Fertilizer
(friend or foe, that depends upon you)

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Definitions

* **Fertilizer** – a chemical or natural substance added to soil or land to increase its fertility.

* **Fertility** – the quality of being fertile: productiveness.
Nature doesn’t just apply N, P, K...
and it keeps all the organic matter that falls to the ground!
* **Organic matter** is continually being added to the **soil surface**.

* A healthy Soil Food Web plays crucial role in **nutrient cycling** in the soil. (This is nature’s way of fertilizing plants!)
In Nature.....

* The **Soil Food Web** includes fungi, bacteria, protozoa, nematodes, insects, spiders, earthworms, etc.

* The activities of the soil microbes are what “fertilizes” plants in natural areas.

Spore of a mycorrhizal fungus
Take care of the soil
and it will take
care of your plants!

(as in – “feed the soil, not the plants”)
What nutrients do plants need?

- Hydrogen, carbon, & oxygen are supplied by air and water.
- Macronutrients N, P, K, Ca, Mg, and S.
- Micronutrients Fe, Mn, Zn, Cu, Mo, B, & Cl!
Now, how do humans grow plants?

* Often, a synthetic fertilizer is used **without even testing the soil first.**
* It is assumed that nutrients always need to added.

This is a complete fertilizer.
Elements in excess... tie up these nutrients (become unavailable to plants)

<table>
<thead>
<tr>
<th>Element</th>
<th>Interactions</th>
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<tbody>
<tr>
<td>N</td>
<td>K, Ca</td>
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<tr>
<td>K (raises the pH)</td>
<td>N, Ca, Mg</td>
</tr>
<tr>
<td>P</td>
<td>Zn, Fe, Cu</td>
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<tr>
<td>Ca (raises the pH &amp; loosens the soil)</td>
<td>B, Mg, P</td>
</tr>
<tr>
<td>Mg (raises the pH &amp; tightens the soil)</td>
<td>Ca, K</td>
</tr>
<tr>
<td>Fe</td>
<td>Mn</td>
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<tr>
<td>Mn</td>
<td>Fe, Mo, Mg</td>
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</tbody>
</table>

This is another reason why soil testing is important!
* Fertilize the lawn/plants based on a soil test from the UF Soil Lab. The $7 test B measures the levels of P, K, and Mg.

* The soil test results will determine the best fertilizer analysis to apply.
Use test results to choose analysis!

% Total Nitrogen (N)  

16 – 0 – 8  

% (P₂O₅) Phosphorus  

Flowers/Fruit  

% (K₂O) Potassium  

Foliage  

Roots
How do synthetic fertilizers work?

- They “feed the plant.”
- Plants have it so easy, they don’t secrete their sugars through the roots to attract the soil microbes.
- Apply when plants are actively growing.
Synthetic fertilizers...

* ...are essentially growing plants hydroponically!
* Plus, synthetic fertilizers, which are made up of salts, can harm or kill soil microbes they come in contact with.

Protozoa regulate bacteria populations & cycle nitrogen
Additional ways to fertilize

* **Re-mineralize the soil!**

* Our Florida soils are poor due to high temperatures & rainfall and low levels of organic matter.

* Rock powders provide many trace elements that plants need for growth and good health.
... more ways to fertilize

Fish hydrolysate with P increases brix (want 12+)

Humic substances include humic acid, fulvic acid and humin make up 80% of OM.

Liquid seaweed supplies 60+ trace elements & growth hormones – use on edibles, **turf**, etc.!
Inoculate St. Augustine!

* Most (if not all) organic fertilizers contain soil microbes like mycorrhizal fungi (*Glomus spp.* have a symbiotic relationship with St. Augustine grass), beneficial bacteria, etc.
How to apply fertilizer

- Broadcast over the soil and then immediately water it in lightly (with ~1/4” of water.)
- Fertilizer spikes are not effective for plants growing in the ground!
- Don’t use weed & feed on St. Augustinegrass if you love your trees & shrubs.
Fertilizer Ban throughout Brevard

- No application of N & P from June 1st – September 30th
- Fertilizer must contain at least 50% slow release nitrogen (SRN). (organic fertilizers typically have much higher amounts of SRN)
- Apply only 1 lb. of N per 1,000 sq. ft. per application.
- Do not apply fertilizer if heavy rain is forecasted.
- A shield should be used when broadcasting fertilizer near impervious surfaces and waterbodies.
Phosphorus Rule

FDACS Fertilizer Rule limits use to:

| 0.25 lb. 1,000 ft² per application | 0.5 lb. 1,000 ft² annually | 4:1 ratio (16-4-8) |

All Fertilizer Ordinances state that P can only be applied if a soil test indicates a deficiency.
Pests Indicate Plant STRESS!

* What could cause plants to be stressed?
  * Wrong light conditions for the plant
  * Improper watering (in well-draining soil, typically not enough)
  * Nutritional deficiencies due to a lack of nutrients and/or imbalance of nutrients resulting in pH extremes (caused by improper fertilizing?)
  * Weather extremes (flood, drought, cold.)
NRCS USDA Soil Health Initiative

Any questions?