

We Grow Soil.

Step by step
towards a **green** season.



PHC

Plant Health Cure

Hereby a short guide for the use of PHC products in the green sector during the season. The different steps from preparation to planting and crop care to irrigation are discussed step by step.

For more detailed information, cultivation programs or products sheets, please visit our website www.phc.eu.

For further questions or specialized advice, we refer you to our advisor Stefan Even.



Stefan Even

s.even@phc.eu

+31 (0) 6 - 53 27 04 24

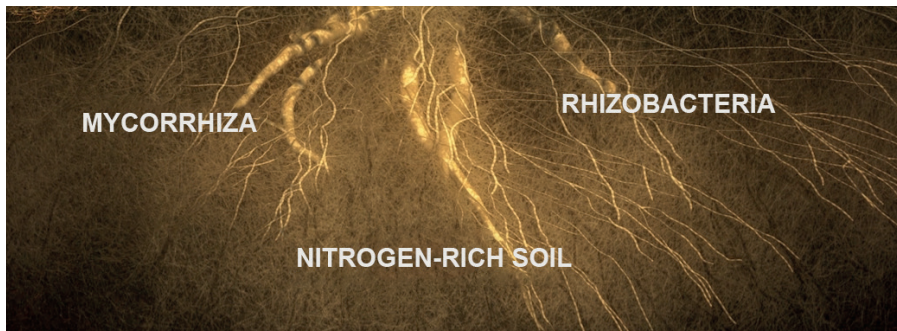
Explanation of terms:

Rhizosphere

In the direct vicinity of the root (no more than 1.5 mm from the root), an increased biological activity is present. This zone is called the rhizosphere. This is where the specialized rhizobacteria live that provide the roots with minerals.

Mycorrhiza

is the collective name of beneficial fungi that have a symbiotic connection with the root system of plants. In exchange for plant sugars from the roots, they make minerals available for uptake by plants, keeping plants healthier and better use of nutrition.



Application of mycorrhiza

There are many suppliers of mycorrhizal fungi. The different instructions for use of these products are mostly confusing and many times incorrect. For the application of mycorrhiza, there is only one rule applicable; Mycorrhiza should be applied to the roots or where the roots soon will be! That means that mycorrhizas should not be applied on the ground. They belong into the soil.

Explanation

The spores (or seeds) of endomycorrhiza are spheres of 0.2 to 0.5 mm large. They look a bit like fish eggs. They float in water. If applied by irrigation they stay on the surface for they are too big to flush into the soil. Because spores develop in the soil, they are vulnerable to UV light. If the spores remain on the soil surface, they will die within a few hours. Once applied into the soil, they will survive for months until they can connect to an absorbing root.

The Plant Health Cure method

PHC works with a complete system in which soil and plant resistance is increased in 5 steps. A resilient plant is more resistant and therefore less dependent on chemical fertilizers & crop protection products or other symptom suppression products. By working with a step-by-step plan, the foundation is built for plant resilience. This results in better growth, healthier plants and less planting failures.



For plants to grow healthy, each soil must meet three conditions. The soil must be rootable, the right minerals must be present and the soil biology needs to be correct. After intensive tillage, there is hardly any correct soil biology left in the soil. Therefore, PHC recommends the application of beneficial root bacteria, soil fungi and mycorrhizal fungi before planting and sowing.



The absorption of water and minerals is regulated via the root system. The more roots on a plant, the better. Moved and newly mixed soil as well as composts do not contain mycorrhiza and usually very few or no beneficial bacteria. PHC's mycorrhizal spores and the selected beneficial soil bacteria are easy to apply and ensure a better start and vital growth as long as the plant lives.



A healthy soil can only be created if fertilizers both feed the soil and the plant. Chemical fertilizers only feed the plant. Soil that is fertilized with chemical N-fertilizers lose the crucial factors that help to build a healthy soil. Natural fertilizing not only feeds the plants but also feeds the soil. This stimulates high quality soil life, greatly improving root penetrability, disease resistance and absorption capacity.



