



Disease Management

Disease Management



Crop damage due to bacterial, fungal and viral diseases is a serious concern worldwide. Most plant pathogenic bacteria belong to the following genera: *Erwinia*, *Pectobacterium*, *Pantoea*, *Agrobacterium*, *Pseudomonas*, *Ralstonia*, *Burkholderia*, *Acidovorax*, *Xanthomonas*, *Clavibacter*, *Streptomyces*, *Xylella*, *Spiroplasma*, and *Phytoplasma*. Plant pathogenic bacteria cause many different kinds of symptoms that include galls and overgrowths, wilts, leaf spots, specks and blights, soft rots, as well as scabs and cankers. Bacteria that cause plant diseases are spread in many ways—they can be splashed about by rain or carried by the wind, birds or insects. Water facilitates the entrance of bacteria carried on pruning tools into the pruning cuts. Propagation with bacteria-infected plant material is a major way pathogenic bacteria are moved over great distances. Between hosts they may grow harmlessly on plant surfaces and then can overwinter or survive unfavorable environmental periods or the absence of a susceptible host by either going dormant in infected tissue, infested soil or water, or in an insect vector.

There are many different fungi that are capable of causing disease on plants. The first signs of infection you will notice are usually spots, rots or stem dieback; damping off or you may notice mildew, mold or other evidence of fungal disease. Typically, airborne fungi produce spores that spread by air currents, rain or watering splash, or, less importantly, on insects or seeds. Spores need moisture to germinate, which is why fungal diseases - mildews and molds, for example - are so much worse in wet weather. Many fungi also produce resting bodies that survive dry or cold periods. These persist in the soil until better conditions or the presence of a susceptible plant is "detected," and then release spores that start the disease cycle over again. Fungi also persist in infected plants. Dieback diseases carry over from year to year in infected shoots.

Viruses are obligate parasites; that is, they require a living host in order to grow and multiply. Once in a wounded cell, the virus particle sheds its protein coat and the nucleic acid then directs the production of multiple copies of itself and related proteins leading to the development of new virus particles. Plant viruses cause disease in part by causing a reallocation of photosynthates and a disruption of normal cellular processes as they replicate. Plant viral pathogens are spread through vectors. Therefore, vector control is the mandatory.

Several chemical agents are available commercially to control the microbial diseases in plants. Due to extensive application and abuse of chemical microbicides, the plant pathogenic microbes have developed resistance to certain chemical agents. Therefore, researchers have identified several antagonistic microbes such as *Pseudomonas fluorescens*, *Trichoderma viride*, *T.harzianum* and *Streptomyces lydicus* as potential organisms to overcome several plant diseases. These microbes can survive in the soil environment, rhizosphere and plant surface as well as in the plant tissues and have the potential to produce several metabolites and antimicrobial compounds. These compounds are toxic to plant pathogenic microbes. Therefore, soil or foliar application of these plant-beneficial microbes could not only control the pathogens but also save the soil fertility.

Pseudo-Bio-Com

(*Pseudomonas fluorescens*)

Pseudo-Bio-Com

Pseudo-Bio-com controls Blasts, Blight, Damping off, Leaf spot, Root Rot, Wilt, Mango Anthracnose, Paddy Sheathblight, Paddy Sheathrot, Paddy Footrot, Banana Anthracnose, Tea Blister Blight, Sugarcane Redrot, Banana Wilt etc. Besides, Pseudo-Bio-com promotes plant growth and enhances yield potential. It controls soil-borne pathogens and nematodes. Further it induces systemic resistance in plant against pathogens.

Dosage

3 Liters / ha

Packing

500ml, 1 Litre, 5 Litres

Shelf Life

One Year

Method of Application:

Seed Treatment: Mix 10 ml of Pseudo-Bio-com with 1 kg of seeds and moisturize with cooled rice gruel or water and leave it for 30 minutes. Then sow the seeds within 24 hours to prevent the damping off disease. In case of paddy, 10 ml / kg of seeds should be mixed with Pseudo-Bio-com and soak the seeds in water for overnight. Decant the water and allow the seed to sprout for 24 hours and sow the sprouted seeds.

Seedling Root dipping: The seedlings in pouch or tray can be treated with 1% Pseudo-com solution (10 ml / litre of water). The root of seedlings should be placed in 1 % Pseudo-Bio-com solution for at least 10 minutes before plantation. Prolonged dipping or soaking is acceptable and it will enhance the efficiency.

