

Organic Corn Test in Ohio, 3-yr. summary



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**Corn & Emerging Crops
Horticulture and Crop Science**

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**Corn Performance Test
Horticulture and Crop Science**



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US Organic Corn

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\$61.9 billion sales (2020)



55% growth, Ac (2011 to 2016)



Mostly use for livestock



Crop Rotation (4y)



Cover Crops (40%)



Manure &/or Compost (90%)



Biostimulants (20-25%)



2018 (source: <https://non-gmoreport.com/articles/organic-corn-soybean-acres-looking-good-in-the-u-s-as-harvest-nears/>)

— Organic Corn – Nutrient Sources

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Cover Crops

Biologically
fixed N



Fall-seeded mix
Legume + Grass



Grasses
dominate



Legumes fix
additional N



Crop Rotation



Supply
necessary
Nitrogen



Legumes:
Alfalfa
2-3 years
planting



Soybean
doesn't
supply N
needed

Supplementary Sources



Cottonseed
Meal



Feather
Meal



Blood
Meal



Fish
Meal



Disease & Weed Management

Diseases

Good Crop Rotation

Adequate Nutrients

Varietal Selection

Beneficial Fungus

Weeds

• Crop Rotation

• Cover Crops

• Tillage

• Mechanical Cultivation

• Later Plantings

Ohio Organic Corn Performance Test

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Evaluate

Agronomic
Characteristics

Certified
Organic Corn
Hybrids

From 2019 – present:

- The purpose is to **evaluate** certified organic corn hybrids for **grain yield** and other important **agronomic** characteristics.
- Results can assist **farmers and industry** in **selecting hybrids** best **suited** to different production **environments**.



Measurements

Yield

Moisture

Lodging

Final Stand

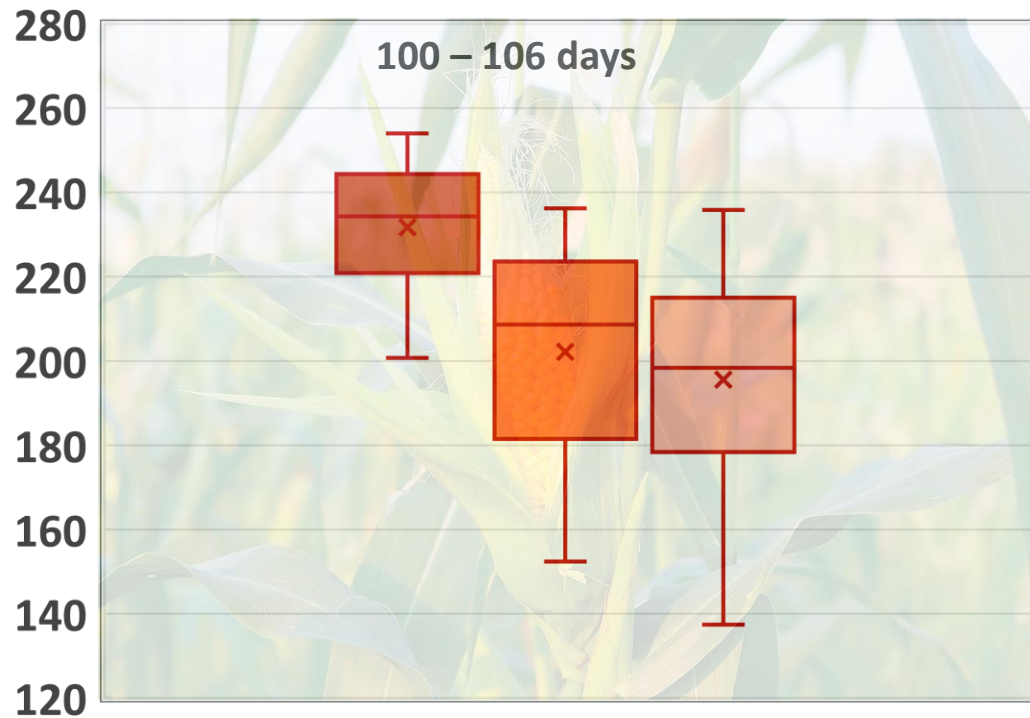
Emergence

Test Weight

LSD 0.10

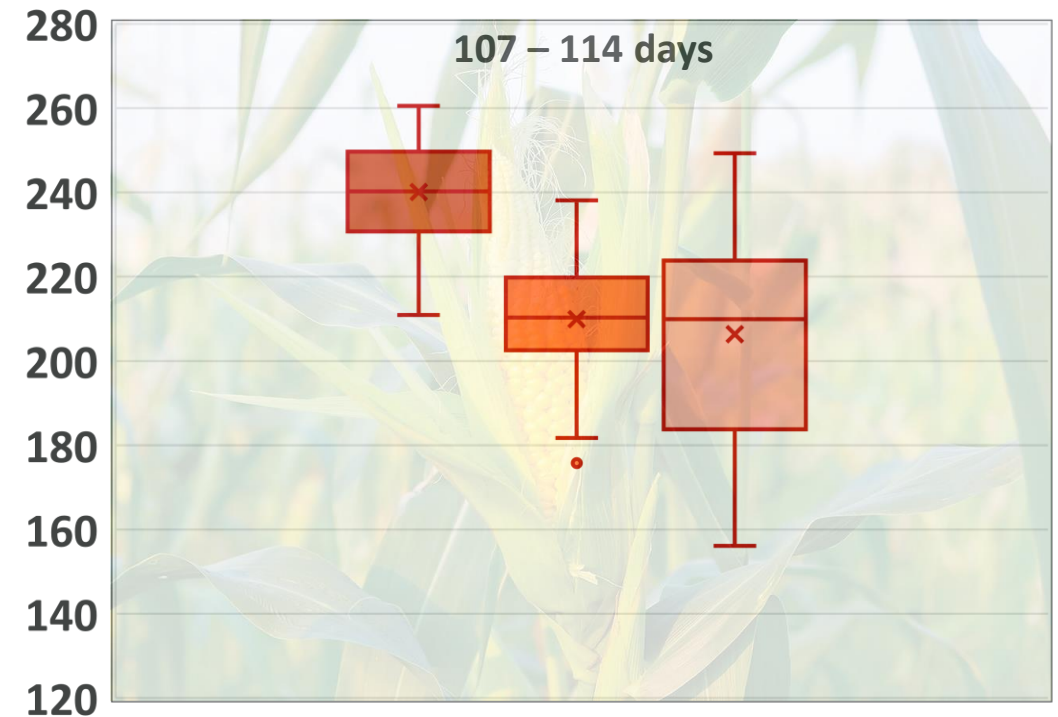
Yield: early vs. full season test

Early Maturity Yield (Bu/A)



