

# Western Illinois University- School of Agriculture Organic Research Program

## 2016 Soybean Variety Trials-Yields Summary

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### Site Descriptions and Research Methods

#### Organic Site

The Allison Organic Research Farm is located 7 miles north of Sciota, IL in southwestern Warren County. The farm has been 100% certified organic since 2009 and is currently certified by MOSA. The 2016 soybean variety trial was located in field 2C, which is mapped as a Sable silty clay loam. One-row x 220' plots were planted on June 3rd with a John Deere 1760, 12-row planter with a target seeding rate of 174,000/a. The planter monitor indicated that the actual planting rate was 180,000/a. The plots were arranged in a complete randomized block design with 4 replications. On 6/14 and 6/20, all healthy plants were counted in 2 representative 5' sections (east and west halves) of each plot and plants per acre were extrapolated. Weed control included tine weeding (6/7), rotary hoeing (6/20), row cultivation (6/28, 7/5), and a small amount of hand weeding. Sub-plots ranging from 39'-70' in length were harvested with an old Kincaid plot combine on 10/25/16. The harvest from each sub-plot was weighed and analyzed for moisture content, and yields per acre were extrapolated assuming 60 lbs per bushel @ 13% moisture.

#### Conventional Site

The WIU Research Farm is located ~ 2 miles north of Macomb, IL in central McDonough County. The variety trial was located in block 3/4, which is also mapped as a Sable silty clay loam. Two-row plots were planted on 5/25/16 with a Kincaid JD71, 2-row plot planter at a rate of 160,000 seeds/a. The plots were arranged in a complete randomized block design with 5 replications. Weed control consisted of a herbicide program and moderate hand weeding to remove broadleaf weeds. Plots ranging from 14'-19' in length were harvested with an old Kincaid plot combine on 10/21/16 and 10/24/16. The harvest from each sub-plot was weighed and analyzed for moisture content, and yields per acre were extrapolated assuming 60 lbs per bushel @ 13% moisture.

### Results

Grain yields and stand counts (only at the organic site) are summarized in Table 1. Blue River Hybrids 34A7 was the top ranked variety at the organic site (69.5 bu/a) and ranked 3<sup>rd</sup> at the conventional site (56.8 bu/a). Great Harvest Organics GH389N was the top ranked variety at the conventional site (61.5 bu/a) and ranked 2<sup>nd</sup> at the organic site (65.9 bu/a). Yields for the top 6 varieties at the organic site (BRH 34A7, 35C6, 37C6 39C4; LVF 3211 & GH 389N) were not significantly different at  $\alpha=0.05$ . Yields for the top 5 varieties at the conventional site (BRH 39C4, 34A7 & GH 389N, 349, 291) were not significantly different at  $\alpha=0.05$ .

