

Seed carbon source bolsters crop establishment

Energising soils is helping agronomist Gary White get crops off to a flying start

For agronomist Gary White, the use of liquid carbon soil improvers is as much to do with this season as the following ones.

Improving soil health is a foundation for sustainable crop production, but its effect on immediate profitability shouldn't be overlooked. "Reduced soil carbon and lower levels of organic matter compromise crop yield. It is therefore important to reverse this trend, to rebuild soil organic matter and promote more efficient nutrient uptake for more profitable and sustainable production," he says.

"Research has shown that increasing the supply of readily available energy to the soil microbiome stimulates soil biology, increasing the activity of fungi and protozoa as well as bacteria. Additionally, increasing the supply of carbon will help to improve the soil's physical and chemical properties."

A planned approach to improving soil health and crop sustainability starts with boosting soil microbial activity. Soil microbes capture and solubilise nutrients for the plant, so the more effective the microbial populations, the better the nutrient supply to the plant.

In a symbiotic arrangement, plants provide carbohydrates and carbon to the soil in the form of root exudates, effectively a sugar/carbon solution for the microbes. The microbes and organic acids increase

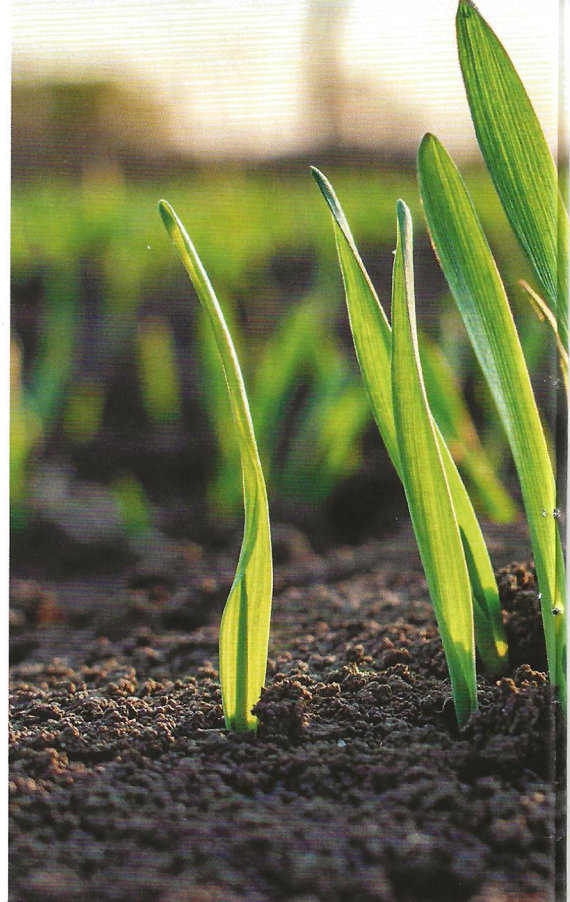
the rate at which mineral nutrients in the soil are dissolved, increasing their availability to the plant, he explains.

"Plants produce carbohydrates via photosynthesis and any surplus is used for root exudates to feed the soil microbiota. When performing well, a plant will provide 40% of assimilates from photosynthesis into the soil via root exudates, containing carbon and sugars. Feed the plant with a source of sugar and carbon and it can meet its demand for carbohydrates for growth more efficiently, allowing the production of root exudates to increase."

He uses the ED&F Man Agronomy liquid carbon range, as it is formulated for soil and foliar application, and because it is filtered to 200 microns, it is suitable for use in the majority of spraying systems. He advises a rate of 1-2 litres/ha, depending on the crop.

Better root development

Gary advises using both soil and foliar applications through the growing season. He says the immediate benefit of soil applications is that it drives root development, which is advantageous throughout the season.



"By feeding the microbiome around the seed, we are providing a feed and carbon source to increase soil bacteria, which in turn encourages stronger rooting and better crop establishment. The increased carbon supply also helps maintain and build carbon levels in the soil.

"Strong rooting can help the plant throughout the season by ensuring better access to water and nutrients. I am seeing evidence of better drought resistance and faster recovery after a period of drought.

"Frost can cause loss of root mass and fewer tillers, but deeper-rooted crops are better able to withstand the effects of frost."

During the season, foliar applications will continue to supply carbon to the soil, but will also increase the supply of root

Promote protozoa to boost nutrient availability

Protozoa proliferation was the focus of sampling of AminoA's plots at this year's Cereals Event. Mycolife and SoilBioLab analysed samples from crops treated with amine-based nitrogen product Blaazt.