Soil application: 1000 ml of Pseudo-Bio-com is recommended per acre. Mix the desired volume with 50 – 100 kg of farmyard manure or sand and broadcast in the field. For efficiency, mix the Pseudo-Bio-com with farmyard manure and leave it for few days and broadcast it in the field before sowing or transplantation. The Pseudo-Bio-com can also be applied through drip irrigation.

Spray: Spray the Pseudo-Bio-com at 1 % concentration (10ml/litre of water) at regular interval of 1 month after transplantation.

Content: *Pseudomonas fluorescens* 2×10^9 cfu / ml

Caution: Do not mix with chemical fungicides or fertilizers.



Pseudo-Bio-Com (Pseudomonas fluorescens)



Target Crops and Disease

CROP	COMMON NAME	SCIENTIFIC NAME
Cereals : Wheat, Rice, Maize, Corn, Teff	Seedling Blight Blast Head Blight	<i>Fusarium roseum</i> <i>Pyricularia oryzae</i> <i>Fusarium graminearum</i>
Pulses: Peas, Sorghum, Chickpea, Grams, Lentils, Beans, Cowpeas, Soyabean	Phomopsis	<i>Phomopsis spp</i>
Oil Seeds: Seame, Peanut, Soyabean, Canala, Linseed, Sunflower	Phytophthora stem rot White Mold Damping off Wilt Damping off Peanut pod rots Clubroot Charcoal rot	<i>Phytophthora spp</i> <i>Sclerotium rolfsii</i> <i>Pythium</i> <i>Fusarium spp.</i> , <i>Verticillium spp</i> <i>Rhizoctonia solani</i> <i>Plasmodiaphora brassicae</i> <i>Macrophomina phaseolina</i>
Vegetables & Cole Crops: Tomato, potato, cabbage, Cucuebits, Chillies, Cucumber, Capsicum, carrot	Late blight Wilt Leaf spot Leaf blight	<i>Phytophthora infestans</i> <i>Fusarium oxysporum</i> <i>Colletorichum spp</i> <i>Botrytis squamosa</i>
Fiber Crops: Cotton Sisal	Root rot	<i>Fusarium oxysporum</i>
Lawns & Galf courses: Grassland, Turf	Phytophthora stem rot White Mold Fusarium wilt	<i>Phytophthora spp</i> <i>Sclerotium rolfsii</i> <i>Fusarium spp</i>
Orchards & Fruit Crops: Apple, Grapes, Oranges, banana, Strawberry, , Pineapples, Mango, Durian, Citrus, Plum	Botrytis's Scab Fireblight Bacterial blackspot Phytophthora stem & root rot Wilt	<i>Botrytis cinera</i> <i>Venturia inequalis</i> <i>Erwinia amylovora</i> <i>Xanthomonas campestris</i> <i>Phytophthora palmivora</i> <i>Rhizoctonia solani</i>
Cash Crops: Cotton, Sisal, Sugarcane, Tobacco	Phytophthora stem rot Wilt Damping off Charcoal root rot Damping-off Brown Spot	<i>Phytophthora spp</i> <i>Fusarium spp</i> <i>Rhizoctonia</i> <i>Macrophomina phaseolina</i> <i>Pythium aphanidermatum</i> <i>Cercospora longipes</i>

Myco-T3-Tricho

(*Trichoderma viride*, *T. harzianum* and *T. longibrachiatum*)

Myco-T3-Tricho

The Myco- T3- Tricho is a Bio-control agent produced by using *Trichoderma viride*, *T.harzianum* and *T. longibrachiatum*. This formulation is a very effective biological mean for plant disease management. It is highly interactive in root, soil and foliar environments. It can inhibit and eliminate pathogens through different mechanisms like competition, antibiosis, mycoparasitism, hyphal interactions, and enzyme secretion.

