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
Agriculture and Forestry

## Nitrogen Fertiliser Recovery and Yield Response of Greenhouse Grown and Fertigated Tomato to Root - Zone Soil Water Tension

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**Abstract:** Tomatoes were grown in a plastic greenhouse under 2 irrigation programmes and four N-fertiliser concentrations (0, 100, 150 and 200 mg N l<sup>-1</sup>) of irrigation water. P and K concentrations were kept constant at 30 and 200 mg l<sup>-1</sup>, respectively, for all N treatments. A drip irrigation system with single laterals centred between the plant rows, spaced 50 cm apart was used for irrigation as well as for feeding fertiliser solution (i.e. fertigation) during the experiment. Tensiometers, installed in 3 replicates at 45 cm soil depth and centred mid-way between 2 plants in rows, were used for irrigation scheduling. Two irrigation programmes, controlled through continuous monitoring of root-zone soil-water tension, were used as irrigation treatments. In one of the treatments, irrigation scheduling was based on a maximum soil-water tension of 50 kPa during the entire season. In the second treatment, soil-water tension to initiate irrigation was initially high (70 kPa), until fruit setting, and it fell down to 50 kPa, later in the season. <sup>15</sup>N labelled urea was used in one of the N-concentration treatments (150 mg N l<sup>-1</sup>) to estimate tomato N-fertiliser recovery. The results showed that tomato yield was not influenced significantly by irrigation treatments, although the irrigation treatment of low soil-water tension (<= 50 kPa), maintained throughout the season, gave higher yield. Exposing tomatoes to high soil water stress during the early growth stage, first 70 kPa then dropping to 50 kPa, promotes proportionally higher uptake of soil N, and thus reduces the recovery of applied N-fertiliser. However, when low soil water tension (<= 50 kPa) was maintained throughout the season, N-fertiliser recovery was 22.4% higher compared with when high soil water-tension prevailed until mid season. As for the effects of N concentration of the feeding solution, tomatoes showed a statistically significant (P <= 0.05) fruit-yield response to varying N concentrations. The feeding-solution-N concentration giving the highest tomato fruit yield was about 120 mg N l<sup>-1</sup> as estimated using a N-concentration yield-response function.

**Key Words:** Fertigation, N-fertiliser recovery, N-fertiliser concentration, <sup>15</sup>N, soil-water tension, tomato

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