 

# Oregon Processed Vegetable Commission Reports

2025

# Table of Contents

**Reports**

**Research/Extension Progress Report for 2024-2025 Funded Projects**
**Progress Report for the Agricultural Research Foundation**
**Oregon Processed Vegetable Commission**

Title: Evaluation of entomopathogenic fungi against seed corn maggot in sweet corn

Project Leader(s): Josephine Antwi. Hermiston Agricultural Research & Extension Center. Oregon State University.

Funding History: 2024 funding: **$23,287**; 2025 funding: **$16,132**.

**Abstract** (300 word limit):
The aim of this study was to assess the efficacy of entomopathogenic fungi (EPF) against seed corn maggot (SCM) (*Delia platura*). EPF occur naturally in the soil or within plant tissues. When EPF spores directly attach to insect bodies, they germinate and proliferate inside insects, eventually killing them. A field trial using sweet corn was conducted to evaluate EPF-based biopesticides at planting for SCM management. Nine treatments were tested: an untreated control; three commercial EPF products (BoteGHA, NoFly, and LalGuard) applied either as soil or seed treatments or both; the same products applied as seed treatments only but paired with a fungicide (Apron) to assess compatibility; and additional controls combining the fungicide with chemical insecticides (Fortenza and ForceEvo) as seed treatment only or as both seed and soil treatments. Data collected include sweet corn stand count at germination and harvest, number of ears (including developed, underdeveloped and total ears) at harvest, incidence of smut masses, and yield. In a preliminary greenhouse study, we did not find any negative effect of EPF on germination. In the field, stand count from EPF seed-only treatments were significantly higher than those from seed+soil treatments. Seed+soil treatments did not differ significantly from the untreated control. Plant count at harvest did not differ significantly between EPF seed-only and seed+soil treatments. The highest plant count occurred in the fungicide plus insecticide treatments, while the lowest was observed in seed+soil treatment with BoteGHA. The fungicide and ForceEvo treatment yielded the highest number of developed ears, whereas the untreated control produced the fewest. All the other treatments had similar numbers of developed ears. The LalGuard and Apron seed treatment yielded the highest total number of ears, while LalGuard and BoteGHA seed+soil treatments each yielded the lowest total number of ears. Overall, there were no significant differences in yield among the EPF treatments evaluated for SCM control.

**Key Words:** Entomopathogenic fungi, sweet corn, *Delia platura*, *Beauveria bassiana*, *Isaria fumosorosea, Metarhizium brunneum.*

**Objective(s):** The objectives of the study were to (1) test the efficacy of commercial strains of EPF containing *B. bassiana*, *M. anisopliae,* and *Cordyceps fumosorosea* as biopesticides against seed corn maggot, and (2) to determine if product use pattern (i.e., seed treatment, in-furrow, or a combination of both) affects product efficacy.

**Procedures:**
Objectives 1 and 2 are described together. Raw seeds of the sweet corn variety 'Bull Moose®' from Bayer were used in this field study. The EPF products, insecticides, fungicide, and the rates at which these products were used in the study during the 2025 growing season are shown in Table 1. The nine treatments were applied in a randomized complete block design with four replications. For seed treatments, raw seeds were coated with suspensions of each product and allowed to dry before

planting. Prepared seeds were planted on May 13, 2025 with a 2-row corn planter. Planting date was intended to coincide with the emergence of the second generation of SCM. Prepared suspensions of each product were applied in-furrow at planting to represent soil treatments, before row closure. Plot size was 25 ft x 5 ft, with 2 rows per plot, 2.5 ft between rows and approximately 0.5 ft in-row spacing. The field was irrigated with a center pivot irrigation system.

To enhance SCM pressure, the green biomass of winter wheat cover crop was incorporated during soil preparation. Green biomass increase soil organic matter content which attract adult SCM flies to lay eggs. Additionally, immediately after planting, approximately 600 g of dog food were manually broadcasted on each plot. Suggestions from other entomologists who have expertise in field trials with SCM indicated that these practices attract SCM adults into fields.

Stand count per row per plot was taken on May 30 (V2 growth stage or 17 DAP), June 6 (V4 growth stage or 24 DAP), and June 17 (V6 growth stage or 35 DAP), 2025. On August 25, the following data were collected in 10 feet sections per row per plot: stand count, number of developed ears, number of underdeveloped ears, incidence of smut masses, and fresh weight of developed ears. All data were analyzed using SAS 9.4 (SAS Institute, Cary, NC) with the GLM (General Linear Model) procedure. Treatment effects were determined to be significant at the alpha = 0.10 level, using the Tukey's studentized range (HSD) test analysis.

Table 1. List of treatment products targeting seed corn maggot, application rates and application type in a field study with sweet corn at the Hermiston Agriculture Research and Extension Center in 2025.

| Treatment number | Product | Active ingredient | Application type | Rate used in this study | Label rate |
|---|---|---|---|---|---|
| 1 | UTC | water | Soil | - | - |
| 2 | Fortenza® + ApronXL | Cyantraniliprole + Mefenoxam | Seed | 5 fl.oz./100 lb + 0.6 fl.oz./100 lb | 1.24-5.0 fl.oz./100 lb + 0.32-0.64 fl.oz./100 lb |
| 3 | Force® Evo + ApronXL | Tefluthrin + Mefenoxam | Seed & soil | 0.57 fl.oz./1000' row + 0.6 fl.oz./100 lb | 0.46-0.57 fl.oz./1K'row + 0.32-0.64 fl.oz./100 lb |
| 4 | BoteGHA® ES | *Beauveria bassiana* | Seed & soil | 4 fl.oz./A + 4 fl.oz./A | 4 fl.oz./A |
| 5 | No Fly® WP | *Cordyceps fumosorosea* | Seed & soil | 0.5 lb/A + 2.0 lb/A | ½ - 2 lb/A |
| 6 | LalGuard M52 | *Metarhizium brunneum* | Seed & soil | 1 fl.oz./gal + 60 fl.oz./A | ½ - 1fl.oz./gal + 40-80 fl.oz./100 gal |
| 7 | BoteGHA® ES + ApronXL | *Beauveria bassiana* + Mefenoxam | Seed | 4 fl.oz./A + 0.6 fl.oz./100 lb | 4 fl.oz./A + 0.32-0.64 fl.oz./100 lb |
| 8 | No Fly® + ApronXL | *Cordyceps fumosorosea* + Mefenoxam | Seed | 0.5 lb/A + 0.6 fl.oz./100 lb | ½ - 2 lb/A + 0.32-0.64 fl.oz./100 lb |
| 9 | LalGuardM52 + ApronXL | *Metarhizium brunneum* + Mefenoxam | Seed | 1 fl.oz./gal + 0.6 fl.oz./100 lb | ½ - 1fl.oz./gal + 0.32-0.64 fl.oz./100 lb |

**Accomplishments:**

*Greenhouse study*

Prior to the start of the 2025 growing season, we conducted a greenhouse study to determine if EPF application has any negative effect on sweet corn germination. Each of the EPF products was used at low, medium, and high rates either as a seed treatment only, a soil treatment only, or a combination of seed and soil treatments (Table 2). For seed treatments, seeds were soaked in suspensions of each product with their corresponding rates and dried prior to planting in pots in the greenhouse. Suspensions for soil treatments were applied in-furrow with a $CO_2$ backpack sprayer before covering seeds with soil. Results of sweet corn germination at 19 DAP are shown in Figure 1. Germination ranged from 62% for the BoteGHA medium rate seed treatment to 81, 97, 93, and 100% for the remaining treatments, with a median % germination value of 94%. Seed + soil treatments and soil treatments only showed higher percent germination compared to the seed only treatments with corresponding overall average values for each group of 94, 96, and 88%.

Table 2. List of products and application rates in a greenhouse study with sweet corn at the Hermiston Agriculture Research and Extension Center in 2024.

| **Product** | **Active ingredient** | **Rate** | **Soil treatment** | **Seed treatment** |
|---|---|---|---|---|
| Untreated seed | - | - | - | - |
| Traditional seed Apron XL + Fortenza® | Mefenoxam + Cyantraniliprole | - | - | 0.6 fl.oz./100 lb + 5.0 fl.oz./100 lb |
| BoteGHA® ES | *Beauveria bassiana* | Low | 1 fl.oz./A | 1.0 fl.oz./A |
| | | Medium | 2.5 fl.oz./A | 2.5 fl.oz./A |
| | | High | 4 fl.oz./A | 4.0 fl.oz./A |
| No Fly® WP | *Isaria fumosorosea* | Low | 14 oz. /A | 0.50 lb/A |
| | | Medium | 21 oz. /A | 1.25 lb/A |
| | | High | 28 oz. /A | 2.00 lb/A |
| LalGuard M52 | *Metarhizium brunneum* | Low | 40 fl.oz./A | 0.50 fl.oz./gal |
| | | Medium | 60 fl.oz./A | 0.75 fl.oz./gal |
| | | High | 80 fl.oz./A | 1.00 fl.oz./gal |

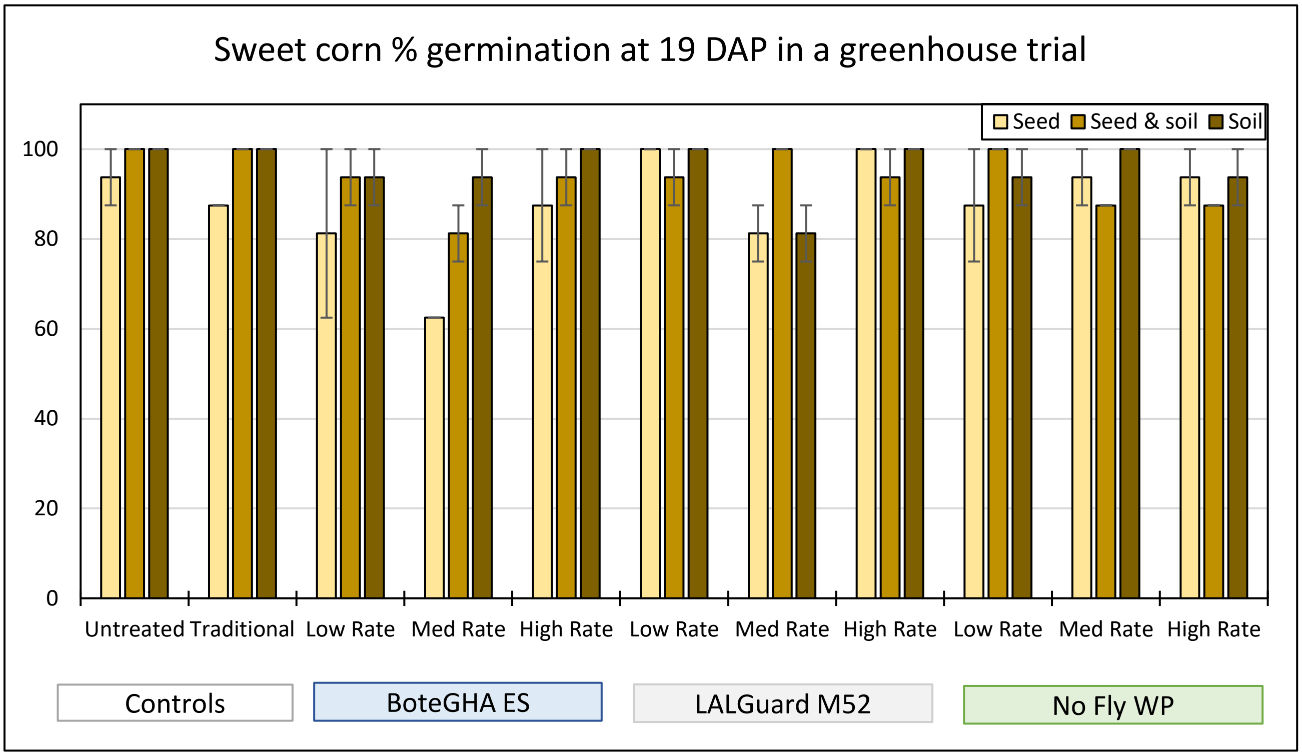


Figure 1. Sweet corn % germination at 19 DAP in a greenhouse setting. Three EPF products were applied at low, medium, and high rates. Seeds were treated with corresponding products and rates before planting in the seed treatments, and the seed + soil treatments. For soil treatments, EPF suspensions were directly applied in-furrow on treated or untreated seeds based on treatment category. Error bars represent standard error of the mean (n=2).

***Field study***

*Stand count*

Stand count was recorded at 17 DAP, 24 DAP, and 35 DAP and averaged 48, 49, and 48%, respectively (Table 3). Although seed germination under greenhouse conditions was higher, these findings did not translate to field conditions. The stand count of seed treatments only with EPF was significantly higher than those of the seed + soil treatments (Table 3; rows 4-6). In contrast, stand counts of EPF seed + soil treatments were similar to the untreated control.

Table 3. Treatment effects on stand count of sweet corn against seed corn maggot in a field study at the Hermiston Agriculture Research and Extension Center in 2025. Treatment effects were determined to be significant at the alpha = 0.10 level, using the Tukey's studentized range (HSD) test analysis. RCB design with four replications.

| **Treatments** | **Application site** | **30-May** | **6-Jun** | **17-Jun** |
|---|---|---|---|---|
| | | ----------- stand count (%) --------- | | |
| 1. UTC (water) | Soil | 36.5 c* | 37.4 b | 37.9 b |
| 2. Apron+Fortenza | Seed | 58.8 ab | 59.9 a | 59.9 a |
| 3. Apron+ForceEvo | Seed & soil | 64.4 a | 65.6 a | 63.2 a |
| 4. Botegha | Seed & soil | 37.1 c | 37.6 b | 37.2 b |
| 5. NoFly | Seed & soil | 36.5 c | 36.3 b | 35.9 b |
| 6. LalGuard | Seed & soil | 39.1 c | 39.9 b | 38.4 b |
| 7. Botegha+Apron | Seed | 53.4 ab | 54.4 a | 52.1 a |
| 8. NoFly+Apron | Seed | 52.5 b | 55.0 a | 54.1 a |
| 9. LalGuard+Apron | Seed | 55.1 ab | 56.3 a | 55.0 a |
| p-value | | <.0001 | <.0001 | <.0001 |

*Yield*

We also evaluated final stand count of sweet corn, number of corn ears (including developed, underdeveloped, and total), incidence of smut masses, and total yield at harvest. Results are shown in Table 4. Overall, plant count was not significantly different between seed treatments and seed + soil treatments. The highest plant count was observed in the Apron and ForceEvo seed and soil treatments while the lowest plant count was with the BoteGHA seed and soil treatment. Apron and ForceEvo seed and soil treatments yielded the highest number of developed corn ears (Table 4; row 3). Chemistries from these two products are typically used at planting in commercial farming. The lowest number of developed corn ears was in the untreated control treatment. For the remaining treatments, including all EPF treatments, the number of developed corn ears was similar among remaining treatments. The highest number of total corn ears was observed in the LalGuard and Apron seed treatment (Table 4; row 9), while the lowest was in the seed + soil treatments of BoteGHA and LalGuard (Table 4; rows 4 and 6, respectively). While the untreated control group had the lowest sweet corn yield, there were no significant differences in yield among treatments.

Table 4. Sweet corn yield data collected from a field trial evaluating EPF treatments targeting sweet corn maggot at the Hermiston Agriculture Research and Extension Center. Treatment effects were determined to be significant at the alpha = 0.10 level, using the Tukey's studentized range (HSD) test analysis. RCB design with four replications.

| **Treatments** | **Application site** | **Plants count** | **Developed corn ears** | **Underdeveloped corn ears** | **Total corn ears** | **Incidence of smut** | **Sweet corn yield** |
|---|---|---|---|---|---|---|---|
| | | ---------------------------------- number/acre | | | | ----------------------------------- | cwt/acre |
| 1. UTC (water) | Soil | 22,216 ab | 30,928 c | 9,583 | 40,511 bc | 2,396 | 240 |
| 2. Apron+Fortenza | Seed | 27,878 ab | 37,462 abc | 9,583 | 47,045 abc | 871 | 286 |
| 3. Apron+ForceEvo | Seed & soil | 33,323 a | 45,302 a | 9,583 | 54,886 ab | 2,396 | 285 |
| 4. Botegha | Seed & soil | 19,602 b | 32,017 bc | 6,752 | 38,768 c | 4,792 | 247 |
| 5. NoFly | Seed & soil | 25,047 ab | 36,373 abc | 9,583 | 45,956 abc | 2,396 | 268 |
| 6. LalGuard | Seed & soil | 22,651 ab | 31,581 bc | 8,494 | 40,075 c | 1,742 | 253 |
| 7. Botegha+Apron | Seed | 30,928 ab | 39,640 abc | 12,197 | 51,836 abc | 1,960 | 280 |
| 8. NoFly+Apron | Seed | 27,007 ab | 38,115 abc | 11,108 | 49,223 abc | 1,307 | 270 |
| 9. LalGuard+Apron | Seed | 28,532 ab | 41,382 ab | 13,939 | 55,321 a | 3,049 | 288 |
| p-value | | **0.0454** | **0.0026** | 0.1295 | **0.0079** | 0.3904 | 0.1491 |

**Impacts:**

This the second year of field trial for this study. Findings from the study has generated new knowledge about the efficacy of EPF to control SCM on sweet corn in the Columbia Basin of Oregon. In the long term, the project will benefit sweet corn IPM by offering alternative (i.e., EPF) tools to growers in managing SCM. To my knowledge, this study is the first of its kind on sweet corn in the Columbia Basin of Oregon. On November 19, 2025, I presented findings of this study at the annual meeting of the Pacific Northwest Vegetable Association. I also presented findings on November 4, 2025, at the Pesticide Safety Education Program webinar organized by Oregon IPM Center. I plan to publish findings in a peer reviewed article to reach a wider audience.

**Relation to Other Research:**

The goal of my extension entomology program is to explore alternative control methods besides synthetic chemistries to develop sustainable IPM programs that will benefit Oregon growers. Growers are faced with increased cases of insect resistance, secondary pest outbreaks, and declines in field natural enemies due to sole reliance on synthetic chemistries for pest control. I hope to use related studies to raise more grower awareness to alternatives, especially microbials, to insect management.

**Oregon Processed Vegetable Commission**

**Final Report**

Funding Cycle 2024-2025

**TITLE:** Evaluating electric weed control in vegetable production systems of western Oregon

**RESEARCH LEADER:** Aaron Becerra-Alvarez, Assistant Professor, Department of Horticulture, Oregon State University, Corvallis, OR

**COOPERATORS:** Marcelo Moretti, Associate Professor, Department of Horticulture, Oregon State University, Corvallis, OR

*Keywords:* Electric weed control, flaming, processed vegetables, snap beans, tillage

**SUMMARY/ABSTRACT.** Stale and false seedbed methods are an important tool used in annual crop production to reduce weed populations early in the crop's lifecycle. Electric weed control (EWC) is a novel tool with potential for use in organic and conventional processed vegetable production systems of Oregon. EWC, flaming, and tillage were evaluated in false stale seedbed and stale seedbed methods on snap beans. EWC performed best on larger weeds and more effective in a stale seedbed than a false stale seedbed. Flaming performs best on small weed seedlings and tillage was effective in either scenario. Stale seedbeds are a better option to avoid potential crop injury. Treatment differences across weed control were observed in the stale seedbed method trial. EWC improved control of pigweeds, nightshades, purslane, and wild radish compared to tillage. Further research is needed to confirm results and improve the use of EWC as a new tool for weed management in vegetable production.

**INTRODUCTION.** Organic vegetable production is an increasing market for processed vegetable producers; however, weed management is often the main challenge in transitioning fields to organic. Few effective tools are available for organic weed control.

Stale and false seedbed methods are useful tools to reduce weed populations in a field in both conventional and organic fields (Boyd et al. 2006). The stale seedbed method is when fields are prepared and irrigated to let weeds emerge and then controlled by herbicides in conventional fields, flaming, or tillage. The false seedbed method is when the field is prepared and the crop is planted, then herbicides in conventional fields, flaming, or shallow tillage kills emerging weeds on the soil surface before the crop emerges over the soil. In organic production, these methods are commonly used with flaming and tillage to reduce weed populations later in the season; however, they do not control all weed species, and many times cause population shifts in the field.

Electric weed control (EWC) is an emerging tool that may have a fit for organic vegetable production; however, minimal research is available in annual cropping systems. In a stale and false seedbed method, EWC could provide an additional tool with minimal soil disturbances and may control missed weeds from the other available tools.

**OBJECTIVE:** Evaluate weed control and crop injury from EWC, flaming, and tillage alone and in combination in false stale seedbed and stale seedbed methods on snap bean production.

**PROCEDURES.** Two studies were conducted at the Oregon State University Vegetable Research Farm in Corvallis, OR in the summer of 2025.

Trial 1 evaluated EWC and flaming alone applied in a false stale seedbed method. The field was prepared by discing with two passes and a single pass with a power harrow, then, snap bean variety 'OSU 5630' was planted on June 19, 2025, on two 30-inch rows at 10 seeds per foot. Treatments were then applied once weed seedlings were observed in the plots. EWC was applied with a tractor driven electricity generator and an offset 4 ft wide applicator (EH30 Thor, Zasso, Brazil) (Figure 1). The electricity is generated from the PTO. The application speed was about 3 mph. The flame treatments were applied with a custom-made tractor driven two-row flamer that only applies flame over the crop row as described in Peachey (2019) (Figure 2). The flame is created with propane at 10 gal/A. The application speed was 3 mph for both equipment. Weed control and crop emergence and injury were collected at 2 weeks after treatment (WAT).

Figure 1. Trial 1, EWC application in a false seedbed method at 3 mph. In his field, snap beans emerged quicker and outgrew the weeds leading to greater bean injury at the time of application.

Trial 2 evaluated EWC and tillage alone in stale seedbed method and a combination with flaming in a stale plus false seedbed method. A different field from the previous study was chosen which had greater weed population pressure. The field had already been disced in early spring and only prepared with the power harrow and irrigated twice in late July. Weeds were allowed to get larger in this field before treatments were applied on August 22, 2025. EWC was applied with similar equipment as mentioned above but at 0.5 mph. The tillage treatment was applied with a tractor PTO-driven rototiller with two passes in either direction on the plots at about 2 mph. After the treatments snap beans were planted on two 30-inch rows at 5 seeds per foot. Weed counts and crop stand count were collected at 1 and 3 WAT within the crop row only on a 24 in by 5 in quadrat that went over the crop row. Weed biomass was collected at 2 WAT with the same quadrat on the crop row only.

All data was run by ANOVA and mean separation with Tukey's HSD (α=0.05) where appropriate.

***Results***

*Trial 1*

The field site did not have high enough weed populations and therefore, snap beans emerged quickly and established faster than weeds. In this scenario, the false stale seedbed did not work and many of the beans were killed by the electric and flame (Figure 3 and 4).

Figure 2. Two-row flamer used in the study to apply over the crop rows in trial 1. The snap beans emerged to early and were larger than the weeds at time of application leading to significant injury on the beans.

Despite the fast-emerging beans, EWC was still applied; however, it was applied at a faster speed to see if we would avoid injury to some of the emerged beans (Figure 1). EWC needs good contact with the plants to cause injury and kill. Many of the beans with the first true leaves developed were killed, while the small weed seedlings were left untouched or only slightly damaged (Figure 3). Additionally, at the 3 mph, the equipment was not a smooth ride and may be too fast for this equipment to operate on this field site. To improve EWC contact with small weed seedlings the seed bed needs to be smooth on the surface. In areas where the equipment left ridges on the soil surface, no contact with the weeds occurred.

Figure 3. Snap beans injury from EWC minutes after application in trial 1. The emerged snap beans already had their first true leaves developed, which led to greater contact with the applicator unlike the small weeds that were missed.

Figure 4. Flame injury to emerged snap beans. Snap beans are moderately tolerant to flame if less than 12% of seedlings and 8% of hypocotyls have emerged from the soil.

Flame injury on the emerged beans was also observed (Figure 4). Snap beans are moderately tolerant to flame when only the hypocotyls have emerged over the soil or still protected under the soil as it begins cracking after emergence (Figure 2; Peachey 2019).

On average, EWC resulted in nearly complete snap bean stand loss while with flaming some beans remained for about 50% stand compared to the nontreated (data not shown). No weed control treatment difference was observed after killing the beans in this study (data not shown).

*Trial 2*

Trial 2 was conducted in August and in a different field with greater weed populations. At time of application, weed dry biomass averaged 161 g/10ft$^2$ quadrat across the field made up of pigweeds, common lambsquarters, hairy nightshade, purslane, crabgrass, witchgrass, and wild radish (Figure 5). The EWC treatment left weed residue on the plots and snap beans were planted right after and no soil disturbance occurred (Figure 6).

Figure 5. Trial 2, EWC application on emerged weeds in a stale seedbed method.

