

For Immediate Release

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Fallow, Scour, or Flooded Soil Syndrome (FSFSS) occurs on preventive planted acres without a cover crop or flooded fields with no crop grown for extended periods. Generally, corn and small grains are the most often affected but soybeans can also be hurt. At Dekalb corn plots in Perrysburg, Ohio; FSFSS syndromes were seen this year with corn being 8 to 15 inches shorter and less vigorous. FSFSS occurs because phosphorus (P) and/or zinc (Zn) are not available due to the decline in soil Arbuscular Mycorrhizae Fungus (AMF).

The AMF form a hyphae soil network (like a spider web) extending the reach of roots as much as 6-18 inches; absorbing water, macro, and micro-nutrients in exchange for plant root sugars. FSFSS occurs because without live host plants during fallow periods, AMF hyphae have to reestablish and/or reproduce from spores next year. This process can take several months, so P lacking corn symptoms may be visible into July or even longer. AMF supply up to 6x more P than the plant can by itself. AMF allows corn to explore 20X more soil surface area than the corn root can by itself. Live plants like cover crops or even some weeds (foxtail) allow the AMF to flourish and maintain their hyphae network for corn establishment the next year. FSFSS generally only lasts one year because the AMF hyphae networks quickly reestablish each year.

“Phosphorus (P) deficiency corn symptoms, include slow-stunted early growth, purple coloration, and poorly developed roots.” (Sawyer et al. 2011). “The primary symptoms of FSFSS are deficiency in P or Zn accompanied by slow, uneven early growth. The leaves of young phosphorus-deficient plants are bluish-green turning reddish-purple and leaf tips may die. Zn deficiency symptoms are rare beyond the seedling stage. Yellow to white bleached bands appear on the lower part of leaves while the midvein, margins, and tips remain green.” (Specialty, 2019) Often light green corn leaves would indicate nitrogen deficiency, but it may be P deficiency in FSFSS, even with high P soil test.

Where FSFSS may occur next year: 1) First, if no crop was planted and you tilled your field and kept it bare this summer, FSFSS could be an issue. If you planted a cover crop, FSFSS should be less of a problem. 2) Fields or areas with standing water this summer are especially susceptible to FSFSS. 3) Take a shovel and dig. If you find hard cloddy soil, poor soil structure, and soil compaction near the soil surface, FSFSS could be a real problem. Tillage is not a real solution because this is a biological problem. These conditions also promote *Phytophthora*, *Rhizoctonia*, *Fusarium* and *Pythium* which are plant diseases common in saturated compacted soils.

FSFSS does not always occur but as much as 15% corn yield reductions or 0-32 bu/acre have been reported (Specialty, 2019, Pioneer, 1998) with higher corn grain moisture (5%) at harvest common. Soybeans appear to be less effected by FSFSS and may be an alternative crop to plant.

Solutions to FSFSS: 1) Plant a cover crop to allow the AMF populations to reestablish. The best cover crops to plant are oats, sorghum-Sudan, (both highly mycorrhizal), cereal rye, and legumes like winter peas, crimson clover, Balansa clover, hairy vetch, cowpeas. At this late date, cereal rye may be the only viable option planted this fall, but early next spring; oats and lentils could be planted in early March to revitalize and heal soils from FSFSS. Avoid planting brassicas like radish, kale, rape seed, or turnips which do not form AMF associations. Allow ample cover crop spring growth so that AMF hyphae networks reestablish and AMF reproduce, so planting green is an option. There are over 150 AMF species and multiple AMF species infect both corn and soybeans.

2) Band starter fertilizer: Starter P and chelated Zn applied directly to the seed or banded next to the row help reduce FSFSS. Be careful of salt content when applying fertilizer directly to the seed as a “pop up” fertilizer. Banded (2 inches by 2 inches) corn starter applied at 5-10 gallons of 10-34-0 (not in furrow) or about 30 pounds of P have been recommended (Stahl et al. 2014, Advise 2019) even when P soil test levels are high. Ellis (1998) recommended 60-80# P be banded at planting. Broadcast applications of P and Zn have not been shown to be effective.

For more information on cover crops and soil health, visit my website at [hoormansoilhealth.com](http://hoormansoilhealth.com).