

**Report to the Oregon Processed Vegetable Commission  
2000–2001**

1. Title: Broccoli Breeding and Evaluation
2. Project Leaders: James R. Myers, Horticulture
3. Project Status: Terminating 30 June 2001
4. Project Funding: \$7,040

Breeding funds were used for a major portion of the support of a vegetable breeding technician, student labor, supplies, greenhouse, and research farm expenses.

5. Objectives:

A. Develop broccoli varieties adapted to western Oregon with the following attributes:

1. Relatively tall plants with exerted heads for easy mechanical harvest.
2. Large openly branched heads with heavy, clean stem for easy trimming and separation into spears and chunks.
3. Medium fine, firm, uniform florets of good color and short pedicels, and which are retained after freezing.
4. Early to midseason maturity, concentrated yield potential.
5. Head rot, clubroot and downy mildew resistance.

B. Evaluate cytoplasmic male sterility (CMS) as a method for producing F<sub>1</sub> hybrid seed.

6. Report of Progress:

We continued to refine and focus the program to identify the best hybrids for production and develop sustainable seed production systems.

*Greenhouse inbred and hybrid seed production:* Cuttings taken from the Vegetable Farm in the 1999 season were grown in the greenhouse and used to produce selfed and hybrid seed. One S240 series inbred and seven S300 and S400 series inbreds were intercrossed, with the focus on testing S453 and S454 with as many of the best inbred lines as possible. Seeds for observation trials were produced for 21 crosses and reciprocals. Also, quantities of seed sufficient for a replicated yield trial were obtained for 10 cross combinations (crosses and reciprocals combined).

*Field Hybrid Seed Production:* A second backcross was made in the greenhouse between the Arnand cytoplasmic male sterile (CMS) line and S410, and S411. Seed from these crosses were taken to the field and were planted in isolation with either S410, S411, or S453 at the Lewis Brown Farm to produce an additional backcross generation for incorporation of CMS into OSU germplasm. Plots were direct seeded. Because of the mild summer and late seeding date, lines failed to set seed before the onset of winter rains. Cuttings were taken into the greenhouse to make these crosses during the spring of 2001. We are incorporating CMS into S410 and S411 inbreds because they show self-fertility indicating a lack of self-incompatibility alleles. S453 was dropped but S454 was added to this backcrossing effort because of issues discussed below as well as the fact that S454 appears to be self-compatible.

*Yield Trial:* Ten OSU hybrids and four commercial checks were grown in a yield trial replicated four times (Tables 1 and 2, Figures 1 and 2). The trial was direct seeded 5 July for the main fall harvest. We used 36 inch rows with a within row spacing of 12 inches, attempting to get 30 plants per plot. The trial was checked twice weekly, and up to three harvests were made for a particular hybrid. Only primary heads were harvested. Heads were trimmed to a six-inch head plus stem length prior to weighing. Samples were processed at the OSU Food Science Pilot Plant and frozen for evaluation and display of processing characteristics.

Plant stands were generally close to the target number of one per foot except for 'Legend' and S240-5-5 x S400 (average of 24 per 30 feet of row). Based on unadjusted yields, 'Regal' was highest though not significantly different from S454 X S387, S410 X S454, S453 x S410, and 'Arcadia' (Table 1). Among the lowest yielding were S240-5-5 x S400 and 'Excelsior'. When yields were adjusted for plant stand, ranking were similar with the exception of Legend, which moved from 8<sup>th</sup> to 3<sup>rd</sup> place, and Arcadia, which moved from 4<sup>th</sup> to 9<sup>th</sup> place. S240-5-5 x S400 remained in last place by both measures of yield. Adjusting yield for plant stand did not take into account head size differences with differences in stand, and so may have artificially inflated yield of the hybrid.

This year differed substantially from past years in that yields were lower overall, and the number of blind plants per plot was much higher. Many of the entries had a concentrated maturity duration with the exception of Regal, which in past years has had a short yield duration. S400 x S453, Arcadia, and Legend had the most concentrated harvest durations, averaging four days. Such a concentrated harvest duration is promising for the development of a mechanical broccoli picker. In terms of maturity, the experimental lines ranged from 77 to 79 days to harvest, which was intermediate to the check hybrids.