After the treatments at 2 WAT, no difference across weed dry biomass within the crop row was observed. Weed dry biomass was 4 to 6 g/quadrat in the crop row across all treatments (data not shown). While weed biomass was no different, weed counts did differ across species (Table 1). Most notably, EWC reduced pigweeds, nightshades, purslane, and radish compared to tillage (Table 1). The grass control appeared to be less by EWC; however, the grass weeds were not dominant in the field and patches were common in the field. The improved control of certain weed species with EWC may be the response to not disturbing the soil. Previous research demonstrated that in reduced-till systems of snap beans, the number of nightshade emergence was reduced compared to conventional tillage (Peachey et al. 2004). However, with weeds like purslane, the EWC may be having improved contact with low-laying weeds which would also be influenced by the application speeds.

Figure 6. Left, a 4-ft wide application with EWC on emerging weeds before planting snap beans. The seed bed was not tilled again before planting, and the snap beans were planted in that 4-ft wide area shortly after. Right, tillage for controlling emerged weeds and preparing the seedbed before planting snap bean.

Table 1. Snap bean and weed count within the crop row of the plot at 3 WAT for trial 2 on stale seedbed and false stale seedbed methods in Corvallis, OR[a]

| Treatments | Snap bean | Pigweed | Lambsquarters | Nightshade | Purslane[b] | Wild radish[b] | Grasses[b,c] |
|---|---|---|---|---|---|---|---|
| | Number per quadrat in crop row[d] | | | | | | |
| Tillage | 3 ab | 13 a | 11 b | 7 ab | 6 a | 2 a | 0 b |
| Tillage, fb flaming after planting | 2 b | 15 a | 25 a | 8 a | 2 b | 1 ab | 0 b |
| EWC | 3 a | 6 ab | 11 b | 4 bc | 1 bc | 0 b | 1 a |
| EWC, fb flaming after planting | 2 b | 3 b | 10 b | 1 c | 0 c | 0 b | 1 a |

[a]Means with the same letter within a column to do not differ by Tukey's HSD α=0.05.
[b]Data was log-transformed and back transformed for presentation.
[c]Grasses were grouped together but most species observed was witch grass and crabgrass.
[d]Quadrat was 24 in by 5 in

The additional flaming treatments did not necessarily improve weed control in this study. In this field, the flaming was more appropriately applied with less than 15% beans emerging over the soil and some weed seedlings present on the soil surface (Figure 7). However, this research demonstrates some difficulties in flaming after planting which can injure crops and not provide additional weed control. The reduced weed control may have been because of the high weed population in this field, which was extremely high compared to grower fields. The flaming may have performed better if performed before planting snap beans, but that would delay planting. Flaming after an EWC treated area is not recommended. A lot of weed residues remained and was prone to catch fire after passing the flamer (Figure 7). Mowing before planting may be useful to reduce the residue; however, that may compact the soil even more and could affect crop response negatively. Future research aims to explore methods for EWC to be used in no-till systems effectively and efficiently.

EWC followed by flaming in crop row

EWC followed by flaming

Tillage followed by flaming in crop row

Tillage followed by flaming

Figure 7. Treated plots 2 weeks after treatment and snap bean planting in trial 2.

**SIGNIFICANT ACCOMPLISHMENTS:** *Conclusions.* This research demonstrates potential for EWC in organic vegetable production systems as a stale seed bed method as compared with tillage and flaming. EWC performs best when weeds are larger, and good contact with the electrodes occurs unlike flaming which performs best when broadleaf weeds are small seedlings and tillage can work in either scenario. False stale seedbed methods can work on snap beans if you understand field history and know the weed population beforehand and the correct equipment is utilized. However, stale seedbeds may be a better option to avoid potential crop injury. Treatment effects on weed control across different species were observed. EWC could provide value in control of weeds other methods don't control or could be integrated with other methods for improved control. Future research will continue to explore the EWC in stale seedbed methods for organic vegetable crops.

The results of these studies have provided preliminary information for improving the application of EWC in organic processed vegetables. The results from this project improved our ability to obtain new funding from the USDA-NIFA.

**BENEFITS & IMPACT:** Our research continues to evaluate the applicability and effectiveness of EWC in vegetable production systems of Oregon. The ability to use this organically compliant effective tool in perennial and annual systems will improve the cost-effectiveness of this equipment for producers of diverse crops in western Oregon. The research efforts in organic vegetable production will continue to provide practical information for processed vegetable producers who wish to pursue organic certification. More organic producers will allow vegetable processors to keep up with the increasing demand for organic products.

**ADDITIONAL FUNIDNG RECEIVED DURING PROJECT TERM**:

We have been awarded nearly 1 million USD for a 4-year research grant award from USDA-NIFA Organic Transitions Initiative to continue investigating electric weed control in organic processed vegetable production. The project's title is "Empowering Organic Farmers: Integrating Electric Weed Control in Vegetable Farming."

**FUTURE FUNDING POSSIBILITIES:**

The upcoming research will help us identify future funding options; however, we see a fit for this technology in other vegetable production systems and potential for expanding no-till production efforts. Our lab will be purchasing an interrow EWC applicator to evaluate as post planting treatments in organic vegetables. Future projects will also include on-farm trials with participating growers.

**References**


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**Research/Extension Progress Report for 2025-2026 Funded Projects**
**Progress Report for the Agricultural Research Foundation**
**Oregon Processed Vegetable Commission**

Title: VegNet: Regional Insect Pest Monitoring and Reporting

Project leader: Jessica Green, Oregon IPM Center 2710 SW Campus Way, room 2215, Corvallis, OR 97331
Cooperators: Kyleah Rabe (OSU student), Jessica Blakley, Megan Sturzen, Matthew Cook, Thomas Barnett, Mike Christensen, Ben Lyon (OSU Vegetable Research Farm)

Funding history:
2023-24: $14,781
2024-25: $7,727 (+ $7K match from PNVA)
2025-26: $15,657

ABSTRACT

Timely assessment of insect pests in vegetable crops is crucial, and during the growing season, pest activity can change rapidly. Without monitoring, pest levels may go unnoticed until a large portion of the crop becomes unmarketable. Depending on pre-harvest intervals, 'rescue' insecticide applications may be available, but a much better approach is to have knowledge of pest activity throughout the season. For instance, soil pests are a big concern during establishment, foliar feeders must be recognized before they become too large to manage, and insects that feed on pollen or contaminate marketable parts of crops affect can harvest or limit load acceptance at the processing plant. VegNet, a long-standing monitoring and reporting system for insect pests, aims to reduce this knowledge gap by collecting direct, weekly trap counts as a means to estimate and compare pest levels, both temporally and spatially. If an increase in trap counts is noted, we use degree-day models to predict timing of pest pressure and potential impact.

KEYWORDS: insect, pest monitoring, IPM, sweet corn, broccoli

OBJECTIVES

1. Conduct weekly pest monitoring at 8-10 selected locations in Western Oregon. Data become part of a digital dashboard (the Oregon Pest Monitoring Network, OPMN).
2. If abnormally high activity anomalies occur, issue reports and interpretations about pest activity and predicted impact to growers.

PROCEDURES

Wire mesh Hartstack traps or plastic bucket traps were placed at selected field edges and baited with pheromone lures. Yellow sticky traps were used to monitor *Diabrotica* beetles (cucumber beetles and western corn rootworm). Baited delta wing traps were used to monitor diamondback moths. All pheromones were purchased from AlphaScents, and lures were changed every 4 weeks. Monitoring was conducted from 7 May to 2 September 2025. Counts were entered into an Arc-GIS mobile application that seamlessly integrates with the Oregon Pest Monitoring Network, allowing for real-time viewing.

ACCOMPLISHMENTS

Since 2023, we have noticed a general decline in the number of detected target pest moths and butterflies (Order Lepidoptera). We are using the same company and replacement schedule for lures, so do not attribute the trend to that. Last year's report suggested that low activity may be due to cyclical trends or the normal ecological time lag between pest insects and natural enemies that act to keep their populations in check. We do track beneficial insects when they are found in our traps, and a quick analysis of differences between 2024 and 2025 do not suggest any immediate influence. Yet, counts of most monitored pests were even lower this year. On average, there was a -80% change in monitored pests between 2024 and 2025. The exceptions were black cutworm (-13%) and *Diabrotica* beetles (-24%) compared to last year (FIG. 1). The adage 'no news is good news' may have been in play this year, but we do recognize that the frequency of reports could have been more consistent. We are still in a transitional learning stage of having counts publicly available on the OPMN and compiling data tables by hand and emailing them to program subscribers. Your feedback is welcome and encouraged.

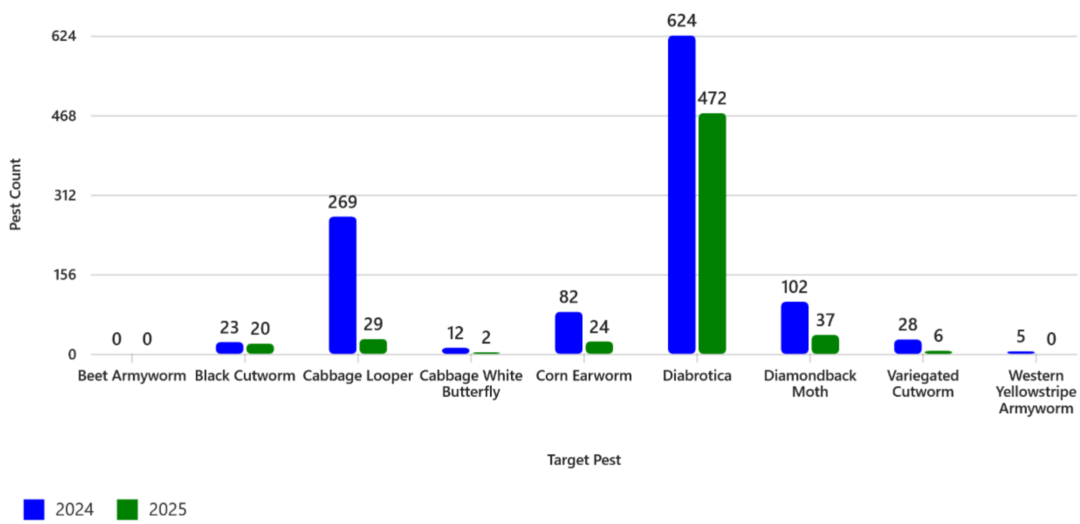


*Figure 1. Total cumulative count of monitored insect pests during the 2024 vs. 2025 season*

IMPACTS

Historical data from the VegNet program have now been utilized for two scientific papers: one on corn earworm population patterns across the United States (Lawton et al. 2024), and another on black cutworm phenology here in Western Oregon (Slone et al. 2025). These are available on the blog site. Additionally, we attended and presented at the 2025 national Entomological Society of America meeting on cabbage looper trends from the past 28 years and how they may be influenced by El Nino Southern Oscillation (ENSO) patterns in the tropical Pacific. This analysis is ongoing and will be submitted to a journal in the coming year. Using the OPMN as a data repository has proved particularly valuable for these kinds of studies.

RELATION TO OTHER RESEARCH / EXTENSION

- The Oregon IPM Center Director and her Master's graduate student had a separate OPVC proposal to evaluate *Diabrotica* beetle distribution. We contributed to this effort by suggesting locations and training personnel. As in years prior, *Diabrotica* data are being contributed to the National Corn Rootworm IPM Working Group.

**Research/Extension Progress Report for 2025-2026 Funded Projects**
**Progress Report for the Agricultural Research Foundation Oregon Processed Vegetable Commission**

**Title:** Breeding broccoli for heat tolerance, automated harvest and processing quality

**Project Leader(s)**: James R. Myers
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**Cooperator(s)**: N/A

**Funding History**: $11,483

**Abstract:** Oregon has had a favorable climate for summer production of broccoli, with mild temperatures and a long growing season. However, the long-term trends are towards warmer summers with more extremes in temperature. This presents challenges to broccoli growers that affects the cost of production and whether broccoli will remain profitable. The challenges facing processors are finding cultivars with the desired quality and ease of processing characteristics, along with productivity. Mechanization has reduced labor costs in many crops, but broccoli harvest remains relatively non-mechanized. Large labor crews are typically needed to harvest broccoli and the cost of and access to labor are the two main problems for broccoli harvest. The industry is progressing towards mechanization, but problems remain in developing systems that would achieve efficiency in the field and deliver quality product to the processing plant. Our program has focused on the plant genetics side of mechanization. The OSU broccoli breeding program has worked for over 30 years to develop cultivars that have architectural traits that make the cultivar more amenable to machine harvest. Fifty-nine experimental broccoli lines at various stages of inbreeding were grown in the field at the OSU Vegetable Research Farm in 2025. These were evaluated in an observation nursery for productivity and quality traits. Seventy-one selections were made with cuttings brought into the greenhouse to root, grow, flower and be used for selfing for generation advance and to perpetuate the line. A commercial broccoli trial was also grown which included two commercial entries and three OSU experimental hybrids. The experimental hybrids have excellent processing characteristics and yields on par with Cascadia, but lower than commercial check hybrids.

**Key Words**: plant breeding, *Brassica oleracea* var. *italica*, mechanical harvest, heat tolerance, abiotic stress tolerance processing

## Objective(s):

1. Breed broccoli cultivars with excellent processing quality and field productivity.
    a. Incorporate new genetics from non-cytoplasmic male sterile commercial hybrids to broaden the genetic base of the OSU broccoli breeding program.
    b. Identify inbreds with stability for yield and quality across the growing season.
    c. Select for field traits that includes exserted heads, reduced leaves about the head, and lodging resistance. Hybrids should be high yielding, have solid stems, and have large and heavy heads with shallow branches.

   d. Select for processing traits that includes segmented heads that produce uniformly colored florets that are dark green in color with fine beads and short pedicles. Florets should be <2½" in size.
2. Develop seed production systems using cytoplasmic male sterility (CMS) to produce field scale quantities of $F_1$ hybrid seed.

## Procedures:

### Early generation nursery

Cuttings from 2024 rooted and grown to flowering in greenhouse where they were bud pollinated to produce selfed seed on eight advanced inbreds, 15 early generation inbreds, and 14 crosses. We observed spontaneous seed set on some early generation inbreds, and rated these for degree of spontaneous seed set. Seed harvested from the greenhouse was used to establish a fall planting of experimental broccoli lines at various stages of inbreeding along with five commercial hybrids.

Fifty-nine experimental lines were transplanted 30-Jun into the field along with Cascadia, Emerald Pride, Eastern Crown, Eiffel and Imperial as hybrid checks (Table 2). Plots of experimental lines had up to 15 plants in 15 feet of row length on a 30-inch row spacing. A 16-16-16 N-P-K fertilizer at 250 lb/A was banded in row. Plots were hand weeded. Plots were not replicated, except checks, which had two replicates. Date of heading was recorded along with various head quality parameters (head exsertion, shape, segmentation, branch depth, stem color, head firmness, bead size and diameter (Tables 2 and 3). Uniformity of heading across the plot was also evaluated (table 2). Numbers of heads show heat damage symptoms were recorded, and symptoms were detailed on a per plot basis with the heat damage parameters including yellow florets, uneven floret development, uneven bead development, rosetting, leafy heads and cat's eye beads (Table 3).

### Commercial broccoli trial and evaluation of OSU hybrids

**Table 1.** Broccoli hybrids received for trial and grown at the OSU Vegetable Research Farm in a fall trial in 2025.

| Entry | Source |
|---|---|
| Cascadia | Check |
| Eiffel | Check |
| Imperial | Check |
| FBC4614 | Sakata |
| SBC3609 | Sakata |
| EPxS483 | OSU |
| S471x(EP/S481) | OSU |
| S471x(EP/S483) | OSU |

Broccoli hybrids were solicited from seed companies, and we received two lines for trial (Table 1). Imperial and Eiffel were included as check cultivars because these are the main hybrids being used by processors at present. Cascadia was also included as a check representing OSU breeding materials. A replicated yield trial was seeded June 9th into 50 cell trays in the greenhouse and transplanted to the field on July 25th. Hybrids were transplanted into one-row plots 30 feet in length replicated four times with a one-foot in-row spacing. A one row border of an OSU experimental population was planted along the sides, and 10 foot plots at the ends of the trial. N-P-K 16:16:16 fertilizer was banded in row at planting. Hand weeding was used to control weeds and no pesticides were applied. Harvest occurred over a 9-day period beginning September 22nd.

At harvest, plant stand and maturity was recorded (Table 4). In the grading room, broccoli heads were cut to a 6.5 inch length and the attached leaves were stripped and weighed separately from the heads. Underdeveloped and over-mature heads were separated from prime heads. Weights of the various categories were used to estimate yield (Table 4). Heads were evaluated for head diameter (determined on 10 randomly selected heads/plot), and hollow stems (Table 5). A subsample of five head was floretted using a tomahawk cutter and the weight of florets in relation to whole head was obtained. Florets were graded for size and any with greater than 2.5 inch dimension were removed before reweighing the sample. Percent florets and optimum sized florets was calculated (Table 5). In the field just prior to harvest, the plots were rated for head and canopy height, and various head traits including exsertion, shape, segmentation, bead size, stem color and firmness (Table 6). Whole plots were evaluated for uniformity of heading. Entries in the yield trials were taken to the OSU pilot processing plant for blanching and freezing. Frozen material was displayed at the Pacific Northwest Vegetable Association (PNVA) meetings in Kennewick, WA on November 19.

## Accomplishments:

### Early generation nursery

Among early generation lines, 8 showed strong to very strong spontaneous selfing, another 8 were moderately strong and three were weak spontaneous selfers. In general, the progeny of spontaneous selfers grown in the field resembled those made by bud pollination. Spontaneous selfing inbreds will be useful for introgression of cytoplasmic male sterility for commercial hybrid seed production.

Harvestable heads were obtained on the order of 98 to 109 days, reflecting the late planting date with plants growing into cooler conditions. Heading height and exsertion of the experimental lines was variable, but generally taller than Imperial and similar to Cascadia and Eiffel. A total of 28 lines had overall scores of 7 to 9 and were comparable to Cascadia and Eiffel. Although some OSU OP lines had fine to medium or medium beads, many had coarse bead size. Crosses are needed to improve head quality while selecting for heat tolerance, which was the objective in crossing in the greenhouse in 2024 (see those lines labeled “cross” in the seed source column in table 2).

OSU OP lines were selected for their heat tolerance in previous years, but due to the production cycle, we are not able to produce seed for a spring planting, so weren’t able to plant them early enough in 2025 to get a good evaluation for heat. Emerald Pride did show uneven bead and floret development but most experimental lines showed little or no evidence of abiotic stress (Table 3).

A set of 71 lines were selected for further propagation that showed the best combination of traits. Cuttings were taken from these lines and were rooted in the greenhouse. These will be selfed in 2026 to perpetuate the line and for generation advancement for lines that have not yet reached homozygosity.

### Commercial broccoli trial and evaluation of OSU hybrids

Growing temperatures during August and September were 4 - 5°F warmer than the 25 year average and precipitation during those months totaled 0.79in., which is significantly less than the 25 year average of 1.83in. We did see temperatures ≥100°F on 8/11 – 8/13, and 8/23 – 8/24, but these seemed not to have triggered any heat damage during head initiation.

Stands were generally uniform and at target and the trial appeared very uniform in maturity. Some aphid infestation was present, but mainly in the border rows and did not affect the trial plots. The hybrids matured in 64 to 73 days after harvest with FBC4614 significantly later than others (Table 4).

The hybrids ranged from 2.0 T/A to 5.5 T/A net head yield. SBC3609 had the highest net yield (5.5 T/A) and was significantly higher than Imperial (3.8 T/A) but not significantly different from Eiffel (4.1 T/A) (Table 4). Imperial and FBC4614 had the most leaves around the head, while Eiffel and Cascadia had the least (Table 5). Percent florets ranged from 52 – 69% with Eiffel and FBC4614 having the highest percentages. However, they had a lower percentage of florets less than 2.5 in. (Table 5). The OSU hybrids generally had the highest number of optimal-sized florets. The differences in hybrids and their adaption to the needs for mechanical harvest and processing was also apparent in the field observation data (Table 6.) Imperial had the least head exsertion and segmentation compared to the other lines. Eiffel and the OSU materials generally had the highest degree of head exsertion and segmentation, and the two Sakata lines were intermediate. When all traits are considered together, SBC3609 combines high yield with medium head exsertion and segmentation, fine beads, high head firmness and the highest overall plot uniformity.

**Impacts:** The long-term benefits of the breeding program are hybrids with higher and stable yields, adapted to mechanization, with improved quality traits and abiotic tolerance. In the short term, we would generate new knowledge about the genetic control of yield, quality, and abiotic stress traits.

**Relation to Other Research:** N/A

**Table 2.** Plant and plot characteristics of broccoli inbreds and breeding lines grown in an observation trial at the OSU Vegetable Research Farm in 2025.

| Entry | Seed source[z] | Seed set[z] | No. plants | Days to harvest maturity | Head height (in) | Canopy height (in) | Exser-tion[y] | Plot uni-formity[y] | Over-all[y] | Notes[x] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cascadia** | ck | | 15 | 98 | 22 | 24 | 7 | 5 | 7 | |
| **Emerald Pride** | ck | | 15 | 98 | 14.5 | 20 | 5 | 7 | 3 | |
| **Eastern Crown** | ck | | 15 | 98 | 10 | 26 | 3 | 9 | 1 | |
| **Eiffel** | ck | | 15 | 102 | 20.5 | 22 | 7 | 5 | 7 | |
| **Imperial** | ck | | 15 | 109 | 16 | 17 | 3 | 3 | 5 | |
| **S446** | self | | 13 | 98 | 21 | 25 | 7 | 5 | 5 | |
| **S446** | spont. | weak | 13 | 98 | 19 | 21 | 7 | 7 | 7 | Leaf spotting, DM? |
| **S454** | self | | 1 | 98 | 24 | 23.5 | 9 | | 9 | 1plt with no competition |
| **S454** | spont. | mod. | 14 | 98 | 20 | 19 | 8 | 5 | 7 | Leaners |
| **S463** | self | | 2 | 96 | 24 | 22 | 9 | 3 | 6 | Loose head |
| **S463** | spont. | mod. | 15 | 98 | 21 | 20 | 8 | 5 | 7 | |
| **S471** | self | | 4 | 100 | 18 | 19 | 6 | 5 | 7 | |
| **S471** | spont. | strong | 14 | 100 | 19 | 20 | 7 | 5 | 7 | |
| **S479** | self | | 15 | 109 | 25 | 25 | 9 | 8 | 9 | |
| **S479** | spont. | mod. | 15 | 109 | 25 | 22 | 9 | 7 | 9 | Leaves around head much reduced |
| **S483** | spont. | v. strong | 15 | 98 | 14 | 16 | 7 | 7 | 5 | |
| **S487** | self | | 12 | 98 | 18 | 17 | 8 | 5 | 3 | |
| **S487** | spont. | weak | 4 | 98 | 18.5 | 19 | 8 | 5 | 5 | |
| **OSU OP-01-01** | self | | 9 | 94 | 19 | 20 | 7 | 5 | 5 | |
| **OSU OP-01-01** | spont. | weak | 5 | 94 | 22 | 25 | 7 | 7 | 7 | |
| **OSU OP-03** | spont. | | 15 | 96 | | | 7 | 5 | 7 | Seg. height, bead size, head shape, and maturity |
| **OSU OP-03-01** | self | | 15 | 98 | 18 | 24 | 6 | 7 | 6 | More uniform than spon-taneous planting |
| **OSU OP-05-01** | spont. | mod. | 15 | 93 | 15 | 16 | 5 | 7 | 5 | |
| **OSU OP-07-01** | self | | 11 | 96 | 15.5 | 16 | 7 | 7 | 7 | |
| **OSU OP-09-01** | spont. | v. strong | 14 | 98 | 17 | 20 | 6 | 3 | 5 | |

