JUST AGRICULTURE
multidisciplinary e-Newsletter

Changing Scenario of Agriculture by the use of Natural Enemies

Hemant Swami, Neeraj Kumar Meena and Saif ali Khan
Rajasthan College of Agriculture, MPUAT, Udaipur-313001, Rajasthan, India

ARTICLE ID: 11

Introduction

Natural enemies are the fundamental unit For implementation of IPM programmes in Agriculture. Natural enemies are organisms that kill, decrease the reproductive potential or reduce the number of another organism. They can limit the pest damage hence they are of great interest in pest management. They are beneficial organisms that compete with pest or secrete substances that inhibit pest activities.

The misuses of insecticides have resulted to increase in different problems in agriculture:-

- Effect of insecticides on balance of nature.
- Development of resistant strains of insects.
- Effect of toxic residues on user and consumer.
- Outbreak of different insect pest due to use of synthetic insecticides.
- Hazardous effect on wildlife and human.
- Problems of pest resurgence.
- Adverse effect on soil treated for nematodes, white grubs or sucking pest complexes.

These all factors have been responsible for evoking considerable interest in adoption of biological control in recent years. Also recent development in field of insecticides resolved the fact that insecticides will never permanently solve the pest problems. Biological control is a promising alternative to ecologically disruptive pest control measures. There is a great need to improve the efficiency of the biological agents for which a proper understanding of their ecology, behavior, physiology, genetics and immunology is essential. Natural enemies are introduced, encouraged, multiplied by artificial means and disseminated by man with his own efforts instead of leaving it to nature. The natural enemies of insects include some of the parasitoids, predators, disease causing viruses, bacteria, fungi and protozoa, parasitic nematodes and predatory vertebrates.

JUST AGRICULTURE
multidisciplinary e-Newsletter

Parasitoids as beneficial

A Well-known biological control agents for arthropod pests in agricultural and forest ecosystem are parasitoids which are a very large group of hymenopteran insects. It is an organism during its development lives in or on the body of single host individual, eventually killing the host in the process of parasitism. By making use of a battery clues and stimuli parasitoids have solved many problems of host location. They perform an important ecosystem by suppressing pest populations. The life cycle and reproductive habits of parasitoid are complex. They are smaller than their host. There are 68,000 named species of parasitoids. Different parasitoid species attack different life stages of the host viz. Egg parasitoid- *Trichogrammachilonis* targets eggs of cotton bollworm, sugarcane internode borer, rice leaf folder ; Larval parasitoid- *Campoletischloridae* targets larvae of *helicoverpaarmigera* ; Nymph and adult parasitoid- *Encarsiaformosa* against cotton whitefly.

Encarsiaformosa

Telonomusremus

Tichogrammachilonis

Evaniaappendigaster

JUST AGRICULTURE
multidisciplinary e-Newsletter

Predators as beneficial

An organism that during its development consumes more than one prey individual to complete its lifecycle. They are large than their prey and overwhelm their prey by attacking in large numbers. Predators are active in habits and have structural adoptions for catching the prey with well-developed sense organs and swift movements. They feed upon a large number of small insects every day. Amongst them lady beetle is one of the most helpful insects, friendliest looking; Green lacewings are found worldwide, with a network of wing veins giving a lacy appearance ; Praying mantis are another type of carnivores that prey on pest that damages desirable plants.

Lady bird beetle

Dragonfly

Green lacewing

Preying mantis

Biological control practices involves three techniques:

- **Introduction:-** It is deliberate introduction and establishment of natural enemies to a new locality where they did not occur or originate naturally. When natural enemies are successfully established, it usually continues to control pest population.
- **Augmentation:-** It is efforts to increase population of natural enemies either by propagation and release or by environmental manipulation. It includes all activities designed to increase the number or effect of existing natural enemies.
- **Conservation:-** It is actions to preserve and release of natural enemies by environmental manipulations or alter production practices to protect natural enemies that are already present in an area or non-use of those pest control measures that destroy natural enemies.