During cultivation, plants will be under the influence of environmental factors. Various cultivation practices often result in stress. Plants are often damaged after extreme weather conditions such as heavy rainfall, hail, storm or frost, which can cause an entrance for fungi and bacteria. Also, actions such as transplanting or pruning cause stress in the plant. The application of natural plant strengtheners and amino acid based foliar fertilizers will, in anticipation of stressful situations, initiate a number of self defence systems in the plant to protect itself and quickly recover from stress.



For all forms of life water is essential. Too little water in the soil causes dehydration of plants and soil life. Too much water results in a lack of oxygen. This causes the soil life to withdraw. The result will be that the absorption of nutrients becomes impossible and the plants start suffering. A good moisture balance is of the utmost importance for healthy plant growth. Plants with mycorrhiza are drought resistant and can even absorb water from soil that feels dry.



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Planting perennial plant borders.

Before planting:

To provide the necessary soil life, we recommend spreading Biovin or TerraPulse (100 gr/m²) before planting. This not only increases water holding capacity but also provides essential soil organisms to flourish. We strongly recommend the use of mycorrhiza and rhizosphere bacteria for planting.

We developed the product Flower Saver Plus for this purpose. This product also contains a start fertilizer. Apply 150 - 200 gr/m². Rake in to 5-10 cm to make sure the product is in contact with the roots.

Fertilizing:

Like stated before, fertilizers must feed both the soil and the plant. The PHC fertilizers meet and exceed that requirement. OPF granular 11-0-5 + trace elements is a plant-based fertilizer that works for 3+ months and nourishes the soil and the plant. The advice is to apply OPF granular twice a year in a dosage of 40 - 50 gr/m². Apply on the soil in spring and summer. Always remove from leaves by shaking the plants.

Maintenance:

To keep soil life up and running, we advise you to spread, annually in spring, Biovin (50 gr/m²) or TerraPulse (50 gr/m²).



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Planting shrubs and hedgerows.

Before planting shrubs and hedgerows:

To provide the necessary soil life, it is recommended to spread Biovin or TerraPulse (100 gr/m²) prior to planting.

Dosage plant hole, shrubs:

Biovin (50 - 100 grams per planting hole).

Dosage planting trench for hedgerows:

Biovin (250 - 500 grams per m¹)

At planting:

To increase survival rate and fast regrowth without the usual drawback and stress, it is highly recommended to apply a combination of beneficial mycorrhiza and bacteria on and around the root system before closing the planting hole. (If you are a first-time user, allow yourself a small trial by not treating a few plants).

Bare root plant material:

For plant material with bare roots, we recommend to use Mycordip. This product contains pure mycorrhizal spores and rhizosphere bacteria. The water-holding gel from the Mycordip ensures that the plant roots are protected from drying.

Mycordip Universal:

Contains both Endo and Ecto mycorrhiza spores and is therefore suitable for all types of woody forest plants as well as hedgerow plants.



Mycordip PT:

Contains Ecto mycorrhizal spores, and is therefore only suitable for plants that live in symbiotic relation with Ecto mycorrhiza, like Abies, Acacia, Allocasuarina (Cassuarina), Alnus, Betula, Carpinus, Castanea, Cedrus, Cistus, Corylus, Fagus, Helianthemum, Larix, Nothofagus, Picea, Pinus, Polygonum, Populus, Pseudolarix, Pseudotsuga, Ostrya, Ostryopsis, Quercus, Salix, Tilia and Tsuga.

Plant material with root ball:

To increase survival rate and fast regrowth without the usual drawback and stress of “balled and burlapped” plants we recommend to apply a combination of beneficial bacteria and mycorrhiza on and around the root system before closing the planting hole. (Do not forget to remove as much from the burlap as possible).

The appropriate products are TreeStart or TreeSaver Transplant. Both products contain a mix of Endo and Ecto mycorrhizal spores and the necessary root bacteria and can be used for all types of plants.

- Apply TreeStart biodegradable ‘sachets’ in the planting hole.
- Mix TreeSaver Transplant in the planting hole

For exact dosages, we refer you to the datasheet.



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Planting trees.

