

## 2021 VEGETABLE RESEARCH FUNDING

|   | TITLE   | RESEARCHER     | \$ AMOUNT FUNDED |
|---|---|----------------|------------------|
| 1 | Weed Control Evaluations in Lima Beans                      | D. E. Robinson | \$19,000         |
| 2 | Weed Control Evaluations in Snap Beans                      | D. E. Robinson |                  |
| 3 | Weed Control Evaluations in Carrots                         | D. E. Robinson |                  |
| 4 | Weed Control Evaluations in Peas                            | D. E. Robinson |                  |
| 5 | NYS Processing Snap Bean, English Pea and Sweet Corn Trials | S. Reiners     | \$5,400 US       |
| 6 | Processing Pea Cultivar Evaluations                         | Bonduelle      | \$5,000          |
|   |   |                |                  |

**Project Title:** Weed Control and Problem Weed Management in Processing Vegetables

**Research Agency:** Ridgetown Campus, University of Guelph

**Lead Investigator:** Darren Robinson

**Executive Summary:**

The purpose of this research was to examine the tolerance and weed control of various herbicides in lima and snap bean, carrots and processing peas.

**Lima bean.** In trial 1, we observed extensive injury in the pethoxamid treatments, which resulted in a reduction in plant size and yield loss. In addition, we observed injury in the Zidua treatments and a corresponding reduction in dry weight and yield at the 2X rate. In trial 2, plant height, dry weight and yield were similar to the untreated check in all treatments, though some leaf puckering and plant stunting was observed early in the growing season. By crop maturity, lima bean outgrew the injury in trial 2.

**Snap bean.** In trial 1, though yield was not less than the untreated check in any of the pethoxamid treatments, some injury symptoms (leaf puckering and plant stunting) was observed early in the growing season. Snap bean yield was less than the untreated check in the Shieldex treatments, despite showing little visible injury (ie. 7% or less) and no reduction in plant height. In trial 2, yield was less than the untreated check in the pethoxamid and Zidua treatments, with some extensive injury symptoms (leaf puckering and plant stunting), particularly early in the growing season. Snap bean yield was slightly less than the untreated check in the Shieldex treatments (though not statistically significant, despite showing little visible injury (ie. 7% or less) and no reduction in plant height. Snap bean showed acceptable tolerance to Prowl in both trials.

**Carrot.** Marketable yield was not reduced at a Zidua® rate of 100 g/ha. A minor use was submitted, requesting a rate of 100 g/ha – additional data have been requested by PMRA on both tolerance and efficacy. Another set of trials is part of a long term study to develop an approach to managing linuron-resistant pigweed. Tank mixes of Dual II Magnum with Nortron (applied PRE) followed by micro-rates of Goal gave the best control of velvetleaf, redroot pigweed, common and crabgrass. Carrot yield was greatest where the two-way tank mix of Dual II Magnum+Nortron (PRE) was followed by Goal micro-rates.

**Peas.** Visible injury was less than 10% in all pea cultivars at both rates of Zidua, Pea tenderness and yields were all similar to the untreated check. Peas did not show the same level of tolerance to Reflex. Injury, decreased tenderometer readings and a reduction in pea yield were observed at the 0.8 L/ac rate of Reflex in Tyne, Sherwood and Sweet Savour.

**Objectives:****Lima bean.**

1. To evaluate weed management systems in lima bean to various tank mixes of Sandea, Prowl H20, and Dual II Magnum.
2. To evaluate pethoxamid (CHA-2735) for tolerance in lima beans.

**Snap bean.**

1. To evaluate weed management systems in snap bean to various tank mixes of Sandea, Prowl H20, and Dual II Magnum.
2. To evaluate pethoxamid (CHA-2735) for tolerance in snap beans.

**Carrots.**

1. To examine carrot tolerance to pyroxasulfone applied at various POST timings in processing carrot.
2. To evaluate tolerance of carrots to and control of linuron-resistant pigweed by preemergence applications of pyroxasulfone, Nortron, Prowl H20.
3. To examine carrot tolerance to and linuron-resistant pigweed control by micro-rates of Goal, Reflex and Blazer for control of linuron-resistant pigweed in carrot.

**Peas.**

- 1) To evaluate Zidua for variety sensitivity and annual broadleaf weed control in peas.
- 2) To evaluate Reflex for variety sensitivity and annual broadleaf weed control in peas.

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## **TRIAL 1: TOLERANCE OF LIMA BEAN TO PREEMERGENCE HERBICIDES - I**

### **Materials & Methods:**

**Crop:** Lima bean

**Variety:** Cypress

**Planting rate:** 266667 seeds/ha

**Row spacing:** 75cm

**Planting date:** May 25/21

**Depth:** 3.5 cm

**Plant spacing:** 5 cm

**Design:** Randomized Complete Block Design

**Plot width:** 1.5m

**Plot length:** 10m

**Reps:** 4

**Field Preparation:** Field was fertilized on June 2 with 19-19-19 at 38 kg/ha of actual N, P and K.

### **Soil Description:**

**Sand:** 82%

**Silt:** 10%

**Clay:** 8%

**OM:** 1.3%

**pH:** 6.0

**CEC:** 6.2

**Texture:** Loamy Sand

**Soil:** Watford/Brady series

### **Application Information:**

**Application Date:** May 27-2021  
**Time of Day:** 8:15 AM  
**Application Method:** CO2 SPRAY  
**Application Timing:** PRE  
**Application Placement:** SOIL  
**Air Temperature, Unit:** 10 C  
**% Relative Humidity:** 71  
**Wind Velocity, Unit:** 3 KPH  
**Wind Direction:** NE  
**Dew Presence (Y/N):** N  
**Soil Temperature, Unit:** 17 C  
**Soil Moisture:** MOIST

### **Spray Equipment:**

**Application Method:** CO2 Backpack

**Nozzle Type:** Air Induction

**Nozzle Spacing:** 50 cm (20")

**Spray Volume:** 200 L/ha (20 GAL/AC)

**Pressure:** 207 KPA (30 PSI)

**Nozzle Size:** ULD120-02

**Boom Width:** 1.5 m (60")

**Results:** We observed extensive injury (up to 28%) in the pethoxamid treatments, which resulted in a reduction in plant size (from 40 to 14 g/plant) and yield loss (from 3.0 T/ac to 1.1 T/ac - Table 1.1). In addition, we observed up to 13% injury in the Zidua treatments and a corresponding reduction in dry weight (from 40 TO 18 g/plant) and yield (from 3.0 to 2.0 T/ac) at the 2X rate.

**Table 1.1. Effect of herbicide treatment on lima bean percent injury 7, 14 and 28 days after application, dry weight at 28 days and yield.**

| HERBICIDE           | RATE      | PERCENT INJURY |     |     | DRY WT | YIELD<br>T/AC |
|---------------------|-----------|----------------|-----|-----|--------|---------------|
|                     |           | 7D             | 14D | 28D | G      |               |
| 1. Check (WEEDFREE) |           | 0A             | 0B  | 0C  | 40A    | 3.0A          |
| 2. pethoxamid       | 1200 G/HA | 1A             | 1B  | 0C  | 40A    | 3.2A          |
| 3. pethoxamid       | 2400 G/HA | 2A             | 17A | 28A | 14C    | 1.1C          |
| 4. ZIDUA            | 47 G/AC   | 1A             | 5B  | 5C  | 29B    | 2.7A          |
| 5. ZIDUA            | 94 G/AC   | 1A             | 8B  | 13B | 18C    | 2.0B          |
| 6. PROWL H20        | 0.96 L/AC | 2A             | 2B  | 4C  | 38A    | 3.0A          |
| 7. PROWL H20        | 1.92 L/AC | 2A             | 3B  | 4C  | 37A    | 3.3A          |
| 8. SHIELDEX         | 16.3 G/AC | 0A             | 5B  | 5C  | 38A    | 3.0A          |
| 9. SHIELDEX         | 32.6 G/AC | 1A             | 1B  | 1C  | 29B    | 2.6AB         |
| LSD (P <0.05)       |           | 2              | 8   | 14  | 9      | 0.6           |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

### Conclusions:

Conclusions: This trial was kept weed-free to test for the effect of pethoxamid, a new preemergence herbicide under development for field crops. We also examined the tolerance of lima bean to Zidua, Prowl H20, and Shieldex (tolpyralate). This trial was conducted on a fairly sandy soil with low (1.3%) organic matter. Injury, reductions in plant size and yield loss were observed in both pethoxamid and Zidua treatments. Prowl H2O and Shieldex did not injure lima bean. The results of this trial contrasted with those of Trial 2 (please see below), in which little injury and no yield loss were observed. This is hypothesized to have occurred because Trial 2 was conducted on a heavier soil type, and though some treatments injured lima bean, we did not measure any decreases in plant dry weight or yield.

## TRIAL 2: TOLERANCE OF LIMA BEAN TO PREEMERGENCE HERBICIDES - II

**Objective:** Determine the tolerance of lima bean to PRE applications of new herbicide active ingredients – pethoxamid, Zidua, Shieldex, as well as Prowl H20.

### Materials & Methods:

**Crop:** Lima bean

Variety: Cypress

Planting rate: 266667 seeds/ha

Row spacing: 75cm

Planting date: May 25/21

Depth: 3.5 cm

Plant spacing: 5 cm

**Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Field was fertilized on June 2 with 19-19-19 at 38 kg/ha of actual N, P and K.

### Soil Description:

Sand: 52%

Silt: 24%

Clay: 24%

OM: 4.3%

pH: 7.3

CEC 12.3

Texture: Loamy Sand

Soil: Watford/Brady series

### Application Information:

|                         |             |
|-------------------------|-------------|
| Application Date:       | May 27-2021 |
| Time of Day:            | 9:15 AM     |
| Application Method:     | CO2 SPRAY   |
| Application Timing:     | PRE         |
| Application Placement:  | SOIL        |
| Air Temperature, Unit:  | 14 C        |
| % Relative Humidity:    | 64          |
| Wind Velocity, Unit:    | 3 KPH       |
| Wind Direction:         | NE          |
| Dew Presence (Y/N):     | N           |
| Soil Temperature, Unit: | 18 C        |
| Soil Moisture:          | MOIST       |

### Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

**Results:** Pethoxamid caused up to 9% visual injury to lima bean (Table 2.1), but plant dry weight and yield were similar to the untreated, weed-free check. Injury in the Zidua, Prowl and Shieldex treatments was less than 10% in all cases, and there were no significant reductions in plant dry weight or yield, relative to the untreated, weed-free check.

**Table 2.1. Effect of herbicide treatment on lima bean percent injury 7, 14 and 28 days after application, dry weight at 28 days and yield.**

| HERBICIDE           | RATE      | PERCENT INJURY |     |     | DRY WT | YIELD<br>T/AC |
|---------------------|-----------|----------------|-----|-----|--------|---------------|
|                     |           | 7D             | 14D | 28D | G      |               |
| 1. Check (WEEDFREE) |           | 0A             | 0A  | 0A  | 42A    | 2.5A          |
| 2. pethoxamid       | 1200 G/HA | 3A             | 5A  | 2A  | 40A    | 2.6A          |
| 3. pethoxamid       | 2400 G/HA | 4A             | 9A  | 5A  | 46A    | 2.3A          |
| 4. ZIDUA            | 47 G/AC   | 1A             | 3A  | 2A  | 49A    | 2.7A          |
| 5. ZIDUA            | 94 G/AC   | 1A             | 5A  | 4A  | 48A    | 2.3A          |
| 6. PROWL H20        | 0.96 L/AC | 1A             | 1A  | 0A  | 38A    | 2.5A          |
| 7. PROWL H20        | 1.92 L/AC | 2A             | 2A  | 0A  | 47A    | 2.6A          |
| 8. SHIELDDEX        | 16.3 G/AC | 0A             | 3A  | 5A  | 38A    | 2.4A          |
| 9. SHIELDDEX        | 32.6 G/AC | 1A             | 6A  | 7A  | 39A    | 2.6A          |
| LSD (P <0.05)       |           | 2              | 8   | 6   | 11     | 0.3           |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

### Conclusions:

Conclusions: This trial was kept weed-free to test for the effect of pethoxamid, a new preemergence herbicide under development for field crops. We also examined the tolerance of lima bean to Zidua, Prowl H20, and Shieldex (tolpyralate). Though plant height, dry weight and yield was not less than the untreated check in any of the treatments, some injury symptoms (leaf puckering and plant stunting) was observed early in the growing season. By crop maturity, lima bean had outgrown the injury.



## TRIAL 3: TOLERANCE OF SNAP BEAN TO PREEMERGENCE HERBICIDES - I

### Materials & Methods:

**Crop:** Snap bean

Variety: Huntington

Planting rate: 374532 seeds/ha

Row spacing: 75cm

Planting date: May 27, 2021

Depth: 2.5 cm

Plant spacing: 3.6 cm

**Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Field was fertilized on May 25 with 19-19-19 at 38 kg/ha of actual N, P and K.

### Soil Description:

Sand: 51%

Silt: 22%

Clay: 26%

OM: 3.8%

pH: 7.3

CEC 13.5

Texture: Sandy Clay Loam

Soil: Watford/Brady series

### Application Information:

**Application Date:** May 27-2021  
**Time of Day:** 7:45 AM  
**Application Method:** CO2 SPRAY  
**Application Timing:** PRE  
**Application Placement:** SOIL  
**Air Temperature, Unit:** 10 C  
**% Relative Humidity:** 71  
**Wind Velocity, Unit:** 4 KPH  
**Wind Direction:** NE  
**Dew Presence (Y/N):** N  
**Soil Temperature, Unit:** 17 C  
**Soil Moisture:** WET

### Spray Equipment:

Application Method: CO2 Backpack  
Nozzle Type: Air Induction  
Nozzle Spacing: 50 cm (20")  
Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)  
Nozzle Size: ULD120-02  
Boom Width: 1.5 m (60")

**Results:** Snap bean injury, dry weight and yield were similar to the untreated, weed-free check in all treatments (Table 3.1). Injury ranged from 1 to 7% across all treatments, and plant dry weight ranged from 40 g/plant to 45 g/plant. Snap bean yield was less in both Shieldex treatments (from 3.0 to 3.3 T/ac) than the untreated check (4.1 T/ac).

**Table 3.1. Effect of herbicide treatment on snap bean percent injury 7, 14 and 28 days after application, dry weight at 28 days and yield.**

| HERBICIDE           | RATE      | PERCENT INJURY |     |      | DRY WT<br>G | YIELD<br>T/AC |
|---------------------|-----------|----------------|-----|------|-------------|---------------|
|                     |           | 7D             | 14D | 28D  |             |               |
| 1. Check (WEEDFREE) |           | 0C             | 0A  | 0C   | 40A         | 4.1A          |
| 2. pethoxamid       | 1200 G/HA | 3B             | 1A  | 1BC  | 44A         | 4.2A          |
| 3. pethoxamid       | 2400 G/HA | 3B             | 5A  | 4ABC | 42A         | 4.5A          |
| 4. ZIDUA            | 47 G/AC   | 6A             | 3A  | 7A   | 42A         | 4.0A          |
| 5. ZIDUA            | 94 G/AC   | 6A             | 1A  | 1C   | 41A         | 4.4A          |
| 6. PROWL H20        | 0.96 L/AC | 3B             | 1A  | 1C   | 43A         | 4.2A          |
| 7. PROWL H20        | 1.92 L/AC | 5AB            | 3A  | 1C   | 45A         | 4.1A          |
| 8. SHIELDDEX        | 16.3 G/AC | 5AB            | 4A  | 1C   | 40A         | 3.3B          |
| 9. SHIELDDEX        | 32.6 G/AC | 7A             | 4A  | 1C   | 43A         | 3.0B          |
| LSD (P <0.05)       |           | 2              | 5   | 4    | 12          | 0.8           |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

### Conclusions:

Conclusions: This trial was kept weed-free to test for the effect of pethoxamid, a new preemergence herbicide under development for field crops. We also examined the tolerance of snap bean to Zidua, Prowl H20, and Shieldex (tolpyralate). Snap bean yield was less than the untreated check in the Shieldex treatments, despite showing little visible injury (ie. 7% or less) and no reduction in plant dry weight. After carefully examining the root systems of snap beans this year (which we did also note in 2020), we observed a reduction in secondary root growth in the Shieldex treatments.

## TRIAL 4: TOLERANCE OF SNAP BEAN TO PREEMERGENCE HERBICIDES - II

### Materials & Methods:

**Crop:** Snap bean

Variety: Huntington

Planting rate: 374532 seeds/ha

Row spacing: 75cm

Planting date: May 27/21

Depth: 2.5 cm

Plant spacing: 3.6 cm

**Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Field was fertilized on May 25 with 19-19-19 at 38 kg/ha of actual N, P and K.

