Introduction:

This report summarizes the activites of the Vegetable Breeding and Cultivar evaluation work at Ridgetown College for the 1990 growing season.

As always most of the work was directed toward wholepack processing tomato breeding and cultivar evaluation. Results this past year tended to support the results of 1989 and so some initial recommendations were made.

The processing pepper breeding work continued with emphasis on sweet bell types for dicing/freezing and hot cherries and bananas suited for both conventional and mechanical harvest. The sweet peppers were hit quite hard with hail late in the season and prevented collection of reliable yield data on the cultivars submitted for trial by co-operators.

The processing shrunken-2 sweet corn cultivar trial was conducted a second year and some trends are beginning to show up in cultivar performance.

The processing late cauliflower cultivar trial was new this season. This trial will be repeated in 1991.

S. A. Loewen
Ridgetown College of Agricultural Technology
Ridgetown, Ontario
(519) 674-5456

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Table of Contents:

SECTION I. WHOLEPACK TOMATO RESEARCH

Part A: Multilocation Yield Trials

Introduction:

This section of the report summarizes the results of the wholepack tomato cultivar evaluation work done at Ridgetown College during the 1990 growing season.

Three processing tomato cultivars considered to have potential for wholepack use along with three checks were evaluated for yield at 6 grower sites and 3 research station sites. The check cultivars were Ohio 7983, Ohio 7814 and Ohio 8245. The cultivars being tested were Peto 696, Peto 2196 and Ont 871. The F1 hybrid cultivar Peto 696 had shown promise during the 1989 season and so was of great interest for the 1990 year. Peto 2196, another F1 hybrid, has been reported to have acceptable yield and very good colour. The open-pollinated cultivar
Ont 871 had demonstrated very good yield potential at some locations during the 1989 season. At the research station sites the F1 hybrid cultivar Peto 1996 was evaluated in addition to those already mentioned.

The locations were chosen to represent different areas and soil types on which tomatoes are grown in Kent, Essex, and Norfolk counties. The plots were established according to the management practices of the respective grower co-operators so that the crop was grown on twin rows at some locations and single rows at other locations. Plots at research stations were planted in twin rows with one station having the plot planted in both twin and single rows.

Materials and Methods:

Location: Ridgetown - clay loam soil

Fertilizer: 300 kg/ha, 20-10-10, broadcast

Weed Control: Treflan (1 l/ha), Dual (2 l/ha), and Sencor 500 (0.5 l/ha) tank mixed and applied prior to planting.

Plants: Greenhouse grown in 288 cell plug trays, seeded April 6, 1990.

Hardening Off: Trays of plants were placed outdoors one week before planned date of planting.

Transplanting: May 25, using a one row carousel plug planter. Starter fertilizer 6-24-6 at 1 litre diluted in 182 litres of water, continuous flow of solution.

Plot size and spacing: Twin row plots, 6 metres (20 ft.) long, plant spacing 41 cm (16 inches), 45 cm (18 inches) between rows on 1.5 m centres. Replicated 4 times.
Single row plots, 6 metres (20 ft.) long, plant spacing 30 cm (12 inches), 1.5 metres between rows. Replicated 4 times.

Disease and Insect control: Foliar fungal diseases controlled according to TOM-CAST. Colorado Potato Beetle, 2 applications of Ambush 500 EC at 200 ml/ha.

Grower Locations: Leamington - sand
Stoney Point - clay
Wheatley - clay
Mitchell's Bay - silt loam
Wallaceburg - clay loam
Eberts - sandy loam

Transplanting: Leamington - May 9, replanted June 6. Twin rows, 41 cm (16 inches) between rows, 41 cm (16 inches) between plants, rows on 1.5 metre centres.

Stoney Point - May 9. Single rows, 25 cm (10 inches) between plants, 1.5 metres between rows.

Wheatley - May 9, replanted June 6. Twin rows, 45 cm (18 inches) between rows, 45 cm (18 inches) between plants, rows on 1.7 metre centres.

Mitchell's Bay - May 18. Single rows, 25 cm (10 inches) between plants, 1.5 metres between rows.

Wallaceburg - May 18. Twin rows, 38 cm (15 inches) between rows, 35 cm (14 inches) between plants, rows on 1.5 metre centres.

Eberts - May 28. Twin rows, 41 cm (16 inches) between rows, 41 cm (16 inches) between plants, rows on 1.5 metre centres.

Research Stations: Harrow - sandy loam
Simcoe - sandy loam

Transplanting: Harrow - June 4. Twin rows, 45 cm (18 inches) between rows, 45 cm (18 inches) between plants, rows on 1.5 metre centres.

Simcoe - May 23. Twin rows, 41 cm (16 inches) between rows, 41 cm (16 inches) between plants, rows on 1.5 metre centres.

Disease and Insect control: Managed by co-operators at the respective locations.

Results and Discussion:

Due to the difficulty in plot establishment at the Wheatley location, and subsequent poor plant stand even after replanting it was decided that results from that plot would not reliably reflect the performance of the cultivars being evaluated. Consequently yield data are not reported for that site. However, samples were collected from this site for peeling and processing quality evaluation and data for those trials is reported in Part B of Section 1 of this report.

