

Tonics for the soil

Promoting healthy soil flora can protect plants and boost growth across all areas of horticulture.

Gavin McEwan reports

Much of conventional horticulture works on the model of growing plants in an inert medium to which water, nutrients and pest control agents are added to protect and promote growth.

But many growers and managers are increasingly coming to view the vitality of the soil as being as important as that of the plant. And many suppliers now offer products and services to ensure that both soil and plants are as productive as possible.

Laverstoke Park, a 1,000ha organic and biodynamic farm in Hampshire, has made a niche for itself in analysing soil health for growers and providing tailored remedial treatments, chiefly as compost teas.

According to Laverstoke agronomist Joel Williams: "Unlike conventional fertilisers, a compost tea consists of living organisms that work to solubilise nutrients, so making them available to the plants. That lets you reduce your fertiliser usage and also gives you healthier plants with less risk of pest and disease problems. The compost tea has to be of high quality, though, and there are a lot of factors that influence that."

Williams also produces compost teas for use on the farm. "They are crop-specific, since different crops require different microbes - for example, some will be mainly fungal, others mainly bacterial," he says. "There's a lot more we'd like to know though. We've only scratched the surface so far."

Environmental biotechnology company Symbio, based in Surrey, works with Laverstoke Park in analysing soil to identify microbial requirements. Managing director Martin Ward says: "We can tell growers what they have and what's missing, so they can get the bacteria-to-fungi ratio right before planting."

He explains: "Different plants have different requirements. Brassicas, for example,



Bacteria: different plants have different requirements — a soil analysis will help provide the right microbial balance for each crop

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Joel Williams, agronomist, Laverstoke Park

don't have a very long life cycle so need soil bacteria, whereas conifers are adapted to growing in the fungi-rich soil of a forest. So you need the right microbial balance for each plant.

"We know roughly what the requirements are for most plants. In organic vegetable growing, for example, you don't put bacteria-dominant brassicas beside onions, which are fungi-dominant."

Symbio's MycoForce is available in powdered form, to which water is added, as a liquid which is ready to spray onto leaves, as a gel-based root dip, as concentrated tablets and even as a seed coating.

"The traditional NPK fertilisers are salts and too much of them will kill the soil biology," says Ward. "A compost tea is the cheapest way to deliver a range of bacteria and fungi to the soil."

The products are applicable across horticulture, the company says, adding: "The same growth principles apply for plants used for food, ornamental display, forestry and landscape or amenity sports turf."

So far, it is the last of these that has been

in the vanguard of adopting the techniques, with around one-fifth of golf courses using bio-stimulants in one form or another, compared with only around one to two per cent of growers, says Ward.

"The turf industry has found it can reduce fungicide applications from seven to eight per year to just one or two. The landscape industry also bought into it earlier."

Finding the right application

Edible horticulture also stands to gain, as Laverstoke Park has shown by managing without fungicide applications on its vineyard, compared with the fungicide application rates of every two to three weeks typical in the viticulture industry.

"Attitudes are changing rapidly," says Ward. "When we first came to Four Oaks 10 years ago, no one wanted to know. This year, even the big growers are saying: 'We are reading your research.'"

"The high-value crop sector has embraced it, along with some bedding and containerised nurseries. We seem to have reached a tipping point."

This will help plants better cope with the stresses of climate change, he adds. "The English garden will lose more plants to reduced rainfall than to heat. [Efficient water use] is already a big issue in areas like the southern United States." • The change of heart has come too late for some though. "In the 1990s there were a lot of startups in this area but nearly all of them have failed," says Ward. "The market wasn't ready for it."

Another product that is winning acceptance in the industry for its ability to improve soil flora and so plant health and vigour is worm compost, sold by Powys-based ORM under the name Wormcast-Pro.

According to sales manager Tony Beaumont: "It's full of beneficial bacteria and nematodes - the good ones that drive away the bad ones - as well as humic acids and micronutrients, to create a healthy environment in the rootzone and so give you strong, disease-resistant plants."

ORM claims to be the largest worm breeder and supplier in the UK, turning farmyard manure and vegetable waste into a product that is Soil Association-approved and can be mixed to order for growers and used straight away.

Like other such products, Wormcast-Pro is compatible with integrated pest management regimes, though it will itself reduce the incidence of pests such as aphids and spider mites, the company says.

James Coles and Stewarts Nurseries are two growers that have already successfully trialled the products, Beaumont says, while a partnership with Sinclair Horticulture now promotes its wider distribution. "Most growers who have tried it have cut back on fungicides or even use none at all," he says.

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Tony Beaumont, sales manager, ORM



Planting at the Royal Botanic Gardens, Kew's 2007 "Mediterranean Summer" display benefited from Rootgrow Plus mycorrhizal granules - so much so that designer and installer East of Eden Plants of Cornwall has become an agent for the product, which it sells to both the retail and professional markets.

According to owner Peter Belton: "Our main thing is Mediterranean and tropical planting designs, and we feature Root-grow because it's good for our plants. But after the Kew planting we got a large number of landscapers wanting to enhance their own plants' survival chances, as well as amateur gardeners looking to promote growth in an organic way."

Explaining how it works, he says: "Plants and mycorrhizae have evolved a symbiotic relationship. The fungi massively increase the root surface area and hence the uptake of water and nutrients, but that gets lost in cultivation."

By one estimate, around 90 per cent of plant species are capable of forming symbiotic relationships with mycorrhizal fungi. They are, to some extent, host-specific but manufacturer Plantworks gets round this by incorporating fungi from 10 different genera to ensure broad application, rather than producing plant-specific treatments. Belton says: "Only one or two will get picked up by the plant and there are some species, such as *Rhododendron*, which do not form such symbiotic relationships."

The nursery recommends combining fungi with a later dose of the seaweed-derived nutrient Maxicrop. "It will stimulate the plant in different ways. Seaweed is high in micronutrients that boost the plant in ways that NPK alone won't."

He says commercially grown plants, both ornamental and edible, could benefit from such treatment, but he would like to see more research on the benefits.



Worm compost: vegetable waste becomes a Soil

"But this sort of thing is still in its infancy." i? The potential use of these products ex-3 tends across horticulture, the company says, with turf and landscaping standing to benefit as well as production horticulture.

Natural ingredients

Another type of product with a humble source that is finding a wide application in horticulture is a garlic-based range from Aston Horticulture. The range includes Tree Wash, a foliar spray for top fruit, and Garshield, a blend of garlic, seaweed and citrus extracts that helps plants repel pests and diseases while promoting strong growth.

According to the company's founder Hugh Struth: "Unlike conventional treatments, there's no chemical setback with these."

The company has also found an applica-

tion in turf enhancement with its Aston Turf, which it claims will reduce or even eliminate the need for chemical treatment against many of the familiar pest and disease problems of grass, thanks to the anti-bacterial and anti-fungal properties of the garlic-derived compound allicin.

The company's product Rabbitof, when applied as a foliar spray, serves as a deterrent to rabbits and other browsing creatures.

As part of what he describes as his "retirement hobby", Struth has even bred two varieties of garlic that have a high sulphur content, to create a more potent product.

Trials that are taking place with the Horticultural Development Company and with growers are already providing promising results, Struth says. He concludes: "We learn every year through feedback from growers." •