Before planting trees:

To provide the necessary soil life, we recommend applying Biovin in the plant hole and through the backfill soil. The dosage depends on the root ball/tree size, 100 – 1000 gram per planting hole.

During planting:

When planting trees (from approx. girth 8 – 10cm) there are 2 possibilities to provide them with mycorrhiza; this can be TreeStart or TreeSaver Transplant. Both products contain both Endo and Ecto mycorrhiza and are therefore suitable for all tree species.

- TreeStart, biodegradable ‘sachets’, apply around the root ball/ root system
- TreeSaver Transplant, mix in the plant hole and through the supplementing soil.

For exact dosages, we refer to the datasheet.

Aftercare planted trees:

A newly planted tree benefits directly after planting from the applied soil improvers, rhizosphere bacteria, fungi and mycorrhizas. However, more factors, including water, are crucial for a good start. To improve the penetration and absorption of water in the soil, we recommend adding Yuccah at a dosage of 0.5 – 1% of the water volume at the first watering(s). This concentrated extract from the Yucca shidigera plant ensures an optimal penetration of water into the root zone and also has a positive effect on soil bacteria.



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Fertilizing and maintenance of shrubs, hedges and trees.

To obtain truly healthy soil, soil improvers and fertilizers must have a positive effect on both soil and plant health. It is not acceptable for fertilizers to have a positive effect on one thing and a negative on something else. This is the case with all forms of chemical fertilizers. The plant-based fertilizers of PHC contain amino acids and have sufficient minerals to feed both the soil and the plant.

Fertilizing:

Fertilizers must feed both the soil and the plant. The PHC fertilizers meet and exceed that requirement. OPF granular 11-0-5 + trace elements is a plant-based fertilizer that works for 3+ months and nourishes the soil and the plant. The advice is to apply OPF granular twice a year in a dosage of 40 – 50 gr/m². Apply on the soil in spring and summer. Always remove from leaves by shaking the plants.

Maintenance:

To keep soil life at the highest active level, it is recommended to spread Biovin (50 gr/m²) or TerraPulse (50 gr/m²) annually (in spring).



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Fertilization of flower pots.

The Healthy Start Tablet 12-8-8 can be used as a basic fertilizer for plants in flower pots. This nutritional tablet provides a long lasting effect of 1 full growing season. The table below shows the recommended dosage per pot.

Pot volume in litres	Dosage tablets of 10 grams	Dosage tablets of 21 grams
0,5	1	
1	1	
2	1	
4	2	1
5	3	1
10	4	2
20		2 - 3
30		2 - 3
50		3 - 4
60		4 - 5
70		5 - 6
80		6 - 7
90		6 - 8
100		7 - 9

We advise you to press the tablets a few centimeters into the ground.



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Revitalizing trees, shrubs and hedge plants.

The vitality of vegetation in gardens and public spaces can deteriorate considerably due to various causes, such as soil compaction, damage caused by excavation work, lack of space and an excess of harmful substances. Usually, the invisible decline of the trees can start years before this actually shows. Smaller leaves, light green foliage and other symptoms will only show when the reserves are depleted. When this shows, the condition of the roots is even worse. Adding mycorrhizas and rhizobacteria in the root zone of weakened trees helps in a fast recovery of the whole tree. Roots grow by the sugars from photosynthesis. When the tree declines, the roots are not “fed” anymore. The root depending organisms then will leave the roots or decline with the tree, making space for pathogens.

Injection (liquid):

The PHC injectable liquid suspension of mycorrhizas and rhizobacteria are introduced into the root zone with an injection probe connected to a tank and low pressure pump (max. 2 bar). Best practice is to soil inject the liquid as soon as possible after damaging the root system (when the canopy still delivers enough sugars).

Injectable Universal:

Contains both Endo and Ecto mycorrhiza spores, making it suitable for almost all types of plants, shrubs and trees.