Yield data are reported in three different ways; as yield potential, deliverable yield and percent peelable. Data for yield potential includes all fruit (ie. usable fruit as well as green and rotten) produced by the plants. Yield potential is important since it is less dependent on timing of harvest of plots. Although every attempt was made to harvest plots at optimum maturity some compromise was unavoidable. Thus deliverable yield may in some cases tend to be biased in favour of early to midseason maturing cultivars. Deliverable yield represents all tomatoes produced that would be shipped to a processing factory. The difference between yield potential and deliverable yield provides an estimate of the amount of sorting that would be necessary on the tomato harvester. Per cent peelable is an estimate, based on external appearance only (ie. acceptable external shoulder colour and free from surface blemishes), of delivered fruit that could be peeled.

Data for yield potential from the twin row locations, each considered separately, are shown in Table 1.

Table 1. Wholepack Processing Tomato Cultivar Trial 1990.
Yield potential (tons/acre) from twin row locations separately.

Cultivar	Leamington	Wallaceburg	Eberts	Harrow	Ridgetown	Simcoe
Ohio 7983	24.2 b	41.3 b	48.8 ab	28.4	19.8 c	31.2
Peto 696	32.1 a	61.8 a	54.3 a	28.0	38.9 a	35.4
Ont 871	27.0 ab	37.0 b	42.8 bc	24.2	19.9 c	26.4
Ohio 7814	34.0 a	43.5 b	39.5 c	28.7	29.6 abc	32.2
Peto 2196	33.8 a	45.2 b	46.7 abc	27.1	26.4 bc	35.8
Ohio 8245	23.9 b	48.5 b	51.7 a	28.3	23.8 bc	35.8
Peto 1996				29.2	32.3 ab	31.1
				NS		NS

Means followed by the same letter are not significantly different (DMRT).

At the Leamington site the performance of the cultivars being tested,(Peto 696, Peto 2196 and Ont 871), was not significantly different in yield from the widely grown check cultivar Ohio 7814. Peto 696 was particularly well adapted to the growing conditions at the Wallaceburg site. At this location the yield was dramatically higher than the checks and the other cultivars under evaluation. At Eberts the performance of Ohio 7814 was surprisingly low when compared to the other cultivars. It rarely performed this poorly in relation to the other entries. The two Peto hybrids performed well and at this site were not significantly better or worse than the checks. At both Harrow and Simcoe no significant differences were found between any entries. Initially this is somewhat surprising however not unusual if one compares the yield results for 1989 where only 1 out of 5 locations showed significant differences between cultivars. At the Ridgetwon site Peto 696 and also Peto 1996 were significantly better than at least 2 of the check cultivars.

Results from the Leamington site for deliverable yield (Table 2) are consistent with those for yield potential in that the cultivar Peto 696, Peto 2196 and Ont 871 are not significantly different from Ohio 7814.

Table 2. Wholepack Processing Tomato Cultivar Trial 1990.
Deliverable yield (tons/acre) from twin row locations separately.

Cultivar	Leamington	Wallaceburg	Eberts	Harrow	Ridgetown	Simcoe
Ohio 7983	20.4 bc	30.4	43.7 a	16.1	13.6 b	23.7
Peto 696	24.7 ab	39.5	40.0 ab	15.3	23.0 a	29.4
Ont 871	23.5 ab	28.3	35.9 b	15.0	15.1 b	20.7
Ohio 7814	30.1 a	27.4	33.6 b	16.0	14.9 b	25.2
Peto 2196	27.3 ab	30.9	40.1 ab	16.9	17.4 ab	29.3
Ohio 8245	16.6 c	26.9	33.9 b	15.1	12.7 b	29.2
Peto 1996				16.2	18.9 ab	25.1
		NS		NS		NS

Means followed by the same letter are not significantly different (DMRT).

Yields for these entries are still ranked the same as well. In spite of its superior performance in yield potential at Wallaceburg, Peto 696 was not statistically better in deliverable yield when compared to the other cultivars even though the yield is numerically higher. At Eberts the two Peto hybrids demonstrate good yields, numerically, but not significantly less than Ohio 7983. At the Ridgetown site all 3 Peto hybrids performed well.

At most locations no significant difference was found between cultivars for percent peelable based on visual inspection (Table 3).

Table 3. Wholepack Processing Tomato Cultivar Trial 1990.
Percent peelable (visual estimate) from twin row locations separately.

Cultivar	Leamington	Wallaceburg	Eberts	Harrow	Ridgetown	Simcoe
Ohio 7983	95	83 a	91 a	66	80	85
Peto 696	91	74 ab	80 b	68	78	93
Ont 871	94	82 a	88 a	70	83	91
Ohio 7814	95	81 a	92 a	74	75	88
Peto 2196	93	80 a	91 a	73	81	92
Ohio 8245	90	68 b	76 b	79	75	91
Peto 1996				68	75	93
	NS			NS	NS	NS

Means followed by the same letter are not significantly different (DMRT).

