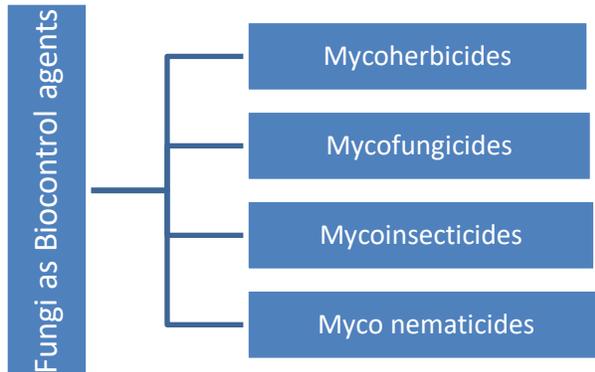


Topic for today Mycoinsecticides and Mycoherbicides

Teacher : Dr Gurpreet Kaur

Fungi in Biological control



Fungi act as biocontrol agents : depending on their host they are named mycoherbicides, mycofungicides, mycoinsecticides, myconematicides

Advantages

1. High specificity to target weed
2. No effect on non target and beneficial plants
3. Cost effective
4. Environmentally safe: no residue build up

Disadvantages

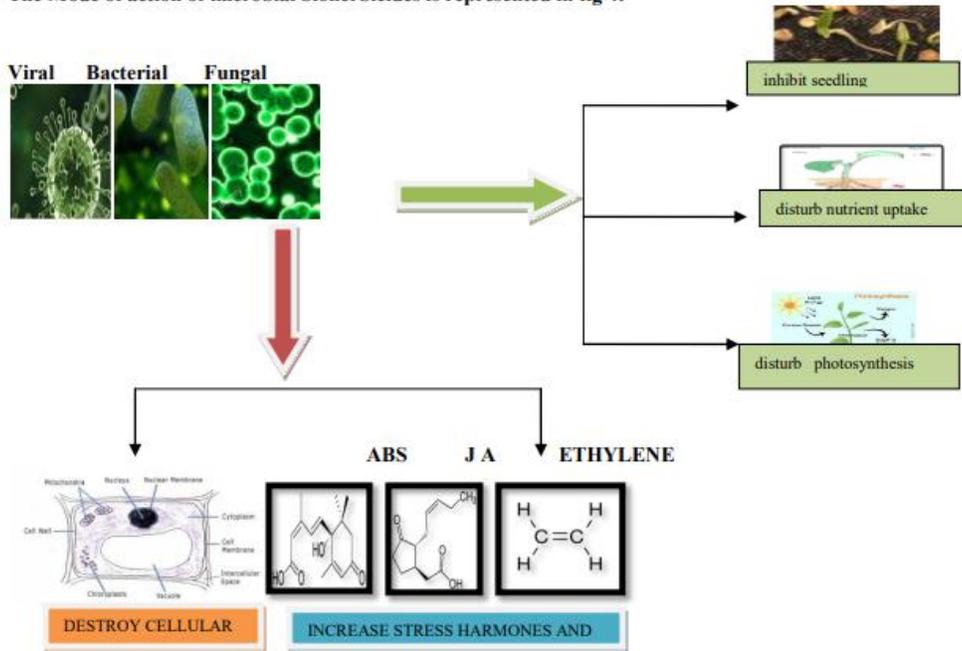
1. Control is slow
2. Problem : If target is related to a crop, then limited use
3. Probability of mutation and possible spread to non target organisms

Mycoherbicides

- For a long time chemical herbicides were more popular as they are inexpensive and easy to obtain.
- But biological control preferred as they are ecofriendly option
- **Mycoherbicides** : are biological control of weeds
- Weeds are wild plants which are unwanted growth in any farm or agricultural land; they compete with useful plants of field for nutrients, sunlight, water and gradually displace them too

- World's crop loss: 1/3rd attributed to weeds (many billion dollars)
- traditional methods of weed Management were ploughing fields, pulling out weeds manually : disadvantage (huge manual labour required and for large fields , practically not feasible); other methods are use of chemical weedicides but not ecofriendly and lot of chemical load on soil (soil pollution), affect non target organisms
- thus importance of biological control
- mycoherbicides: There are certain fungi apecifically pathogenic on weeds: these can be used to kill weeds
- most common commercially used are:
 1. *Colletotrichum gloeosporioides f. sp. aeschynomene* : sold as trade/commercial name: **Collego** → its effective against weed (*Aeschynomene virginica*) :weedof rice and soybean fields
 2. *Phytophthora palmivora* (Commercial name: **DeVine**) → effective against weed called milkweed Vine weed (*Asclepias*) which grows in citrus orchards
 3. *Alternaria cassiae* (Commeccial/trade name : **Caast**) → effective against weed Sicklepod (*Arabis canadensis*)
 4. *Colletotrichum gloeosporioides f. sp. malvae* : commercial name : **BioMal** against →round leaf mallow (Weed) (*Malva pusilla*)
- There are more which are not sold in trade name but directly applied as mycoherbicides as:
 - Cercospora rodmanii* against waterweed : water Hyacinth (*Eicchornia crassipes*)
- **Mode of Action** : reduction in growth and germination in weeds

The Mode of action of microbial bioherbicides is represented in fig 4:-



Mycoinsecticides

- Many Insects cause huge losses to crop yield, these unwanted insects are killed by chemical sprays, while biological control is again preferred (due to same reasons as mentioned above in mycoherbicides: soil pollution etc)
- Certain fungi species can specifically kill and parasitize insects , these fungi are called entomopathogenic fungi.
- First commercial mycoinsecticide in 1980s strain of *Lecanicillium lecanii* (trade name **Mycotal**)
- *Beauveria* and *Metarhizium* : are broad host range fungi to control beetles , moth , grasshoppers
- Host specific fungi : *Entomophthora muscae* : against houseflies
- *Coelomomyces* : against mosquitoes, midges
- Mode of action: The fungus grows on cuticle on body of insect, hypha penetrates through epidermis inside body, tissues invaded insect, the infected insect dies with 3-5 days
- *Beauveria bassiana* (commercial name **Mycotrol, BotaniGard, Naturalis**) has been useful word over to handle insect pests as Colorado potato beetle, boll weevil, European corn borer
- *Metarhizium anisopliae*: (Commercial name : **BioBlast, Green Muscle**) : has been useful to handle termites; *Metarhizium flavoviride* (commercial name: **BioGreen**)

BotaniGard® 22WP

WETTABLE POWDER MYCOINSECTICIDE

For use in controlling Whitefly, Aphids, Thrips, Psyllids, Weevils and Mealybugs in Ornamentals and Vegetables, Indoor/Outdoor Nursery, Greenhouse, Shadehouse, Commercial Landscape, Interiorscape and Turf.

Active Ingredient: <i>Beauveria bassiana</i> Strain GHA	22.0%*
Inert Ingredients	78.0%**
Total	100.0%

*Based on the weight estimate of 4.78×10^{12} grams per spore.
**Contains petroleum distillates.

BotaniGard 22WP contains 2×10^{13} viable spores per pound.

KEEP OUT OF REACH OF CHILDREN
CAUTION

See additional precautionary statements and first aid statements in attached booklet.

Store between 40°F and 85°F



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