Both S453 and S454 appear to be a good combiners. Of the two, S454 is preferred because S453 contributes its flat head to hybrid offspring. The best hybrid combinations (based on one year of data) are S399 x S454, S410 x S454, and S454 x S387. Unfortunately, the cross combination S 400 x S454 was not among the higher ranking hybrids for yield, because S400 is one of the parents that we have chosen to convert to a CMS background.

Where entries have been tested for two or three years, performance across years was evaluated. Over two years, yields of Regal and Legend were statistically

significantly higher than the OSU hybrids for adjusted, but not necessarily for unadjusted yields. In terms of unadjusted yields, S399 x S453 was not significantly different from the checks (see table below).

| Hybrid          | Lbs/Head |      |      | Tons/Acre |      |      | T/A Adj. Plts/Plot |      |      |
|-----------------|----------|------|------|-----------|------|------|--------------------|------|------|
|                 | 1999     | 2000 | Ave  | 1999      | 2000 | Ave  | 1999               | 2000 | Ave  |
| S240-5-5 x S400 | 0.68     | 0.42 | 0.55 | 4.58      | 2.15 | 3.37 | 4.94               | 2.75 | 3.85 |
| S399 x S453     | 0.75     | 0.45 | 0.60 | 4.94      | 3.26 | 4.10 | 5.15               | 3.37 | 4.26 |
| Arcadia         | 0.73     | 0.55 | 0.64 | 5.02      | 3.73 | 4.38 | 4.99               | 3.36 | 4.18 |
| Excelsior       | 0.72     | 0.45 | 0.59 | 4.77      | 2.43 | 3.60 | 4.76               | 2.75 | 3.76 |
| Legend          | 0.83     | 0.58 | 0.71 | 5.86      | 3.23 | 4.55 | 5.67               | 4.09 | 4.88 |
| Regal           | 0.91     | 0.65 | 0.78 | 5.53      | 3.95 | 4.74 | 6.10               | 4.42 | 5.26 |
| LSD @ 5%        | 0.16     | 0.10 | 0.07 | 1.02      | 0.52 | 0.99 | 1.32               | 0.71 | 0.44 |

Only one hybrid (S 240-5-5 x S 400) was available for comparison to the four checks over three years. In general, it was not significantly different from Excelsior, but was lower yielding than the other checks (see table below).

| Hybrid          | Lbs/head |      |      |      | T/A  |      |      |      | T/A adj. plts./plot |      |      |      |
|-----------------|----------|------|------|------|------|------|------|------|---------------------|------|------|------|
|                 | 1998     | 1999 | 2000 | Ave  | 1998 | 1999 | 2000 | Ave  | 1998                | 1999 | 2000 | Ave  |
| S240-5-5 x S400 | 1.23     | 0.68 | 0.42 | 0.78 | 4.08 | 4.58 | 2.15 | 3.60 | 4.40                | 4.94 | 2.75 | 4.03 |
| Arcadia         | 1.33     | 0.73 | 0.55 | 0.87 | 5.35 | 5.02 | 3.73 | 4.70 | 4.78                | 4.99 | 3.36 | 4.38 |
| Excelsior       | 1.08     | 0.72 | 0.45 | 0.75 | 3.68 | 4.77 | 2.43 | 3.63 | 3.85                | 4.76 | 2.75 | 3.79 |
| Legend          | 1.50     | 0.83 | 0.58 | 0.97 | 4.43 | 5.86 | 3.23 | 4.51 | 5.40                | 5.67 | 4.09 | 5.05 |
| Regal           | 1.48     | 0.91 | 0.65 | 1.01 | 3.48 | 5.53 | 3.95 | 4.32 | 5.33                | 6.10 | 4.42 | 5.28 |
| LSD @ 5%        | 0.21     | 0.16 | 0.10 | 0.12 | 0.90 | 1.02 | 0.52 | 1.10 | 0.80                | 1.32 | 0.71 | 0.38 |

*Observation Trials:* An unreplicated observation trial was also planted on 5 July. Plots varied in size from one to 20 plants. Data were recorded for plant and head characteristics (Table 3). General combining ability of the inbreds was examined by averaging performance by inbred (Table 4). Most cross combinations performed well, with the main decision from this trial being to drop S453 as an inbred because of its tendency to produce flat heads in its offspring.

Inbred lines used to make crosses were grown with the observation trial, and observation data were recorded (Table 5). Most impressive was the performance of S433 and higher numbered lines, which show considerable vigor even though highly inbred. S433, S443, and S453 have potential to be released as open-pollinated cultivars for the home garden trade. Headrot and clubroot were not observed in this trial.

