



—Scientific Note—

Nitrogen Management for Greenhouse Production of Luffa, A High Value Asian Vegetable

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Luffa (*Luffa acutangula*) is an Asian vegetable in the Cucurbitaceae family known for its nutritional and medicinal value. It is suitable for cultivation in tropical and subtropical regions including Florida (Xie et al., 2019). An experiment was designed to find the optimal nitrogen levels, in the form of calcium nitrate, for greenhouse production of luffa. Key factors for growing luffa were identified, including susceptibility to pests.

Findings

Over a 20-week period, optimal fertilizer rates for pot-grown luffa were tested under greenhouse conditions. Luffa seeds were sown in transplant trays on 8 Mar. 2021 and watered daily. Twenty-four (24) luffa 21-day old seedlings, cultivar ‘Jiao Gua’ (Tainong Seeds, Inc.), were planted in 4-gallon containers filled with 3.5 gallons of Promix Mycorrhizae with one plant per pot. There were four nitrogen (N) rates: T1, T2, T3, and T4 – 0, 72.6, 108.9 and 145.2 lb/acre (0, 13, 20, and 27 g/plant) N as $\text{Ca}(\text{NO}_3)_2$, respectively. There were six replications. All plants received 122 lb/acre P_2O_5 as triple superphosphate (TSP), and 120 lb/acre K_2O as potassium sulfate. The fertilizers were split applied once a week for 8 weeks from 21 Apr. thru 18 Jun. 2021. Plants were irrigated manually to field capacity daily with 2 L a day until flowering and 4 L a day after flowering. T1 and T4 received a total of 168 L/plant while T2 and T3 received a total of 276 L/plant.

Phosphorous and potassium applications were the same for all treatments, with each plant receiving a total 43.3 grams of triple superphosphate and 50 grams of potassium sulfate. Nitrogen, in the form of calcium nitrate, was treatment specific. The N treatment groups: T1, T2, T3, and T4 received 0, 13, 20, and 27 g of N per plant per season. The zero nitrogen treatment (T1) produced no fruit. T2 and T3 produced numerous fruit. The highest nitrogen treatment (T4) had tissue necrosis and wilting leaves consistent with symptoms of salt injury which may have been caused by build-up which has been reported previously in many different vegetable crops. T2 produced 17 total fruit, for an average of 2.83 fruit/plant, and a total fresh weight of 4023 g. T3 produced 18 total fruit, for an average of 3 fruit/plant, and a total fresh weight of 5168 g. During this experiment, plants were affected by spider mites and aphids and which were managed with Agrimek and

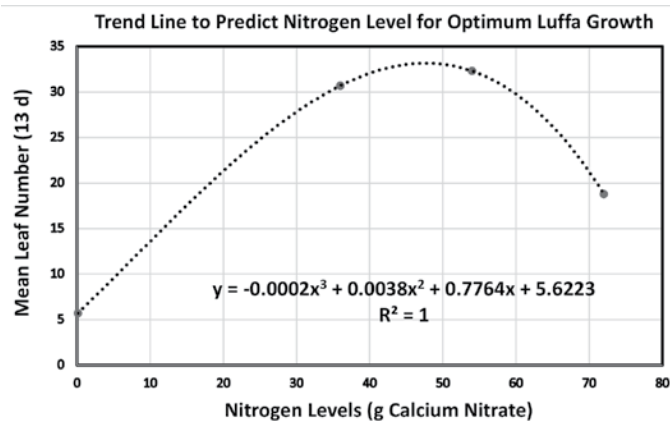


Fig. 1. Trend line to predict nitrogen level for optimum luffa growth in a greenhouse.

neem oil. We also found that the number of leaves on the luffa plant fitted a polynomial third order equation with an optimal level of 20 grams of nitrogen per plant under the conditions of this experiment (Fig. 1).

Suggestions for Future Direction

Using the results of this study as a guide, future experiments are needed to determine the optimal levels of nutrients especially nitrogen. It will also be useful to optimize additional nutritional programs and pest management options for greenhouse production of this vegetable.

An analysis between nitrogen concentration, the amount supplied, and the number of leaves on the luffa plant fitted a polynomial third order equation with an optimal level of 20 g of nitrogen per plant for this experiment.

Literature Cited

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