Of particular interest is that at the Eberts location Peto 696 did not have particularly good colour compared to the other cultivars. Similarly at Wallaceburg it showed a tendency to have poor colour. Consequently this cultivar would be required to have a high yield in order to make up for the lower percent of peelable fruit.

The cultivar Ont 871 had a percent peelable at least as good as the best checks at locations where differences were found and no better or worse than other entries where no significant differences were detected. As long as this cultivar is grown in locations where it has the potential to yield well it could be considered at least as good as the currently grown cultivars.

When the yield results for plants grown on twin rows are averaged over the six locations (Table 4) the trends already noticed become more obvious.

Table 4. Wholepack Processing Tomato Cultivar Trial 1990.
Plants grown in twin rows, results averaged over six locations.

Cultivar	Yield Potential (tons/acre)	Deliverable Yield (tons/acre)	% Peelable
Ohio 7983	32.3 bc	24.6 bc	83 ab
Peto 696	41.7 a	28.6 a	81 ab
Ont 871	29.5 c	23.1 c	85 a
Ohio 7814	34.6 b	24.5 bc	84 ab
Peto 2196	35.8 b	27.0 ab	85 a
Ohio 8245	35.3 b	22.4 c	80 b

Means followed by the same letter are not significantly different (DMRT).

In yield potential Peto 696 performed well above the other entries. Peto 2196 was not significantly better or worse than the checks and Ont 871 did not perform well, although, not significantly worse than Ohio 7983. In deliverable yield however, Ont 871 was no different from any of the check cultivars although not as good as either of the Peto hybrids. The Peto hybrids showed a trend toward better deliverable yield than the other entries.

On single rows Peto 696 performed better than at least one check cultivar at each location as as well as the two best checks (Table 5).

Table 5. Wholepack Processing Tomato Cultivar Trial 1990.
Yield potential (tons/acre) from single row locations separately.

Cultivar	Stoney Point	Mitchell's Bay	Ridgetown
Ohio 7983	16.1 bc	37.2 ab	8.4 bc
Peto 696	23.6 a	43.5 a	14.1 a
Ont 871	12.4 c	32.8 b	5.2 c
Ohio 7814	20.3 ab	35.6 b	12.7 ab
Peto 2196	21.6 ab	35.6 b	16.6 a
Ohio 8245	16.8 abc	37.9 ab	16.9 a
Peto 1996			18.1 a

Means followed by the same letter are not significantly different, (DMRT).

Peto 2196 performed as well as the best checks in two locations. Peto 1996 demonstrated good yield potential at the one single row location where it was evaluated. The performance of Ont 871 was disappointing when grown on single rows although at two of the locations the yield potential was not significantly different from two of the check cultivars. The results show that Ont 871 had the lowest yields and suggest that this cultivar is not suited for production in single rows.

The results for Ont 871 were very different for deliverable yield on single rows when compared with yield potential, particularly at the Mitchell's Bay location (Table 6).

Table 6. Wholepack Processing Tomato Cultivar Trial 1990.
Deliverable yield (tons/acre) from single row locations separately.

Cultivar	Stoney Point	Mitchell's Bay	Ridgetown
Ohio 7983	13.1	28.9 a	6.6 ab
Peto 696	14.7	25.8 a	9.3 a
Ont 871	9.8	25.0 a	3.6 b
Ohio 7814	15.4	20.7 b	6.6 ab
Peto 2196	15.2	25.0 a	9.9 a
Ohio 8245	12.5	16.4 c	10.2 a
Peto 1996			9.9 a
	NS		

Means followed by the same letter are not significantly different, (DMRT).

Here Ont 871 is not significantly different from Ohio 7983 or the two Peto hybrids cultivars. This result is consistent with the 1989 results where Ont 871 performed as well as Peto 696 and better than most other entries on silty soil types. Although the difference was not significant, the trend is for Ont 871 to perform poorly in single rows on clay soils. At Ridgetown all three Peto hybrids performed well on single rows. Peto 696 and Peto 2196 performed well on single rows at Mitchell's Bay also.

Table 7 shows the visual estimate of percent peelable fruit when grown on single rows. Based on visual estimates of percent peelable Ont 871 performs as well as Ohio 7983 and Peto 696. Although Peto 2196 performed well at Mitchell's Bay it did poorly at Ridgetown, but not significantly worse than Ohio 7814.

Table 7. Wholepack Processing Tomato Cultivar Trial 1990.
Percent peelable (visual estimate) from single row locations separately.

Cultivar	Stoney Point	Mitchell's Bay	Ridgetown
Ohio 7983	94	87 a	93 a
Peto 696	84	80 bc	85 abc
Ont 871	90	86 ab	90 ab
Ohio 7814	91	76 c	83 bc
Peto 2196	81	87 a	80 cd
Ohio 8245	89	77 c	72 de
Peto 1996			69 e
	NS		

Means followed by the same letter are not significantly different, (DMRT).