## 8. Summary:

Eight inbreds used for hybrid production were propagated in the greenhouse, selfed and intercrossed to produce 21 combinations for field-testing. Ten of the best hybrids based on observation data were grown with four commercial hybrids in a replicated yield trial. Three OSU hybrids had unadjusted yields comparable to the commercial hybrids, while also possessing an exerted plant habit with segmented heads. OSU hybrids and inbreds

were evaluated in an observation trial. S453 will be dropped as a parent in hybrid combinations because while it possesses many good attributes, it has flat heads - a trait that appears to be dominant in crosses. S454 appears to be the best inbred for use in hybrid combinations with other OSU lines, and will be the focus of future evaluation efforts. It may be fortuitous that S454 is self-compatible, and can be incorporated into a CMS background for easy crossing to other inbred lines.

**Table 1. Yield data from a hybrid broccoli trial, Corvallis, 2000.<sup>z</sup>**

| Hybrid          | Days to Harvest | No. of Harvests | Harvest Duration (days) | No. Plts/Plot | No. Blind Plts/Plot | No. Heads/Plot | Lbs/Head | T/A  | T/A Adj Plts/Plot <sup>x</sup> |
|-----------------|-----------------|-----------------|-------------------------|---------------|---------------------|----------------|----------|------|--------------------------------|
| S240-5-5 x S400 | 77              | 3.0             | 5                       | 23.5          | 4.3                 | 21.8           | 0.42     | 2.15 | 2.75                           |
| S399 x S453     | 77              | 3.0             | 5                       | 29.3          | 3.3                 | 30.3           | 0.45     | 3.26 | 3.37                           |
| S399 x S454     | 77              | 3.0             | 5                       | 28.0          | 3.8                 | 28.3           | 0.50     | 3.36 | 3.62                           |
| S400 x S453     | 77              | 2.8             | 4                       | 27.0          | 2.3                 | 27.3           | 0.47     | 3.05 | 3.42                           |
| S400 x S454     | 77              | 3.0             | 5                       | 28.8          | 4.3                 | 29.0           | 0.41     | 2.87 | 3.01                           |
| S410 x S453     | 77              | 3.0             | 5                       | 26.0          | 2.0                 | 26.5           | 0.54     | 3.44 | 3.98                           |
| S410 x S454     | 79              | 3.0             | 5                       | 29.3          | 2.5                 | 29.5           | 0.54     | 3.79 | 3.89                           |
| S411 x S453     | 79              | 3.0             | 5                       | 27.3          | 2.5                 | 27.3           | 0.46     | 2.96 | 3.32                           |
| S411 x S454     | 79              | 3.0             | 5                       | 26.5          | 2.3                 | 26.3           | 0.49     | 3.07 | 3.49                           |
| S454 x S387     | 77              | 3.0             | 5                       | 27.5          | 2.0                 | 27.0           | 0.60     | 3.83 | 4.31                           |
| Arcadia         | 82              | 3.0             | 4                       | 33.8          | 5.5                 | 28.8           | 0.55     | 3.73 | 3.36                           |
| Excelsior       | 79              | 3.0             | 5                       | 26.5          | 3.0                 | 22.8           | 0.45     | 2.43 | 2.75                           |
| Legend          | 75              | 3.0             | 4                       | 23.8          | 3.0                 | 23.0           | 0.58     | 3.23 | 4.09                           |
| Regal           | 72              | 3.5             | 6                       | 27.3          | 5.3                 | 26.0           | 0.65     | 3.95 | 4.42                           |
| LSD @ 5%        | 1               | 0.3             | 1                       | 5.5           | 2.4                 | 5.1            | 0.10     | 0.52 | 0.71                           |

<sup>z</sup>Planted July 5 in 30' plots, rows 36" apart, thinned to 12" between plants. Mean of four replications.

<sup>x</sup>Yield adjusted to a uniform stand of 30 plants/plot (14,520 plants/A).

