

2007 University of Delaware Processing Onion Demonstration

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The 2007 Processing Onion Demonstration included 13 varieties from three participating seed companies. The purpose of this demonstration was to determine the feasibility of growing onions for processing in Delaware. Variables included planting date, sidedress timing, and direct seeding vs. transplanting.

Varieties Entered in the 2007 Delaware Processing Onion Demonstration

| Variety # | Variety Name | Seed Company |
|-----------|------------------|-------------------------|
| 1 | Sweet Perfection | Crookham Company |
| 2 | CXI-78 | Crookham Company |
| 3 | CXI-71 | Crookham Company |
| 4 | Montero | Nunhems USA, Inc. |
| 5 | Infinity | Nunhems USA, Inc. |
| 6 | Caveat | Seminis Vegetable Seeds |
| 7 | Bunker | Seminis Vegetable Seeds |
| 8 | Golden Spike | Seminis Vegetable Seeds |
| 9 | Exacta | Seminis Vegetable Seeds |
| 10 | Citation | Seminis Vegetable Seeds |
| 11 | Vision | Seminis Vegetable Seeds |
| 12 | Ricochet | Seminis Vegetable Seeds |
| 13 | Nicolet | Seminis Vegetable Seeds |

Location

Field 12-A at the University of Delaware Carvel REC Farm, Georgetown, DE.

Cultural Practices

Plots were 30 ft long with 30 inch between-row spacing and approximately 4 inch in-row spacing. Plots were seeded or transplanted by hand. Direct seeded plots were thinned by hand. Seeding, transplant and sidedress dates are given below in Table 1. Treatments were not replicated.

Table 1. Treatment seeding date, transplant date and sidedress dates, and varieties included in each treatment.

| Treatment | Seeding Date | Transplant Date | Sidedress Dates* | Varieties |
|----------------|--------------|-----------------|-----------------------|---------------|
| Transplant 1.1 | Jan 29, 2007 | Apr 3, 2007 | Apr 30; May 14 | #1 through #5 |
| Transplant 1.2 | Jan 29, 2007 | Apr 3, 2007 | Apr 30; May 14; Jun 6 | #1 through #5 |
| Transplant 2 | Mar 27, 2007 | Apr 25, 2007 | May 14; Jun 6 | all |
| Direct Seed 1 | Apr 3, 2007 | NA | Jun 6 | all |
| Direct Seed 2 | Apr 26, 2007 | NA | Jun 6 | all |

* 25 lbs/A N applied at each sidedress

No herbicides were used on the plots. Weeds were controlled by cultivation and hand weeding. Existing plots were rotary hoed on April 24, 2007 to break up a crust that had formed so that the Direct Seed 1 treatment plants could emerge. Warrior was applied twice at a rate of 3.8 oz/A (on June 9 and June 23) to control thrips. Plots were irrigated (usually twice a week) with overhead sprinklers set in moveable pipe.

Harvest

Treatments were harvested when 50% of the tops had fallen over. A 15 ft portion of each plot was pulled by hand. The harvest sample was dried on a covered porch for approximately six days, graded by size, topped and weighed.

Results and Discussion

Onions grown from transplants had higher yields than those that were direct seeded. The transplanted onions also had a higher percent of bulbs with a diameter of 3.25 inches or greater. The economic viability of growing onions for processing from transplants is unknown but suspect. Precision seeding, planting of a small grain nurse crop, and careful irrigation management during seedling emergence and early growth may all help to increase the success of direct seeded onions.

There seemed to be a detrimental effect of later or excessive nitrogen fertilization on bulb size, as seen in the differences between the treatments Transplant 1.1 and Transplant 1.2. Transplant 1.1 received two applications of 25 lb/A of N while Transplant 1.2 received three such applications. On average, the Transplant 1.2 treatment produced less than half the weight of onions $\geq 3.25''$ that Transplant 1.1 did.

