

BIOPESTICIDES AND SO HERBICIDES

Pest usually damage a substantial portion of our crops by consuming nearly one third of the food production everywhere and this great loss of food causes starvation on earth.

usually killing of mass pest have been achieved by man made chemicals called pesticides traditionally but these pesticides are harmful in the following ways -

- ① they are highly costly
- ② Long term toxicity of many of them
- ③ Environment pollution and accumulation in food chain.
- ④ Spread of insect resistance against them -
- ⑤ Lethal effect is also not specific and they kill beneficial insect as well.

Control of pest with the help of biological agent can minimize the use of these chemical pesticides

Microbial pesticides (Biopesticide) are preparations of such ~~such~~ antagonistic microbial population that are pathogenic towards a particular pest population.

Effectiveness of Biopesticide depends upon several factors like

- ① It must be virulent and able to cause disease in particular pest population when applied in recommended concentration
- ② It must be host specific and must not cause disease in non target pest population
- ③ It must be sensitive to environment variation
- ④ Rapidly cause disease in pest population so as to minimize disease caused by them

- ⑤ Microbial pesticides should be harmless to human being and other valuable plants and animal population as well.

Now a days large number of microbial pesticides are commercially marketed for agriculture use

① Viral insecticides →

use of the viruses against many pest have been successfully raised recently, and their host specificity make them ideal insecticides

Viruses that are pathogenic for insects are found in the family

- Baculoviridae (Inoculum method)
- Poxviridae (Powdered form)
- Reoviridae

Several Baculoviridae are produced in USA on large scale for their use as viral insecticides. Inoculation of leaves with these viruses can initiate epizootics (epidemic) in insect larvae that feed on such leaves and can reduce the insect population significantly.

Poxviridae viruses are produced in wettable powdered form under the trade name in USA like Gypcheck, Eclar etc. to control Heliothis sp. & Gypsy moth,

- ② Bacterial insecticides → large number of bacteria are found to be pathogenic for various pest and most important of them are -

- Bacillus sp
- Clostridium sp
- Pseudomonas sp
- Enterobacter sp

Bacillus thuringiensis (Bt) an endospore forming bacteria has been exploited as most widely used insecticides. It is registered for the use against 90 different insect pest.

Commercial preparations are available in the trade name - Thuriacide-HPC
Thuriacide-HP
Thuriacide-32B etc.

and equally used for numerous crops, forest trees, and ornamental crops.

A mixture of Bacillus popilliae and B. lentimorbis is available under the trade name Soom in USA market and effective against Japanese beetle (feed on more than 300 species of plant)

Bacillus thuringiensis israelensis (Bti) is of particular interest in controlling population of mosquito vector of Malaria because it is biodegradable and mosquito shows no sign of resistance.

(C) Fungal insecticide → Many of the fungi causes insect diseases like Beauveria sp, Metarrhizium sp, Entomophthora, Vesiculiaria.

Beauveria effective against controlling Colorado beetle and codling moth.

Vesiculiaria is commercial in Europe effective against black rice bug.

(D) Fungal Herbicides → weeds are unwanted herbs growing in agriculture field, pond, lakes etc. and cause bad effect on flora and fauna growing in their vicinity.

Use of fungal herbicide may prove helpful in controlling weed population.

Myrothiza and Colletotrichum are commercially available fungal herbicide whereas Cercospora sp is at experimental stage in USA.

In USA, Colletotrichum sp is used to kill weeds in rice fields while that of Cercospora sp is used to kill water hyacinth.

⑥ POPA - Group of bacteria also used as biocontrol agents by producing large no of chemical compounds like siderophores, antibiotics etc used to control growth of pathogenic fungi, bacteria, virus etc.
Rhizobium sp, Azotobacter sp etc.