

# BIOLOGICAL CONTROL

Biological control - brings about reduction in activity of a pathogen by another organism. This may be bio-cidal or biostatic. In biocidal biological control an organism kills the other, while in biostatic one, the organisms only inhibit the pathogen.

Garrett (1965) defined biological control as "any condition under which, or practise whereby survival or activity of a pathogen is reduced through the agency of any other living organism, with the result that there is a reduction in the incidence of the disease caused by the pathogen". Later Wright (1956) reported that Trichoderma lignosum inhibits the growth of large number of pathogens. The inhibitory effects is found due to the toxin "Gliotoxin".

In the biological control antagonistic effects may be found between Fungi ~~vs. fungi~~ vs. fungi, fungi vs. bacteria, fungi vs. nematodes, fungi vs. insects, bacteria vs. virus & insects vs. virus. There are some examples which are mentioned below: -

Fungi vs. fungi :- Darluca filum is found as parasite on the wredial stage of Puccinia sp.. In Pythium we find parasite on conidium which is soil borne

Fungi vs. insect :- Swain (1914) reported entomogenous fungi on the aphid Entomophthora chromophidis

Fungi vs. nematodes :- Zopt (1888) reported that there is some fungus which kills nematodes by strangulation.

Bacteria vs. virus :- Antagonistic effects of virus on bacteria was reported by d'Herelle (1917). The common bacteria in this category are Xanthomonas, Pseudomonas, Agrobacteria etc. Kawamura (1948) found in certain bacterial disease of tomato caused by Pseudomonas, habitation of bacteriophage virus.

Virus vs. insects :- Bolle in 1898 reported some polyhedral bodies with insects. Later in 1950, Bergold identified it as virus.

Processes in Biological Control

Biological control of plant diseases can be done

by the application of the following processes:—

① Lysis:— By this method soil borne pathogens are inactivated along two lines:—

② Heterolysis:— It is the secretion of extracellular enzymes by other organisms which when grown with the pathogens act on them and check their growth.

③ Autolysis:— It is the production of intracellular enzymes in the host which increases power of ~~enzymes in the host~~ ~~which increases~~ resistance of the host plant and thereby rate of infection is reduced.

② Antibiosis:— Soil microflora can affect the growth of other soil borne pathogenic organisms by producing some diffusible substances. For example, Kernel smut of maize can be controlled by Clostridium globosum.

③ Predaceous fungi:— They obtain their food by capturing animals. Members of Zoopagales behave as obligate parasite and trap nematodes. Nematodes are responsible for many root diseases of economic importance. Biological control of plant diseases by these soil fungi are of 2 types:—

② By soil inhabiting types:— These fungi can be inoculated to soil in case of soil borne root diseases of plants caused by nematodes.

Infection is initiated by fungal spore of Cochlonema sp. or Endocochlus sp. etc.. Initially the fungus do not harm nematode but subsequently it feeds on the nematodes. The mechanism of capture of nematodes includes formation of short lateral hyphal branches that curl and anastomose with similar branches forming loop. Nematodes are captured in the sticky secretion of these loops or by the enlargement in the network of loops. This type of mechanism is found in Arthrobotrys oligospora. This fungus may be cultured in horse manure.

⑥ By terrestrial types: — This technique

leads to introduction of fungus into insect population under such environmental condition which will allow the fungus to establish itself. There is an advantage of using insect parasite fungus of restricted host range as it usually infects and kills only the insect pests. Those insect-parasite fungi that have produced positive results are Beauveria bassiana and other Beauveria sp.. These fungi can also help in controlling pests such as common borer. In orchards Citrus mealybug infestation may also be ~~effectively~~ effectively controlled by the use of Entomophthora fumosa.