New rootgrow FAQ's

1. What is rootgrow?

   Rootgrow contains a mixture of species of UK origin mycorrhizal fungi. These fungi are completely natural and are grown in England at our production facilities in Kent. Rootgrow also contains an inert clay carrier which acts as a substrate for the fungi to grow through and a few bio-additives which enhance mycorrhizal colonisation such as chitin (from shells), alginates (from seaweed) and humates (from decomposed organic matter). These bio-additives are present at levels of less than 1% so will not affect plants.

   Mycorrhizal (from the Latin mycor "fungal" and Greek rhiza "root") fungi are known to have originated at least 460million years ago and have a symbiotic relationship with plants. Symbiosis (from the Greek *sym* "with" and *biosis* "living") means a close and long term interaction between different biological species, in the case of mycorrhizal fungi, plant and fungus. This relationship in many cases is obligate, meaning that both symbionts entirely depend on each other for survival.

   Other common symbionts in the natural world can be seen with lichens which are a symbiosis between a fungus and a photosynthetic partner such as an algae or Mistletoe which exhibits ectosymbiosis with trees.

   The earliest fossil records yielding mycorrhizal fungi are found in Aberdeenshire in Scotland in the Rhynie Chert where fossils date back to the Devonian period.

   Rootgrow contains a blend of both arbuscular mycorrhizal fungi and ectomycorrhizal fungi. Arbuscular mycorrhizal fungi are the oldest and colonise plant roots by penetrating the cells. Ectomycorrhizal fungi form a sheath or mantle over the plant root, these fungi colonise approximately 10% of plant families and are most associated with long lived trees such as Oak and Pine. Ectomycorrhizal fungi also produce mushrooms as fruiting bodies (methods of reproduction) and some of these are highly prized culinary mushrooms such as Truffles and Porcini mushrooms. Unfortunately rootgrow does not contain Truffles.

2. How do I use rootgrow?

   The key to using rootgrow is to get the granules into intimate contact with the plant roots. Plant roots give off chemicals (exudates) that trigger the mycorrhizal fungi into germinating and colonising the plant root. In the case of containerised plants if you look at the bottom of the pot that is the size of the area that you should apply the granules to. Sprinkle a light dusting into the bottom of the planting hole and plant the plant directly on the granules. Backfill as normal including soil conditioners or fertilisers if required and ideally mulch the plant.

3. Why do I need it?

Plants in nature are critically dependent on mycorrhizal fungi for normal healthy plant growth. The standard production of plants in nurseries is a very unnatural process (however very effective and efficient) that relies on sterilised composts, fertilisers and artificial irrigation, as such these plants will have no or very low levels of mycorrhizal fungi on their roots. When a plant is planted into soil it will become colonised by native mycorrhiza but this will be a very slow process taking up to 3 years. If rootgrow is used at planting time you are applying such high levels which will make the plant fungus bond inevitable and colonisation will occur in 2-4 weeks.

The faster a plant is colonised by these friendly fungi the sooner the plant will show the benefits, rootgrow simply speeds up the natural process.

4. What are the benefits of using rootgrow?

Put simply mycorrhizal fungi achieve many of the functions that plant roots do just quicker and better. Fungi grow faster than plant roots especially the woody roots of trees. In a matter of weeks mycorrhizal fungi will have connected with the host plants roots and will begin to grow. This growth is called mycelium and is usually microscopic. Mycelium when examined under a microscope look like a mass of branching thread like strands (known as Hyphae)

This mycelium grows through every millimetre of the soil, in a sugar cube size piece of soil you can have up to 7 metres of fungal Hyphae. A mature 100 year old oak tree has enough fungal Hyphae living on its roots to circumnavigate planet Earth.

Every single piece of this fungal Hyphae is biologically active and capable of extracting nutrients from the soil. Better nutrient uptake is the first benefit mycorrhizal fungi confer to plants however it should be emphasised that the speed that mycorrhizal fungi colonise plants and the subsequent early availability of nutrients and water leads onto other benefits of better establishment and reduced mortality.

If a plant is planted without mycorrhizal fungi it may take some time for the roots to start growing and explore a significant enough amount of soil to feed itself. This is typically seen with trees which have quite coarse woody roots that can be slow to grow. If the trees is bare root, or has been root pruned or is planted badly this can further exacerbate the problem and lead onto something called transplant shock. Effectively the plant starves in the soil as its roots can’t grow into the soil fast enough to find enough nutrients to feed itself. Mycorrhizal fungi solve this problem as they grow so much faster than the plants roots and are capable of taking up nutrients and water very quickly and efficiently.

The mass of Hyphae colonising the soil are very effective at finding nutrients especially phosphorous. Phosphorous is a very important nutrient for enabling plants to flower and subsequently produce fruit so using rootgrow will give your plants a better show of flowers and yield of fruit and vegetables.