The varieties Montero, Sweet Perfection and Vision had a higher percentage of bulbs that were $\geq 3.25''$ across treatments. The varieties CXI-71 and CXI-78 initiated bulbing too early to reach significant size, except in the earliest transplanted treatment.

Acknowledgements

The authors gratefully acknowledge Brian Hearn, James Adkins and Ward Harris for their attention to insecticide applications, cultivation, and irrigation, respectively.

Table 2. Onion Yield Data by Variety and Treatment

| Treatment | Variety | Yield $\geq 3.25''$ (Lbs/A) | Total Yield (Lbs/A) | % $\geq 3.25''$ (by weight) |
|----------------|-----------------------|-----------------------------|---------------------|-----------------------------|
| Transplant 1.1 | Sweet Perfection | 27135 | 33826 | 80 |
| | Montero | 17633 | 32664 | 54 |
| | Infinity | 16425 | 27507 | 60 |
| | CXI-78 | 9316 | 23975 | 39 |
| | CXI-71 | 0 | 16541 | 0 |
| | <i>Treatment Mean</i> | <i>14102</i> | <i>26903</i> | <i>52</i> |
| Transplant 1.2 | Montero | 16959 | 28668 | 59 |
| | Sweet Perfection | 15612 | 31537 | 50 |
| | Infinity | 1394 | 21327 | 7 |
| | CXI-78 | 0 | 15635 | 0 |
| | CXI-71 | 0 | 12174 | 0 |
| | <i>Treatment Mean</i> | <i>6793</i> | <i>21868</i> | <i>31</i> |
| Transplant 2 | Montero | 32385 | 37194 | 87 |
| | Vision | 23813 | 35266 | 68 |
| | Sweet Perfection | 17656 | 33477 | 53 |
| | Caveat | 12569 | 28599 | 44 |
| | Citation | 10896 | 27367 | 40 |
| | Exacta | 9060 | 26926 | 34 |
| | Bunker | 8991 | 24974 | 36 |
| | Infinity | 8735 | 33617 | 26 |
| | Golden Spike | 4437 | 25346 | 18 |
| | Ricochet | 4414 | 24510 | 18 |
| | Nicolet | 2648 | 20769 | 13 |
| | CXI-78 | 697 | 13823 | 5 |
| | CXI-71 | 0 | 9525 | 0 |
| | <i>Treatment Mean</i> | <i>10485</i> | <i>26261</i> | <i>40</i> |
| Direct Seed 1 | Vision | 2300 | 5924 | 39 |
| | Ricochet | 813 | 13986 | 6 |
| | Caveat | 0 | 16634 | 0 |
| | Nicolet | 0 | 9734 | 0 |
| | Infinity | 0 | 8573 | 0 |
| | Citation | 0 | 6575 | 0 |
| | Bunker | 0 | 5831 | 0 |
| | Golden Spike | 0 | 5204 | 0 |
| | Exacta | 0 | 4484 | 0 |
| | <i>Treatment Mean</i> | <i>346</i> | <i>8549</i> | <i>4</i> |
| Direct Seed 2 | Montero | 1975 | 11221 | 18 |
| | Bunker | 1185 | 6993 | 17 |
| | Vision | 650 | 11779 | 6 |
| | Caveat | 604 | 13265 | 5 |
| | Infinity | 0 | 15682 | 0 |
| | Golden Spike | 0 | 12545 | 0 |
| | Ricochet | 0 | 12359 | 0 |
| | Exacta | 0 | 11384 | 0 |
| | Nicolet | 0 | 7922 | 0 |
| | Citation | 0 | 7643 | 0 |
| | Sweet Perfection | 0 | 5181 | 0 |
| | CXI-78 | 0 | 4902 | 0 |
| | CXI-71 | 0 | 1696 | 0 |
| | <i>Treatment Mean</i> | <i>340</i> | <i>9429</i> | <i>4</i> |

