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→ Suppressive soils may have hypovirulence / cross protection when a hypovirulence (a mechanism in which the same pathogen strains kill the other strain of same pathogen) so when a hypovirulence strain of Fusarium moniliforme is present it kills or eat on virulent strain of Fusarium moniliforme. This phenomena is cross protection.

The plants also convert soil into suppressive soil.

~~In su~~ Examples:

In suppressive soil:-

* Less develop / suppress their growths:-

- Fusarium oxysporum (wilt of vascular plant)
- Gaeumannomyces graminis (Take all of disease)
- Phytophthora cinnamomi (Root rot of fruit tree)
- Pythium spp. (Damping off)
- Heterodera avenae (Oat cyst nematode)

These all pathogens are soil borne and it is reported that all these are controlled or present in less amount in suppressive soils

→ How these Antagonists control such pathogens?

i) due to competition of Antagonists & pathogenic fungi.

→ Mode of action: →

ii) By producing antibiotics / substances that directly kill the pathogen.

iii) Antagonists secrete lytic enzymes. (which cause lysis of cell wall of fungi.)

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4. Direct Parasitizing. (antagonists parasitize the pathogen).

5. suppressive soils due not allow the pathogen to increase their population.

⇒ some microbes of suppressive soil:

→ Fungi:-

- i) Trichoderma spp.
- ii) Penicillium spp.
- iii) Sporodisium spp.
- iv) Aspergillus spp.
- v) Mucor spp.

→ Bacteria

- 1) Pseudomonas spp.
- 2) Bacillus spp.
- 3) Streptomyces spp.

When in an experiment, they mix these microbes in conducive soil, the soil character change & soil become suppressive.

e.g. If you monoculture melons in conducive soil with these microbes,

Fusarium wilt disease can be effectively controlled because a hypovirulent strain of Fusarium start developing & act as antagonist. And soil also change into suppressive.

Some case in Broccoli when we monoculture it the disease (Sclerotinia sclerotium) also effectively controlled.

Then in case of Fungi there are two phenomena for direct parasitism of fungi:-

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i) mycolysis: in which antagonist produce metabolites, toxins & enzymes & cause direct killing or lysis of fungi.

ii) Mycoparasitism: in which antagonist parasitize the fungi & cause direct parasitism of fungi present in suppressive soil
e.g. Trichoderma harziana it parasitise the Rhizoctonia

8-10-19

Practical

Techniques for Identification of seed borne

fungi:- Tests used for identification of seed borne fungi

- 1) Blotter Test
- 2) Agar plate method.
- 3) Brick stone seedling method
- 4) Water Agar plate method.
- 5) Freezing test
- 6) Soil & polythene bag Test.
- 7) Test tube agar method.
- 8) Dry seed testing
- 9) Indicator plant test.
- 10) Seed surface washing test.

1) Blotter Test

① → Take some ^{sub} sample from bulk seed lot and divide every sub sample into two ^{further} sub sample so that each should have at least 300 seeds. Take sub sample:

→ Sterilize the 3 blotter disc and fit into the bottom of each petri dish.

→ Use 19cm petri dishes & place at least 30 seeds 0.5cm apart and 15 seeds in case of