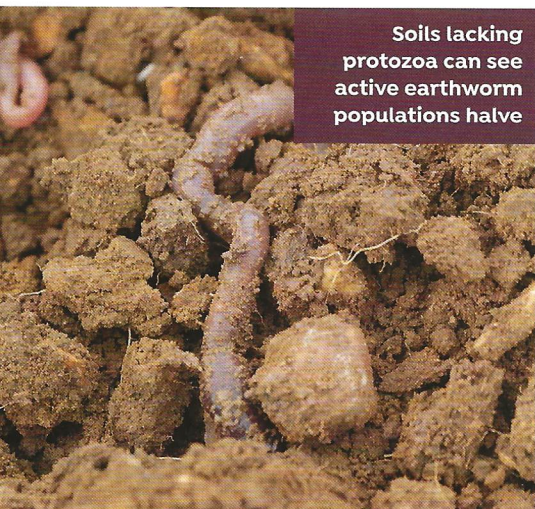
Protozoa are critical for nutrient cycling, as they release nutrients in forms readily available to plants, enhancing soil fertility and supporting a balanced, biologically active soil biome.

Independent university trials have shown that soils lacking protozoa can see active earthworm populations halve, diminishing benefits like nutrient cycling, improved soil structure, enhanced water

infiltration, better aeration and support for birds and soil invertebrates.

"Protozoa are a cornerstone of a healthy soil ecosystem, fostering beneficial interactions with crops and enabling earthworms to thrive," explains Nick Cooper, associate consultant at SoilBioLab.

The multi-year analysis of the company's demonstration plots at Cereals reveals that amine-based nitrogen products support an optimised soil biome, maintaining yields even as nitrogen inputs are reduced. "The data suggests that combining lower nitrogen rates with Blaazt enhances protozoa



Soils lacking protozoa can see active earthworm populations halve



exudates, which will maintain a higher rate of bacterial activity and greater supply of nutrients back to the plant.

"The increased release of soil minerals is allowing growers to reduce reliance on artificial fertilisers, increasing nitrogen use efficiency and reducing input costs. Over time, as soil carbon increases the workability of soils improves, allowing a reduction in cultivation costs and increasing the timeliness of cultivations.

"As growers strive to improve soil health, it will be important to recognise the need to make changes. Fuelling the symbiotic relationship between plants and soil microbiome is certainly one change that is beginning to deliver benefits, both in the short and longer term," Gary concludes. 🌱

“ Microbes and organic acids increase the rate at which mineral nutrients in the soil are dissolved ”

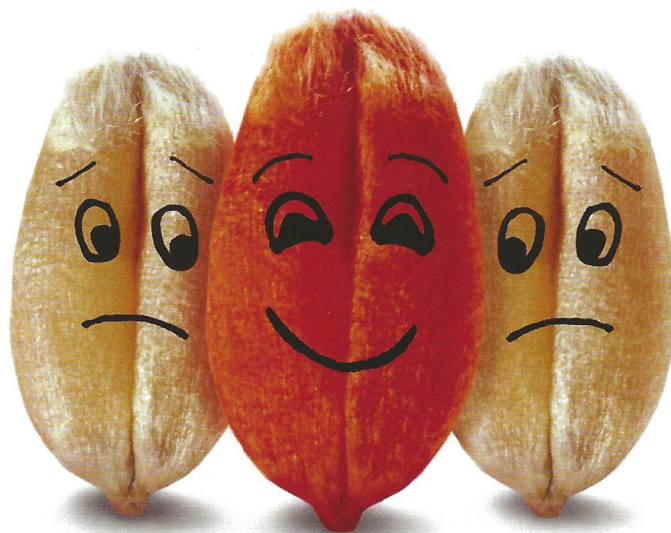
populations while sustaining high wheat yields," he adds.

Foliar applications of the hybrid biostimulant can boost the production of potent root exudates, which serve as a vital food source for soil bacteria. These bacteria, in turn, become prey for protozoa, driving a nutrient recycling process that can liberate 20-40kg of nitrogen and other essential nutrients for plant uptake.

This can have a profound influence on the soil microbiology in a matter of months. By leveraging amine-based nitrogen to stimulate root exudates and foster protozoa-driven nutrient cycling, farmers can optimise soil biology, reduce reliance on synthetic inputs, and maintain yields, paving the way for a more resilient and sustainable agricultural future.



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