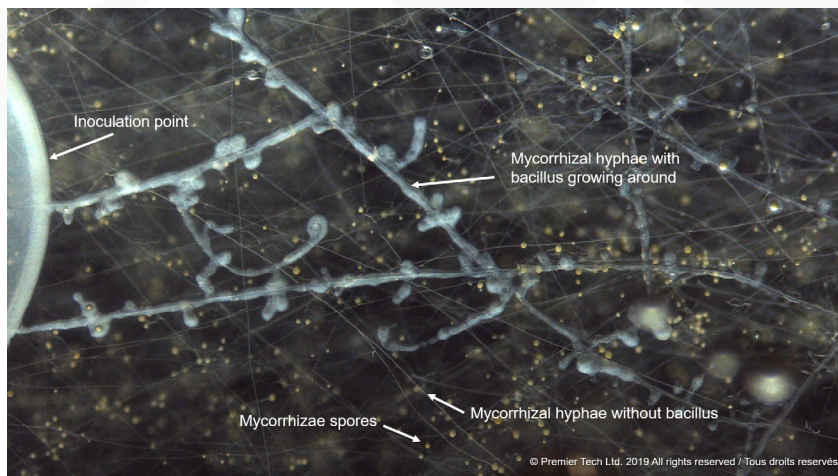


ASK THE EXPERTS: GROWING MEDIA



Bacillus pumilus bacteria are growing in combination with endomycorrhizae hyphae to form a tripartite association between beneficial organisms and host plant.

The benefits of active ingredients

Ed Bloodnick, Premier Tech Horticulture's director of grower services, discusses active ingredients in growing and how they can help growers.

Greenhouse Management: Why use growing media with active ingredients?

Ed Bloodnick: Some active ingredients improve nutrient and water uptake for plants. Endomycorrhizae, for example, are symbiotic fungi that attach to plant root systems and form an extensive filament network to acquire certain nutrients and water for the plant. About 90% of the terrestrial flowering plants with economic importance in the world host endomycorrhizal fungi. The benefits are that plants grow better, more prolific flowering and fruiting, they adapt quicker when transplanted, they are more resistant to transplant shock

and root diseases. Some beneficial fungi and bacteria live in the plant root zone to compete with pathogens. Some active ingredients form large populations around the plant root to exclude pathogens, called niche exclusion. Some also produce metabolites that suppress pathogens. *Trichoderma sp.* are fungi that exclude pathogens from plant roots. *Bacillus subtilis* and *Bacillus pumilus* are bacteria that exclude pathogens, but also produce metabolites that suppress certain root pathogens. By adding these active ingredients into the growing media, the microbes in the 'living soil' help to improve the quality of plants by suppressing pathogens that cause root

diseases, thus crops have fewer challenges from nutrient imbalances. Growers can reduce chemical fungicides applications and get better performing plants that require less maintenance.

GM: Are they easy to use?

EB: Most active ingredients are packaged in various forms including liquid, powder or granular format. Some of the liquid products can be applied in the greenhouse with injectors through the irrigation system. Most of the powders can be added to water and drenched as a suspension, however, there is added labor and time to apply products in this method and uniformity can be compromised. Products with granular carriers can be added to growing media in the mixing line and at transplanting. You can also have active ingredients already incorporated in a growing media product before you plant, which has some advantages, including saving time and labor, and preventing disease establishment from early growth.

GM: What is tripartite association?

EB: Plants and endomycorrhizae form a symbiosis, which is a mutually beneficial association between two living organisms. Endomycorrhizae attach to plant roots and provide the plant with certain nutrients and water that the plant root system cannot obtain easily. In return, the plant provides the endomycorrhizae fungus with sugars and starches. A tripartite association is when there are three living organisms involved. In field studies, it has been demonstrated that endomycorrhizae and rhizobium partner to improve the growth of pulse plants to improve the photosynthetic rate resulting in greater crop yields. For greenhouse crops, endomycorrhizae resulting in greater crop yields form a tripartite association with plants to improve overall plant growth. **GM**