■ Year 2019 ■ Year 2020 ■ Year 2021

Full Season Yield (Bu/A)

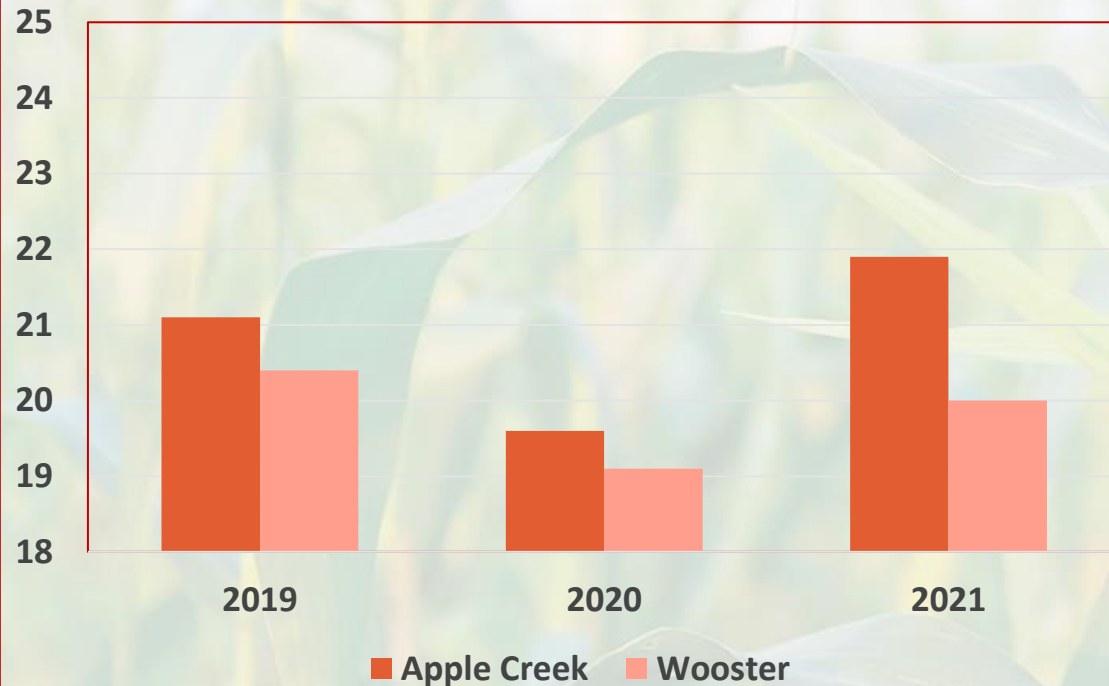


■ Year 2019 ■ Year 2020 ■ Year 2021

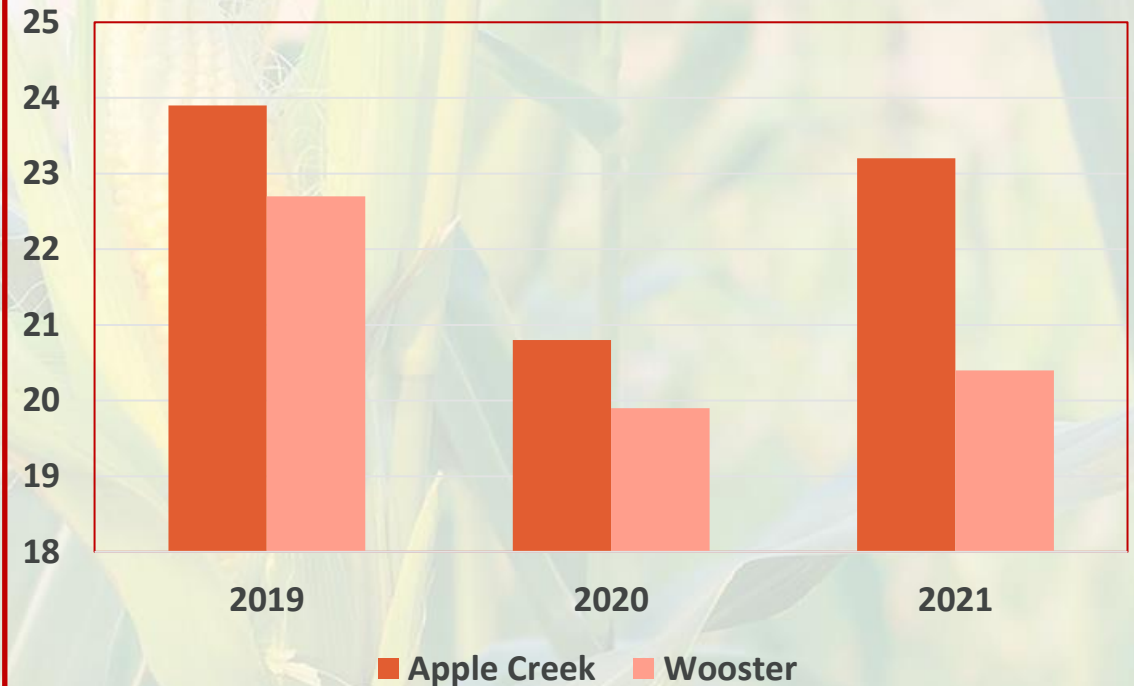
— Harvest Moisture

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Early Maturity Moisture (%)