### Soil Description:

Sand: 82%

OM: 1.3%

Silt: 10%

pH: 6.0

Clay: 8%

CEC 6.2

Texture: Loamy Sand

Soil: Watford/Brady series

### Application Information:

A

|                         |             |
|-------------------------|-------------|
| Application Date:       | May 27-2021 |
| Time of Day:            | 6:45 AM     |
| Application Method:     | CO2 SPRAY   |
| Application Timing:     | PRE         |
| Application Placement:  | SOIL        |
| Air Temperature, Unit:  | 7 C         |
| % Relative Humidity:    | 84          |
| Wind Velocity, Unit:    | 4 KPH       |
| Wind Direction:         | NE          |
| Dew Presence (Y/N):     | N           |
| Soil Temperature, Unit: | 17 C        |
| Soil Moisture:          | DAMP        |

### Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

**Results:** Snap bean injury ranged from 1 to 17% in the pethoxamid treatments and from 3 to 21% in the Zidua treatments (Table 4.1). Snap bean injury was less than 10% in all treatments. Plant dry weight was not significantly less than the untreated check in any treatments, but tended to be less in both the pethoxamid and Zidua treatments. Yield decreased to 3.5 and 3.4 T/ac in the pethoxamid and Zidua treatments, respectively, from 5.1 T/ac in the untreated, weed-free check. Snap bean yield was less in both Shieldex treatments (3.0 to 3.3 T/ac) than the untreated check (4.1 T/ac).

**Table 4.1. Effect of herbicide treatment on snap bean percent injury 7, 14 and 28 days after application, dry weight at 28 days and yield.**

| HERBICIDE           | RATE      | PERCENT INJURY |      |      | DRY WT<br>G | YIELD<br>T/AC |
|---------------------|-----------|----------------|------|------|-------------|---------------|
|                     |           | 7D             | 14D  | 28D  |             |               |
| 1. Check (WEEDFREE) |           | 0C             | 0C   | 0C   | 53A         | 5.1A          |
| 2. pethoxamid       | 1200 G/HA | 3BC            | 1BC  | 1BC  | 44A         | 5.2A          |
| 3. pethoxamid       | 2400 G/HA | 3BC            | 9A   | 17AB | 32A         | 3.5B          |
| 4. ZIDUA            | 47 G/AC   | 5AB            | 3ABC | 7A   | 46A         | 5.0A          |
| 5. ZIDUA            | 94 G/AC   | 6AB            | 11BC | 21BC | 31A         | 3.4B          |
| 6. PROWL H20        | 0.96 L/AC | 3BC            | 1BC  | 1BC  | 53A         | 5.2A          |
| 7. PROWL H20        | 1.92 L/AC | 5AB            | 3ABC | 7BC  | 50A         | 4.5A          |
| 8. SHIELDDEX        | 16.3 G/AC | 5AB            | 4AB  | 1BC  | 50A         | 4.7A          |
| 9. SHIELDDEX        | 32.6 G/AC | 7A             | 4AB  | 1BC  | 50A         | 4.3A          |
| LSD (P <0.05)       |           | 4              | 3    | 4    | 25          | 1.9           |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

### Conclusions:

Conclusions: This trials was kept weed-free to test for the effect of pethoxamid on snap bean. We also examined the tolerance of snap bean to Zidua, Prowl H20, and Shieldex (tolpyralate). In this trial, yield was less than the untreated check in the pethoxamid treatments, with some extensive injury symptoms (leaf puckering and plant stunting), particularly early in the growing season. Snap bean yield was slightly less than the untreated check in the Shieldex treatments (though not statistically significant, despite showing little visible injury (ie. 7% or less) and no reduction in plant height.

## TRIAL 5: TOLERANCE OF CARROT TO POSTEMERGENCE APPLICATIONS OF PYROXASULFONE

### Materials & Methods:

#### **Crop:** Carrot

Variety: Belgrado

Planting date: May 12/21

Planting rate: 393750 seeds/ha      Depth: 1 cm

Row spacing: 38cm

#### **Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Fertilized with 75 kg/ha of 27-0-0 on May 12. Entire trial was kept weed-free by hand.

#### **Soil Description:**

Sand: 78%

OM: 3.5%

Texture: loamy sand

Silt: 15%

pH: 6.2

Soil: Normandale

Clay: 7%

CEC 6.6

#### **Application Information:**

|                  | A         | B         |
|------------------|-----------|-----------|
| APPLICATION DATE | May 23/21 | June 6/21 |
| TIME OF DAY      | 8:30AM    | 7:30AM    |
| TIMING           | POST1     | POST2     |
| AIR TEMP (c)     | 22        | 23        |
| RH (%)           | 74        | 80        |
| WIND SPEED (KPH) | 5         | 8         |
| SOIL TEMP (c)    | 20        | 26        |
| CLOUD COVER (%)  | 100       | 0         |
| CROP STAGE       | 2-3 LF    | 4-5 LF    |

#### **Spray Equipment:**

Application Method: CO2 Backpack

Pressure: 207 KPA (30 PSI)

Nozzle Type: AIR INDUCTION

Nozzle Size: ULD120-02

Nozzle Spacing: 50 cm (20")

Boom Width: 1.5 m (60")

Spray Volume: 200 L/ha (20 GAL/AC)

**Results:**

Carrot injury at 7 days after treatment (DAT) increased from 1 to 16%, and from 3 to 27%, when it was applied postemergence to carrots at the 2-3 and 4-5 leaf stages, respectively (Table 5.1). The level of injury increased to 46% by 28 DAT in the 2-3 leaf application timing, and decreased to 19% by 28 DAT in the 4-5 leaf application timing. Yield was similar to the untreated check in most treatments, with three exceptions. Yield decreased from 26 T/ac to 21 and 9 T/ac when pyroxasulfone was applied at rates of 250 and 500 g/ha at the 2-3 leaf timing. Also, yield decreased to 19 T/ac when pyroxasulfone was applied at a rate of 500 g/ha at the 4-5 leaf timing.

**Table 5.1. Effect of herbicide treatment on visual injury (7 and 28 days after treatment) and carrot yield.**

| HERBICIDE         | RATE    | TIMING | PERCENT INJURY |     | YIELD<br>T/AC |
|-------------------|---------|--------|----------------|-----|---------------|
|                   |         |        | 7D             | 28D |               |
| 1. UNTREATED      |         |        |                |     | 26A           |
| 2. PYROXASULFONE  | 89G/HA  | 2-3LF  | 1C             | 0C  | 25A           |
| 3. PYROXASULFONE  | 100G/HA | 2-3LF  | 4C             | 0C  | 31A           |
| 4. PYROXASULFONE  | 125G/HA | 2-3LF  | 4C             | 1C  | 27A           |
| 5. PYROXASULFONE  | 178G/HA | 2-3LF  | 8BC            | 1C  | 30A           |
| 6. PYROXASULFONE  | 200G/HA | 2-3LF  | 9B             | 1C  | 24A           |
| 7. PYROXASULFONE  | 250G/HA | 2-3LF  | 12B            | 13B | 21B           |
| 8. PYROXASULFONE  | 500G/HA | 2-3LF  | 16A            | 46A | 9C            |
| 9. PYROXASULFONE  | 89G/HA  | 4-5LF  | 3B             | 6C  | 25A           |
| 10. PYROXASULFONE | 100G/HA | 4-5LF  | 6B             | 5C  | 27A           |
| 11. PYROXASULFONE | 125G/HA | 4-5L   | 8B             | 8BC | 25A           |
| 12. PYROXASULFONE | 178G/HA | 4-5LF  | 11B            | 9BC | 26A           |
| 13. PYROXASULFONE | 200G/HA | 4-5LF  | 14B            | 9BC | 28A           |
| 14. PYROXASULFONE | 250G/HA | 4-5LF  | 19B            | 8BC | 27A           |
| 15. PYROXASULFONE | 500G/HA | 4-5LF  | 27A            | 19B | 19B           |
| LSD (P <0.05)     |         |        | 4              | 9   | 6             |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

**Conclusions:** Pyroxasulfone (Zidua®) is an excellent candidate for control of linuron-resistant pigweed; therefore studies were established in mineral and muck soils to determine tolerance of carrot to postemergence applications of pyroxasulfone. As Zidua® rate increased from 100 to 500 g/ha at the early

application timing (ie. 2-3 leaf), injury increased from 1-16%, and 0-46% at 7 and 28 days after herbicide treatment (DAT). Visible injury increased from 3-27% and 6-19% at 7 and 28 days after application at the 4-5 leaf stage of carrot. Despite the levels of injury that were apparent at either application timing, marketable yield was similar to the untreated check at most herbicide rates. Marketable yield was not reduced at a Zidua® rate of 100 g/ha. **A minor use was submitted, requesting a rate of 100 g/ha – additional data have been requested by PMRA on both tolerance and efficacy.**

## TRIAL 6: PRE-POST STRATEGIES FOR WEED CONTROL IN CARROT

### Materials & Methods:

#### **Crop:** Carrot

Variety: Belgrado

Planting date: May 12/21

Planting rate: 393750 seeds/ha      Depth: 1 cm

Row spacing: 38cm

#### **Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Fertilized with 75 kg/ha of 27-0-0 on May 12.

#### **Soil Description:**

Sand: 78%

OM: 3.5%

Texture: loamy sand

Silt: 15%

pH: 6.2

Soil: Normandale

Clay: 7%

CEC 6.6

#### **Application Information:**

|                  | A         | B         | C         | D         |
|------------------|-----------|-----------|-----------|-----------|
| APPLICATION DATE | May 11/21 | May 21/21 | May 28/21 | June 5/21 |
| TIME OF DAY      | 8:00AM    | 9:00AM    | 11:00AM   | 8:30AM    |
| TIMING           | PRE       | POST1     | POST2     | POST3     |
| AIR TEMP (c)     | 10        | 29        | 25        | 25        |
| RH (%)           | 53        | 56        | 54        | 70        |
| WIND SPEED (KPH) | 1         | 1         | 4         | 0         |
| SOIL TEMP (c)    | 16        | 30        | 28        | 25        |
| CLOUD COVER (%)  | 50        | 10        | 10        | 30        |
| CROP STAGE       | PRE       | COT       | 2 LF      | 4-5LF     |
| WEED STAGE       | PRE       | COT-2 LF  | COT-2 LF  | COT- 2LF  |

#### **Spray Equipment:**

Application Method: CO2 Backpack

Pressure: 207 KPA (30 PSI)

Nozzle Type: AIR INDUCTION

Nozzle Size: ULD120-02

Nozzle Spacing: 50 cm (20")

Boom Width: 1.5 m (60")

Spray Volume: 200 L/ha (20 GAL/AC)



**Results:**

Applications of Dual II Magnum, Prowl H2O gave good (81 and 85%) control of crabgrass, but did not control velvetleaf or redroot pigweed (control ranged from 45 to 79%). Nortron alone gave 80% and 75% control of velvetleaf and redroot pigweed, but only 35% control of crabgrass (Table 6.1). The two-way tank-mixes of Dual + Nortron and Prowl + Nortron gave fair to good control of velvetleaf (76%), redroot pigweed (83-84%) and crabgrass (84-87%). The three-way tank-mix of Dual + Prowl + Nortron gave greater than 90% of all weeds in the trial area. The addition of micro-rates of either Goal or Blazer increased the level of control to 96% for all three weeds, for all the different two-way and three-way tank-mixes of preemergence herbicides.

Visual injury in the three-way tank-mix combinations (with or without micro-rates of Goal or Blazer) ranged from 18 to 31% (Table 6.2). This injury was accompanied by yield reductions – relative to the untreated, weed-free check – in all the three-way tank-mix treatments whether they were followed by micro-rates of Blazer and Reflex or not. The tank-mix of Dual + Nortron followed by micro-rates of Goal gave 99% of all three weeds in the trial area (Table 6.1), commercially acceptable injury (3-8% - Table 6.2) and yield was 59 T/ac, which was similar to the yield in the untreated, weed-free check.

**Table 6.1. Effect of herbicide treatment on percent control of velvetleaf (ABUTH), pigweed (AMARE), and crabgrass (DIGSS) control 56 days after application.**

| HERBICIDE         | RATE      | TIMING | ABUTH<br>% | AMARE<br>% | DIGSS<br>% |
|-------------------|-----------|--------|------------|------------|------------|
| 1. UNTREATED      |           |        |            |            |            |
| 2. DUAL II MAGNUM | 0.7 L/AC  | PRE    | 50DE       | 79B        | 81A        |
| 3. PROWL H2O      | 2.7 L/AC  | PRE    | 45E        | 70B        | 86B        |
| 4. NORTRON        | 3.3 L/AC  | PRE    | 80BC       | 75AB       | 35D        |
| 5. PROWL H2O      | 2.7 L/AC  | PRE    | 76BC       | 83AB       | 84AB       |
| NORTRON           | 3.3 L/AC  | PRE    |            |            |            |
| 6. DUAL II MAGNUM | 700 ML/AC | PRE    | 76BC       | 84AB       | 87AB       |
| NORTRON           | 3.3 L/AC  | PRE    |            |            |            |
| 7. DUAL II MAGNUM | 700 ML/AC | PRE    | 96AB       | 98AB       | 98A        |
| PROWL H2O         | 2.7 L/AC  | PRE    |            |            |            |
| NORTRON           | 3.3 L/AC  | PRE    |            |            |            |
| 8. GOAL           | 0.1 L/AC  | POST1  | 99A        | 99A        | 61C        |

|                    |           |       |      |      |     |
|--------------------|-----------|-------|------|------|-----|
| GOAL               | 0.1 L/AC  | POST2 |      |      |     |
| GOAL               | 0.1 L/AC  | POST3 |      |      |     |
| 9. BLAZER          | 0.03 L/AC | POST1 | 95AB | 94AB | 0D  |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 L/AC | POST2 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 I/AC | POST3 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| 10. DUAL II MAGNUM | 700 ML/AC | PRE   | 99A  | 98AB | 99A |
| PROWL H20          | 3.3 L/AC  | PRE   |      |      |     |
| GOAL               | 0.1 L/AC  | POST1 |      |      |     |
| GOAL               | 0.1 L/AC  | POST2 |      |      |     |
| GOAL               | 0.1 L/AC  | POST3 |      |      |     |
| 11. DUAL II MAGNUM | 700 ML/AC | PRE   | 96AB | 99A  | 99A |
| PROWL H20          | 3.3 L/AC  | PRE   |      |      |     |
| BLAZER             | 0.03 L/AC | POST1 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 L/AC | POST2 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 I/AC | POST3 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| 12. DUAL II MAGNUM | 700 ML/AC | PRE   | 99A  | 99A  | 99A |
| NORTRON            | 3.3 L/AC  | PRE   |      |      |     |
| GOAL               | 0.1 L/AC  | POST1 |      |      |     |
| GOAL               | 0.1 L/AC  | POST2 |      |      |     |
| GOAL               | 0.1 L/AC  | POST3 |      |      |     |
| 13. DUAL II MAGNUM | 700 ML/AC | PRE   | 98AB | 99A  | 99A |
| NORTRON            | 3.3 L/AC  | PRE   |      |      |     |
| BLAZER             | 0.03 L/AC | POST1 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 L/AC | POST2 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| BLAZER             | 0.03 I/AC | POST3 |      |      |     |
| + ASSIST           | 0.5% V/V  |       |      |      |     |
| 14. DUAL II MAGNUM | 700 ML/AC | PRE   | 99A  | 99A  | 99A |

|                    |           |       |      |     |     |
|--------------------|-----------|-------|------|-----|-----|
| PROWL H20          | 2.7 L/AC  | PRE   |      |     |     |
| NORTRON            | 3.3 L/AC  | PRE   |      |     |     |
| GOAL               | 0.1 L/AC  | POST1 |      |     |     |
| GOAL               | 0.1 L/AC  | POST2 |      |     |     |
| GOAL               | 0.1 L/AC  | POST3 |      |     |     |
| 15. DUAL II MAGNUM | 700 ML/AC | PRE   | 96AB | 99A | 99A |
| PROWL H20          | 2.7 L/AC  | PRE   |      |     |     |
| NORTRON            | 3.3 L/AC  | PRE   |      |     |     |
| BLAZER             | 0.03 L/AC | POST1 |      |     |     |
| + ASSIST           | 0.5% V/V  |       |      |     |     |
| BLAZER             | 0.03 L/AC | POST2 |      |     |     |
| + ASSIST           | 0.5% V/V  |       |      |     |     |
| BLAZER             | 0.03 L/AC | POST3 |      |     |     |
| + ASSIST           | 0.5% V/V  |       |      |     |     |

