

# What To Put In Your Pot

(by Clive Wing 2004)

**1. Sulphur-** Many people think NPK, they are so wrong, it should be NSPK and Brimstone90 from J&S Technical, a British Company, give a good explanation of why Sulphur is very important for FEEDING THE WORLD. Google: "Sulphur Fertilizer Application in Crop Production" and/or download and read about Sulphur Fertilizer Application



**Sulphur Use in Enhanced Efficiency Fertilizers**

- Sulphur Coated Urea/NP/NPK compound fertilizers
- Sulphur Urea
- Sulphur Enhanced NP/NPK fertilizers
- Sulphur Micronutrients

Sulphur has long been known to be the natural enemy of blackspot and powdery mildew, and in times when sulphur dioxide was present in the atmosphere – as a result of coal burning fires etc. – blackspot was unknown. So give your roses a treat with GrowGood Sulphur. Roses love it – and so do rose growers. As the disease spores overwinter in the soil, the first application of GrowGood Sulphur should be applied to create a sulphuric condition that is alien to the spores. Regular applications at two to three monthly intervals during the dormant period, followed by monthly applications (at one-third of the application rate) during the leafing and flowering period will give good control. GrowGood Sulphur is applied as a liquid tonic, so it immediately gets to work in the soil. Among its advantages, GrowGood Sulphur: - Can be applied throughout the year. - Also promotes healthy vigorous growth and a profusion of perfect blooms. - An insecticide may be added to the solution if required



**2. Mycorrhizal Fungi** - Acts as a symbiotic lifetime fertilizer, having co-evolved with plants and trees for over 500 million years, mycorrhizal fungi are widespread throughout nature and are a fundamental reason for normal plant growth and development. Acting as a lifetime fertilizer - as it finds more food and finds more water for your plant, bush or tree. Rapid and good growth of newly planted or transplanted plants is enabled as the fungi adds more roots to your plant. As shown on BBC , often causing up to seven times more root growth, thus reducing requirements for high inputs of fertilizers, increasing tolerance to heat and drought conditions. Also, increased tolerance to adverse soil conditions e.g. high acidic or alkaline soils, reducing PH problems. . Mycorrhizal Fungi 'fungal-roots' that form a natural beneficial relationship with your shrub and rose roots. Features Better nutrition Improved flowering Natural plant health insurance Give your shrubs, roses and vegetables extra metres of roots Mix with the growing medium if small plants are being grown together (e.g. strawberries). Plants most suitable include roses, all garden shrubs, garden flowers, bulbs and vegetables. Unlikely to help brassicas, rhododendrons, azaleas, orchids or heathers.



**3. Diatomaceous Earth** - a naturally occurring, soft, chalk-like sedimentary rock that is easily crumbled into a fine white to off-white powder. This powder has an abrasive feel, similar to pumice powder, and is very light, due to its high porosity. The typical chemical composition of diatomaceous earth is 86% silica, 5% sodium, 3% magnesium and 2% iron. Diatomaceous earth consists of fossilized remains of diatoms, a type of hard-shelled algae. It is used as a filtration aid, as a mild abrasive, as a mechanical insecticide, as an absorbent for liquids, (its the main component of cat litter), as an activator in blood clotting studies, and as a component of dynamite. It is also heat-resistant, and often used as a thermal insulator.



As said, the fossilised shells of Diatoms are the main ingredient in diatomaceous earth, but not just any old diatom fossil will do, it has to originate from a freshwater source, not saline or salty marine. Only the fresh water diatoms found in the ancient freshwater lakes of Inner Mongolia and Peru have the essential jagged shape that ensures air gaps for gases and fluids can freely flow through when part of a growing medium. Diatomaceous earth in white/grey powder form can be used to dust all crops and is very effective against all insects. It appears as broken shrouds of glass to the insect, cutting through the exoskeleton like glasspaper and being mainly silica based, absorbing the bodily fluids of the insect like a sponge when the exoskeleton (skin/armour) of the insect is breached, resulting in dehydration and death.