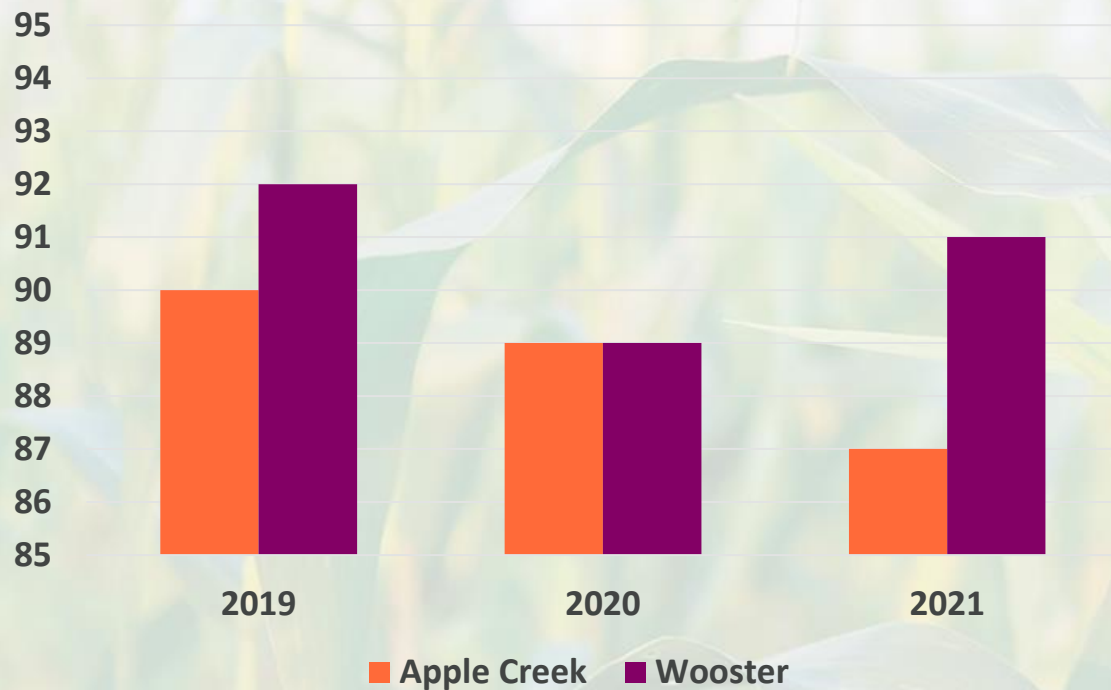
Full Season Moisture (%)



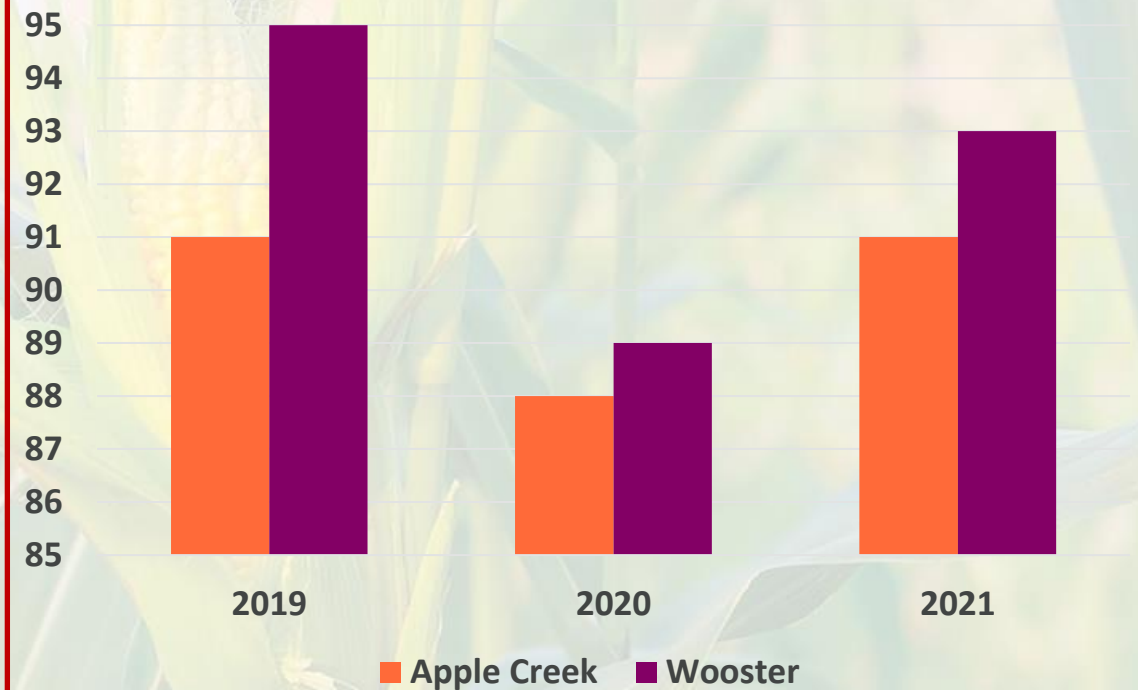
— Emergence (%)

