2.5 METHODS OF INSECT CONTROL

Every practice that makes life hard for insects and tends to kill them and to prevent their population increase is called method of insect control. The insect control implies the regulation of insect activity in the interest of man. Control of insects is of two types.

2.5.1 Natural Control

All control measures which are in the hands of nature collectively constitute natural control. Natural control has the following types.

- Weather factors e.g. temperature, humidity, light, rainfall, hail storm, wind etc.
- Topographical features e.g. mountains, oceans, lakes, deserts, rivers etc.
- Parasites, parasitoids and predators take their food from other insects and harm or kill them.
- Diseases are caused in the insects that weaken or kill them.

2.5.2 Artificial or Applied Control

All the measures and practices carried out by man for the control of insects are called artificial control. It is of following types:

- Cultural or agricultural control
- Physical control
- Mechanical control
- Biological control
- Reproductive or genetic control
- Legal control or legislative control
- Chemical control
- Integrated pest management

2.5.2.1 CULTURAL OR AGRICULTURAL CONTROL

It is the control of insect pests by performing ordinary agricultural practices or farm operations. The following farm operations can control the insect pests in various crops:

1. **Ploughing:** Certain insects like crickets and grubs of beetles are exposed to the sun by ploughing and thus they are eaten by the birds or may be killed by extreme sunlight.

2. **Hoeing or Interculture:** Hoeing or inter-culture can also reduce the population of certain insect pests e.g. the eggs of mango mealy bug can be destroyed by hoeing.

3. **Manuring:** Fertilizer application in the field can make the crop healthy and vigorous. Such a crop can resist or withstand the attack of various insect pests. So, manuring or fertilizing has an indirect effect upon the insects.

4. **Irrigation or Watering:** By irrigating the fields, certain insect pests can be driven out of the field and thus the crop can be saved e.g. the ants attacking cotton, sugarcane, etc.

5. **Clean Culture or Eradication of weeds:** The crops, which are not clean and are full of weeds, are seriously attacked by some insect pests. For keeping the insects away from the crop, the farmers should not allow the weeds to grow in their fields. Some weeds act as alternate host plant for food and egg laying places for the insects like army worms and hairy caterpillars.

6. **Removal of stubbles:** Stubbles of various crops like sugarcane, rice, maize etc. should be uprooted because the borers of these crops hibernate or hide themselves in these stubbles.

7. **Removal of affected crop plants and the fallen fruits:** Insect attacked portions of the plants should be cut and removed from the fields. If we do not remove the affected portions from the field, then the insect move towards the healthy portions of the other plants. Borers affected plant portions of rice and sugarcane & fruits affected by fruit fly in mango and citrus orchards should be removed.

8. **Crop rotation:** A single crop should not be grown year after year in the same field because the insects attacking on a particular crop remain hibernated in the soil/stubbles and attack the crop in the next year.

9. **Sowing of resistant varieties:** The susceptible varieties of crops get the higher level

of attack of insect pests whereas the resistant varieties are least affected by them. At present we do not have any absolutely resistant variety of any crop but many varieties of crops have a comparative resistance against insect pests. The hairy cotton varieties are more resistant to the attack of sucking pests like cotton jassid, whitefly etc. than the non-hairy varieties. The cane varieties with hard skin or epidermis are more resistant to the attack of sugar cane borers than the varieties with soft skin. The Basmati variety of rice is highly susceptible to the attack of rice borers than the IRRI of rice. Similarly the rice Basmati variety is comparatively resistant against the attack of the leaf hopper.

10. Growing of trap crops: Growing of lady finger crop around outer border of cotton field attracts the cotton jassid and spotted boll worm. Thus cotton crop will be saved from the attack of these insects. Similarly, arhar crop can be sown along outer borders of the cotton crop to attract the cotton weevil and thus the crop can be saved from this insect pest. Cotton weevil may also be controlled easily by spraying on arhar crop.

2.5.2.2 PHYSICAL CONTROL

It is the control of insect pest by the manipulation of physical factors of the environment. The following physical factors are used for the control the insect pests:

1) Temperature:

The insects can carry out their development and activity at a particular level of temperature (optimum temp. of 30-35 °C). If the temperature is extremely increases or decreases, the insects can't perform their normal activities.

(i) Use of Solar Energy: In Pakistan, it is a common practice to spread the infested cereal grains in the sun light for killing stored grain insects.

(ii) Use of high temperature: All stored grain pests in the stores can be killed by maintaining a very high temperature of 54 - 55 °C with the help of heating pipes. By this method, all insect pests are quickly killed.

(iii) Use of low temperature: It is a common practice to keep the food products