GreenariA
Go Green, Learn Green
An Agricultural Monthly e-Magazine
Volume 02, Issue 07, 2024
ISSN: 2584-153X
Article ID: G-24-0714

CHICANERY IN THE WILD: EXPLORING INSECT'S AGGRESSIVE MIMICRY

Dharani Priya N
Assistant Professor (Entomology), Department of Crop Protection,
PGP College of Agricultural Sciences, Namakkal 637405
Corresponding Author Mail ID: dharanipriya1123@gmail.com

INTRODUCTION

Nature frequently showcases intriguing instances of deception and mimicry, as organisms use clever strategies to survive and flourish in their habitats. Among these, aggressive mimicry in insects stands out as a captivating demonstration of evolutionary strategy. This paper delves into the fascinating world of deception in nature, exploring how various insects have mastered aggressive mimicry to manipulate their prey, predators, and competitors. By understanding these complex tactics, we gain valuable insights into the dynamics of ecological interactions and the remarkable adaptability of organisms in their natural environments.

Aggressive Mimicry

Aggressive mimicry was first observed by E.G. Peckham, 1889 and later the term was coined by Poulton in 1890 and included it in the classification of mimicry. It is also called as Peckhamanian mimicry. It is opposite to Batesian and Mullerian mimicry. There, the imitation is meant for protection whereas in Aggressive mimicry, the imitation is not for protection but to prey upon other species. The predator mimic like a prey in order to exploit the recipient of the signal.

Insects Mastering Aggressive Mimicry

Blister beetle Triungulins - *Meloe franciscanus*

Predacious firefly - *Photuris versicolor*

Assassin bug - *Stenoleumus bituberus*

Spotted predatory katydid - *Chlorobalius leucoviridis*

Bolas spider - *Mastophora hutchinsoni*

The Deceptive Strategy: Triungulins Vs Bees

Triungulins, the larvae of Blister beetle, *Meloe franciscanus*, have developed a cunning and sophisticated technique to assure their survival by parasitizing particular types of bees, particularly those in the genus Habropoda. These triungulins target male digger bees (Habropoda spp.) by producing chemical signals that resemble the sex pheromones released by female bees.

Remarkably successful mimicry is used to fool male bees into thinking they are interacting with receptive females. A male bee mistakenly detects the triungulins as possible mates when it gets close to the source of the chemical signal. After then, the triungulins cling to the male bee's body. The male bee transfers its triungulins to the female during subsequent mating rituals. This transfer frequently occurs organically during the course of reproduction. The triungulins are carried to the bee's nest by the female bee when they board her. The triungulins take advantage of their host's resources inside the beehive. They eat the resources that the female bee gathers, which are usually bee eggs, nectar, and pollen. The triungulins obtain the nutrients and

energy required for their development by absorbing these essential resources.

By taking advantage of the targeted bee species' reproductive patterns and nest-building customs, this parasitic tactic guarantees the survival of the triungulins. The triungulins gain entry to bee nests where they can flourish at the expense of the host bee's progeny and resources by imitating the pheromones of female bees and jumping aboard unsuspecting male bees. This symbiotic connection shows an intriguing example of the intricate interactions between species that occur in nature, despite being harmful to the host bee.

Triungulins on the body of Bees

Femme fatale: Photuris female Vs Photinus male

Fireflies are nighttime insects known for their bioluminescence, belonging to the Lampyridae family. Two common genera are Photinus and Photuris. They have soft bodies with specialized glowing organs on their abdomens, used for intricate light-based communication to attract potential mates.

Female Photinus fireflies can distinguish between males by assessing their flashing patterns. Females are more likely to respond to males with longer flashes. During courtship, females typically remain stationary on the ground or vegetation while males fly nearby, signalling. If the female responds positively, the male approaches, and they engage in species-specific communication.

Female Photuris fireflies have the ability to mimic Photinus flash patterns. They respond to male Photinus signals, luring them under the guise of mating. However, instead of mating, the Photuris females prey on the male Photinus. This behaviour is driven not by hunger but by the desire to obtain Lucibufagin, a chemical found in the blood of Photinus males that acts as a defense against predators. Photuris do not naturally produce Lucibufagin, making this chemical benefit crucial for their defense. This acquired protection may also extend to the offspring, providing them with similar defenses against predators (Lloyd, 1975).