Another benefit of this mass of Hyphae growing through the soil is the Hyphae binds the soil particles together leading to better soil structure and aggregation (soil granules binding together). This improved soil structure leads to better water holding capacity in the soil. This not only leads to drought tolerance in plants but this extra soil moisture helps nutrients to dissolve into a solution which can be more easily taken up by the fungi. In a soil such as this the whole range of both macro and micro nutrients are more available which leads to much better more balanced plant nutrition.

5. When should I be using I use rootgrow?

   Rootgrow can be used all year round when planting plants. The only time you shouldn't use rootgrow is when the ground is frozen and in that situation you shouldn't be planting plants anyway. When planting into frozen ground the problem is actually breaking up the soil enough in the backfill of the planting hole, large frozen lumps of soil leave large air pockets that allow in frost and also water which can freeze and damage the plant roots.

6. I have heard rootgrow is particularly good for Roses, why is this?

   Rootgrow is recommended by virtually all UK rose growers, the reasons behind this are many and varied but it all starts with how roses are grown. Roses are grown commercially in fields, they are then lifted by machine and sold bare root potted up and delivered to garden centres. In most cases the roses won't have fully rooted through into the pot and when you plant a rose most of the compost will fall away from the plant.

   If you treat a Rose to rootgrow you will get colonisation of the fungi in 2-4 weeks and these fungi will grow rapidly into the soil sourcing water and nutrients to feed back to the rose, as Roses are quite greedy plants the Rose will appreciate this early boost of nutrients and reward you with good establishment and vigorous early growth.

7. I have also heard rootgrow can overcome replant problems in roses, how does this work?

   Rose replant syndrome, Rose replant disease (it's not technically a disease), Rose soil sickness are the many different names used to describe this phenomena, the latter is probably the most apt. If new roses are planted into old rose beds that haven't been improved then it is likely the Rose will not grow and die in the sick soil.

   The reasons behind this are varied and not fully understood. Back in 2003 it was our particular blend of rootgrow mycorrhizal fungi that first showed benefits to Roses and since then rootgrow has become a standard treatment when planting roses.

   Roses are very hungry plants so soils can become depleted of nutrients and organic matter, if the rose beds have been fertilised heavily with inorganic fertilisers over years (and when roses start to look unhealthy there is a tendency by gardeners to give them an extra feed)

this can further disrupt soil fertility. If you add to this the problem of effectively planting a bare root rose into this poor (sick) soil then is it any wonder that Roses fail to establish?

To overcome this double dig the bed and incorporate copious quantities of organic matter, treat the plants to rootgrow, top dress with a standard rose fertiliser (if you wish) and then mulch with organic matter every autumn. This should allow you to plant new Roses in old Rose beds however in Horticulture there are no guarantees as so many other things could be occurring in the soil but in our experience since 2003 very few roses have failed to establish when following the above guidelines.

8. I have heard rootgrow is very good for trees and also bare root plants such as hedging, why is this?

   Trees and hedging plants tend to be long lived and woody, in nature these plants tend to be more dependent on mycorrhizal fungi than other plants. Also we have to look at the methods of commercial production to understand why mycorrhizal fungi are so effective with these plants.

   Firstly in the case of trees grown in pots, especially in the case of large trees the reason they can be slow to establish is down to a thing called root to shoot ratio. Put simply there should be enough of a root to support the shoots, top growth or leaf canopy. When these trees are grown in pots the pot holds water and nutrients around the roots very effectively, and this enables nurserymen to grow very large trees in quite small pots. This is absolutely fine in the nursery but when you take the pot off i.e plant it in your garden it will take time for the roots to find enough nutrients and water in the soil to support the top growth. As mentioned earlier it is the speed of rootgrow colonising the roots and then exploring the surrounding soil much faster than the trees course woody roots that lead to better establishment and better early growth.

   Secondly in the case of bare root hedging, these plants are grown in the field and root pruned before heeling in to be sold over the winter (dormant) months. These plants can be quite fragile and in some varieties in some situation losses as high as 10% can be found. Again as mentioned above it is the speed of colonisation by the fungi and the subsequent early boost of water and nutrients that ensure good establishment and better early growth. Typically using rootgrow on hedging should reduce losses to less than 1%.

   There is also another benefit with treating hedging to mycorrhizal fungi which could be called the community effect. The mycorrhizal fungi will actually link plants together and share nutrients and resources amongst all members of the plant community. This will actually hold back more vigorous plants and boost less vigorous plants leading to more uniform and consistent growth.

9. I grow my own vegetables and fruit and I am a bit concerned about using inorganic or animal based fertilisers. Is rootgrow safe?