Injectable PT:

Contains only Ecto mycorrhiza spores and is therefore ideal for trees living in symbiotic relation with Ectomycorrhiza. Applicable to the



following plant species: Abies, Acacia, Allocasuarina (Cassuarina), Alnus, Betula, Carpinus, Castanea, Cedrus, Cistus, Corylus, Fagus, Helianthemum, Larix, Nothofagus, Picea, Pinus, Polygonum, Populus, Pseudolarix, Pseudotsuga, Ostrya, Ostryopsis, Quercus, Salix, Tilia and Tsuga.

Liquid food for the plant can be added directly to the injectable, in the form of Biovin liquid or OPF liquid in combination with Fulvic 25.

Vertical soil application (earth auger):

By applying Vertimulch, holes are drilled with 75 by 75 cm interspace in the root zone. The holes are refilled with a mixture of soil, Vertimulch and Biovin. As a result, mycorrhizas, rhizosphere bacteria, soil bacteria and oxygen are easy accessible for the fine roots and recovery will start immediately.

Vertimulch:

Contains both Endo and Ecto mycorrhiza spores, making it suitable for almost all types of plants, shrubs, hedges and trees. The practice is to drill every 75cm. holes with a depth of approx. 30 cm around the plant. Then in each hole, a mixture of some soil from the drill hole + 85 grams Vertimulch with 100 grams Biovin is used as backfill.

Please read the manual on the datasheet.



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Installing lawn grass and sports grass.

Preparation:

To start the installation of a perfect lawn without chemical fertilizers it is necessary to create a good soil life, it is recommended to spread 100 gr/m² Biovin or TerraPulse after levelling, and prior to raking, seeding or sodding.

Why would you choose to apply mycorrhiza?

To strongly stimulate root growth and overall plant development combined with deep-rooted grass. The mycorrhiza forms a chemical in the soil that binds soil and organic matter together, forming aggregates. An aggregated soil contains more oxygen is highly resilient and demands a lot less fertilizing. While the grass is very dense, leaving no space for weeds. Applying 25-50 gr/m² TurfSaver is one of the best possible investments for a long-term drought- and disease resistant lawn or sports field.

Mix 25-50 grams of TurfSaver with 100 gr/m² Biovin and spread over the soil to include the necessary soil life prior to seeding or sodding. This practice also increases the volume of the product to be spread considerably, which improves the applicability.

Aftercare:

After laying turf or sowing grass, we recommend spraying Flexx after 7-14 days to stimulate the rooting of the young turfgrass. The dosage is 0.8 gr/m², drench with water after application or spray prior to rainfall.



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Maintenance of the lawn.

Maintenance after scarifying:

To maintain an active soil life, it is recommended to spread 50-100 gr/m² Biovin or TerraPulse each late winter or early spring. An active soil life prevents the formation of felt (thatch) in the lawn.

Regular maintenance:

On stressed lawns, and lawns that have a problem with moss, the Flexx product delivers solutions. Flexx contains rhizosphere bacteria that increase soil fertility, accelerate the breakdown and conversion of cuttings and moss, avoids thatch formation and dry spots. Flexx improves moisture retention and ensures an intense green colour.

After scarifying/reseeding, perform a spraying with 0.8 gr/m² Flexx. For recovery of heavily damaged lawns, spray 1.6 grams of Flexx per m². Maintenance dosage monthly (as required) 0.4 grams Flexx per m². Drench with water after applying Flexx.

Fertilizing:

We recommend to fertilize with OPF granular 11-0-5 + trace elements. Repeat 2 to 4 times a year.

For spring fertilizing (after scarification) the dosage is 40 gr/m².

In summer the dosage is 30-50 gr/m².



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Revitalizing existing lawns.

By applying mycorrhizas under an existing lawn, the lawn will be revitalized, the rooting stimulated and rooting depth increased, thus making the grass drought resistant while increasing resilience

For the application of mycorrhiza under an existing lawn, we recommend the mycorrhiza product TurfSaver in a higher dosage: Mix 100 gr/m² TurfSaver with the same amount of Biovin. Spread it on an open lawn (after scarifying and aerating). After spreading, sweep the mixture in the rooting zone with a hard broom. Do not carry out this work during warm and sunny days. The spores are UV sensitive.