LSD (P <0.05)

9

17

19

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

**Table 6.2. Effect of herbicide treatment on visual injury (7 and 28 days after treatment) and carrot yield.**

| HERBICIDE         | RATE      | TIMING | PERCENT INJURY |     | YIELD<br>T/AC |
|-------------------|-----------|--------|----------------|-----|---------------|
|                   |           |        | 7D             | 28D |               |
| 1. UNTREATED      |           |        |                |     | 54A           |
| 2. DUAL II MAGNUM | 0.7 L/AC  | PRE    | 0B             | 0B  | 54A           |
| 3. PROWL H20      | 2.7 L/AC  | PRE    | 0B             | 0B  | 67A           |
| 4. NORTRON        | 3.3 L/AC  | PRE    | 0B             | 0B  | 53A           |
| 5. DUAL II MAGNUM | 700 ML/AC | PRE    | 0B             | 0B  | 52A           |
| PROWL H20         | 3.3 L/AC  | PRE    |                |     |               |
| 6. DUAL II MAGNUM | 700 ML/AC | PRE    | 5B             | 10A | 42AB          |
| NORTRON           | 3.3 L/AC  | PRE    |                |     |               |
| 7. DUAL II MAGNUM | 700 ML/AC | PRE    | 18A            | 20A | 38B           |
| PROWL H20         | 2.7 L/AC  | PRE    |                |     |               |
| NORTRON           | 3.3 L/AC  | PRE    |                |     |               |

|                    |           |       |    |     |       |
|--------------------|-----------|-------|----|-----|-------|
| 8. GOAL            | 0.1 L/AC  | POST1 | 0B | 0B  | 55A   |
| GOAL               | 0.1 L/AC  | POST2 |    |     |       |
| GOAL               | 0.1 L/AC  | POST3 |    |     |       |
| 9. BLAZER          | 0.03 L/AC | POST1 | 1B | 0B  | 58A   |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 L/AC | POST2 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 I/AC | POST3 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| 10. DUAL II MAGNUM | 700 ML/AC | PRE   | 0B | 0B  | 38A-E |
| PROWL H20          | 3.3 L/AC  | PRE   |    |     |       |
| GOAL               | 0.1 L/AC  | POST1 |    |     |       |
| GOAL               | 0.1 L/AC  | POST2 |    |     |       |
| GOAL               | 0.1 L/AC  | POST3 |    |     |       |
| 11. DUAL II MAGNUM | 700 ML/AC | PRE   | 0B | 0B  | 40B   |
| PROWL H20          | 3.3 L/AC  | PRE   |    |     |       |
| BLAZER             | 0.03 L/AC | POST1 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 L/AC | POST2 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 I/AC | POST3 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| 12. DUAL II MAGNUM | 700 ML/AC | PRE   | 3B | 8B  | 59A   |
| NORTRON            | 3.3 L/AC  | PRE   |    |     |       |
| GOAL               | 0.1 L/AC  | POST1 |    |     |       |
| GOAL               | 0.1 L/AC  | POST2 |    |     |       |
| GOAL               | 0.1 L/AC  | POST3 |    |     |       |
| 13. DUAL II MAGNUM | 700 ML/AC | PRE   | 8B | 22A | 36B   |
| NORTRON            | 3.3 L/AC  | PRE   |    |     |       |
| BLAZER             | 0.03 L/AC | POST1 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 L/AC | POST2 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |
| BLAZER             | 0.03 I/AC | POST3 |    |     |       |
| + ASSIST           | 0.5% V/V  |       |    |     |       |

|                    |           |       |     |     |     |
|--------------------|-----------|-------|-----|-----|-----|
| 14. DUAL II MAGNUM | 700 ML/AC | PRE   | 10A | 31A | 33B |
| PROWL H20          | 2.7 L/AC  | PRE   |     |     |     |
| NORTRON            | 3.3 L/AC  | PRE   |     |     |     |
| GOAL               | 0.1 L/AC  | POST1 |     |     |     |
| GOAL               | 0.1 L/AC  | POST2 |     |     |     |
| GOAL               | 0.1 L/AC  | POST3 |     |     |     |
| 15. DUAL II MAGNUM | 700 ML/AC | PRE   | 12B | 30A | 26A |
| PROWL H20          | 2.7 L/AC  | PRE   |     |     |     |
| NORTRON            | 3.3 L/AC  | PRE   |     |     |     |
| BLAZER             | 0.03 L/AC | POST1 |     |     |     |
| + ASSIST           | 0.5% V/V  |       |     |     |     |
| BLAZER             | 0.03 L/AC | POST2 |     |     |     |
| + ASSIST           | 0.5% V/V  |       |     |     |     |
| BLAZER             | 0.03 L/AC | POST3 |     |     |     |
| + ASSIST           | 0.5% V/V  |       |     |     |     |

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LSD (P <0.05)

4

8

13

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

**Conclusions:** The results presented are part of a long term study to develop an approach to managing linuron-resistant pigweed. The tank mixes of Dual II Magnum with Nortron or Prowl H20 (applied PRE) followed by micro-rates of Goal gave the best control of redroot pigweed, common lambsquarters and crabgrass. Visual injury was observed in those treatments where Nortron was included in the PRE application with either Goal or Blazer micro-rates at 7 and 28 days after treatment. Carrot yields were less than the untreated check in all treatments where Nortron was included in the PRE application. Carrot yield was greatest where the two-way tank mix of Dual II Magnum+Nortron (PRE) were followed by Goal micro-rates.

## TRIAL 7: TOLERANCE OF PROCESSING PEAS TO PRE APPLICATIONS OF ZIDUA

### Materials & Methods:

#### **Crop:** Pea

Variety: various

Planting rate: 300 kg/ha

Row spacing: 18cm

Planting date: April 29/21

Depth: 5 cm

#### **Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Worked the field with S-tine cultivator prior to planting.

Based on soil test recommendations, pea trials were fertilized with 6-24-24 N-P-K to provide 14 kg/ha actual N and 57 kg/ha of actual P and K.

#### **Soil Description:**

Sand: 52%

Silt: 24%

Clay: 24%

OM: 4.3%

pH: 7.3

CEC: 12.3

Texture: Sandy Clay Loam

Soil: WATFORD/BRADY

#### **Application Information:**

|                  |                    |
|------------------|--------------------|
| APPLICATION DATE | A<br>April-29-2021 |
| TIME OF DAY      | 9:20AM             |
| TIMING           | PRE                |
| AIR TEMP (c)     | 10                 |
| RH (%)           | 96                 |
| WIND SPEED (KPH) | 3                  |
| SOIL TEMP (c)    | 15                 |
| CROP STAGE       | PRE                |

#### **Spray Equipment:**

Application Method: CO2 Backpack

Nozzle Type: AIR INDUCTION

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

**Table 7.1. Effect of pea cultivar and Zidua rate on pea percent injury 7, 14 and 28 days after application.**

| CULTIVAR        | ZIDUA<br>RATE (ML/AC) | VISUAL INJURY |        |        |
|-----------------|-----------------------|---------------|--------|--------|
|                 |                       | 7 DAT         | 14 DAT | 28 DAT |
| 1. RICCO        | 100                   | 1A            | 1A     | 0A     |
|                 | 200                   | 0A            | 1A     | 0A     |
| 2. PAO 826      | 100                   | 0A            | 0A     | 0A     |
|                 | 200                   | 0A            | 0A     | 3A     |
| 3. LIL MO       | 100                   | 0A            | 0A     | 0A     |
|                 | 200                   | 0A            | 0A     | 0A     |
| 4. CONCEPT      | 100                   | 1A            | 0A     | 0A     |
|                 | 200                   | 4A            | 4A     | 0A     |
| 5. TYNE         | 100                   | 0A            | 1A     | 4A     |
|                 | 200                   | 6A            | 4A     | 4A     |
| 6. SHERWOOD     | 100                   | 1A            | 1A     | 3A     |
|                 | 200                   | 3A            | 6A     | 1A     |
| 7. RELIANCE     | 100                   | 0A            | 0A     | 2A     |
|                 | 200                   | 2A            | 3A     | 4A     |
| 8. SWEET SAVOUR | 100                   | 1A            | 1A     | 3A     |
|                 | 200                   | 2A            | 5A     | 4A     |
| LSD (P <0.05)   |                       | NS            | NS     | NS     |

Note: None of the means were significantly different from one another (P=0.05, LSD).

**Table 7.2. Effect of pea cultivar and Zidua rate on pea tenderometer readings (PSI) and marketable yield (T/AC).**

| CULTIVAR        | ZIDUA RATE<br>(L/AC) | TENDEROMETER<br>PSI | YIELD<br>(T/AC) |
|-----------------|----------------------|---------------------|-----------------|
| 1. RICCO        | 0                    | 98                  | 5.6             |
|                 | 100                  | 99                  | 6.2             |
|                 | 200                  | 98                  | 5.7             |
| 2. PAO 826      | 0                    | 103                 | 2.0             |
|                 | 100                  | 101                 | 2.9             |
|                 | 200                  | 105                 | 2.8             |
| 3. LIL MO       | 0                    | 117                 | 2.5             |
|                 | 100                  | 119                 | 3.5             |
|                 | 200                  | 118                 | 3.2             |
| 4. CONCEPT      | 0                    | 103                 | 2.5             |
|                 | 100                  | 108                 | 2.9             |
|                 | 200                  | 101                 | 2.8             |
| 5. TYNE         | 0                    | 104                 | 2.2             |
|                 | 100                  | 108                 | 2.9             |
|                 | 200                  | 98                  | 3.0             |
| 6. SHERWOOD     | 0                    | 102                 | 1.6             |
|                 | 100                  | 108                 | 2.2             |
|                 | 200                  | 105                 | 2.2             |
| 7. RELIANCE     | 0                    | 100                 | 3.4             |
|                 | 100                  | 101                 | 3.7             |
|                 | 200                  | 102                 | 3.9             |
| 8. SWEET SAVOUR | 0                    | 97                  | 3.4             |
|                 | 100                  | 98                  | 3.9             |
|                 | 200                  | 96                  | 3.7             |
| LSD (P <0.05)   |                      | NS                  | NS              |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).



**Results/Conclusions:**

This trial was established to test for tolerance of eight pea cultivars ('Ricco', 'PAO 826', 'Lil Mo', 'Concept', 'Tyne', 'Sherwood', 'Reliance', and 'Sweet Savour') to preemergence applications of Zidua at rates of 100 and 200 ml/acc. Pea tenderness at harvest was rated using a tenderometer and final yield adjusted based on tenderometer readings. In addition, the level of weed control was rated in each treatment.

Visible injury was less than 10% in all pea cultivars at both rates of Zidua at all three rating intervals (7, 14 and 28 days after emergence). Injury symptoms included slight leaf puckering. Pea tenderness ratings were all similar to the untreated check, an indication that pea maturity was not negatively affected. Finally, pea yield in all cultivars was similar to the untreated check. There was a tendency for pea yield to be slightly greater in the plots that had received herbicide treatment, associated with the presence of weeds competing for resources with the crop.

## TRIAL 8: TOLERANCE OF PROCESSING PEAS TO PRE APPLICATIONS OF REFLEX

**Crop:** Pea

Variety: various

Planting rate: 300 kg/ha

Row spacing: 18cm

Planting date: April 29/21

Depth: 5 cm

**Design:** Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

**Field Preparation:** Worked the field with S-tine cultivator prior to planting.

Based on soil test recommendations, pea trials were fertilized with 6-24-24 N-P-K to provide 14 kg/ha actual N and 57 kg/ha of actual P and K.

### **Soil Description:**

Sand: 52%

Silt: 24%

Clay: 24%

OM: 4.3%

pH: 7.3

CEC: 12.3

Texture: Sandy Clay Loam

Soil: WATFORD/BRADY

### **Application Information:**

|                  |                    |
|------------------|--------------------|
| APPLICATION DATE | A<br>April-29-2021 |
| TIME OF DAY      | 9:20AM             |
| TIMING           | PRE                |
| AIR TEMP (c)     | 10                 |
| RH (%)           | 96                 |
| WIND SPEED (KPH) | 3                  |
| SOIL TEMP (c)    | 15                 |
| CROP STAGE       | PRE                |

**Table 8.1. Effect of pea cultivar and Reflex rate on pea percent injury 7, 14 and 28 days after application.**

| CULTIVAR        | Reflex<br>RATE (L/AC) | VISUAL INJURY |        |        |
|-----------------|-----------------------|---------------|--------|--------|
|                 |                       | 7 DAT         | 14 DAT | 28 DAT |
| 1. RICCO        | 0.4                   | 1B            | 1B     | 0B     |
|                 | 0.8                   | 0B            | 1B     | 0B     |
| 2. PAO 826      | 0.4                   | 0B            | 0B     | 0B     |
|                 | 0.8                   | 0B            | 0B     | 3B     |
| 3. LIL MO       | 0.4                   | 0B            | 0B     | 0B     |
|                 | 0.8                   | 0B            | 0B     | 0B     |
| 4. CONCEPT      | 0.4                   | 1B            | 0B     | 0B     |
|                 | 0.8                   | 4A            | 4A     | 0B     |
| 5. TYNE         | 0.4                   | 0B            | 1B     | 4AB    |
|                 | 0.8                   | 6A            | 10A    | 14A    |
| 6. SHERWOOD     | 0.4                   | 1B            | 1B     | 6AB    |
|                 | 0.8                   | 5A            | 6A     | 17A    |
| 7. RELIANCE     | 0.4                   | 0B            | 0B     | 2B     |
|                 | 0.8                   | 2AB           | 3AB    | 4AB    |
| 8. SWEET SAVOUR | 0.4                   | 1B            | 1B     | 11A    |
|                 | 0.8                   | 2AB           | 5A     | 10A    |
| LSD (P <0.05)   |                       | 5             | 5      | 9      |

Note: None of the means were significantly different from one another (P=0.05, LSD).

**Table 8.2. Effect of pea cultivar and Reflex rate on pea tenderometer readings (PSI) and marketable yield (T/AC).**

| CULTIVAR        | REFLEX RATE<br>(L/AC) | TENDEROMETER<br>PSI | YIELD<br>(T/AC) |
|-----------------|-----------------------|---------------------|-----------------|
| 1. RICCO        | 0                     | 96                  | 3.6A            |
|                 | 0.4                   | 92                  | 3.2A            |
|                 | 0.8                   | 98                  | 3.9A            |
| 2. PAO 826      | 0                     | 104                 | 2.4A            |
|                 | 0.4                   | 104                 | 2.5A            |
|                 | 0.8                   | 107                 | 2.8A            |
| 3. LIL MO       | 0                     | 115                 | 2.5A            |
|                 | 0.4                   | 116                 | 3.0A            |
|                 | 0.8                   | 108                 | 3.3A            |
| 4. CONCEPT      | 0                     | 111                 | 2.7A            |
|                 | 0.4                   | 108                 | 2.7A            |
|                 | 0.8                   | 101                 | 2.8A            |
| 5. TYNE         | 0                     | 107A                | 3.2A            |
|                 | 0.4                   | 105A                | 2.7AB           |
|                 | 0.8                   | 98B                 | 2.2B            |
| 6. SHERWOOD     | 0                     | 111A                | 2.6A            |
|                 | 0.4                   | 108A                | 2.0AB           |
|                 | 0.8                   | 99B                 | 1.7B            |
| 7. RELIANCE     | 0                     | 100A                | 2.9A            |
|                 | 0.4                   | 101A                | 3.7A            |
|                 | 0.8                   | 100A                | 4.0A            |
| 8. SWEET SAVOUR | 0                     | 94A                 | 3.7A            |
|                 | 0.4                   | 94A                 | 2.7B            |
|                 | 0.8                   | 84B                 | 2.0C            |
| LSD (P <0.05)   |                       | 3                   | 0.7             |

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

**Results/Conclusions:**

This trial was established to test for tolerance of eight pea cultivars ('Ricco', 'PAO 826', 'Lil Mo', 'Concept', 'Tyne', 'Sherwood', 'Reliance', and 'Sweet Savour') to preemergence applications of Reflex® at rates of 47 and 94 g/ac. Pea tenderness at harvest was rated using a tenderometer and final yield adjusted based on tenderometer readings. In addition, the level of weed control was rated in each treatment.