With the recent boom in Grow Your Own (GYO) many gardeners are starting to look very carefully at the types of products they use on plants that are destined for the family dining table. For many fruit and vegetable gardeners rootgrow is a vital product to use as it gives their plants the best start in life by ensuring the plant has access to water and nutrients as fast as possible through the combination of plant and fungal root.

The species of fungi in rootgrow are isolated from UK soils and then grown on in the UK, as such they are truly sustainable, safe and easy to use, ideal for GYO

Rootgrow is especially good in the case of fruit as mycorrhizal fungi can extract Phosphorous ((P) a vital nutrient for flowering and fruiting) from soils very effectively particularly clay soils where (P) can be unavailable due to being immobile and tightly bound into the structure of the soil.

10. I have heard rootgrow helps plants to withstand drought using something called Glomalin, How does this work?

    Glomalin is a recently discovered protein that exists in the soil and is causing a bit of a stir in the soil science community as it is causing them to re-examine what makes up soil organic matter.

    Glomalin is a Glycoprotein that is exuded by mycorrhizal fungi, this sticky glue like substance permeates organic matter and binds soil particles such as sands, silts and clays together to create a soil aggregate. These soil aggregates (clumps of soil) vastly improve soil structure by holding onto moisture and through this moisture many nutrients can dissolve and become soluble and available to be taken up by the plant.

    Very poor soils have low organic matter, low Glomalin and low levels of mycorrhizal fungi and soils such as this are very prone to nutrient leaching, erosion and quickly become quite hostile environments to support plant and soil life.

11. How can I feed the soil and use fertilisers effectively work with rootgrow?

    One of the best ways of managing soil fertility is with the addition of organic matter, dug into the soil and then applied again annually as a mulch. Rootgrow also works exceptionally well under these conditions as the annual mulch mimics the autumn leaf layer that condition the soil and actually help mycorrhizal fungi reproduce.

    However it should be remembered that gardens are fundamentally unnatural and some plants can be very hungry feeders such as Roses and Sweetcorn and will benefit from a boost of fertiliser. When planting a plant and applying extra fertiliser put the mycorrhizal fungi in the bottom of the planting hole and then mix the fertiliser into the backfill or apply as a top dress. The only rule of thumb is to try and keep the fertiliser away from the fungi. After a month or so the plant will be fully colonised and then should not be affected by fertiliser. Mycorrhizal fungi are quite robust and you would probably have to apply a strong liquid feed of inorganic fertiliser every week for 3 months to prevent the fungi from

colonising a plant (which hopefully no one would consider doing as it would be a waste of time and money)

12. I like to propagate plants from seeds and cuttings, when should I use rootgrow?

    Generally speaking the best time to use rootgrow is when planting out the young plant into its final position in the soil. However for some difficult to propagate plants it may be advisable to use rootgrow in the propagation.

    In the case of seeds you need to apply a thin layer of rootgrow 1cm (half an inch) below the seed so when the seed germinates and the roots grow down they will have to grow through that layer of mycorrhizal fungi and become colonised.

    In the case of cuttings it is best to treat the cuttings once they have rooted and being potted on for the first time. Mycorrhizal fungi do not speed up the process of a cutting callusing and producing its first adventitious roots.

13. How do I treat Bulbs, Corms, Rhizomes and Tubers?

    Plants that produce these underground storage organs are known as Geophytes. These storage organs are also very strongly mycorrhizal. The best way to treat them is to prior to planting slightly wet the basal area (where the roots will grow from and the dip the wet part into a saucer of mycorrhizal fungi granules, whatever sticks is the quantity you need. This is a particularly efficient way to treat bulbs. With larger corms and Tubers you may need to sprinkle a layer into the bottom of the planting hole instead

14. Does rootgrow work with subtropical and Mediterranean plants?

    Yes rootgrow does work with these types of plants. Even though they may come from tropical climates you are planting them into UK soils or growing them in containers under UK conditions. Some of the species of mycorrhizal fungi in rootgrow are soil specific not plant specific and these will colonise such plants.

15. I have heard some Ericaceous plants don't become colonised by mycorrhizal fungi, which plants are these?

    Please read very carefully.

    There is a group of mycorrhizal fungi known as Ericoidal mycorrhizal fungi and these colonise certain specific plant groups. These are

    Rhododendrons and Azalea's
    Heathers (*Erica, Calluna, Daboecia* and *Cassiope*)

Blueberrries and Cranberries (*Vaccinium* sp.)

Please note it is only the above plants that use Ericoidal mycorrhizal fungi, many other common Ericaceous or acid loving garden plants such as *Pieris, Skimmia,* and Japanese Acers use the normal species of mycorrhizal fungi found in rootgrow.