Sometimes called silica stone, DE's composition is predominantly silicon dioxide, which results in the media slowly releasing silica to the plant, which is particularly important to cell growth. It does not break down like other media, and can be used to successfully cultivate plants from seedling to specimen. DE is completely reusable after a thorough cleansing and its porosity will not clog over time. Highly porous, DE is capable of absorbing up to 150% of its own

weight in water and boasts an excellent Cation Exchange Ratio. The internal porosity allows the granules to absorb moisture and to slowly release it back to the plant as required. As a result of the multi-faceted granules, the media achieves an excellent air to water ratio in the pot which is particularly important to discourage root rot. DE can be used as a beneficial supplement to expanded clay, rockwool, coconut coir, composted bark in fact virtually all mediums depending on the application. As an example, DE used as a supplement with coconut coir helps to reduce the common problem of compaction and increases moisture retention. My favourite use is lining the bottom of a pot with DE, the DE acts as a reserve reservoir so plants can get the extra moisture they need in the later stages of growth. DE can also be applied as a top dressing for outdoor gardens. The silica and micronutrients are slowly released into the root zone during each watering cycle while adding a decorative appeal to any garden, the DE will continue to discourage insects, looking to insects like a field of body piercing broken shrouds of glass.

#### 4. Essex Comfrey Mix - The Origin of Organic Gardening

Comfrey, an incredible plant that has a deep root system which fills its leaves with nutrients. The above surface plant material is used to make the "comfrey mix". Comfrey contains high levels of the basic NPK nutrients, drawn up from the deep by its extensive root system. As such it can be useful as animal feed and as plant feed. The plant re-grows from small root cuttings and, as a weed, is very difficult to eradicate. In the nineteenth century an Essex based Quaker smallholder, Henry Doubleday (1808 – 1875), became intrigued by the possibilities of Comfrey as a useful food crop & fertiliser, dedicating the last 30 years of his life to Comfrey, Henry Doubleday introduced the cultivated varieties which the varieties of today are based on. In the 1950's Lawrence D Hills took up the Comfrey cause growing new varieties in Bocking, which is a village in Essex England. Almost as a side effect he started what has become Europe's largest organic gardening association, the HDRA. Hills wrote two major works on comfrey: Comfrey: Past, Present and Future (1976) and Russian comfrey: A hundred tons an acre of stock feed or compost for farm, garden or smallholding (1953). On the HDRA trial ground at Bocking in Essex, L D Hills developed the most valuable (Lot 14) variety, Bocking 14. High in nutrients and sterile, thus is exclusively propagated from root cuttings.



#### 5. Paramagnetic Cosmic Dust for Zen based moonlight farming

Paramagnetism is Yang and Diamagnetism is Yin. Plants are diamagnetic, when measured on a paramagnetic meter, and require paramagnetic soil to be healthy and strong. Paramagnetic material is usually silica based rock with small amounts of iron oxide (approx.12%). But not all iron oxide is "paramagnetic". Basalt is the most common rock type in the Earth's crust (the outer 10 to 50 km). In fact, most of the ocean floor is made of basalt. Common minerals in basalt include olivine, pyroxene, and plagioclase. The most commercially sold paramagnetic dust (Lava Sand & other 'made-up' stuff) actually is very common Basaltic Rock or Basaltic magma, and its available in its purest, dusty form, from most major horticultural suppliers (if you ask nicely) starting from less than £2 a kilo for small sample packs, but usually purchased by the ton. Basalt is the dark, fine-grained stuff of many lava flows and magma intrusions. Its dark minerals are rich in magnesium (Mg) and iron (Fe), hence basalt is called a mafic rock. So basalt is mafic and either extrusive or intrusive.