Visible injury was less than 10% in most pea cultivars at both rates of Reflex, except Tyne, Sherwood and Sweet Savour, which showed 14, 17 and 10% visual injury at 28 days after emergence (DAE), respectively. Injury symptoms included leaf puckering and shortened midribs (drawstringing). Along with this injury, pea tenderometer readings decreased relative to the untreated check. This may be an indication that pea maturity is delayed by the herbicide in these cultivars. Finally, pea yield decreased at the 0.8 L/ac rate of Reflex in Tyne, Sherwood and Sweet Savour. This confirms the results from 2020: Reflex may have the potential to injure some pea cultivars.

# NEW YORK STATE 2021 PROCESSING PEA CULTIVAR TRIAL REPORT

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*I would like to dedicate all my work during the 2021 season and beyond, to my late father, Lester W. Fillingham, he was a veteran, volunteer fireman, longtime lineman, proud family man and above all else, the kindest, fairest man I have ever known. May my work be a reflection of your love and guidance.*

## **Procedure & Materials**

**Location:** Cornell AgriTech Farm, Geneva - soil type - silt loam. **Tillage** - Conventional. **Fertilizer:** broadcast 400 lb/A of 8-14-21 and worked in. **Planter** - Modified Hege 80 (cone type). **Planting Date** - 4/28. Harvest started on 6/24 and was finished on 7/13. **Herbicide** - Dual directly after planting. **Plot Size:** 7 rows by 30 ft. **Row Width:** 6 inches, Row length: 30 ft. **In-row Spacing:** All cultivars were adjusted (seed planted) to 100% germination. Our processor has asked us to approximate 600,000 plants per acre for early, 570,000 for second early and 550,000 plants per acre for the rest. **Insecticide** - none. **Experimental Design** - Randomized split block design, 4 replications (3 replications were harvested, and another was left for demonstration). **Model TG4EI Integrating Texturegag** - measure for maturity.

The objective of this trial was to compare several normal leaf and afila type pea varieties for yield and other quality characteristics. This was accomplished in cooperation with the pea processor in New York and seed companies, in an attempt to find new, higher quality, and disease resistant varieties that are adapted to our climate and soil conditions. Evaluation of processed products is scheduled to be held on 11/04/21 for processing and seed company representatives.

Yield of seven rows by 5 feet per replication (35 Row feet) was obtained by pulling the plants and hand picking the pods. Two harvests were taken, if possible, to plot yield increase and also tenderometer reading increase. A target tenderometer value of 110 was used for the final harvest. A stationary sheller was used to remove berries from the harvested pods. Tenderometer readings were taken on each replication and averaged for the report. Pea berries were hand sieved with Seedburo hand testing screens. See following table for details.

**Table 1. Sieve size diameters.**

| Sieve Size | Diameter of circular Opening in MM (inches) |                   |
|------------|---|-------------------|
|            | Will not pass through                       | Will pass through |
| 1          | 6.35 (1/4)                                  | 7.1 (18/64)       |
| 2          | 7.1 (18/64)                                 | 7.9 (20/64)       |
| 3          | 7.9 (20/64)                                 | 8.7 (22/64)       |
| 4          | 8.7 (22/64)                                 | 9.5 (24/64)       |
| 5          | 9.5 (24/64)                                 | 10.3 (26/64)      |
| 6          | 10.3 (26/64)                                | 11.1 (28/64)      |

## **Temperature and Moisture Conditions**

This spring was abnormally dry, and fields were workable earlier than usual. Field conditions were decent at planting. The day after planting, we received about 0.5 inches of rain, and cool, slightly wet conditions persisted for about two weeks. There were several instances in May and June where hot dry periods were followed by cool periods and rains. Supplemental irrigation was not provided as rainfall provided adequate. For the months of May and June, 2.2 and 2.8 inches of rain fell, respectively. Then, in the first 13 days of July, Geneva received 3.30 inches of rain. Overall, pea season was mostly mild, with both dry and wet periods. See the weather insert at the end of the summary for a breakdown of temperatures and precipitation over the growing season.

**Table 2 - Cultivar List and Maturity From Seed Sources**

| Cultivar | GDD (40F) | Seed Source | Leaf Type   | Seed Treatment              | Seed Count/lb | Germ. % | Sieve Index | Node to blossom |
|----------|-----------|-------------|-------------|-----------------------------|---------------|---------|-------------|-----------------|
| Spring   | 1100      | Pure Line   | normal leaf | LSV + Cruiser 0.75          | 2961          | 95      | 4.1         | 9 to 10         |
| Eldorado | 1100      | Pure Line   | normal leaf | LSV + Cruiser 0.75          | 2586          | 95      | 3.8         | 9 to 10         |
| Sherwood | 1160      | Seminis     | normal leaf | allegiance, captan, cruiser | 2400          | 99      | 3.3         | 9 to 10         |
| SVS795QE | 1170      | Seminis     | normal leaf | allegiance, captan, cruiser | /             | 95      | /           | 10              |
| SV3628QH | 1205      | Seminis     | normal leaf | allegiance, captan, cruiser | 2619          | 95      | /           | 10 to 11        |
| EXP461   | 1216      | Brotherton  | afila       | allegiance, captan, cruiser | 2413          | 95      | 3.2         | 9 to 10         |
| DGL0027  | 1250      | Pure Line   | afila       | LSV + Cruiser 0.75          | 3328          | 95      | 3.5         | 12              |
| PLS-M14  | 1250      | Pure Line   | normal leaf | LSV + Cruiser 0.75          | 2290          | 95      | 4           | 9 to 10         |
| CS455AF  | 1355      | Crites      | afila       | maxim, Apron, Cruiser       | 2100          | 99      | 3.7         | 10              |
| Saltingo | 1300      | Pure Line   | afila       | LSV + Cruiser 0.75          | 2213          | 95      | 3.5         | 11              |
| Portage  | 1305      | Crites      | afila       | allegiance, captan, cruiser | 2032          | 99      | 3.8         | 8 to 11         |
| BSC905   | 1332      | Brotherton  | normal leaf | allegiance, captan, cruiser | 4725          | 99      | 1.4         | 11 to 12        |
| EXP125   | 1332      | Brotherton  | afila       | allegiance, captan, cruiser | 2548          | 99      | 3.1         | 14              |
| EXP773   | 1332      | Brotherton  | normal leaf | allegiance, captan, cruiser | 2592          | 95      | 3.4         | 13              |
| SV0969QH | 1360      | Seminis     | normal leaf | allegiance, captan, cruiser | 3340          | 98      | 3.1         | /               |
| Nitro    | 1370      | Seminis     | normal leaf | /                           | 4800          | /       | 2           | 13 to 14        |
| 518      | 1410      | GVS         | afila       | maxim/Apron XL              | 2400          | 96      | 3.8         | 11              |
| BSC712   | 1422      | Brotherton  | afila       | allegiance, captan, cruiser | 1786          | 99      | 3.8         | 14              |
| PLS 586  | 1430      | Pure Line   | afila       | LSV + Cruiser 0.75          | 1991          | 95      | 4           | 12 to 13        |
| CS494DAF | 1470      | Crites      | Det afila   | maxim, Apron, Cruiser       | 2800          | 97      | 3.1         | 12 to 13        |
| SV3290QF | 1450      | Seminis     | normal leaf | allegiance, captan, cruiser | 2518          | 90      | /           | 14 to 15        |
| PLS 576  | 1450      | Pure Line   | afila       | LSV + Cruiser 0.75          | 2424          | 95      | 3.6         | 12 to 13        |
| BSC599   | 1469      | Brotherton  | afila       | allegiance, captan, cruiser | 2268          | 95      | 3.8         | 15              |
| Da1470   | 1470      | Seminis     | Det afila   | /                           | 2683          | /       | /           | /               |
| PLS 602  | 1470      | Pure Line   | afila       | LSV + Cruiser 0.75          | 2414          | 95      | 3.1         | 15 to 16        |
| SV1231QF | 1480      | Seminis     | afila       | /                           | 2900          | /       | 3.2         | 15              |
| Boogle   | 1490      | Brotherton  | afila       | allegiance, captan, cruiser | 2075          | 99      | 4.3         | 14              |
| 828      | 1500      | GVS         | afila       | /                           | 2300          | 98      | 3.8         | 14 to 15        |
| SV0823QG | 1525      | Seminis     | afila       | /                           | 2669          | /       | 3.3         | 17              |
| Ricco    | 1530      | GVS         | afila       | /                           | 2375          | /       | 3.7         | 15 to 16        |
| CS464AF  | 1565      | Crites      | afila       | maxim, Apron, Cruiser       | 2400          | 99      | 3.7         | 15              |
| SV6844QG | 1600      | Seminis     | afila       | /                           | 2500          | /       | 3.6         | 17              |
| PLS196   | 1600      | Pure Line   | afila       | LSV + Cruiser 0.75          | 2307          | 95      | 4           | 16              |
| SV5685QG | 1750      | Seminis     | normal leaf | /                           | 2347          | /       | 3.4         | 20              |



**Table 3. Plant Characteristics**

| Cultivar | GDD to full flower | Plant Stand Rating | Trial Root Rot Rating | Root Rot Trial* | Plant Habit Rating (Harvest) | Overall Rating |
|----------|--------------------|--------------------|-----------------------|-----------------|------------------------------|----------------|
| Sherwood | 725                | 2.75               | 5.0                   | 3.00            | 3.00                         | 3.4            |
| Eldorado | 725                | 2.75               | 5.0                   | 3.00            | 2.50                         | 3.3            |
| Spring   | 799                | 2.50               | 5.0                   | 2.75            | 2.50                         | 3.2            |
| SV3628QH | 861                | 3.25               | 5.0                   | 3.50            | 3.50                         | 3.8            |
| SVS795QE | 861                | 2.75               | 5.0                   | 3.00            | 3.00                         | 3.4            |
| PLSM14   | 861                | 3.25               | 5.0                   | 3.50            | 3.50                         | 3.8            |
| CS455AF  | 861                | 3.50               | 5.0                   | 3.00            | 3.00                         | 3.6            |
| EXP461   | 889                | 3.50               | 5.0                   | 3.50            | 3.50                         | 3.9            |
| Portage  | 918                | 3.25               | 5.0                   | 3.00            | 3.00                         | 3.6            |
| EXP773   | 918                | 3.25               | 5.0                   | 3.50            | 3.50                         | 3.8            |
| BSC905   | 948                | 3.00               | 5.0                   | 3.25            | 3.50                         | 3.7            |
| 518      | 948                | 3.25               | 5.0                   | 3.50            | 3.75                         | 3.9            |
| DGL0027  | 918                | 3.25               | 5.0                   | 3.75            | 3.75                         | 3.9            |
| Nitro    | 975                | 3.00               | 5.0                   | 3.50            | 3.75                         | 3.8            |
| EXP125   | 975                | 3.00               | 5.0                   | 4.00            | 3.75                         | 3.9            |
| BSC599   | 975                | 4.00               | 5.0                   | 3.00            | 3.25                         | 3.8            |
| Saltingo | 948                | 3.50               | 5.0                   | 3.25            | 3.50                         | 3.8            |
| SV0969QH | 975                | 3.00               | 5.0                   | 3.75            | 3.75                         | 3.9            |
| SV3290QF | 1020               | 3.50               | 5.0                   | 3.00            | 3.75                         | 3.8            |
| 828      | 1000               | 3.75               | 5.0                   | 3.50            | 3.75                         | 4.0            |
| CS494DAF | 1000               | 2.75               | 5.0                   | 3.00            | 4.00                         | 3.7            |
| PLS586   | 1000               | 3.25               | 5.0                   | 3.25            | 3.50                         | 3.8            |
| Ricco    | 1000               | 3.50               | 5.0                   | 3.50            | 3.00                         | 3.8            |
| CS464AF  | 1020               | 3.25               | 5.0                   | 3.50            | 3.50                         | 3.8            |
| PLS576   | 1000               | 3.25               | 5.0                   | 3.50            | 3.75                         | 3.9            |
| BSC712   | 1020               | 3.75               | 5.0                   | 3.25            | 3.50                         | 3.9            |
| DA1470   | 1020               | 3.00               | 5.0                   | 2.75            | 3.00                         | 3.4            |
| Boogie   | 1000               | 3.25               | 5.0                   | 4.00            | 4.00                         | 4.1            |
| PLS602   | 1044               | 3.50               | 5.0                   | 3.00            | 3.25                         | 3.7            |
| SV1231QF | 1072               | 3.50               | 5.0                   | 4.25            | 4.00                         | 4.2            |
| SV0823QG | 1107               | 4.00               | 5.0                   | 3.25            | 4.00                         | 4.1            |
| PLS196   | 1107               | 3.00               | 5.0                   | 3.00            | 4.25                         | 3.8            |
| SV6844QG | 1138               | 2.50               | 5.0                   | 3.50            | 4.50                         | 3.9            |
| SV5685QG | 1310               | 3.75               | 5.0                   | 3.50            | 3.50                         | 3.9            |

### **Explanations for Headings in Table 3:**

**GDD to Full Flower** – Monitored peas to identify full flower date and used base 40F for growing degree days.

**Plant Stand Rating** – About three weeks after planting, a visual evaluation of the plant stand is made, using a scale of 1 to 5. 1 – Few plants, extremely patchy, 5 – full stand, no empty patches.

**Trial Root Rot Rating** – Root rot is scouted for in the harvested reps of the variety trial and rated on a scale of 1 to 5. 1 – completely dead, 5 – no visual symptoms.

**\*Root Rot Trial** - A field at the research farm was converted to a root rot nursery. We plant peas annually to encourage inoculum and plant all the varieties in the variety trial into that field and rate for root rot damage using a scale of 1 to 5. 1 – completely dead, 5 – no visual symptoms.

**Plant Habit Rating** – Each varieties habit is visually measured at the time of harvest closest to a 110 TU reading. 1 - totally recumbent, 5 - completely erect.

