CFAES

OHIO STATE UNIVERSITY EXTENSION

Effect of Starter Phosphorus and Microbial Inoculants on Corn Growth and Yield after a Fallow Period

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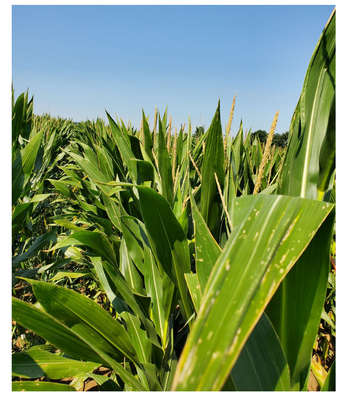

Rationale

- Ohio had 1.57 million reported Prevented Planting acres in 2019 **(Figure 1)**
- Mycorrhizal fungi aid in plant nutrient and water uptake by extending the root system via hyphal networks
- Decline in mycorrhizal fungi may occur in fallow fields due to lack of available hosts
- Fallow syndrome is a phenomenon where corn planted into fallow fields exhibit nutrient deficiencies due to decrease in mycorrhizal root colonization
- Fallow syndrome is poorly reported in Ohio and few on-farm studies have been conducted to inform management strategies

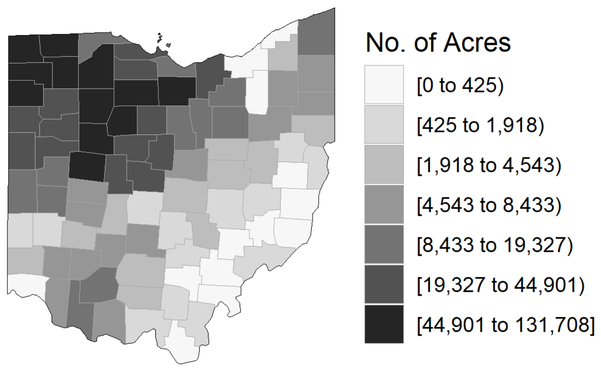

Figure 1. *Number of reported Prevented Planting acres by county in Ohio as of January 1, 2020 (Source: Farm Service Agency)*

Research Objective

- Assess the efficacy of starter phosphorus applications and microbial inoculants on reducing the impacts of fallow syndrome in corn

Research Hypothesis

- Plots treated with starter phosphorus alone or in combination with a microbial inoculant will have higher biomass and grain yield than untreated plots

Materials & Methods

- Randomized complete block with four replications
- One location planted to corn in 2020 after fallow in 2019
- Treatments:
  1. Control
  2. 7-16-3 applied at 5 gal/ac in-furrow
  3. Valent MycoApply® EndoPrime® SC Mycorrhizal Inoculant + 7-16-3 **(Figure 2)**
  4. 3Bar Bio-YIELD® + 7-16-3 **(Figure 2)**
- 10 gal/ac of UAN 28% applied 2x2 at planting
- Soil samples taken at planting
  - Mehlich-3 P values at 26 ppm
- Aboveground tissue collected at V4 – V6

Figure 2. *Mycorrhizal inoculant (left) and microbial inoculant (right) used in study*

Results

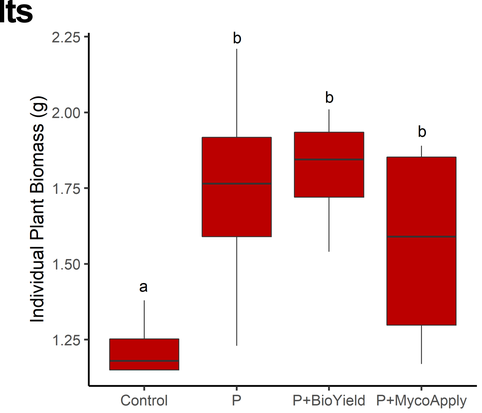

Figure 3. *Plant biomass at V5 by treatment. Treated means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1. LSD: 0.30. CV: 14.77%.*

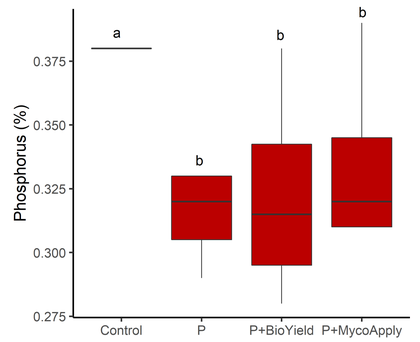

Figure 4. *Corn biomass P concentration at V5. Treated means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1. LSD: 0.03 CV: 6.69%.*

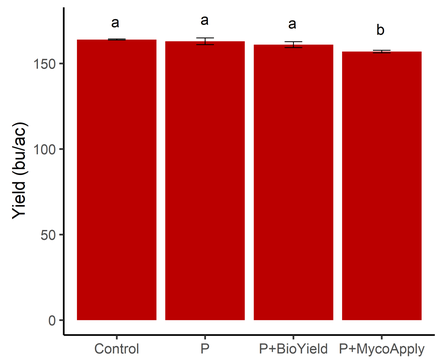

Figure 5. *Grain yield by treatment. Treated means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1. LSD: 3.29 CV: 1.5%. Bars represent standard error.*

Conclusions

- Starter phosphorus and inoculants did not significantly increase yield when compared to the no-phosphorus control **(Figure 5)**
- No evidence of fallow syndrome at this location after a year without crops
- These data will inform future management recommendations to growers planting corn after a fallow period

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