

Notes on Displays of Violin Mantis

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Praying Mantis (Insecta: Mantodea), holds a significant place in the ecosystem as predators. They mainly feed on grasshoppers, moths, butterflies, flies, beetles and are well adapted to their environment by camouflage and mimicry. They have attained their common popular name from the way they raise their two fore legs in a posture of prayer. They are often found waiting still for hours for their prey with their heads rotating 180°. They are diurnal and are attracted to lights at night. There are around 2300 species of mantids under 434 genera all over the world. From India 162 species of mantids under 68 genera belonging to six families were reported.

Almost all mantids, regardless of the family they belong to, show a cryptic colouring and behaviour that allows them to being unnoticed by other organisms both prey and predators. Some mimics flowers while some mimics dry leaves. Also, some have cryptic colouration on the body which scares the predator out. They have poor flying ability and are generally seen sitting on herbs, shrubs and trees. Therefore, they generally mimic plant structures or parts to camouflage in its environment. There are two families of plant mimicking mantis belonging to Empusidae and Hymenopodidae. The family Empusidae consists of two subfamily Blepharodinae and Empusinae of 10 genera and 30 species. Under the subfamily Empusinae, tribe

Empusini four genera are present i.e., *Dilatempusa* Roy, *Empusa* Illiger, *Gongylus* Thunberg, *Hypsicorypha* Krauss. Among the genus *Gongylus* three species are present worldwide namely *G. gongylodes* L., *G. pauperatus* Fabricius, *G. trachelophyllus* Burmeister (<http://mantodea.speciesfile.org>).

Globally, *G. gongylodes* is distributed in India: Andhra Pradesh, Kerala, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, West Bengal and Madhya Pradesh; Java; Malaysia; Myanmar; Nepal; Sri Lanka; Thailand. Out of three species present globally, two species of *Gongylus* is present in Odisha i.e., *G. gongylodes* and *G. trachelophyllus*. Here, description of defensive behaviour of *Gongylus gongylodes* L. (Empusidae: Empusinae) was made in R. Udayagiri Range (19°09'22.1''N & 84°08'41.8''E) of Parlakhemundi Forest Division, Gajapati District, Odisha, India.

Below the description of defensive behaviours recorded and reviewed in praying mantids were listed as follows. Frightening attitude in *Mantis religiosa*, *Stagmomantis* spp., Curious Behaviour of *Eremiaphila braueri*, Complex Combined Display (Curious posture, menacing movements, sounds, bright colours) in *Hestiasula sarawaka*, Simple Combined Display: A) Raised wings and Tegmina, foreleg spread and sway in *Deroplatys shelfordi*, *Gryllacris*, and *Theopropus*. B) Flattened coloured forelegs, but not the white mark under tegmina in *Deroplatys*

desiccata. C) Plain foreleg and does not display at all in *Tenodera superstitiosa*. Adaptive Colouration in *Pseudocreobotra wahlbergi*. Floral Simulation in *Gongylus gongylodes* and *Idolum diabolicum*. Deimatic Reaction in *Stagmatoptera biocellata*.

Deimatic behaviour is designed to terrify predators and prevent them from attacking. It typically involves the display of some conspicuous colour or structure. It has also been called 'dymantic', 'frightening' or 'startle behaviour'. Deimatic displays cause attacking predators to hesitate, and perhaps withdraw, thereby giving the prey animal a chance to escape. It occur in both aposematic and cryptic animals so that they can be either a genuine warning of unpleasantness or a bluff.

Many large praying mantids and phasmids have dramatic deimatic displays. These insects are typically cryptic but, if disturbed, they expose previously hidden brightly coloured hind wings in a static display which is maintained for perhaps a minute or more. Large mantids also often expose bright colours on the inside of the forelegs and they may stridulate by rubbing the abdomen between the raised wings making a hissing noise.

The *Gongylus gongylodes* has fascinated entomologists for a long time. In fact, it was the first mantis described by Linnaeus in 1758. *Gongylus* prefers bushes and shrubs in hot areas of South-East Asia.

Gongylus Thunberg is considered to be a floral simulator and shows an impressive defensive behaviour. As in all Empusids, the anterior edges of the forewing are serrated. So, when disturbed, *Gongylus*

rubs them against the femora of its hind legs, thus producing a hissing noise. Floral simulators mean that these mantids mimics a flower to confuse its prey. So, when a prey approach to sit or feed these virtual flowers the mantis grab and feed on it. Meanwhile, if *G. gongylodes* gets disturb it shows a dancing movement in which the mid leg and hind leg are fixed and the central axis of the body moves left and right with the raptorial legs folded and faced anteriorly. The prothorax resembles a stem and swaying sideways movements which mimics a flower moving in the wind (Fig:4). This movement is said to attract prey (insects, including butterflies).

Defensive posture shown to scare a predator or superior organism. The deimatic behaviour observed here as the raptorial legs crossed and enclosed towards the central axis of the body in a 'V' shape for 10-12 sec. Later it opens up this crossed position of raptorial legs upwards to form a 'W' shape formation which exposes a black spot on the ventral white surface of the thorax 8-10sec (Figs. 1-3). If that expression doesn't work it raise its raptorial legs upwards and waves from left to right and vice versa to scare the opposer. In this defensive behaviour the interesting thing to notice is that the mantid does not opens its tegmina or extend its forelegs to either side to increase the apparent size of the body. Rather it waves the raptorial legs in upward position from left to right and vice versa. Also, as earlier recorded that it rubs its tegmina with femora of its hindleg which produces hissing noise when disturbs, but here no hissing noise was observed. This kind of deimatic behaviour was not recorded in violin mantis earlier rather only floral simulation was recorded.



Figs. 1-3. represent the sequence of 'Deimatic behaviour' of female *Gongylus gonylodes*



Fig. 4. Swaying movement of *Gongylus gonylodes*

From the above study it can be concluded that there are still much more to discover in the defensive behaviour of the mantids. It is necessary to understand behaviour of an organism to understand its evolutionary linkages with other organisms.

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Fig. 5. Adult of Female *Gongylus gonylodes*



Fig. 6. Nymph of Female *Gongylus gonylodes*

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