#### Alternatives to Peat-Based Potting Mixes

Unless you are in Canada it is unlikely that you can source peat from a sustainable source that is a viable distance away. So peat alternatives are virtually a must.

The past favourite to bulk out the mix was humic peat, but there are alternatives that have been found to be very successful:



**Garden compost** - sieved, well rotted garden compost provides a suitable alternative to peat in most growing media, although the fact the compost adds nutrients will mean that the mix ratio will need to be adjusted (i.e., compost is not a straight replacement for peat).

**Coconut Coir** - often considered better than bark but not usually sourced locally if you are European. Coconut coir is made from the waste of coconut fibre production, disposal of this waste was, in fact, causing its own environmental problems before it was introduced as a peat substitute. Left to rot down, Coir ends up as a crumbly substance which when used in mixes for potting compost improves porosity and moisture retention in a very similar manner to peat.



Coir is also available as small blocks for growing individual plants which can be planted out without disturbing the roots.

**Composted bark** - actually it is usually 'composted forest products' i.e. it includes wood chips, sawdust etc. Providing that it is well composted, this provides a structure very similar to peat, although it does contain nutrients thus necessitating re-balancing of the mixture. For



mass production of media composted bark is often the best for producing consistent results especially when supplied from mono-culture forestry.

# Killer Fossils cutting up bugs & sucking them dry, sado-masochistic roots, symbiosis and de-cloaking nutrients, that's Terraponic!

(by Clive Wing 2004)

The science of growing plants in soilless cultures has evolved. Hydroponics has proven advantages, it can't be ignored that the yield of fruit from hydroponically grown plants is greater than those grown in earth. Yet any fruit grower will admit how much better a fruit grown in earth tastes and smells to that grown hydroponically. Commercial Horticulturalists have been growing indoors for years, now the technology is here for you

**Diatomaceous Earth** - Killer Fossils are here ! If you are an insect, a bug trying to take a stroll in my dirt, I think not, the killer fossils will get you and then they will suck you dry of all your bodily fluids. It's true, Organic pest control is practised by the use of earth containing the fossilised shells of diatoms (a type of algae) that have microscopically sharp edges. The fossils are like broken glass for the bug to walk on, because it has an exoskeleton, where the 'grit' get's caught in the bug's exterior plating, it wears away and cuts through as the bug moves it is effectively wearing holes in itself as the fossil grinds its way through. The fossil cuts into the bug's cuticles and because of silica properties, absorbs the pest's bodily fluids, resulting in dehydration and death. Earth containing the unique fossilised shells has proved an invaluable tool against a range of crawling insects including ants, cockroaches and bed bugs. It is used widely by horticulturalists for its properties and implementation of 100% environmentally safe pest control.

**De-cloaking.** I'm not suggesting that nutrients are Klingons, but I just had to be trekky for a moment. A lot of my research has included reading spurious research findings from the billions and billions of dollars spent by NASA and associated elite researchers into how plants grow and in particular how they feed through the root system. There are some metaphors used, but "it is all true" (requires voice of Eddy Izzard) and is backed up by NASA published research & web links for reference. Terraponic (meaning earth working) is considered a hybrid of Hydroponics (meaning water working). Cytoplasmic Streaming is increasing the active movement of organelles within a root hair cell.

**Cytoplasmic Streaming.** When it comes to hydroponics, some of the facts are well documented and in an easy to read form, others are wildly corrupted, abused or even unconsidered. I'm almost exclusively interested in the ones that billions of dollars have & are still being spent on. I hope to convince you that there are a lot of quite obvious and fundamental reasons of why hydroponics has a very important sub-type or hybrid, terraponics. Earth working, as well as the water, hydroponics and eventually airponics may well be practised by the majority in the future and the inclusion of earth or 'dirt' as I prefer to call it appears to have been replaced by synthetic, artificial, even plastic mediums, in some cases, just a plastic tray! I would argue that dirt is essential to the plant's quantitative and qualitative growth, whether you harvest the roots, the stems, the leaves, the flowers or the fruit they all have one thing in common. They all depend on the effective transportation of nutrients from the environment to the root canal system. I am going to tell you why you should believe that roots which are fortunate show a sado-masochistic fetish and why symbiotic relationships that form from this 'behaviour' can only take place effectively in 'dirt'. First a few cyto-delic words; cytoplasm is what the plants root cells are made of, cytoplasmic is active movement of elements of the cells structure, and cytoplasmic streaming is "increasing" that active movement. OK, so now you know what all "fertilizers" are trying to do, they are trying to induce cytoplasmic streaming.

