

Summary Report to OTRI, November, 2001

**Project Title:** Nitrogen and Plant Spacing Management for Enhancing Earliness and Concentrating Fruit Maturity of Processing Tomatoes.

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**Objectives:** To determine the optimum rate of nitrogen (N) fertilization and plant spacing (including both plant population densities and planting patterns) for enhancing earliness and concentrating fruit maturity of processing tomatoes.

**Methodology:**

Field experiments were carried out at the GPCRC, Harrow using small plots and treatments were replicated 4 times (N management trial) or 6 times (spacing trial). Plots were harvested by hand.

**Nitrogen management trial:** Treatments consisted of 5 nitrogen rates (0, 100, 150, 200 and 250 kg of N/ha) as main plot treatments and 4 cultivars (H9230, H9492, H9553 and CC337) as sub-plot treatments using a split-plot design.

**Spacing trial:** Treatments consisted of 3 row arrangements (single row with 75cm between rows and 2 twin row systems with either 60cm or 40cm between rows) all at 1.5m centres; 2 within row plant spacings with either 40cm or 33cm between plants giving a plant population of 33,300 or 40,400 plants/ha (13,870 or 16,735 plants per acre); and 2 cultivars (H9230 and N1045).

**Results:**

**Nitrogen management trial - fertilizer rate effects:** Because of the very dry weather in 2001, there was little difference in yield among the fertilizer application rates. With H9492, total yield was significantly greater with the 150 kg N/ha rate compared to the zero and 250 kg N/ha rates. With other cultivars, no significant yield differences among fertilizer rates occurred. Linear regression analysis indicated that blossom end rot increased as N rate increased. This was similar to 1999 when blossom end rot also increased linearly as N rate increased. Fruit colour (Agtron colour) improved as N rate increased as indicated by linear regression analysis. Fruit size, soluble solids and fruit firmness were not affected by nitrogen rate.

**Cultivar effects:** H9553 had the greatest total yield, however, there was no significant difference in marketable yield among the cultivars. Green fruit yield was greater for H9553 and CC337 compared to H9230 and H9492. Blossom end rot was greatest for H9553, followed by H9492 and CC337 and lowest for H9230. Fruit size was largest for H9230 and smallest for H9492. Soluble solids was highest for H9492 and lowest for H9230 and CC337. H9553 had the firmest fruit, followed by H9492, with H9230 and CC337 having the softest fruit. Agtron colour was better for H9230 and CC337 compared to H9553 and H9492.

**Spacing trial (3 year summary):** Early maturing, small vine size cultivars will benefit by increasing the plant population from 13,870 to 16,735 plants per acre. Marketable yield was increased by 1.2 to 1.9 tons per acre with the higher plant population over the 3 years of the study. The wider row arrangements provided an advantage in both total and marketable yields in 2000 and a reduction in foliage and fruit disease compared to the 40 cm twin row system. Fruit maturity, as measured by the amount of green fruit harvested, was not consistently affected by the row arrangements or plant spacings used in this study. Fruit size and soluble solids were not affected by plant spacing or row arrangement.