Chart 1. Transplanted Onion Yields by Variety and Planting

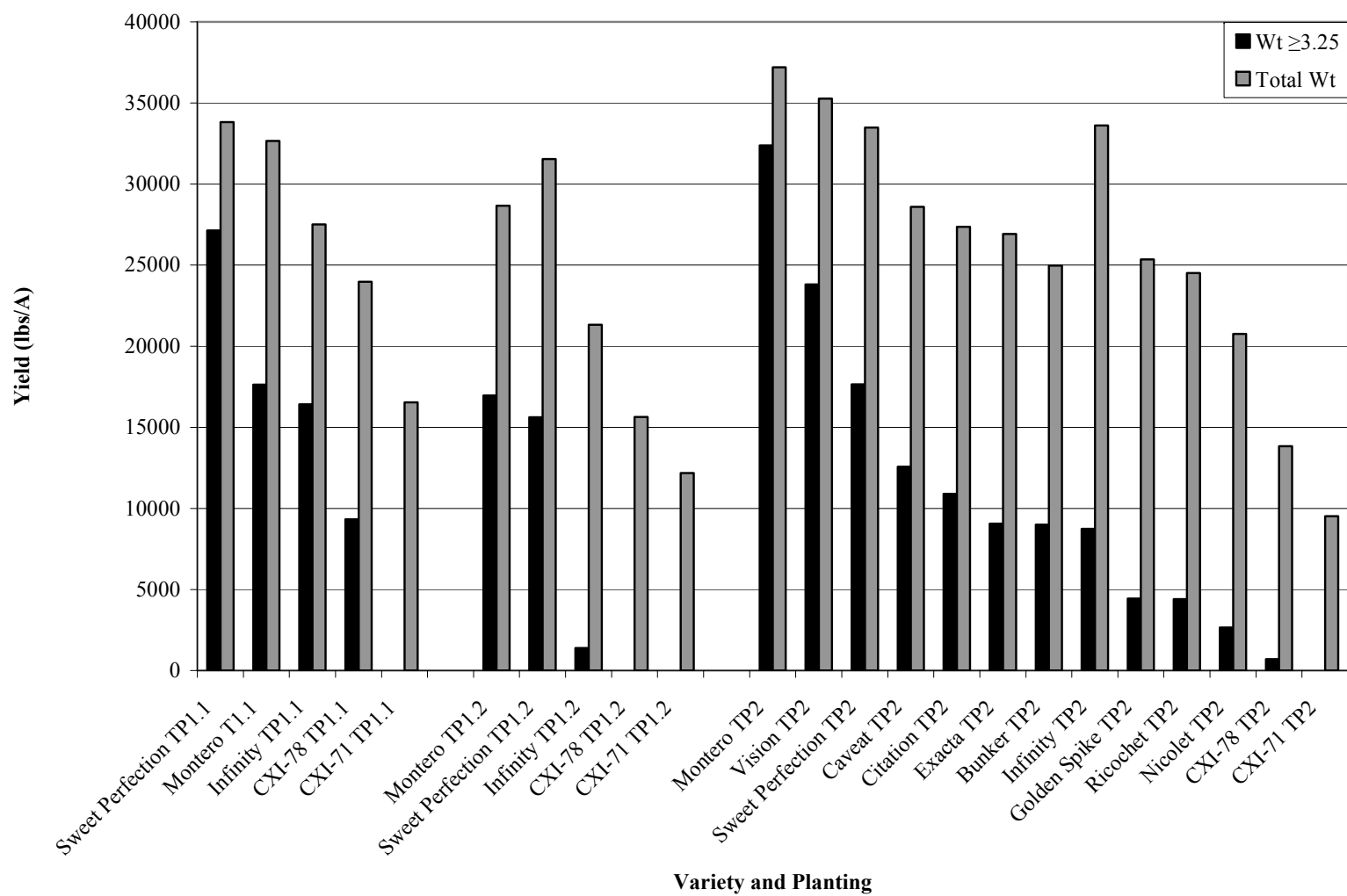


Chart 2. Direct Seeded Onion Yields by Variety and Planting

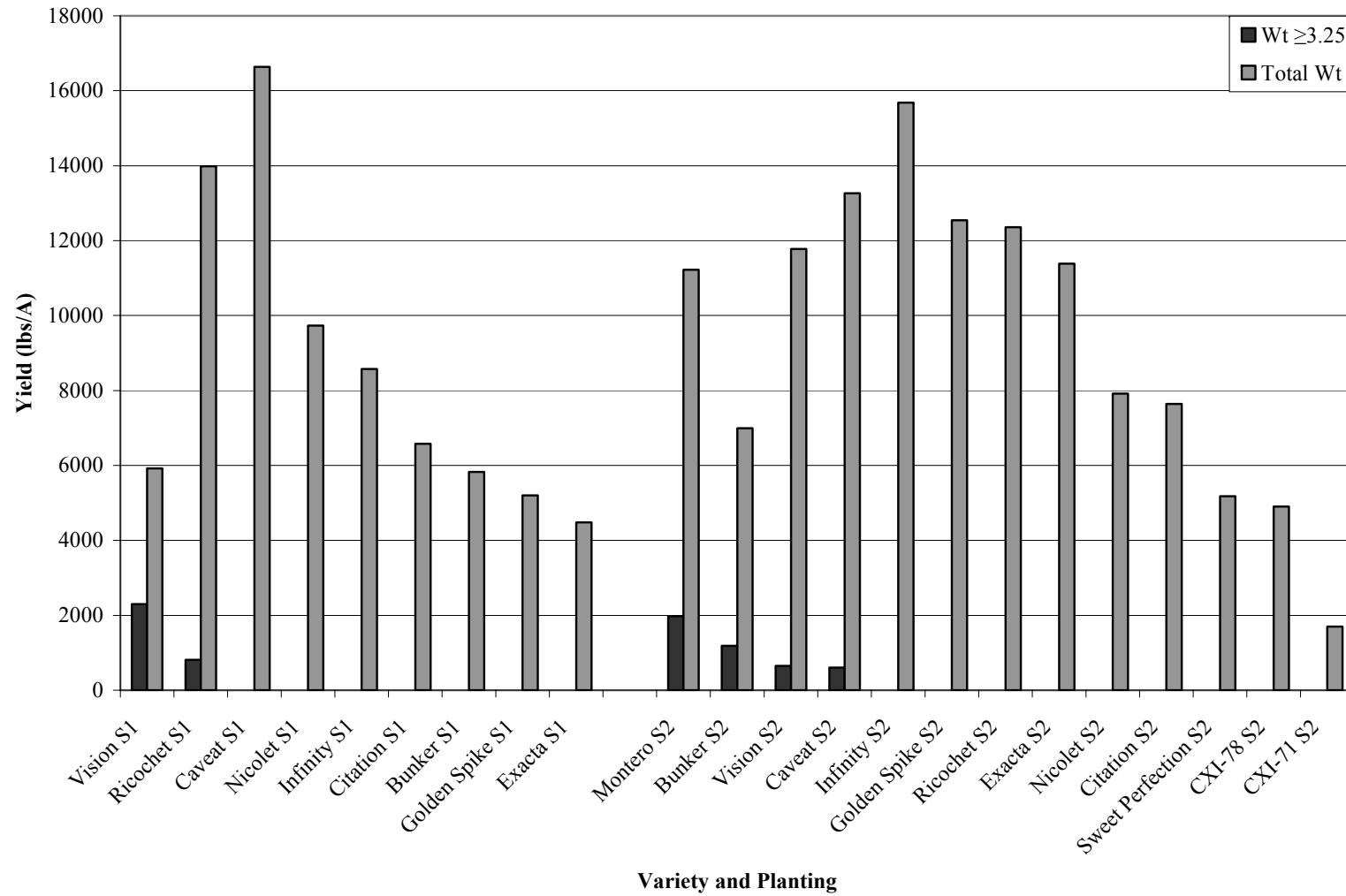


Table 3. Days to Harvest by Variety and Treatment

| Treatment | Variety | Harvest Date | Days from Seed to Harvest | Days from Transplant to Harvest |
|---|------------------|--------------|---------------------------|---------------------------------|
| Transplant 1.1 Seeded : Jan 29 Transplanted: Apr 3 | CXI-71 | 16-Jul | 168 | 104 |
| | CXI-78 | 16-Jul | 168 | 104 |
| | Infinity | 31-Jul | 183 | 119 |
| | Montero | 31-Jul | 183 | 119 |
| | Sweet Perfection | 7-Aug | 190 | 126 |
| Transplant 1.2 Seeded : Jan 29 Transplanted: Apr 3 | CXI-71 | 16-Jul | 168 | 104 |
