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Strategic Goal of Attaining National Food Self-Sufficiency

Murad Zaveed*

Department of Plant and Microbial Biology, University of California, Berkeley, USA

***Corresponding author:** Murad Zaveed, Department of Plant and Microbial Biology, University of California, Berkeley, USA, E-mail: Zaveed_M@Led.Us

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Description

It has been grown for a variety of purposes in Southern Ethiopia, with the leaves, which have a high nutritional value and appear toward the end of the dry season when few other green vegetable sources are available, being especially important as food for humans. The leaves contain a lot of vitamins A and C and essential amino acids. Its acreage as a cultivated crop is growing and so is demand for its products. Its multiple uses, ease of propagation, and ability to thrive in harsh environments are all contributing factors. Due to its widespread use in medicine and agriculture, *Moringa* has received a lot of attention from ethnobotanists and conservationists of plant genetic resources. There are 13 species in the genus *Moringa*, but only *Moringa oleifera* has received research and development attention.

Traditional management of the plant by farmers in Southern Ethiopia was insufficient to meet the ever-increasing demand for *Moringa* products because they only included the tree in agricultural landscapes as a tree. To meet market demands, intensive management of the tree may be an appropriate option for increasing its productivity. To increase the plant's productivity, it may therefore be essential to evaluate and demonstrate various improved management practices. As a result, this research was started to figure out the best spacing for *Moringa stenopetala* production.

Plant Mortality

In some of the inner row plants, lower branches and leaves died as a result of the intense competition for essential growth factors like water, nutrients and sunlight at a narrower spacing. This could lower the survival rate. Increased competition has the same effect as a decrease in the concentration of growth factors. Additionally, a significant number of plants perished during this time. The plants were also monitored monthly during this time, which also coincided with the dry season. The close spacing relative to the other treatments may be to blame for this decline because of a decrease in growth factors and an increase in plant competition that resulted in the death of numerous plants. In addition, it suggests that excellent field management-including fertilization and watering-is required to supply the optimal amount of nutrients necessary to lessen plant competition. In the long run, this will guarantee sustainability and greatly reduce plant mortality.

The treatment spacings of 3 m x 3 m, 2 m x 2.5 m and 2 m x 2 m were significantly greater than the other three closer spacings (1640.1 gm, 1222 gm and 1270 gm per tree, respectively). However, there are studies that have not shown that *Moringa* biomass is affected by spacing. On the other hand, Norman and others' reports stated that, as long as the plant density is below the level at which plants compete with one another, increasing plant density does not affect individual plants. However, yield decreases when there is excessive plant density and plant competition. With increased planting density, yield per plant decreases as total biomass production per unit area rises. It has been chosen as one of the crops to target in the country's strategic goal of food self-sufficiency, income generation, poverty alleviation and socioeconomic growth. However, the use of too much nitrogen fertilizer results in low production and productivity.

Farmers should use the right amount of nitrogen fertilizer to boost plant height, spike length and fertile tiller grain weight because nitrogen fertilizer improves growth and yields. The difference between the amount of nitrogen needed by the crop and the amount of nitrogen in the soil that is available depends on how much organic matter has been mineralized and how much nitrogen remains from previous applications. For a successful, high-yielding barley crop, optimal nitrogen fertilization is necessary. The application of moderate amounts of nitrogen typically results in an increase in yield on soil with low N availability. Yield, protein content and lodging risk increase when soil nitrogen is applied at a high rate or at a high nitrogen level. Keeping a close eye on the application of fertilizer, particularly nitrogen, is effective in preventing lodging. The application of nitrogen at the right time is especially crucial in this setting. Applying the nitrogen in two or three parts to the crop plant as needed helps reduce lodging. However, outputs from tree products made up for the loss in yield and *Moringa*-maize intercropping systems are more financially viable than maize monocropping. Therefore, incorporating *Moringa stenopetala* and maize intercropping into farming systems in southern Ethiopia is a viable option for generating income and other benefits from *Moringa* plantings.

Socioeconomic Growth

Sugarcane is grown for commercial purposes because it contains more sucrose. Numerous studies have been conducted to develop sugarcane resistance to weeds and stemborers in order to preserve sucrose yields. By expressing glyphosate resistant genes (CEMB-GTGene) and borer resistant genes (CEMB-Cry1Ac and CEMB-Cry2A) under the control of No's terminator and maize ubiquitin promoter, this study addressed two issues by genetically manipulating sugarcane to make it resistant to both herbicides and insects. The cry proteins were evaluated using insect bio-toxicity assays to determine the percentage of shoot borers that died. In 80-day-old transgenic plants, 100% mortality rates were found, indicating that transgenic sugarcanes were highly resistant to shoot borers and had sufficient gene expression to fully resist target pests. Glyphosate spray assays were used to control weeds. In the V1 generation, 70%-76% of the transgenic plants were found to be glyphosate resistant (3000 ml/Ha), while in the V2 generation, 100% were found to be tolerant. As a result, the country's sugarcane yield will rise as a result of this transgenic sugarcane's successful resistance to stemborers and glyphosate herbicides. The fresh transgenic plant leaves were used to dip these sticks in total proteins. The expression of the transgenes was measured using ELISA. The leaf biotoxicity assay was used to determine the CEMB-Cry1Ac and CEMB-Cry2A endotoxins' toxicity effects on the leaves. Glyphosate was sprayed on the transgenic plants to confirm the expression and activity of the CEMB-GTGene.