

**Ex No: 12**

**Date:**

## **STUDY OF INSECT WEED KILLERS AND SCAVENGERS**

### **Weed Killers:**

Quite many insects feed upon unwanted weeds just the same manner they do with cultivated crops. Because they damage the noxious and menacing weeds, these insects are considered helpful or friendly to man. In many cases the occurrence of these insects have contributed much towards eradication of the weed or at least keeping it in check.

What is a weed? A weed is a plant in the wrong place. They cause losses in many ways like (a) Yield loss due to competition (b) Increased cost of cultivation (c) Direct injury of man, livestock or livestock products (d) Depreciation of watershed and wild life values (e) Serving as alternative hosts for insect pests or plant pathogens.

### **Insects as agents for weed control:**

From the year 1902 when eight species of insects were introduced into Hawaii from Mexico for the control of *Lantana camera*, insects have been principal agents used in biological control of weeds. These insects feed on various parts of the weed plants and destroy them. Important groups of insects which have been successfully used for weed control are;

Lepidoptera	:	Phycitidae, Tortricidae
Homoptera	:	Coccidae
Hemiptera	:	Coreidae, Tingidae
Coleoptera	:	Cerambycidae, Chrysomelidae, Buprestidae, Curculionidae, Galeuricidae
Diptera	:	Agromyzidae, Trypetidae

**Action on weeds :** Insects often destroy weeds through direct destruction of vital parts.

Ex : Action of *Cactoblastic cactorum* on Opuntia. The weed may die quickly or die during the next season.

Insects also attack weeds indirectly through (a) creating favourableness to infection by plant pathogens (b) affecting the competitive advantage of the weed.

### **Desirable attributes of a weed killer:**

1. It should not itself be a pest of cultivated plants (as *Orthezia insignis*) and should not even at a later date turn to attack useful crops, which is often the case with weed killing insects.
2. It should be effective in damaging and controlling the weeds.
3. It should preferably be a borer or internal feeder of the weed. Leaf feeders have also been found to be equally effective in checking weeds.
4. It should be able to multiply in good number without being affected very much by parasitoids and predators.

### **Examples of biological control of weeds with insects :**

**1. Lantana weed *Lantana camera* :** It is a perennial shrub, native of Central America; is used extensively throughout the world as an ornamental plant. But it became a pest of range lands, coconut plantations, field crops, etc. the search by Albert Koebela in Mexico and Central America for insects destructive to Lantana resulted in the introduction of eight species of insects into Hawaii of which a seed fly *Ophiomyia lantanae* was more effective. *O.lantanae* was introduced into India from Hawaii for the control of Lantana. But an introduced coccid (scale insect) *Orthezia insignis* besides its failure to effectively check the weed began to infest economic plants like citrus, coffee, cinchona and tomato.

**2. Prickly pear, *Opuntia spp* :** Various species of *Opuntia* have been transported by man around the world. In many places it has become a very serious weed occupying millions of cultivated area. One of the outstanding examples of use of insects in the biological control of weeds was the control of *Opuntia* in Australia. The prickly pear, *Opuntia inermis (O.stricta)* got accidentally introduced into that country by 1840. The cactus spread was so rapid that in the year 1925, 24 million hectares of cultivable land were rendered useless. Control of this weed by chemical and mechanical means was not feasible and was too costly. In 1925 the moth borer, *Cactoblastis cactorum* (Pyralidae : Lepidoptera) was introduced from Argentina and the plants were killed by damaging them into papery structures. Within few years the weed population was reduced to a very great extent that *Opuntia* was no more a problem.

In India, *Opuntia dilleni* was wrongly introduced in 1780 in the place of *O. coccinellifera* for the cultivation of the commercial cochineal insect *Dactylopius coccus* valued for its dye. The cactus got established and spread rapidly assuming a serious proportion as a noxious weed. *Dactylopius tomentosus* was introduced from Sri Lanka in 1926 and within two years the insect effected a striking control of *Opuntia dilleni* in about 1,00,000 acres.

3. Crofton weed *Eupatorium adenophorum* in Nilgiris and Palani hills was controlled by introducing an exotic Tephritid fly, *Procecidochares utilis* from New Zealand.

4. Water hyacinth (*Eichhornia crassipes*) was successfully controlled with *Neochetina eichhorniae*, *N. brunchi* and mite *Orthogalumna terebrantis* (Curculionidae) in Kerala and Karnataka.

7. Water fern *Salvinia molesta* was successfully controlled with *Cryptobagus cingularis* (Curculionidae) in India.

8. Control of Siam weed *Chromolaena odorata* by release of *Parenchaetes pseudoinsulata* (Arctiidae) has been found promising in Kerala and Karnataka.

9. *Parthenium hysterophorus* (Congress grass, carrot weed, white top) has been successfully controlled in Karnataka by Mexican beetle, *Zygogramma bicolorata* (Chrysomelidae).

Classical biological control of weed is relatively inexpensive when applied in proper situation. Ex : *Opuntia triacantha* was controlled in the Island Nevis, West Indies between 1957 and 1960 at a cost of \$1,500. This would have cost \$30,000-40,000 annually with herbicides. A successful biocontrol project offers long term control with little or no additional costs after initial implementation costs.

**Scavengers :** Insects which feed on dead and decaying plant and animal matter are called scavengers.

Remove decomposing material and prevents health hazard Convert complex material into simple substances, Chafer beetles (Scarabaeidae : Coleoptera), Bark beetles (Tenebrionidae : Coleoptera), Nitidulids (Nitidulidae : Coleoptera), Water scavenger beetle (Hydrophilidae : Coleoptera), Daddy long legs (Tipulidae : Diptera) Muscid flies (Muscidae : Diptera), Termites (Isoptera) and Ants (Hymenoptera)

**Record Work:**

Collect, observe and identify different insect pollinators, scavengers and weed killers from the fields.