Endoprime® Technology in Corn

Background:

Interest is rising in new ways to increase nutrient efficiency and soil health by using soil fungi. Valent EndoPrime® is a concentrated, wettable powder containing four top-performing endomycorrhizal fungi, formulated for in-furrow applications. Early development work by Valent and the University of Wisconsin indicate positive biological activity of EndoPrime technology in corn. This contract research provides independent testing of this technology by comparing the performance of corn treated with EndoPrime in-furrow to corn without EndoPrime.

Protocol:

Growers planted alternating strips of corn with and without Valent EndoPrime in-furrow across the length of their field. The recommended rate of EndoPrime was 4 grams/acre. Product was provided by the Iowa Soybean Association On-Farm Network® through an agreement with Valent. Either water or starter fertilizer could be used as a carrier. Growers were asked to plant at least four replications of EndoPrime and no-EndoPrime. All other inputs were required to remain constant across the trial area.

Yield monitor data was cleaned according to industry standard protocols and subjected to statistical analysis. Locations were analyzed both separately and in a combined location mixed model analysis. Of interest in the analysis was the possible interaction of EndoPrime with soil types and terrain attributes.

Outcome:

At some locations there were visual responses to using EndoPrime (Figure 1) including larger root mass and lower leaves tended to be darker green.

Despite the visual responses, yield differences between EndoPrime and no-EndoPrime were small (Table 1). The range in responses was from −5.3 bu/acre to 8.1 bu/acre with an average response of −0.3 bu/acre across the 17 locations in the study.

In the combined and individual location analysis, the interaction between EndoPrime response and soil was not significant, meaning soil types responded similarly to EndoPrime treatment.

Iowa soils tend to be higher in phosphorous compared to other states. One function of endomycorrhizal fungi is to make phosphorous more available to the crop. An abundance of phosphorous in the trial sites could explain the lack of response in these trials.

Future work with EndoPrime could focus on placing trial locations in sandier, more drought-prone soils or in fields where phosphorous levels are moderate. Also, there are reports in scientific literature that endomycorrhizal fungi can stimulate and enhance nodulation in soybeans. Testing EndoPrime response in soybeans might be an avenue to explore in the future.

Figure 1. EndoPrime treated corn roots on left, untreated on the right.

Table 1. Location responses to EndoPrime technology.

Location	EndoPrime	No EndoPrime	Difference	Pr>t[1]
	----------Yield (Bu/A)----------			
ST2017IA0030	279.1	279.6	−0.6	0.82
ST2017IA0034	171.8	175.7	−3.9	0.63
ST2017IA0035	258.9	261.5	−2.6	0.10
ST2017IA0036	213.7	215.1	−1.4	0.35
ST2017IA0037	260.3	260.8	−0.5	0.56
ST2017IA0057	223.7	224.9	−1.2	0.30
ST2017IA0070	227.3	224.5	2.8	0.02
ST2017IA0079	241.2	246.5	−5.3	0.11
ST2017IA0080	215.4	212.0	3.5	0.33
ST2017IA0081	214.6	206.5	8.1	0.01
ST2017IA0082	223.8	224.3	−0.4	0.92
ST2017IA0083	230.0	229.9	0.02	0.99
ST2018IA0094	203.1	200.1	3.0	0.56
ST2018IA0096	214.6	219.9	−5.3	0.15
ST2018IA0100	232.9	236.3	−3.4	0.32
ST2018IA0111	208.8	209.7	−0.9	0.60
ST2018IA0181	239.5	239.9	-0.4	0.92
Average	225.8	226.1	−0.3	0.67

[1]Pr>t is the level of significance. Values below 0.2 indicate that the treatment differences were greater than we expect to observe by chance alone. In this study four locations responded significantly to EndoPrime.