| | CXI-78 | 16-Jul | 168 | 104 |
| | Sweet Perfection | 31-Jul | 183 | 119 |
| | Infinity | 31-Jul | 183 | 119 |
| | Montero | 31-Jul | 183 | 119 |
| Transplant 2 Seeded: Mar 27 Transplanted: Apr 25 | CXI-71 | 31-Jul | 126 | 97 |
| | CXI-78 | 31-Jul | 126 | 97 |
| | Exacta | 31-Jul | 126 | 97 |
| | Golden Spike | 31-Jul | 126 | 97 |
| | Ricochet | 31-Jul | 126 | 97 |
| | Caveat | 7-Aug | 133 | 104 |
| | Citation | 7-Aug | 133 | 104 |
| | Infinity | 7-Aug | 133 | 104 |
| | Montero | 7-Aug | 133 | 104 |
| | Nicolet | 7-Aug | 133 | 104 |
| | Bunker | 14-Aug | 140 | 111 |
| | Sweet Perfection | 14-Aug | 140 | 111 |
| | Vision | 14-Aug | 140 | 111 |
| | Ricochet | 7-Aug | 126 | |
| | Exacta | 14-Aug | 133 | |
| Direct Seed 1 Seeded: Apr 3 | Golden Spike | 14-Aug | 133 | |
| | Nicolet | 14-Aug | 133 | |
| | Bunker | 22-Aug | 141 | |
| | Caveat | 22-Aug | 141 | |
| | Citation | 22-Aug | 141 | |
| | Infinity | 22-Aug | 141 | |
| | Vision | 22-Aug | 141 | |
| | CXI-71 | 8-Aug | 104 | |
| | CXI-78 | 8-Aug | 104 | |
| Direct Seed 2 Seeded: Apr 26 | Citation | 14-Aug | 110 | |
| | Exacta | 14-Aug | 110 | |
| | Golden Spike | 14-Aug | 110 | |
| | Ricochet | 14-Aug | 110 | |
| | Bunker | 22-Aug | 118 | |
| | Caveat | 22-Aug | 118 | |
| | Infinity | 22-Aug | 118 | |
| | Montero | 22-Aug | 118 | |
| | Nicolet | 22-Aug | 118 | |
| | Sweet Perfection | 22-Aug | 118 | |
| | Vision | 22-Aug | 118 | |
| | CXI-71 | 8-Aug | 104 | |
| | CXI-78 | 8-Aug | 104 | |
| | Citation | 14-Aug | 110 | |
| | Exacta | 14-Aug | 110 | |