**Overall Rating** – An average of plant stand rating, plant habit rating, and both root rot ratings.

**Table 4. Maturity Sieve Distribution and Yield - (in order of maturity)**

| Cultivar | Days to harv. | GDDr | % Sieve >1 | % Sieve 1 | % Sieve 2 | % Sieve 3 | % Sieve 4 | % Sieve 5 | % Sieve 6 | % 6> Sieve | Sieve size Index | Ten. | Berries (lbs/A) | Tons/Acre | Adj. Yield Based on 110 TU* | Adj. Tons/Acre* | Plants per Acre (1000) |
|----------|---------------|------|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------------|------|-----------------|-----------|-----------------------------|-----------------|------------------------|
| Sherwood | 54            | 1175 | 0          | 1         | 5         | 22        | 42        | 28        | 2         | 0          | 4.0              | 91   | 5741            | 2.87      | 7923                        | 3.96            | 546                    |
| Sherwood | 55            | 1192 | 0          | 1         | 3         | 13        | 37        | 41        | 5         | 0          | 4.3              | 102  | 6189            | 3.09      | 6746                        | 3.37            | 499                    |
| Sherwood | 56            | 1213 | 0          | 0         | 1         | 10        | 34        | 45        | 10        | 0          | 4.5              | 110  | 5932            | 2.96      | 5932                        | 2.96            | 471                    |
| Eldorado | 54            | 1175 | 0          | 1         | 5         | 20        | 37        | 35        | 2         | 0          | 4.1              | 93   | 5650            | 2.80      | 7402                        | 3.70            | 547                    |
| Eldorado | 55            | 1192 | 0          | 1         | 2         | 10        | 33        | 47        | 7         | 0          | 4.4              | 103  | 6621            | 3.30      | 7084                        | 3.54            | 499                    |
| Eldorado | 56            | 1213 | 0          | 0         | 1         | 8         | 21        | 42        | 28        | 0          | 4.9              | 103  | 6177            | 3.08      | 6609                        | 3.30            | 471                    |
| Spring   | 54            | 1175 | 1          | 7         | 5         | 21        | 30        | 31        | 5         | 0          | 3.9              | 83   | 3683            | 1.84      | -                           | -               | 444                    |
| Spring   | 55            | 1192 | 12         | 11        | 17        | 5         | 15        | 28        | 7         | 5          | 3.6              | 93   | 3721            | 1.86      | 4875                        | 2.43            | 454                    |
| Spring   | 57            | 1239 | 0          | 1         | 2         | 6         | 19        | 36        | 33        | 3          | 4.9              | 102  | 5028            | 2.50      | 5481                        | 2.51            | 407                    |
| SV3628QH | 55            | 1192 | 0          | 2         | 11        | 39        | 38        | 10        | 0         | 0          | 3.4              | 81   | 5210            | 2.60      | -                           | -               | 531                    |
| SV3628QH | 57            | 1239 | 0          | 1         | 3         | 16        | 43        | 34        | 3         | 0          | 4.2              | 97   | 6413            | 3.20      | 7631                        | 3.81            | 550                    |
| SV3628QH | 58            | 1271 | 0          | 1         | 2         | 11        | 31        | 48        | 7         | 0          | 4.4              | 109  | 7060            | 3.50      | 7131                        | 3.56            | 519                    |
| SVS795QE | 57            | 1239 | 1          | 3         | 10        | 38        | 38        | 9         | 1         | 0          | 3.4              | 86   | 4775            | 2.39      | -                           | -               | 486                    |
| SVS795QE | 58            | 1271 | 1          | 2         | 8         | 31        | 43        | 15        | 0         | 0          | 3.6              | 95   | 5032            | 2.50      | 6290                        | 3.14            | 412                    |
| SVS795QE | 59            | 1310 | 0          | 1         | 4         | 24        | 49        | 20        | 2         | 0          | 3.9              | 108  | 5720            | 2.86      | 5834                        | 2.91            | 459                    |
| PLSM-14  | 57            | 1239 | 0          | 1         | 4         | 21        | 31        | 41        | 2         | 0          | 4.1              | 83   | 6168            | 3.08      | -                           | -               | 469                    |
| PLSM-14  | 58            | 1271 | 1          | 1         | 1         | 11        | 41        | 42        | 3         | 0          | 4.3              | 97   | 8081            | 4.04      | 9616                        | 4.80            | 574                    |
| PLSM-14  | 59            | 1310 | 0          | 1         | 2         | 10        | 40        | 43        | 4         | 0          | 4.3              | 104  | 6807            | 3.40      | 7215                        | 3.60            | 424                    |
| CS455AF  | 60            | 1352 | 0          | 0         | 2         | 11        | 35        | 44        | 8         | 0          | 4.5              | 114  | 8363            | 4.18      | 8028                        | 4.01            | 532                    |
| CS455AF  | 61            | 1396 | 0          | 0         | 1         | 7         | 33        | 47        | 12        | 0          | 4.6              | 143  | 8882            | 4.44      | 7550                        | 3.77            | 456                    |
| EXP461   | 58            | 1271 | 2          | 7         | 17        | 35        | 30        | 9         | 0         | 0          | 3.2              | 81   | 5082            | 2.54      | -                           | -               | 562                    |
| EXP461   | 60            | 1352 | 0          | 2         | 6         | 25        | 39        | 26        | 2         | 0          | 3.9              | 108  | 6716            | 3.36      | 6850                        | 3.42            | 502                    |
| Portage  | 60            | 1352 | 0          | 0         | 4         | 14        | 31        | 42        | 9         | 0          | 4.4              | 99   | 7587            | 3.79      | 8725                        | 4.36            | 518                    |
| Portage  | 61            | 1396 | 0          | 0         | 1         | 9         | 30        | 50        | 10        | 0          | 4.6              | 124  | 8077            | 4.03      | 7350                        | 3.67            | 502                    |
| EXP773   | 60            | 1352 | 0          | 0         | 3         | 13        | 33        | 45        | 6         | 0          | 4.4              | 94   | 7276            | 3.64      | 9313                        | 4.65            | 543                    |
| EXP773   | 61            | 1396 | 0          | 0         | 2         | 10        | 28        | 47        | 13        | 0          | 4.6              | 124  | 8276            | 4.14      | 7531                        | 3.75            | 504                    |
| BSC905   | 61            | 1396 | 4          | 12        | 34        | 37        | 12        | 1         | 0         | 0          | 2.5              | 110  | 6139            | 3.06      | 6139                        | 3.06            | 543                    |
| BSC905   | 62            | 1439 | 2          | 14        | 46        | 35        | 3         | 0         | 0         | 0          | 2.3              | 122  | 6392            | 3.20      | 5881                        | 2.94            | 542                    |

Table 4. Maturity Sieve Distribution and Yield - (in order of maturity) Cont.

| Cultivar | Days to harv. | GDDr | % Sieve >1 | % Sieve 1 | % Sieve 2 | % Sieve 3 | % Sieve 4 | % Sieve 5 | % Sieve 6 | % 6> Sieve | Sieve size index | Ten. | Berries (lbs/A) | Tons/Acre | Adj. Yield Based on 110 TU* | Adj. Tons/Acre* | Plants per Acre (1000) |
|----------|---------------|------|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------------|------|-----------------|-----------|-----------------------------|-----------------|------------------------|
| S18      | 63            | 1476 | 0          | 1         | 2         | 7         | 31        | 50        | 9         | 0          | 4.5              | 131  | 8405            | 4.20      | 7396                        | 3.69            | 523                    |
| DGL0027  | 60            | 1352 | 0          | 1         | 7         | 27        | 44        | 21        | 0         | 0          | 3.8              | 85   | 5791            | 2.90      | -                           | -               | 552                    |
| DGL0027  | 61            | 1396 | 0          | 1         | 3         | 17        | 44        | 35        | 0         | 0          | 4.1              | 94   | 5633            | 2.81      | 7210                        | 3.60            | 472                    |
| DGL0027  | 62            | 1439 | 0          | 0         | 2         | 8         | 35        | 51        | 4         | 0          | 4.5              | 118  | 7388            | 3.70      | 6945                        | 3.47            | 403                    |
| Nitro    | 62            | 1439 | 3          | 15        | 41        | 39        | 2         | 0         | 0         | 0          | 2.3              | 105  | 5621            | 2.81      | 5902                        | 2.95            | 546                    |
| Nitro    | 63            | 1476 | 2          | 10        | 32        | 52        | 4         | 0         | 0         | 0          | 2.5              | 122  | 5413            | 2.70      | 4980                        | 2.49            | 461                    |
| EXP125   | 63            | 1476 | 0          | 1         | 5         | 27        | 56        | 11        | 0         | 0          | 3.7              | 134  | 6077            | 3.03      | 5287                        | 2.64            | 505                    |
| BSC599   | 63            | 1476 | 0          | 0         | 1         | 6         | 26        | 58        | 9         | 0          | 4.7              | 125  | 8579            | 4.29      | 7807                        | 3.90            | 556                    |
| Saltingo | 61            | 1396 | 0          | 1         | 6         | 21        | 47        | 25        | 0         | 0          | 3.9              | 93   | 7446            | 3.72      | 9754                        | 4.87            | 543                    |
| Saltingo | 62            | 1439 | 0          | 0         | 4         | 19        | 45        | 30        | 2         | 0          | 4.1              | 101  | 8243            | 4.12      | 9150                        | 4.57            | 558                    |
| Saltingo | 63            | 1476 | 0          | 0         | 2         | 14        | 50        | 33        | 1         | 0          | 4.2              | 118  | 8483            | 4.24      | 7974                        | 3.98            | 462                    |
| SV0969QH | 62            | 1439 | 2          | 4         | 15        | 37        | 36        | 6         | 0         | 0          | 3.3              | 97   | 5546            | 2.77      | 6600                        | 3.30            | 451                    |
| SV0969QH | 63            | 1476 | 1          | 3         | 10        | 32        | 44        | 10        | 0         | 0          | 3.5              | 116  | 7160            | 3.58      | 6802                        | 3.40            | 460                    |
| SV3290QF | 63            | 1476 | 0          | 3         | 10        | 24        | 56        | 7         | 0         | 0          | 3.5              | 104  | 7035            | 3.50      | 7457                        | 3.72            | 583                    |
| 828      | 64            | 1505 | 2          | 2         | 4         | 19        | 54        | 18        | 1         | 0          | 3.9              | 156  | 8641            | 4.30      | 7172                        | 3.58            | 563                    |
| CS494DAF | 64            | 1505 | 2          | 2         | 5         | 26        | 38        | 22        | 5         | 0          | 3.9              | 132  | 5397            | 2.70      | 4749                        | 2.37            | 489                    |
| CS494DAF | 65            | 1530 | 0          | 1         | 8         | 25        | 42        | 21        | 3         | 0          | 3.8              | 158  | 6745            | 3.37      | 5598                        | 2.79            | 514                    |
| PLS586   | 64            | 1505 | 1          | 2         | 2         | 14        | 52        | 26        | 3         | 0          | 4.1              | 129  | 8753            | 4.38      | 7790                        | 3.89            | 554                    |
| PLS586   | 65            | 1530 | 0          | 0         | 1         | 5         | 41        | 47        | 6         | 0          | 4.5              | 158  | 8857            | 4.40      | 7351                        | 3.67            | 480                    |
| Ricco    | 64            | 1505 | 0          | 1         | 2         | 7         | 22        | 57        | 11        | 0          | 4.7              | 124  | 9454            | 4.73      | 8603                        | 4.30            | 486                    |
| CS464AF  | 64            | 1505 | 0          | 0         | 3         | 19        | 51        | 26        | 1         | 0          | 4.0              | 119  | 8894            | 4.45      | 8360                        | 4.18            | 553                    |
| CS464AF  | 66            | 1556 | 0          | 0         | 3         | 16        | 48        | 30        | 3         | 0          | 4.1              | 130  | 8732            | 4.40      | 7771                        | 3.88            | 462                    |
| PLS576   | 64            | 1505 | 1          | 1         | 2         | 9         | 42        | 40        | 5         | 0          | 4.3              | 118  | 9143            | 4.60      | 8594                        | 4.29            | 558                    |
| PLS576   | 65            | 1530 | 0          | 0         | 1         | 6         | 39        | 46        | 8         | 0          | 4.5              | 144  | 9014            | 4.50      | 7662                        | 3.83            | 513                    |
| BSC712   | 64            | 1505 | 1          | 1         | 3         | 17        | 40        | 35        | 3         | 0          | 4.2              | 114  | 9396            | 4.70      | 9020                        | 4.51            | 541                    |
| BSC712   | 65            | 1530 | 0          | 0         | 1         | 9         | 34        | 45        | 11        | 0          | 4.6              | 138  | 9674            | 4.84      | 8320                        | 4.16            | 487                    |
| DA1470   | 64            | 1505 | 1          | 2         | 4         | 22        | 48        | 21        | 2         | 0          | 3.9              | 112  | 6372            | 3.20      | 6245                        | 3.12            | 463                    |

**Table 4. Maturity Sieve Distribution and Yield - (in order of maturity) Cont.**

| Cultivar | Days to harv. | GDD <sup>r</sup> | % Sieve >1 | % Sieve 1 | % Sieve 2 | % Sieve 3 | % Sieve 4 | % Sieve 5 | % Sieve 6 | % 6> Sieve | Sieve size index | Ten. | Berries (lbs/A) | Tons/Acre | Adj. Yield Based on 110 TU* | Adj. Tons/Acre* | Plants per Acre (1000) |
|----------|---------------|------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------------|------|-----------------|-----------|-----------------------------|-----------------|------------------------|
| Boogie   | 65            | 1530             | 0          | 0         | 1         | 5         | 18        | 50        | 25        | 1          | 4.9              | 129  | 8247            | 4.12      | 7340                        | 3.67            | 540                    |
| PLS602   | 65            | 1530             | 1          | 4         | 12        | 44        | 37        | 3         | 0         | 0          | 3.2              | 112  | 7322            | 3.66      | 7176                        | 3.58            | 475                    |
| PLS602   | 66            | 1556             | 0          | 2         | 6         | 30        | 54        | 7         | 0         | 0          | 3.6              | 119  | 7413            | 3.70      | 6968                        | 3.48            | 424                    |
| SV1231QF | 65            | 1530             | 0          | 2         | 4         | 18        | 45        | 29        | 2         | 0          | 4.0              | 108  | 6135            | 3.07      | 6258                        | 3.12            | 540                    |
| SV1231QF | 66            | 1556             | 0          | 1         | 4         | 16        | 45        | 32        | 2         | 0          | 4.1              | 118  | 6990            | 3.50      | 6571                        | 3.28            | 530                    |
| SV0823QG | 64            | 1505             | 1          | 4         | 8         | 33        | 44        | 10        | 0         | 0          | 3.5              | 99   | 5816            | 2.90      | 6688                        | 3.34            | 472                    |
| SV0823QG | 66            | 1556             | 0          | 5         | 8         | 26        | 42        | 19        | 0         | 0          | 3.6              | 103  | 6235            | 3.12      | 6671                        | 3.33            | 432                    |
| SV0823QG | 68            | 1614             | 0          | 0         | 4         | 16        | 37        | 37        | 6         | 0          | 4.3              | 132  | 7015            | 3.50      | 6173                        | 3.08            | 373                    |
| PLS196   | 68            | 1614             | 0          | 2         | 3         | 7         | 26        | 53        | 9         | 0          | 4.5              | 106  | 8483            | 4.24      | 8822                        | 4.41            | 487                    |
| PLS196   | 69            | 1654             | 0          | 0         | 2         | 5         | 17        | 55        | 21        | 0          | 4.9              | 119  | 9433            | 4.70      | 8867                        | 4.43            | 424                    |
| SV6844QG | 68            | 1614             | 0          | 2         | 6         | 19        | 24        | 35        | 14        | 0          | 4.3              | 87   | 4555            | 2.30      | -                           | -               | 316                    |
| SV6844QG | 69            | 1654             | 0          | 1         | 4         | 12        | 27        | 43        | 13        | 0          | 4.5              | 93   | 5368            | 2.70      | 7032                        | 3.51            | 286                    |
| SV6844QG | 70            | 1683             | 0          | 1         | 2         | 8         | 25        | 39        | 23        | 2          | 4.7              | 105  | 6260            | 3.13      | 6573                        | 3.28            | 263                    |
| SV5685QG | 72            | 1744             | 0          | 2         | 6         | 18        | 32        | 34        | 8         | 0          | 4.1              | 76   | 6451            | 3.23      | -                           | -               | 506                    |
| SV5685QG | 75            | 1824             | 0          | 0         | 4         | 11        | 19        | 34        | 28        | 4          | 4.7              | 99   | 9840            | 4.90      | 11316                       | 5.65            | 448                    |
| SV5685QG | 76            | 1861             | 0          | 0         | 3         | 10        | 19        | 35        | 27        | 6          | 4.8              | 103  | 10147           | 5.07      | 10857                       | 5.42            | 427                    |

^ Font in bold represents harvests that were closest to a 110 TU reading

\*The formula for adjusted yield is most accurate when TU readings are closest to 110 (see factors on table 7)

<sup>r</sup> Growing Degree days base 40F

-Column explanations page 9

### **Explanation for Headings in Table 4:**

**Days to Harvest** - Number of days from planting until day of harvest.

**Growing Degree Days (GDD)** - Accumulation of heat units (base 40-degree F.) from planting until harvest.

**Average sieve percentage** - Berries were hand sieved with Seedburo screens. The table on the title page describes the size of the various sieves.

**Sieve Size index** - Sieve size index reflects the mean sieve size of the variety at harvest.

**Tenderometer measurement** - A model TG4EI Integrating Texturegag was used to determine the tenderometer units of each harvested plot. The average of the three harvested plots per cultivar was listed.

**Yield lbs/A** - Pounds per acre was determined by extrapolating the total weight of the berries per plot to obtain lbs per acre. Harvest plot was 7 rows by 5 ft in length or 35 row feet.  $(43560 \text{ sq ft/A} / .5 \text{ ft} = 87,120 \text{ row ft per acre})$ . 87120 row ft /A divided by 35 harvested row ft gives a factor of 2489. This factor was multiplied by total berry weight harvested per plot to obtain lbs per acre.

**Yield - Tons per acre** - The weight of the harvested berries was extrapolated to tons per acre.

**Adjusted Yield lbs/acre** - A correlation factor was used to adjust yield based on a tenderometer reading of 110. For example, if a sample read 90 Tenderometer Units, we would then multiple the yield by a correlation factor of 1.42. Please see correlation factors in Table 7.