| Entry | Seed source[z] | Seed set[z] | No. plants | Days to harvest maturity | Head height (in) | Canopy height (in) | Exser-tion[y] | Plot uni-formity[y] | Over-all[y] | Notes[x] |
|---|---|---|---|---|---|---|---|---|---|---|
| **OSU OP-10-01** | self | | 14 | 98 | 17.5 | 18.5 | 6 | 3 | 5 | Many side-shoots |
| **OSU OP-11-02-01** | spont. | mod. | 15 | 98 | 16 | 21 | 5 | 7 | 5 | |
| **OSU OP-11-04-01** | self | | 15 | 96 | 22 | 26 | 8 | 7 | 7 | |
| **OSU OP-11-04-01** | spont. | strong | 15 | 98 | 15 | 19 | 5 | 5 | 1 | Very small heads |
| **OSU OP-24-01-01** | spont. | strong | 14 | 98 | 24 | 27 | 8 | 7 | 7 | |
| **OSU OP-24-02-01** | spont. | mod. | 15 | 98 | 22 | 25 | 9 | 7 | 7 | |
| **OSU OP-24-03** | spont. | | 15 | 96 | 19 | 25 | 7 | 7 | 7 | |
| **OSU OP-24-04-01** | self | | 15 | 96 | 20.5 | 22 | 7 | 5 | 7 | |
| **OSU OP-24-05-01** | self | | 14 | 96 | 25.5 | 29 | 8 | 7 | 6 | |
| **OSU OP-24-06-01** | spont. | mod. | 15 | 98 | 19.5 | 21 | 8 | 5 | 7 | Seg. height, color, bead size, and exsertion |
| **(S479/S486)-01** | self | | 9 | 109 | 23 | 24 | 8 | 7 | 5 | Small heads |
| **(S479/S486)-01** | spont. | mod. | 15 | 109 | 23 | 25 | 8 | 7 | 6 | |
| **(Em. Pride/S475)-01** | self | | 13 | 109 | 17 | 18 | 6 | 7 | 3 | Heavy aphids, DM |
| **(Em. Pride/S475)-01** | spont. | weak | 15 | 109 | 18 | 19 | 7 | 3 | 5 | Heavy aphids |
| **(EP/S481)-01-01** | spont. | strong | 15 | 109 | 22 | 25 | 8 | 3 | 7 | Seg. plant types |
| **(EP/S483)-03-01** | spont. | v. strong | 14 | 98 | 19 | 18 | 8 | 3 | 7 | Seg. maturity and head size |
| **(Em. Pride/S475// Em. Pride/S483)-01** | self | | 14 | 98 | 22 | 24 | 7 | 3 | 7 | Seg. for many traits |
| **(Em. Pride/S483// S471)-01** | self | | 15 | 100 | 18.5 | 19 | 7 | 1 | 3 | Very small heads |
| **(Em. Pride/S483//S471)-01** | spont. | v. strong | 15 | 98 | 18 | 23 | 7 | 7 | 5 | Small leaves around heads |
| **(S471/S486)-01-01-01** | self | | 14 | 98 | 23 | 22 | 9 | 3 | 7 | Seg. head size, some nice selections |
| **S446/OSU OP-03-01** | cross | | 2 | 109 | 22 | 26 | 6 | 5 | 3 | |
| **OSU OP-10/S446** | cross | | 15 | 98 | 25.5 | 24 | 9 | 9 | 9 | Fairly uniform, nice line |
| **S446/OSU OP-10** | cross | | 10 | 98 | 25 | 26 | 9 | 8 | 9 | |
| **OSU OP-11-02/S446** | cross | | 15 | 100 | 18 | 22 | 6 | 3 | 5 | Mostly small heads |

| Entry | Seed source[z] | Seed set[z] | No. plants | Days to harvest maturity | Head height (in) | Canopy height (in) | Exser-tion[y] | Plot uni-formity[y] | Over-all[y] | Notes[x] |
|---|---|---|---|---|---|---|---|---|---|---|
| **S454/OSU OP-03-01** | cross | | 8 | 98 | 21 | 20 | 7 | 9 | 7 | |
| **OSU OP-11-02/S454** | cross | | 15 | 98 | 21 | 24 | 7 | 9 | 6 | |
| **S463/OSU OP-10** | cross | | 15 | 98 | 25 | 23 | 9 | 9 | 8 | |
| **S463/OSU OP-11-02** | cross | | 9 | 98 | 21.5 | 22 | | 7 | 7 | Seg. head size |
| **S471/OSU OP-10** | cross | | 15 | 98 | 21 | 25 | 6 | 7 | 5 | Already developing side-shoots |
| **S471/S483** | cross | | 14 | 109 | 23 | 26 | 7 | 5 | 7 | Seg. plant types |
| **S479/OSU OP-10** | cross | | 15 | 100 | 19 | 23 | 6 | 1 | 5 | Leaners |
| **S487/OSU OP-05** | cross | | 2 | 98 | 16 | 18 | 5 | 3 | 3 | End plot |
| **S487/OSU OP-10** | cross | | 14 | 98 | 26 | 32 | 8 | 7 | 7 | Seg. for small heads |
| **(S471/S486)-01-01//S463** | cross | | 15 | 100 | 22 | 23 | 8 | 3 | 6 | Seg. for many traits |
| **EP/S483-04** | spont. | | 15 | 109 | 20 | 26 | 7 | 5 | 5 | Heavy aphids |
| **OSU OP-09-01** | self | | 15 | 98 | 17 | 20 | 6 | 3 | 5 | "Wilting" foliage, Seg. many traits |
| **S475** | spont. | | 15 | 109 | 18 | 22 | 7 | 5 | 1 | Very DM susceptible, but seg.? |
| **Cascadia** | ck | | 15 | 109 | 25 | 26 | 8 | 7 | 7 | |
| **Emerald Pride** | ck | | 14 | 96 | 16 | 23 | 5 | 7 | 3 | |
| **Eastern Crown** | ck | | 15 | 100 | 11 | 18 | 1 | 7 | 3 | |
| **Eiffel** | ck | | 15 | 100 | 20 | 23 | 8 | 7 | 7 | |
| **Imperial** | ck | | 15 | 100 | 14 | 24 | 3 | 5 | 5 | |

[z]Seed was produced by bud pollination (self), crossing after emasculation (cross) or set spontaneously (spont.) in the greenhouse. The lines with spontaneous seed set were classified as to how prone to spontaneous selfing they were based on seed fill of siliques. [y]Scale of 1 – 9 where 9 = greatest/best. [x]Abbreviations: DM – downy mildew, Seg. - segregating

**Table 3.** Head characteristics of broccoli inbreds and breeding lines grown in an observation trial at the OSU Vegetable Research Farm in 2025.

| Entry | Head shape[z] | Segmen-tation[y] | Branch depth[x] | Bead size[w] | Stem color[v] | Head dia. (in) | Firm-ness[u] | Yellow florets[t] | Une-ven beads[t] | Une-ven flo-rets[t] | Ro-set-ting[t] | Leafy heads[t] | Cat's eye[t] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cascadia** | 5 | 5 | 5 | M | 7 | 3.75 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Emerald Pride** | 3 | 5 | 7 | M | 5 | 5 | 7 | 0 | 5 | 7 | 0 | 0 | 0 |
| **Eastern Crown** | 7 | 1 | 3 | F-M | 3 | 4.5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Eiffel** | 4 | 5 | 5 | F-M | 5 | 5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Imperial** | 6 | 3 | 5 | F-M | 5 | 5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S446** | 4 | 7 | 5 | F-M | 5 | 3 | 9 | 0 | 0 | 0 | 0 | 1 | 0 |
| **S446** | 4 | 5 | 5 | F-M | 5 | 2.75 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S454** | 5 | 7 | 7 | M | 7 | 6.5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S454** | 6 | 7 | 7 | M | 7 | 5 | 7 | 5 | 3 | 0 | 0 | 0 | 0 |
| **S463** | 3 | 9 | 5 | F-M | 7 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S463** | 4 | 7 | 7 | F-M | 5 | 4 | 7 | 3 | 0 | 0 | 0 | 0 | 0 |
| **S471** | 4 | 3 | 3 | F-M | 7 | 2.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S471** | 4 | 3 | 3 | F-M | 7 | 2.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S479** | 7 | 8 | 9 | F | 9 | 4 | 7 | 0 | 0 | 0 | 0 | 7 | 0 |
| **S479** | 8 | 9 | 9 | F | 9 | 4.5 | 7 | 1 | 0 | 0 | 0 | 7 | 0 |
| **S483** | 4 | 9 | 7 | F-M | 9 | 3.5 | 7 | 1 | 0 | 1 | 0 | 3 | 0 |
| **S487** | 5 | 7 | 7 | F-M | 9 | 3.25 | 9 | 5 | 7 | 1 | 0 | 3 | 0 |
| **S487** | 4 | 7 | 5 | F-M | 9 | 3.25 | 9 | 1 | 0 | 0 | 0 | 3 | 0 |
| **OSU OP-01-01** | 5 | 3 | 7 | F-M | 7 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OSU OP-01-01** | 4 | 3 | 9 | F-M | 7 | 3.75 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OSU OP-03** | 5 | 1 | 5 | M-C | 9 | 5.5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OSU OP-03-01** | 6 | 1 | 3 | C | 9 | 4.5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OSU OP-05-01** | 6 | 1 | 3 | C | 9 | 6 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OSU OP-07-01** | 4 | 9 | 9 | F-M | 9 | 5 | 7 | 0 | 0 | 1 | 0 | 0 | 0 |
| **OSU OP-09-01** | 4 | 5 | 5 | F-M | 5 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |

| Entry | Head shape[z] | Segmen-tation[y] | Branch depth[x] | Bead size[w] | Stem color[v] | Head dia. (in) | Firm-ness[u] | Yellow florets[t] | Une-ven beads[t] | Une-ven flo-rets[t] | Ro-set-ting[t] | Leafy heads[t] | Cat's eye[t] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OSU OP-10-01 | 9 | 7 | 9 | F-M | 9 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-11-02-01 | 7 | 1 | 5 | C | 7 | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-11-04-01 | 5 | 1 | 5 | F-M | 9 | 3.75 | 7 | 0 | 0 | 0 | 1 | 0 | 0 |
| OSU OP-11-04-01 | 5 | 1 | 3 | C | 9 | 2.75 | 5 | 0 | 0 | 0 | 0 | 9 | 0 |
| OSU OP-24-01-01 | 4 | 3 | 5 | F-M | 9 | 4.75 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-24-02-01 | 4 | 5 | 7 | M-C (seg.) | 9 | 5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-24-03 | 5 | 3 | 5 | M-C | 5 | 5.5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-24-04-01 | 6 | 1 | 3 | M | 9 | 4.25 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-24-05-01 | 4 | 3 | 7 | M-C | 9 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-24-06-01 | 4 | 7 | 5 | F-M | 5 | 3.75 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (S479/S486)-01 | 6 | 1 | 3 | F-M | 5 | 2.75 | 8 | 0 | 3 | 0 | 3 | 0 | 0 |
| (S479/S486)-01 | 6 | 5 | 3 | F-M | 7 | 3 | 9 | 0 | 3 | 0 | 0 | 0 | 0 |
| (Em. Pride/S475)-01 | 4 | 3 | 5 | M-C | 5 | 3 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| (Em. Pride/S475)-01 | 5 | 1 | 5 | M-C | 7 | 4.5 | 7 | 0 | 3 | 0 | 0 | 1 | 0 |
| (EP/S481)-01-01 | 7 | 5 | 7 | F-M | 5 | 4.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| (EP/S483)-03-01 | 4 | 5 | 5 | M | 5 | 4.75 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (Em. Pride/S475//Em. Pride/S483)-01 | 5 | 5 | 7 | M | 9 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| (Em. Pride/S483//S471)-01 | 4 | 1 | 7 | M-C | 7 | 2.5 | 5 | 0 | 5 | 0 | 0 | 7 | 0 |
| (Em. Pride/S483//S471)-01 | 5 | 1 | 3 | M-C | 5 | 3.75 | 9 | 0 | 0 | 0 | 0 | 5 | 0 |
| (S471/S486)-01-01-01 | 5 | 3 | 5 | M-C | 9 | 4.25 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| S446/OSU OP-03-01 | 6 | 1 | 3 | M-C | 7 | 2.25 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-10/S446 | 6 | 5 | 7 | M | 9 | 4.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| S446/OSU OP-10 | 6 | 3 | 7 | M | 7 | 4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| OSU OP-11-02/S446 | 4 | 1 | 5 | M-C | 5 | 3.75 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |

| Entry | Head shape[z] | Segmen-tation[y] | Branch depth[x] | Bead size[w] | Stem color[v] | Head dia. (in) | Firm-ness[u] | Yellow florets[t] | Une-ven beads[t] | Une-ven flo-rets[t] | Ro-set-ting[t] | Leafy heads[t] | Cat's eye[t] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S454/OSU OP-03-01** | 4 | 7 | 7 | M | 5 | 5.5 | 8 | 0 | 0 | 0 | 0 | 0 | 1 |
| **OSU OP-11-02/S454** | 4 | 3 | 5 | C | 9 | 5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S463/OSU OP-10** | 7 | 7 | 9 | M | 9 | 5.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S463/OSU OP-11-02** | 7 | 1 | 5 | M-C | 5 | 5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S471/OSU OP-10** | 4 | 1 | 9 | M-C | 5 | 4.5 | 9 | 0 | 0 | 0 | 0 | 5 | 0 |
| **S471/S483** | 6 | 3 | 7 | F-M | 9 | 5.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S479/OSU OP-10** | 5 | 5 | 7 | F-M | 9 | 4.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S487/OSU OP-05** | 3 | 1 | 7 | C | 7 | 6.5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S487/OSU OP-10** | 5 | 5 | 7 | F-M | 7 | 5.75 | 8 | 0 | 0 | 0 | 0 | 3 | 0 |
| **(S471/S486)-01-01//S463** | 4 | 1 | 3 | M | 7 | 4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP/S483-04** | 6 | 5 | 5 | F-M | 7 | 5.5 | 7 | 0 | 5 | 0 | 0 | 0 | 0 |
| **OSU OP-09-01** | 3 | 3 | 5 | M | 5 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **S475** | 6 | 1 | 5 | M | 9 | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Cascadia** | 7 | 3 | 7 | M | 7 | 5.5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Emerald Pride** | 4 | 3 | 7 | F-M | 5 | 5 | 8 | 0 | 3 | 5 | 0 | 0 | 0 |
| **Eastern Crown** | 7 | 1 | 3 | F | 5 | 5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Eiffel** | 5 | 3 | 1 | F | 5 | 4.5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Imperial** | 6 | 1 | 5 | F | 5 | 4.5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |

[z]Scale of 1 – 9 Scale of 1 - 9 where 1 is concave, 3 is flat, 5 is slight dome 7 is strong dome and 9 is extreme dome. [y]Scale of 1- 9 (1 least, 9 most) for degree of separation of florets. [x]Scale of 1 - 9 where 9 is greatest branching depth. [w]F = fine, M = medium & C = coarse (may be modified by V = very). [v]Scale of 1 - 9 where 1 is light and 9 is dark green. [u]Scale of 1 - 9 where 1 is soft and 9 is hard head surface. [t]Scale of 0 - 9 where 0 = none observed to 9 with severe symptoms related to head damage on all plants.

**Table 4.** Field performance of broccoli hybrids grown in a yield and quality fall trial at the OSU Vegetable Research Farm in 2025[z].

| Hybrid | No. plants/A | Days to harvest[y] | Total T/A[x] | Gross head wt. (T/A) | No. heads/A | No. immature heads/A | Immature T/A | No. culls/A | Cull T/A | Net heads/A | Net T/A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cascadia | 170,927 | 66 | 3.2 | 2.6 | 12,197 | 2,614 | 0.3 | 0 | 0.0 | 9,583 | 2.4 |
| EPxS483 | 173,824 | 64 | 3.2 | 2.2 | 11,035 | 1,162 | 0.1 | 290 | 0.1 | 9,583 | 2.0 |
| Eiffel | 172,375 | 68 | 5.2 | 4.4 | 16,988 | 2,033 | 0.2 | 145 | 0.0 | 14,810 | 4.1 |
| FBC4614 | 170,927 | 73 | 7.3 | 4.3 | 15,682 | 2,759 | 0.4 | 290 | 0.1 | 12,632 | 3.9 |
| Imperial | 166,581 | 66 | 7.7 | 4.1 | 13,358 | 2,178 | 0.3 | 436 | 0.1 | 10,745 | 3.8 |
| S471x(EP/S481) | 166,581 | 59 | 4.0 | 2.9 | 12,923 | 2,759 | 0.4 | 145 | 0.0 | 10,019 | 2.5 |
| S471x(EP/S483) | 172,375 | 66 | 3.8 | 2.7 | 11,906 | 1,742 | 0.2 | 290 | 0.0 | 9,874 | 2.5 |
| SBC3609 | 169,478 | 68 | 7.4 | 5.7 | 15,827 | 581 | 0.1 | 290 | 0.1 | 14,956 | 5.5 |
| LSD 0.05 | 9,418 | 2 | 1.7 | 1.4 | 3,847 | 1,400 | 0.2 | 516 | 0.1 | 3,972 | 1.5 |

[z]Seeded on 06/09/25 and transplanted on 07/25/25. [y]Days to harvest from transplanting. [x]Total including leaves and heads trimmed to a 6.5 in. length.

**Table 5.** Head characteristics, percent leaves around the head, floret characteristics and overall desirability of broccoli hybrids grown in a fall trial at the OSU Vegetable Research Farm in 2025.

| Hybrid | Head diam-eter (in) | Hollow stem (%)[z] | Leaves around head (%) | Florets (% by wt.)[x] | Small florets (%)[w] | Overall[v] | Notes |
|---|---|---|---|---|---|---|---|
| Cascadia | 4.5 | 52.5 | 19.8 | 54.0 | 93.9 | 6.5 | 1 blind, partial lodging in 3 plots |
| EPxS483 | 4.4 | 40.0 | 27.7 | 52.1 | 91.7 | 4.0 | Aphids, downy mildew & yellow beads |
| Eiffel | 4.9 | 0.0 | 15.2 | 69.4 | 71.8 | 7.0 | |
| FBC4614 | 4.7 | 0.0 | 40.3 | 66.4 | 56.7 | 5.0 | Partial lodging in 2 plots, 1 off type |
| Imperial | 5.1 | 42.5 | 46.8 | 59.0 | 79.9 | 3.0 | 1 early bolter, 1 stunted & 1 blind |
| S471x(EP/S481) | 4.8 | 55.0 | 27.1 | 55.4 | 87.6 | 5.0 | |
| S471x(EP/S483) | 4.6 | 60.0 | 28.4 | 55.8 | 86.8 | 6.3 | 1 stunted & 1 early flowering |
| SBC3609 | 5.2 | 0.2 | 24.0 | 60.4 | 69.8 | 5.3 | |
| LSD 0.05 | 0.9 | 37.4 | 16.0 | 5.8 | 13.1 | 1.3 | |

[z]Percent of stems with cavities after trimming to 6.5 inch length. [y]Percent leaves (weight leaves/total head weight*100) remaining around head after trimming. [x]Percent of head that is composed of florets (floret weight/head weight*100). [w]Percent of florets less than 2.5 inches in size (Usable floret weight/total head weight*100). [v]Scale of 1 - 9 where 1 is least and 9 is best.

**Table 6.** Field observations of broccoli hybrids grown at the OSU Vegetable Research Farm in 2025.

| Hybrid | Head ht. (in)[z] | Canopy Ht. (in)[z] | Head ex-sertion[y] | Head shape[x] | Head seg-mentation[w] | Branch depth[v] | Bead size[u] | Stem color[t] | Head firmness[s] | Plot uni-formity[r] |
|---|---|---|---|---|---|---|---|---|---|---|
| Cascadia | 23 | 26 | 6.5 | 5.3 | 5.5 | 5.5 | 4.5 | 7.0 | 6.8 | 5.3 |
| EPxS483 | 21 | 23 | 6.5 | 4.0 | 4.5 | 5.5 | 5.0 | 7.0 | 4.5 | 2.0 |
| Eiffel | 21 | 27 | 7.3 | 5.0 | 3.8 | 3.3 | 4.0 | 4.5 | 9.0 | 6.8 |
| FBC4614 | 17 | 27 | 5.0 | 5.3 | 3.0 | 3.0 | 5.0 | 3.0 | 9.0 | 2.0 |
| Imperial | 14 | 29 | 3.0 | 5.5 | 2.0 | 3.0 | 4.3 | 4.0 | 7.5 | 6.0 |
| S471x(EP/S481) | 20 | 26 | 7.0 | 4.3 | 4.5 | 5.5 | 4.0 | 5.0 | 7.0 | 1.0 |
| S471x(EP/S483) | 22 | 27 | 6.5 | 4.5 | 3.5 | 5.5 | 4.8 | 6.5 | 6.0 | 4.0 |
| SBC3609 | 15 | 23 | 5.3 | 5.3 | 5.3 | 3.5 | 3.5 | 4.0 | 9.0 | 7.0 |
| LSD 0.05 | 2 | 2 | 0.8 | 1.0 | 1.9 | 1.5 | 1.4 | 1.5 | 1.6 | 1.8 |

[z]Height to the tallest leaves or top of the broccoli head. [y]Scale of 1 - 9 where 1 is very short and 9 is extremely exserted heads. [x]Scale of 1 - 9 where 1 is concave, 3 is flat, 5 is slight dome 7 is strong dome and 9 is extreme dome. [w]Scale of 1- 9 (1 least, 9 most) for degree of separation of florets. [v]Scale of 1 - 9 where 9 is greatest branching depth. [u]Scale of 1 - 9 where 1 is very fine and 9 is very coarse beads. [t]Scale of 1 - 9 where 1 is light and 9 is dark green. [s]Scale of 1 - 9 where 1 is soft and 9 is hard head surface. [r]Scale of 1 - 9 where 1 is least and 9 is most uniform.

**Research/Extension Progress Report for 2025-2026 Funded Projects**
**Progress Report for the Agricultural Research Foundation Oregon Processed Vegetable Commission**

**Title:** Identifying cauliflower cultivars adapted to a changing climate

**Project Leader(s)**: James R. Myers

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**Cooperator(s)**: N/A

**Funding History**: $6,189

Abstract: Historically, with mild temperatures and a long growing season, western Oregon has had a favorable climate for summer production of cauliflower. In recent years, temperatures have been trending warmer and there have been more extreme high and low temperatures as well. Overall, the long-term trends are towards warmer summers with more extremes in weather variables. This presents challenges for cauliflower production, especially in terms of good head quality. The challenge facing processors is finding cultivars with the desired quality along with productivity, that can grow under these changing weather conditions. Processors in Oregon have been experiencing difficulties with producing high quality cauliflower heads and are looking for ways to mitigate this. Heads from certain fields lack the compact and tight curds expected for high quality cauliflower. There are two syndromes that are known in cauliflower that reduce quality. One is "riciness" (riceyness) and the other is "bracting" or fuzzy heads. Riciness is a function of high temperatures followed by low temperatures occurring at the sensitive apex size of 0.35 mm (range 0.2 – 0.5 mm) It is a vernalization response with floral primordial being converted to inflorescences. Plants are within the sensitive apex size range about 10 to 25 d after transplanting. Highest percentages are found where warm temperatures are preceded and followed by periods of cool temperatures. This syndrome is more likely to be observed in early plantings, when a warm spell interrupts the cool spring temperatures. Bracting or fuzziness is a function of plant age (measured by curd diameter) and warm temperatures. The "bracts" are actually tiny leaves, and in its most extreme form, bracting leads to leafy heads. The curd takes on a fuzzy appearance as opposed to the inflorescence development seen with riciness. The critical stage for induction is later than for riciness and just as the plant is transitioning from a vegetative bud to curd formation. Depending on when cauliflower is planted (or transplanted) both syndromes may be present in commercial cauliflower fields. Fifteen hybrids, including Artica as a check were included in the trial. Five planting dates from 18-Apr to 25-July were used to obtain an idea of performance across the season. The first three plantings were direct-seeded, and the latter two were transplanted. Stands were less than optimal in the first three plantings, and planting 3 was eventually abandoned because of poor stands. Data were collected on field performance and curd quality, including color, development and fuzziness and riciness. Over the season, yields and quality generally increased, while fuzziness and riciness generally decreased. Individual hybrids exhibited variation in performance and quality, and subsets of hybrids were identified that had higher yields than Artica, and consistently showed reduced levels of fuzziness and riciness. The only hybrid that appeared to combine most desirable traits was Moonshine, which was earlier, had similar yields, had better head quality and consistently low levels of fuzziness and riciness compared to Artica.

**Key Words**: Variety trial, *Brassica oleracea* var. *botrytis*, curd quality, ricey, fuzzy, processing

## Hypothesis & Objectives:

Our **hypothesis** is that it is possible to identify cauliflower cultivars that are more resistant to producing ricey or fuzzy curds. Cauliflower cultivars bred for summer production will likely be the best candidates. These will need to be screened to identify cultivars with the best combination of quality traits that processors need.

### Objectives:

1. Identify cauliflower cultivars that show stable head development across the growing season.
2. Evaluate cultivars for production and processing traits to identify those best meeting the needs of growers and processors.

## Procedures:

A cauliflower cultivar trial consisting of 15 cultivars with five planting dates across the season was conducted (Table 1). We solicited cauliflower hybrids from seed companies with a particular focus on summer types that have desired head characteristics (tight wrapper leaves, holds white head color, uniform maturity, tight heads that do not become loose, no riciness or bracting). The hybrid ‘Artica’ was included as a check cultivar. The first three plantings were directed-seeded and the last two were transplanted on the dates shown in table 1. Transplants were seeded May 15 and June 15 for late June and late July transplanting, respectively.

**Table 1.** Cauliflower hybrids, their sources and planting dates for a variety trial conducted at the OSU Vegetable Research Farm in 2025. Some cultivars were not received until the third planting date.

| | **Planting date:** | 18-Apr | 1-May | 2-Jun | 25-Jun | 25-Jul |
|---|---|---|---|---|---|---|
| | **Method:** | Seed | Seed | Seed | Transplant | Transplant |
| | | **Planting** | | | | |
| **Entry** | **Company** | **1** | **2** | **3** | **4** | **5** |
| Artica | HM Clause/Check | x | x | x | x | x |
| Alaska | HM Clause | | | x | x | x |
| Alpes | HM Clause | | | x | x | x |
| Aquarius | HM Clause | | | x | x | x |
| Balerma | Bejo | x | x | x | x | x |
| CLX33712 | HM Clause | | | x | x | x |
| Comares | Bejo | x | x | x | x | x |
| Draconis | Syngenta | x | x | x | x | x |
| HMC 33850 | HM Clause | | | x | x | x |
| HMC 33925 | HM Clause | | | x | x | x |
| Lacerta | Syngenta | x | x | x | x | x |
| Moonshine | Enza Zaden | x | x | x | x | x |
| Tessaury | Enza Zaden | x | x | x | x | x |
| XCF3524 | Sakata | x | x | x | x | x |
| XCF9519 | Sakata | x | x | x | x | x |

Preplant triple 16 was banded in row at 250 lb/A. A preplant application of Treflan at 1.5 pints/A was applied to control weeds. On 15-May and 21-Jul, Mustang Maxx at 4 oz/acre was applied to control flea beetles.

