

YIELD PARAMETERS OF SUNFLOWER AS INFLUENCED BY INORGANIC AND MICRONUTRIENT FERTILIZATION

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ABSTRACT

The experiments revealed that effect of 100 % RDF, 125% RDF, 150% RDF, 100% RDF+Soil application of micro nutrient @ 20 kg ha⁻¹, 125% RDF+ Soil application of micro nutrient @ 20 kg ha⁻¹, 150% of RDF + Soil application of micro nutrient @ 20 kg ha⁻¹, 100% of RDF + Foliar spray of micro nutrient @ 250 g ha⁻¹ at 25 & 45 DAS, 125% RDF + Foliar spray of micro nutrient @ 250g ha⁻¹ at 25 & 45 DAS, 150% RDF + Foliar spray of micro nutrient @ 250 g ha⁻¹ at 25 & 45 DAS on the yield attributes (total number of seeds capitulum⁻¹, number of filled seeds capitulum⁻¹, seed filling per cent, 100 seed weight and seed yield and stalk yield) favorably influenced by 150 % of RDF + Foliar spray of micro nutrient @ 250 g ha⁻¹ at 25 & 45 DAS this was followed by the treatment 125 % of RDF + foliar spray of micro nutrient @ 250 g ha⁻¹ at 25 & 45 DAS. the lowest value for yield attributes were recorded in control.

Keywords: Inorganic – Micronutrient – Yield of Sunflower.

INTRODUCTION:

Indian vegetable oil economy is the fourth largest in the world, accounting for about 14.5 percent of the world oil seed area and 6.65 per cent of the production and plays the second important role in the agricultural economy, next only to food grains in terms of area and production. In India oilseeds crop occupy an area of 32.4 million hectares with 28.2 million tones of production registering a productivity level of 1041 kg ha⁻¹. About 14 million persons are engaged in production and another one million in processing of oil seeds (Sonnad *et al.*,2011).In spite of cultivation of number of oilseed crops, country meets 50 per cent of its domestic requirements through import. One of the main reasons for this inadequate carrying capacity is their low productivity and stagnation or decline in area under principal oilseed crops such as, sunflower, rapeseed, mustard, and groundnut. Burgeoning population, improved living standard and purchasing power of people, the demand of vegetable oil in the country is increasing at the rate of about 4-6 per cent (Agarwal, 2007).To provide oilseeds to the exploding population, it is obligatory to produce double the present oilseed production of the country. Hence, there is an urgent need to augment oilseed production on sustainable basis to meet out the needs of the expanding demand. As chances of expanding the cultivation area under oilseeds at the cost of other field crops are limited, exploring viable and economical crop management strategies to enhance the per hectare productivity of individual oilseed crops might be suggestive and feasible approach. Sunflower (*Helianthus annuus* L.) hold great promise as an

oilseed crop because of its short duration, photo-in-sensitivity, and wide adaptability to different agro-climatic regions and soils types. Sunflower seed contains about 48-53 per cent edible oil. Sunflower oil is a rich source of linoleic acid (64%) which is good for heart patients. The oil is also used for manufacturing hydrogenated oil. The lower productivity of sunflower is mainly due to improper choice of cultivar, lack of improved agronomic management, its cultivation on marginal lands with inadequate nutrients leads to poor seed settings and also uses of inorganic fertilizers deteriorates soil health and which makes unproductive for next season. Among many factors responsible for its low productivity, the inadequate and imbalanced nutrition of essential nutrients is most important. The present investigation was conducted to evaluate the productivity of enhancement sunflower crop through nutrient management.

MATERIALS METHODS:

The field experiment was conducted in field number GL 6 at the experimental farm, Department of Agronomy Annamalai University, Annamalai Nagar, Tamil Nadu. The experimental farm situated at 11°24'N latitude and 79°44'E longitude at an altitude of +5.79m above mean sea level. The weather of Annamalai Nagar is moderately warm with hot summer months. The mean maximum temperature ranged from 32.60°C to 37.80°C with a mean of 35.27°C. The mean minimum temperature ranged from 24.00°C to 27.30°C with mean of 25.44°C. The mean relative humidity ranged from 72 to 87 per cent with a mean of 80.72 per cent and crop received a rainfall (290.2 mm) distributed over 20 rainy days. The experiment was laid out in Randomized block design with three replications with 10 treatments viz., (T1) - Control, (T2)- 100% RDF, (T3)- 125% RDF, (T4)- 150% RDF, (T5)- 100% RDF + soil application of micro nutrient @ 20 kg ha⁻¹, (T6)- 125% RDF + soil application of micro nutrient @ 20 kg ha⁻¹, (T7)- 150% RDF + soil application of micro nutrient 20 kg ha⁻¹, (T8)- 100% RDF + Foliar spray of micro nutrient @ 250 gm ha⁻¹, (T9)- 125% RDF + Foliar spray of micro nutrient @ 250gm ha enhancement of sunflower crop through nutrient management. (T10)- 150% RDF + Foliar spray of micronutrient @ 250 gm ha⁻¹ at 25 & 45 DAS.

