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Entomology, Ornithology & Herpetology: Current Research

Commentary

Population and Community Ecology of Agricultural Entomology

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DESCRIPTION

The study of insects and their interactions with other living things, people, and the environment is known as entomology. The fields of molecular science, criminology, forensics, chemistry, biology, human and animal health, and agriculture all benefit greatly from the work of entomologists. A branch of entomology that focuses on the study of harmful and beneficial insects that affect field crops, fruits, and vegetables is known as agricultural entomology. It also includes pests that aren't insects, such rodents and other vertebrates and invertebrates (like nematodes).

Teaching numerous courses about insects and their function in agricultural systems is one of the department of agricultural entomology's main goals. Additionally, it strives to graduate students, keep track of the primary insect and vertebrate crop pests, and create effective technological solutions to reduce the production losses brought on by these pests. The division is now concentrating its efforts on creating integrated pest management solutions.

Population of agricultural entomology

Studies at the population and community levels fall under the scope of insect ecology. Although the species is the primary focus of biological analysis in agricultural entomology, knowledge of processes occurring at the population and community levels is crucial for management. Populations are groups of conspecific people living in a specific geographic area (e.g., a crop field, a river valley, a mountain chain).

Insects in general have tremendous reproductive capacities. According to Borror, Triplehorn, and Johnson's calculations, a pair of fruit flies (Drosophila), for instance, produces 100 viable eggs, half of which produce females that in turn will lay 100 eggs, and so on for 25 possible generations in a year; by the end of the year, the twenty-fifth generation would contain 1.1921041 flies, which, if packed closely together, 60,000 to a litre, would form a ball of flies Obviously, nature does not experience such unrestricted population expansion. Populations are often controlled by a combination of environmental physical (or abiotic) and biological (or biotic) variables.One of the most active areas of research in agricultural entomology is the understanding of the mortality factors that aid in controlling insect populations.

An ecological community is a group of organisms that coexist and interact in a given area to varied degrees. The main producers in a farming community are the crop plants and the weeds that cling to the crop field or spread out along the edges. The creatures that make up the crop community maintain dynamic trophic connections; some eat both living and dead plants, while others eat mammals. Herbivores, often known as main consumers, are animals that devour plants for food. On the crop plants, pests are the main consumers. The secondary consumers are parasitoids and predators.

Beneficial natural enemies are those who prey on pests. Finally, organic matter in decay is the food source for decomposers and detritivores. "Food webs" link the community's biotic components together. Because it provides a foundation for analysing the nature of disturbances in crop ecosystems, knowledge of food webs and trophic interactions in crop communities is crucial. Pest organism outbreaks and the need for control measures might result from disturbances in trophic relationships.

Community ecology of agricultural entomology

Our understanding of arthropod population dynamics has been greatly influenced by agricultural entomology, particularly the need to manage insect pests. Due of the huge concentration of resources they represent, cropping systems may attract large numbers of specialised herbivore species (the resource concentration theory of Root). The "Root's natural enemies hypothesis" postulates that such monocultures may also have less insect diversity than native plant communities, which would consequently result in a relative decrease in the number of generalist predators targeting herbivores in monocultures.

- To teach and develop appropriate strategies for IPM technologies.
- To develop technologies based on bio-control methods to manage insect pests and weeds.

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- To create effective insect/non-insect pest management methods based on botanicals and organic goods (mite, snail, slug, and rodent).

CONCLUSION

We conduct research on ecosystem services and biodiversity in agricultural environments. We investigate the connections between biodiversity, food web structure, and the supply of services, as well as how different scales of land use and farming techniques might be altered to support ecosystem services. We focus on invertebrate pest and weed biological management, but we also examine other ecosystem services including pollination.