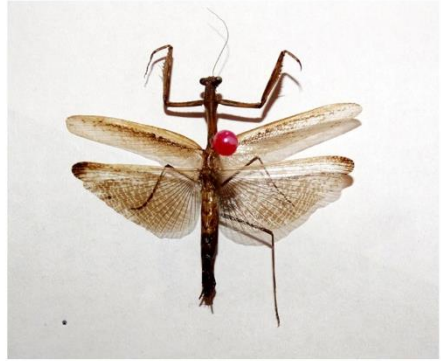
Hierodula ventralis



Deiphobe infuscata



Eomantis guttatipennis



Statilia maculata



Hierodula coarctata



Hierodula membranacea



Deiphobe mesomelas



Gonypetyllis semuncialis



Toxoderopsis taurus



Aethalochroa ashmoliana



Gongylus gongylodes



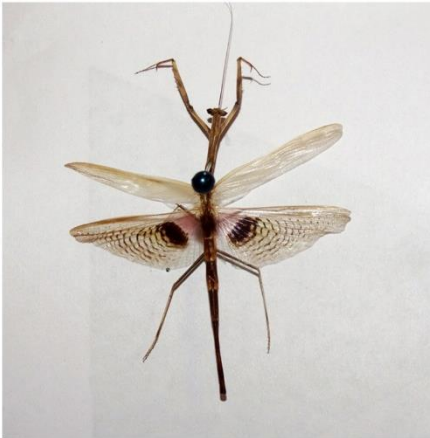
Hestiasula brunneriana



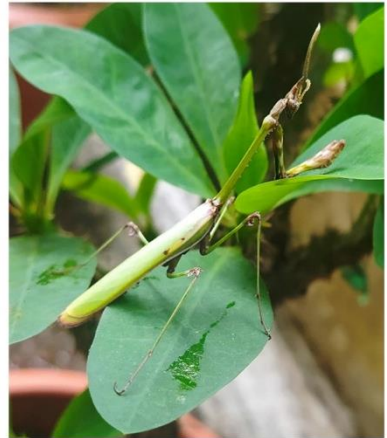
Didymocorypha lanceolata



Dysaules himalayanus



Heterochaetula fissispinis



Empusa guttula



Ephestiasula rogenhoferi



Odontomantis pulchra



Dysaules longicollis



Schizocephala bicornis