Technical sheet of ECOFLORA

ECOFLORA is a complete microbial amendment (bacteria and fungi) that brings life back to impoverished soils and foliage of plants resulting in faster plant development, better growth, vigor and productivity of all crops.

ECOFLORA directly provides essential nutrients to the roots and foliage of plants.

The strains of ECOFLORA benefit plants by:

- Increasing acquisition of nutrients by fixing nitrogen and solubilizing phosphorus
- Producing active metabolites (phyto-hormones) that stimulate plant growth and productivity
- Improving soil structure that retains nutrients and water
- Promoting plant health by inducing Systemic Resistance
- Producing active metabolites that reduce the stress caused by adverse environmental conditions and deleterious organisms

ECOFLORA is available as a dry powder. ECOFLORA is 100% soluble.

ECOFLORA can be applied to the soil with any type of irrigation systems. ECOFLORA can be applied to the foliage with any devise used for this type of application

ECOFLORA is a balanced blend of beneficial bacteria and fungi certified in the USA by the Organic Materials Review Institute (OMRI) for use in the production of organic food and fiber.

Strain composition

Bacillus firmus
Bacillus amyloliquefaciens
Bacillus subtilis
Bacillus licheniformis
Bacillus megaterium
Bacillus pumilus
Bacillus azotoformans
Bacillus coagulans
Paenibacillus polymyxa
Paenibacillus durum
Pseudomonas aurofaciens
Pseudomonas fluorescens
Pseudomonas putida
Streptomyces coelicolor
Streptomyces lydicus
Streptomyces griseus
Trichoderma harzianum
Trichoderma reesei
Trichoderma hamatum

Total counts of microbes: $3.2x10^8$ CFU/gr.

ECOFLORA also contains a proprietary blend of nutrients for microbes certified as organic by OMRI.

Mechanisms of action

Free Living Nitrogen Fixing Bacteria
(*Paenibacillus durum, P. polymyxa, Bacillus azotoformans*)

Convert atmospheric di-nitrogen (N2) into plant available ammonia (NH3). Process is mediated by nitrogenase enzyme (secondary metabolite). Paenibacillus are mesophilic, facultative anaerobes, function in both aerobic & anaerobic soil environments. Paenibacillus form tough endospore covering to protect them against harsh environmental conditions. Azotobacter are aerobic organisms which thrive in neutral and alkaline soil environments. Azotobacter form protective cysts which mitigate the negative effects of dry soil conditions & UV light.

Phosphate Solubilizing & Phosphate Mineralizing Bacteria
(*Bacillus subtilis, B. amyloliquefaciens, B. firmus, B. megaterium, P. polymyxa*)

Mineral phosphates (inorganic) are solubilized via organic acids (secondary metabolites) produced by bacteria. Organic acids include gluconic acid, 2-ketogluconic acid, lactic acid, isovaleric acid & acetic acid. Organic phosphates are mineralized via phosphatase enzymes (secondary metabolites) produced by bacteria. Enzymes include phytase, acid phosphatase, D-glycerophosphatase. Solubilized mineral phosphates are rapidly & efficiently sequestered by endomycorrhizal fungi (synergy). Facilitates root growth, root development, rapid root strike and overall plant establishment. Enhances germination process.

Plant Growth Promoting Rhizo-Bacteria (PGPRB)
(*Bacillus subtilis, B. amyloliquefaciens, B. firmus, B. licheniformis, B. pumilus, Paenibacillus polymyxa*)

Gibberellin Production = *B. pumilus, B. licheniformis*
Auxin (Indole Acetic Acid) = *B. subtilis, B. amyloliquefaciens, B. firmus*
Cytokinins = *P. polymyxa, B. subtilis*.

Auxins control root architecture, vascular tissue differentiation, lateral root initiation, polar root hair positioning & root gravitropism. Gibberillins control cell elongation, cell division, cell differentiation & stress reduction. Cytokinins control cell division (cytokinesis) in roots & shoots, increased resistance to drought, chlorophyll synthesis. PGPRB promote plant growth independent of supplemental fertilizer applications.

Rhizo-Bacteria, which Stimulate Induced Suystemic Resistance (ISR)
(*Bacillus subtilis, B. amyloliquefaciens, B. pumilus*)

Plant health is induced by exposure of plant roots to specific Plant Growth Promoting Rhizo Bacteria (PGPRB). Process dependent on signaling via phytohormones, jasmonic acid and ethylene, results in production of phenolic compounds.

