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Cover Cropping's Effect on Soil Organic Carbon Fractions

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Description

The framers also produce this variety only during main cropping season even though irrigation water is available. Farmers should produce improved tomato variety at least two times per year using irrigation water to increase their production on their limited land. As tomato is being consumed, growers have to grow crops with high yield, good quality and well performed to their environment. Considering these problems, a field experiment was conducted at the Erer valley on farmers land during offseason of the two consecutive years to evaluate tomato varieties under irrigation water and recommend high fruit yielding variety to the area. The results revealed that there was a significant ($P \leq 0.05$) difference among varieties for plant height, days to flowering, fruits per cluster, clusters per plant, average fruit weight and fruit yield per hectare, except primary branches per plant. However, farmers preferred 'Melkashola' due to its fruit size and shape over 'Bishola' which is extreme in fruit size and was susceptible to sun scald. Therefore, 'Melkashola' was recommended to the area for its high fruit yield per hectare under irrigation during offseason cropping.

Soil Conditions

Tomato (*Lycopersicon esculentum* Mill.) is one of the most important edible and nutritious vegetable crops in the world. It ranks next to potato and sweet potato with respect to world vegetable production. It is widely cultivated in tropical, subtropical and temperate climates and thus ranks third in terms of world vegetable production. The leading tomato producing countries are China, the United State of America, India, Egypt, Turkey, Iran, Mexico, Brazil and Indonesia. A total of 7,255.93 hectares of land was under tomato in the country and yielding about 81,738.05 tons of tomato production in Ethiopia. Tomato is an essential ingredient in the diet of the people and often used in almost every household. It is used in preparing soups, sauces, stews, salads and other dishes and used in large quantities as compared to other vegetables. The fruit is fairly nutritious and contains high amount of vitamins A and C. Such diverse uses make the tomato an important vegetable in irrigated agriculture in Ethiopia and the production is rapidly increasing in many parts of the country. However, local production of tomato in Eastern Harerghe is not able to meet the domestic demand. This has led to high supply of tomato from other parts of the country. The landholding of Ethiopian farmers is so much fragmented with most farmers owning a piece of land less than a hectare. The rainfall pattern is so erratic and intensive throughout when it rains. Currently, it is being tried to harvest rain water using different water harvesting structures and using it in combination with gravity drip system. This is useful especially for vegetable production which can augment farmers' income and nutritional intake.

Tomato generally requires warm weather and abundant sunshine for best growth and development. The climatic soil conditions of Ethiopia allow cultivation of a wide range of fruit and vegetable crops including tomato, which is largely grown in the eastern and central parts of the mid- to low-land areas of the country. Large scale production of tomato takes place in the upper Awash valley, under irrigated and rain-fed conditions whereas small scale production for fresh market is a common practice around Koka, Ziway, Wondo-Genet, Guder, Bako and many other areas.

Ecological Distribution

The shortage of varieties and recommended information packages, poor irrigation systems, lack of information on soil fertility, diseases and insect pests, high postharvest loss, lack of awareness of existing improved technology and poor marketing system are the major constraints in Ethiopian tomato production. Therefore, it is important to evaluate different tomato varieties under irrigation during offseason to recommend high fruit yielding variety/varieties for the study area. Thus, the objective of this study was to evaluate performance of tomato varieties under supplemental irrigation and recommend the best performed variety.

The one variety is farmer's variety (Babile local). The study was conducted under irrigation for two consecutive years during offseason. Seedlings were raised in nursery beds at Erer valley; the beds were thoroughly prepared, 5 m x 1 m in size, raised 15 cm from the soil surface. The seeds were sown in rows spaced 10 cm apart and covered lightly with fine soil before irrigation. The beds were irrigated every two days until germination then twice a week. The treatments consisted of nine improved and one farmers (Babile local) tomato. The experimental plots were laid out in Randomized Complete Block Design (RCBD) with three replications. Tomato seedlings were carefully transplanted at 12 cm height to the prepared plots with 4 m x 1.8 m dimensions to accommodate 24 plants per plot at a recommended spacing of 100 cm x 30 cm between rows and plants, respectively. The varietal differences in growth and yield might be attributed to the differences in ecological distribution of the tomato varieties. Besides the differences of varietal genetic makeup, the low marketable yield obtained for some tomato varieties used might be due to non-development of flowers into fruits as about 50% of the flowers developed into fruits.

Tomato is one of the most widely accepted fruits in the world. As tomato is being consumed, growers have to grow crops with high yield, good quality and well performed to their environment. As indicated in the results there were significant differences among the varieties for all parameters, except average number of primary branches per plant. 'Melkashola' and 'Bishola' were increased fruit yield per hectare by about 40% and 35% over the 'Babile local'. However, farmers preferred 'Melkashola' due to its fruit size and shape over 'Bishola' which is extreme fruit size. Therefore, 'Melkashola' was recommended to the area for its high fruit yield per hectare under irrigation during offseason cropping. Furrow irrigation was applied weekly from pond through water pump. Standard agronomic practices such as weeding, cultivation, irrigation, fertilizer application and staking were carried out uniformly during the growing season for all plots. Fruit was harvested at the mature green stage. All quantitative data (days to 50% flowering, number of branches per plant, plant height (cm), number of bunches per plant, average number of fruits per bunches, average fruit weight (g), fruit yield per hectare (kg/ha)) were collected. Data were analyzed using GenSTAT statistical software package and mean values or Least Significant Differences (LSD) were compared using the procedures of Duncan's at the 5% level of significance.