



Soil Amendment and Foliar Application Trial 2015 Full Report

Overview:

In 2015, the Soil Fertility Lab at Ohio State started offering a third party evaluation of proprietary soil amendments and foliar applications aimed at improving the mineral nutrition and productivity of crops. This new service intends to provide timely and unbiased information on these products for farmers. In 2015, we tested submitted products from the following companies:

- 1) AgZyme[®] by Ag Concepts: <http://agconcepts.com/products/agzyme/>
- 2) AO Crop by Agrarian Organics: <http://agrarianorganics.com/pages/crop>
- 3) Enersol[®] and Enersol LDG[®] by AMCOL[®] Bio-Ag:
<http://www.amcolbioag.com/productEnersol.aspx>
- 4) Liquid Carbon by Monty's Plant Food:
<http://www.montysplantfood.com/products/monty%E2%80%99s-liquid-carbon/>

Methods:

Field Operations

Corn and soybean plots were planted at three sites on Ohio State University Research Farms (**Wood County** at the Northwest Agricultural Research Station in Custar, **Clark County** at the Western Agricultural Research Station in S. Charleston, and **Wayne County** at the Ohio Agricultural Research and Development Center in Wooster). A randomized complete block design was implemented at each site with four replications. Sites were managed conventionally using best management practices and fertility followed the Tri-State Recommendations. Fields at all three sites have followed a corn-soybean rotation. Corn and soybean planted this year continued with that respective rotation pattern. All plots were 10 feet wide (4 rows of 30-inch corn, 7 rows of 15-inch soybean). Plot lengths for both crops were 40 feet in Clark and Wood Counties and 30 feet in Wayne County. Products were applied as instructed on the registration forms.

Wood County. No P or K fertilizer was applied at this site. For the corn plots, the field was tilled in the fall of 2014 with a disk and field cultivator. DeKalb hybrid DKC57-75RIB was planted on May 14th at 34,000 seeds per acre. Side-dressing of 28% UAN occurred on June 23rd (total N rate 180 lbs/ acre) and corn was harvested on October 16, 2015. For soybean plots, Pioneer variety 27T87R2 was no-till planted on May 14th with 15-inch row spacing at 175,000 seeds per acre and harvested on September 30, 2015.

Clark County. The Clark County site was fall chisel plowed. Following spring disking, 107 lbs P₂O₅/ acre

(supplied as DAP) and 140 lbs K₂O/ acre were broadcast applied and incorporated with a finishing tool. For corn, Seed Consultants hybrid SC1093AM was planted on May 14th at 32,097 seeds per acre. Anhydrous ammonia was applied pre-plant on May 1st (total N rate 180 lbs/ acre) and corn was harvested on October 21, 2015. For soybeans, Seed Consultants variety SC3345LL was planted on May 15th in 15-inch rows at 175,386 seeds per acre and harvested on October 12, 2015.

Wayne County. In the spring, 116 lbs K₂O/ acre were surface broadcast over all plots for both crops. Both crops were planted no-till. For corn, Seed Consultants hybrid SCS10HQ34 was planted on May 23rd at 33,000 seed per acre. Side-dressing of 28% UAN occurred on June 26th (total N rate 180 lbs/ acre) and corn was harvested on October 27, 2015. For soybean, Seed Consultants variety SCS9314RR was planted on May 25th at 175,000 seed per acre and harvested on October 19, 2015.

Data Collection:

1. **Complete soil sample analysis prior to planting.** Soil samples were collected by using a 1-inch push probe to composite ten, 8-inch soil cores from each plot. Soils were air-dried and sent to Spectrum Analytic for an S3 complete soil test: spectrumanalytic.com
2. **Initial stand counts at V5 for corn and soybean.** Initial stand counts were collected for corn plots by counting plants in a 17 feet, 5 inch length (1/1000th of an acre with 30-inch rows) within one of the plot harvest rows. Initial stand counts for soybeans were collected by counting the number of plants in an 11 feet, 8 inch length within each of two harvest rows.
3. **Whole plant sampling at V5 for total biomass and complete nutrient analysis.** Vegetative stage plant samples were collected by clipping 10 plants at ground level from the plot border rows. Plants were oven-dried and weighed for total biomass. Samples were then sent to Spectrum Analytic for nutrient analysis (P2 test).
4. **Leaf sampling at R1 for corn and soybean for complete nutrient analysis.** Reproductive stage corn leaf tissue samples were collected by removing the ear leaf from 10 randomly selected plants. Soybean tissue samples were collected by removing the uppermost fully mature leaf trifoliolate from 12 randomly selected plants. Samples were oven-dried, ground and sent to Spectrum Analytic for nutrient analysis (P2 test).
5. **Final stand counts at maturity.** Final stand counts for corn were collected by counting all plants in the center two harvest rows in each plot. Final stand counts for soybeans were collected by counting the number of plants within a 6 feet length in each of two harvest rows.
6. **Harvest grain yield with complete grain nutrient analysis.** Grain was harvested with a small plot combine and moisture was adjusted to 15.5% for corn and 13% for soybeans. A subsample of grain was oven-dried, ground and sent to Spectrum Analytic for nutrient analysis (P2 test).

