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Effect of Combination of Organic and Inorganic Nitrogen Fertilizers and Spacing on Growth and Yield of Tomato (*Lycopersicon esculantus* L. var. Thilina) in the Eastern Region of Sri Lanka

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A field experiment was carried out to investigate the effect of combination of organic nitrogen (Org.N) and inorganic nitrogen (Inorg.N) sources and spacing on plant growth and yield of tomato (var. Thilina). The treatments were arranged in a randomized complete block design with three replications. Each plot size was 4 m × 4 m. As per the recommendation of the Department of Agriculture (DOA) Sri Lanka, 90 kg/ha of nitrogen was provided through different combinations of organic and inorganic fertilizers.

Different combinations of nitrogen sources (N_1- ¾ part of Inorg.N + ¼ part of Org.N, N_2- ½ part of Inorg.N + ½ part of Org.N and N_3- ¼ part of Inorg.N + ¾ part of Org.N) and spacing (S_1- 80 × 35 cm, S_2 - 80 × 50 cm as per the DOA recommendation and S_3- 80 × 80 cm) were arranged in a two factor factorial design. Required amount of Org.N was provided through compost as basal dressing. Other major nutrients viz. phosphorus and potassium were supplied through inorganic fertilizers. The parameters of plant height, leaf area, plant biomass and fruit yield were measured and data were analyzed by ANOVA using SAS.

Different levels of nitrogen sources and spacing had a significant effect ($p < 0.05$) on plant height, leaf area and plant biomass at harvesting stage and fruit yield of tomato. The interaction effects of nitrogen sources and spacing on leaf area, biomass and fruit yield were also significant ($p < 0.05$). Plants belonging to treatment N_1S_3 produced significantly higher leaf area (1450.78 cm^2 per plant) while plants belong to N_1S_1 produced higher plant biomass (2648.70 $kg.ha^{-1}$) and fruit yield (27.93 $t.ha^{-1}$) than the others. Leaf area per plant showed higher response to inorganic nitrogen and wider spacing.

However, application of ¾ part of inorganic and ¼ part of organic levels of nitrogen planted at the spacing of 80 × 35 cm could increase the productivity of tomato with reduced level of inorganic nitrogen in the sandy soil of the Eastern region of Sri Lanka.