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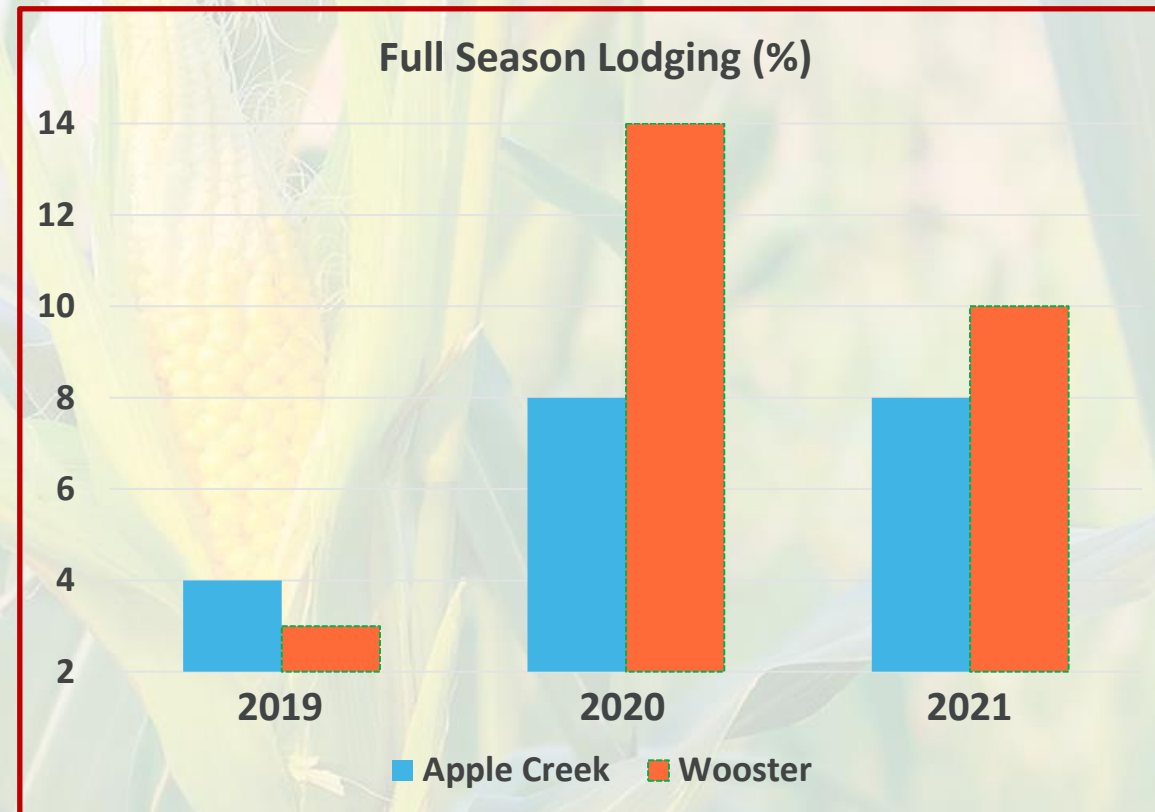
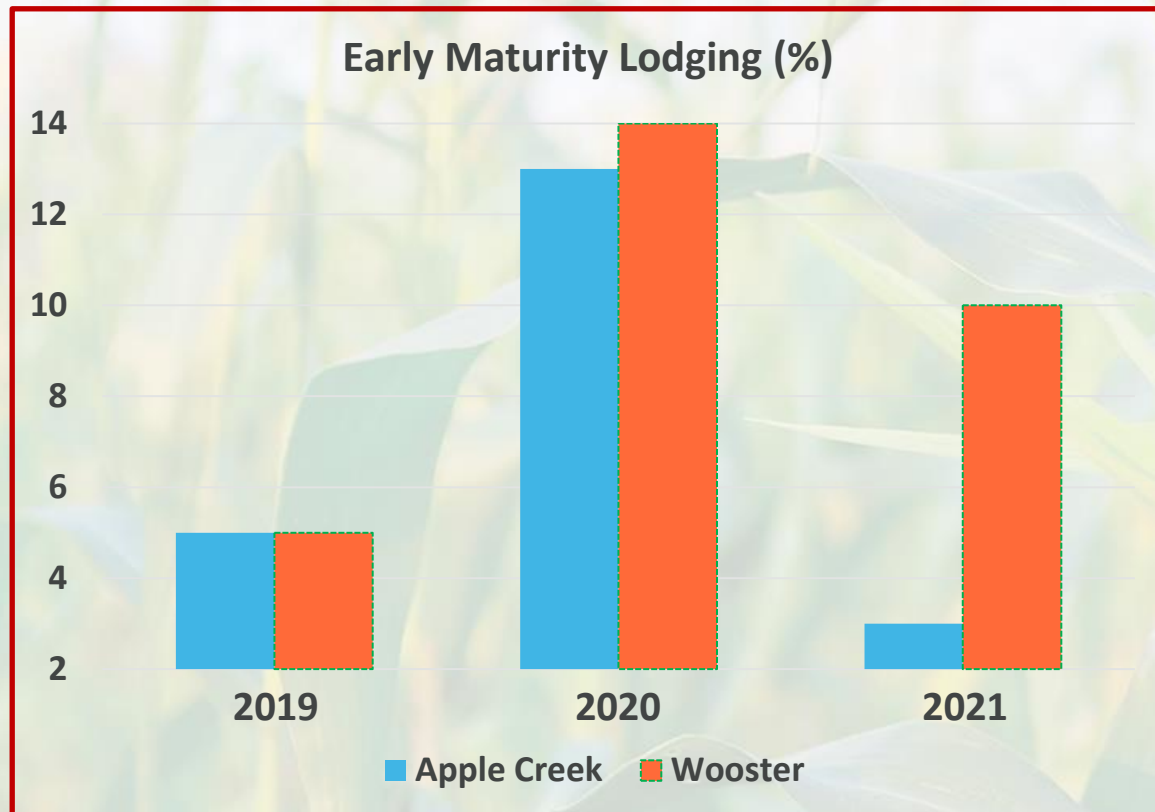
Early Maturity Emergence (%)



Full Season Emergence (%)



Lodging



— Take-Aways: 3 yr. summary (2019 – 2021)

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Consistently 180 Bu/Ac or more

