

## 2002 Executive Summary Report to the Ontario Tomato Research Institute

**Project Title:** Nitrogen and Row Spacing Management for Processing Tomatoes.

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**Objectives:** To determine the optimum rate of nitrogen (N) fertilization for enhancing yield, fruit quality, earliness and concentrating fruit maturity of processing tomatoes. To determine the optimum row spacing for two, high vigour, late maturing, processing tomato cultivars.

### Methodology:

Field experiments were carried out on a Granby sandy loam soil at the Greenhouse and Processing Crops Research Centre, Harrow, Ont. Treatments were replicated 4 times. All plots were trickle irrigated. Plots were harvested by hand.

**Nitrogen management trial.** Treatments consisted of 5 nitrogen rates (0, 100, 150, 200 and 250 kg of N/ha) applied preplant as main plot treatments and 4 cultivars (H9230, H9492, H9553 and CC337) as sub-plot treatments using a split-plot design. Plot size was 1.5 m x 8.0 m. A split harvest was carried out with the first harvest occurring when approximately 80% of the fruit was red (Aug. 22 to Sept. 5). Ethrel was applied on Sept. 6 at 5.0 L/ha and a second harvest was completed approximately 3 weeks after the first harvest (Sept. 16 to 24).

**Row spacing trial.** Treatments consisted of 3 row arrangements: equidistant row arrangement with a single row every 75 cm; and 2 twin row systems with either 60 cm or 40 cm between rows (all at 1.5 m centres); and 2 cultivars (H9553 and CC337) as sub-plot treatments. Plot size was 1.5 m x 6.0 m.

### Results:

**Nitrogen management trial. Nitrogen fertilizer rate effects:** Although 2002 was dry during most of the growing season, high yields were achieved with trickle irrigation. Blossom end rot was not a problem in this trial in 2002. Linear regression analyses indicated that yield parameters (total, marketable, green fruit and cull) increased as N rate increased. The highest N rate (250 kg/ha) provided the highest yield in 2002 (53.2 tons/ac marketable yield averaged over 4 cultivars). The positive linear relationship between N rate and marketable yield was significant ( $P \leq 0.05$ ) for all cultivars. Plant vigour was reduced for the 0 N rate compared to the 150, 200 and 250 kg N/ha rate on July 10 and Aug. 20. However, excessive plant vigour did not occur with the 250 kg N/ha rate as happened in 2000, a wet year. Leaf greening was greater for all N rates compared to the 0 N rate on Aug. 12. Fruit size, soluble solids, fruit firmness and Agron colour were not significantly affected by nitrogen rate ( $P \leq 0.05$ ).

**Cultivar effects:** H9553 had the greatest total and marketable yields, followed by H9492. H9230 and CC337 had the lowest total and marketable yields. Green fruit yield was greater for H9492 and H9553 compared to H9230 and CC337. The amount of cull fruit was greater for H9230 compared to the other 3 cultivars. Fruit size was largest for H9230, followed by H9553, H9492 and smallest for CC337. Soluble solids was highest for H9492 and lowest for H9553. Fruit firmness was greater for H9553 compared to H9492 and CC337. Agron fruit colour was best for CC337 and poorest for H9230.

**Harvest date effects:** Total and marketable yields did not change by delaying harvest by 3 weeks. However, the percentage of green fruit decreased and the percentage of cull fruit (rots) increased with the later harvest for all cultivars. Soluble solids of H9553 was not significantly affected by harvest date ( $P \leq 0.05$ ).

**Row spacing trial.** Although 2002 was dry during most of the growing season, high yields were obtained with trickle irrigation. Marketable yield of H9553 and CC337 was 67.4 and 57.1 tons/ac, respectively. Blossom end rot was not a problem. The equidistant row arrangement with a single row every 75 cm provided a more uniform canopy coverage over the field compared to the twin row systems. This may allow better utilization of land area and light interception and result in higher yields. With CC337, the equidistant row arrangement (single row every 75 cm), had a higher marketable yield (61.4 tons/ac) compared to the less equidistant row arrangements (twin rows 45 or 60 cm apart with 1.5 m bed centres; 55.4 and 54.6 tons/ac, respectively). With H9553, there was no significant difference ( $P \leq 0.05$ ) in yield between the row spacings.

The row spacing treatments did not affect earliness of flowering or fruit set. However, with CC337, the equidistant single row system had the lowest percentage of green fruit at harvest indicating an advancement in harvest date may be possible. Row spacing did not affect fruit size or soluble solids for either cultivar.

H9553 had a greater total and marketable yield compared to CC337. Fruit size was larger for H9553 but soluble solids was lower compared to CC337.