Table 8 shows the results of the single row plots averaged over the 3 locations. Overall the same trends are evident as with the results for each location separately. Peto 696 and Peto 2196 perform well in overall yield potential while Ont 871 is poor. For deliverable yield the two Peto hybrids perform as well as at least two of the checks and for percent peelable Ont 871 is as good as the best check and better than the rest of the entries.

Table 8. Wholepack Processing Tomato Cultivar Trial 1990.
Plants grown in single rows, results averaged over three locations.

Cultivar	Yield Potential (tons/acre)	Deliverable Yield (tons/acre)	% Peelable
Ohio 7983	20.6 c	16.2 a	91 a
Peto 696	27.1 a	16.6 a	83 b
Ont 871	16.8 d	12.8 b	89 a
Ohio 7814	22.9 bc	14.2 ab	83 b
Peto 2196	24.6 ab	16.7 a	83 b
Ohio 8245	23.9 abc	13.0 b	80 b

Means followed by the same letter are not significantly different (DMRT).

Conclusions

1. The cultivar Peto 696 was at least as good as the best performing check at each location tested. It was better than at least one of the the checks at all but two locations and was better than all of the checks at one of the twin row locations (table 1).

Peto 696 shows a trend to higher yield stability since its relative performance does not fluctuate from location to location as much as the relative performance of some of the checks.

Peto 696 is recommended on a trial basis for wholepack use in Ontario. It has a relatively high yield potential. One important caution is that the fruit can show a great tendency to inverted blossom end on heavier soils. Colour is slightly poorer than Ohio 7814.

2. Peto 2196 performed at least as good as the best check cultivars at 2 locations and not differently from any of the checks at 2 locations. Peto 2196 is recommended for use

on a trial basis. Peto 2196 can be expected yield almost as well as Peto 696 and have better peeled colour (table 9). This is consistent with reports from the US midwest where Peto 2196 has better peeled colour than Peto 696.

3. Ont 871 is recommended for trial on a limited basis. In 1990 and 1989 it was able to yield as well as Peto 696 on some soil types at some locations. It appears to be particularly suited to lighter soil types, and especially the silty sand and silty loam soils. It is showing a trend to be at least as early in maturity and sometimes earlier than Ohio 7983. Results show that Ont 871 must be twin rowed for good yields.

4. Ohio 7814 had the best colour of all entries tested in 1990.

Part B: Processing Quality Trial

Introduction:

Tomato fruit samples were gathered for evaluation of peeling and processing characteristics from each location where the cultivar yield trial was conducted.

Materials and Methods:

Within each location fruit were collected from each replication of the yield trial and pooled such that for the procesing quality trial each location was treated as a replication. No attempt was made to test for differences between single row and twin row locations. The protocol followed for the lye peeling and evaluation of processing characteristics is outlined in Appendix 1.

The percent cannable represents the percent of fruit that would have been delivered to the factory and subsequently canned. It includes the loss of weight in the lye bath. Agtron, pH and soluble solids were evaluated on fresh juice prepared according the method outlined in the OMAF Tomato Grading Manual. Consistency measurements were taken on unconcentrated tomato juice using a method modified from the one described by Mohr (1987).

Results and Discussion:

No significant differences were detected between cultivars for Agtron readings, pH or consistency of juice (Table 9).

Table 9. Wholepack Tomato Processing Characteristics, 1990

Cultivar	% Cannable	Agtron	pH	S.S.	Consistency
Ohio 7983	55 a	35	4.3	5.0 ab	10.6
Peto 696	43 b	36	4.3	4.7 bc	9.4
Ont 871	52 ab	35	4.3	4.6 c	9.8
Ohio 7814	62 a	34	4.3	4.7 bc	9.7
Peto 2196	60 a	35	4.3	5.1 a	10.0
Ohio 8245	58 a	34	4.3	5.2 a	9.8
	NS	NS		NS	

Means followed by the same letter are not significantly different (DMRT).

The pH readings are numerically equal due to rounding off. The percent cannable was low for Peto 696 which reflects the trend for percent peelable found at the single row sites during yield evaluation. It was noted previously that Peto 696 showed a slight trend to have lower percent peelable when grown on twin rows but was not signficiantly different from the best cultivars (Table 4).

The relatively high level of soluble solids in the cultivar Ohio 8245 was as expected. The level of soluble solids in Ohio 7983 was higher than expected since this cultivar is not known for having particularly high soluble solids.

Conclusions:

1. Peto 2196 had a significantly higher percent cannable fruit than Peto 696. This is consistent with observations of others who have had experience with both cultivars, that Peto 2196 generally has better peeled colour than Peto 696.

Part C: Wholepack Tomato Breeding

Introduction:

Many wholepack tomato processors in Ontario rely on external sources for new tomato cultivars. In order to address the specific needs of Ontario wholepack processors and to provide easy access to well adapted material the development of new cultivars is an ongoing project.

Materials and Methods:

As described above for the Ridgetown site with the exception that plants were seeded later and planted later. Breeding plots were planted on 1.5 metre single rows with 36 cm (14 inches) between plants.