Terraponic. The only growing part of a plant root is the tip. As the root tip moves through a medium, scraping against obstacles, some of the cells become detached from the body of the root, to the effect of a protective layer being formed. This happens on all plant roots. As the cells are scraped from the root, the root becomes textured (self induced lesions). In the crevasses of the textured root, pathogens are encouraged to reside. The pathogens have a symbiotic relationship with the plant root and act like a catalyst (to cytoplasmic streaming). They help it to grow more efficiently by assisting in the chemical exchange through the protective coating of the root (which is cytoplasmic). The pathogen affects the waste of the plant by drawing it into itself as food. The effective waste the pathogen produces is food for the plants.

So, this is just one of the reasons why you need the fusion of hydroponics and organics, earth works (terraaponics) to encourage the qualitative growth of the plants root systems. Thus facilitating a more effective chemical exchange and improving the process of growth and exchange through the root.

**Only 5% of all nutrients a plant receives comes from the roots - Another Analogy ?** It's a scientifically proven fact that 95% of all nutrients a plant receives comes from the atmosphere only 5% from the roots. Forests burn and the winds spread the nutrients to all other plants around the world. Roots main purpose are mainly as legs or anchors to support the plant as it grows up to catch the sun. If you are not convinced, then consider how nutrients are supplied to a tree that has been in the same patch of earth for more than 100 years. At least consider the importance of what goes on above the root system and how the atmosphere above dramatically effects the roots. Atmospheric CO2 enrichment typically enhances the growth rates of roots, especially those of fine roots, and CO2-induced

increases in root production eventually lead to increased carbon inputs to soils, due to enhanced root turnover and exudation of various organic carbon compounds, which can potentially lead to greater soil carbon sequestration. In addition, increased soil carbon inputs stimulate the growth and activities of soil micro-organisms that utilize plant-derived carbon as their primary energy source; and subsequently enhanced activities of fungal and bacterial plant symbionts often lead to increased plant nutrient acquisition.

**Let roots be roots.** For your plants root systems to have unbridled freedom they must start with a layered growing medium which should be prepared to emulate the natural soil matrix (structural tessellation) that a root system adapts to in the natural environment. The root system has taken millions of years to evolve and through 'survival of the fittest', its structure has developed to work most efficiently in earth, not water, not air, earth. A fortified terraponic growing medium should be prepared and potted. Root rubbing at micro level is known to stimulate growth, as the roots develop, they collect the essential elements needed to underpin the characteristic flavours of the plant. There's nothing mystical here, the roots are gathering all the different ingredients that are needed to make the flavour and if you've got them roots hanging around in a Hydroponic NFT cave, tips crawling in Pytheren and absolutely nowhere to hide should the lights come on. NFT hydroponics really can be the best way to maximise your yield, but unless you use the right nutrients and deliver some physical stimulus you run the risk of loss in quality, especially flavour. But you will also learn the meaning of "ponic", in fact you'll be doing a fair bit of work, if you are a bit inexperienced then you will end up exposing your root system to a bombardment of photons! ..... back to Earth. A terraponic approach will absorb all of the benefits of hydroponics yet have your roots exploring a terrain in a structured growing medium matrix especially prepared to emulate the natural terra layers which a root system adapts to in the natural environment. No chance of any drafts or feeling like a freak show in good old Terra. A sophisticated, fortified terraponic growing medium is what the roots expect. They want to go rubbing up against those sexy stones and they want to cuddle up in some nutrient rich terra now and then, and yes, they love oxygen rich water and they adore a rush of fresh air. Let them have it all, that's truly terraponic.

