The following information was provided by Howard Jeffries, Master Gardener, Volusia County, UF/IFAS at the Florida Wildflower and Garden Festival, Deland, FL, March 2024

Mycorrhizae (fungus root)

They are fungi that grow in mutually beneficial relationship with plant roots. Plants provide carbon, lipids, and sugar. Mycorrhizae respond with chelated inorganic nutrients, such as calcium, magnesium, nitrogen, phosphorous, and zinc. Once this connection occurs, spores germinate and send out hyphae to penetrate the plant roots, and live both inside (endomycorrhiza), and outside of the root (ectomycorrhizal), and are dependent on the host plant to survive. Both favor certain plant species and different stages of plant growth.

Benefits:

- Mycorrhizae improves plant tolerance to drought, nutrient deficiencies, high soluble salts, and transplant shock.
- Improved flowering and lateral branching of roots and shoots.
- Reduces fertilizer requirements resulting in overall improvement of plants.

Can be applied in a variety of ways:

- Incorporated in soilless media
- Seed treatments
- Plug/liner dips
- Soil drenches
- 2-year shelf life when incorporated in the soil or with plants. Will continue to produce more mycorrhizae.

Local sources of products containing mycorrhizae:

Lowes: Dr. Earth's Organic & Natural Fertilizer (also available at Walmart)

- All purpose
- Azalea & Camellia
- Roses & Flowers
- Tomatoes & Vegetables

Pennington Plant Food with mycorrhizae
Espoma All Purpose Plant Food

Home Depot: Dr. Earth's Fertilizers
Burpee All Purpose Organic with mycorrhizae

NOTE: MycoApply Endo Thrive is available at BWI in Apopka, in pint bottles. Add water and apply as a media drench.

<u>Organic Fertilizers vs. Synthetic/Manufactured Fertilizers</u>

<u>Organic</u>

- Help build up soil – its structure, and feed living micro-organisms, including earthworms.
- Actual nutrient level is low, (rarely is the combined percent 15% or more).
- Slow released and lasts longer, (typically 4-6 months).

- A good source when only 1 or 2 of the 3 primary elements are needed.
- More expensive and often not as readily available as synthetic fertilizers.
- Effect on overall environment is gentler.

Synthetic

- Mostly combination of mineral salts that form a complete fertilizer.
- Promoted for their low price and convenience of use – "quick fixes."
- Preferred my most homeowners, especially because of "promotions" which often result in their complete dependency and over-use.
- Water soluble – quickly taken up by plants, but provides no food source for microorganisms and often harms our environment by pollution and can also harm living organisms within the soil.
- Short lasting and adds nothing to the soil.
- Available for use on specific plants and types of plants, (esp. vegetables, roses, houseplants, flowering plants, foliage plants, etc.).
- Liquid fertilizer applications are good for foliar feeding and reduce transplant shock; however, nutrient benefits don't last long, (usually 2-4 weeks) especially in sandy soils and can pollute our environment.

Common Organic Fertilizers

Many of these products are biofertilizers containing microorganisms , especially mycorrhizae and/or synthetic quick-release fertilizer components.

- Milorganite – derived from organic solids produced by sewage wastewater treatment processes. Will not burn – slowly releases nutrients and greens plants without excess growth. Typically applied in spring and fall. Not recommended for gardens, however, because of heavy metals.
- Espoma – offers a variety of fertilizers
- Agro Thrive Inc. – liquid and granular fertilizer
- Fertel
- Bio Plex Organics – contain fertilizers and microorganisms
- Quality Green Specialists (Deland)

Organic Fertilizer Sources:

- Access to Organics, Daytona Beach
- BWI, Apopka
- Quality Green Specialists, Deland
- Box stores
- Amazon
- DeBary Nursery, DeBary
- Biosphere, Winter Garden

New Biorational Products for Homeowners

What are they? – Products that help reduce environmental stress on our plants and our soil. They can be biologically derived or synthetically reproduced yet are structurally similar and function identically to biological materials found in our soil.

Examples:

- PGR's (Plant Growth Regulators)
- Botanical insecticides

- Microbial pesticides
- Essential oils and minerals
- Insect growth regulators

Why use them? – Together they give us the ability to control pest problems, maximize overall plant performance, and unlike other available agriculture products, are safer and have fewer environmental side effects. Most have a 2-year shelf life.

Additional benefits – They shorten restricted-entry and pre-harvest intervals. They reduce phytotoxicity, pest resistance, and health risks to users. Many are also safe for organic use.

Examples of Currently Available Biorational Products (source: MGK Insect Controls):

- Azera Pro – a botanical insecticide that kills over 200+ insects, including aphids, thrips, whiteflies, gnats, and spider mites.
- PyGanic Gardening – for home gardeners. It kills ants, aphids, stink bugs, caterpillars, and more.
- Debug Turbo – an insecticide, nematicide, fungicide, and miticide.
- Actinovate (source: Actinovate Biological Fungicide) – a biological fungicide that prevents and controls many common foliar and soil-borne fungal pathogens, including Powdery Mildew, Botrytis, Pythium, Rhizoctonia, Phytophthora, and Verticillium Wilt.

Valent Plant Growth Regulators

- ProGibb LV Plus T&O (source: Valent Plant Growth Regulators) – a plant growth regulator that promotes plant growth, stem elongation, flower set, and increases seed germination.
- ConShape SL – a plant growth regulator that reduces water stress and transplant shock. Aids in plant establishment.
- CytoFlor – promotes flowering, increases branching, and leads to more compact plants.

MycoApply Endo (source: Mycorrhizal Applications, Oregon) – a liquid formulation that contains propagules of multiple pieces of arbuscular mycorrhizal fungi, that colonize the root systems of plants in a symbiotic manner, expand beyond the plant roots or rhizosphere region of the soil surrounding plant roots to acquire nutrients and water that are delivered to the plant's vascular system.