Results in increased resistance to environmental stress (heat, drought, cold, disease).

Bacteria, Actinobacteria & Fungi Antagonistic To Pathogenic Organisms (*Streptomyces lydicus, S. griseus, S. coelicolor, Trichoderma hamatum, T. reesei, Pseudomonas fluorescens, P. putida, Bacillus subtilis, B. pumilus, B. licheniformis*)

Release a variety of secondary metabolites which are antagonistic to pathogenic fungi & viruses. Produce antibiotics which inhibit vital cellular functions of pathogens (Protein synthesis, DNA replication, etc). Produce chitinase (breaks down chitin based cell wall of pathogenic fungi). Produce a variety of cell wall degrading enzymes & ethyl acetate to control pathogenic fungi. Control pathogen through inactivation of virulence traits

All microbes originate from the American Type Culture Collection and have been determined to be non-pathogenic to plants or animals. The microbes are maintained cryopreserved at -80 degrees Celsius. The strains are multiplied individually under liquid conditions in aseptic systems that guarantee no contamination. The produced microbes are spray dried under aseptic conditions. The dry strains go through a strict quality control process where presence of contaminants, viable counts and activity are determined. Finally the strains are blended into the formulation to guarantee the composition of each batch.

Application rates

ECOFLORA should be applied at moments when the plant has the highest nutrient requirements, such as at planting time, before flowering and during fruit formation. However, continuous applications during the growth cycle have proven most effective.

Growing Media Amendment

Incorporate 1 oz of ECOFLORA per cubic yard of growing media (37 gr/m^3).

Nursery

Apply ECOFLORA weekly or every two weeks at a rate of 1.8 oz per 100 square yards (61 gr/m^2).

Ornamentals, Row Crops

Apply ECOFLORA to soil and foliage at a rate of 4 to 8 oz per acre (280 to 560 gr/ha) every 4 to 6 weeks. For strawberries apply a dose rate of 8 oz per acre (560 gr/ha) every month. For grapes apply a dose rate of 4 to 6 oz per acre (280 to 420 gr/ha) per month. Foliar application over the fruits at a 1:5,000 to 1:10,000 dilution will protect them from fungal diseases.

Alternatively, apply product at planting or 3 leaves stage, pre-florescence and pre-fruit formation at a rate of 4 to 10 oz per acre (280 to 700 gr/ha).

Fruit and nut trees

Apply ECOFLORA to soil at a rate of 3 to 5 oz per acre (210 to 350 gr/ha) every month. Apply ECOFLORA to folliage at a dilution of 1:5,000 to 1:10,000 prior to flowering and fruit formation.

In case of disease apply ECOFLORA every week at a dilution of 1:5000 to 1:10,000. Apply to foliage and/or soil according to the origin of the disease.

Grains

Apply ECOFLORA to soil and foliage at a rate of 4 to 7 oz per acre (280 to 490 gr/ha) at emergence and pre-florescence.

Flowers

Apply ECOFLORA every two weeks at a rate of 8 oz per acre (560 gr/ha) for intensive flower production, and half this dose for lower density production.

Golf courses

Dissolve ECOFLORA in water and apply at a rate of 0.44 oz per 100 square yards (14.9 gr/100 m^2) of greens or tees, and 0.2 oz per 100 square yards (6.78 gr/100 m^2) of fairways. Apply the product monthly.

If bacterial or fungal disease is evident increase the dose rate to 0.88 oz per 100 square yards (30 gr/100 m^2), and apply the product every two weeks.

Hydroponic systems

Dissolve monthly 1/4 oz of ECOFLORA for every 55 gallons of water in the culture system (3.4 gr/ 100L).

Integrated programs

ECOFLORA works best when used in an integrated program that includes ECOFUNGI, ECOSIL and COMCAT (Agraforum, Germany). Please refer to the technical sheets of these products for dosage rate and frequency of application. It is recommended to apply first ECOSIL and then one week later ECOFLORA.

Recommendations

Flush irrigation systems and sprayers with plenty of water from any pesticide residue before applying ECOFLORA. Avoid applying pesticides one week before and one week after applying ECOFLORA.

For best results apply foliar applications early in the morning of late in the afternoon.

Keep product dry in an airtight container. Avoid prolonged exposure to direct sunlight.