CHAPTER I

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Biological control or biocontrol is the method of controlling pests whether of plants, animals or man, by exposing them to their natural enemies. For insects, the natural enemies are the parasites, parasitoids, predators and pathogens.

The increasing levels of insect resistance to chemical insecticides has been driving force for change in insect pest management. The development of insect resistance prompted the search for alternative means of control both as a substitute to chemical control and as a means of delaying the development of resistance. The use of natural enemies would also reduce the reliance on chemical insecticides. Since natural enemies have many advantages over chemicals other than providing an immediate form of control, their increased use would seem particularly appropriate in the context of increasing pest resistance to chemicals.

Management of an insect pest in a cropping system can be achieved if the techniques used reduce both the initial numbers infesting the crop and the rate of population growth i.e., they utilize the important density dependent and independent factors that have been indentified. Should population density continue to increase, then natural enemy population
would ideally start to regulate the population size. Hence collection, identification, augmentation and conservation of natural enemies is very much required for better insect pest management.

In India, lot of work has been done on collection and identification of natural enemies of various insect species, but proportionately much less work has been done for their conservation. For many natural enemies, large scale production technology is not available. Longer self life of the formulation is need of the time. Very often there is an extreme shortage of natural enemies encountered in the field which indicate that inundative release is required to control the insect menace. Hence, it becomes imperative to develop a unit for mass culturing of natural enemies for continuous supply of the natural enemies.

Biological control came into existence with some spectacular success from the very beginning of the civilization and since then the attempts continue to use natural enemies, like pathogens, parasite, predators etc. to combat the noxious pests of crops. Biological control has the advantage that once established, it is self perpetuating and no further expenditure is involved. About 110 pests in 60 countries of the world have been controlled by using biological methods.

Heliothis armigera infested badly tomato & brinjal causes loss may exceed about 300 million per year approximately and losses in other must add substantially to that total. So Heliothis armigera is becoming an increasing serious problem; Heliothis spp. cause extensive losses to food
and fibre crops in India. Indiscriminate pesticide use and the availability of monocultures of preferred host plants have aggravated the problem.

The principal parasite’s that contributes to mortality of Heliothis larvae was found to be the most predominant larval parasite and a key mortality factor suppressing the larval population in early stages. Second instar larvae were practically immune to the attack of this parasite.

Ridway and Lingren (1972) summarised that 50 to 90 per cent of eggs and larvae of Heliothis spp. are normally destroyed by naturally occurring predators and parasites. They agreed with that it was reasonable to assume 75% natural control of Heliothis by natural enemies.

The proposed research objectives were as follows:

1) To develop mass production techniques of Heliothis, NPV and Trichogramma, spp. for field release in Solanaceous and Cucurbitaceous insect pests.

2) To develop techniques for round the year production of all these natural enemies.

3) To use these natural enemies in an integrated manner with other eco-friendly pest management techniques.

4) To develop the effective formulation of Heliothis NPV.

5) To study the economic facility of natural enemies in field conditions.

The proposed research proved the use of natural enemies and supplying them for release whenever the need is felt in fields.
The insect viruses (NPV and GV) have to be mass multiplied in vivo conditions for which the host larvae have to be reared on semi synthetic diets. Proper maintenance conditions for healthy host larvae has to be worked out. The lost larvae have to be prevented from any disease on parasitoid infection/infestation. High degree of hygienic conditions has to be maintained.