Each planting was replicated four times with plots 30 feet in length on a 30 inch between row spacing. Plant spacing within rows was 18 inches, for a total of 20 plants per plot. For direct seeded plantings, the plots were over-seeded (80 seeds/plot) and thinned to stand at V3. Transplanted cauliflower was set at 18 inches within row. Plot maturity was determined by feeling developing heads within wrapper leaves, and plot was judged as mature when one or more curds became visible within the wrapper leaves. Cauliflower hybrids were evaluated in the field for plant stand, blind and stunted plants, plot uniformity, and tightness of wrapper leaves. For plantings 1 – 3, plots were harvested up to four times as heads developed. In the transplanted plantings (plantings 4 and 5), the entire plot was harvested when one or more curds were exposed. Heads were brought to the grading room and trimmed to remove wrapper leaves. A total plot weight was obtained, and the heads were evaluated for overall curd quality. A subset of up to five heads per plot were individually evaluated for curd quality, curd external and internal development, degree of riciness and fuzziness, and external and internal curd quality. Curd quality and development were quantified using a 1 – 9 scale where 9 represented the highest degree of quality and development. Internal development was related to head density, where a 9 represented little air space within the curd. For riciness and fuzziness, a 0 – 9 scale was employed; 0 indicated an absence of the trait and a 9 extreme floral development and differentiation. External and internal color was objectively evaluated using a colorimeter and recorded using the CIE L*a*b* color scale.

## Accomplishments:

We intended to plant the first planting at the beginning of April but were delayed by wet conditions that prevented field preparations until mid-April. We did not achieve a full stand with the direct-seeded plantings despite planting 4X the number of seed for the desired stand. Mean number of plants/plot across plantings is shown in table 2 and fig. 1, with 12 to 13 plants/plot on average in the first two plantings, and only about 6 plants/plot in the third planting. The third planting on 2-Jun was seeded into very dry conditions, with difficulty in maintaining a moist seed bed during germination and emergence. Weed control with herbicides was less than optimal in this planting, and weed competition may have also affected stand. In all plantings, hand weeding was required to supplement herbicide applications. In the direct seeded plantings, germination was uneven, resulting in variability in maturity in addition to reduced stands. The two transplanted plantings had nearly complete stands and showed very uniform maturity across plots. Because of the uneven maturity in the first three plantings, we harvested these up to four times at one-week intervals. Because the transplanted plantings were more uniform in maturity, we harvested these just once when some heads were showing within wrapper leaves. About 70-75% of plants in first two plantings produced harvestable heads, but only 21% in planting 3 had harvestable heads. The third planting was terminated with about half the plots harvested because the low stand and uneven maturity was not providing usable data. Plantings 4 and 5 had 92 and 98% harvestable heads, respectively (table 2, fig. 1).

### Overall performance across planting dates

Head weights averaged two T/A in first two plantings and essentially nothing in the 3$^{rd}$ planting (Table 2, fig. 2). Significantly higher yields of 8 – 12 T/A were achieved in plantings 4 and 5 (table 2, fig. 2). Head uniformity and wrapper leaf tightness were also better in plantings 4 and 5 compared to the direct seeded plantings (Table 2). Curd quality rating increased across planting dates, while the incidence of fuzziness and riciness decreased (fig. 3). Fuzziness was similar across the first 4 plantings, and dropped significantly in the 5th planting, while riciness dropped significantly in both the 4th and 5th plantings. External curd color varied across planting dates, with the first two planting being greener, and the latter three plantings being more yellow or white (Table 3). Internal curd color was more uniform across plantings, but the latter three planting dates were slightly whiter than the first two (Table 3).

### Performance by hybrids across planting dates

Table 4 shows performance of hybrids over planting dates for field parameters. Artica had its highest yield (11.3 T/A) and showed good quality in the 4th planting, but dropped in yield to 4.7 T/A in the 5th planting. Other hybrids that produced high yields in plantings 4 and 5 included Alps, Aquarius, Balerma, CLX33712, Draconis, HMC33925, Lacerta, Moonshine, Tessaury, XCF 3524 and XCF 9519. Highest yielding in the trial was HMC33925 (20.1 T/A) in the fifth planting.

Days to harvest showed an inverted J shape, with longest days to harvest with the first plantings dropping to the fewest days to harvest in the fourth, planting, then extending to an intermediate level in the 5th planting (fig. 4). Artica had a relatively long days to harvest maturity in most plantings, although there were later maturing hybrids in plantings 4 and 5. The earliest maturing hybrids in most plantings were Alaska, Aquarius, Draconis, Lacerta and Moonshine.

The trends apparent for the quality data across plantings are shown in more detail in table 5 and fig. 5. Overall curd quality dramatically improved in plantings 4 and 5 (fig. 5). External and internal curd development was more variable, but generally showed a trend of improving over planting dates (table 5). Individual hybrids varied in their development of fuzzy and/or ricey heads. For example, Aquarius, CLX33712, Comares HMC 33925, Moonshine, Tessaury, XCF3524 and XCF9519 generally had low levels of fuzziness across plantings (table 5, fig. 6). The data are particularly robust for the latter four hybrids, which were represented in all five plantings. Others (Alps, Balerma, and Draconis) showed a stepwise decrease with planting dates. Artica was high across planting dates until the 5th one, but still showed significant fuzziness in the last planting. Riciness was observed less frequently than fuzziness (table 5, fig. 7). Overall levels of riciness were highest in the first two plantings and dropped in the latter three. Most hybrids showed a stepwise drop, but CLX33712, HMC 33850 and XCF9519 were consistently low across plantings (it should be noted that data for CLX33712 only comes from the last two planting dates). It became apparent in this trial that a hybrid could simultaneously have fuzzy and ricey curds.

### Performance of hybrids – means of planting dates

When performance of hybrids across planting dates was compared, four hybrids stand out as having relatively high yields compared to Artica. These include Alpes, Aquarius CLX33712 and HMC 33925 (table 6). The high yields mainly represent excellent performance in plantings 4 and 5, and show the yield potential of these hybrids. Six hybrids stand out with fuzziness scores of less than 1 and include Aquarius, CLX33712, Comares, Moonshine, Tessaury and XCF3524 (table 7). Three hybrids (Lacerta, Moonshine and XCF9519) had riciness scores of less than 1, but only Moonshine was consistently low in both parameters (table 7). In terms of external curd color, hybrids fell into two RHS groups: greyed-yellow (160D) and greyed-green (195C or D) (table 8). Internal curd color was consistently in the RHS group greyed-white, with RHS values either 156C or 156D. The latter is closer to a true white and would be more desirable. Internal and external colors do not seem to be necessarily correlated.

In summary, we identified hybrids that have the potential to produce better curd quality than Artica. Moonshine in particular shows similar yields but relatively low levels of fuzziness and riciness. Moonshine was also relatively early compared to Artica. Some hybrids also show higher yield potential than Artica, but this result needs further refinement because some of the highest yielding hybrids were only planted in the last two plantings. As with all variety trial data, it is important to repeat the trial in different environments. In our case, the different planting dates provided different environments to evaluate performance, but a larger environmental component is likely to be differences in years, and a better understanding of performance could be achieved if a version of this trial was grown next year. If this trial were to be repeated, it should focus on the early planting dates, when curd quality issues are more likely to occur.

## Relation to Other Research: N/A

**Table 2.** Days to first harvest, plant populations, yield and yield components, and quality traits for a cauliflower variety trial planted five times over the growing season at the OSU Vegetable Research Farm in 2025.

| Planting | 1st harvest days | No. Plants/plot | No. blind/stunted plants/plot | No. heads harvested | Mean head wt. (lb/plot) | Mean head wt. (T/A) | Plot uniformity[z] | Wrapper Leaf Tightness[z] |
|---|---|---|---|---|---|---|---|---|
| 1 | 103 | 13.4 | 1.4 | 10.1 | 8.2 | 2.4 | 4.4 | 4.6 |
| 2 | 98 | 12.0 | 1.7 | 8.3 | 6.4 | 1.9 | 4.3 | 5.4 |
| 3 | 103 | 6.4 | 1.2 | 1.4 | 0.2 | 0.0 | 3.2 | 7.0 |
| 4 | 83 | 19.3 | 1.6 | 17.8 | 29.9 | 8.7 | 5.6 | 7.2 |
| 5 | 96 | 19.6 | 1.9 | 19.3 | 41.2 | 12.0 | 6.1 | 7.2 |
| RMSE[y] | 5.1 | 2.6 | 0.89 | 2.6 | 11.8 | | 1.6 | 1.5 |
| CV[x] | 5.5 | 18.1 | 62.0 | 18.5 | 51.9 | | 30.5 | 23.7 |
| $R^{2}$ [w] | 0.80 | 0.83 | 0.52 | 0.84 | 0.73 | | 0.41 | 0.44 |

[z]Scale of 1 – 9 where 9 = highest uniformity or tightest wrapper leaves. [y]Root mean square error from the analysis of variance. [x]Coefficient of variation: ratio of the standard deviation to the mean. [w]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 3.** External and internal color of cauliflower curds averaged across hybrids for five planting dates of a variety trial grown at the OSU Vegetable Research farm in 2025. CIE L*a*b* and Royal Horticultural Society (RHS) color values are shown, and the equivalent RBG colors are shown for each planting date.

| | External curd color | | | | | Internal curd color | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Planting | L* | a* | b* | RHS Group | RHS Value | L* | a* | b* | RHS Group | RHS Value |
| **1** | 78.4 | -0.2 | 18.1 | Greyed-Green Group | 195C | 82 | -1.5 | 6.7 | Greyed-White Group | 156C |
| **2** | 77.9 | -0.4 | 17.8 | Greyed-Green Group | 195C | 83 | -1 | 5.3 | Greyed-White Group | 156C |
| **3** | 80.8 | 0.03 | 18.6 | Greyed-Yellow Group | 160D | 87 | -0.8 | 10 | Greyed-White Group | 156D |
| **4** | 86.2 | -0.7 | 17.4 | Green-White Group | 157A | 85 | -0.2 | 8.8 | Greyed-White Group | 156D |
| **5** | 86.9 | -1.1 | 19.6 | Greyed-Yellow Group | 160D | 85 | -0.2 | 8.1 | Greyed-White Group | 156D |
| RMSE[z] | 3.2 | 0.9 | 3.5 | | | 2.7 | 0.75 | 2.3 | | |
| CV[y] | 3.9 | -137.3 | 19.1 | | | 3.2 | -126.1 | 31.1 | | |
| $R^{2}$ [x] | 0.64 | 0.20 | 0.19 | | | 0.32 | 0.42 | 0.32 | | |

[z]Root mean square error from the analysis of variance. [y]Coefficient of variation: ratio of the standard deviation to the mean. [x]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 4.** Plant populations, yield and yield components, and quality traits for each hybrid on each planting date for a cauliflower variety trial planted five times over the growing season at the OSU Vegetable Research Farm in 2025.

| Entry | Plant -ing | No. plants /plot | No. heads harvest- ed | Mean head wt. (lb/plot) | Mean head wt. (T/A) | Plot uniform -ity[z] | Wrapper Leaf Tightness[z] | No. blind/stunted plants/plot |
|---|---|---|---|---|---|---|---|---|
| Artica | 1 | 15 | 11.3 | 4.4 | 1.3 | 5.0 | 5.5 | 0.5 |
| Artica | 2 | 14 | 8.8 | 5.3 | 1.5 | 4.0 | 5.0 | 0.8 |
| Artica | 3 | 9 | 2.6 | 2.0 | 0.6 | 2.9 | 5.9 | 0.3 |
| Artica | 4 | 20 | 18.0 | 39.0 | 11.3 | 4.5 | 7.0 | 0.5 |
| Artica | 5 | 19 | 19.0 | 16.3 | 4.7 | 3.5 | 9.0 | |
| Alaska[y] | 1 | | | | | | | |
| Alaska[y] | 2 | | | | | | | |
| Alaska | 3 | 10 | 1.8 | 0.5 | 0.1 | 3.2 | 3.2 | 0.8 |
| Alaska | 4 | 20 | 17.8 | 24.5 | 7.1 | 4.0 | 6.0 | |
| Alaska | 5 | 17 | 16.8 | 16.3 | 4.7 | 1.0 | 8.9 | |
| Alpes[y] | 1 | | | | | | | |
| Alpes[y] | 2 | | | | | | | |
| Alpes[x] | 3 | 1 | | | | | | |
| Alpes | 4 | 20 | 17.0 | 19.2 | 5.6 | 2.0 | 6.3 | 1.0 |
| Alpes | 5 | 19 | 19.0 | 67.0 | 19.5 | 7.0 | 6.0 | |
| Aquarius[y] | 1 | | | | | | | |
| Aquarius[y] | 2 | | | | | | | |
| Aquarius | 3 | 1 | 0.4 | 0.0 | 0.0 | 2.6 | | |
| Aquarius | 4 | 20 | 18.3 | 39.1 | 11.4 | 7.0 | 5.5 | 1.0 |
| Aquarius | 5 | 20 | 19.8 | 51.2 | 14.9 | 5.0 | 5.5 | |
| Balerma | 1 | 14 | 8.5 | 3.8 | 1.1 | 5.5 | 6.5 | |
| Balerma | 2 | 11 | 6.5 | 2.4 | 0.7 | 4.5 | 7.0 | |
| Balerma | 3 | 7 | | | | | | 1.0 |
| Balerma | 4 | 20 | 19.5 | 35.4 | 10.3 | 6.5 | 6.5 | 0.5 |
| Balerma | 5 | 20 | 19.8 | 46.4 | 13.5 | 7.0 | 8.5 | |
| CLX33712[y] | 1 | | | | | | | |
| CLX33712[y] | 2 | | | | | | | |
| CLX33712[x] | 3 | 3 | | | | | | |
| CLX33712 | 4 | 20 | 18.8 | 35.6 | 10.3 | 7.0 | 8.0 | 0.3 |
| CLX33712 | 5 | 20 | 19.5 | 61.2 | 17.8 | 7.2 | 3.5 | 0.5 |
| Comares | 1 | 15 | 11.8 | 5.0 | 1.4 | 4.0 | 6.5 | 0.5 |
| Comares | 2 | 11 | 5.9 | 2.2 | 0.6 | 4.3 | 6.0 | 1.3 |
| Comares[x] | 3 | 8 | | | | | | |
| Comares | 4 | 20 | 16.5 | 13.4 | 3.9 | 3.5 | 7.8 | |
| Comares | 5 | 19 | 18.5 | 27.0 | 7.8 | 6.5 | 8.0 | 0.5 |
| Draconis | 1 | 13 | 10.8 | 6.7 | 1.9 | 3.0 | 4.0 | |
| Draconis | 2 | 15 | 10.3 | 6.7 | 1.9 | 3.5 | 4.8 | 0.3 |
| Draconis[x] | 3 | 9 | | | | | | 0.8 |
| Draconis | 4 | 16 | 15.5 | 27.5 | 8.0 | 7.0 | 8.5 | 0.3 |
| Draconis | 5 | 20 | 18.5 | 33.2 | 9.6 | 5.8 | 7.8 | 0.8 |

| Entry | Plant -ing | No. plants /plot | No. heads harvest-ed | Mean head wt. (lb/plot) | Mean head wt. (T/A) | Plot uniform -ity[z] | Wrapper Leaf Tightness[z] | No. blind/stunted plants/plot |
|---|---|---|---|---|---|---|---|---|
| HMC 33850[y] | 1 | | | | | | | |
| HMC 33850[y] | 2 | | | | | | | |
| HMC 33850[x] | 3 | 6 | | | | | | |
| HMC 33850 | 4 | 20 | 18.0 | 25.6 | 7.4 | 4.5 | 9.0 | 0.3 |
| HMC 33850 | 5 | 19 | 17.8 | 21.6 | 6.3 | 6.5 | 9.0 | 0.8 |
| HMC 33925[y] | 1 | | | | | | | |
| HMC 33925[y] | 2 | | | | | | | |
| HMC 33925 | 3 | 6 | 0.8 | 1.2 | 0.3 | 5.2 | 9.2 | |
| HMC 33925 | 4 | 20 | 18.5 | 30.8 | 8.9 | 6.5 | 9.0 | 0.3 |
| HMC 33925 | 5 | 20 | 20.0 | 69.2 | 20.1 | 7.0 | 4.5 | |
| Lacerta | 1 | 16 | 12.5 | 8.6 | 2.5 | 5.5 | 4.5 | |
| Lacerta | 2 | 15 | 12.5 | 6.5 | 1.9 | 5.5 | 6.3 | 0.8 |
| Lacerta | 3 | 10 | 2.1 | 2.0 | 0.6 | 2.9 | 6.9 | 0.3 |
| Lacerta | 4 | 13 | 12.8 | 34.9 | 10.1 | 5.7 | 5.2 | |
| Lacerta | 5 | 20 | 19.3 | 30.3 | 8.8 | 6.5 | 7.5 | 1.0 |
| Moonshine | 1 | 13 | 8.0 | 6.1 | 1.8 | 4.5 | 4.5 | 0.3 |
| Moonshine | 2 | 14 | 10.3 | 5.4 | 1.6 | 4.0 | 6.0 | 0.3 |
| Moonshine[x] | 3 | 6 | | | | | | 0.3 |
| Moonshine | 4 | 20 | 19.3 | 38.9 | 11.3 | 7.0 | 5.5 | |
| Moonshine | 5 | 20 | 20.0 | 25.4 | 7.4 | 6.0 | 8.0 | |
| Tessaury | 1 | 15 | 11.3 | 7.3 | 2.1 | 4.0 | 5.0 | 0.5 |
| Tessaury | 2 | 11 | 7.8 | 4.4 | 1.3 | 5.5 | 5.5 | 0.3 |
| Tessaury | 3 | 10 | 1.6 | 0.7 | 0.2 | 3.9 | 6.9 | 0.5 |
| Tessaury | 4 | 19 | 18.4 | 29.4 | 8.5 | 6.1 | 7.0 | 0.3 |
| Tessaury | 5 | 20 | 20.0 | 51.8 | 15.0 | 6.5 | 7.5 | |
| XCF3524 | 1 | 11 | 8.5 | 5.7 | 1.7 | 4.0 | 5.5 | |
| XCF3524 | 2 | 10 | 5.8 | 2.1 | 0.6 | 4.0 | 6.0 | 0.3 |
| XCF3524[x] | 3 | 4 | | | | | | 0.5 |
| XCF3524 | 4 | 20 | 19.3 | 28.0 | 8.1 | 6.0 | 8.5 | |
| XCF3524 | 5 | 20 | 20.0 | 52.6 | 15.3 | 6.5 | 8.3 | |
| XCF9519 | 1 | 12 | 8.5 | 4.4 | 1.3 | 5.0 | 3.0 | 0.3 |
| XCF9519 | 2 | 10 | 6.8 | 2.5 | 0.7 | 5.0 | 6.0 | 1.0 |
| XCF9519 | 3 | 5 | 1.8 | 1.1 | 0.3 | 3.2 | 7.2 | 0.5 |
| XCF9519 | 4 | 17 | 16.7 | 31.0 | 9.0 | 7.0 | 6.4 | 0.5 |
| XCF9519 | 5 | 20 | 20.0 | 36.1 | 10.5 | 6.8 | 7.5 | |
| RMSE[w] | | 2.1 | 2.5 | 9.1 | | 1.4 | 1.3 | 1.4 |
| CV[v] | | 14.7 | 17.3 | 40.2 | | 27.6 | 19.4 | 98.3 |
| $R^2$ [u] | | 0.91 | 0.89 | 0.88 | | 0.62 | 0.71 | 0.70 |

[z]Scale of 1 – 9 where 9 = highest uniformity or tightest wrapper leaves. [y]Hybrid not received in time for plantings 1 and 2. [x]Plant stands in planting 3 were very poor and development was slow, so hybrid was not harvested. . [w]Root mean square error from the analysis of variance. [v]Coefficient of variation: ratio of the standard deviation to the mean. [u]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 5.** Internal and external curd development, overall quality and fuzziness and riciness for cauliflower hybrids grown in a variety trial with five planting dates at the OSU Vegetable Research farm in 2025. For development and quality parameters, a scale of 1 – 9 was used where 9 = best quality or development. For fuzziness and riciness, a 0 – 9 scale was employed where 0 = none observed and 9 = severe floret development.

| Entry | Planting | Internal curd development | External curd development | Curd Quality | Fuzziness | Riciness |
|---|---|---|---|---|---|---|
| Artica | 1 | 6.1 | 7.0 | 2.2 | 7.1 | 2.2 |
| Artica | 2 | 7.4 | 7.7 | 4.0 | 7.2 | 1.6 |
| Artica | 3 | 8.0 | 6.9 | 4.8 | 6.1 | 0.9 |
| Artica | 4 | 6.1 | 7.3 | 3.7 | 8.3 | 1.2 |
| Artica | 5 | 8.1 | 8.7 | 9.0 | 2.7 | 0.0 |
| Alaska | 3 | 8.5 | 5.9 | 0.0 | 8.9 | 1.7 |
| Alaska | 4 | 6.5 | 7.8 | 4.4 | 7.2 | 0.4 |
| Alaska | 5 | 8.0 | 7.9 | 7.0 | 4.7 | 0.1 |
| Alpes | 4 | 7.3 | 7.5 | 6.1 | 6.0 | 0.4 |
| Alpes | 5 | 6.3 | 6.8 | 7.0 | 0.0 | 0.7 |
| Aquarius | 3 | 6.9 | 7.2 | 3.9 | 0.0 | 2.1 |
| Aquarius | 4 | 5.2 | 8.0 | 7.9 | 0.2 | 0.3 |
| Aquarius | 5 | 6.3 | 7.2 | 7.9 | 0.0 | 1.5 |
| Balerma | 1 | 6.4 | 7.3 | 3.7 | 6.2 | 4.3 |
| Balerma | 2 | 7.3 | 6.9 | 4.7 | 4.7 | 3.2 |
| Balerma | 4 | 6.3 | 8.6 | 5.0 | 5.9 | 0.0 |
| Balerma | 5 | 6.6 | 8.0 | 8.4 | 0.0 | 0.1 |
| CLX33712 | 4 | 9.0 | 8.5 | 8.9 | 0.9 | 0.0 |
| CLX33712 | 5 | 8.2 | 7.4 | 7.2 | 0.0 | 0.4 |
| Comares | 1 | 7.5 | 7.6 | 5.7 | 1.5 | 3.4 |
| Comares | 2 | 7.9 | 6.1 | 5.0 | 2.0 | 3.8 |
| Comares | 4 | 8.2 | 8.6 | 8.5 | 0.4 | 0.2 |
| Comares | 5 | 8.2 | 8.7 | 8.9 | 0.0 | 0.0 |
| Draconis | 1 | 6.4 | 5.0 | 3.5 | 2.0 | 4.8 |
| Draconis | 2 | 6.9 | 6.8 | 4.7 | 3.3 | 4.0 |
| Draconis | 4 | 4.2 | 7.7 | 4.6 | 4.0 | 1.9 |
| Draconis | 5 | 5.9 | 8.0 | 8.3 | 0.0 | 0.0 |
| HMC 33850 | 4 | 7.6 | 8.2 | 7.1 | 4.9 | 0.0 |
| HMC 33850 | 5 | 8.8 | 8.9 | 9.0 | 0.0 | 0.0 |
| HMC 33925 | 3 | 9.5 | 9.9 | 7.0 | 0.9 | 1.2 |
| HMC 33925 | 4 | 8.2 | 8.7 | 8.1 | 1.5 | 0.1 |
| HMC 33925 | 5 | 8.3 | 7.3 | 7.6 | 0.0 | 0.3 |
| Lacerta | 1 | 6.4 | 6.1 | 5.5 | 2.7 | 1.3 |
| Lacerta | 2 | 7.0 | 7.3 | 6.1 | 3.5 | 1.1 |
| Lacerta | 3 | 6.8 | 8.4 | 8.0 | 0.9 | 0.3 |
| Lacerta | 4 | 5.1 | 7.7 | 6.4 | 2.5 | 0.0 |
| Lacerta | 5 | 5.7 | 7.6 | 8.2 | 0.2 | 0.2 |
| Moonshine | 1 | 6.4 | 7.4 | 8.1 | 0.9 | 0.3 |
| Moonshine | 2 | 6.6 | 7.0 | 6.6 | 1.0 | 2.0 |

| Entry | Planting | Internal curd development | External curd development | Curd Quality | Fuzziness | Riciness |
|---|---|---|---|---|---|---|
| Moonshine | 4 | 5.5 | 8.2 | 8.5 | 0.2 | 0.2 |
| Moonshine | 5 | 6.4 | 8.1 | 8.4 | 0.1 | 0.0 |
| Tessaury | 1 | 7.1 | 5.8 | 4.4 | 0.0 | 3.6 |
| Tessaury | 2 | 8.0 | 7.4 | 4.8 | 0.0 | 4.6 |
| Tessaury | 3 | 7.5 | 5.4 | 4.6 | 0.0 | 3.6 |
| Tessaury | 4 | 7.1 | 8.6 | 8.6 | 0.0 | 0.2 |
| Tessaury | 5 | 8.3 | 7.7 | 7.9 | 0.1 | 0.1 |
| XCF3524 | 1 | 6.7 | 6.0 | 5.0 | 0.2 | 2.9 |
| XCF3524 | 2 | 6.3 | 6.2 | 6.6 | 0.5 | 0.8 |
| XCF3524 | 4 | 4.9 | 8.0 | 8.5 | 0.1 | 0.2 |
| XCF3524 | 5 | 6.9 | 7.5 | 8.2 | 0.0 | 0.2 |
| XCF9519 | 1 | 6.5 | 6.9 | 7.4 | 1.3 | 0.2 |
| XCF9519 | 2 | 5.6 | 7.4 | 6.7 | 1.7 | 0.2 |
| XCF9519 | 3 | 6.5 | 7.9 | 6.0 | 0.9 | 0.7 |
| XCF9519 | 4 | 4.3 | 8.2 | 7.8 | 1.5 | 0.1 |
| XCF9519 | 5 | 6.2 | 8.0 | 8.6 | 0.0 | 0.2 |
| RMSE[z] | | 1.4 | 1.4 | 1.7 | 1.3 | 1.6 |
| CV[y] | | 20.0 | 18.7 | 25.9 | 66.0 | 142.7 |
| $R^{2}$ [x] | | 0.49 | 0.29 | 0.56 | 0.80 | 0.49 |