**Table 2. Broccoli yield trial observation data, Corvallis, 2000.<sup>2</sup>**

| Hybrid          | Plt Ht.<br>(cm) | Bead<br>Size <sup>y</sup> | Stem<br>Color <sup>x</sup> | Head<br>Color <sup>x</sup> | Head<br>Dia.<br>(cm) | Head<br>Shape <sup>w</sup> | Head<br>Exser-<br>tion <sup>x</sup> | Head<br>Segment-<br>ation <sup>x</sup> | Branch-<br>ing <sup>x</sup> | Unif. <sup>x</sup> | Overall<br>Score <sup>x</sup> | Notes   |
|-----------------|-----------------|---------------------------|----------------------------|----------------------------|----------------------|----------------------------|-------------------------------------|--|-----------------------------|--------------------|-------------------------------|---|
| S240-5-5 x S400 | 49              | F                         | 7                          | 7                          | 16                   | 5                          | 7                                   | 7                                      | 5                           | 5                  | 5                             |   |
| S399 x S453     | 56              | M                         | 7                          | 9                          | 16                   | 3                          | 7                                   | 9                                      | 1                           | 7                  | 9                             |   |
| S399 x S454     | 58              | M                         | 7                          | 7                          | 13                   | 7                          | 7                                   | 7                                      | 1                           | 5                  | 7                             |   |
| S400 x S453     | 58              | F                         | 7                          | 9                          | 18                   | 3                          | 9                                   | 9                                      | 1                           | 7                  | 9                             | loose heads                                   |
| S400 x S454     | 58              | M                         | 5                          | 9                          | 14                   | 7                          | 9                                   | 7                                      | 1                           | 7                  | 9                             |   |
| S410 x S453     | 54              | F                         | 5                          | 7                          | 16                   | 3                          | 7                                   | 9                                      | 5                           | 5                  | 7                             |   |
| S410 x S454     | 56              | F                         | 7                          | 9                          | 13                   | 5                          | 7                                   | 9                                      | 1                           | 7                  | 5                             | loose, rough heads with<br>variable bead size |
| S411 x S453     | 41              | M                         | 7                          | 7                          | 13                   | 3                          | 7                                   | 9                                      | 3                           | 7                  | 7                             | very nice except flat head                    |
| S411 x S454     | 52              | F-M                       | 7                          | 7                          | 14                   | 7                          | 7                                   | 7                                      | 5                           | 5                  | 7                             |   |
| S454 x S387     | 56              | M                         | 7                          | 9                          | 15                   | 7                          | 7                                   | 7                                      | 1                           | 7                  | 9                             |   |
| Arcadia         | 50              | M                         | 5                          | 5                          | 13                   | 7                          | 5                                   | 5                                      | 1                           | 5                  | 5                             |   |
| Excelsior       | 39              | M                         | 5                          | 3                          | 13                   | 5                          | 3                                   | 5                                      | 1                           | 5                  | 5                             |   |
| Legend          | 53              | M                         | 3                          | 5                          | 16                   | 7                          | 5                                   | 3                                      | 3                           | 5                  | 5                             |   |
| Regal           | 37              | M                         | 5                          | 3                          | 14                   | 5                          | 3                                   | 3                                      | 3                           | 5                  | 3                             |   |

<sup>2</sup>Planted July 5 in 36" rows, thinned to 12" apart.

<sup>y</sup>F = fine, M = medium, C = coarse.

<sup>x</sup>Scale of 1-9 where 1 = poor and 9 = excellent.

<sup>w</sup>Scale of 1-9 where 1 = extreme concave, 3 = slight concave, 5 = slight dome, 7 = moderate dome and 9 = extreme dome.