Hybrid differences, year to year, site to site

Full season test (longer maturities), generally higher yields

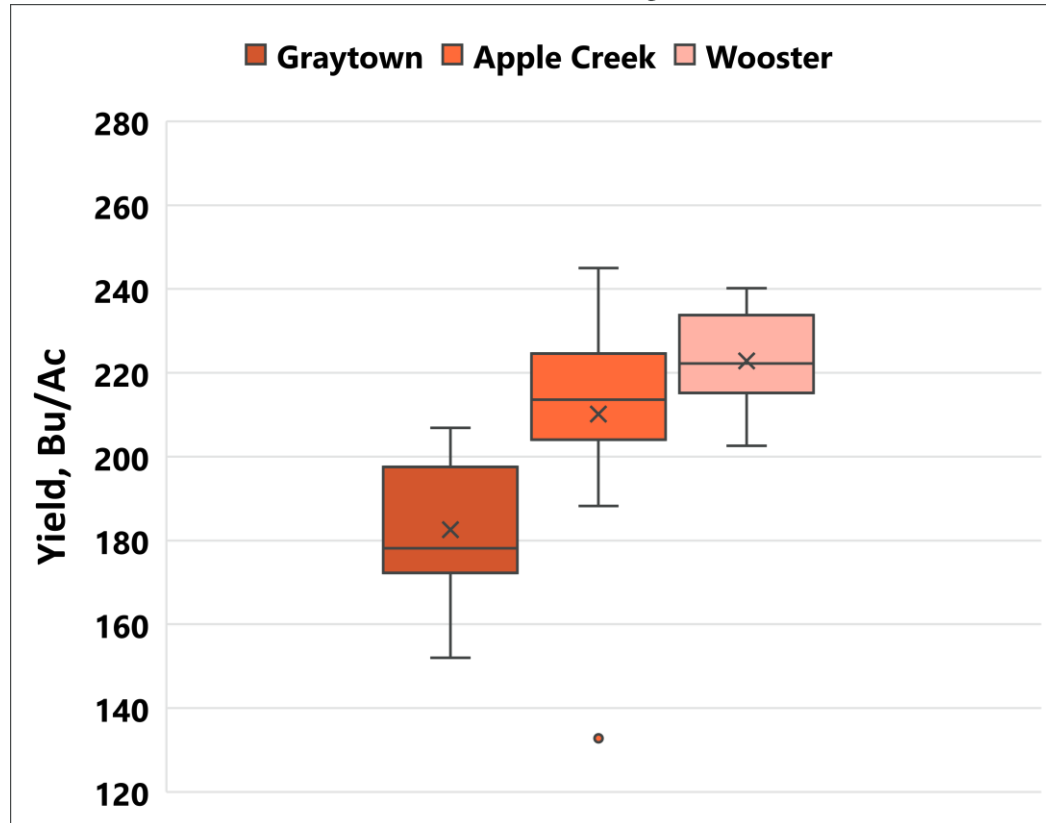
Lower harvest moisture with early test (shorter maturities)

Generally better establishment with full season

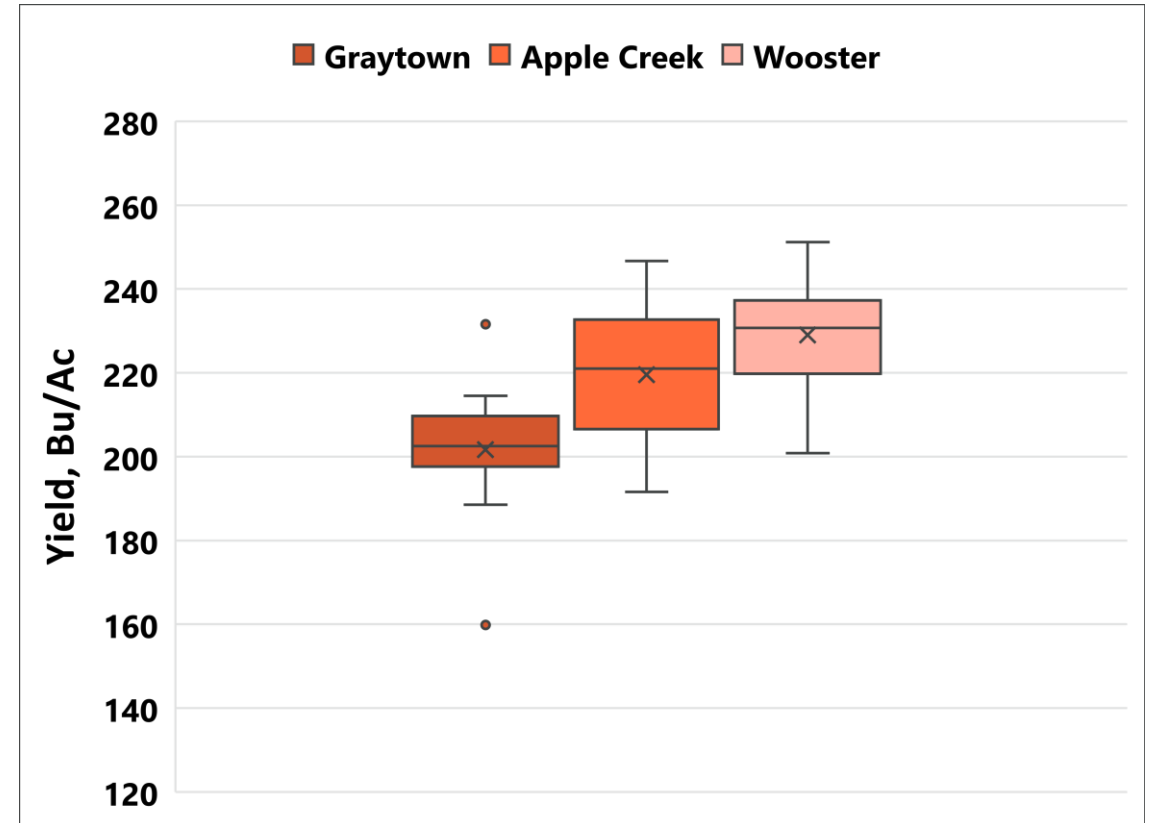
Lodging can be an issue, regardless of test

2022 Results

Early Maturity Test 100 – 106 days



Full Maturity Test 107 – 114 days



Wooster/Apple Creek planted at **34K seeds/ac**. Graytown planted at **32.5K seeds/ac**. A total of **29 hybrids** tested in 2022.

— Take-Aways: 2022

- Hybrid differences and yield levels close or above 200 Bu/Ac
- Wet/cool soil conditions in May delayed field preparation and planting
- The **Wooster and Apple Creek** received over 2" of rain within 48 hours of planting: which impacted the emergence on most hybrids. **Dry conditions for Graytown**
- The **weather** presented **unique challenges**: delayed planting and delayed harvest, two sites harvested on December 5th
- **Foliar Diseases present**:
 - Low/Moderate levels of **Gray Leaf Spot**
 - A few **Northern Corn Leaf Blight** lesions
 - Tar Spot**, late in the season, likely not impact yield
 - Low levels of **Diplodia and Gibberella**, a few hybrids

Table 1. Performance of hybrids in the Organic Early Maturity trial. (106 Day RM and Earlier) North Central / Northeast Ohio, 2022.