Dosage	Packing	Shelf Life
3 Liters / ha	500ml, 1 Litre, 5 Litres	One Year

Benefits of Myco-T3-Tricho

- ❖ This is a unique formulation which can serve as a potent biocontrol agent that could prevent soil-borne infections caused by *Fusarium*, *Phytophthora*, *Scelerotia* etc.
- ❖ *Alternaria alternata*, *A. solani*, and *Botrytis cinerea* and *Rhizectonia* spp, *Pellicularis filamentosa*, *Pythium*, *Pellicularia rolfsii*, *Macrophomina phaseoli*, *Macrophomina phaseoli* are the other pathogens that could be controlled by Myco –T3- Tricho.
- ❖ The application of Myco- T3- Tricho increases the number of deeproots.
Myco- T3- Tricho solubilize phosphates and micronutrients.
Increasing the plant's ability to resist drought.
- ❖ Myco- T3- Tricho induce ethylene production, hypersensitive responses and other defense related reactions in plant cultivars.
Ability to degrade a wide range of insecticides
- ❖ It produces antibiotics and toxins which have a direct effect on other organisms.
- ❖ Secrete different lytic enzymes such as chitinase, glucanase and pectinase that are involved in the process of mycoparasitism.
Myco-T-3-Tricho enhance yield, germination rate, increase in shoot and root length
- ❖ Crops: Myco-T-3-Tricho is most useful for all types of plants and vegetables such as cauliflower, cotton, tobacco, soybean, sugarcane, sugarbeet, eggplant, red gram, bengal gram, banana, turmeric, coconut, tomato, chillies, potato, carrot, beetroot, citrus, grape, onion, groundnut, peas, sunflower, brinjal, coffee, tea, ginger, cadamom, cashew, pepper, betel vine etc.

Method of application:

Seed treatment: Mix 10ml of Myco-T3-Tricho with 1 kg of seeds and moisturize with cooled rice gruel or water and leave it for 30 minutes and sow the seeds.

Soil Application: Mix 1 kg or 500ml of Myco-T3-Tricho with 150 kg of farmyard manure and broadcast it in the field.

Drip System: Mix 1 litre of Myco-T3-Tricho with water and incorporate it into the soil through the drip irrigation system.

Content: *Trichoderma viride*, *T.harzianum* and *T. longibrachiatum* (1×10^9 cfu / ml)

Caution: Do not mix with chemical fungicides or fertilizers.



Myco-T3-Tricho (Trichoderma viride, T. harzianum and T. langibrachiatum)



Target Crops and Disease

CROP	COMMON NAME	SCIENTIFIC NAME
Cereals : Wheat, Rice, Oats Maize, Corn, Sorghum, Millet, Corn	Root rot Root wilt	<i>Pythium sp p.</i> <i>Rhizoctonia solani</i> <i>Fusarium spp.</i> , <i>Botrytis cinera</i>
Pulses: peas, Chickpea, Grams, Lentils, Beans, Cowpeas	Damping-off, Foot rot Root rot	<i>Pythium spp.</i> <i>Rhizoctonia sp</i> <i>Fusarium sp</i>
Oil Seeds: Seame, Peanut, Soyabean, Canala, Linseed	Wilt Damping-off Peanut pod tots White mold Clubroot Charcoal rot Phytophthora stem rot	<i>Fusarium spp</i> <i>Verticillium spp</i> <i>Pythium</i> <i>Rhizoctonia solani</i> <i>Sclerotium rolfsii</i> <i>Plasmodiophora brassicae</i> <i>Macrophomina phaseolina</i> <i>Phytophthora spp</i>
Vegetables & Cole Crops: Tomato, potato, cabbage, Cucuebits, Chillies, Cucumber	Ring Spot, Damping off Foot rot Root rot	<i>Mycosphaerella grasicola</i> <i>Pythium spp.</i> , <i>Rhizoctonia spp</i> <i>Fusarium spp.</i> , <i>Sclerotium rolsii</i>
Beverage Crops: tea, Coffee, Spices	Coller rot or Damping off Brown-eye-spot Armillaria root rot Charcoal stump rot	<i>Rhizoctonia solani</i> <i>Cercospora coffeico;a</i> <i>Armillaria heimii</i> <i>Ustulina deusta</i>
Ornamental Crops: Roses, Cut flower, Lilly, Carnation, Aster	Root rot	<i>Fusarium spp</i>
Lawns & Galf courses: Grassland, Turf	Root rot Root wilt	<i>Rhizoctonia solani</i> <i>Fusarium spp</i>
Orchards & Fruit Crops: Citrus, Grapes, Oranges, banana, Strawberry, Pomegranate, Plum, raspberry, Avocado, Melon, Pineapples	Damping off Foot rot Root rot	<i>Pythium spp.</i> , <i>Rhizoctonia sp</i> , <i>Fusarium spp</i> <i>Sclerotium rolsii</i>
Cash Crops: Cotton, Sisal, Sugarcane, Tobacco	Wilt Damping off Charcoal root rot Damping - off Brown spot	<i>Fusarium spp</i> <i>Rhizoctonia</i> <i>Macrophomina phaseolina</i> <i>Pythium aphanidermatum</i> <i>Cercospora longipes</i>