Table 4. Percent of Onions in Each Size Class by Variety and Treatment

| Treatment | Variety | Total # | Percent of Onions in Each Size Class by Count | | | | | | | | | | | |
|-----------------------|-----------------------|---------|---|----|-----|-----|-----|----|-----|-----|-----|----|------|------|
| | | | <2" | 2" | 2¼" | 2½" | 2¾" | 3" | 3¼" | 3½" | 3¾" | 4" | ≥3¾" | <3¼" |
| Transplant 1.1 | Sweet P ¹ | 38 | 0 | 0 | 3 | 5 | 11 | 11 | 37 | 18 | 13 | 3 | 71 | 29 |
| | Infinity | 42 | 2 | 0 | 5 | 12 | 26 | 7 | 43 | 5 | 0 | 0 | 48 | 52 |
| | Montero | 54 | 2 | 2 | 9 | 4 | 26 | 17 | 31 | 4 | 6 | 0 | 41 | 59 |
| | CXI-78 | 41 | 0 | 0 | 20 | 5 | 29 | 17 | 29 | 0 | 0 | 0 | 29 | 71 |
| | CXI-71 | 43 | 12 | 9 | 28 | 21 | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 100 |
| | <i>Treatment Mean</i> | 44 | 3 | 2 | 13 | 9 | 24 | 11 | 28 | 5 | 4 | 1 | 38 | 62 |
| Transplant 1.2 | Montero | 50 | 6 | 0 | 6 | 8 | 28 | 8 | 32 | 6 | 4 | 2 | 44 | 56 |
| | Sweet P ¹ | 43 | 2 | 0 | 5 | 7 | 30 | 16 | 30 | 5 | 5 | 0 | 40 | 60 |
| | Infinity | 48 | 15 | 2 | 6 | 17 | 46 | 10 | 4 | 0 | 0 | 0 | 4 | 96 |
| | CXI-71 | 51 | 41 | 12 | 37 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | CXI-78 | 40 | 10 | 10 | 28 | 15 | 33 | 5 | 0 | 0 | 0 | 0 | 0 | 100 |
| | <i>Treatment Mean</i> | 46 | 15 | 5 | 16 | 11 | 27 | 8 | 13 | 2 | 2 | 0 | 18 | 82 |
| Transplant 2 | Montero | 45 | 0 | 0 | 0 | 0 | 7 | 11 | 44 | 9 | 24 | 4 | 82 | 18 |
| | Vision | 51 | 0 | 0 | 2 | 6 | 24 | 12 | 49 | 4 | 2 | 2 | 57 | 43 |
| | Sweet P ¹ | 47 | 0 | 4 | 4 | 6 | 26 | 15 | 40 | 0 | 2 | 2 | 45 | 55 |
| | Caveat | 47 | 2 | 0 | 2 | 13 | 38 | 11 | 30 | 2 | 2 | 0 | 34 | 66 |
| | Citation | 48 | 0 | 4 | 4 | 10 | 38 | 13 | 31 | 0 | 0 | 0 | 31 | 69 |
| | Bunker | 45 | 7 | 2 | 13 | 13 | 33 | 7 | 20 | 2 | 2 | 0 | 24 | 76 |
| | Exacta | 51 | 2 | 4 | 6 | 22 | 27 | 16 | 22 | 2 | 0 | 0 | 24 | 76 |
| | Infinity | 55 | 0 | 2 | 7 | 9 | 33 | 29 | 18 | 2 | 0 | 0 | 20 | 80 |
| | Ricochet | 49 | 2 | 0 | 4 | 10 | 57 | 14 | 12 | 0 | 0 | 0 | 12 | 88 |
| | Golden S ² | 51 | 0 | 4 | 6 | 18 | 49 | 12 | 10 | 2 | 0 | 0 | 12 | 88 |
| | Nicolet | 48 | 6 | 4 | 6 | 27 | 40 | 8 | 8 | 0 | 0 | 0 | 8 | 92 |
| | CXI-78 | 50 | 26 | 14 | 28 | 20 | 10 | 0 | 2 | 0 | 0 | 0 | 2 | 98 |
| | CXI-71 | 44 | 41 | 11 | 30 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | <i>Treatment Mean</i> | 49 | 7 | 4 | 9 | 13 | 29 | 11 | 22 | 2 | 3 | 1 | 27 | 73 |
| Direct Seed 1 | Vision | 13 | 8 | 0 | 15 | 38 | 15 | 0 | 23 | 0 | 0 | 0 | 23 | 77 |
| | Ricochet | 30 | 3 | 3 | 13 | 30 | 37 | 10 | 3 | 0 | 0 | 0 | 3 | 97 |
| | Bunker | 17 | 6 | 18 | 24 | 24 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Caveat | 44 | 9 | 9 | 18 | 27 | 32 | 5 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Citation | 20 | 10 | 5 | 30 | 30 | 15 | 10 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Exacta | 11 | 9 | 9 | 27 | 18 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Golden S ² | 15 | 7 | 13 | 27 | 33 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Infinity | 26 | 15 | 23 | 27 | 27 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Nicolet | 25 | 8 | 12 | 16 | 40 | 20 | 4 | 0 | 0 | 0 | 0 | 0 | 100 |
| | <i>Treatment Mean</i> | 22 | 8 | 10 | 22 | 30 | 24 | 3 | 3 | 0 | 0 | 0 | 3 | 97 |
| Direct Seed 2 | Montero | 29 | 3 | 3 | 10 | 17 | 48 | 7 | 10 | 0 | 0 | 0 | 10 | 90 |
| | Bunker | 21 | 14 | 10 | 19 | 19 | 29 | 0 | 10 | 0 | 0 | 0 | 10 | 90 |
| | Vision | 32 | 13 | 9 | 13 | 41 | 19 | 3 | 3 | 0 | 0 | 0 | 3 | 97 |
| | Caveat | 38 | 16 | 8 | 16 | 24 | 29 | 5 | 3 | 0 | 0 | 0 | 3 | 97 |
| | Citation | 27 | 26 | 26 | 19 | 26 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | CXI-71 | 28 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | CXI-78 | 37 | 86 | 11 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Exacta | 29 | 7 | 10 | 24 | 24 | 31 | 3 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Golden S ² | 27 | 7 | 11 | 7 | 19 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Infinity | 34 | 9 | 3 | 6 | 24 | 47 | 12 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Nicolet | 26 | 15 | 15 | 35 | 19 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Ricochet | 27 | 4 | 4 | 15 | 26 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | Sweet P ¹ | 23 | 48 | 17 | 22 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | <i>Treatment Mean</i> | 29 | 27 | 10 | 14 | 19 | 26 | 2 | 2 | 0 | 0 | 0 | 2 | 98 |

