



ATOMIC ENERGY CENTRAL SCHOOL NO-3, TARAPUR



CLASS -XII



UNIT-VIII

CHAPTER-10- MICROBES IN HUMAN WELFARE



MODULE- 6/7



GOURI KRISHNA RAJESH, PGT - BIOLOGY

CONTENT

REASON FOR
INTRODUCING
BIOLOGICAL
CONTROL INSTEAD
OF CHEMICAL
PESTICIDES

Conventional and
holistic approaches
of pest control
measures.

Biological control
by microbes

Biological control
by genetic
modification

Biological control
by pathogens

Reasons for introducing biological control instead of chemical pesticides.

- ▶ Chemical pesticides cause serious environmental pollution .
- ▶ Chemical pesticides are toxic and extremely harmful, to human beings and animals.
- ▶ Continuous use of chemical pesticides cause pollution of soil and reduction in fertility of soil



Conventional and holistic approaches of pest control measures.

- 'Conventional' farming practices involve use of chemical methods to kill both useful and harmful life forms indiscriminately.
- Holistic approach that seeks to develop an understanding of the webs of interaction between the myriad of organisms that constitute the field fauna and flora.

What is the view point of organic farmers about eradication of pests?

- ▶ The organic farmer holds the view that the eradication of the creatures that are often described as pests is not only possible, but also undesirable, for without them the beneficial predatory and parasitic insects which depend upon them as food or hosts would not be able to survive. Thus, the use of biocontrol measures will greatly reduce our dependence on toxic chemicals and pesticides



How can we develop appropriate means of bio-control?

- The biological farming approach is to become familiar with the various life forms that inhabit the field, predators as well as pests, and also their life cycles, patterns of feeding and the habitats that they prefer. This will help develop appropriate means of bio-control.

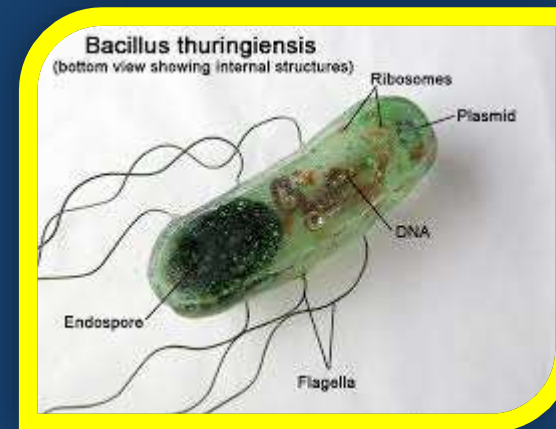
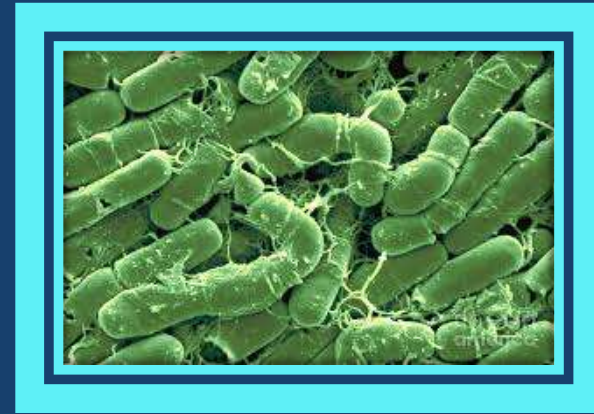
What is Biological control?

- ▶ When we use natural enemies to reduce invasive species populations, we refer to the natural enemies as "biological control agents," or sometimes "bio-control agents." Biological control can be defined as the use of living organisms to depress the population of a pest.
- ▶ This is an important component of integrated pest management.
- ▶ Example the Ladybird and Dragonflies are useful to get rid of aphids and mosquitoes.



Microbial bio control against insect pests.

- Bacillus thuringiensis is a microbe which secretes certain toxins which are insect specific.
- These microbes are available in sachets as dried spores which are mixed with water and sprayed onto vulnerable plants such as brassicas and fruit trees, where these are eaten by the insect larvae.
- In the gut of the larvae, the toxin is released and the larvae get killed.
- The bacterial disease will kill the caterpillars, but leave other insects unharmed. So this type of pest control approach may not harm the food web.



Biological control by genetically engineered crops.

- Bacillus thuringiensis toxin is a crystal protein produced by “cry” genes.
- These genes are introduced into plants like cotton, brinjal etc.
- Those genetically engineered plants resistant to attack by insect pests.
- Bt-cotton is one such example, in which the products of genes cryIAc and cryIIAb control the cotton bollworms.



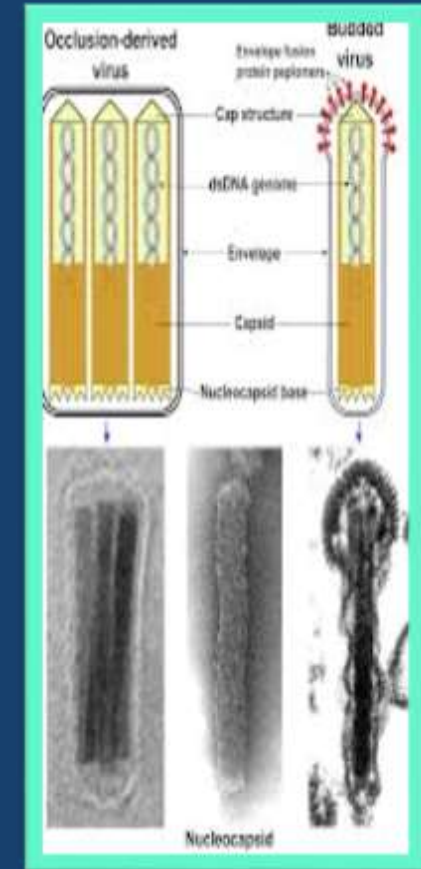
Microbial biocontrol against pathogens

- ▶ Trichoderma is a potent biocontrol agent and used extensively for soil born diseases.
- ▶ It is free living as well as an opportunistic symbiotic Fungi in the root systems.
- ▶ It has been used successfully against pathogenic fungi belonging to various genera, like Fusarium.



Biological control by pathogens

- Baculoviruses are pathogens that attack insects and other arthropods.
- The majority of baculoviruses used as biological control agents are in the genus Nucleopolyhedrovirus.
- These viruses are excellent candidates for species-specific, narrow spectrum insecticidal applications.
- They have been shown to have no negative impacts on plants, mammals, birds, fish or even on non-target insects.



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THANKYOU