To achieve the necessary penetration of the spore into the soil we recommend, after the application of TurfSaver, to spray with 2 ml per m² Yuccah. Apply with plenty of water, and drench with water after the application.

To stimulate the development of mycorrhizas, we recommend to spray Flexx in a dosage of 0.8 gr/m² ten days after the inoculation with TurfSaver. Repeat once more after a few weeks.

Mycorrhizal spores are up to 0.3 mm.in size. They can only germinate in contact with roots. Therefore, it is really necessary to ensure that the spores come into contact with the root system.



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A close-up photograph of pink azalea flowers with green leaves, serving as a background for the title.

Maintenance of Rhododendrons and other acid-loving plants.

Acid-loving plants grow best at a pH level between 4.5 and 5.5. Above and below this pH the growth stagnates, and the plants will show stunted growth, yellowing and other deficiency symptoms.

Before planting:

Apply plenty of peat in the planting hole, this will ensure that the plant has a sufficiently acidic soil. To provide the necessary soil life, we recommend mixing Biovin or TerraPulse into the, with turf filled, planting hole. (100 - 250 grams per plant hole).

Spreading:

To keep soil life at an active and healthy level, we recommend spreading 100 gr/m² Biovin annually every late winter, early spring.

Watering + sprinkling with water:

Next, it is recommended depending on the condition of the plants to carry out 1-3 times a year, a drench to keep the soil condition and nutrition optimal for healthy growth. The following dosage is sufficient for treatment of 10 m².

Dosage per 10 litres of water:

10 grams Compete Plus and 10 ml Yuccah. Simultaneously add 500 ml OPF 7-2-3 and 15 ml Fulvic25.

**Foliar Feeding:**

In the growing season (April - September) we advise a monthly foliar feed with PreTect and Natural Green to increase plant resistance and vigour. Dosage per 10 litres of water: 2 grams PreTect 2.0 and 15 grams Natural Green. After preparing the solution, leave it for approx. 15 minutes and stir again. The protein in PreTect needs time to dissolve.

In case the pH is too high:

When a soil analysis shows that the pH in a fixed plantation is too high, the soil can be acidified by the application of AgroAcid. It is often necessary to carry out several drench treatments with an interval of 4-6 weeks to get the pH at the right level. Stop this application when the growth recovers. Perform an analysis in between if necessary to monitor pH.

Dosage per 10 litres of water:

Reduction of pH by 0,5 point: 25 ml AgroAcid

Reduction of pH by 1,0 point: 50 ml AgroAcid.

Pour a solution of 10 litres per m² around the roots of the plant and drench into the soil.

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Maintenance of susceptible plants.

Various types of ornamental plants are susceptible to fungal diseases, which affect the leaves and make the plant visually less attractive. Some examples are leaf spots in boxwood, mildew, rust and black spots in roses and mildew in grapes.

Spreading:

To keep soil life at an active and healthy level, we recommend spreading 100 gr/m² Biovin twice a year around these sensitive crops. Do this in fall and spring. The application of Biovin in autumn accelerates decomposition of fallen leaves that house surviving fungal spores. This causes reduction of the infection source.

Foliar feeding:

In the growing season (April - September) we recommend a monthly leaf spraying with PreTect and Natural green to increase plant resistance.

Dosage per 10 litres of water:

2 grams PreTect 2.0 and 15 grams Natural Green. After making the solution, leave to stand for approx. 15 minutes and stir again. The protein in PreTect needs time to dissolve.



When the disease pressure is high, we recommend adding the bio-stimulant OLF-Ag to the mixture of PreTect and Natural Green. OLF Ag contains a wide range of plant-based amino acids and trace elements that stimulate plant health. (Dosage: 50 ml per 10 litres of water).

Fertilizing:

As a complete fertilizer, we recommend using organic plant-based fertilizer OPF granular 11-0-5 + trace elements. This plant-based fertilizer makes the crop more resistant compared to crops that are fertilized with chemical fertilizer.

OPF granular delivers the plants the required nutrients for around 3 months. The advice is to apply OPF granular twice a season at a dosage of 40-50 gr/m². In early spring and during summer).



