



Ridgetown College

Processing Tomato Breeding Report to the Ontario Tomato Research Institute, November 2005

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1. Brief review of program background

(a) In earlier tomato breeding work at Harrow, modern cultivated varieties of tomato were hybridized with wild species of tomato. These crosses represent a source of new genetic variation to broaden the genetic base of processing tomatoes for Ontario. A wide genetic base among cultivars is associated with reduced risk of disease epidemics, and greater tolerance to weather extremes.

(b) While it is not an easy task, in some respects, it is easier to make the cross between the wild species and cultivated tomatoes than it is to bring the resulting hybrid to a point where it is useful to private sector breeders. The work at Ridgetown continues to focus on backcrossing and selection to combine the new genetic variation with commercially adapted traits.

2. Summary of program objectives

(a) The Ridgetown processing tomato breeding program has the primary objective of providing enhanced germplasm for O.T.R.I. member breeders to promote sustainability of the Ontario tomato industry.

(b) Horizontal, or additive genetic resistance to disease is a system of disease resistance largely overlooked by tomato breeders in the past. This strategy offers enduring tolerance to disease and has potential for managing diseases where traditional vertical resistance has not yet proved helpful.

3. Release of breeding lines

Sixty advanced lines from the Ridgetown program were released to O.T.R.I. member breeders for 2005 planting.

4. Disease resistance breeding

(a) Anthracnose: There were 6 populations (compared to 2 in 2004) grown out for breeding for horizontal resistance to anthracnose. Selections were made for

resistance and those are being grown in the greenhouse during winter 2006 for intercrossing. The resulting seed will be grown out in 2006 for another cycle of selection under field conditions and in the presence of susceptible varieties.

(b) Bacterial spot: There were 6 populations (compared to only 2 last year) inoculated with a mixture of 3 races of bacterial spot. In spite of the dry season, we had good infection in the plots. Selection for tolerance to this bacterial disease is difficult.

(c) Early blight: Work on breeding for horizontal resistance to early blight was started in 2005. Resistance is often associated with late maturity and so selection focussed on early maturing plants with few symptoms.

(d) Bacterial speck: All field selections are routinely screened for resistance to bacterial speck.

5. Selection for Earliness and Field Holding Ability

We are working with our general breeding population to extend the harvest season both at the beginning (by selecting for earliness) and at the end of the season (by selecting for field-holding ability).

6. Summary of field work in 2005

There were 1,303 breeding lines from F2 to F6 generations planted this year. They originated from selections made at Ridgetown during fall 2004, and were the lines retained following screening for disease resistance during the winter. Selection in 2005 tended to focus on traits such as acceptable vine size, acceptable maturity, and acceptable fruit size. Where these traits already existed in the lines, then early maturity, firmness, large fruit size, colour, yield and field-holding ability were important traits under selection. In fall 2005 1,112 selections were made.

The breeding plots were located on a different farm compared to previous years and we achieved our objective of more uniformity in growing conditions. The Ridgetown site of the cultivar trial was located on a different farm within a commercial field to avoid the bacterial spot contamination we had in 2004.

7. Plans for 2006

We plan to keep the plots at 14 acres for 2006. The field-based disease resistance work on anthracnose, bacterial spot, and early blight resistance took up half the field in 2005. We plan to scale this back slightly for the coming year.