**Plant population per acre** - An extrapolation of the number of harvested plants to plants per acre.

**Table 5. Plant and Pod Characteristics (In order of maturity)**

| Cultivar | Node to first flower (avg.) | Vine length (in) (avg.) | Ht. at harvest (in) | Pods per plant (avg.) | Avg. # nodes w/ pods/ plt. | # of Single pods/ node | # of Double pods/ node | # Triple pods/ node | # Quad. pods/ node | % of Single pods/ node | % of Double pods/ node | % of Triple pods/ node | % of Quad. pods/ node | Berries per pod (avg.) | Pod length (in) (avg.) |
|----------|-----------------------------|-------------------------|---------------------|-----------------------|----------------------------|------------------------|------------------------|---------------------|--------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|
| Sherwood | 9                           | 14                      | 10 to 11            | 2.80                  | 2.20                       | 1.50                   | 0.67                   | 0.00                | 0.00               | 69                     | 31                     | 0                      | 0                     | 5.8                    | 2.5                    |
| Eldorado | 10                          | 21                      | 10 to 11            | 4.00                  | 3.60                       | 3.10                   | 0.43                   | 0.00                | 0.00               | 88                     | 12                     | 0                      | 0                     | 6.0                    | 2.7                    |
| Spring   | 9                           | 18                      | 11 to 12            | 2.80                  | 2.30                       | 1.76                   | 0.53                   | 0.00                | 0.00               | 77                     | 23                     | 0                      | 0                     | 5.4                    | 2.9                    |
| SV3628QH | 11                          | 16                      | 10                  | 3.10                  | 1.90                       | 0.73                   | 1.10                   | 0.03                | 0.00               | 39                     | 60                     | 1                      | 0                     | 7.6                    | 2.8                    |
| SVS795QE | 9                           | 14                      | 11                  | 3.70                  | 2.50                       | 1.30                   | 1.20                   | 0.00                | 0.00               | 51                     | 49                     | 0                      | 0                     | 6.7                    | 2.6                    |
| PLSM14   | 8                           | 17                      | 10 to 11            | 3.60                  | 2.20                       | 0.67                   | 1.50                   | 0.00                | 0.00               | 31                     | 69                     | 0                      | 0                     | 7.1                    | 2.7                    |
| CS455AF  | 9                           | 15                      | 10 to 12            | 3.6                   | 2.10                       | 0.83                   | 1.10                   | 0.16                | 0.00               | 39                     | 53                     | 8                      | 0                     | 6.7                    | 2.8                    |
| EXP461   | 11                          | 15                      | 10 to 12            | 4.9                   | 3.10                       | 1.40                   | 1.70                   | 0.03                | 0.00               | 44                     | 55                     | 1                      | 0                     | 6.4                    | 2.8                    |
| Portage  | 11                          | 17                      | 9 to 11             | 4.0                   | 2.30                       | 0.83                   | 1.20                   | 0.23                | 0.00               | 36                     | 54                     | 10                     | 0                     | 5.6                    | 2.6                    |
| EXP773   | 10                          | 18                      | 10 to 12            | 4.3                   | 2.70                       | 1.10                   | 1.50                   | 0.07                | 0.00               | 42                     | 56                     | 2                      | 0                     | 6.1                    | 2.7                    |
| BSC905   | 10                          | 18                      | 11 to 13            | 5.8                   | 3.40                       | 1.40                   | 1.60                   | 0.36                | 0.00               | 41                     | 48                     | 11                     | 0                     | 7.9                    | 2.7                    |
| 518      | 10                          | 16                      | 10 to 13            | 3.6                   | 3.30                       | 3.00                   | 0.30                   | 0.00                | 0.00               | 91                     | 9                      | 0                      | 0                     | 7.6                    | 3.7                    |
| DGL0027  | 10                          | 20                      | 11 to 13            | 3.2                   | 2.30                       | 1.43                   | 0.90                   | 0.00                | 0.00               | 61                     | 39                     | 0                      | 0                     | 7.4                    | 3.6                    |
| Nitro    | 12                          | 16                      | 10 to 13            | 5.4                   | 2.93                       | 1.03                   | 1.30                   | 0.60                | 0.00               | 35                     | 44                     | 21                     | 0                     | 8.2                    | 4.7                    |
| EXP125   | 12                          | 17                      | 11 to 13            | 3.3                   | 1.96                       | 0.83                   | 0.96                   | 0.20                | 0.00               | 42                     | 49                     | 9                      | 0                     | 6.9                    | 3.0                    |
| BSC599   | 14                          | 24                      | 11 to 13            | 4.8                   | 3.26                       | 1.73                   | 1.53                   | 0.00                | 0.00               | 53                     | 47                     | 0                      | 0                     | 8.0                    | 3.5                    |
| Saltingo | 11                          | 20                      | 11 to 13            | 3.9                   | 2.50                       | 1.10                   | 1.40                   | 0.00                | 0.00               | 43                     | 57                     | 0                      | 0                     | 7.7                    | 3.4                    |
| SV0969QH | 11                          | 17                      | 10 to 12            | 4.4                   | 2.50                       | 0.86                   | 1.23                   | 0.36                | 0.00               | 35                     | 50                     | 15                     | 0                     | 7.1                    | 3.1                    |
| SV3290QF | 12                          | 18                      | 11 to 14            | 5.9                   | 3.03                       | 1.16                   | 1.06                   | 0.63                | 0.16               | 38                     | 35                     | 21                     | 6                     | 6.4                    | 3.5                    |
| 828      | 12                          | 18                      | 10 to 13            | 4.00                  | 2.20                       | 0.63                   | 1.36                   | 0.20                | 0.00               | 29                     | 62                     | 9                      | 0                     | 6.9                    | 2.8                    |
| CS494DAF | 10                          | 15                      | 10 to 13            | 2.70                  | 2.13                       | 1.60                   | 0.53                   | 0.00                | 0.00               | 75                     | 25                     | 0                      | 0                     | 7.4                    | 3.2                    |
| PLS586   | 11                          | 15                      | 10 to 12            | 3.2                   | 2.13                       | 1.23                   | 0.70                   | 0.20                | 0.00               | 58                     | 33                     | 9                      | 0                     | 7.4                    | 3.2                    |

**Table 5. Plant and Pod Characteristics (In order of maturity) Cont.**

| Cultivar | Node to first flower (avg.) | Vine length (in) (avg.) | Ht. at harvest (in) | Pods per plant (avg.) | Avg. # nodes w/ pods/p lt. | # of Single pods/ node | # of Double pods/ node | # Triple pods/ node | # Quad. pods/ node | % of Single pods/ node | % of Double pods/ node | % of Triple pods/ node | % of Quad. pods/ node | Berries per pod (avg.) | Pod length (in) (avg.) |
|----------|-----------------------------|-------------------------|---------------------|-----------------------|----------------------------|------------------------|------------------------|---------------------|--------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|
| CS464AF  | 13                          | 20                      | 11 to 13            | 4.70                  | 2.90                       | 1.36                   | 1.26                   | 0.26                | 0.00               | 47                     | 44                     | 9                      | 0                     | 6.5                    | 3.0                    |
| PLS576   | 11                          | 18                      | 11 to 13            | 4.10                  | 2.93                       | 1.83                   | 1.03                   | 0.06                | 0.00               | 63                     | 35                     | 2                      | 0                     | 8.2                    | 3.3                    |
| BSC712   | 12                          | 20                      | 11 to 14            | 3.5                   | 2.20                       | 1.06                   | 0.96                   | 0.16                | 0.00               | 48                     | 44                     | 8                      | 0                     | 6.7                    | 2.6                    |
| DA1470   | 10                          | 16                      | 11 to 13            | 3.10                  | 2.16                       | 1.26                   | 0.90                   | 0.00                | 0.00               | 58                     | 42                     | 0                      | 0                     | 5.7                    | 2.9                    |
| Boogie   | 12                          | 15                      | 10 to 13            | 3.90                  | 2.46                       | 1.16                   | 1.20                   | 0.10                | 0.00               | 47                     | 49                     | 4                      | 0                     | 6.2                    | 2.9                    |
| PLS602   | 13                          | 20                      | 11 to 13            | 5.20                  | 3.16                       | 1.16                   | 2.00                   | 0.00                | 0.00               | 37                     | 63                     | 0                      | 0                     | 7.8                    | 3.1                    |
| SV1231QF | 14                          | 20                      | 12 to 15            | 4.60                  | 2.63                       | 1.06                   | 1.06                   | 0.43                | 0.06               | 41                     | 41                     | 16                     | 2                     | 7.8                    | 2.9                    |
| SV0823QG | 13                          | 21                      | 11 to 15            | 5.60                  | 2.86                       | 0.76                   | 1.46                   | 0.63                | 0.00               | 27                     | 51                     | 22                     | 0                     | 6.8                    | 3.2                    |
| PLS196   | 12                          | 17                      | 11 to 13            | 3.70                  | 2.36                       | 1.10                   | 1.23                   | 0.03                | 0.00               | 47                     | 52                     | 1                      | 0                     | 8.4                    | 3.5                    |
| SV6844QG | 14                          | 21                      | 12 to 15            | 4.30                  | 3.26                       | 2.26                   | 0.96                   | 0.03                | 0.00               | 69                     | 30                     | 1                      | 0                     | 8.3                    | 3.1                    |
| SV5685QG | 20                          | 25                      | 11 to 16            | 5.20                  | 3.20                       | 1.40                   | 1.56                   | 0.23                | 0.00               | 44                     | 49                     | 7                      | 0                     | 8.8                    | 3.7                    |



### **Explanation for Table 5:**

This data was derived from 30 plants harvested the same day as our yield harvest that was closest to our objective of 110 tenderometer unit reading. Example – Variety X was harvested twice at tenderometer readings of 99 and 116. The afternoon of the second harvest (116 units), 30 plants were harvested from the back of the plot, weighed and pods were hand stripped and berries were hand shelled.

**Node to first flower** - The average number of nodes on the stem until the first flower (included that one or two at the soil line or below).

**Height at Harvest** – Height was measured day of optimal harvest.

**Pods per plant** - The total number of pods was divided by 30 (number of plants) to determine average pods per plant.

**Average Number of nodes with pods per plant** - The number of nodes that had pods were counted and recorded.

**Number and percentage of single pods, double pods or triple pods per node** - The number of pods per node were hand counted and the number of single pods, double pods and triple pods were recorded. This was changed to a percentage.

**Berries per pod** – Ten uniform pods were selected and opened. The average of berries per pod in this group was listed.

**Pod length** - 10 pods were lined up and measured in inches and an average reported.

| Cultivar | Day 54<br>1175<br>6/21 | Day 55<br>1192<br>6/22 | Day 56<br>1213<br>6/23 | Day 57<br>1239<br>6/24 | Day 58<br>1271<br>6/25 | Day 59<br>1310<br>6/26 | Day 60<br>1352<br>6/27 | Day 61<br>1396<br>6/28 | Day 62<br>1439<br>6/29 | Day 63<br>1476<br>6/30 | Day 64<br>1505<br>7/01 | Day 65<br>1530<br>7/02 | Day 66<br>1556<br>7/03 | Day 67<br>1582<br>7/04 | Day 68<br>1614<br>7/05 | Day 69<br>1654<br>7/06 | Day 70<br>1683<br>7/07 | Day 71<br>1713<br>7/08 | Day 72<br>1744<br>7/09 | Day 73<br>1771<br>7/10 | Day 74<br>1796<br>7/11 | Day 75<br>1824<br>7/12 | Day 76<br>1861<br>7/13 |
|----------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Sherwood | 92                     | 102                    | 110                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Eldorado | 93                     | 103                    | 103                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Spring   | 83                     | 93                     |                        | 102                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV3628QH |                        | 81                     |                        | 97                     | 109                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV5795QE |                        |                        |                        | 86                     | 95                     | 108                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| PLSM14   |                        |                        |                        | 83                     | 97                     | 104                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| CS455AF  |                        |                        |                        |                        |                        |                        | 114                    | 143                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| EXP461   |                        |                        |                        |                        | 81                     |                        | 108                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Portage  |                        |                        |                        |                        |                        |                        | 99                     | 124                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| EXP773   |                        |                        |                        |                        |                        |                        | 94                     | 124                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| BSC905   |                        |                        |                        |                        |                        |                        |                        | 110                    | 122                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| 518      |                        |                        |                        |                        |                        |                        |                        |                        | 119                    | 131                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| DGL0027  |                        |                        |                        |                        |                        |                        | 85                     | 94                     | 118                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Nitro    |                        |                        |                        |                        |                        |                        |                        |                        | 105                    | 122                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| EXP125   |                        |                        |                        |                        |                        |                        |                        |                        |                        | 134                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| BSC599   |                        |                        |                        |                        |                        |                        |                        |                        |                        | 125                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Saltingo |                        |                        |                        |                        |                        |                        |                        | 93                     | 101                    | 118                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV0969QH |                        |                        |                        |                        |                        |                        |                        |                        | 97                     | 116                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV3290QF |                        |                        |                        |                        |                        |                        |                        |                        |                        | 104                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| 828      |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 156                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| CS494DAF |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 132                    | 158                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| PLS586   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 129                    | 158                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Ricco    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 124                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| CS464AF  |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 119                    | 130                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| PLS576   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 118                    | 144                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| BSC712   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 114                    | 138                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| DA1470   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 112                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Boogie   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 110                    | 129                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| PLS602   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 112                    | 119                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV1231QF |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 108                    | 118                    |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| SV0823QG |                        |                        |                        |                        |                        |                        |                        |                        |                        | 99                     |                        |                        | 103                    |                        | 132                    |                        |                        |                        |                        |                        |                        |                        |                        |
| PLS196   |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 106                    | 119                    |                        |                        |                        |                        |                        |                        |                        |
| SV6844QG |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 87                     | 93                     | 105                    |                        |                        |                        |                        |                        |                        |
| SV5685QG |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | 76                     |                        |                        | 99                     | 103                    |

\*Growing Degree Days (GDD) base 40F

\*Growing Degree Days (GDD) base 40F

| Table 7. Weather Summary and 110 tenderometer chart       |     |            |            |            |         |             |                        |                      |            |                              |
|---|-----|------------|------------|------------|---------|-------------|------------------------|----------------------|------------|------------------------------|
| Date  | day | Mean Temp. | Min. Temp. | Max. Temp. | Precip. | Acc Precip. | Degree days base (40F) | acc dd units base 40 | Ten. Units | Correlation factor for Yield |
| 4/28/21   | 0   | 59.5       | 49.5       | 70.5       | 0.05    | 0.05        | 0                      | 0                    | 80         | 2.33                         |
| 4/29/21   | 1   | 49.4       | 46.4       | 51.6       | 0.52    | 0.57        | 9                      | 9                    | 81         | 2.18                         |
| 4/30/21   | 2   | 45.7       | 33.6       | 50.2       | 0.02    | 0.59        | 2                      | 11                   | 82         | 2.05                         |
| Total Precipitation April ---->                           |     |            |            |            |         | 0.59 in     |                        | 11 GDD               |            |                              |
| Table 7. Weather Summary and 110 tenderometer chart cont. |     |            |            |            |         |             |                        |                      |            |                              |
| Date  | day | Mean Temp. | Min. Temp. | Max. Temp. | Precip. | Acc Precip. | Degree days base (40F) | acc dd units base 40 | Ten. Units | Correlation factor for Yield |
| 5/1/21  | 3   | 44.0       | 33.4       | 56.8       | 0.01    | 0.01        | 5                      | 16                   | 83         | 1.93                         |
| 5/2/21  | 4   | 56.3       | 49.3       | 63.7       | 0.02    | 0.03        | 17                     | 33                   | 84         | 1.82                         |
| 5/3/21  | 5   | 56.7       | 49.3       | 66.6       | 0.13    | 0.16        | 18                     | 51                   | 85         | 1.72                         |
| 5/4/21  | 6   | 61.3       | 51.8       | 73.6       | 0.08    | 0.24        | 23                     | 74                   | 86         | 1.64                         |
| 5/5/21  | 7   | 52.4       | 46.9       | 58.5       | 0.07    | 0.31        | 12                     | 86                   | 87         | 1.57                         |
| 5/6/21  | 8   | 47.2       | 39.9       | 54.9       | 0.00    | 0.31        | 7                      | 93                   | 88         | 1.51                         |
| 5/7/21  | 9   | 42.1       | 34.0       | 49.8       | 0.32    | 0.63        | 2                      | 95                   | 89         | 1.46                         |
| 5/8/21  | 10  | 45.0       | 39.6       | 52.9       | 0.33    | 0.96        | 6                      | 101                  | 90         | 1.42                         |
| 5/9/21  | 11  | 45.8       | 40.3       | 54.0       | 0.31    | 1.27        | 7                      | 108                  | 91         | 1.38                         |
| 5/10/21   | 12  | 48.4       | 41.4       | 57.4       | 0.05    | 1.32        | 9                      | 117                  | 92         | 1.34                         |
| 5/11/21   | 13  | 45.9       | 38.3       | 52.5       | 0.00    | 1.32        | 5                      | 122                  | 93         | 1.31                         |
| 5/12/21   | 14  | 51.1       | 40.6       | 61.5       | 0.00    | 1.32        | 11                     | 133                  | 94         | 1.28                         |
| 5/13/21   | 15  | 55.9       | 45.9       | 66.0       | 0.00    | 1.32        | 16                     | 149                  | 95         | 1.25                         |
| 5/14/21   | 16  | 58.7       | 48.6       | 70.2       | 0.00    | 1.32        | 19                     | 168                  | 96         | 1.22                         |
| 5/15/21   | 17  | 59.0       | 43.0       | 72.3       | 0.00    | 1.32        | 18                     | 186                  | 97         | 1.19                         |
| 5/16/21   | 18  | 58.1       | 43.2       | 71.1       | 0.00    | 1.32        | 17                     | 203                  | 98         | 1.17                         |
| 5/17/21   | 19  | 61.6       | 48.0       | 74.1       | 0.00    | 1.32        | 21                     | 224                  | 99         | 1.15                         |
| 5/18/21   | 20  | 65.3       | 48.4       | 78.6       | 0.00    | 1.32        | 24                     | 248                  | 100        | 1.13                         |
| 5/19/21   | 21  | 69.3       | 53.6       | 83.7       | 0.00    | 1.32        | 29                     | 277                  | 101        | 1.11                         |
| 5/20/21   | 22  | 70.8       | 55.8       | 87.4       | 0.00    | 1.32        | 32                     | 309                  | 102        | 1.09                         |
| 5/21/21   | 23  | 74.9       | 61.0       | 90.3       | 0.00    | 1.32        | 36                     | 345                  | 103        | 1.07                         |
| 5/22/21   | 24  | 73.3       | 66.2       | 81.5       | 0.00    | 1.32        | 34                     | 379                  | 104        | 1.06                         |
| 5/23/21   | 25  | 66.3       | 55.0       | 78.3       | 0.00    | 1.32        | 26                     | 405                  | 105        | 1.05                         |
| 5/24/21   | 26  | 61.1       | 44.8       | 75.2       | 0.00    | 1.32        | 20                     | 425                  | 106        | 1.04                         |
| 5/25/21   | 27  | 70.0       | 58.8       | 88.5       | 0.07    | 1.39        | 34                     | 459                  | 107        | 1.03                         |
| 5/26/21   | 28  | 72.7       | 64.2       | 85.3       | 0.18    | 1.57        | 34                     | 493                  | 108        | 1.02                         |
| 5/27/21   | 29  | 56.8       | 45.7       | 63.3       | 0.00    | 1.57        | 15                     | 508                  | 109        | 1.01                         |
| 5/28/21   | 30  | 44.2       | 41.5       | 46.6       | 0.58    | 2.15        | 4                      | 512                  | 110        | 1.00                         |
| 5/29/21   | 31  | 48.9       | 41.9       | 56.8       | 0.04    | 2.19        | 9                      | 521                  | 111        | 0.99                         |
| 5/30/21   | 32  | 50.7       | 41.4       | 58.6       | 0.00    | 2.19        | 10                     | 531                  | 112        | 0.98                         |
| 5/31/21   | 33  | 58.7       | 42.1       | 71.6       | 0.00    | 2.19        | 17                     | 548                  | 113        | 0.97                         |
| Total Precipitation May ---->                             |     |            |            |            |         | 2.19 in     |                        | 548 GDD              |            |                              |