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Product guide mycorrhiza products for nurseries.

Ecto mycorrhiza varieties			
Abies, Acacia, Allocasuarina (Cassuarina), Alnus, Betula, Carpinus, Castanea, Cedrus, Cistus, Corylus, Fagus, Gaultheria, Helianthemum, Larix, Nothofagus, Picea, Pinus, Polygonum, Populus, Pseudolarix, Pseudotsuga, Ostrya, Ostryopsis, Quercus, Salix, Tilia and Tsuga.			
Product	Bare roots	Root ball	Revitalize
TreeSaver Trans.			
TreeStart			
Mycordip PT			
Mycordip Uni.			
Injectable PT			
Injectable Uni.			
Vertimulch			

Endo mycorrhiza varieties			
All * varieties not mentioned in the list of Ecto mycorrhizas.			
Product	Bare roots	Root ball	Revitalize
TreeSaver Trans.			
TreeStart			
Mycordip Uni.			
Injectable Uni.			
Vertimulch			

**) Excluding Ericoid mycorrhizal plants. These are some acid-loving plants such as Azalea, Calluna, Erica, Rhododendron, Vaccinium, etc.*



Biovin

Plant-based soil improver. Contains organic matter, trace elements, soil bacteria, fungi and streptomycetes. With this, active soil life is applied to allow the soil to function optimally.



TerraPulse

Plant-based soil improver. Contains Biovin, rock flour and Fulvic. With this, a combination of active soil life, minerals, root stimulating and absorption enhancing Fulvic is applied.



FlowerSaver Plus

Mycorrhiza product, based on endo mycorrhizal spores, intended for the construction of (perennial) borders. Also contains a starting fertilizer for good growth.



OPF Granular

Organic plant-based fertilizer (11-0-5 + trace elements). This fertilizer is released throughout approx. 10-12 weeks.



Mycordip Uni

Mycorrhiza root dip universally applicable. With root dip, a moisturizing gel is applied with mycorrhizal spores.



Mycordip Pt

Mycorrhiza root dip for ecto mycorrhiza crops (a.o. Fagus and Carpinus). With root dip, a moisturizing gel is applied with mycorrhizal spores.



TreeStart

Mycorrhiza product based on endo- and ecto mycorrhizal spores. Also contains a starting fertilizer and rhizosphere bacteria which stimulate rooting.



Yuccah

Natural wetting agent from Yucca-extract, improves the penetration of moisture into the soil and also stimulates beneficial soil bacteria in the root environment.



Flexx

Soluble Iron containing bio-stimulant for improving the turf. Supports root growth, soil fertility, the quality and recovery of the turf.



TurfSaver

Mycorrhiza product, based on endo mycorrhizal spores, intended for the construction and revitalization of lawns. Also contains a starting fertilizer for good growth.



Compete Plus

Rhizosphere inoculant which contains bacteria and fungi for healthy root and plant growth. Supports the uptake and availability of nutrients from the soil and increases abiotic stress tolerance.



PreTect

Plant enhancer based on harpine proteins. Ensures the activation of the plant's immune system and supports growth, flowering and fruiting/occupancy of crops.



Natural Green Classic

Natural calcium fertilizer based on calcite. Provides a strong cell structure, and therefore a solid crop. Calcium also ensures efficient functioning of the plant's immune system. Natural Green is unique due to the 4 micron particle size.



Fulvic 25

Natural fulvine extracted from Dutch drinking water. Fulvic improves the root environment and development. At the same time, the chelating properties of fulvine ensure optimal absorption of all required nutrients, even when sparingly available.



AgroAcid

Biodegradable synthetic acid. Suitable to solve unwanted salt accumulation and to acidify soils, e.g. in acid-loving plants. Contrary to harmful sulphuric acid, AgroAcid is harmless, does not cause burns and does not hurt roots.



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Plant Health Cure B.V.

Veldweg 7

5061 KJ Oisterwijk (NL)

+31 (0)13 7 200 300

info@phc.eu

www.phc.eu