2105 Weather Data

More information can be found here: <http://www.oardc.ohio-state.edu/newweather/default.asp>

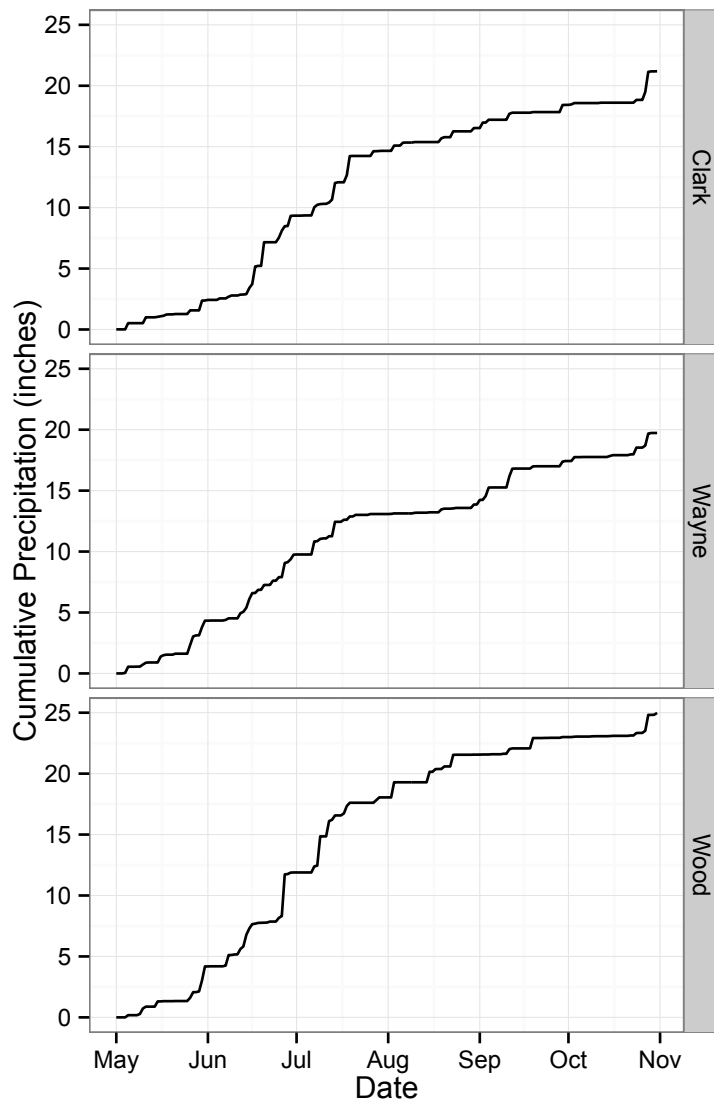


Figure 1. 2015 Cumulative Precipitation at the three field sites from May – November.

Table 1. Cumulative Precipitation (inches) by Month at the three field sites.

Site	May	June	July	August	September	October
Clark	2.4	7.0	5.3	1.9	1.9	2.8
Wayne	4.3	5.4	3.3	0.8	3.6	2.3
Wood	4.2	7.7	6.2	3.5	1.4	2.0