Table 3. Broccoli observation trial, OSU hybrids, Corvallis, 2000.<sup>2</sup>

| Hybrid          | Maturity (days) | Plt Ht (cm) | Head Diam (cm) | Head Shape <sup>y</sup> | Head Color <sup>x</sup> | Bead Size <sup>w</sup> | Stem Color <sup>x</sup> | Head Exsertion <sup>w</sup> | Head Segment-ation <sup>x</sup> | Plot Uniform-ity <sup>x</sup> | Branch-ing <sup>x</sup> | Overall Score <sup>x</sup> | Notes              |
|-----------------|-----------------|-------------|----------------|-------------------------|-------------------------|------------------------|-------------------------|-----------------------------|---------------------------------|-------------------------------|-------------------------|----------------------------|--------------------|
| S240-5-5 x S400 | 79              | 63          | 13             | 7                       | 7                       | M                      | 7                       | 7                           | 8                               | 5                             | 5                       | 7                          |                    |
| S400 x S240-5-5 | 79              | 62          | 13             | 8                       | 7                       | F                      | 7                       | 7                           | 8                               | 5                             | 3                       | 7                          |                    |
| S387 x S453     | 79              | 54          | 11             | 7                       | 7                       | M                      | 7                       | 7                           | 7                               | 5                             | 3                       | 5                          |                    |
| S453 x S387     | 79              | 54          | 15             | 4                       | 7                       | F                      | 7                       | 7                           | 9                               | 7                             | 3                       | 7                          |                    |
| S454 x S387     | 79              | 53          | 15             | 7                       | 7                       | M                      | 7                       | 8                           | 7                               | 9                             | 3                       | 9                          |                    |
| S399 x S453     | 79              | 56          | 20             | 3                       | 5                       | F-M                    | 7                       | 7                           | 9                               | 9                             | 3                       | 5                          | loose, flat heads  |
| S453 x S399     | 79              | 54          | 15             | 4                       | 7                       | F                      | 7                       | 7                           | 8                               | 7                             | 3                       | 7                          |                    |
| S399 x S454     | 79              | 51          | 14             | 7                       | 7                       | M                      | 7                       | 7                           | 7                               | 7                             | 3                       | 7                          | some small heads   |
| S454 x S399     | 76              | 56          | 15             | 5                       | 7                       | M                      | 7                       | 7                           | 7                               | 7                             | 3                       | 7                          |                    |
| S400 x S453     | 79              | 65          | 18             | 3                       | 7                       | M                      | 7                       | 9                           | 9                               | 9                             | 3                       | 5                          | loose, flat heads  |
| S453 x S400     | 79              | 61          | 15             | 5                       | 7                       | F                      | 7                       | 7                           | 9                               | 7                             | 3                       | 7                          |                    |
| S400 x S454     | 76              | 58          | 15             | 7                       | 7                       | C                      | 5                       | 7                           | 7                               | 7                             | 1                       | 8                          |                    |
| S454 x S400     | 76              | 61          | 13             | 7                       | 7                       | C                      | 5                       | 7                           | 7                               | 7                             | 1                       | 8                          |                    |
| S410 x S453     | 79              | 64          | 15             | 3                       | 7                       | F                      | 7                       | 8                           | 9                               | 5                             | 5                       | 5                          | loose heads        |
| S453 x S410     | 79              | 56          | 14             | 3                       | 7                       | F                      | 7                       | 7                           | 9                               | 7                             | 3                       | 5                          |                    |
| S410 x S454     | 79              | 51          | 17             | 3                       | 7                       | F                      | 7                       | 7                           | 5                               | 7                             | 3                       | 7                          |                    |
| S454 x S410     | 79              | 53          | 15             | 6                       | 7                       | F                      | 7                       | 7                           | 7                               | 7                             | 3                       | 7                          | irregular segments |
| S411 x S453     | 83              | 58          | 16             | 3                       | 7                       | M                      | 5                       | 6                           | 9                               | 5                             | 1                       | 7                          |                    |
| S453 x S411     | 79              | 58          | 13             | 3                       | 7                       | F-M                    | 7                       | 7                           | 8                               | 3                             | 1                       | 5                          |                    |
| S411 x S454     | 83              | 50          | 16             | 5                       | 7                       | C                      | 5                       | 6                           | 7                               | 7                             | 3                       | 7                          |                    |
| S454 x S411     | 83              | 52          | 13             | 5                       | 7                       | M                      | 5                       | 6                           | 7                               | 5                             | 3                       | 7                          |                    |

<sup>2</sup>Planted July 5 in 36" rows, thinned to 12" apart.

<sup>y</sup>Scale of 1-9 where 1 = extreme concave, 3 = slight concave, 5 = slight dome, 7 = moderate dome and 9 = extreme dome.

<sup>x</sup>Scale of 1-9 where 1 = poor and 9 = excellent.

<sup>w</sup>F = fine, M = medium, C = coarse.