Results and Discussion:

The breeding plots were subject to a number of different stresses during the 1990 growing season. An intentionally low rate of applied potash fertilizer was used to discriminate between lines for acceptability of mature fruit colour. The frequent rains coupled with the absence of fungicide sprays promoted the development of bacterial, and fungal diseases. Plant vigour was poor and, in retrospect, due in part, to compaction of the soil from the previous crop. These difficult conditions provided an opportunity for selection of lines well suited for growing under less than ideal circumstances.

Selection was made for high yield, good red fruit colour, and suitability for mechanical handling. Several selections from lines obtained through co-operative work with the Harrow Research Station demonstrated acceptable maturity and superior ability to retain foliage late into the season under conditions of high disease pressure.

Conclusions:

1. Selection has resulted in five Ridgetown lines ready for evaluation in the multilocation cultivar trial for the coming year.

2. A large number of F1 hybrids was evaluated and one hybrid was identified as having suitable yield and quality to merit evaluation for at least one more year.
3. The work will continue with open-pollinated lines receiving the most emphasis. F1 hybrid cultivars are recognized as having great potential particularly for the early part of the season so that work will expand in this area.

SECTION II: PROCESSING PEPPER RESEARCH

Part A: Sweet and Hot Pepper Breeding

Introduction:

The pepper breeding programme at RCAT has had the objectives of developing cultivars of bell, hot banana, and hot and sweet cherry peppers particularly suited to Ontario processing requirements. Selection has been directed at conventional plant types as well as plant types suited for machine harvest should the need for this harvest method arise in Ontario.

Materials and Methods:

Plants: seeded April 2, 1990 into Plastomer 200 size plug trays.

Weed Control: Treflan 1 L/ha applied ppi.

Fertilizer: 300 kg/ha 20-10-10 broadcast before planting, 75 kg/ha 34-0-0 sidedressed.

Transplanting: plants set out on May 31, 1990. Starter fertilizer 6-24-6 at 1 litre diluted in 182 litres of water, continuous flow of solution.

Plant spacing: rows 1 metre apart, plants spaced 46 cm apart. (8720 plants per acre)

Results and Discussion:

Advances in breeding for earliness were not as great as expected since earliness is associated with the upright fruiting habit while the pendant fruiting habit is required for successful mechanical harvest.

The hot cherry pepper line RCAT 78114 is suited for machine harvest and has been used on a trial basis by one U.S. processor. In the RCAT plots this past season the line was reselected for better wind tolerance. The plant type is upright and tall and was subject to a certain amount of lodging.

Banana types were selected for high numbers of uniformly yellow peppers, with all fruit at least as long as the minimum required length. Several severely windy days during the growing season permitted selection of plant types that stand up well.

The bell pepper plots were hit by hail this season and evaluation was very difficult. It did permit some selection against sunburning, since the hail removed some of the foliage, and exposed the fruit to the sun. Selections were also made for high yield.

Conclusions

1. One advanced bell selection looked particularly promising when grown under less than ideal conditons. It will be included in a cultivar trial to determine its performance against the industry standards in the coming year.

2. Selection will continue within RCAT 78114 since it is still segregating for several characteristics.

3. Several years are still required before Ontario growers will be able to realize direct benefits of this work.

4. Results can not be reported to co-operators who sent seed samples in 1990 since the hail made evaluation practically impossible.

SECTION III: VEGETABLE CULTIVAR EVALUATION

Part A: Processing Shrunken-2 Sweet Corn

Introduction:

Twenty-five cultivars of shrunken-2 sweet corn were evaluated at Ridgetown College in 1990. The cultivars were tested for yield and adaptation to Southwest Ontario growing conditions and suitability for processing.

Materials and Methods:

Seeding: John Deere Flex 71 seeding units.

Weed Control: Atrazine 90 WP at 1 kg/ha, Bladex 80 WP at 3 kg/ha and Dual at 2.5 L/ha.

Fertilizer: 300 kg/ha 20-10-10, and 150 kg/ha 46-0-0

Plant spacing: Rows 76 cm (30 inches) apart.
Plants 23 cm (9 inches) apart.
(population of 23,232 plants per acre)

Plot size: Rows 5 m long, three rows per plot, replicated 4 times.

Insect and Disease Control: two applications of Ambush 500EC at 200 mL/ha

Evaluations: The percent emergence was taken at 21 days after emergence and again at the 3 to 4 leaf stage of growth in order to determine cultivar susceptability to early dieback. Plots were harvested 22 days after 50 % of the plants in the plot were showing silk. All harvested ears greater than 2 inches in diameter, with usable kernels were weighed (unhusked) and reported as total yield. Marketable yield was based on husked weight. Kernels were cut from 5 representative ears and percent recovery was calculated.

Results and Discussion:

The results for the trial are shown in Tables 10a and 10b. The difference between percent emergence at the 3 to 4 leaf stage and percent emergence after 21 days should represent the percent of plants that succumbed to early dieback. In most cases, however, the percent emergence actually increased. This was due to the cool temperatures resulting in erratic germination and more variation in emergence. This would have resulted in a later half-silk date and slightly later harvests. Consequently this explains the higher number of corn heat units from seeding to harvest for all entries during the 1990 season when compared to 1989. The 1990 season was such that more tiller growth was evident on all entries in the trial.