[z]Root mean square error from the analysis of variance. [y]Coefficient of variation: ratio of the standard deviation to the mean. [x]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 6.** Plant populations, yield and yield components, and quality traits for each hybrid on each planting date for a cauliflower variety trial planted five times over the growing season at the OSU Vegetable Research Farm in 2025.

| Entry | No. plants/plot | No. blind/stunted plants/plot | No. heads harvested | Mean head wt. (lb/plot) | Mean head wt. (T/A) | Plot uniformity[z] | Wrapper Leaf tightness[z] |
|---|---|---|---|---|---|---|---|
| Artica | 15.3 | 1.3 | 11.8 | 12.5 | 3.6 | 3.9 | 6.7 |
| Alaska | 15.8 | 2.2 | 10.9 | 8.9 | 2.6 | 2.8 | 5.3 |
| Alpes | 12.8 | 1.0 | 10.8 | 24.7 | 7.2 | 3.4 | 5.2 |
| Aquarius | 13.0 | 1.5 | 11.7 | 25.7 | 7.5 | 4.8 | 4.6 |
| Balerma | 14.2 | 1.7 | 11.1 | 17.7 | 5.1 | 5.5 | 7.3 |
| CLX33712 | 13.3 | 1.0 | 12.0 | 30.0 | 8.7 | 6.0 | 4.9 |
| Comares | 14.3 | 1.5 | 10.8 | 7.3 | 2.1 | 4.2 | 7.2 |
| Draconis | 14.4 | 1.4 | 11.3 | 14.3 | 4.1 | 4.4 | 6.4 |
| HMC 33850 | 14.0 | 2.5 | 10.7 | 5.2 | 1.5 | 4.4 | 8.1 |
| HMC 33925 | 14.5 | 1.9 | 11.9 | 30.6 | 8.9 | 5.7 | 6.0 |
| Lacerta | 15.5 | 2.4 | 12.5 | 15.1 | 4.4 | 5.4 | 6.4 |
| Moonshine | 14.4 | 0.9 | 11.9 | 14.7 | 4.3 | 5.0 | 6.2 |
| Tessaury | 14.8 | 1.3 | 11.8 | 18.7 | 5.4 | 5.2 | 6.5 |
| XCF3524 | 13.0 | 1.3 | 10.9 | 17.8 | 5.2 | 4.8 | 7.2 |
| XCF9519 | 12.8 | 1.6 | 10.7 | 14.4 | 4.2 | 5.4 | 6.0 |
| RMSE[y] | 2.6 | 0.89 | 2.6 | 11.8 | | 1.6 | 1.5 |
| CV[x] | 18.1 | 62.0 | 18.5 | 51.9 | | 30.5 | 23.7 |
| $R^2$[w] | 0.83 | 0.52 | 0.84 | 0.73 | | 0.41 | 0.44 |

[z]Scale of 1 – 9 where 9 = highest uniformity or tightest wrapper leaves. . [y]Root mean square error from the analysis of variance. [x]Coefficient of variation: ratio of the standard deviation to the mean. [w]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 7.** Internal and external curd development, overall quality and fuzziness and riciness for cauliflower hybrids grown in a variety trial at the OSU Vegetable Research farm in 2025. Each value is the mean of five planting dates. For development and quality parameters, a scale of 1 – 9 was used where 9 = best quality or development. For fuzziness and riciness, a 0 – 9 scale was employed where 0 = none observed and 9 = severe floret development.

| Entry | Internal curd development | External curd development | Fuzziness | Riciness | Curd Quality |
|---|---|---|---|---|---|
| Artica | 7.0 | 7.6 | 6.3 | 1.3 | 4.5 |
| Alaska | 7.4 | 7.1 | 6.5 | 1.5 | 3.8 |
| Alpes | 7.2 | 6.5 | 3.5 | 1.7 | 5.2 |
| Aquarius | 6.1 | 7.0 | 0.5 | 2.0 | 6.5 |
| Balerma | 6.8 | 7.7 | 4.1 | 1.9 | 5.3 |
| CLX33712 | 9.0 | 7.3 | 0.9 | 1.3 | 6.7 |
| Comares | 8.2 | 7.9 | 0.8 | 1.8 | 7.0 |
| Draconis | 6.0 | 6.9 | 2.2 | 2.7 | 5.1 |
| HMC 33850 | 8.6 | 7.9 | 2.9 | 1.1 | 6.7 |
| HMC 33925 | 8.7 | 7.4 | 1.2 | 1.3 | 6.6 |
| Lacerta | 6.3 | 7.3 | 2.1 | 0.6 | 6.6 |
| Moonshine | 6.4 | 7.7 | 0.4 | 0.7 | 7.7 |
| Tessaury | 7.7 | 7.3 | 0.0 | 2.3 | 6.1 |
| XCF3524 | 6.3 | 6.9 | 0.1 | 1.0 | 6.9 |
| XCF9519 | 5.8 | 7.6 | 1.1 | 0.2 | 7.5 |
| RMSE[z] | 1.4 | 1.5 | 1.6 | 1.7 | 1.9 |
| CV[y] | 21.0 | 19.4 | 82.0 | 155.0 | 28.9 |
| $R^2$ [x] | 0.34 | 0.21 | 0.68 | 0.38 | 0.43 |

[z]Root mean square error from the analysis of variance. [y]Coefficient of variation: ratio of the standard deviation to the mean. [x]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1 would indicate that the model accounts for all the variation in the trial.

**Table 8.** External and internal color of cauliflower curds from 15 hybrids in a variety trial grown at the OSU Vegetable Research farm in 2025. CIE L*a*b* and Royal Horticultural Society (RHS) color values are shown, and the equivalent RBG colors are shown for each hybrid.

| | External curd color | | | | | Internal curd color | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Entry | L* | a* | b* | RHS Group | RHS Value | L* | a* | b* | RHS Group | RHS Value |
| Artica | 82 | -0.4 | 19 | Greyed-Yellow Group | 160D | 84 | -0.8 | 7.7 | Greyed-White Group | 156C |
| Alaska | 83 | -0.3 | 18 | Greyed-Yellow Group | 160D | 84 | -1.3 | 8.2 | Greyed-White Group | 156C |
| Alpes | 82 | -0.6 | 20 | Greyed-Yellow Group | 160D | 86 | -0.9 | 8.6 | Greyed-White Group | 156D |
| Aquarius | 82 | -1.0 | 20 | Greyed-Yellow Group | 160D | 84 | -0.9 | 8.0 | Greyed-White Group | 156D |
| Balerma | 82 | -0.5 | 17 | Greyed-Green Group | 195D | 84 | -0.4 | 6.8 | Greyed-White Group | 156D |
| CLX33712 | 82 | -0.4 | 18 | Greyed-Yellow Group | 160D | 85 | -0.5 | 8.6 | Greyed-White Group | 156D |
| Comares | 83 | -0.1 | 16 | Greyed-Green Group | 195D | 84 | -0.4 | 6.9 | Greyed-White Group | 156C |
| Draconis | 80 | -0.3 | 18 | Greyed-Green Group | 195C | 84 | -0.9 | 7.6 | Greyed-White Group | 156C |
| HMC 33850 | 83 | -0.2 | 19 | Greyed-Yellow Group | 160D | 86 | -0.5 | 7.8 | Greyed-White Group | 156D |
| HMC 33925 | 83 | -0.4 | 21 | Greyed-Yellow Group | 160D | 87 | -0.4 | 7.7 | Greyed-White Group | 156D |
| Lacerta | 82 | -0.4 | 19 | Greyed-Yellow Group | 160D | 85 | -0.8 | 7.7 | Greyed-White Group | 156D |
| Moonshine | 81 | -0.4 | 18 | Greyed-Green Group | 195C | 84 | -0.6 | 6.9 | Greyed-White Group | 156C |
| Tessaury | 83 | -0.4 | 16 | Greyed-Green Group | 195D | 84 | -1.1 | 8.6 | Greyed-White Group | 156C |
| XCF3524 | 82 | -0.5 | 17 | Greyed-Green Group | 195D | 83 | -0.7 | 8.1 | Greyed-White Group | 156C |
| XCF9519 | 81 | -0.9 | 19 | Greyed-Yellow Group | 160D | 83 | -1 | 8 | Greyed-White Group | 156C |
| RMSE[z] | 3.2 | 0.9 | 3.3 | | | 2.6 | 0.73 | 2.2 | | |
| CV[y] | 3.8 | -133.2 | 18.4 | | | 3.1 | -122.3 | 29.2 | | |
| $R^2$ [x] | 0.67 | 0.28 | 0.27 | | | 0.40 | 0.47 | 0.43 | | |

[z]Root mean square error from the analysis of variance. [y]Coefficient of variation: ratio of the standard deviation to the mean. [x]Regression coefficient; varies from 0 to 1 and an $R^2$ of 1.0 would indicate that the model accounts for all the variation in the trial.

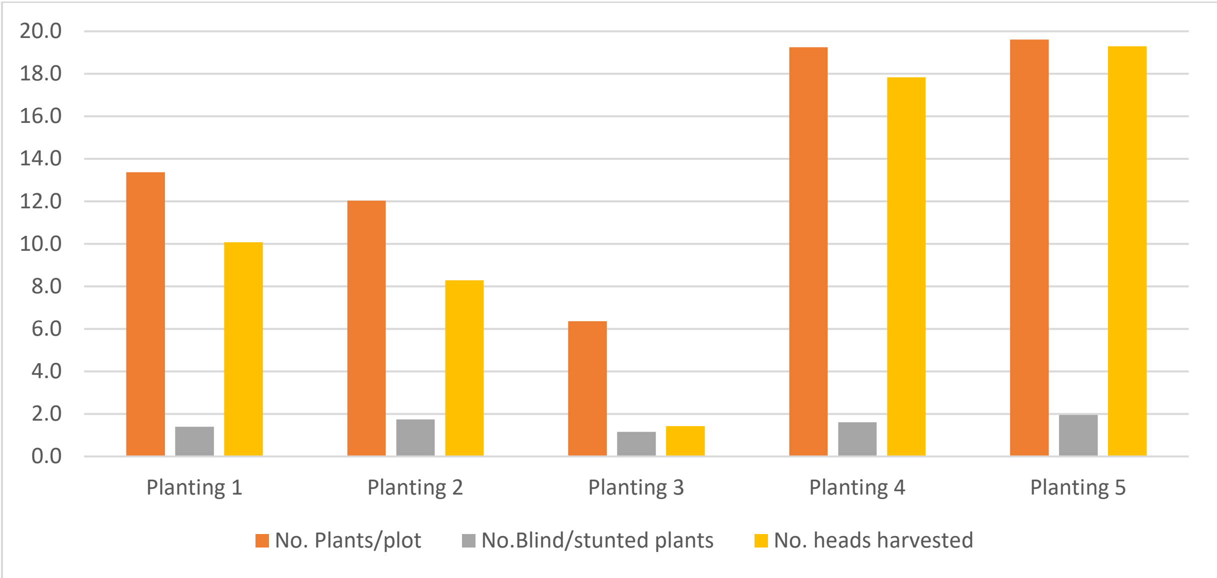


**Figure 1.** Plant populations, number of blind or stunted plants and number of heads harvested per plot for a cauliflower variety trial grown at five planting dates at the OSU Vegetable Research Farm in 2025.

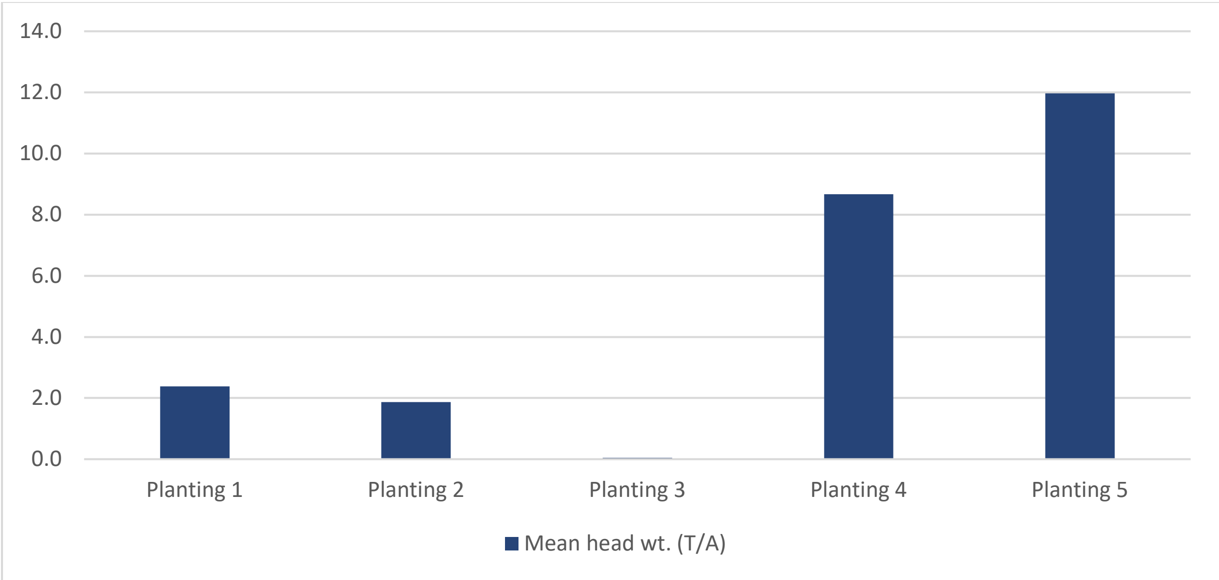


**Figure 2.** Mean T/A head weight for a cauliflower variety trial grown at five planting dates at the OSU Vegetable Research Farm in 2025.

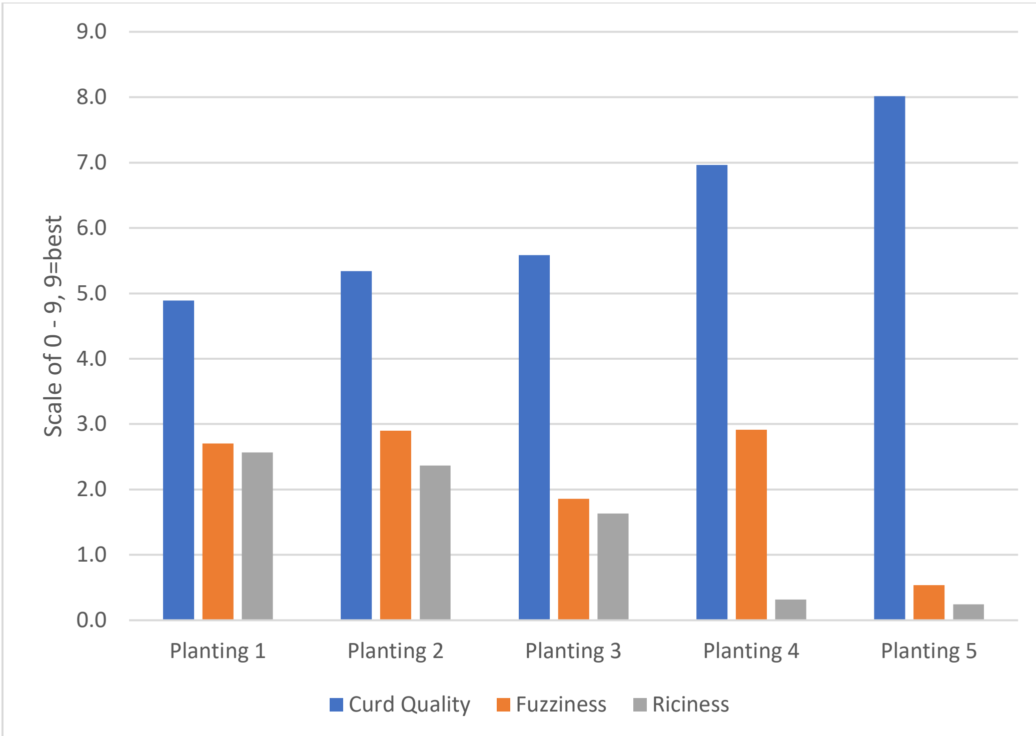


**Figure 3.** Curd quality, fuzziness and ricey curds over planting dates for a cauliflower variety trial grown at the OSU Vegetable Research farm in 2025.

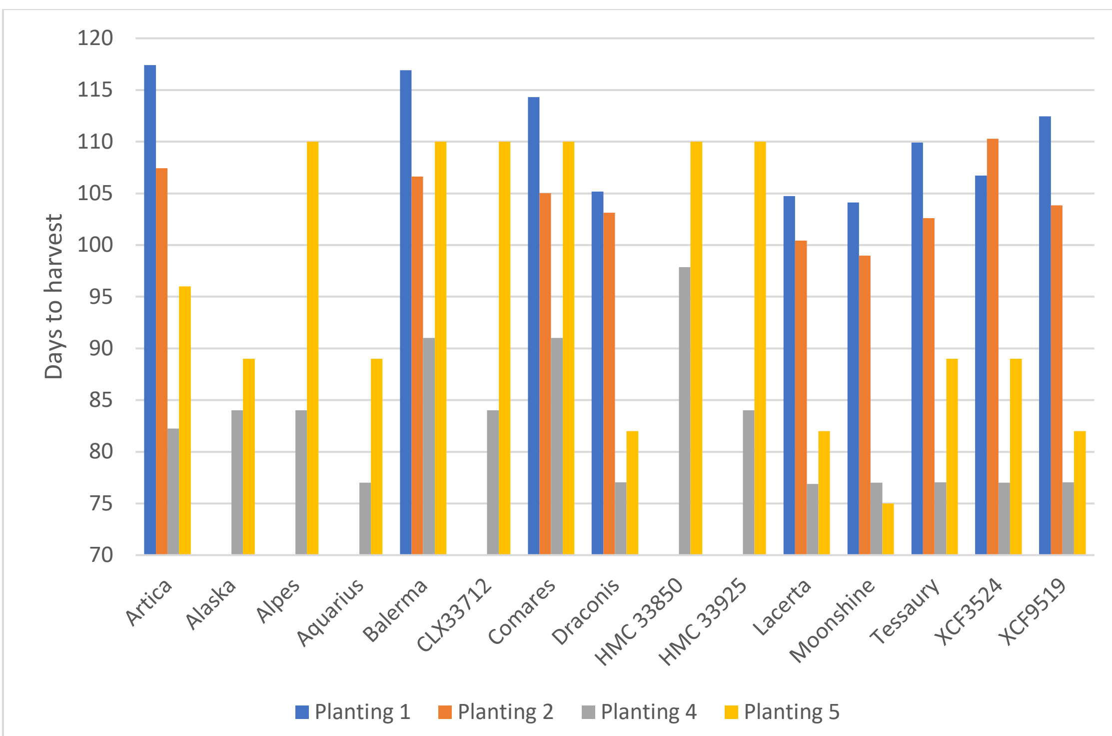


**Figure 4.** Days to harvest for each cauliflower hybrid at each planting date from a variety trial grown at the OSU Vegetable Research farm in 2025.

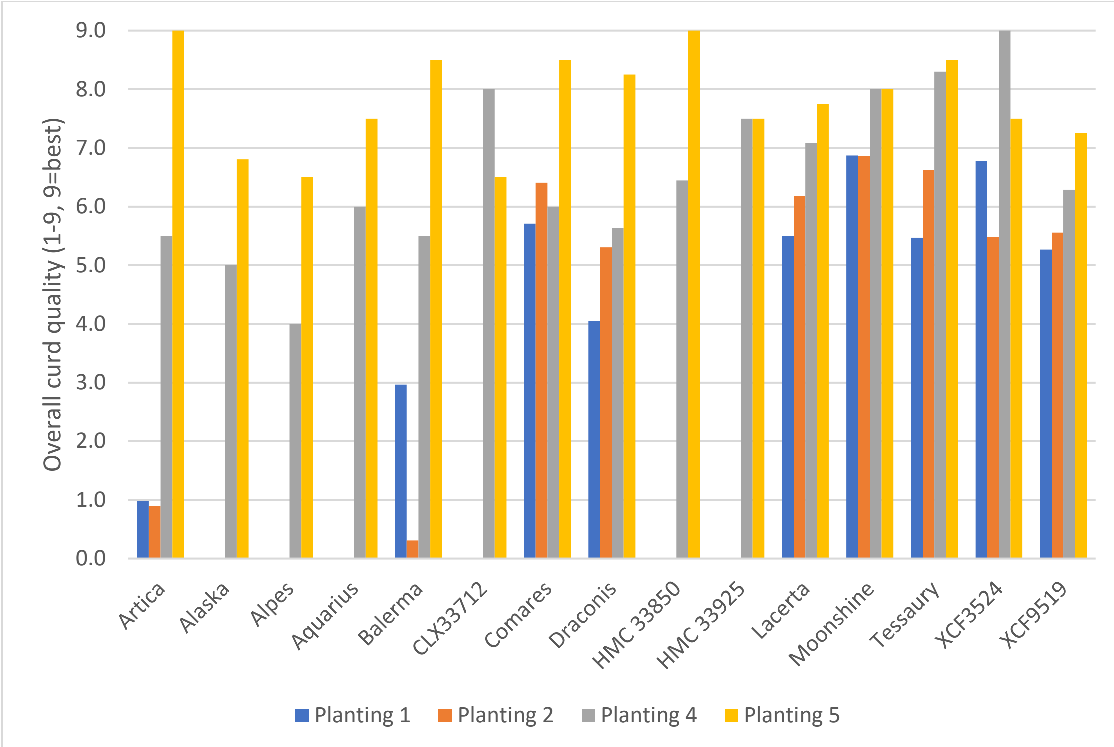


**Figure 5.** Overall curd quality after harvest and trimming for each cauliflower hybrid at each planting date from a variety trial grown at the OSU Vegetable Research farm in 2025.

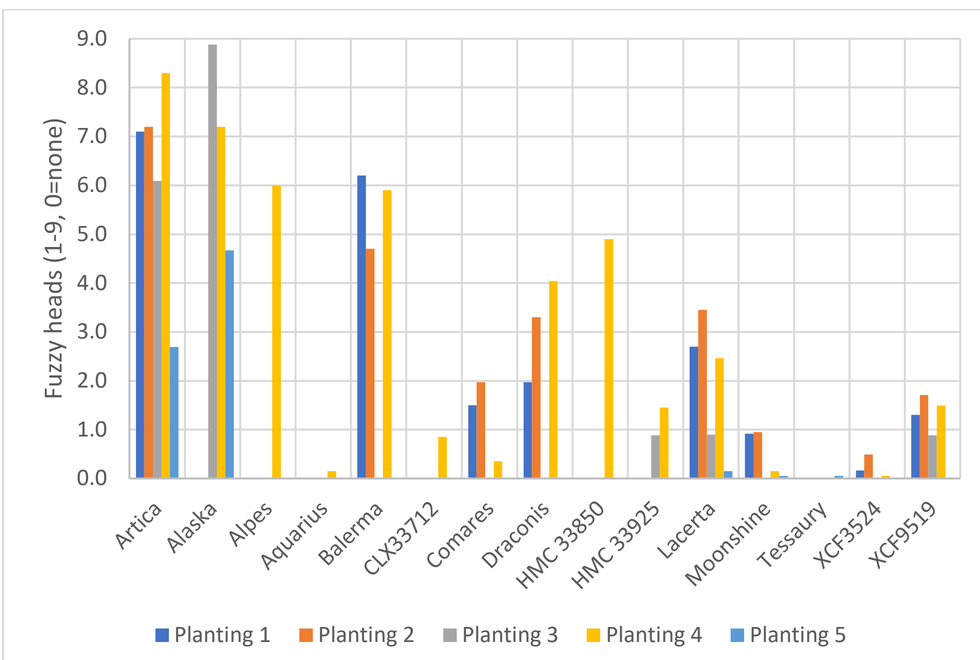


**Figure 6.** Fuzzy head rating for 15 cauliflower hybrids rated across five plantings in a variety trial grown at the OSU Vegetable Research Farm in 2025. Scale of 0 – 9 where 0 = no fuzziness, 1 = just visible, 3 = slight fuzziness, 5 = moderate fuzziness, 7 = severe fuzziness, and 9 = severe fuzziness with enlarged bracts.