RESULT AND DISCUSSION:

Among the various treatments combination 150% RDF + foliar spray of micro nutrient @ 250 g ha⁻¹ at 25 & 45 DAS (T10) recorded the maximum capitulum⁻¹ diameter of 20.85cm, the maximum mean total number of seeds capitulum⁻¹ (1040.65), the maximum mean number of filled seeds capitulum⁻¹ (925.63), highest percentage of filled seeds capitulum⁻¹ with 88.88, the maximum test weight of (5.9g), highest yield of 2195.3 kg ha⁻¹ and the highest stalk yield of 35556.48 kg ha⁻¹. This was followed by the application of 125% RDF + foliar spray of micro nutrient @ 250g ha⁻¹ at 25 & 45 DAS. The control registered the least diameter values 10.12cm, the least number of seed capitulum⁻¹ (448.15), the lower total number of filled seeds capitulum⁻¹ (217.65), the least percentage of filled seeds capitulum⁻¹ (48.56), the least test weight (4.92g), the lowest seed yield of 750kg ha⁻¹, the least stalk yield (1620.85kg ha⁻¹). These could be due to synergistic and cumulative effect of the integration of RDF and micro nutrient on sunflower. The increase in capitulum⁻¹ diameter could be due to better nutrient supplement and consequently efficient translocation of assimilates to the developing sink (capitulum⁻¹). The higher dose of NPK significantly recorded higher head

diameter. The present results are in conformity with the earlier reports Reddy and Raja Reddy. (2001) in sunflower crops. Similar report conformity with the Pragathi Kumar *et al.*, (2004). The foliar applied micro nutrient increased photosynthetic and enzymatic activity and an effective translocation of assimilate to reproductive parts result in higher yield (Sarkar Mallick, 2001). The increased leaf number, LAI, higher nutrient uptake and translocation of photosynthesis might be contributed to greater number of seeds capitulum⁻¹. These findings are in agreement with reports published on sunflower crops by Siddiqui *et al.*, (2009). This might be due to combined effect of foliar spray of micro nutrient along with readily available inorganic fertilizers. It could be attributed to better partitioning and translocation of photosynthesis to the sink, as earlier reported in crop by Vijay Kumar *et al.* (2001). The better metabolic activity might be due to the higher utilization of phosphorus in the presence of nitrogen, which in turn might have resulted in increased filled seeds per capitulum⁻¹. This findings are in conformity with results of Nawaz *et al.* (2003).

Table.1 Influence of inorganic and micronutrient on yield parameters and Yield of Sunflower

Treatment	Capitulum diameter(cm)	Total no.of seeds capitulum ⁻¹	No .of filled seeds capitulum ¹	Test weight (g)	Seed yield (kg ha ⁻¹)	Stalk yield (kg ha ⁻¹)
T1	10.12	448.15	217.65	4.92	750.13	1620.83
T2	11.83	723.38	511.21	5.13	1491.63	2670.18
T3	13.35	766.01	600.44	5.23	1610.86	2826.53
T4	14.31	818.37	659.07	5.34	1720.09	2978.18
T5	15.74	881.02	734.32	5.47	1830.65	3127.41
T6	16.39	907.54	762.32	5.55	1856.10	3168.97
T7	18.87	979.88	855.58	5.73	2034.34	3354.78
T8	16.98	937.99	793.13	5.61	1881.22	3210.53
T9	19.49	992.33	886.16	5.80	2062.88	3397.25
T10	20.85	1040.65	925.21	5.90	2195.30	3556.48
S.Ed	0.40	20.02	16.02	0.01	51.02	69.22
CD (P=0.05)	0.89	40.25	32.64	0.03	103.00	140.21

Conclusion:

Among all the treatment, application of 150% RDF+ foliar spray of micro nutrient @ 250g ha⁻¹ at 25 & 45 DAS has registered higher values of yield attributes and yield of sunflower. This was followed by application of 125% RDF + foliar spray of micro nutrient @ 250g ha⁻¹ at 25 & 45 DAS. The least values of yield attributes were recorded under the treatment control.

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