**Table 1: Performance of 12 soybean varieties at 2 sites (organic and conventional management)**

| Variety  | Group | Company/<br>Source        | Organic<br>Allison Farm<br>Planted 6/3<br>Yield (Bu/Acre) | Significance<br>Groupings | Rank | Organic<br>Allison Farm<br>Population<br>(Plants/Acre) | Significance<br>Groupings | Conventional<br>WIU Farm<br>Planted 5/25<br>Yield (Bu/Acre) | Significance<br>Groupings | Rank |
|----------|-------|---------------------------|---|---------------------------|------|--|---------------------------|---|---------------------------|------|
| 34A7     | 3.4   | Blue River<br>Hybrids     | 69.5  | a                         | 1    | 148,083  | ab                        | 56.8  | ab                        | 3    |
| GH389N   | 3.8   | Great Harvest<br>Organics | 65.9  | ab                        | 2    | 148,665  | ab                        | 61.5  | a                         | 1    |
| 35C6     | 3.5   | Blue River<br>Hybrids     | 65.6  | ab                        | 3    | 141,115  | bc                        | 48.2  | c                         | 11   |
| LVF 3211 | 3.2   | Lakeview Farms            | 64.5  | abc                       | 4    | 129,501  | cd                        | 48.4  | c                         | 10   |
| 37C6     | 3.7   | Blue River<br>Hybrids     | 63.9  | abc                       | 5/6  | 101,045  | fg                        | 49.0  | c                         | 8    |
| 39C4     | 3.9   | Blue River<br>Hybrids     | 63.9  | abc                       | 5/6  | 150,987  | ab                        | 58.3  | ab                        | 2    |
| GH331N   | 3.3   | Great Harvest<br>Organics | 58.7  | bc                        | 7    | 163,763  | a                         | 54.3  | bc                        | 6    |
| LVF 3507 | 3.5   | Lakeview Farms            | 57.3  | bcd                       | 8    | 126,597  | cde                       | 53.7  | bc                        | 7    |
| GH291    | 2.9   | Great Harvest<br>Organics | 55.0  | cde                       | 9    | 146,922  | ab                        | 56.3  | ab                        | 5    |
| GH349    | 3.4   | Great Harvest<br>Organics | 54.6  | cde                       | 10   | 115,563  | def                       | 56.4  | ab                        | 4    |
| GH327    | 3.2   | Great Harvest<br>Organics | 47.6  | de                        | 11   | 91,754   | g                         | 40.1  | d                         | 12   |
| LVF 3924 | 3.9   | Lakeview Farms            | 44.7  | e                         | 12   | 110,918  | ef                        | 48.7  | c                         | 9    |
|          |       |                           | LSD =10.3   |                           |      | LSD = 16,985   |                           | LSD = 7.0   |                           |      |

Least Significant Difference (LSD) calculated at  $\alpha = 0.05$

Different letters in the significance groupings columns indicate significant yield differences among varieties, e.g., yield(s) associated with “a” are different than those associated with “bc”, but are not different than those associated with “ab” because they both contain an “a.” The organic site results are from 3 reps (2-4). The plants in rep 1 were repeatedly grazed by wildlife and weed control was less effective. The conventional site results are from 4 reps (2-5). Data from rep 1 was not included due to multiple outliers.

## Discussion

The 2016 growing season (drier than average in June followed by regular, but not excessive rain in July and August) was favorable for high soybean yields at both locations but over-all growing conditions appear to have been superior at the organic site with 9 of the 12 varieties producing higher yields at the organic site. In addition, the average yield across all plots was 6.7 bu/a higher at the organic site, despite being planted 11 days later. At both locations, variation in yield between the highest and lowest performing varieties was significant (>12 bu/a).

Blue River Hybrids 34A7, the top ranked variety at the organic site and 3<sup>rd</sup> ranked variety conventional site, has been a very strong and consistent performer in our plots since 2006 (with the exception of 2009 when yields were poor at both sites). BRH 34A7 is a tall leafy variety that competes well against weeds and is a good fit with organic no-till production. We have used BRH 34A7 in organic no-till plots since 2009, and it averaged slightly over 70 bu/a in our no-till experiment in 2016. One weakness of this variety is its relatively low resistance to soybean cyst nematodes. 34A7 is scored 2 out of 5 (5 being the best score) for nematode resistance on the Blue River Hybrids website and nematode damage to this variety was observed at the organic site in one field during 2011.

Great Harvest Organics 389N, the top ranked variety at the conventional site and 2<sup>nd</sup> ranked variety at the organic site, also performed well in a cultivation experiment at the organic site in 2016. It is a tall bushy variety that competes well with weeds but lost over 20 bu/a where weed control was poor in the cultivation experiment. The Great Harvest Organics website lists 389N as having high yield potential across all soil types, excellent stress tolerance and a high level of resistance to soybean cyst nematode and Phytophthora root rot.

Both BRH 34A7 and GH 389N established well (148.1k and 148.7k, respectively) and this may have contributed to their high yields (69.5 and 65.9 bu/a respectively). Interestingly, LVF 3211 and BRH 37C6 had much lower stand counts (129.5k and 101k, respectively), but produced high yields (64.5 and 63.9 bu/a respectively).

## Conclusion

2016 was an excellent year for soybean production in Western Illinois. The all-plot average of 59.3 bu/a was the highest ever recorded for a variety trial at the organic site. Both BRH 34A7 and BRH 39C4 averaged over 70 bu/a in a no-till experiment, and the Allison Farm/organic site whole-farm average soybean yield was over 60 bu/a.