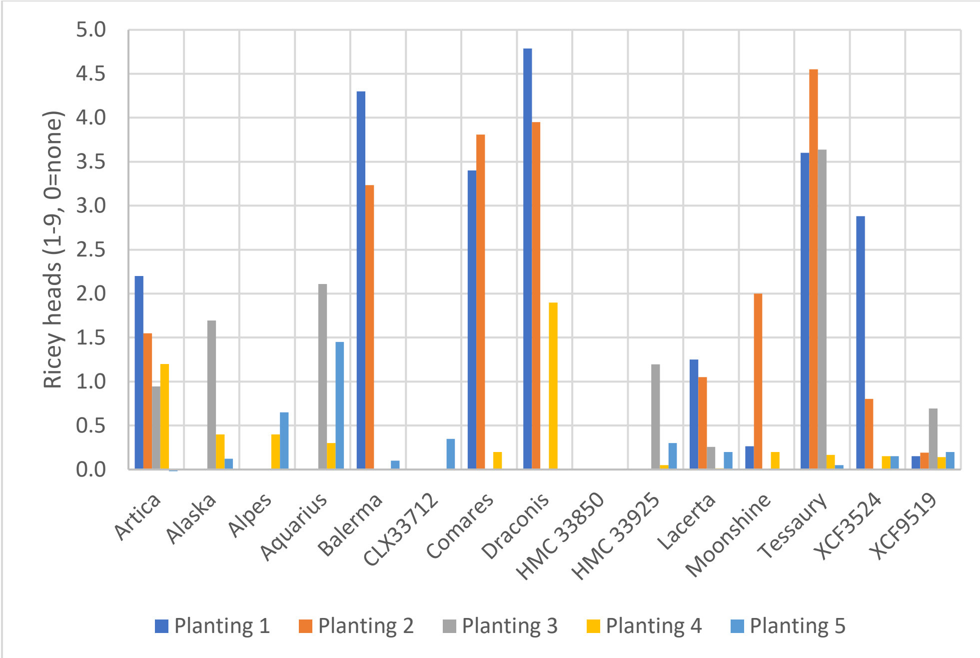


**Figure 7.** Ricey head rating for 15 cauliflower hybrids rated across five plantings in a variety trial grown at the OSU Vegetable Research Farm in 2025. Scale of 0 – 9 where 0 = no riciness, 1 = just visible, 3 = slightly ricey, 5 = moderate ricey, 7 = severe riciness and 9 = strong floret differentiation.

**Research/Extension Progress Report for 2025-2026 Funded Projects**
**Progress Report for the Agricultural Research Foundation Oregon Processed Vegetable Commission**

Title: Nitrogen fertility requirements of new sweet corn hybrids

Project Leader(s): Identify project leader(s) and their location(s).


| **PI:** | James R. Myers | **Co-PI**: | Kristine Buckland |
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**Cooperator(s)**: N/A



**Funding History**: $16,501 (3rd year)



**Abstract:** Cost of inputs for sweet corn production have risen dramatically in recent years, making the crop unattractive to growers for production and processing. One input for which prices have been especially high is nitrogen fertilizer. If nitrogen use could be reduced without loss of yield, then sweet corn contracts for processing would be more competitive with other crop options. Newer hybrids currently in use by processors have not been evaluated for nitrogen use efficiency. We conducted the third year of a trial of contemporary hybrids using different nitrogen fertilizer sidedress treatments to determine if existing recommendations still apply or if these might be adjusted to increase profitability for growers. The objective of this research was to evaluate nitrogen sidedress requirements for supersweet corn hybrids currently used in processing in the Willamette Valley and Columbia Basin. A yield and quality trial was established at the OSU Vegetable Research Farm in 2025 with seven hybrids grown at five levels (0, 50, 100, 150 and 200 lb/A) of side-dressed nitrogen. A preplant soil test revealed that residual N was 26 lb/A (potentially mineralizable nitrate), and 40 lb/A N as 16-16-16 (applied at 250 lb/A) was banded in row prior to planting. At V4, sidedress N treatments were applied in the form of liquid N. Plant height was recorded at V6 stage and 50% silking date was used to estimate time of harvest, which was refined using moisture testing as harvest neared. Data was recorded on yield parameters, yield and some quality characteristics. Hybrids showed a linear to curvilinear response for net T/A yield to increasing levels of N. In 2025, overall N rates were similar to 2023, but lower than 2024 trials. There was plateauing for several hybrids at 100 lb/A sidedress N, and in some cases, yields decreased at 200 lb/A. The proportion of total yield that consisted of culls was highest at 0 and 50 lb/A N, lowest at 100 and 150 lb/A N, but increasing again at 200 lb/A N. There was little effect of ear size in response to N treatment. When data was analyzed across three years, a response similar to the one year response was observed. The data suggests that some hybrids could be grown at lower N rates of 100 lb/A whereas others were responsive to N and no threshold for maximum was identified even when rates were 200 lb/A. Type of response did not necessarily correlate with overall yield.



**Key Words:** Sweet corn, fertility trial, ammonium, nitrate, yield response


**Objective:** Determine nitrogen (N) requirements for new supersweet corn hybrids grown for processing.

**Procedures:**

The trial was conducted at the OSU Vegetable Research Farm. The field selected for this study had been in peas and beans the summer of the previous year, then fallowed through the fall and winter. A preplant soil test submitted on 13-June revealed that N levels were about 26 lb/A (12.9 ppm) of potentially mineralizable nitrate remaining after winter rains (Table 1). Prior to planting, 40 lb/A N was banded in row using 16-16-16 (N-P-K) applied at the rate of 250 lb/A. The field was irrigated on a weekly basis with approximately an inch of water applied through solid-set sprinklers.

Sidedress fertilizer treatments were applied on 14-July at the V4 stage using urea ammonium nitrate solution UAN 32 (Simplot) between rows. Sidedress treatments consisted of 0, 50, 100, 150, 200 lb N/A applied to the field. The tractor moved at a constant speed through the field and adjustments in rate of flow were used to achieve the desired amount. Fertilizer was injected into the soil on both sides of the center data row. Seeds were treated with fungicide/insecticide mix as supplied by the seed company. Weeds were controlled through preemergent application of atrazine (1pt/acre), Outlook (18oz/acre), and Prowl (1.8 pts/acre) applied on 19-Jun.

Seven supersweet corn hybrids representing those currently being grown in the Willamette Valley and Columbia Basin were planted 16-June. The hybrids included in the trial, their area of production and processing traits are shown in Table 2. 'Strongheart' was added to the trial for the first time this year.These were seeded with a hand-propelled belt planter into 30-foot plots spaced at 30 inches between rows on 16-June. Initial population was about 80 seeds/plot, which was thinned to 60 seeds, giving an average of a six inch within row spacing for a target population density of about 35,000 plants/A. The experiments was arranged as a split plot design with fertilizer treatments as whole strips through the field and hybrids as subplots within strips. Subplots consisted of three rows where the center row received the sidedress treatment and was harvested for yield and quality evaluation. The trial was replicated four times and had border rows top, bottom and sides in the field. The center 15 feet of each subplot was harvested by hand and brought to the grading room for husking and yield and quality measurements.

Date of 50% silking was recorded and a 28 day interval from 50% silking was used to predict harvest, with moisture testing used to determine actual harvest date (target of 75-77% for supersweet hybrids) (Table 3). Final moisture was not measured on harvested ears, but estimated moisture at harvest was calculated based on a 0.5% drop per day in moisture content. Data was collected for plant height at V6 at approximately 60 days after planting (Table 4).

At harvest, total ear number and weight, net ear number and weight, and cull ear number and weight were recorded. Individual ear measurements included length and diameter, row number, tip fill, kernel depth, and weight per ear. A soil test of residual ammonium and nitrate N was obtained after harvest for each hybrid-treatment combination (combined across replicates) to determine if any plant-available N remained.

**Accomplishments:**

*Trial in 2025*

Hybrids showed a similar range in 50% silking date and maturities (Tables 3 and 4). Fertilizer treatment did not significantly affect growth rates as individual hybrids matured at a similar rate across treatments (Table 4). Estimated moistures at harvest were generally on the low end of the range of 75 – 77% with

007R, Coronado, GSS1477 and Kopa being just below the 75% threshold (Table 3). Total (unhusked) weight of sweet corn hybrids ranged from 13.7 to 17.2 T/A in 2025, but was reduced by 30 to 40% when husks and culls were removed (Table 4). Overall yields were lower than observed in 2024, and similar to 2023. Hybrids produced economic yields (net T/A) in the range of 5.3 to 11.6 T/A (Table 4, Figure 1). In terms of overall ranking, Driver, Strongheart, Column and Coronado had highest average yield across all treatment, followed by 007R, Kopa, and GSS1477.

Lowest yields were observed with the 0 lb/A N sidedress rate, and increased by 0.3 to 2.0 T/A for the higher fertilizer rates (Table 4, Figure 1). Yields were somewhat variable at increasing levels of N, and in some cases, showed a drop at the highest sidedress treatment. Driver, Coronado, Strongheart and Kopa all plateaued at 100 lb/A N and decreased at 200 lb/A N. Kopa had a significantly higher cull percentage than other hybrids. For all hybrids, the highest cull rates were observed at 0 and 50 lb/A N and lowest at 100 lb/A N, with cull percentage increasing at 200 lb/A (Table 4, Figure 1). Driver and Coronado exhibited highest yields at 150 lb/A N. The only hybrid to show a linear response to N across all treatments was GSS1477. Cull percentages were quite high, particularly for Kopa (Table 4).
Weight per ear varied among hybrids, with Driver producing the heaviest and Strongheart the lightest ears (Table 5). Little variation was observed across N treatments for ear length, diameter, kernel depth, number of rows and tip fill (Table 5, Figure 2). Ear weight, length, diameter and kernel depth were positively correlated with sidedress N (Table 6). Total, husked and net yield were positively correlated with sidedress N rates, while cull parameters were negatively correlated (Table 6).

Post-harvest plant-available residual N amounts were relatively low except for the 150 and 200 lb/A sidedress treatments (Table 7). Kopa in particular had a residual of 70 lb/A N at the 200 lb/A sidedress rate (Table 7) and was the only hybrid to show a plateau at the highest rates for uptake of residual and applied N (Table 8, Figure 3).

*Trial summary over three years*
When the three years of data were combined for analysis, similar trend to the 2025 results were observed. The mean of three years was analyzed for the five hybrids common to all years (Tables 9 and 10, Figures 5 & 6).Three (Coronado, 007R and Kopa) showed increases in yield up to the 100 lb/A N sidedress treatment, after which yields plateaued or decreased at higher N treatments. The other four hybrids showed a continuous linear response across treatments, with highest yields achieved at the highest rates of N.

**Impacts:**

The three years of data support a hypothesis that some contemporary supersweet corn hybrids may produce optimum yields at lower sidedress N rates than others.

**Relation to Other Research:**

Some of the same hybrids were included in our commercial supersweet corn yield and quality trial. This trial is supported entirely by fees from commercial companies and data are provided to companies and processors as well as conducting a sample display of frozen ears and kernels at the PNVA meetings held in Kennewick WA in November 2025. This report is available upon request.

**Table 1.** Preplant nutrient status of a field used for a supersweet sweet corn nitrogen fertility trial grown at the OSU Vegetable Research Farm in 2025. **A.** Carbon, organic matter, biological activity and residual nitrogen. **B.** pH, electrical conductivity and macro and micro elements.

| A. | % | | | ppm | μg $CO_2$-C/g dry soil/d | | ppm $NO_3$-N time 0 | ppm $NO_3$-N time 28 | mg N/kg soil/d |
|---|---|---|---|---|---|---|---|---|---|
| Lab ID[z] | C | N | OM | Active C | $CO_2$ Respiration 24 hr | $CO_2$ Respiration 96 hr | Potentially Mineralizable Nitrogen | | |
| 1 | 0.56 | 0.08 | 1.12 | 127 | 11 | 3 | 7.35 | 13.47 | 0.22 |
| 2 | 0.56 | 0.08 | 1.12 | 140 | 10 | 6 | 5.33 | 12.33 | 0.25 |

| B. | pH Units | dS/m | ppm (mg/kg) | | | | meq/100g | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID[z] | pH | EC | P | K | Ca | Mg | K | Ca | Mg | CEC |
| 1 | 6.38 | 0.09 | 63 | 209 | 1774 | 391 | 0.5 | 8.9 | 3.3 | 13 |
| 2 | 6.57 | 0.08 | 69 | 195 | 2068 | 540 | 0.5 | 10.3 | 4.5 | 15 |

[z]Lab ID 1 sample came from the south half and lab ID 2 came from the north half of field 15 at the OSU Vegetable Research Farm.

**Table 2.** Supersweet corn hybrids source and production information, grown in a sidedress N fertility trial at the OSU Vegetable Research Farm in 2025.

| Hybrid | Source | Kernel color | Area of production |
|---|---|---|---|
| Driver | HM Clause | yellow | Willamette Valley |
| Kopa | HM Clause | yellow | Willamette Valley |
| Coronado | HM Clause | white | Columbia Basin |
| Column (HMC302) | HM Clause | yellow | Columbia Basin |
| GSS1477 | Syngenta | yellow | Willamette Valley |
| 007R | Syngenta | yellow | Willamette Valley |
| Strongheart | Crookham | Yellow | Willamette Valley |

**Table 3.** Supersweet corn kernel moisture percentages at harvest of a nitrogen fertility trial grown at the OSU Vegetable Research Farm in 2025. Trial was planted 16-June.

| Hybrid | Test date | Days after planting | Pre-harvest moisture (%) | Days to harvest | Estimated final moisture (%)[z] |
|---|---|---|---|---|---|
| 007R | 11-Sep | 87 | 74.1 | 88 | 73.6 |
| Column | 10-Sep | 86 | 77.4 | 87 | 76.9 |
| Coronado | 11-Sep | 87 | 76.0 | 91 | 74.0 |
| Driver | 11-Sep | 87 | 77.3 | 91 | 75.3 |
| GSS1477 | 12-Sep | 88 | 76.2 | 92 | 74.2 |
| Kopa | 12-Sep | 88 | 76.8 | 92 | 74.8 |
| Strongheart | 10-Sep | 86 | 75.8 | 87 | 75.3 |

[z]Final moistures were not measured. Estimated final moisture at harvest is based on 0.5% drop per day from initial moisture.

**Table 4.** Yield, yield components, days to silking, and maturity of supersweet corn hybrids grown in a fertility trial at the OSU Vegetable Research Farm in 2025.

| Hybrid | Sidedress N )lb/A) | Days to 50% silking | Days to harvest | V6 plot height (cm) | Plants/A | Total T/A | Total husked T/A | Net ear T/A | Cull ear T/A | % culls (by wt) | Net ears/A | Cull ears/A | % cull (by Area) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 007R | 0 | 61 | 88 | 135 | 38,914 | 13.3 | 9.6 | 7.3 | 2.3 | 24.3 | 26,426 | 13,358 | 33.4 |
| 007R | 50 | 62 | 88 | 128 | 44,141 | 13.2 | 9.7 | 7.0 | 2.7 | 27.9 | 24,103 | 15,682 | 39.4 |
| 007R | 100 | 61 | 88 | 130 | 42,108 | 14.5 | 10.9 | 9.9 | 0.9 | 9.1 | 33,396 | 5,518 | 14.5 |
| 007R | 150 | 61 | 88 | 138 | 42,689 | 13.6 | 10.2 | 8.5 | 1.7 | 17.6 | 27,588 | 8,712 | 24.6 |
| 007R | 200 | 61 | 88 | 141 | 44,722 | 15.1 | 11.2 | 9.4 | 1.9 | 16.9 | 30,782 | 10,745 | 26.1 |
| Column | 0 | 60 | 87 | 120 | 52,853 | 14.0 | 9.8 | 8.2 | 1.6 | 17.4 | 32,815 | 13,358 | 29.3 |
| Column | 50 | 59 | 87 | 130 | 44,141 | 14.0 | 9.8 | 9.1 | 0.7 | 7.0 | 32,815 | 6,389 | 16.0 |
| Column | 100 | 59 | 87 | 131 | 42,979 | 16.1 | 11.1 | 10.9 | 0.2 | 2.0 | 38,914 | 3,194 | 7.2 |
| Column | 150 | 59 | 87 | 129 | 42,689 | 15.8 | 10.7 | 10.3 | 0.5 | 4.7 | 36,881 | 4,356 | 11.0 |
| Column | 200 | 60 | 87 | 131 | 44,722 | 16.2 | 11.3 | 10.9 | 0.4 | 3.5 | 38,333 | 4,066 | 9.5 |
| Coronado | 0 | 63 | 91 | 118 | 44,722 | 13.7 | 10.0 | 8.3 | 1.7 | 16.9 | 29,040 | 13,358 | 30.8 |
| Coronado | 50 | 62 | 91 | 110 | 42,398 | 14.8 | 10.9 | 9.7 | 1.1 | 10.6 | 32,234 | 8,131 | 18.9 |
| Coronado | 100 | 62 | 91 | 112 | 46,174 | 15.8 | 11.8 | 10.9 | 1.0 | 8.5 | 36,300 | 6,679 | 15.7 |
| Coronado | 150 | 61 | 91 | 117 | 39,785 | 15.6 | 11.9 | 11.5 | 0.4 | 3.1 | 34,848 | 2,614 | 6.8 |
| Coronado | 200 | 62 | 91 | 110 | 49,949 | 16.0 | 12.1 | 10.5 | 1.7 | 14.0 | 34,848 | 10,454 | 22.9 |
| Driver | 0 | 62 | 91 | 128 | 44,141 | 14.9 | 10.5 | 7.3 | 3.2 | 30.3 | 22,942 | 16,262 | 41.1 |
| Driver | 50 | 62 | 91 | 130 | 40,366 | 15.9 | 11.2 | 9.3 | 2.0 | 17.5 | 27,878 | 9,293 | 24.9 |
| Driver | 100 | 62 | 91 | 133 | 35,429 | 15.1 | 10.9 | 10.1 | 0.8 | 8.0 | 28,750 | 3,775 | 11.8 |
| Driver | 150 | 61 | 91 | 132 | 41,527 | 18.1 | 12.7 | 11.6 | 1.1 | 8.7 | 36,881 | 6,098 | 14.8 |
| Driver | 200 | 62 | 91 | 129 | 44,141 | 17.0 | 12.3 | 11.1 | 1.2 | 9.6 | 33,396 | 5,808 | 14.5 |
| GSS1477 | 0 | 63 | 92 | 126 | 45,883 | 15.1 | 10.9 | 8.4 | 2.5 | 22.7 | 27,007 | 14,230 | 34.4 |
| GSS1477 | 50 | 64 | 92 | 119 | 40,366 | 14.3 | 10.1 | 8.7 | 1.4 | 13.8 | 27,588 | 7,550 | 21.6 |
| GSS1477 | 100 | 63 | 92 | 125 | 40,656 | 16.0 | 11.6 | 9.7 | 1.8 | 16.5 | 30,202 | 10,454 | 23.9 |
| GSS1477 | 150 | 63 | 92 | 125 | 41,237 | 16.0 | 11.8 | 10.3 | 1.5 | 13.2 | 31,654 | 8,712 | 22.0 |
| GSS1477 | 200 | 64 | 92 | 123 | 47,045 | 16.6 | 12.3 | 10.2 | 2.1 | 16.8 | 32,815 | 10,745 | 24.6 |
| Kopa | 0 | 65 | 92 | 123 | 42,398 | 14.3 | 9.5 | 5.3 | 4.2 | 45.4 | 17,134 | 20,909 | 55.0 |
| Kopa | 50 | 63 | 92 | 126 | 44,141 | 15.9 | 10.8 | 6.3 | 4.5 | 42.6 | 19,166 | 22,361 | 54.3 |
| Kopa | 100 | 64 | 92 | 127 | 42,689 | 16.9 | 11.8 | 9.4 | 2.4 | 21.5 | 27,588 | 11,616 | 29.5 |
| Kopa | 150 | 63 | 92 | 132 | 40,366 | 17.2 | 12.0 | 9.6 | 2.5 | 20.2 | 27,588 | 10,454 | 26.4 |

| Hybrid | Sidedress N )lb/A) | Days to 50% silking | Days to harvest | V6 plot height (cm) | Plants/A | Total T/A | Total husked T/A | Net ear T/A | Cull ear T/A | % culls (by wt) | Net ears/A | Cull ears/A | % cull (by Area) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kopa | 200 | 64 | 92 | 134 | 44,722 | 17.2 | 11.8 | 7.9 | 3.9 | 32.7 | 23,522 | 18,005 | 41.3 |
| Strongheart | 0 | 60 | 87 | 119 | 44,141 | 12.9 | 9.4 | 8.4 | 1.0 | 10.4 | 32,815 | 8,712 | 20.2 |
| Strongheart | 50 | 59 | 87 | 121 | 47,626 | 14.6 | 10.7 | 9.7 | 0.9 | 8.8 | 33,686 | 7,550 | 18.1 |
| Strongheart | 100 | 59 | 87 | 123 | 45,883 | 15.6 | 11.5 | 11.2 | 0.3 | 2.4 | 40,656 | 3,194 | 7.3 |
| Strongheart | 150 | 59 | 87 | 127 | 41,818 | 16.0 | 11.8 | 11.4 | 0.4 | 3.6 | 37,171 | 3,485 | 8.3 |
| Strongheart | 200 | 60 | 87 | 129 | 49,949 | 16.5 | 10.9 | 10.4 | 0.5 | 4.9 | 38,042 | 5,227 | 12.7 |
| LSD 0.05[z] | | 2 | 0.1 | 14 | 7,957 | 2.3 | 1.7 | 2.2 | 1.2 | 11.1 | 6,981 | 6,670 | 14.5 |

[z]If the difference between a pair of means in a column is greater than the LSD value, they are significantly different at P ≤ 0.05 by Fisher's Least Significant Difference test.

**Table 5.** Ear characteristics of supersweet corn hybrids grown in a fertility trial at the OSU Vegetable Research Farm in 2025.

| Hybrid | Sidedress N (lb/A) | Wt/ear (lb) | Ear length (in) | Ear diameter (in) | No rows | Tip fill[z] | Kernel depth (mm) |
|---|---|---|---|---|---|---|---|
| 007R | 0 | 0.56 | 7.9 | 1.9 | 17.5 | 6.0 | 11.9 |
| 007R | 50 | 0.59 | 7.7 | 1.9 | 17.2 | 6.3 | 11.5 |
| 007R | 100 | 0.60 | 7.9 | 2.0 | 17.5 | 7.3 | 12.2 |
| 007R | 150 | 0.61 | 8.0 | 2.0 | 16.7 | 6.8 | 12.4 |
| 007R | 200 | 0.61 | 8.0 | 2.1 | 17.2 | 7.3 | 12.5 |
| Column | 0 | 0.50 | 7.3 | 1.8 | 17.5 | 6.3 | 11.3 |
| Column | 50 | 0.56 | 8.0 | 2.0 | 16.9 | 7.0 | 12.0 |
| Column | 100 | 0.56 | 8.3 | 1.9 | 18.3 | 6.5 | 12.7 |
| Column | 150 | 0.55 | 8.3 | 2.0 | 17.6 | 7.3 | 12.9 |
| Column | 200 | 0.57 | 8.1 | 2.0 | 18.0 | 6.7 | 12.8 |
| Coronado | 0 | 0.58 | 7.2 | 2.0 | 18.1 | 9.0 | 12.5 |
| Coronado | 50 | 0.60 | 7.3 | 2.1 | 17.3 | 8.5 | 12.9 |
| Coronado | 100 | 0.60 | 7.4 | 2.1 | 18.1 | 9.0 | 12.9 |
| Coronado | 150 | 0.66 | 7.4 | 2.1 | 17.1 | 9.0 | 13.1 |
| Coronado | 200 | 0.60 | 7.4 | 2.0 | 17.8 | 9.0 | 12.4 |
| Driver | 0 | 0.63 | 8.2 | 1.9 | 18.5 | 3.0 | 12.0 |
| Driver | 50 | 0.66 | 8.5 | 2.0 | 18.1 | 6.0 | 12.8 |
| Driver | 100 | 0.70 | 8.5 | 2.1 | 18.4 | 6.0 | 13.1 |
| Driver | 150 | 0.65 | 8.4 | 2.0 | 18.1 | 5.5 | 12.9 |
| Driver | 200 | 0.67 | 8.4 | 2.0 | 18.6 | 5.0 | 12.5 |
| GSS1477 | 0 | 0.62 | 7.5 | 2.0 | 16.3 | 5.5 | 13.0 |
| GSS1477 | 50 | 0.63 | 7.7 | 2.0 | 15.8 | 4.5 | 13.3 |
| GSS1477 | 100 | 0.64 | 7.7 | 2.0 | 16.3 | 4.5 | 13.2 |
| GSS1477 | 150 | 0.65 | 7.8 | 2.1 | 17.1 | 4.0 | 13.2 |
| GSS1477 | 200 | 0.63 | 7.7 | 2.1 | 16.6 | 4.3 | 13.1 |
| Kopa | 0 | 0.62 | 7.8 | 2.0 | 16.8 | 5.3 | 12.2 |
| Kopa | 50 | 0.66 | 7.8 | 2.0 | 16.8 | 4.0 | 12.4 |
| Kopa | 100 | 0.67 | 7.9 | 2.1 | 17.5 | 5.0 | 12.6 |
| Kopa | 150 | 0.69 | 8.1 | 2.0 | 17.3 | 5.0 | 12.7 |
| Kopa | 200 | 0.67 | 8.0 | 2.1 | 17.6 | 5.0 | 13.0 |
| Strongheart | 0 | 0.51 | 7.5 | 1.9 | 15.8 | 5.3 | 11.7 |
| Strongheart | 50 | 0.58 | 7.5 | 2.0 | 15.6 | 7.0 | 12.9 |
| Strongheart | 100 | 0.55 | 7.5 | 1.9 | 15.4 | 6.0 | 12.7 |
| Strongheart | 150 | 0.61 | 7.6 | 2.0 | 15.7 | 7.0 | 13.4 |
| Strongheart | 200 | 0.55 | 7.4 | 1.9 | 15.9 | 6.8 | 12.5 |
| LSD 0.05[y] | | 0.06 | 0.5 | 0.1 | 1.0 | 1.5 | 0.8 |

[z]Scale of 1 – 9 where 9 is complete tip fill. [y]If the difference between a pair of means in a column is greater than the LSD value, they are significantly different at $P \leq 0.05$ by Fisher's Least Significant Difference test.