Brand	Hybrid	RM	Graytown					Apple Creek					Wooster					Summary					
			Yield	Harv.	Stk.	Final	Emg.	Yield	Harv.	Stk.	Final	Emg.	Yield	Harv.	Stk.	Final	Emg.	Yield	Harv.	Stk.	Final	Emg.	TW
			Bu/A	---	%	---		100/A	---	%	---		100/A	---	%	---		100/A	---	%	---		
American Organic	AM 2378	103	175.1	15.6	0	303	89	194.0	17.4	15	254	71	221.0	17.5	0	285	80	196.7	16.8	5	280	80	58.1
Blue River	48G35	102	192.0	15.7	0	320	96	188.2	18.4	1	230	65	215.9	18.1	1	287	82	198.7	17.4	1	279	81	57.3
Blue River	49M23	103	177.1	15.7	1	321	97	226.3	17.8	0	311	88	213.0	17.6	0	314	88	205.5	17.0	0	315	91	57.4
Blue River	54C27	105	206.9	15.7	2	318	92	204.6	19.1	5	255	72	221.6	18.7	2	289	82	211.0	17.8	3	287	82	56.9
Merit	O 5454	104	189.6	15.7	2	328	97	245.0	19.9	2	283	81	240.2	19.7	2	320	91	224.9	18.4	2	310	90	55.8
Merit	O 6160	106	199.4	16.1	14	323	97	211.2	18.9	0	276	78	215.0	18.8	0	309	88	208.5	17.9	5	303	88	56.4
Prairie Hybrid	PH 2741	102	175.5	15.9	6	317	93	214.3	17.8	2	267	76	233.5	17.7	1	308	87	207.8	17.1	3	297	85	56.4
Prairie Hybrid	PH 4211	106	200.5	16.6	1	318	95	219.4	19.6	1	281	80	234.7	20.0	0	276	77	218.2	18.7	1	291	84	56.7
Prairie Hybrid	PH 5281	102	152.0	17.7	0	327	95	212.9	20.8	0	292	81	235.5	21.5	16	297	83	200.1	20.0	6	306	86	53.8
Viking	O.18-06UP	106	178.5	15.6	1	333	98	230.7	17.3	1	296	84	222.8	17.2	1	299	85	210.7	16.7	1	309	89	59.1
Viking	O.46-02P	102	177.7	15.6	1	328	95	211.7	17.1	1	285	80	230.8	17.0	2	307	86	206.7	16.5	1	307	87	58.2
Viking	O.51-04P	104	169.0	15.7	2	282	83	203.9	18.8	0	240	69	202.8	18.5	1	257	72	191.9	17.7	1	259	75	56.7
Viking	O.69-01P	101	184.2	16.0	4	316	94	218.2	18.6	1	290	82	215.9	18.4	2	286	80	206.1	17.6	2	297	86	57.8
Viking	O.85-00P	100	171.3	16.1	0	299	89	132.8	17.0	0	259	73	202.6	17.0	0	282	80	168.9	16.7	0	280	81	56.9
Welter Seed & Honey	WS 2260	102	166.0	15.7	2	319	95	216.7	19.3	6	264	75	225.8	18.8	4	292	83	202.8	17.9	4	292	84	56.1
Welter Seed & Honey	WS 2482	104	205.8	16.2	1	319	93	232.1	20.5	2	272	77	233.9	20.6	8	311	90	223.9	19.1	3	301	87	55.4
High			206.9	17.7	14	333	98	245.0	20.8	15	311	88	240.2	21.5	16	320	91	224.9	20.0	6	315	91	59.1
Average			182.5	16.0	2	317	94	210.1	18.6	2	272	77	222.8	18.6	3	295	83	205.2	17.7	2	295	85	56.8
Low			152.0	15.6	0	282	83	132.8	17.0	0	230	65	202.6	17.0	0	257	72	168.9	16.5	0	259	75	53.8
LSD .10			20.6	0.6	6	15	5	19.5	0.7	NS	33	9	17.2	0.8	7	24	7	21.2	0.8	NS	15.3	4.7	1

Soil Type	Hoytville Silty Clay Loam	Canfield Silt Loam	Canfield Silt Loam
Soil Test (pH,P,K) M-3 ppm	6.9, 77, 269	7.5, 130, 340	7.1, 64, 272
Previous Crop	Alfalfa	Oats / Cover Crop Mix	Oats / Cover Crop Mix
Planting /Harvest Dates	May 23 / Nov. 14, 2022	May 25 / Dec. 5, 2022	May 25 / Dec. 5, 2022
Tillage	Conventional Tillage	Conventional Tillage	Conventional Tillage
Nutrients Applied (N,P,K)	None	43, 63, 200	43, 63, 200
Cooperator	Steve Turnow	Mike Sword / Ken Scaife, OARDC	Mike Sword / Ken Scaife, OARDC
County	Ottawa	Wayne	Wayne

— For More Information

Hybrid performance results of *Ohio Performance Trials*

Available on-line: <https://u.osu.edu/perf/archive/>

**Information regarding entering OSU Crop Performance Trials
are available at: <https://u.osu.edu/perfentry/>**

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— Organic Corn Growers... A survey

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OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER

RESEARCH SUMMARY

A Survey of Organic Corn Growers in Ohio, Indiana, Michigan, and Pennsylvania

Caroline Brock, Doug Jackson-Smith, Subbu Kumarappan, Doug Doohan, Steve Culman, Matt Kleinhenz, Cathy Herms, Cassandra Brown, The Ohio State University Soil Balancing Team

Organic corn acreage in the United States increased by more than 55% between 2011 and 2016, driven largely by demand from organic livestock producers, particularly dairies.¹ However, aside from USDA census data, relatively little is known about these farms and their management practices. Additional information about organic corn farms will help guide education and research initiatives for continued growth in the region's organic corn production.

In the spring of 2018, we mailed a survey to all organic corn growers in Ohio, Indiana, Michigan, and Pennsylvania. These four states collectively represent one-third of all U.S. organic corn growers and produce about 20% of the nation's organic corn.²

Survey questions covered overall farm operation, specific field practices, economic data, and farm management decision-making, particularly concerning soils. Of the 1,495 farms who grew corn in 2017, we received 859 usable responses (57% response rate, margin of error is 2%).

Key findings are summarized in this report. More detailed information is available at go.osu.edu/orgcorn.

Access complete report here:

<https://offer.osu.edu/offer.osu.edu/research/orgcorn>

Thank you!!! Any questions?