**Table 4. Average inbred performance of broccoli hybrids, Corvallis, 2000.<sup>2</sup>**

| Source           | Maturity (days) | Plt Ht (in) | Head Dia. (in) | Head Shape <sup>y</sup> | Head Color <sup>x</sup> | Bead Size <sup>w</sup> | Stem Color <sup>x</sup> | Head Exsertion <sup>x</sup> | Head Segmentation <sup>x</sup> | Plot Uniformity <sup>x</sup> | Branching <sup>x</sup> | Overall Score <sup>x</sup> |
|------------------|-----------------|-------------|----------------|-------------------------|-------------------------|------------------------|-------------------------|-----------------------------|--------------------------------|------------------------------|------------------------|----------------------------|
| S240-5-5 crosses | 79.0            | 58.5        | 12.0           | 7.0                     | 7.0                     | M                      | 7.0                     | 7.0                         | 7.5                            | 5.0                          | 3.5                    | 5.5                        |
| S387 crosses     | 79.0            | 56.3        | 16.0           | 6.0                     | 6.3                     | F-M                    | 7.0                     | 7.0                         | 8.0                            | 7.0                          | 3.0                    | 6.3                        |
| S399 crosses     | 79.0            | 60.0        | 16.0           | 4.0                     | 7.0                     | F-C                    | 6.5                     | 7.8                         | 7.5                            | 7.5                          | 3.0                    | 6.3                        |
| S400 crosses     | 80.3            | 55.5        | 14.0           | 5.8                     | 7.0                     | F-C                    | 6.3                     | 6.7                         | 8.0                            | 6.0                          | 2.8                    | 6.5                        |
| S410 crosses     | 79.0            | 57.0        | 14.0           | 4.5                     | 7.0                     | F-M                    | 7.0                     | 7.3                         | 8.3                            | 6.5                          | 2.5                    | 6.5                        |
| S411 crosses     | 78.5            | 55.5        | 14.0           | 5.8                     | 7.0                     | F-C                    | 6.0                     | 6.8                         | 7.0                            | 6.5                          | 2.5                    | 7.3                        |
| S453 crosses     | 78.9            | 57.2        | 16.0           | 4.8                     | 7.0                     | F-C                    | 6.2                     | 7.0                         | 8.0                            | 7.2                          | 2.4                    | 6.6                        |
| S454 crosses     | 79.4            | 55.7        | 15.0           | 4.8                     | 7.0                     | F-M                    | 6.8                     | 7.1                         | 7.6                            | 6.1                          | 3.0                    | 6.7                        |

<sup>2</sup>Planted July 5 in 36" rows, thinned to 12" apart.

<sup>y</sup>Scale of 1-9 where 1 = extreme concave, 3 = slight concave, 5 = slight dome, 7 = moderate dome and 9 = extreme dome.

<sup>x</sup>Scale of 1-9 where 1 = poor and 9 = excellent.

<sup>w</sup>F = fine, M = medium, C = coarse.