¹Sweet P = Sweet Perfection²Golden S = Golden Spike

Photos of the Onion Varieties in the 2007 Onion Demonstration



Bunker



Caveat



Citation



CXI-71



CXI-78



Exacta

Photos of the Onion Varieties in the 2007 Onion Demonstration, continued



Golden Spike



Infinity



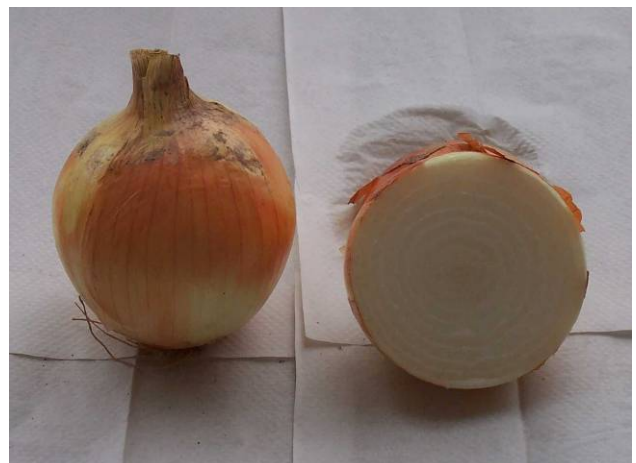
Montero



Nicolet



Ricochet



Sweet Perfection

Photos of the Onion Varieties in the 2007 Onion Demonstration, continued



Vision

Photos of the Demo Plot throughout the Season



Transplant 1 and Direct Seed 1 on Apr 27



Transplant 2 and Direct Seed 2 on Apr 27



Transplant 1 and Direct Seed 1 on Jun 20



Transplant 2 and Direct Seed 2 on Jun 20

Photos of the Demo Plot throughout the Season, continued



Photos from Transplant 1 on July 5



Photos from Transplant 2 on July 5



Photos from Direct Seed 1 (left) and Direct Seed 2 (right) on July 5