**Table 7. Weather Summary and 110 tenderometer chart cont.**

| Date                            | day | Mean Temp. | Min. Temp. | Max. Temp. | Precip. | Acc Precip. | Degree days base (40F) | acc dd units base 40 | Ten. Units | Correlation factor for Yield |
|---------------------------------|-----|------------|------------|------------|---------|-------------|------------------------|----------------------|------------|------------------------------|
| 6/1/21                          | 34  | 63.3       | 52.5       | 74.5       | 0.00    | 0.00        | 24                     | 572                  | 114        | 0.96                         |
| 6/2/21                          | 35  | 62.7       | 48.9       | 73.0       | 0.00    | 0.00        | 21                     | 593                  | 115        | 0.96                         |
| 6/3/21                          | 36  | 66.1       | 60.8       | 75.4       | 0.34    | 0.34        | 28                     | 621                  | 116        | 0.95                         |
| 6/4/21                          | 37  | 70.7       | 59.7       | 81.0       | 0.00    | 0.34        | 30                     | 651                  | 117        | 0.95                         |
| 6/5/21                          | 38  | 77.1       | 66.2       | 87.3       | 0.00    | 0.34        | 37                     | 688                  | 118        | 0.94                         |
| 6/6/21                          | 39  | 78.3       | 64.6       | 89.8       | 0.00    | 0.34        | 37                     | 725                  | 119        | 0.94                         |
| 6/7/21                          | 40  | 78.3       | 65.3       | 89.8       | 0.06    | 0.40        | 38                     | 763                  | 120        | 0.93                         |
| 6/8/21                          | 41  | 74.6       | 69.3       | 83.1       | 0.31    | 0.71        | 36                     | 799                  | 121        | 0.93                         |
| 6/9/21                          | 42  | 74.5       | 66.9       | 79.9       | 0.00    | 0.71        | 32                     | 831                  | 122        | 0.92                         |
| 6/10/21                         | 43  | 69.2       | 58.3       | 80.8       | 0.00    | 0.71        | 30                     | 861                  | 123        | 0.92                         |
| 6/11/21                         | 44  | 68.2       | 54.7       | 82.2       | 0.00    | 0.71        | 28                     | 889                  | 124        | 0.91                         |
| 6/12/21                         | 45  | 68.1       | 60.6       | 79.2       | 0.00    | 0.71        | 29                     | 918                  | 125        | 0.91                         |
| 6/13/21                         | 46  | 71.8       | 56.5       | 83.8       | 0.00    | 0.71        | 30                     | 948                  | 126        | 0.90                         |
| 6/14/21                         | 47  | 67.5       | 59.7       | 74.5       | 0.49    | 1.20        | 27                     | 975                  | 127        | 0.90                         |
| 6/15/21                         | 48  | 62.6       | 59.2       | 70.3       | 0.01    | 1.21        | 25                     | 1000                 | 128        | 0.89                         |
| 6/16/21                         | 49  | 60.6       | 51.8       | 68.9       | 0.01    | 1.22        | 20                     | 1020                 | 129        | 0.89                         |
| 6/17/21                         | 50  | 63.9       | 52.7       | 75.4       | 0.00    | 1.22        | 24                     | 1044                 | 130        | 0.89                         |
| 6/18/21                         | 51  | 68.3       | 54.9       | 79.2       | 0.01    | 1.23        | 28                     | 1072                 | 131        | 0.88                         |
| 6/19/21                         | 52  | 74.7       | 63.7       | 85.5       | 0.20    | 1.43        | 35                     | 1107                 | 132        | 0.88                         |
| 6/20/21                         | 53  | 71.2       | 58.1       | 84.2       | 0.00    | 1.43        | 31                     | 1138                 | 133        | 0.88                         |
| 6/21/21                         | 54  | 75.0       | 66.4       | 89.1       | 0.81    | 2.24        | 37                     | 1175                 | 134        | 0.87                         |
| 6/22/21                         | 55  | 58.2       | 52.7       | 64.4       | 0.00    | 2.24        | 17                     | 1192                 | 135        | 0.87                         |
| 6/23/21                         | 56  | 60.6       | 48.6       | 73.9       | 0.00    | 2.24        | 21                     | 1213                 | 136        | 0.87                         |
| 6/24/21                         | 57  | 67.4       | 52.9       | 78.4       | 0.00    | 2.24        | 26                     | 1239                 | 137        | 0.86                         |
| 6/25/21                         | 58  | 72.2       | 61.9       | 82.9       | 0.00    | 2.24        | 32                     | 1271                 | 138        | 0.86                         |
| 6/26/21                         | 59  | 77.3       | 68.2       | 88.9       | 0.00    | 2.24        | 39                     | 1310                 | 139        | 0.86                         |
| 6/27/21                         | 60  | 81.9       | 71.6       | 92.3       | 0.00    | 2.24        | 42                     | 1352                 | 140        | 0.86                         |
| 6/28/21                         | 61  | 83.8       | 75.7       | 93.0       | 0.00    | 2.24        | 44                     | 1396                 | 141        | 0.85                         |
| 6/29/21                         | 62  | 79.8       | 70.5       | 95.4       | 0.24    | 2.48        | 43                     | 1439                 | 142        | 0.85                         |
| 6/30/21                         | 63  | 76.3       | 70.7       | 83.5       | 0.12    | 2.60        | 37                     | 1476                 | 143        | 0.85                         |
| Total Precipitation June -----> |     |            |            |            |         | 2.60 in     |                        | 1476 GDD             |            |                              |

| <b>Table 7. Weather Summary and 110 tenderometer chart cont.</b> |     |            |            |            |         |                |                        |                      |            |                              |
|--|-----|------------|------------|------------|---------|----------------|------------------------|----------------------|------------|------------------------------|
| Date   | day | Mean Temp. | Min. Temp. | Max. Temp. | Precip. | Acc Precip.    | Degree days base (40F) | acc dd units base 40 | Ten. Units | Correlation factor for Yield |
| 7/1/21   | 64  | 70.5       | 64.8       | 75         | 0.00    | 0.00           | 29                     | 1505                 | 144        | 0.85                         |
| 7/2/21   | 65  | 63.5       | 58.8       | 70.3       | 0.80    | 0.80           | 25                     | 1530                 | 145        | 0.85                         |
| 7/3/21   | 66  | 65.1       | 60.3       | 72.5       | 0.07    | 0.87           | 26                     | 1556                 | 146        | 0.84                         |
| 7/4/21   | 67  | 67.0       | 59.2       | 74.3       | 0.00    | 0.87           | 26                     | 1582                 | 147        | 0.84                         |
| 7/5/21   | 68  | 72.2       | 55.0       | 89.1       | 0.00    | 0.87           | 32                     | 1614                 | 148        | 0.84                         |
| 7/6/21   | 69  | 79.8       | 73.6       | 85.6       | 0.00    | 0.87           | 40                     | 1654                 | 149        | 0.84                         |
| 7/7/21   | 70  | 70.3       | 61.0       | 76.6       | 0.84    | 1.71           | 29                     | 1683                 | 150        | 0.84                         |
| 7/8/21   | 71  | 68.5       | 61.2       | 77.5       | 0.38    | 2.09           | 30                     | 1713                 | 151        | 0.83                         |
| 7/9/21   | 72  | 69.0       | 63.9       | 77.9       | 0.40    | 2.49           | 31                     | 1744                 | 152        | 0.83                         |
| 7/10/21  | 73  | 67.2       | 61.5       | 74.1       | 0.01    | 2.50           | 27                     | 1771                 | 153        | 0.83                         |
| 7/11/21  | 74  | 64.5       | 59.4       | 70.9       | 0.28    | 2.78           | 25                     | 1796                 | 154        | 0.83                         |
| 7/12/21  | 75  | 67.0       | 61.7       | 74.5       | 0.39    | 3.17           | 28                     | 1824                 | 155        | 0.83                         |
| 7/13/21  | 76  | 75.5       | 68.0       | 85.3       | 0.13    | 3.30           | 37                     | 1861                 | 156        | 0.83                         |
| <b>Total Precipitation July</b>                                  |     |            |            |            |         | <b>3.30 in</b> |                        | <b>1861 GDD</b>      |            |                              |

\*Growing degree days (GDD) base 40F

## Descriptions Provided by the Seed Source:

**Spring** – Pure Line, normal leaf, 1100 heat units, 4.5 average sieve size, 9 nodes to flower, 1-2 pods per plant, 6-7 berries per pod, 16-inch plant height, resistance to Fusarium wilt race 1.

**Eldorado** – Pure Line, normal leaf type, 3.8 sieve size, -1 days to maturity relative to Spring, 1100 heat units, resistant to Fusarium race 1 and powdery mildew.

**Sherwood** – Seminis, normal leaf, 1160 heat units, 3.3 sieve size, IR: PV, HR: BYMV/FOP:1

**SVS795QE** – Seminis, normal leaf, 1170 GDD base 40F. 10 nodes to blossom.

**SV3628QH** – Seminis, normal leaf, 1205 GDD base 40F. 10-11 nodes to blossom.

**EXP 461** – Brotherton, afila leaf type, 1216 heat units, 59 days to maturity, 3.2 average sieve size.

**DGL0027** – Pure Line, afila leaf type, 1250 GDD base 40F. 3.5 sieve index and 12 nodes to flower.

**PLSM14** – Pure Line, normal leaf type, +4 days to maturity relative to Spring, 1250 heat units, 3.8 sieve size, resistance to Fusarium Wilt race1.

**CS-455AF** – Crites, 1355 heat units to maturity, afila leaf type, disease resistance: Fop 1, Pv+, 2 days earlier than Portage, good root system.

**Saltingo** – Pure Line, afila leaf type, 3.5 sieve size, +4 days to maturity relative to Spring, 1300 heat units, resistant to Fusarium Wilt race 1 and powdery mildew, tolerant to downy mildew and pea enation mosaic virus.

**Portage** – Crites, midseason maturity, 60 days to maturity or approximately 1305 heat units (+ 2 days relative to Tomahawk), afila leaf type, 18 inch plant height, 10 nodes to first bloom, 2-3 pods per node, 7-8 peas per pod, 3.7 sieve size index, resistant to fusarium wilt race 1.

**BSC905** – Brotherton, normal leaf, 1332 Heat Units, 65 days to maturity, 1.4 sieve index.

**EXP125** - Brotherton, afila leaf type, 1332 heat units. 65 days to maturity, 3.1 average sieve size.

**EXP773** – Brotherton, normal leaf, 1332 GDD base 40F. 3.4 sieve index and 13 nodes to blossom.

**SV0969QH** – Seminis, normal leaf, 1360 GDD base 40F. 3.1 sieve index.

**Nitro** – Seminis, 1370 heat units, normal leaf, 2 sieve size, HR: BYMV/FOP.

**GVS 518** – Gallatin Valley, Mid-season Afila type, 67 days to maturity, 1410 heat units, 12-13 nodes to first flower, plant height 25", avg. 2 pods per node, avg. sieve size is 3.8, pointed pod shape.

**BSC712** – Brotherton, 1422 heat units, afila leaf type, 68 days to maturity, 3.8 average sieve size. 14 nodes to blossom.

**PLS586** – Pure Line, afila leaf type, 1430 GDD base 40F. 4.0 sieve index and 12-13 nodes to flower.

## Descriptions Provided by the Seed Source Continued:

**CS494DAF** – Crites, afila leaf type, 1470 heat units, 71 days to maturity, 2.8 average sieve size, small sieve size class.

**SV3290QF** – Seminis, normal leaf, 1450 GDD base 40F. 14-15 nodes to blossom.

**PLS576** – Pure Line, afila leaf type, 1450 GDD base 40F. 3.6 sieve index and 12-13 nodes to flower.

**BSC599** – Brotherton, afila leaf type, 1469 heat units, 3.8 average sieve size. 15 nodes to blossom.

**DA1470 (EX08540794)** – Seminis, 1470 heat units, determinate afila type, 3.2 average sieve size, 2-3 pods per node, 8-9 berries per pod, 18 inch plant height, HR for Fusarium R1 and bean yellow mosaic virus. Sweet savor gene which slows conversion of sugar to starch, true determinate plant type which allows for improved sieve distribution and less waste at harvest from immature fruit.

**PLS602** – Pure Line, afila leaf type, +11 days to maturity relative to Spring, 1470 heat units, 3.1 sieve size, resistance to FWR1,r2, Fus.RR, PM.

**SV1231QF** – Seminis, 1480 heat units, afila sweet savor, 15 nodes to first flower, 2-3 pods per node, 7-8 berries per pod, IR for Downy Mildew, HR for Powdery Mildew, Fusarium R1&R2, pea enation mosaic virus and bean yellow mosaic virus

**Boogie** – Brotherton, afila, 1490 HU or 68 days to maturity. 4.3 sieve and 14-15 nodes to first flower. Resistance to PM and tolerance to DM.

**828** – Gallatin Valley, afila leaf type, 14 nodes to bloom, 1500 heat units, 3.8 sieve.

**SV0823QG** – Seminis, 1525 heat units, afila plant type, 3.3 average sieve size, 17 nodes to first flower, 2-3 pods per node, 8-9 berries per pod, 45 cm plant height, 2600 seeds per pound, Ir for Downy Mildew and HR for Powdery Mildew, Fusarium R1 and Pea Enation mosaic virus.

**Ricco** – Gallatin Valley, Main season variety 1530 heat units, afila leaf type, 16 nodes to first flower, 26 inch plant height, 2 pods per node, 3.7 average sieve size, 8-9 berries per pod, pointed pod shape, HR for Fusarium wilt race 1 and IR for race 2, HR for Bean Leaf Roll Virus and Powdery Mildew race 1, dark green foliage, excellent disease package including root rot tolerance, superior yield, medium size berry, uniform berry color, widely adapted.