**Table 6.** Pearson multiple correlation of sidedress nitrogen treatments and various yield components, yield and quality traits of a supersweet corn trial conducted at the OSU Vegetable Research Farm in 2025. Each row contains the correlation coefficient (*r*) which may vary between -1 and +1. Probabilities ≤ 0.05 are highlighted indicating that they are significantly different from the null hypothesis that *r* = 0.

| | Days to harvest | Ear ln | Ear dia | No rows | Tip fill | Kernel depth | Total T/A | Total husked T/A | Net ear T/A | Cull ear T/A | % cull wt | Net ears/A | Cull ears/A | % cull/A | Wt ear | Sidedress N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days 50% silking | 0.75 | -0.11 | 0.15 | 0.10 | -0.29 | -0.07 | -0.05 | -0.12 | -0.49 | 0.63 | 0.64 | -0.59 | 0.58 | 0.61 | 0.26 | -0.12 |
| Days to harvest | 1.00 | 0.04 | 0.47 | 0.21 | -0.29 | 0.29 | 0.25 | 0.25 | -0.13 | 0.47 | 0.41 | -0.41 | 0.34 | 0.36 | 0.62 | 0.00 |
| Ear ln. | | 1.00 | 0.39 | 0.36 | -0.26 | 0.28 | 0.21 | 0.13 | 0.12 | -0.04 | -0.07 | -0.07 | -0.17 | -0.11 | 0.45 | 0.19 |
| Ear dia. | | | 1.00 | 0.26 | 0.09 | 0.65 | 0.26 | 0.33 | 0.24 | -0.02 | -0.07 | -0.07 | -0.13 | -0.09 | 0.66 | 0.31 |
| No. rows | | | | 1.00 | 0.07 | -0.05 | 0.15 | 0.12 | 0.04 | 0.07 | 0.05 | -0.08 | 0.03 | 0.04 | 0.25 | 0.08 |
| Tip fill | | | | | 1.00 | 0.04 | -0.15 | -0.04 | 0.23 | -0.40 | -0.36 | 0.26 | -0.30 | -0.31 | -0.14 | 0.10 |
| Kernel depth | | | | | | 1.00 | 0.40 | 0.43 | 0.45 | -0.23 | -0.30 | 0.22 | -0.31 | -0.32 | 0.48 | 0.31 |
| Total T/A | | | | | | | 1.00 | 0.89 | 0.64 | -0.03 | -0.20 | 0.47 | -0.15 | -0.25 | 0.35 | 0.44 |
| Total husked T/A | | | | | | | | 1.00 | 0.77 | -0.11 | -0.30 | 0.58 | -0.22 | -0.35 | 0.35 | 0.45 |
| Net T/A | | | | | | | | | 1.00 | -0.72 | -0.83 | 0.89 | -0.76 | -0.84 | 0.15 | 0.47 |
| Cull T/A | | | | | | | | | | 1.00 | 0.97 | -0.75 | 0.95 | 0.94 | 0.15 | -0.23 |
| % culls by wt. | | | | | | | | | | | 1.00 | -0.82 | 0.94 | 0.97 | 0.08 | -0.31 |
| Net ears/A | | | | | | | | | | | | 1.00 | -0.72 | -0.82 | -0.31 | 0.35 |
| Cull ears/A | | | | | | | | | | | | | 1.00 | 0.97 | -0.02 | -0.32 |
| % culls by A | | | | | | | | | | | | | | 1.00 | 0.05 | -0.35 |
| Wt./ear | | | | | | | | | | | | | | | 1.00 | 0.23 |

**Table 7.** Residual nitrogen following a supersweet corn trial of six hybrids grown with five sidedress N treatments at the OSU Vegetable Research Farm in 2025.

| Hybrid | N test | Lb/A sidedress N treatment | | | | |
|---|---|---|---|---|---|---|
| | | **0** | **50** | **100** | **150** | **200** |
| | | **lb/A** | | | | |
| 007R | $NO_3$-N | 0.717 | 15.828 | 17.617 | 24.975 | 25.182 |
| 007R | $NH_4$-N | 0.000 | 1.384 | 20.186 | 18.655 | 14.477 |
| Column | $NO_3$-N | 0.000 | 0.000 | 3.242 | 9.655 | 25.148 |
| Column | $NH_4$-N | 0.000 | 0.000 | 0.306 | 0.587 | 4.063 |
| Coronado | $NO_3$-N | 0.000 | 0.496 | 2.691 | 21.349 | 14.600 |
| Coronado | $NH_4$-N | 0.895 | 0.000 | 3.007 | 2.935 | 20.954 |
| Driver | $NO_3$-N | 1.137 | 4.396 | 7.813 | 14.982 | 18.297 |
| Driver | $NH_4$-N | 0.000 | 3.793 | 1.925 | 3.499 | 7.195 |
| GSS1477 | $NO_3$-N | 0.715 | 1.354 | 6.412 | 41.029 | 7.956 |
| GSS1477 | $NH_4$-N | 0.000 | 0.719 | 3.802 | 8.479 | 0.000 |
| Kopa | $NO_3$-N | 0.000 | 0.931 | 8.297 | 5.391 | 37.617 |
| Kopa | $NH_4$-N | 0.000 | 2.910 | 2.391 | 0.000 | 69.602 |
| Strongheart | $NO_3$-N | 0.499 | 3.538 | 8.285 | 11.248 | 14.002 |
| Strongheart | $NH_4$-N | 0.000 | 5.082 | 2.335 | 0.458 | 9.849 |

**Table 8.** Total nitrogen of that supplied (preplant N + starter N + sidedress N - residual N) utilized by sweet corn hybrids in a sidedress N fertility trial conducted at the OSU Vegetable Research Farm in 2025.

| Hybrid | Nitrogen supplied (lb/A) | | | | |
|---|---|---|---|---|---|
| | 66 | 116 | 166 | 216 | 266 |
| 0079R | 65 | 107 | 147 | 194 | 246 |
| Column | 66 | 116 | 164 | 211 | 251 |
| Coronado | 65 | 116 | 163 | 203 | 248 |
| Driver | 65 | 112 | 161 | 206 | 253 |
| GSS1477 | 65 | 115 | 161 | 191 | 262 |
| Kopa | 66 | 114 | 160 | 213 | 211 |
| Strongheart | 66 | 111 | 160 | 210 | 254 |

**Table 9.** Mean of three years (2023- 2025) of yield, yield components, days to silking, and maturity of supersweet corn hybrids grown in a fertility trial at the OSU Vegetable Research Farm.

| Hybrid | Sidedress N) lb/A) | Days to 50% silking | Days to harvest | Total T/A | Total husked T/A | Net ear T/A | Cull ear T/A | % culls (by wt) | Net ears/A | Cull ears/A | % cull (by Area) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 007R | 0 | 60 | 89 | 12.8 | 9.1 | 7.9 | 1.2 | 12.1 | 25,846 | 6,486 | 17.5 |
| Column | 0 | 59 | 89 | 14.1 | 9.8 | 8.9 | 0.8 | 8.8 | 28,846 | 5,711 | 13.8 |
| Coronado | 0 | 61 | 90 | 12.8 | 8.8 | 8.0 | 0.8 | 8.8 | 26,136 | 6,389 | 16.3 |
| Driver | 0 | 61 | 91 | 14.6 | 10.2 | 8.6 | 1.6 | 15.9 | 25,071 | 7,841 | 21.9 |
| GSS1477 | 0 | 62 | 91 | 13.5 | 9.6 | 8.2 | 1.4 | 13.8 | 27,201 | 7,260 | 19.5 |
| Kopa | 0 | 63 | 93 | 14.2 | 9.2 | 7.4 | 1.8 | 19.4 | 22,167 | 8,809 | 24.3 |
| 007R | 50 | 61 | 89 | 12.9 | 9.2 | 8.0 | 1.3 | 13.4 | 25,942 | 6,873 | 18.2 |
| Column | 50 | 59 | 89 | 14.8 | 10.1 | 9.6 | 0.6 | 5.8 | 29,234 | 3,678 | 10.4 |
| Coronado | 50 | 61 | 90 | 14.1 | 9.8 | 9.2 | 0.6 | 5.9 | 29,621 | 4,162 | 10.4 |
| Driver | 50 | 61 | 91 | 15.6 | 10.8 | 9.8 | 1.1 | 9.8 | 27,878 | 4,743 | 13.6 |
| GSS1477 | 50 | 63 | 91 | 13.7 | 9.5 | 8.6 | 0.9 | 9.0 | 27,298 | 4,840 | 13.5 |
| Kopa | 50 | 62 | 93 | 15.1 | 10.0 | 8.2 | 1.8 | 16.5 | 23,619 | 8,906 | 21.8 |
| 007R | 100 | 61 | 89 | 13.4 | 9.8 | 9.2 | 0.6 | 6.2 | 28,846 | 3,194 | 9.5 |
| Column | 100 | 59 | 89 | 14.8 | 10.0 | 9.7 | 0.3 | 3.2 | 30,395 | 2,323 | 6.6 |
| Coronado | 100 | 61 | 90 | 15.2 | 10.9 | 10.0 | 0.8 | 7.9 | 32,138 | 4,840 | 13.0 |
| Driver | 100 | 61 | 91 | 15.7 | 10.9 | 10.2 | 0.7 | 6.2 | 28,266 | 2,710 | 8.5 |
| GSS1477 | 100 | 62 | 91 | 14.0 | 10.1 | 8.6 | 1.4 | 13.6 | 27,394 | 7,357 | 18.6 |
| Kopa | 100 | 63 | 93 | 15.8 | 10.5 | 9.1 | 1.4 | 12.6 | 26,620 | 6,486 | 17.3 |
| 007R | 150 | 60 | 89 | 13.8 | 10.0 | 9.0 | 1.0 | 9.6 | 27,975 | 5,421 | 14.6 |
| Column | 150 | 59 | 89 | 15.7 | 10.7 | 10.2 | 0.6 | 5.2 | 31,460 | 3,194 | 9.0 |
| Coronado | 150 | 61 | 90 | 14.9 | 10.5 | 10.1 | 0.4 | 4.1 | 31,266 | 2,130 | 6.3 |
| Driver | 150 | 61 | 91 | 16.5 | 11.4 | 10.8 | 0.6 | 5.4 | 31,266 | 3,388 | 8.7 |
| GSS1477 | 150 | 62 | 91 | 14.3 | 10.3 | 9.0 | 1.4 | 13.3 | 28,072 | 6,873 | 19.4 |
| Kopa | 150 | 62 | 93 | 16.1 | 10.7 | 9.5 | 1.2 | 10.0 | 27,878 | 4,937 | 13.1 |
| 007R | 200 | 60 | 89 | 14.5 | 10.5 | 9.5 | 0.9 | 8.6 | 29,621 | 4,646 | 11.8 |
| Column | 200 | 59 | 89 | 16.7 | 11.2 | 10.6 | 0.6 | 5.1 | 33,106 | 3,098 | 8.4 |
| Coronado | 200 | 61 | 90 | 15.4 | 10.9 | 9.9 | 0.9 | 8.2 | 31,266 | 5,324 | 13.2 |
| Driver | 200 | 61 | 91 | 17.2 | 11.9 | 10.8 | 1.1 | 8.9 | 30,686 | 5,034 | 13.0 |
| GSS1477 | 200 | 63 | 91 | 15.2 | 11.0 | 9.4 | 1.6 | 14.2 | 30,105 | 7,744 | 19.5 |
| Kopa | 200 | 63 | 93 | 15.8 | 10.5 | 8.8 | 1.7 | 14.6 | 25,458 | 7,841 | 18.8 |
| LSD0.05[z] | | 1 | 0 | 2.3 | 1.6 | 1.8 | 1.0 | 9.2 | 5,609 | 5,089 | 12.2 |

[z]If the difference between a pair of means in a column is greater than the LSD value, they are significantly different at P ≤ 0.05 by Fisher's Least Significant Difference test.

**Table 10.** Mean over three years (2023 - 2025) for ear characteristics of supersweet corn hybrids grown in a fertility trial at the OSU Vegetable Research Farm.

| Hybrid | Sidedress N) lb/A) | Wt/ear (lb) | Ear length (in) | Ear diameter (in) | No rows | Tip fill[z] | Kernel depth (mm) | Plot ht. at V6 (cm) | Plants/A |
|---|---|---|---|---|---|---|---|---|---|
| 007R | 0 | 0.62 | 8.1 | 2.0 | 18.7 | 6.7 | 12.4 | 126 | 37,607 |
| Column | 0 | 0.63 | 8.3 | 2.0 | 17.8 | 6.8 | 12.5 | 117 | 43,996 |
| Coronado | 0 | 0.62 | 7.7 | 2.0 | 18.3 | 8.8 | 12.2 | 112 | 38,623 |
| Driver | 0 | 0.69 | 8.8 | 2.0 | 18.5 | 5.6 | 12.5 | 119 | 41,382 |
| GSS1477 | 0 | 0.61 | 8.0 | 2.0 | 16.4 | 5.0 | 12.8 | 117 | 41,527 |
| Kopa | 0 | 0.67 | 8.2 | 2.0 | 17.4 | 6.0 | 12.6 | 118 | 39,349 |
| 007R | 50 | 0.61 | 8.2 | 2.0 | 17.7 | 7.0 | 11.8 | 118 | 39,059 |
| Column | 50 | 0.66 | 8.7 | 2.0 | 17.8 | 6.8 | 12.6 | 122 | 38,623 |
| Coronado | 50 | 0.63 | 7.7 | 2.1 | 17.9 | 8.3 | 12.1 | 106 | 40,511 |
| Driver | 50 | 0.71 | 8.8 | 2.0 | 18.7 | 5.9 | 12.7 | 123 | 38,623 |
| GSS1477 | 50 | 0.64 | 8.1 | 2.0 | 16.9 | 5.2 | 13.2 | 112 | 38,768 |
| Kopa | 50 | 0.70 | 8.2 | 2.1 | 17.6 | 5.8 | 12.6 | 111 | 40,366 |
| 007R | 100 | 0.64 | 8.2 | 2.0 | 18.5 | 7.6 | 12.6 | 126 | 38,188 |
| Column | 100 | 0.66 | 8.6 | 2.0 | 18.5 | 6.9 | 13.1 | 122 | 39,059 |
| Coronado | 100 | 0.63 | 7.8 | 2.1 | 18.9 | 8.8 | 12.4 | 107 | 40,801 |
| Driver | 100 | 0.73 | 8.9 | 2.0 | 18.8 | 6.4 | 13.0 | 125 | 36,590 |
| GSS1477 | 100 | 0.63 | 8.1 | 2.0 | 16.6 | 5.0 | 13.1 | 112 | 39,640 |
| Kopa | 100 | 0.69 | 8.1 | 2.0 | 17.8 | 5.9 | 12.7 | 118 | 40,511 |
| 007R | 150 | 0.64 | 8.3 | 2.0 | 17.7 | 7.0 | 12.6 | 121 | 40,070 |
| Column | 150 | 0.66 | 8.7 | 2.0 | 18.2 | 6.9 | 13.1 | 122 | 40,656 |
| Coronado | 150 | 0.65 | 7.7 | 2.1 | 18.1 | 8.3 | 12.3 | 108 | 36,590 |
| Driver | 150 | 0.71 | 8.8 | 2.0 | 18.7 | 6.3 | 12.8 | 122 | 39,640 |
| GSS1477 | 150 | 0.64 | 8.1 | 2.0 | 16.5 | 4.7 | 13.2 | 111 | 37,316 |
| Kopa | 150 | 0.70 | 8.2 | 2.0 | 17.6 | 6.3 | 12.6 | 120 | 39,059 |
| 007R | 200 | 0.65 | 8.3 | 2.1 | 17.9 | 7.3 | 12.4 | 126 | 39,640 |
| Column | 200 | 0.65 | 8.6 | 2.0 | 18.3 | 6.8 | 13.0 | 121 | 41,237 |
| Coronado | 200 | 0.64 | 7.7 | 2.1 | 18.9 | 8.8 | 12.1 | 106 | 42,253 |
| Driver | 200 | 0.71 | 8.8 | 2.0 | 18.7 | 5.8 | 12.8 | 120 | 40,220 |
| GSS1477 | 200 | 0.63 | 8.0 | 2.0 | 16.4 | 4.6 | 13.0 | 113 | 42,398 |
| Kopa | 200 | 0.70 | 8.2 | 2.1 | 17.5 | 5.9 | 12.6 | 118 | 40,220 |
| LSD0.05[y] | | 0.05 | 0.3 | 0.1 | 1.7 | 1.3 | 0.9 | 14 | 7,957 |

[z]Scale of 1 – 9 where 9 is complete tip fill. [y]If the difference between a pair of means in a column is greater than the LSD value, they are significantly different at P ≤ 0.05 by Fisher's Least Significant Difference test.

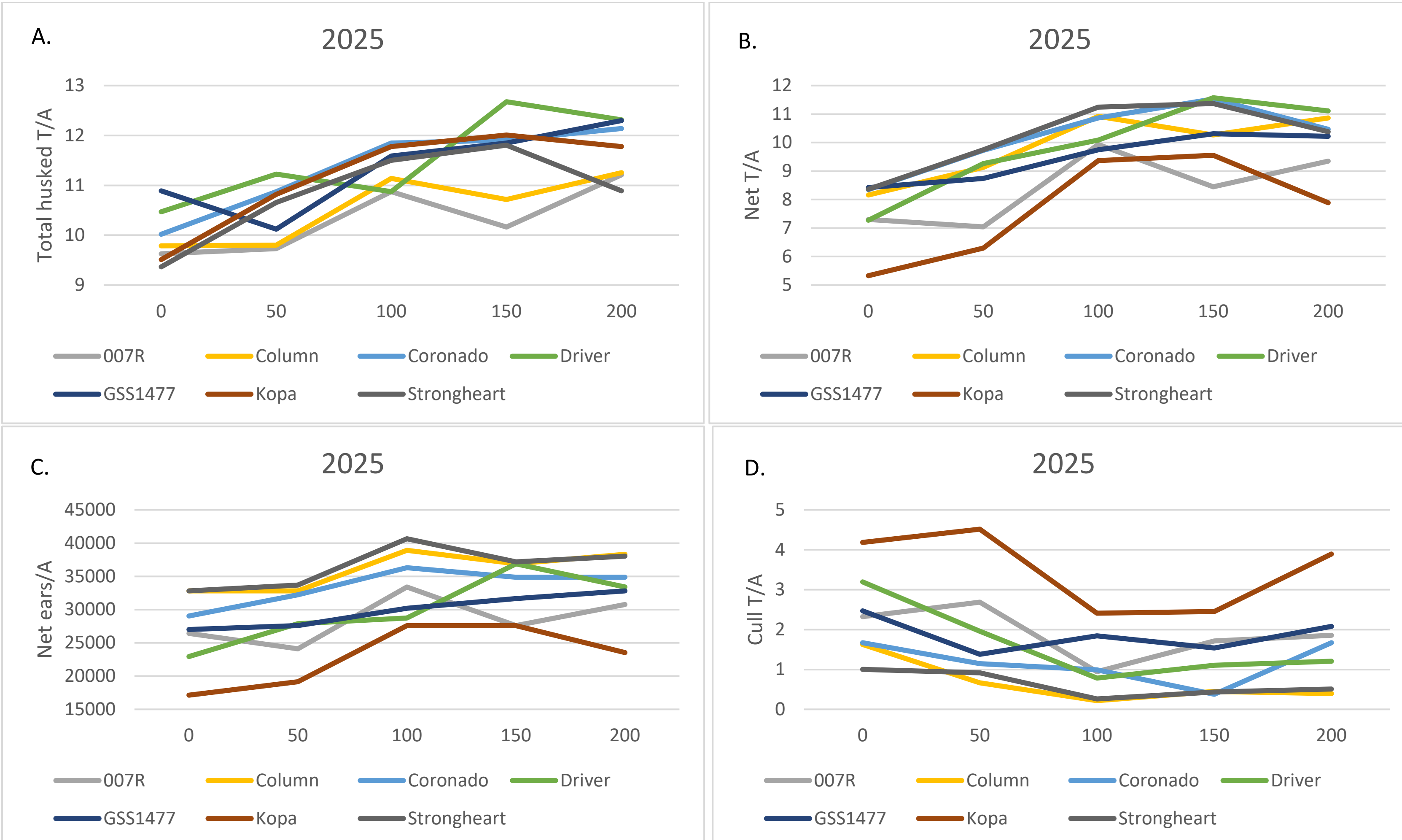


**Figure 1.** Yield response for seven supersweet corn hybrids grown at five sidedress N levels at the OSU Vegetable Research Farm in 2025. **A.** Total husked T/A yield (net + cull weight), **B.** Net T/A, **C.** Net ears/A and **D.** Cull T/A.

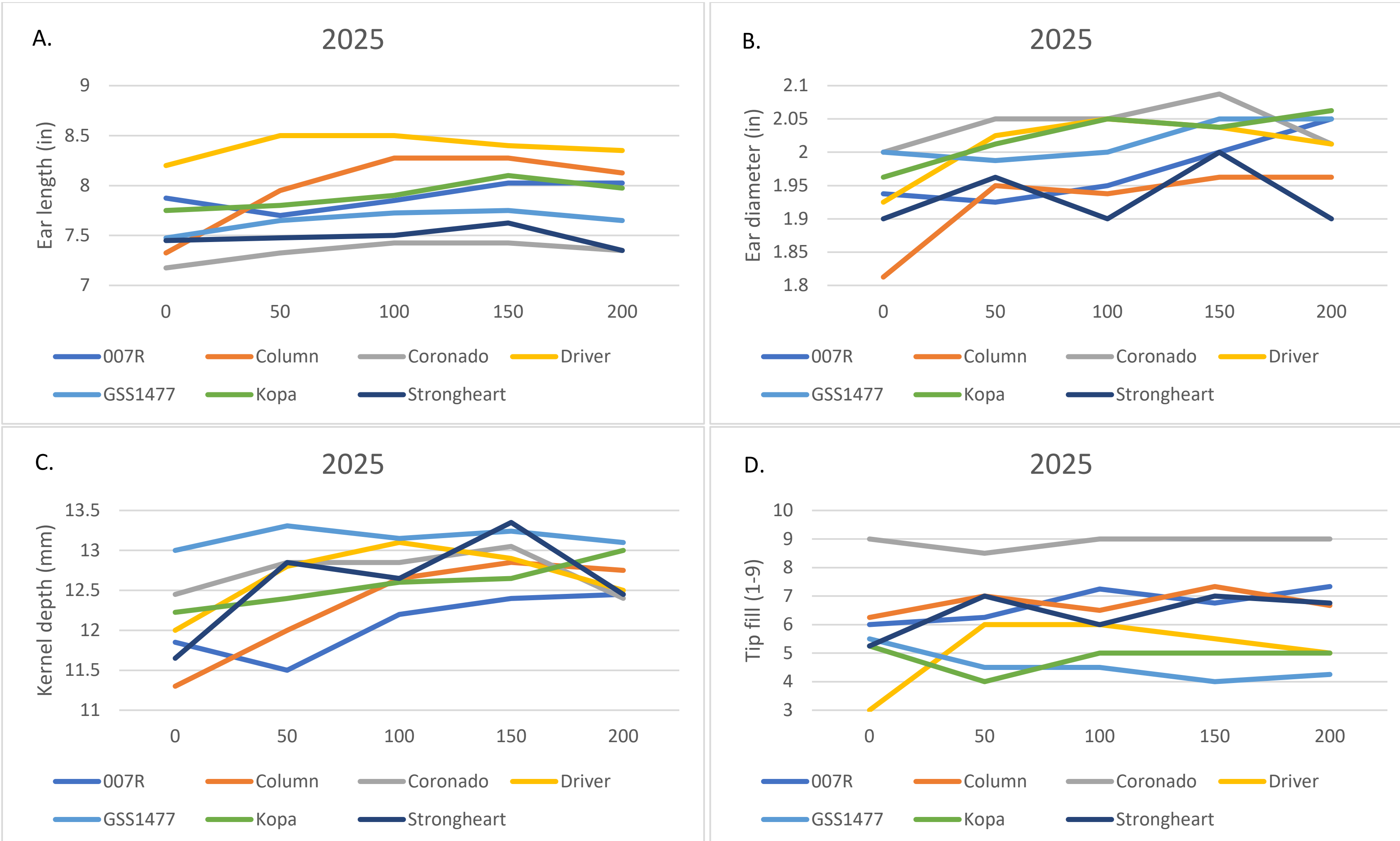


**Figure 2.** Yield components for seven supersweet corn hybrids grown at five sidedress N levels at the OSU Vegetable Research Farm in 2025. **A.** Ear length (in), **B.** Ear diameter (in), **C.** Kernel depth (mm) and **D.** Tip fill (1 – 9 scale, 9 complete).