Table 10a. Emergence, 1990 Processing Shrunken-2 Sweet Corn Cultivar Trial.

Cultivar	Source	% Emerge (21 days)	% Emerge (3-4 leaf)
Landmark	HM	89 a	92 a
GSS 3667	Rogers	81 abcde	77 abcdef
Mariah	Seedway	69 cdef	69 cdef
GSS 3170	Rogers	85 abc	88 ab
GSS 3612	Rogers	66 def	70 cdef
FMX 285	FM	76 abcdef	81 abcde
Crisp N Sweet 710	Crookham	87 ab	88 ab
Sweet Top	Musser	83 abcd	88 ab
GSS 3590	Rogers	39 g	42 g
Sweetie 76	Sunseed	72 bcdefg	74 bcdefg
GSS 3485	Rogers	72 abcdef	72 bcdef
Prominence	Crookham	77 abcdef	77 abcdef
A&C 7210Y	A&C	85 abc	85 abc
FMX 280	FM	71 bcdef	70 cdef
Marquis	Crookham	69 cdef	69 cdef
Excel	Rogers	70 bcdef	68 def
A&C 7710Y	A&C	78 abcdef	84 abcd
Sweet Season	Sunseed	60 f	61 f
Crisp N Sweet 711	Crookham	81 abcde	83 abcde
Showcase	Rogers	63 ef	66 ef
A&C 7620Y	A&C	86 abc	81 abcde
Stylesweet	FM	65 def	67 def
Sweetie 82	Sunseed	81 abcde	87 ab
A&C 7900Y	A&C	65 def	69 cdef
Supersweet Jubilee	Rogers	75 abcdef	75 bcdef

Means followed by the same letter are not significantly different, DMRT.
Cultivars are arranged according to maturity.

Table 10b. Yields, 1990 Processing Shrunken-2 Sweet Corn Cultivar Trial.

Cultivar	CHU	Total Yield T/ha	Marketable Yield T/ha	%Recovery	Tillers per plant
Landmark	1993	9.2 abcd	6.6 abcde	NA	1.1 bcdef
GSS 3667	1999	5.5 e	3.9 f	NA	1.1 bcdef
Mariah	2059	7.9 bcde	5.6 cdef	30.6	1.0 cdef
GSS 3170	2069	8.9 abcd	6.4 abcde	NA	1.7 abc
GSS 3612	2073	7.9 bcde	5.7 bcdef	33.4	2.3 a
FMX 285	2140	9.8 abc	7.0 abcd	37.4	0.8 defg
Crisp N Sweet 710	2146	11.1a	7.9 a	35.2	0.1 g
Sweet Top	2146	10.8 b	7.7 abc	31.3	1.4 abcd
GSS 3590	2152	6.6 de	4.7 ef	37.6	1.6 abcd
Sweetie 76	2152	10.6ab	7.6 abc	34.2	1.9 ab
GSS 3485	2155	7.4 cde	5.3 def	27.4	1.2 bcde
Prominence	2175	11.0a	7.9 ab	30.7	0.3 fg
A&C 7210Y	2197	10.8ab	7.7 abc	33.3	0.5 efg
FMX 280	2204	9.9 c	7.0 abcd	37.9	1.9 abc
Marquis	2211	8.4 abcd	6.0 abcdef	32.7	1.1 bcdef
Excel	2280	9.5 abcd	6.8 abcde	35.1	1.9 ab
A&C 7710Y	2293	10.4ab	7.5 abcd	32.5	1.1 bcdef
Sweet Season	2295	8.3 abcd	6.0 abcdef	37.2	0.8 defg
Crisp N Sweet 711	2302	9.6 abc	6.8 abcde	35.4	0.5 efg
Showcase	2303	10.8ab	7.7 abc	36.4	1.1 bcdef
A&C 7620Y	2305	10.1abc	7.2 abcd	29.9	0.9 defg
Stylesweet	2316	8.3 abcde	6.0 abcdef	32.7	1.8 abc
Sweetie 82	2339	9.5 abcd	6.8 abcde	39.4	0.8 defg
A&C 7900Y	2346	8.3 abcde	5.9 abcdef	36.2	0.4 efg
Supersweet Jubilee	2385	7.4 cde	6.3 abcde	35.7	1.4 bcd

Means followed by the same letter are not significantly different, DMRT.
Cultivars are arranged according to maturity.

The five top yielding (marketable yield) cultivars in 1990 were: Crisp N Sweet 710, Prominence, Sweet Top, A&C 7210Y and Showcase. All five had higher marketable yield than Supersweet Jubilee, one of the checks. In 1989, Showcase, and Crisp N Sweet 710 were also among the top 5 performers for marketable yield.

Conclusions

The two cultivars Crisp N Sweet 710 and Showcase were among the top five performers for 1990 and were also among the top five in 1989. These cultivars have shown a trend to consistently good performance at Ridgetown.