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Double Crop Sunflower, is it an option? 1-yr. summary

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**Jim Jasinski, IPM
Eric Richer, Farm Mgmt.**



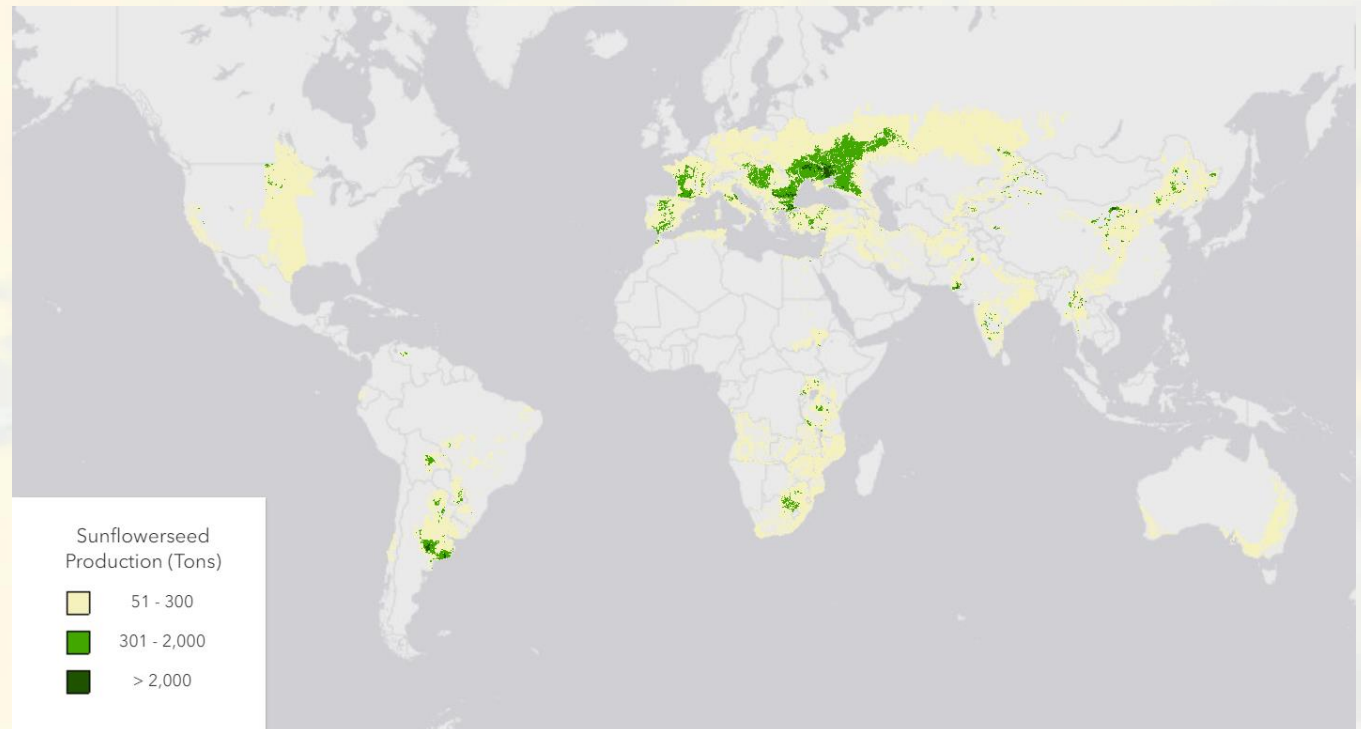
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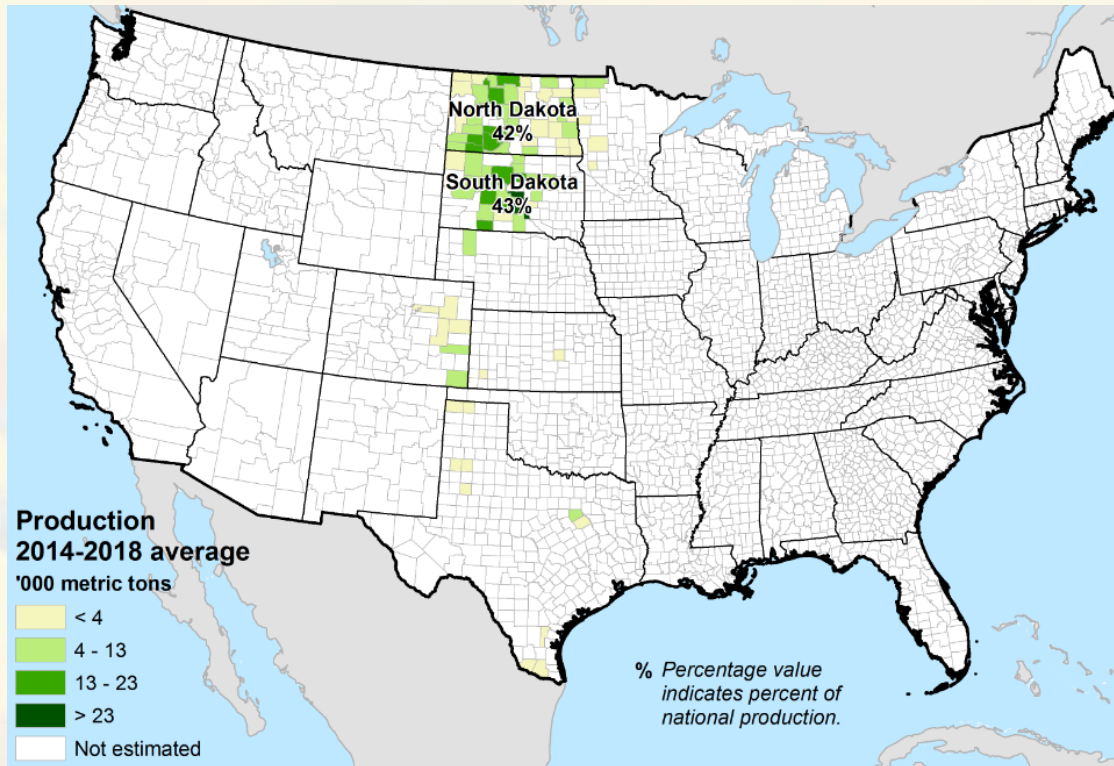
Global Production (2022-2023)