The Deceptive Strategy: Assassin bug Vs Spider

The Assassin bug *(Stenolemus bituberus)* effectively turns the spider's primary tool, its web, against it. This predatory bug employs two main techniques, stalking and luring to capture web-building spiders. In the stalking approach, the bug slowly advances toward the spider until its close enough to strike. In the luring approach, the bug uses its forelegs to pluck the silk threads of the web, mimicking the vibrations caused by prey caught in the web. This action tricks the spider into approaching, thinking it has caught prey. Once close, the Assassin bug swiftly taps, grabs, stabs, and consumes the spider. This hunting behaviour suggests that the bug's plucking of the web generates vibrations that resemble those of struggling prey, fooling the spider into coming closer (Wignall and Taylor, 2010).

Photuris female attacking Photinus male

The Deceptive Strategy: Katydid Vs cicadas

The Spotted Predatory Katydid, *Chlorobalius leucoviridis,* is known for its remarkable ability to mimic the acoustic signals of female cicadas, specifically targeting male cicadas of the Tribe Cicadettini. Both male and female *C. leucoviridis* possess specialized structures on their forewings that allow them to produce sounds. Male katydids create distinctive trilling songs at night to attract female mates.

This katydid species can imitate a wide range of cicada species, even those it has never encountered historically. The character of cicadas is that male produce loud noise and the female “wing flick” in respond to that sound. It is explained by the famous phrase, ”HAPPY THE CICADA LIVE, SINCE THEY ALL HAVE VOICELESS WIVES”

To lure male cicadas, *Chlorobalius leucoviridis* uses a clever strategy: it mimics the wing flicks and sounds of female cicadas. By producing signals resembling those of female cicadas, the katydid tricks male cicadas into approaching, presuming a mate is nearby. Once the unsuspecting cicada draws near, thinking it's a female, the katydid preys upon it. Sonogram recordings demonstrate that the katydid's clicks closely resemble the sound and timing of female cicada wing flicks. This predatory behaviour showcases the katydid's sophisticated adaptation for hunting cicadas using mimicry (Marshall and Hill, 2009).

Assassin bug attacking Spider

The Deceptive Strategy: Bolas spider Vs Moths

Bolas spiders, like those of the *Mastophora hutchinsonii* genus, have a distinctive method of capturing prey. Instead of using a traditional web, they rely on a single silk line ending in a sticky glob called a bolas, which they fling at unsuspecting prey to ensnare them. This unique technique is likened to fishing, where the spider uses its bolas much like a fisherman uses a line and bait to catch fish.

M. hutchinsonii spiders target male moths of both *Lacinipolia renigera* and *Tetanolita mynesalis* species by mimicking the sex pheromones emitted by female moths. These moth species release distinct pheromones and are active at different times during the night. To effectively attract both moths, the spider blends the pheromones of the two species during the evening. Initially, the spider emits the pheromone of *L. renigera* to attract males of this species before 10 PM. Later in the night, after 1 AM, when T. mynesalis becomes active, the spider switches to emitting only the pheromone of this species (Haynes et al., 2002).

Bolas Spider attacking moths

CONCLUSION

The aggressive mimicry in insects shows how these creatures use deception to survive by tricking other species. They employ mimicry to manipulate their prey's senses and behaviours, ensuring their own survival in complex ecosystems. Studying this phenomenon sheds light on the diverse ways organisms adapt and compete in nature. Overall, it's a fascinating glimpse into the cunning strategies of these small but remarkable creatures.

REFERENCES

Haynes, K. F., Gemeno, C., Yeargan, K. V., Millar, J. G., & Johnson, K. M. (2002). Aggressive chemical mimicry of moth pheromones by a bolas spider: How does this specialist predator attract more than one species of prey? Chemoecology, 12(2), 99 - 105.

Lloyd, J. E. (1975). Aggressive mimicry in Photuris fireflies: signal repertoires by femmes fatales. Science, 187(4175), 452 - 453.

Marshall, D. C., & Hill, K. B. R. (2009). Versatile aggressive mimicry of cicadas by an Australian predatory katydid. PLoS ONE, 4(1), e4185.

Wignall, A. E., & Taylor, P. W. (2010). Predatory behaviour of an araneophagic assassin bug. Journal of Ethology, 28, 437 - 445.