Part B: Fall Processing Cauliflower

Introduction:

Twenty-nine cauliflower cultivars were evaluated at Ridgetown during 1990. Cultivars were evaluated adaptation to Southwest Ontario growing conditions and for suitability for processing in Ontario.

Materials and Methods:

Plants: seeded into Plastomer 200 size plug trays on 18 June 1990.

Fertilizer: 300 kg/ha, 20-10-10 applied before planting, 176 kg/ha, 34-0-0 side dressed

Weed Control: Treflan was applied ppi just prior to planting (1 L/ha).

Transplanting: transplants were set out on July 13, 1990.

Plant spacing: rows 1 metre apart and plants 35 cm within row. (8720 plants per acre)

Plot size: each plot consisted of 3 rows, rows were 5.5 m long, only the centre row harvested.

Insect and Disease Control: Guthion 50 WP applied at transplanting for rootmaggot control.

**

Evaluations: Evaluations were done on only the centre row of each plot and only on ten plants from the middle of the row. Average head weight (kg) was taken from each entry. The rating for degree of riciness was such that 5 was most desirable, and 1 was least desirable. Percent recovery was determined by separating the usable portion of each head from the core.

Leaves were not tied in this trial.

Results and Discussion:

The trial was replicated 4 times however due to herbicide carryover from a trial the previous year some replications were lost for some entries. Data are reported in Table 11 according to the number of replications which could be harvested. Plant stands in the trial were very good and so yield trends can be based on the results for average head weight. No significant differences were found in head diameter at time of harvest. Plant height, and consequently plant size varied widely among cultivars. All cultivars were grown at the same plant population. Although differences between cultivars for percent recovery were not found to be significant there was a strong trend evident for XPH 5794 to be better than other entries.

The maturity ranking for cultivars was based on the date of first harvest.
Some cultivars in the trial did not mature in time for harvest during the 1990 season.
These cultivars are listed in Figure 1.
Comments on hollow stems, curd colour, and other notes are summarized in Figure 2.

Figure 1. Cauliflower entries that did not mature in 1990

These cultivars were included in the trial but did not develop harvestable heads before the trial was complete: (trial planted July 13, 1990; first harvest September 26 1990; last harvest November 8, 1990)

Batsman
Cervina
Crystal
Lateman
Snowball
Snowflower
Snowman
XPH 5057

Figure 2. Comments on Entries in 1990 Fall Cauliflower Cultivar Trial.

Andes (Stokes) - no hollow stems, cream coloured, small core

Asterix (TS Seeds) - some hollow stems, colour cream or white

Cloud Nine (Stokes) - some hollow stems, cream to white coloured, some green stems under curds

Early White (Burpee) - no hollow stems, curds tended to be yellow, with some loose heads

Floriade (Nickerson-Zwaan) - some hollow stems, cream coloured

Goodman (Bejo) - no hollow stems, cream to white coloured, some brown decay before maturity

Polar Express (Stokes) - no hollow stems, cream coloured, large core

Ravella (Stokes) - no hollow stems, cream to white coloured, attractive, solid head, large core

Silver Streak (Asgrow) - no hollow stems, cream coloured, some green under curd, some curds loose and black spotted

Siria (Stokes) - no hollow stems, cream to white coloured, some curds with long, narrow core

Snow Crown (Stokes) - many hollow stems, cream coloured

White Bishop (Stokes) - no hollow stems, cream coloured, purple underneath curd

White Cloud (Asgrow) - no hollow stems, white to cream coloured, slender core

White Knight (Stokes) - no hollow stems, white tending to cream coloured

White Rock (Stokes) - no hollow stems, cream coloured

White Sails (Stokes) - many stems tending to be hollow, cream to white coloured

White Summer (Stokes) - no hollow stems, cream coloured

White Top (Stokes) - no hollow stems, cream coloured

XPH 5748 (Asgrow) - many hollow stems, cream to yellow coloured, some heads loose and green underneath

XPH 5793 (Asgrow) - no hollow stems, cream coloured

XPH 5794 (Asgrow) - no hollow stems, cream coloured, some heads irregularly shaped

Conclusions

1. Of the very early maturing entries Polar Express and White Bishop were the best. Polar Express had good yield, no hollow stems, and was cream coloured. White Bishop had no hollow stems, was cream coloured, but had poor yield. In general all very early cultivars had poor colour and many tended to have hollow stems.

2. The best performing cultivars in the midseason range were Siria, Ravella, and White Cloud. Both Siria and Ravella yielded extremely well in 1990, were free of hollow stem and had cream to white curd colour. White Cloud had acceptable yield, good colour and no hollow stems. Asterix yielded well, with good colour but tended to have some hollow stems.

3. The best performing cultivar that matured late in the season was XPH 5794. It had acceptable yield, had no hollow stems, was very solid and showed a trend to have a high recovery. XPH 5793, White Top and White Rock demonstrated a tendency to perform well and will have to be evaluated again before a recommendation can be made.