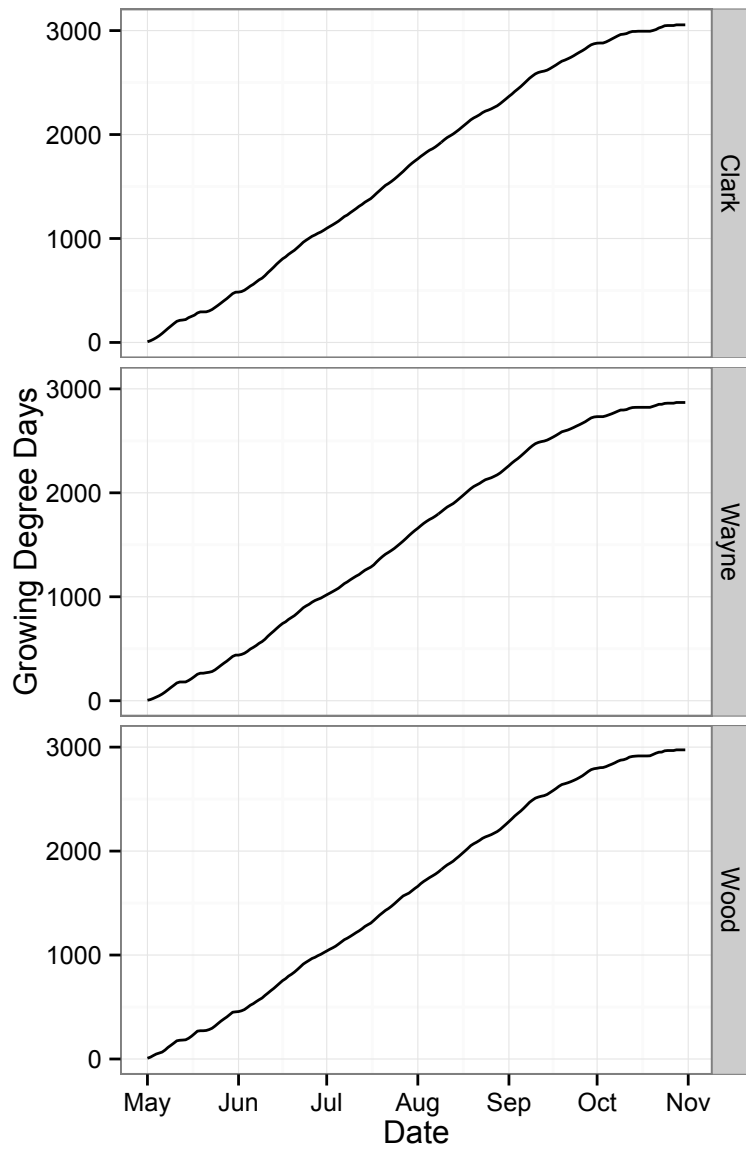


Figure 2. 2015 Cumulative Growing Degree Days at the three field sites from May – November.

Table 2. Average Temperatures (F) by Month at the three field sites.

Site	May	June	July	August	September	October
Clark	66	71	72	70	69	55
Wayne	64	69	71	69	67	53
Wood	65	69	71	70	69	55

Corn Results

Table 1. Soil Properties of the Three Corn Sites Before Application of Product.

County	pH	CEC	OM	P	K	Ca	Mg	S
		cmol/100g	(%)			ppm		
Clark	6.5	15.7	1.8	17	130	2234	605	8
Wayne	6.7	9.3	1.6	21	91	1434	272	11
Wood	6.4	18.7	2.4	36	231	3080	461	9

Table 2. Corn Grain Yields for All Sites.

Treatment	Grain Yield (bu/acre)		
	Clark	Wayne	Wood
Control	173.7	174.5	128.3
AO Crop	146.5	183.6	128.1
Enersol	176.4	170.7	137.6
Enersol LDS	159.6	176.4	125.5
Liquid Carbon	183.1	172.5	128.0
AgZyme	162.0	188.2	125.0
Least Significant Difference	23.0	19.1	13.9

Interpretation: At all three sites, no treatment yielded significantly greater than the control.

Soybean Results

Table 3. Soil Properties of the Three Soybean Sites Before Application of Product.

County	pH	CEC	OM	P	K	Ca	Mg	S
		cmol/100g	(%)			ppm		
Clark	6.7	18.2	2.2	21	138	2484	656	8
Wayne	6.7	8.1	1.3	27	107	1320	210	11
Wood	6.5	18.9	2.2	59	244	3024	518	12

Table 4. Soybean Grain Yields for All Sites.

Treatment	Grain Yield (bu/acre)		
	Clark	Wayne	Wood
Control	63.0	42.1	42.4
Enersol	65.8	49.6	45.5
Liquid Carbon	68.8	43.3	43.2
AgZyme	63.2	40.8	49.7
Least Significant Difference	7.5	9.5	15.6

Interpretation: At all three sites, no treatment yielded significantly greater than the control.

Conclusions

Across all three sites, no consistent trends were found with any of the tested products. No product significantly affected a measured property at more than 1 site. For both corn and soybean, no product treatment yielded significantly greater grain than the untreated control. As a result, only corn and soybean grain yields are reported here. This was the first year of field data, so interpretations should be made with caution, especially considering the weather encountered in the 2015 field season.

More information can be found: <http://go.osu.edu/SAFA>

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