# Pest and Bug Control with Live Ammunition

## Beneficial Nematodes - *Steinernema Feltiae*

Target Pests: Fly pests known collectively as "fungus gnats". Plant parasitic nematodes, particularly those of the Root knot group. Humpbacked flies, Fruit flies, Raspberry crown borer, Leaf miners, Cabbage maggot, Cucumber beetles, Shore flies, Black cutworm, Tobacco cutworm, White grubs, Beet armyworm, Onion maggot, Subterranean Termite and many more. *Steinernema Carpocapse* Nematodes and *Heterohabditis Bacteriophora* Nematodes are also beneficial nematodes. Beneficial nematodes seek out and kill the immature stages of harmful soil-dwelling insects before they become adults. They can be used to control a broad range of soil-inhabiting insects and above-ground insects in their soil-inhabiting stage of life. More than 200 species of insect pests from 100 insect families are susceptible to these insect predators. They are a natural and effective alternative to chemical pesticides, and have no detrimental affect on non-target species such as ladybugs, earth worms and other helpful garden insects. Beneficial nematodes can be applied anytime during the year when soil-dwelling insects are present and daytime soil temperatures are above 50°F (10 °C).



Nematodes are easy to use. They are shipped in a dry powdery clay formulation that is easily mixed with water. The solution can be applied using a watering can; hose end, backpack, or pump sprayers; or through irrigation or misting systems. Always release early in the morning or late afternoon when temperatures are cooler and away from direct sunlight to avoid exposure to ultraviolet rays and the drying effects of the sun. It is good to pre-moisten the soil before application and to water the area where application was performed afterwards. Soil should be moist, but not saturated.

Generally, 10 million of Beneficial Nematodes will effectively treat approximately 900 sq. ft. of conventional garden rows or up to 2500 sq ft broadcast. Release nematodes every 3-6 weeks or until infestation subsides. Nematodes can be stored in a refrigerator (do not freeze!) for up to 2 weeks, but it is best to use them as soon as possible, because they are somewhat perishable. If they start to smell bad, they're on their way out.

The nematode enters the host and kills it within 24 to 48 hours. It then reproduces within the host and searches for new hosts. This hunt and seek cycle provides long-term control.

**Phytoseiulus Persimilis** - (predatory mite) Almost 75% of European greenhouse vegetable production relies on *P. persimilis* for spider mite control, and the California strawberry industry uses this mite, along with another beneficial mite, *Neoseiulus (=Amblyseius) californicus*, to control spider mite infestations in field-grown strawberries. It is also used in interior plantscapes and conservatories. Greenhouse ornamentals growers have long relied on its ability to control spider mites. Relative humidity greater than 60% is required for survival of this predator, particularly through the egg stage.



These predatory mites are shaken over the infected leaves or placed in a distribution box and hung on high or taller plants. The predatory mite reproduces at twice the rate of red spider mite at 18 degrees Celsius and eats the eggs, young and adults of the spider mite. The predatory mite should only be applied after red spider mite have been observed and they work better with higher humidity. *Phytoseiulus persimilis* are also more effective in greenhouses or conservatories. In optimum conditions it will consume more red spider mites than *Amblyseius*.

Supplied as young and adult predators in a shaker bottle of 100's of insects contained in a vermiculite carrier material, which should be shaken or poured onto the infected areas of red spider mite damage.

*Phytoseiulus* require temperatures between 16 & 20°C (61 & 68°F) to be active and reproducing. Always release your predators as soon after receipt as possible. This is a live product and unnecessary storage once received will result in death of the predator.