**CS-464AF** – Crites, 1565 heat units to maturity, disease resistance: Fop 1&2, Ep, PEMV, afila type leaf, triple pods, main-season, disease package.

**SV6844QG** – Seminis, 1600 heat units, afila, Fasc; sweet savor, 3.6 sieve size, 17 nodes to first flower, 2-3 pods per node, 7-8 berries per pod, IR for Downy Mildew, HR for Powdery Mildew, Fusarium R1 &R2, Pea Enation Mosaic Virus and Bean yellow mosaic virus.

**PLS196** – Pure Line, afila, +13 days to maturity relative to Spring, 1600 heat units, 4.0 sieve, resistance to FWR1,2, Fus.RR, PM, tolerant: Downy Mildew.

**SV5685QG** – Seminis, 1750 heat units, normal leaf.

### **- 2021 Annual Cutting -**

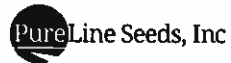
A socially distanced, vegetable “cutting”, is planned for November 4<sup>th</sup>, where frozen peas, snap beans, and sweet corn will be put on display for processors and seed companies to evaluate. Large and 3-4 sieve snap beans were canned and will also be put on display. Our vegetable cutting is the final step of our program’s evaluation. We evaluate the horticultural characteristics in the field and in raw products, but our vegetable cutting takes us all the way to quality evaluation on the plate.



The logo for Bonduelle, featuring the brand name in a stylized, italicized serif font. A thin, curved line arches over the text, resembling a rainbow or a stylized 'B'.A black and white photograph of a rural landscape at sunset or sunrise. The sky is dark with a bright, horizontal band of light near the horizon. In the distance, two silos are visible on the horizon line. The foreground is a dark, textured field.

# PEA VARIETY TRIAL 2021

## In collaboration with:



## Summary

The plot was located just North of Belmont, Ontario.  
Thirty-eight unique varieties were planted on May 10, 2021.  
There was no second planting.

The plot was visited weekly prior to bloom, twice or three times weekly post-bloom and pre-podset, and daily from podset to harvest.

The trial received adequate rainfall and heat during germination and from VE-V6  
Mid June saw a short period of drought, but no impact was seen on the trial.

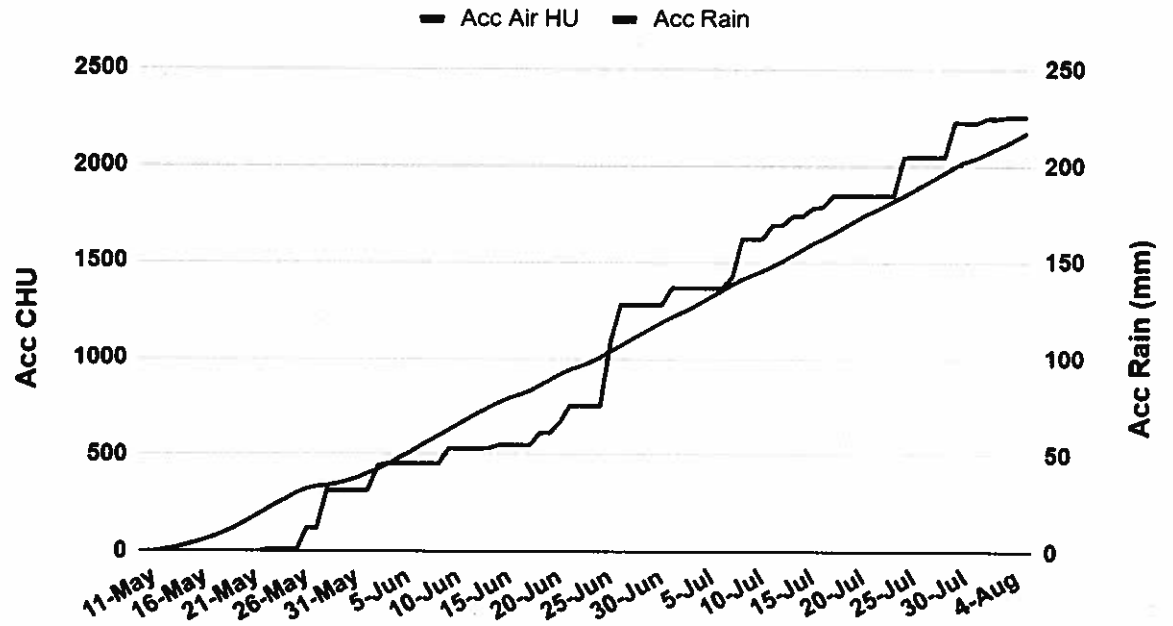
Some varieties experienced severe herbicide damage around V5. Some recovered very well and others were not harvested.

Some varieties experienced stress due to aphid pressure. This did not have an impact on results.

Reported yields are in tons per acre and adjusted to 110 TD.

# SEASON WEATHER

## Crop Heat Units and Rainfall For The 2021 Crop Season



# DATA SUMMARY

| Date   | Variety    | Sieve Size |        |        |        |         |      | AVG YD | Yield(Tons/Acre) | Adjusted Yield | H2   |
|--------|------------|------------|--------|--------|--------|---------|------|--------|------------------|----------------|------|
|        |            | 1          | 2      | 3      | 4      | 5       | Aug  |        |                  |                |      |
| 6-Jul  | LI Mo      | 0.00%      | 23.16% | 67.00% | 7.88%  | 0.00%   | 2.83 | 173    | 3.83             | 3.20           | 1384 |
| 10-Jul | LI Mo      | 37.97%     | 50.00% | 11.30% | 0.63%  | 0.00%   | 1.78 | 163    | 3.06             | 2.64           | 1466 |
| 8-Jul  | BSC 489    | 53.28%     | 29.35% | 17.30% | 0.00%  | 0.00%   | 1.84 | 98     | 1.78             | 2.08           | 1384 |
| 7-Jul  | BSC 489    | 35.88%     | 32.82% | 30.53% | 0.76%  | 0.00%   | 1.96 | 112    | 2.54             | 2.61           | 1384 |
| 10-Jul | BSC 489    | 21.17%     | 46.85% | 31.08% | 0.90%  | 0.00%   | 2.12 | 167    | 4.30             | 3.67           | 1466 |
| 6-Jul  | Nitro      | 72.20%     | 18.25% | 8.76%  | 0.73%  | 0.00%   | 1.38 | 104    | 2.66             | 2.84           | 1384 |
| 7-Jul  | Nitro      | 45.45%     | 27.27% | 22.73% | 4.55%  | 0.00%   | 1.86 | 91     | 0.43             | 0.89           | 1384 |
| 10-Jul | Nitro      | 17.68%     | 44.51% | 34.15% | 3.05%  | 0.61%   | 2.24 | 184    | 3.16             | 2.84           | 1466 |
| 6-Jul  | BSC 481    | 21.83%     | 46.46% | 5.83%  | 26.06% | 0.00%   | 2.38 | 129    | 2.76             | 2.46           | 1384 |
| 10-Jul | 813        | 100.00%    | 0.00%  | 0.00%  | 0.00%  | 0.00%   | 1.00 | 80     | 0.54             | 1.26           | 1466 |
| 13-Jul | 813        | 100.00%    | 0.00%  | 0.00%  | 0.00%  | 0.00%   | 1.00 | 79     | 0.96             |                | 1637 |
| 15-Jul | 813        | 84.04%     | 23.60% | 12.36% | 0.00%  | 0.00%   | 1.46 | 93     | 1.72             | 2.26           | 1697 |
| 16-Jul | 813        | 75.31%     | 20.90% | 2.47%  | 1.23%  | 0.00%   | 1.30 | 98     | 1.67             | 1.63           | 1622 |
| 18-Jul | 813        | 56.58%     | 38.79% | 4.27%  | 0.36%  | 0.00%   | 1.48 | 129    | 6.44             | 4.84           | 1679 |
| 10-Jul | CS-439     | 100.00%    | 0.00%  | 0.00%  | 0.00%  | 0.00%   | 1.00 | 83     | 1.24             | 2.39           | 1466 |
| 12-Jul | CS-439     | 39.06%     | 41.38% | 18.39% | 1.15%  | 0.00%   | 1.82 | 99     | 1.68             | 1.94           | 1607 |
| 13-Jul | CS-439     | 27.16%     | 46.30% | 21.80% | 4.94%  | 0.00%   | 2.04 | 101    | 3.14             | 3.48           | 1637 |
| 15-Jul | CS-439     | 9.82%      | 42.94% | 33.74% | 7.36%  | 6.13%   | 2.67 | 131    | 3.16             | 2.78           | 1697 |
| 17-Jul | Zonvert    | 81.82%     | 15.91% | 2.27%  | 0.00%  | 0.00%   | 1.20 | 76     | 0.88             |                | 1649 |
| 18-Jul | Zonvert    | 69.23%     | 23.83% | 5.98%  | 0.85%  | 0.00%   | 1.38 | 96     | 2.27             | 2.63           | 1679 |
| 19-Jul | Zonvert    | 50.00%     | 46.67% | 3.33%  | 0.00%  | 0.00%   | 1.83 | 96     | 0.88             | 6.73           | 1799 |
| 20-Jul | Zonvert    | 55.82%     | 33.55% | 9.21%  | 1.32%  | 0.00%   | 1.66 | 106    | 2.94             | 3.06           | 1739 |
| 15-Jul | SV 7441 QC | 52.21%     | 24.26% | 10.29% | 6.62%  | 6.62%   | 1.91 | 106    | 2.63             | 2.79           | 1697 |
| 16-Jul | SV 7441 QC | 67.44%     | 30.23% | 1.16%  | 1.16%  | 0.00%   | 1.36 | 110    | 1.64             | 1.84           | 1622 |
| 17-Jul | SV 7441 QC | 50.98%     | 37.91% | 11.11% | 0.00%  | 0.00%   | 1.60 | 139    | 2.94             | 2.66           | 1649 |
| 6-Jul  | 534        | 100.00%    | 0.00%  | 0.00%  | 0.00%  | 0.00%   | 1.00 | 141    | 0.86             | 0.48           | 1384 |
| 6-Jul  | SV 6485 QH | 4.26%      | 10.64% | 59.57% | 19.15% | 6.38%   | 3.13 | 113    | 0.91             | 0.88           | 1384 |
| 16-Jul | ASR 3221   | 4.42%      | 6.08%  | 34.81% | 37.02% | 17.69%  | 3.87 | 223    | 3.86             | 2.91           | 1622 |
| 6-Jul  | Portage    | 3.66%      | 1.22%  | 23.17% | 32.93% | 39.02%  | 4.82 | 121    | 1.89             | 1.48           | 1384 |
| 6-Jul  | Saltingo   | 18.75%     | 3.75%  | 30.00% | 32.50% | 15.00%  | 3.31 | 114    | 1.64             | 1.60           | 1384 |
| 7-Jul  | Saltingo   | 1.02%      | 4.08%  | 33.67% | 35.71% | 25.51%  | 3.81 | 128    | 1.90             | 1.69           | 1384 |
| 6-Jul  | Ambler     | 0.00%      | 0.00%  | 13.61% | 41.42% | 44.97%  | 4.31 | 161    | 3.27             | 2.72           | 1384 |
| 6-Jul  | EXP 125    | 0.00%      | 0.00%  | 0.00%  | 0.00%  | 100.00% | 6.00 | 101    | 0.89             | 0.99           | 1364 |
| 7-Jul  | EXP 125    | 1.82%      | 6.77%  | 42.31% | 30.77% | 19.23%  | 3.80 | 116    | 1.01             | 0.97           | 1384 |

# DATA SUMMARY - CONTINUED

| Date   | Variety    | Sieve Size |        |        |        |        |      | 40/60 TD | Yield (Consistency) | Adjusted Yield | NO   |
|--------|------------|------------|--------|--------|--------|--------|------|----------|---------------------|----------------|------|
|        |            | 1          | 2      | 3      | 4      | 5      | Ang. |          |                     |                |      |
| 6-Jul  | Reliance   | 25.00%     | 26.79% | 41.96% | 5.36%  | 0.89%  | 2.30 | 100      | 2.17                | 2.45           | 1384 |
| 7-Jul  | Reliance   | 10.34%     | 21.38% | 56.55% | 11.03% | 0.89%  | 2.70 | 100      | 2.61                | 2.89           | 1384 |
| 7-Jul  | CS-494DAF  | 33.33%     | 20.51% | 44.67% | 1.28%  | 0.00%  | 2.14 | 82       | 1.51                | 2.40           | 1394 |
| 10-Jul | CS-494DAF  | 8.63%      | 20.19% | 68.69% | 15.02% | 0.47%  | 2.86 | 134      | 4.12                | 3.89           | 1466 |
| 10-Jul | Amalfi     | 13.64%     | 29.55% | 44.70% | 10.61% | 1.52%  | 2.67 | 164      | 2.66                | 2.12           | 1466 |
| 10-Jul | PLS 602    | 25.20%     | 32.28% | 37.80% | 4.72%  | 0.00%  | 2.22 | 99       | 2.46                | 2.83           | 1466 |
| 12-Jul | PLS 602    | 5.61%      | 24.30% | 62.62% | 8.54%  | 0.93%  | 2.73 | 113      | 2.87                | 2.61           | 1607 |
| 12-Jul | SV 0823 QG | 16.42%     | 29.85% | 40.30% | 8.96%  | 4.48%  | 2.66 | 96       | 1.30                | 1.42           | 1607 |
| 13-Jul | SV 0823 QG | 14.07%     | 19.26% | 37.78% | 21.48% | 7.41%  | 2.89 | 104      | 2.61                | 2.80           | 1637 |
| 15-Jul | SV 0823 QG | 8.69%      | 9.51%  | 36.27% | 32.75% | 14.79% | 3.39 | 136      | 5.50                | 4.73           | 1697 |
| 15-Jul | BSC 691    | 9.50%      | 13.41% | 23.48% | 25.14% | 28.49% | 3.80 | 113      | 3.47                | 3.40           | 1697 |
| 15-Jul | Welland    | 11.76%     | 21.93% | 40.11% | 18.18% | 8.02%  | 2.89 | 161      | 3.62                | 3.05           | 1697 |
| 13-Jul | Tyne       | 18.67%     | 8.00%  | 20.00% | 18.67% | 34.67% | 3.43 | 96       | 1.46                | 1.79           | 1637 |
| 15-Jul | Tyne       | 11.60%     | 13.81% | 33.70% | 27.07% | 13.81% | 3.18 | 136      | 3.68                | 3.66           | 1697 |
| 12-Jul | CS-498     | 19.50%     | 34.59% | 36.99% | 6.92%  | 0.00%  | 2.33 | 120      | 3.66                | 2.86           | 1607 |
| 15-Jul | Concept    | 13.18%     | 15.13% | 36.18% | 3.95%  | 31.58% | 3.26 | 118      | 2.94                | 2.80           | 1697 |
| 19-Jul | Ballade    | 33.33%     | 30.00% | 26.67% | 6.67%  | 3.33%  | 2.17 | 78       | 0.58                |                | 1709 |
| 20-Jul | Ballade    | 17.39%     | 19.57% | 35.87% | 20.65% | 6.52%  | 2.79 | 87       | 1.78                | 2.80           | 1739 |
| 23-Jul | Ballade    | 13.18%     | 13.18% | 33.33% | 29.46% | 10.85% | 3.12 | 117      | 2.50                | 2.37           | 1816 |
| 15-Jul | Valkon     | 7.51%      | 11.59% | 30.06% | 36.84% | 15.03% | 3.39 | 97       | 3.36                | 3.99           | 1697 |
| 16-Jul | Valkon     | 6.25%      | 4.89%  | 10.84% | 37.50% | 40.63% | 4.82 | 104      | 2.46                | 2.63           | 1622 |
| 17-Jul | Valkon     | 0.00%      | 3.54%  | 17.70% | 30.08% | 48.67% | 4.34 | 120      | 2.19                | 2.03           | 1649 |
| 17-Jul | SV 5685 QG | 10.11%     | 13.48% | 28.09% | 28.97% | 21.35% | 3.36 | 63       | 1.72                | 3.33           | 1649 |
| 18-Jul | SV 5685 QG | 5.63%      | 9.17%  | 22.50% | 26.67% | 35.83% | 3.78 | 91       | 2.32                | 3.21           | 1679 |
| 19-Jul | SV 5685 QG | 5.52%      | 4.83%  | 20.69% | 24.14% | 44.83% | 3.88 | 106      | 2.81                | 2.92           | 1709 |
| 20-Jul | SV 5685 QG | 0.48%      | 3.38%  | 13.04% | 23.19% | 59.90% | 4.39 | 120      | 4.01                | 3.77           | 1739 |