16. Are there any other plants I can't use rootgrow on?

    There are a number of other plant groups that we do not recommend using rootgrow on. If you do use rootgrow on these plants it will not harm then in any way, the fungi just will not colonise and break down in the soil. These plants are

    Edible Brassica's (Cabbage, Cauliflower, Broccoli, Turnip, Radishes and Brussel Sprouts) all have a natural anti-fungal compound present in their roots. This is a disease resistance mechanism that unfortunately prevents mycorrhizal fungi colonisation. It also offers no protection against the Brasica's worst disease Club Root which is no longer considered part of the fungal kingdom, it is now considered a slime mould (*Plasmodiophorids)*

    Another group of plants which we do not recommend you use rootgrow on is fast growing salad crops such as 'cut and come again' lettuce and salad leaves and spinach. Due to rootgrow taking 2-4 weeks to colonise plants these salad leave can germinate and be harvested in 4 weeks so the plant does not really have time to derive any benefit from the treatment.

17. Does rootgrow have a shelf life?

    Rootgrow should be stored in a cool dry place and kept sealed at all times. If these instructions are followed rootgrow should have a 2 year shelf life. Please do not store rootgrow in the greenhouse.

18. I grow plants in pots, when should I use rootgrow?

    When planting plants in pots rootgrow will have a limited benefit. It is advisable to treat new plants such as vegetables or bedding when planted into containers as they are only usually in the container for one season. With other more longer term plants such as trees,specimen plants or topiary, rootgrow will be of benefit for the first 1-2 years. After 2 years once the plant is fully established the mycorrhizal; fungi will gradually die away as there is no new soil/compost to explore and the plant can be maintained with balanced feeding and regular watering.

    In the case of re-potting larger plants in pots and especially if you are root pruning it is vital to use mycorrhizal fungi at this time to help overcome transplanting shock.

19. What happens if I over or under dose?

    The rootgrow application rates have been carefully worked out to make rootgrow as economic and reliable as possible. If you overdose you will simply waste money and confer no additional benefit to the plant. If you under-dose colonisation will be slower maybe 1-2 months rather than 2-4 weeks.

20. I have heard mycorrhizal fungi is very important for orchids, why is this?

    To answer this question firstly we need to define exactly what orchids we are talking about as the *Orchidaceae* Genus is currently thought to contain up to 26,000 species, the only larger plant family is the *Asteraceae* (Daisy family). For the purpose of these FAQ's it may be useful to split Orchids into two groups.

    Group 1 Flowering orchids bought from garden centres for indoor display grown in pots

    These orchids are usually the tropical *Epiphytic* Orchids that have their own family of mycorrhizal fungi not present in rootgrow. As such we do not recommend using rootgrow when re-potting these types of Orchids

    Group 2 Hardy Orchids grown outdoors in soil

    This group contains the UK native orchids such as the *Dactylorhiza* (Marsh Orchids) and *Epipactis* (Helleborines). There are about 20 different Genera and around 50 species of UK native orchids. If we are honest we must say that we simply do not know if the species of mycorrhizal fungi in rootgrow will be of benefit. It is highly unlikely that they will do any harm so why not give it a try.

    All native UK orchids are protected by law and should never be removed from the wild.

    If you would like to try growing UK Native orchids please visit

    http://www.hardyorchidsociety.org.uk/

    for further information.

21. Can I use fungicides on my treated plants?

    In the case of fungicides bought from a UK garden centre applied to the foliage of plants there should be no problems with the pesticide having a detrimental effect on the mycorrhizal fungi.

22. Can I treat existing plants?

    The simple answer to this question is no, however there are a couple of exceptions.

If the plant has only just been planted (less than a couple of weeks) it can be possible to dig up the plant and treat as normal. This should not however be done with trees or woody plants in the growing season as they can be very prone to root damage and transplant shock.

In the case of established mature plants if they have been in that position for more than 2 years they should already have an established mycorrhizal community. If the plant is looking unhealthy chances are the problem is attributable to soil compaction, a layer of sub soil that the roots have just grown into, some form of disease or just the wrong type of plant in the wrong soil or aspect. In these cases retrospectively treating with mycorrhizal fungi will confer no benefits.

If however you really want to try retrospectively treating plants with mycorrhizal fungi you can drill core holes down into the active area of the root zone and sprinkle granules into those holes. We do not however make any guarantees that this technique will make a difference.

23. What do the mycorrhizal fungi get out of this relationship?

    Mycorrhizal fungi depend on the plant for their carbon nutrition, the fungi use some of the plants photosynthetic products such as Hexoses which can then be converted into Trehalose (used to help the plant withstand drought), Glycogen (used to store energy) and Pentose (used to create nucleic acids).

    In return for these substances the fungi will support the plant for its entire lifetime.

For any further enquiries please email info@plantworksuk.co.uk