SEED SOURCES 1990

Abbott & Cobb, Box 307, Feasterville, PA USA 19047
Agway Seed Div., Box 4741, Syracuse, NY USA 13221
Asgrow Seed Co., Hort. Dept., Kalamazoo, MI USA 49001
Bejo Zaden BV, Trambaan, 1749Cz, Warmenhuizen, Holland 02269-6162
Bruinsma BV, Box 24, 2650 AA, Naaldwijk, Holland 01740-28244
W. Atlee Burpee, 300 Park Ave., Warminister, PA USA 49001
Crookham Co., Box 520, Caldwell, ID USA 83605
Ferry Morse Seed Co., Box 4938, Modesto, CA USA 95352-4938
Harris Moran Inc., Buffalo Rd, Rochester, NY USA 14624
H. J. Heinz Co. Ltd., Leamington. Ont. N8H 3W8
H.E.S., Box 587, Simcoe, Ont.
I.P.P.O. H2766 Tapiozole, Hungary
Institut Zuchtungsforschung Ethelurd Julius Rosenberg 22/23 Quedlinburg GDR 4300
Johnny's Select Seed, Box 701, Albion, ME USA 04910
Mikado, 1203 Hoshikuki, Chiba City, 280 Japan
Musser Seed Co., Box 787 Caldwell, ID USA 83603-0787
Neuman Seed, Box 1530, El Centro, CA USA 92244
Nichols Garden Nursery, 1190 N Pacific Hwy, Albany, OR USA 95020
Nickerson-Zwaan BV, Box 19, 2990 AA, Barendrecht, Holland 01806-13277
Northrup King Ltd., Box 1827, Gilroy, CA USA 95020
Nunhems Zaden BV, Box 4005, 6080 AA Haelen, Holland
NYSAES, Box 642, Geneva, NY USA 14456
OSU, 1680 Madison Ave., Wooster, OH USA 44691-4096
Geo. Park Seed Co., Box 31, Greenwood, SC USA 29647
Pepper Res. Inc., 980 SE 4 St., Belle Glade, FL USA 33430
F. Peters, R.R.1, Harrow, Ont. N0R 1G0
Petoseed Co., Box 4206, Saticoy, CA USA 93003
Rogers Bros. Seed Co., Box 1069, Nampa, ID USA 83653-1069
SDSU, Box 2207-C, Brooking, SD USA 57007-0996
Seedway Inc., Box 250, Hall, NY USA 14463
Smithfield Exp Farm, Box 340, Trenton, Ont. K8V 5R5
Stokes Seeds Ltd., Box 10, St. Catharines, Ont., L2R 6R6
Sunseeds, 9800 Fairview Rd., Hollister, CA USA 95023
Takii, Box 7, Kyoto, Central Japan
TERRA Inc., Box 643, Carmel, IN USA 46032
TS Seeds BV, Box 263, 3340 AG H.I. Ambacht, Holland 078-108911
O. Twilley Seed Co., Box 65, Trevose, PA USA 19047
Veg. Crops Institute, Box 116, Kecskemet, Hungary H-6001
Vesey Seeds Ltd., York PEI, C0A 1P0

Appendix 1. Tomato Processing Protocol 1990

Peeling Line

1. Weigh out 2 kg of fruit for peeling.

2. Size the sample using the size grader.

3. Drop tomatoes from 4 foot height onto floor.

4. Put into basket and immerse in lye for 45 seconds.

Lye Solution: (18 % by weight)
63 litres water
11.35 kg NaOH flakes

5. Make certain that tomatoes are well stirred in the lye solution.

Maintain lye temperature between 95 and 99 C.

6. Rinse tomatoes in the rinse tank on lye applicator.

7. Put tomatoes into water tank of peel eliminator for a second rinse.

8. Run the fruit over the peel eliminator.

Citric Acid Rinse: (pH 3.5)
12.5 g Citric acid
23 litres water

9. Collect fruit from peel eliminator into citric acid rinse.

10. Remove from acid rinse and photograph sample.

11. Weigh sample.

Colormet pass/fail threshold set at 2.6 in "Whole" mode.

12. Grade fruit using Colormet to find cannable fruit.

13. Weigh remaining fruit.

14. Put cannable tomatoes in cans (2 can sample).

Juice Line

1. After 2 kg sample is weighed out for peeling wash a sample of the remaining fruit as required for juice.

2. Turn on vacuum pump and then blend sample under vacuum for 1 minute.

3. After blending submerge sieve and sample juice for agtron, pH, and SS.

4. Pour remaining puree into beaker and heat in microwave to hot break point (82 to 88 C) and hold for 15 sec.

(9 minutes on high for 1 litre of puree yields 600 ml juice at 92 C)

5. Pass heated puree through finisher.

6. Use 50 ml in Bostwick to estimate consistency.

7. Keep juice hot until put into can.

Canning

1. Fill 2 cans with peeled tomatoes.

2. Top up cans with juice.

3. Seam cans and LABEL.

4. Cook cans in still retort for 50 minutes at 100 C.

5. Cool cans after cooking to 38 C.