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Dear Readers,

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If you are interested in more information about Neutrog, please let us know at marketing@neutrog.com.au to make sure you receive both our monthly newsletters.

The one you're reading now is commercially focused, while we also put together a newsletter dedicated to growing plants at home. Each month we collate seasonal advice from experts, product profiles and garden features with a full insight into Neutrog.

Kind Regards,
The Neutrog Team

A New Appointment to Neutrog's Biological Advisory Board

"I am looking forward to working with the other advisory board members and to explore new opportunities for Neutrog products." says Kirsty.

We are excited to announce the appointment of Associate Professor Kirsty L. Bayliss PhD. to Neutrog's Biological Advisory Board, alongside Professor Paul Manning D.Sc. PhD. FASM FRMS and Associate Professor Renato Morona PhD.

Kirsty is a plant scientist specialising in the management of diseases of agricultural and horticultural crops and postharvest pathogens associated with fresh produce and grain. She has a strong interest in solving industry problems, with a passion for the development of chemical-free methods for improving crop performance and managing postharvest moulds and decays, with the aim of reducing food loss and waste.

Kirsty attended the University of Western Australia and completed a Bachelor of Science in Horticulture (Hons) in 1996, followed by a PhD in Plant Pathology in 2000. After her PhD she was awarded an Australian Research Council postdoctoral fellowship to work on blackleg disease in canola. In 2003 she took up a Postdoctoral Fellowship at Murdoch University to work on diseases in tree plantations. In 2006 she was seconded to the Cooperative Research Centre for National Plant Biosecurity as Education and Training Manager for eight years where she was responsible for developing a national postgraduate curriculum in Biosecurity and also recruited more than 40 PhD students with the aim of building biosecurity capacity for Australia. Kirsty is currently Associate Professor at Murdoch University. She leads the Master of Biosecurity and Master of Food Security and also teaches undergraduate units "Paddock to Plate" and "Plant Protection and Biosecurity".

She concurrently leads three major research projects totalling more than $4.5m, primarily supported by Horticulture Innovation, CRC for Future Food Systems, DFAT, and the Department of Defence and industry partners. Of particular interest is her project on using the microbiome associated with crops to improve their growth, similar to the human gut microbiome being needed for good health. This is an international project that includes collaborators from the International Phytobiomes Alliance. Her growing team comprises three staff and several PhD students working on food crops as diverse as artichokes and Spirulina. She has received international recognition for her innovative research and presented keynote addresses to a wide variety of audiences.

Kirsty has authored more than 40 publications to date. She is a peer reviewer for international journals such as the European Journal of Plant Pathology, and also reviews grants for the Australian Research Council and equivalent international funding agencies.

Kirsty joined the Neutrog Biological Advisory Board in October, 2023.

Exploring Fruit and Vegetable Production at Sundrop Farms

Last month, members of Neutrog's R&D and commercial teams had the opportunity to tour one of the most cutting-edge food production facilities in South Australia called Sundrop Farms.

Sundrop Farms is based in Port Augusta SA which enjoys around 300 days of sun per year. Sundrop Farms harnesses this solar energy, for the 20 hectares of greenhouses to produce around 16,000 tonnes of tomatoes annually, exclusively for Coles.

The farm integrates solar power, electricity generation, fresh water conservation and production, climate control and hydroponics to enable year-round sustainable production. 23,000 mirrors direct the sun towards a 127m high tower to generate heat which is used to generate electricity via a turbine to power various farm systems, and to desalinate water drawn from the nearby Spencer Gulf to produce fresh water to water the plants.

Through the implementation of renewable energy practices the farm has little reliance on fossil fuels, setting a big example for future food producers.

The Neutrog team met with Steve Marafiote, Frank Chevalier and James Cossington from Sundrop Farms as Neutrog explore biological product development for large scale hydroponic use.

They took our team through the production process, where seedlings arrive as 45 day old plants from WA which are then grafted onto a wild tomato variety. There are a total of 800,000 individual plants at any given time, and if the rows were placed end to end they would measure a total of 106km. 98% of the fruit produced is saleable.

You can learn more about the facilities and operations at Sundrop Farms in the video below:

'Molasses and Microbes' by Dr Uwe Stroeher

"Everything we put in and on our soils influences the soil microbiome for better or for worse, so it's not the carbohydrates themselves which are the issue but the type of carbohydrates we feed our soils over the longer term."

As the agriculture and horticulture industries have become more aware of the importance of soil biology, and more specifically soil microbiology, molasses has emerged as a way to encourage biologically active soil.

The use of molasses will certainly lead to a spike of microbial activity which can potentially also use up significant other soil nutrients, such as nitrogen, which are required to support both plant and microbial growth.

Using molasses at seeding or planting can be a great way to initially encourage biological activity and to quickly increase microbial numbers to keep out potential pathogens.

However, subsequent applications of molasses are worthy of further consideration when exploring how molasses creates this microbial response. To understand this, we need to look at the makeup of molasses.

Molasses consists mainly of simple sugars such as sucrose, glucose and fructose, which makes it easily broken down and able to act as an energy source for a wide range of soil bacteria and fungi. It is this characteristic that makes molasses ideal to rapidly increase the numbers of these organisms.