-  Russia = 33%
-  Ukraine = 20%
-  Europe Union = 19%
-  Argentina = 8%



US Production (3% of Global)

2014-2018



For 2022-2023

- North Dakota = 41%
- South Dakota = 32%
- Kansas = 7%
- Colorado = 5%



Primary Production in US
(~80% of total)

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More information:

https://ipad.fas.usda.gov/cropexplorer/cropview/comm_chartview.aspx?fattributeid=1&cropid=2224000&startrow=1&sel_year=2022&ftypeid=47®ionid=us&cntryid=USA&nationalGraph=False

Uses



Oil

- Low cholesterol and high fatty acid concentration
- Biodiesel or high-quality edible vegetable oil



Seeds

- Production of seeds
- High protein value, & amino acids (leucine, valine, isoleucine)
- Sunflower meal
- Confectionary (in-shell, snacks)



Others

- Ethnomedicine
- Cut-flowers
- Photography
- Cover crop, pollinator services
- Natural rubber

Crop Growth

Vegetative Stages



True leaf — 4 cm



V-12

Reproductive Stages



R-1



V-E



V-2



V-4



R-2

Stages of Sunflower Development

Reviewed by
Hans Kandel, Extension Agronomist
Authors
A.A. Schnitzer, former NDSU professor
J.F. Miller, former USDA-ARS
D.R. Berglund, emeritus NDSU extension agronomist



R-2

Less than 2 cm



R-3

More than 2 cm



R-3



R-3 Top View



R-4 Top View



R-5.1



R-5.5



R-5.9



R-6



R-7



R-8



R-9

NDSU | EXTENSION

North Dakota State University
Fargo, North Dakota

Reviewed July 2019



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Study Locations

- Wooster Campus
(Wayne County)
- Western Agricultural
Research Station
(Clark County)
- Northwest Agricultural
Research Station
(Wood County)



Hybrids



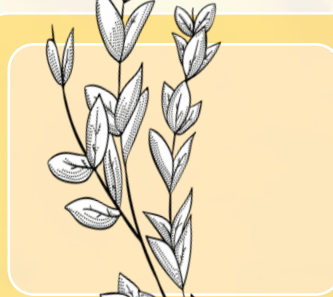
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N4H161 CL

<https://nuseed.com/us/seed/n4h161-cl/>

- Ultra-early high-oleic oilseed
- Short plant height



N4H302 E

<https://nuseed.com/us/seed/n4h302e/>

- Early high-oleic oilseed
- Good late season plant health



CP 455 E

<https://www.winfieldunited.com/products/winfield-united-seed/sunflower/cp455e>

- Medium-early high-oleic oilseed
- Medium-short plant with excellent drydown

Summary

Trt	Hybrid	SR (seeds/Ac)
1	Ultra Early	17K
2	Ultra Early	22K
3	Ultra Early	27K
4	Early	17K
5	Early	22K
6	Early	27K
7	Mid-Early	17K
8	Mid-Early	22K
9	Mid-Early	27K



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Double Crop Sunflower in Ohio, is it an option?

Osler Ortiz, Assistant Professor, Corn and Emerging Crops

Jim Jasinski, Professor, Integrated Pest Management

Eric Richer, Field Specialist, Farm Management

In addition to double cropping with forages and double cropping with wheat and soybean, other alternatives may become feasible within the crop system. In 2022, three field experiments were established to study sunflowers' viability as a double crop after wheat or barley harvest in Ohio. The study had three Perdue commercial high oleic sunflower varieties:



- Ultra-early maturity (**N4H161 CL**)
- Early maturity (**N4H302 E**)
- Mid-early maturity (**CP 455 E**)

These varieties were studied across **three seeding rates**: 17,000 seeds per Acre, 22,000 seeds per Acre, and 27,000 seeds per Acre.

Table 1. Study locations, planting dates, harvest dates, and double crop sunflower yields expressed in pounds per Acre (lbs/Ac) at 10% moisture.

Location	Planting Date	Harvest Date	Min. Yield	Average Yield	Max. Yield
Northwest, Wood County	6/29/2022	11/18/2022	1,296 lbs/Ac	1,867 lbs/Ac	2,599 lbs/Ac
Western, Clark County	7/11/2022	11/10/2022	1,012 lbs/Ac	1,967 lbs/Ac	2,740 lbs/Ac
Wooster, Wayne County	7/15/2022	12/21/2022	Not available	Not available	Not available

Harvest could have occurred earlier in some sites, but due to equipment availability, harvest happened later. All sites were harvested using a small plot combine with corn head. Nitrogen application was added in at least two locations. At Northwest, 90 lbs of Nitrogen per Acre were applied using Urea on August 2nd. At Western Station, 75 lbs of Nitrogen per Acre were applied as side dress of 28-0-0 on August 1st. Weeds were managed with pre and post-emergence applications as needed.

Preliminary results showed that stand establishment was very variable across the three varieties and sites. Other challenges included equipment availability (especially for harvest), bird damage (estimated 10 to 50% in at least one of the sites), plant lodging in some cases, and the low percentage of germination that led to lower stand counts and possibly limited crop yields. Future work will address hybrid selection, germination, fertility, bird control and marketing.

Note that this work was done on conventional ground, not organic. Results under organic systems may differ, and other factors would need considered. If you have any questions, please reach out to Osler Ortiz (ortez.5@osu.edu), Jim Jasinski (jasinski.4@osu.edu) or Eric Richer (richer.5@osu.edu).

Harvest



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Results



Location	Planting Date	Harvest Date	Min. Yield	Average Yield	Max. Yield
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USDA-ERS (10/14/22):

Average U.S. sunflower seed yields are forecasted to reach 1,782 pounds per acre in 2022/23

Take-Aways: 1 yr. summary



- **Hybrid/variety differences** in establishment and relative maturities
- **Lodged plants**, seeding rates or hybrid, Wooster site
- **Birds feeding**, up to 50% in a few cases
- **Harvest challenges** (corn combine, some shatter, seed moisture)
- New **opportunities in crop rotations**, despite delayed planting/harvest
- **Yields** as good or better than national averages: **1,800-1,900 lbs/Ac**
- **Future work**: Address seed quality, hybrid selection, germination, fertility, bird control, and marketing



Thank you!!! Any questions?

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