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Bio-accelerated Phosphorus

Many Australian soils have a bad habit of holding on to phosphorus. For farmers, this can mean money locked up in the soil.

Where plants are unable to use phosphorus once it is bound to the soil particles, there are special photosynthetic and other microbes whose job it is to release phosphorus and make it available in a soluble form.

In a healthy soil environment, these microbes outsource the manufacture of energised phosphorus compounds for plants. There is a fascinating community effort which goes on below ground in healthy soil, which keeps phosphorus in play in a pool which plants and other microbes can draw on.

Depending on how the soil is looked after, the community of organisms which keep phosphorus available either increases or diminishes. In most farmed soils, these organisms now are much lower in population than they once were.

Keeping soil biology healthy is an integral part of making phosphorus available for plant growth. Plants can't source enough phosphorus or enough energy on their own. They need the community effort below the soil to manage both the supply of phosphorus needed to make sugars, and the supply of the energy transport compounds (which contain phosphorus) needed to convert light energy into sugars.

Soil communities including photosynthetic bacteria recycle phosphorus continually. When they are happy, we need to add less phosphorus: When they aren't working, everything stops.

Ken Bellamy is the director of Townsville-based biotech company Vital Resource Management (VRM), Please e-mail questions to: enquiries@vrm.com.au

The Microbial Marketplace

In the 'sugar economy', plants act like banks - they borrow and they lend. But no bank makes money without activity by others. In the microbial marketplace below ground, where sugar is traded for nutrients, photosynthetic bacteria are key players.

These microbes capture sunlight and make special energy transport compounds and sugars on which other microbes and plants ultimately depend.

Plants depend on these organisms to supply the nutrient system with sufficient energy so that all the other functions - including the manufacture of sugar - can continue.

These microbes catch sunlight, catch carbon and make sugar. They also share captured energy in the form of special energy transport proteins, and by sharing sugars. Plants benefit enormously when the soil is full of a rich mix of bacteria doing these energy-harvesting and sugar manufacturing jobs.

If we want to grow more sugar above ground, it pays to give some thought to the traders who help make, circulate and set a background "price" for sugar all around the plant.

Bacterial photosynthesis and the sugar economy underground are what feeds, tends and helps energise plants. It might be time to think of this army of little guys when we think of how to build sugar in the crop.

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