However, due to the very restricted carbon or food source represented by molasses it will be favoured those microbes who grow rapidly, are looking for simple sugar sources and this tends to be mainly bacteria.

Fungi, although they can use molasses as an energy source, tend to grow slower and are in many ways more adapted to using complex sources of carbon. This means that a consideration in the ongoing use of molasses should be that repeated or continual use is likely to direct your soil biology towards being dominated by bacteria while also reducing the overall diversity of microbes present.

Another factor to consider is the types of bacteria that are likely to make use of molasses. General soil microbes do not find simple, free sugars in the soil, with the exception being in the area around the root zone (rhizosphere).

Even in the rhizosphere the types of sugars and other food sources secreted by plants vary and are designed specifically to encourage the growth of certain plant beneficial microbes, and molasses will not necessarily encourage these.

Furthermore, pathogens are often very well adapted to the use of simple sugars, one of the reasons they destroy living tissue, is to gain access to these types of nutrients.

This is highlighted by studies that have shown that the use of molasses can lead to the regrowth of certain types of human pathogens, which are present in extremely low numbers, but once given a simple sugar source, regrow.

Finally, molasses acts (in effect) as a "sugar hit", a simple carbohydrate, and as such will not feed your soil microbes over extended periods and will be burnt up within days, if not hours, of being applied.

This is in large part due to the rate at which microbes can multiply, which is measured in minutes and hours, under conditions where simple sugars and nutrients are provided.

If the use of molasses on an ongoing basis if deemed necessary, it should be supplemented with more complex carbon sources. This will result in a larger diversity of microbes being fed because complex carbohydrates are broken down by some microbes which then feed still others with these breakdown products. The use of molasses as the major carbon source in effect reduces that stratum of microbes that can breakdown complex inputs. This can lead to a reduction in overall diversity and functionality of the soil.

The combination of the sugars in the molasses along with the organic material in composts, mulches, and organically based fertilisers, will not only encourage a wide range of soil microbes but will also help to keep the numbers of microbes high over longer periods, and won't result in a feast or famine scenario for soil bacteria and fungi.

SALIV8 Trials Continue at Mount Lofty Botanic Garden

Neutrog are currently undertaking a trial with the Adelaide Botanic Garden at Mount Lofty to see if the flavour of capsicums and tomatoes can be improved with microbes.

The trial involves two varieties of each plant, each being assessed with a selection receiving water only, and the rest receiving a biological inoculant currently under development, called SALIV8.

SALIV8 is a formula comprising specifically chosen microbes that the Neutrog R&D team believe will enhance flavour.

"The ability to enhance flavours, and potentially nutritional value, by the use of a microbial inoculant represents an exciting opportunity not only for the home gardener but also in the commercial setting" Dr Uwe Stroeher, R&D Manager.

A second application of SALIV8 was applied in mid-January.

"We are at the early stages of the trial and so far we have seen a slight improvement in the treated plants compared to the control groups. Within the next two to three months, we will hopefully be able to harvest the fruits and then do a blind taste test to see if the biological inoculant does in fact improve the flavour of the produce."

◀ Tomato plants from the trial. Three plants on the left have been treated with SALIV8, whereas the three plants on the right have been untreated.

Armillaria Research Continues with the Royal Botanic Gardens Cranbourne

In 2023 Neutrog became a part of an Armillaria Alliance alongside the Royal Botanic Gardens Cranbourne and botanic gardens from every state in Australia to explore opportunities to reduce the impacts of the fungal plant pathogen, Armillaria, commonly known as 'Honey Fungus'.

Armillaria species are recognised as significant garden pathogens and are responsible for plant health decline and mortality within the living collections at Cranbourne gardens. *Armillaria luteobubalina* is of particular concern as it is an extremely destructive fungi which can bring about the death of even mature trees.

Neutrog welcomed the team from the Royal Botanic Gardens Cranbourne to the Neutrog factory and laboratory mid last year and have since continued research into possible controls for the pathogen, which has made significant progress since our last update.

Neutrog R&D Manager, Dr Uwe Stroeher says, "What we have done at Neutrog is obtain soil samples from areas of the garden at Cranbourne known to have Armillaria, as well as areas which are devoid of the pathogen."

The pathogen was isolated from the soil and tissue samples and grown on plates. Armillaria is slow growing which made this step problematic, however the below photos show *Armillaria luteobubalina* from one of the garden sites.

A theory from the Royal Botanic Gardens Cranbourne was that Armillaria is more prevalent in areas of the garden where the soil has been disturbed. To test this theory, samples were taken from areas of the garden where the soil had not been disturbed to be tested, with the findings showing the presence of eight potential inhibitors of Armillaria and therefore proving the theory to be true. In laboratory settings, these isolates have stopped the growth of *Armillaria luteobubalina*.

"The next step is to identify the microbes that can act as a biological control agent against this pathogen, grow them and introduce them into the gardens to hopefully reduce the disease burden. We still have further work to do, but there is certainly a glimmer of hope on the horizon," says Dr Uwe.

Contact us

For more information about Neutrog products, please contact our team.

Neutrog products are also suitable for the home garden, and you can find out more by signing up to receive our monthly retail newsletter for stories from gardening experts, product profiles and seasonal fertilising guides for home gardens.

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