Table 5. Broccoli observation trial, OSU Inbreds, Corvallis, 2000.<sup>2</sup>

| Line      | Maturity (days) | Plt Ht (cm) | Head Dia (cm) | Head Shape <sup>y</sup> | Head Color <sup>x</sup> | Head Size <sup>w</sup> | Stem Color <sup>x</sup> | Head Exsertion <sup>x</sup> | Head Segmentation <sup>x</sup> | Plot Uniformity <sup>x</sup> | Branching <sup>x</sup> | Overall Score <sup>x</sup> | Notes  |
|-----------|-----------------|-------------|---------------|-------------------------|-------------------------|------------------------|-------------------------|-----------------------------|--------------------------------|------------------------------|------------------------|----------------------------|--|
| S240-1    | 2-Oct           | 47          | 14            | 3                       | 7                       | C                      | 5                       | 6                           | 6                              | 5                            | 3                      | 5                          |  |
| S240-5-20 | 18-Sep          | 58          | 17            | 3                       | 7                       | M                      | 7                       | 9                           | 7                              | 5                            | 1                      | 7                          |  |
| S352      | 2-Oct           | 36          | 12            | 7                       | 7                       | C                      | 5                       | 5                           | 1                              | 5                            | 1                      | 5                          | good blue green color; smooth leaf margins                   |
| S370      | 21-Sep          | 55          | 9             | 7                       | 7                       | C                      | 7                       | 9                           | 3                              | 7                            | 5                      | 7                          |  |
| S387      | 22-Sep          | 45          | 11            | 6                       | 7                       | M                      | 7                       | 7                           | 5                              | 7                            | 5                      | 7                          | some leafy heads   |
| S389      | 22-Sep          | 57          | 12            | 7                       | 7                       | M                      | 7                       | 7                           | 5                              | 3                            | 3                      | 7                          |  |
| S391      | 18-Sep          | 57          | 14            | 9                       | 9                       | M                      | 7                       | 7                           | 7                              | 3                            | 3                      | 7                          |  |
| S396      | 18-Sep          | 68          | 14            | 7                       | 9                       | F-M                    | 7                       | 9                           | 7                              | 7                            | 5                      | 9                          | loose heads; downy mildew                                    |
| S398      | 22-Sep          | 61          | 12            | 7                       | 7                       | F-M                    | 7                       | 8                           | 7                              | 7                            | 5                      | 9                          | downy mildew   |
| S399      | 19-Sep          | 60          | 13            | 9                       | 7                       | C                      | 7                       | 7                           | 5                              | 7                            | 5                      | 7                          |  |
| S400      | 19-Sep          | 65          | 12            | 9                       | 7                       | C                      | 5                       | 9                           | 3                              | 7                            | 5                      | 5                          |  |
| S410      | 18-Sep          | 58          | 17            | 3                       | 5                       | F                      | 7                       | 9                           | 9                              | 9                            | 3                      | 8                          |  |
| S411      | 22-Sep          | 53          | 12            | 5                       | 7                       | F                      | 7                       | 7                           | 9                              | 7                            | 3                      | 9                          |  |
| S414      | 16-Sep          | 56          | 12            | 5                       | 7                       | C                      | 7                       | 9                           | 3                              | 3                            | 3                      | 5                          |  |
| S433      | 22-Sep          | 47          | 14            | 5                       | 7                       | F                      | 7                       | 6                           | 7                              | 7                            | 7                      | 5                          | heads slightly rough; smooth leaf margins; good home garden? |
| S437      | 16-Sep          | 60          | 14            | 4                       | 7                       | F                      | 5                       | 7                           | 3                              | 5                            | 1                      | 7                          |  |
| S438      | 22-Sep          | 56          | 13            | 9                       | 7                       | F                      | 7                       | 8                           | 7                              | 5                            | 5                      | 7                          | some very small heads  |
| S440      | 19-Sep          | 48          | 13            | 5                       | 7                       | M-C                    | 7                       | 7                           | 7                              | 5                            | 1                      | 5                          |  |
| S442      | 27-Sep          | 54          | 15            | 7                       | 7                       | F                      | 5                       | 8                           | 7                              | 3                            | 3                      | 5                          | leafy, rough heads; variable                                 |
| S443      | 18-Sep          | 50          | 15            | 3                       | 7                       | C                      | 7                       | 9                           | 3                              | 7                            | 7                      | 7                          | good home garden type?                                       |
| S445      | 26-Sep          | 57          | 12            | 9                       | 5                       | C                      | 7                       | 9                           | 3                              | 7                            | 1                      | 7                          | uniform small heads  |
| S446      | 26-Sep          | 65          | 12            | 9                       | 7                       | M                      | 5                       | 7                           | 7                              | 5                            | 1                      | 7                          | nice heads; size strongly dependent on spacing               |
| S447      | 26-Sep          | 63          | 13            | 8                       | 7                       | F                      | 5                       | 7                           | 7                              | 5                            | 1                      | 7                          | variable head size   |
| S448      | 22-Sep          | 61          | 16            | 7                       | 9                       | VF                     | 7                       | 8                           | 7                              | 3                            | 3                      | 5                          | irregular floret size and maturity                           |
| S449      | 2-Oct           | 47          | 12            | 7                       | 7                       | C                      | 5                       | 5                           | 3                              | 5                            | 3                      | 5                          | soft heads; smooth leaf margins                              |

Table 5. Broccoli observation trial, OSU inbreds, Corvallis, 2000<sup>z</sup> (cont).

| Line | Maturity (days) | Plt Ht (in) | Head Dia (in) | Head Shape <sup>y</sup> | Head Color <sup>x</sup> | Bead Size <sup>w</sup> | Stem Color <sup>x</sup> | Head Exsertion <sup>x</sup> | Head Segmentation <sup>x</sup> | Plot Uniformity <sup>x</sup> | Branching <sup>x</sup> | Overall Score <sup>x</sup> | Notes   |
|------|-----------------|-------------|---------------|-------------------------|-------------------------|------------------------|-------------------------|-----------------------------|--------------------------------|------------------------------|------------------------|----------------------------|---|
| S453 | 2-Oct           | 54          | 13            | 3                       | 9                       | M                      | 5                       | 7                           | 7                              | 7                            | 3                      | 5                          | excellent color; smooth leaf margins; downy mildew; good home garden? |
| S454 | 29-Sep          | 50          | 13            | 7                       | 7                       | F                      | 5                       | 5                           | 5                              | 5                            | 3                      | 5                          |   |

