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JOHN'S CORNER

Organic Fertilizers and Nutrients –14 IRON SULFATE

By John Ferguson

From time to time we hear customers asking for iron sulfate (FeSO_4) to green up their plants. Iron deficiency can often look similar to magnesium (Mg) deficiency, but it shows up on younger leaves as yellowish areas between the leaf veins. A lack of iron can cause yellowing of many plant species, however in Houston and along the Gulf Coast most of our soils have plenty of iron. The problem is that the iron is often not available to the plants.

Iron deficiency is often found in alkaline soils ($\text{pH} > 8$), in soils low in organic matter (humus), and in soils near brick or concrete areas where calcium and magnesium can leach into the soil creating an imbalance resulting in the iron being locked up and unavailable to plants. We also find iron deficiency in areas where the water supply comes from aquifers high in calcium and magnesium. Repeated watering can lead to a build-up of these minerals and alkaline conditions. Additionally, cold soils can induce a temporary iron deficiency that will clear up when the soil warms up. Another cause of iron deficiency is starting to show up as we use more reclaimed water where dissolved bicarbonates cause the iron to be unavailable even at lower pH.

So what is iron sulfate? Iron sulfate is a naturally occurring mineral composed of iron (Fe), sulfur (S) and oxygen (O). It is also known as Ferrous sulfate and contains about 17-20 % iron. When used as a soil treatment, soil microbes will break the molecule into its components so that the iron and sulfur can be used by the plants.

One of the issues with iron is that it is chemically available in two common forms that we call ferrous or ferric, so I am going to have to mention a little chemistry to explain what happens. In the ferric form iron has a +2 electrical charge and is in the form most important to plants as it is readily soluble and easily absorbed. In the ferrous form iron has a +3 electrical charge and is insoluble above a $\text{pH} > 7$ and readily combines with other atoms to form minerals that reduce its availability (precipitates out of solution). For those interested in the chemistry Ferrous sulfate (iron +2) is FeSO_4 and Ferric sulfate (iron +3) is $\text{Fe}_2(\text{SO}_4)_3$.

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SUMMARY:

It is best to get a soil test and confirm that the soil is low in iron before applying iron sulfate. It can correct an iron deficiency quickly if required, however if applied and not required, it can cause many other nutrients to be locked up and unavailable to plants.

Applying a good compost or composted native mulch will add organic matter, stimulate the microbes and earthworms naturally releasing the iron so that plants can use it.

PROS:

- good source of iron and sulfur
- inexpensive and readily available
- feeds soil microbes
- only apply as needed
- some types are water soluble and can be used as a foliar spray

CONS:

- low cost brands often use the wrong form of iron sulfate
- may stain concrete or other items
- low cost brands may contain contaminants
- better choices of iron supplements (e.g. greensand)