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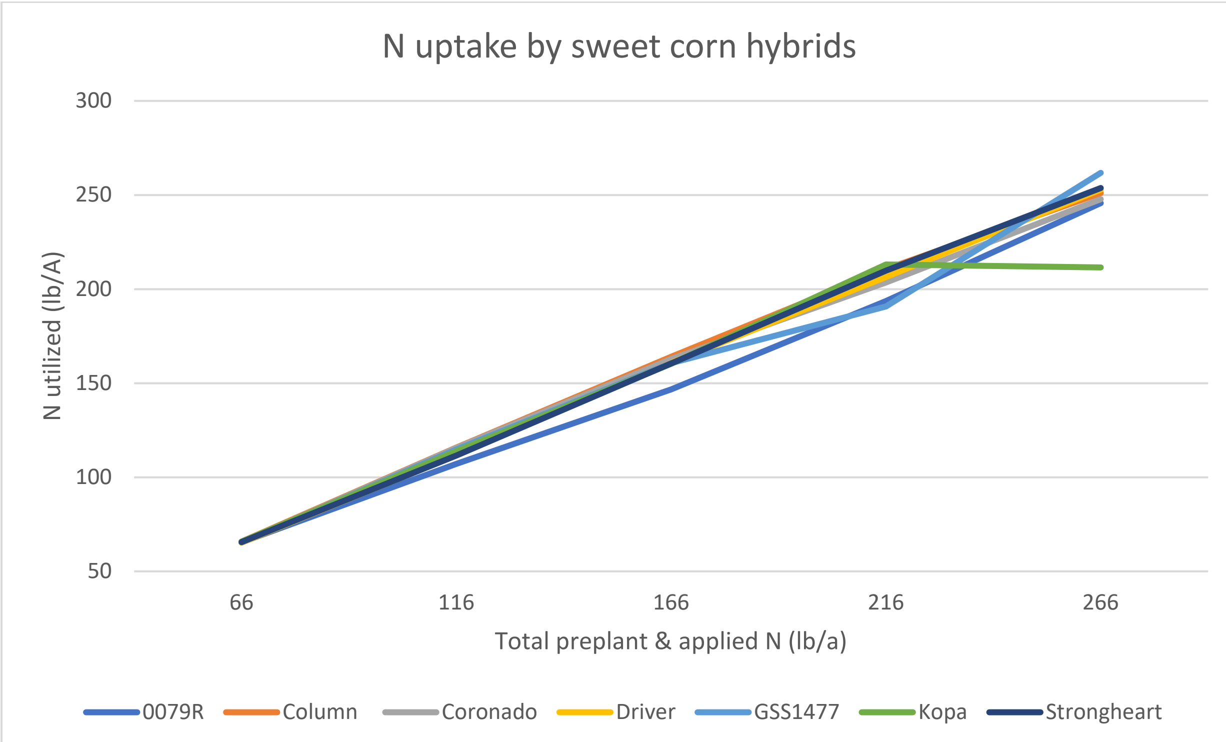



**Figure 3.** Total nitrogen utilized (preplant N + starter N + sidedress N - residual N) by supersweet corn hybrids grown in a yield and quality trial with five sidedress N rates at the OSU Vegetable Research Farm in 2025.

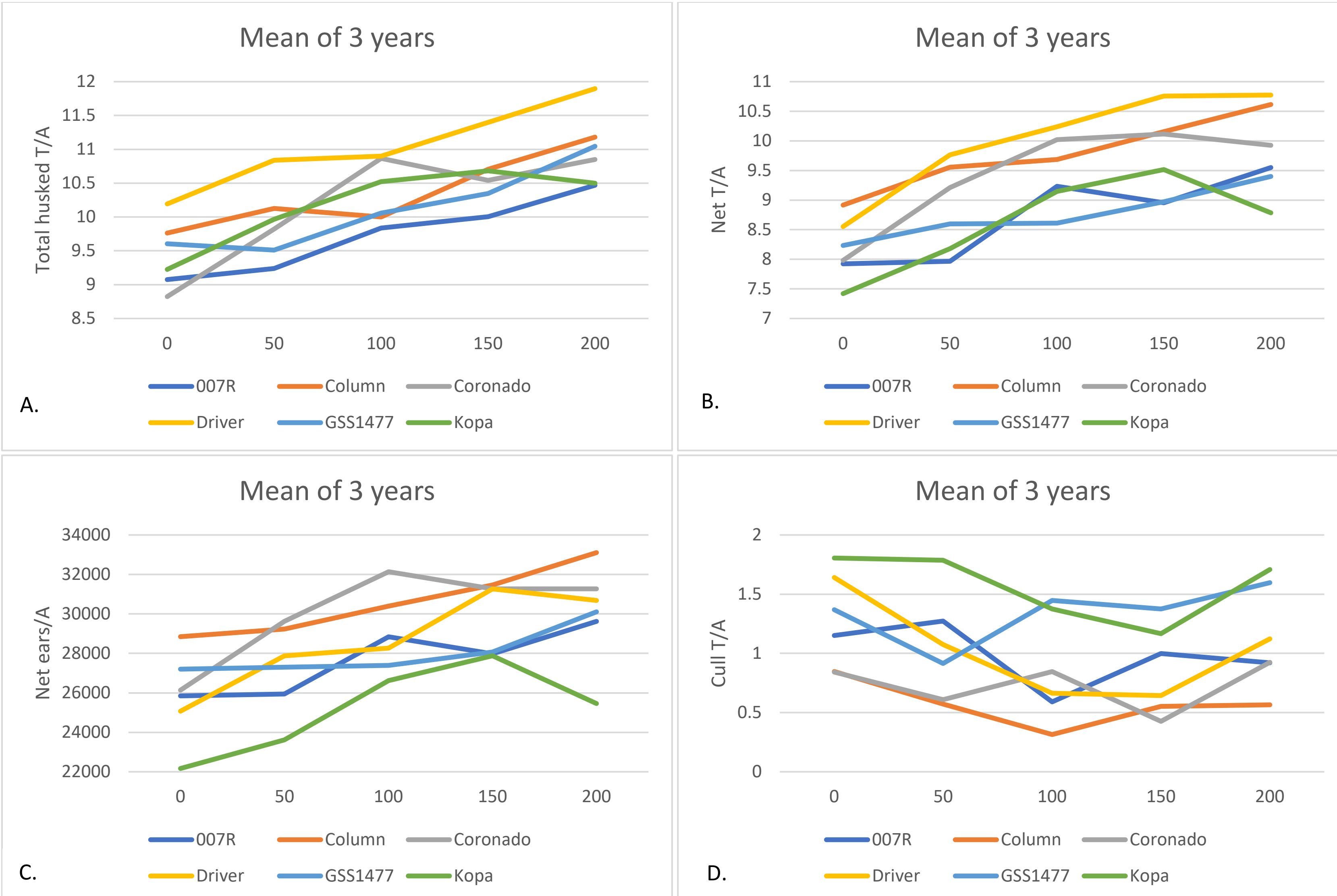



**Figure 4.** Mean of three years (2023- 2025) yield response for six supersweet corn hybrids grown at five sidedress N levels at the OSU Vegetable Research Farm. **A.** Total husked T/A yield (net + cull weight), **B.** Net T/A, **C.** Net ears/A and **D.** Cull/A.

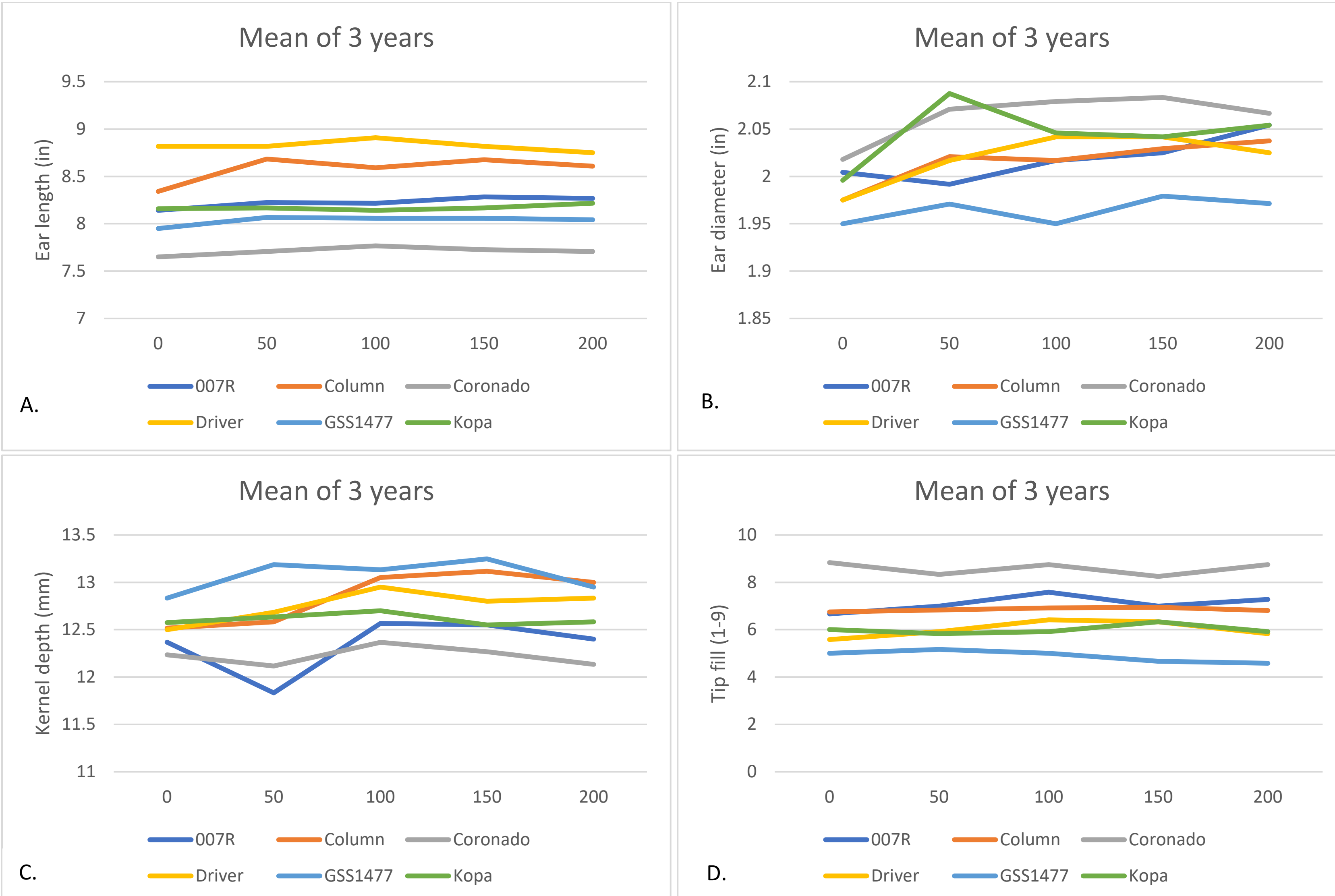



**Figure 5.** Mean of three years (2023- 2025) yield component response for six supersweet corn hybrids grown at five sidedress N levels at the OSU Vegetable Research Farm. **A.** Ear length, **B.** Ear diameter, **C.** Kernel depth and **D.** Tip fill.

**Oregon Processed Vegetable Commission- Report**

Title: Corn rootworms in Oregon: how many and where are they

Project Leader(s): Silvia I. Rondon, Professor and Oregon IPM Center Director, 2217 SW Campus Way, Cordley Hall, Office 2217, Corvallis, OR 97330. Email: Silvia.rondon@oregonstate.edu. Phone (541) 737-2469.

Cooperator(s): Kalli Schoening (MS Candidate), Crop and Soil Sciences; Brittany Barker, Assistant Professor, Oregon IPM Center and Department of Horticulture; Jessica Green, Oregon IPM Center Educator (0.25 FTE), and Kyleah Rabe, OSU Undergraduate student. Roles: Schoening and Rabe will collect, summarize, and report the data. Green will help identify collaborators; Barker will help as a consultant for data analysis.

Amount requested: $16,505 (Yr 1) Amount awarded: $16,505

Summary: The corn rootworm complex (Coleoptera: Chrysomelidae) includes a group of three insects that can damage corn and other vegetable field crops, such as cucurbits and squash. The western *Diabrotica virgifera virgifera LeConte,* the northern *Diabrotica barberi* Smith and Lawrence, and the southern *Diabrotica undecimpunctata* Barber rootworms are among the most challenging pests to control (Figure 1). Some strategies to manage corn rootworms include crop rotation, weed management, scouting and risk assessment, using soil insecticides, and, when available, genetically modified crops. This proposal focuses on collecting information about the corn rootworm complex in Oregon by studying the population dynamics and geographical distribution while informing stakeholders about the findings. Western and southern corn rootworms are present in Oregon west, while northern corn rootworms are not. In 2025, the population of western and southern corn rootworms was low compared to historical levels; however, they are widely present across a variety of crops.

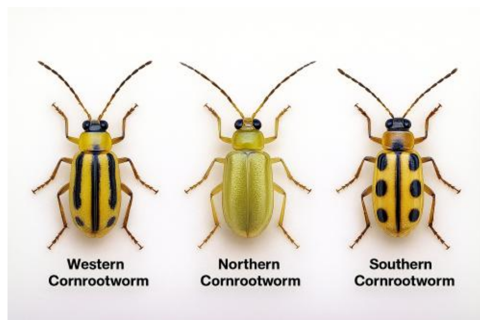



Figure 1. Corn rootworms complex.

Key Words: corn rootworm, Chrysomelidae, spotted cucumber beetle, maize, root rating

Objective(s): The main objectives of this proposal are to gain an understanding of (1) population dynamics and geographical distribution, and (2) to inform stakeholders about our findings using several outlets.

Justification: Corn rootworms significantly impact agriculture, economic stability, and, therefore, food security. This complex is among the most destructive pests of corn crops worldwide. Investing in corn rootworm research in Oregon is a proactive pest management approach that helps develop innovative, environmentally friendly, and cost-effective solutions to ensure agricultural sustainability.

Procedures:

Objective 1A. *Population dynamics*. Field research was conducted in 2025 on at least five commercial crops: maize, squash, artichoke, barley, or wheat. Densities of corn rootworms were monitored with Pherocon AM yellow sticky traps from Great Lakes Integrated Pest Management, Vestaburg, MI (4 per field, per ½ acre). Varieties, planting dates, and agricultural practices were recorded. Sticky traps were attached to metal fencing and replaced every 7 days from early July through late September. Following retrieval, traps were brought to the laboratory and stored at 6 °C until examination. All corn rootworm species were counted. A generalized linear model (GLM) procedure was used to construct analysis of variance (ANOVA) tables for overall corn rootworm densities (per species) as measured with Pherocon AM. A Least Significant Difference test (LSD, $P$ = 0.05) was used to compare adult corn rootworm means per crop by year. The following video (https://www.youtube.com/watch?v=EtaaFYVPR_A) explains the setup, retrieval, counting, and reporting for this pest.

Results: Field research was conducted at 13 farms across 18 unique field sites, representing multiple commercial cropping systems, including sweetcorn, silage corn, winter squash, soybeans, and cucumbers. Across these locations, we documented the occurrence and relative abundance of western corn rootworm, southern corn rootworm (a.k.a. spotted cucumber beetle), and the striped cucumber beetle, *Acalymma vittatum* L. (Figure 2). *Acalymma* was counted because it was abundant and resembled western corn rootworm. In addition to pest counts, observations of beneficial insects were recorded at each site to support a more complete understanding of potential biological control contributions. This data will contribute directly to ongoing modeling, risk assessment, and extension recommendations.

Figure 2. Southern corn rootworm (a.k.a spotted cucumber beetle *Acalymma vittatum*

Objective 1B. *Geographical distribution*. Data were collected in 2025 by placing two double-sided yellow sticky cards (Cascade Ag Service, Wenatchee, WA) per maize field across the Willamette Valley. At least five sites per region were surveyed. Each card was secured to a corn stake approximately 1.2 m above the soil surface, as described in our YouTube video. Trapping begins in early June and continues until September. Sticky cards were collected and replaced weekly, and corn rootworms were counted. The minimum distance between sites was approximately 750 m. Mean corn rootworm counts for each site in the summer and fall of each year were mapped using GPS coordinates and the GPS Visualizer Utility. Weather data were collected from AgWeatherNet stations near the trapping sites to determine corn rootworm phenology. Data will be entered in USPESt.org.

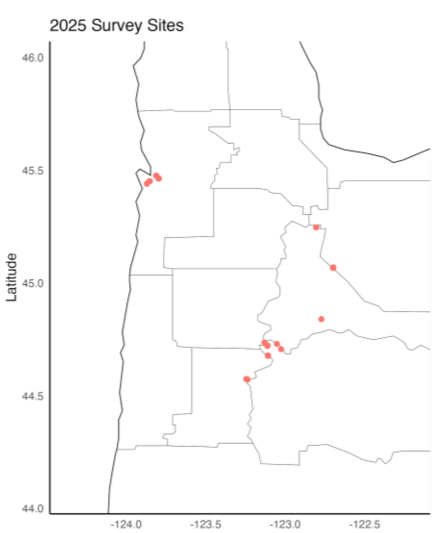
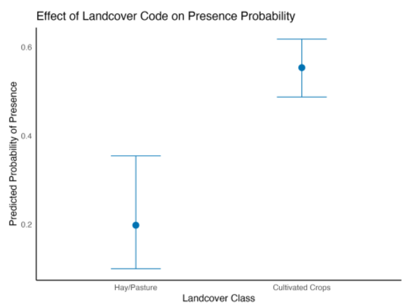



Figure 3. Distribution of all field sites.

Results: Western corn rootworm monitoring was conducted at 13 farms across 18 sites in the greater Willamette Valley (Figure 3). Presence and absence records of western corn rootworms were documented at each site. This data will be implemented into our correlative species distribution model of western corn rootworms. Our model uses occurrence records of western corn rootworms and environmental variables that influence their lifecycle to predict suitable habitats in our region. This model serves as a baseline pest management tool for identifying where western corn rootworms are likely to establish populations in our area. The same approach will be used for the southern and the striped cucumber beetles.

In addition, after running a generalized linear model, precipitation and land cover are shown to be statistically significant predictors of presence. Temperature variables do not show a meaningful relationship with presence, but higher presence is associated with cultivated crops. More analysis is still needed (Figure 4).




| Term | Estimate | Std. Error | z value | Pr(>lzl) | Significance |
|---|---|---|---|---|---|
| (Intercept) | −1.397 | 0.408 | −3.427 | 0.001 | *** |
| tmin_mean_s | 0.052 | 0.209 | 0.247 | 0.805 | |
| tmax_mean_s | −0.033 | 0.198 | −0.167 | 0.867 | |
| ppt_mean_s | 0.426 | 0.162 | 2.628 | 0.009 | ** |
| landcover_code82 | 1.613 | 0.442 | 3.645 | 0.000 | *** |

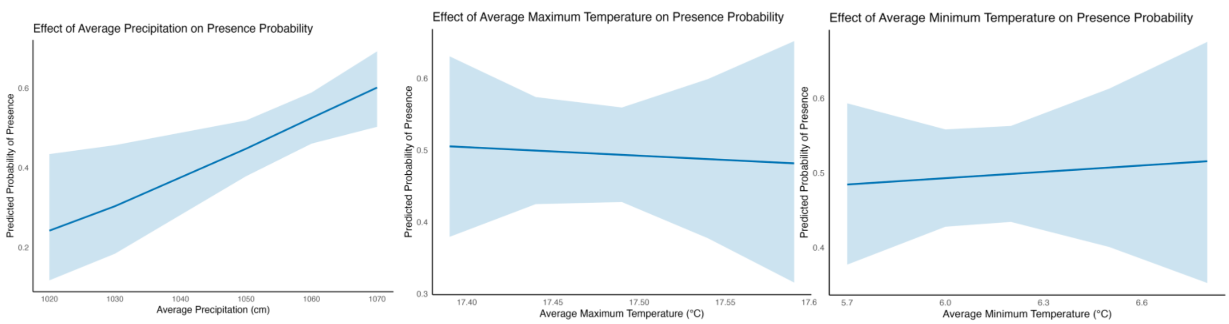



Figure 4. Preliminary model of western corn rootworm presence based on abiotic factors.

Objective 2. Sharing information. Sharing timely information is crucial to ensuring alignment and driving action. We are using several outlets to share our findings. A critical needs assessment conducted in 2023 involving producers, researchers, Extension faculty, and support staff identified the need to have a single website serving as a hub for pest activity reports and applied pest forecast services. Thus, we are using the Oregon IPM Center's site for reporting purposes (https://agsci.oregonstate.edu/oipmc).
Results:

- Verbal communication: presentations explaining the biology and ecology of this pest complex and recommending adequate control methods if needed. Presentations will take place during the winter and summer field days.
- Newsletter. The results will be disseminated using the IPM, VEGnet, and OPVC mailing lists. https://oregonstate.us4.list-manage.com/subscribe?u=eb1d194f29fc447d513159630&id=881dbb7776.
- Social media. We will use LinkedIn and Instagram #IPM accounts to share information. https://www.linkedin.com/company/74710778/admin/dashboard/.
- Written fact sheets will be published on the OSU Extension Communication site. (on going).

- We produced an informative and publicly accessible YouTube series on corn rootworms titled “Corn Rootworm in the PNW”. This three-episode series explains the biology, ecology, and regional importance of the corn rootworm complex in the Pacific Northwest. These videos were developed specifically to support producers and extension audiences by presenting scientific information clearly and concisely.

Episode 1 https://www.youtube.com/watch?v=H5NEMcB0A0s
Episode 2 https://www.youtube.com/watch?v=nLay_AuAiQ8
Episode 3 https://www.youtube.com/watch?v=cbyY2n__Z04

Additionally, Ms. Schoening presented preliminary research findings at the 2025 Entomological Society of America Conference. Her presentation, “Modeling the potential distribution of *Diabrotica virgifera virgifera* (Coleoptera: Chrysomelidae) in western Oregon”, earned first place in the 10-minute Graduate Student Presentation Competition, Plant-Insect Ecosystems, Invasive Species section.

In 2026, our team is scheduled to present at several vegetable-related winter meetings.

Impacts: We expect this project to last **at least two years**. Our short-term goal is to develop educational programming tailored to various vegetable commodity groups throughout Oregon. Critical needs include corn rootworm identification. Although not part of this proposal, we will create hands-on materials to demonstrate look-alike traits and showcase the diversity of Chrysomelidae. Training sessions will be in-person, offering live demonstrations using a “train-the-trainer” approach. All training materials will be hosted at the Oregon IPM Center website. In addition, all English-language material will be made available in Spanish using the language education model.

Acknowledgements: thank you to all producers who allowed us access to their farms.

- Kraemer Farms
- Case Farms
- Gray Farms
- Sublime Organics
- Jenck Farms
- Oldenkamp Farms of Tillamook
- Josi Farms
- Barnett Farms & Nursery
- Christensen Farms
- Headwaters Farm
- Tom Thompson (Tillamook agriculturalist)

Oregon Processed Vegetable Commission & Cooperating Growers

Agricultural Research Foundation

Oregon Integrated Pest Management Center: Silvia Rondon, Brittany Barker, Jessica Green, Kyleah Rabe, Alice Formiga, Calix Pryor

Images:
Joseph L. Spencer, University of Illinois

Scan me to find out more about the National Corn Rootworm Monitoring Network

Scan me to check out our YouTube series on corn rootworms