

Mantis: An Efficient Predator in Nature

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Abstract: -

The praying mantis is a unique insect known for its special body, hunting techniques and ability to ambush with surrounding environments to escape danger. They have triangular head with large eyes and strong front legs designed to catch prey. Mantises hunt by staying still and blending into their surroundings, quickly grabbing prey with their front legs. They can also detach their limbs to escape predators. These characteristics make the mantis a fascinating predator and a subject of interests for insect researchers.

Keywords: Escape, mantis, prey, surroundings.

Introduction:

The common name 'praying' mantid comes from the way in which these insects rest with their front legs held up and together as if in prayer. Mantids are masters of ambush and rely on being difficult to see. They keep very still or sway gently to mimic the movement of the foliage, and their colour patterns are usually sombre greens and browns to blend in perfectly with the background. Some tropical species may be very brightly coloured and ornamented with strange cuticular outgrowths and texturing to mimic the flowers upon which they rest.

Mantids have distinctive triangular and

very mobile heads with a pair of large compound eyes placed laterally and facing forward to give true binocular vision [Fig-1 (a)].



Fig-1(a) *Mantis religiosa*

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Fig-1(b) Predation by *Mantis religiosa*

Binocular triangulation to calculate the prey objects is known in many vertebrates, but has also been proved conclusively in mantids, showing that even the smallest brains can undertake complex sensory tasks. In addition to the eyes, there may be three ocelli. The mobile head of the mantid (*Mantis religiosa*) is supported by a very elongate prothorax, which also bears the raptorial front legs. The coxa of the front legs is also very elongate, and the femur is enlarged and variously equipped with rows of sharp spines and teeth [Fig-1(b)]. The tibia, which is also spined or toothed, folds back on the inner face of the femur like a jack knife. The middle and hind pair of legs are of normal construction and appear to arise much further back down the body. The front wings are narrow and toughened while the fan-folded, hind wings are much larger, membranous, and have a more obvious net-

like arrangement of veins, although some species have short wings or may be wingless. Some mantids can be incredibly stick insect-like, but the shape of the head and the raptorial front legs are characteristic.

Key features of *Mantis religiosa*

- Distinctive highly mobile, triangular head with large, forward-facing compound eyes.
- Front pair of legs characteristically modified for prey capture.
- Asymmetric male genitalia.
- Eggs laid in papery, foam-like, or cellophane-like egg case.

Mechanism of predation

In the initial phase, the tibiae are fully extended in readiness for the second phase, which takes the form of a rapid sweeping action. The femora are quickly extended and at the same time, the tibiae are flexed around the prey. It has been shown that some of the spines projecting from the ventral surface of the femora are moveable and, when stimulated, elicit a tibial flexion reflex, which helps the insect maintain a strong grip on struggling prey. The size of prey that mantids can cope with depends on the species, but, generally, if prey can kick or jump, the mantid will not attack anything much larger than half its own body weight. Portions of the prey containing poisonous secretions are left uneaten. However, mantises of the genus *Carrikerella*

follow a different hunting approach. The spines of their raptorial fore tibiae are forwardly oriented and barbed much like a spear or a harpoon. While most species use the spines of their raptorial forelegs to simply restrain their prey, *Carrikerella* use their fore tibial spines to impale microscopic arthropods that they fish out of small crevices that most mantises would not be able to access.

Egg laying in mantis

Eggs are laid within a protective papery or foam-like ootheca made from abdominal gland secretions. This egg case contains anything from a dozen to a few hundred eggs, depending on the species. In some cases, a balloon of a cellophane-like secretion surrounds an inner ootheca. The ootheca is fixed to twigs or rock surfaces and, in some species, is guarded against predators by the female. Several species of parasitic wasps with appropriately long ovipositors seek out mantid egg cases and will parasitize every egg within. In guarding species, maternal care may even continue for a few days after the young have hatched. On hatching, the very small nymphs moult again before they start feeding; they become adult after ten or twelve moults.

Autotomy in mantis

Mantids also need to defend themselves against birds, reptiles and mammals. They can run, fly, and hide, but also

use threat postures, holding their front legs out sideways to look bigger and displaying bright markings on the inside of the femora. No idle threat, a strike from a mantid can easily draw blood or damage an eye, and a predator might be persuaded to seek an easier meal elsewhere. Like stick insects, mantids will shed a leg if trapped, but autotomy rarely involves the front legs, without which the insect would eventually die of hunger.

Conclusion

In conclusion, the mantis is a highly efficient predator, utilizing its unique physical adaptations, such as its specialized forelegs (raptorial types of leg) and exceptional camouflage, to capture and consume prey with remarkable precision. Its hunting strategies, including ambush and quick strikes, allow it to thrive in diverse environments. The mantis shows the effectiveness of nature's evolutionary design in ensuring survival through skillful predation.