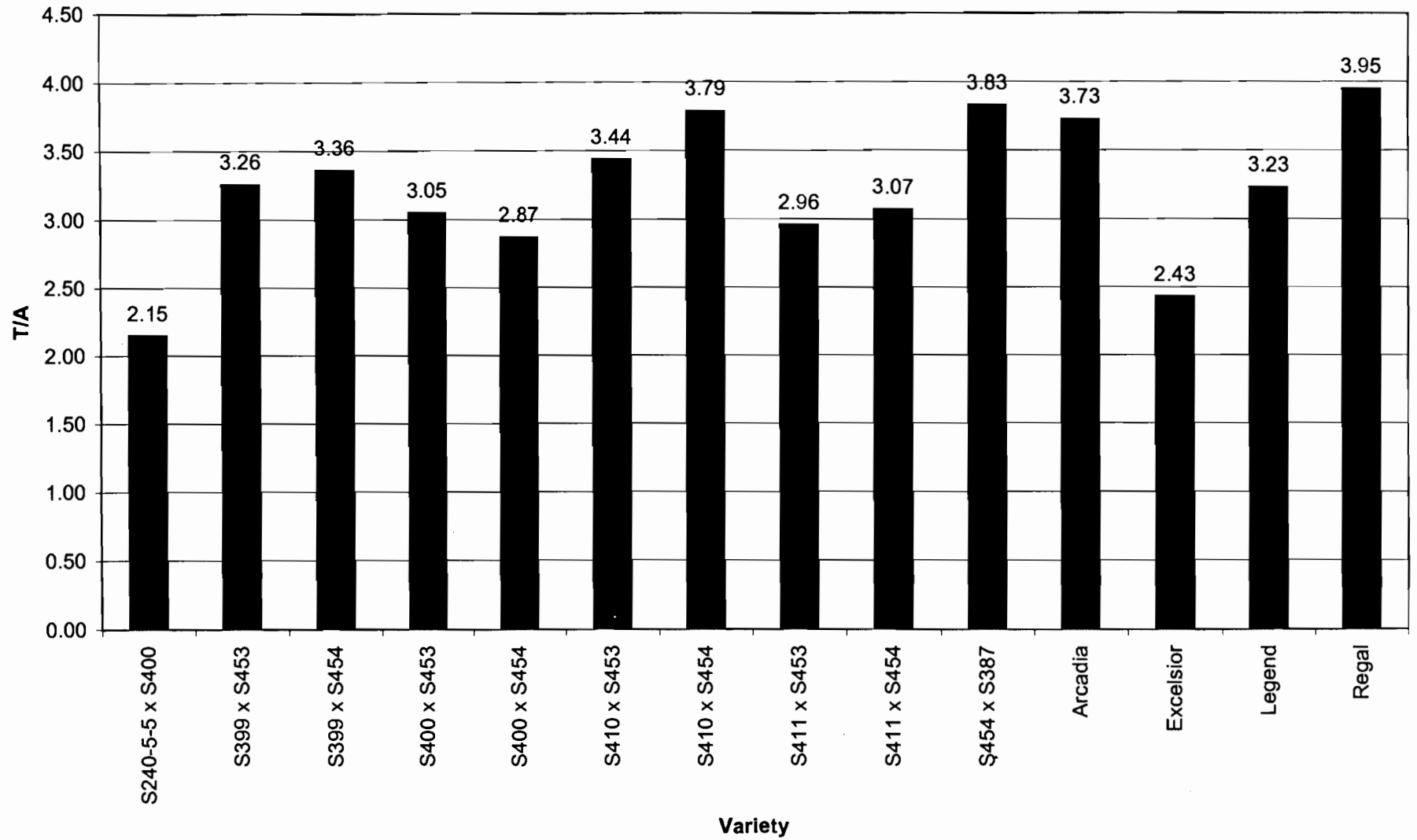
<sup>z</sup>Planted July 5 in 36" rows, thinned to 12" apart.

<sup>y</sup>Scale of 1-9 where 1 = extreme concave, 3 = slight concave, 5 = slight dome, 7 = moderate dome and 9 = extreme dome.

<sup>x</sup>Scale of 1-9 where 1 = poor and 9 = excellent.

<sup>w</sup>F = fine, M = medium, C = coarse.

**Figure 1. Broccoli Yield 2000 - Unadjusted Yield**



**Figure 2. Broccoli Yield 2000 - Adjusted to 30 Plants/Plot**

