

# CGR AND RGR AS INFLUENCED BY INORGANIC AND FOLIAR APPLICATION OF MICRONUTRIENT ON GROWTH AND GROWTH ATTRIBUTES OF SUNFLOWER.

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## ABSTRACT

The influence of combined effect of 100% of RDF, 125% of RDF, 150% of RDF, 100% of RDF +soil application of micro nutrient @ 20 kg ha<sup>-1</sup>, 125% RDF+ soil application of micro nutrient @ 20 kg ha<sup>-1</sup>, 150% RDF + soil application of micro nutrient @ 20 kg ha<sup>-1</sup>, 100% RDF + Foliar spray of micro nutrient @ 250g ha<sup>-1</sup> at 25 & 45 DAS, 125% RDF+ Foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS, 150% RDF+ Foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25& 45 DAS on the growth character crop growth rate, relative growth rate and days to fifty per cent flowering of sunflower were studied. Among the treatments (150% RDF+ foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS) significantly increased the growth characters. This was followed by the treatment 125% RDF + foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS.

**Keywords:** Growth Attributes –Inorganic- Foliar Application-Sunflower.

## INTRODUCTION:

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<sup>-1</sup>. 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 expending 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 AND 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., (T<sub>1</sub>) - Control, (T<sub>2</sub>)- 100% RDF, (T<sub>3</sub>)- 125% RDF, (T<sub>4</sub>)- 150% RDF, (T<sub>5</sub>)- 100% RDF + soil application of micro nutrient @ 20 kg ha<sup>-1</sup>, (T<sub>6</sub>)- 125% RDF + soil application of micro nutrient @ 20 kg ha<sup>-1</sup>, (T<sub>7</sub>)- 150% RDF + soil application of micro nutrient 20 kg ha<sup>-1</sup>, (T<sub>8</sub>)- 100% RDF +Foliar spray of micro nutrient @ 250 gm ha<sup>-1</sup>, (T<sub>9</sub>)- 125% RDF + Foliar spray of micro nutrient @ 250gm ha . (T<sub>10</sub>) – 150% RDF +Foliar spray of micronutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS.

## RESULTS AND DISCUSSION:

Among the treatments application of 150% RDF+ foliar spray of micro nutrient @ 250g ha<sup>-1</sup>at 25 & 45 DAS (T<sub>10</sub>) recorded highest CGR of 10.11 and 4.53 gm<sup>-2</sup> day<sup>-1</sup> between 30-60 DAS and 60 DAS - harvest stage.(Table 1) The least crop growth rate was recorded with (T<sub>1</sub>) control (4.58 and 2.11 gm<sup>-2</sup> day<sup>-1</sup>). Among the various, integrated nutrient management practice tried, the application of 150% RDF +foliar spray of micro nutrient @ 250g ha<sup>-1</sup>at 25 & 45 DAS (T<sub>10</sub>) recorded maximum RGR values of 0.1189 and 0.1234 gm<sup>-2</sup> day<sup>-1</sup> between 30-60 DAS and 60 DAS- harvest stage. The least value of RGR was recorded in control (T<sub>1</sub>) viz., 0.1070 and 0.1117 gm<sup>-2</sup> day<sup>-1</sup> in the crop between, 30-60 DAS and 60 DAS- harvest stage. Among the treatment, application of 150% RDF + foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS 250 (T<sub>10</sub>) had recorded 56.52 days to fifty per cent flowering. In (T<sub>1</sub>) control days to fifty percent flowering had recorded values as 60.52.

All the growth components viz., CGR, RGR and days to fifty per cent flowering recorded an increased value than the recommended level of NPK. This finding is in conformity with the results of Ayad Shaker Saad and Mohammed. (2011) who obtained the maximum CGR, RGR, days fifty per cent flowering in sunflower by the application of higher levels of NPK. These similar inferences were documented by Chinnamuthu et al. (2004) and Murali Arthanari et al., (2009). An increase in the plant height and other

growth parameters with an increase in the doses of nitrogen may be attributed to the fact that nitrogen increases cell elongation as it is a constituent of many important compounds of plant (Bikas Mandal and Gajendra Geri. 2002). Similar result were also reported Reddi Ramu and Maheswara Reddy. (2004). The micronutrient foliar application might be attributes to the favorable influence of these nutrient on metabolism and biological activity its stimulating effect on photosynthetic pigment and enzyme activity which in turn encourage vegetative growth of plant (Michail et al., 2004.).

**Table.1. Influence of growth attributes through inorganic and foliar application of micronutrients in sunflower.**

Treatment	CGR ( $\text{gm}^{-2} \text{day}^{-1}$ )		RGR ( $\text{gm}^{-2} \text{day}^{-1}$ )		Days to fifty per cent flowering	Seed yield ( $\text{Kg ha}^{-1}$ )
	30DAS- 60 DAS	60 DAS- Harvest	30 DAS- 60 DAS	60 DAS- Harvest		
T1	4.58	2.11	0.1070	0.1117	60.52	750.13
T2	7.57	2.34	0.1139	0.1173	58.24	1491.63
T3	7.86	3.0	0.1148	0.1189	58.03	1610.86
T4	8.34	3.69	0.1158	0.1204	57.74	1720.09
T5	8.71	3.96	0.1167	0.1212	57.43	1830.65
T6	8.87	4.01	0.1169	0.1215	57.16	1856.1
T7	9.45	4.27	0.1179	0.1225	56.84	2034.34
T8	8.96	4.03	0.1171	0.1216	56.57	1881.22
T9	9.66	4.31	0.1182	0.1227	56.32	2062.88
T10	10.11	4.53	0.1189	0.1234	56.05	2195.3
S.Ed	0.09	0.07	0.0002	0.0004	0.12	51.02
CD (P=0.05)	0.22	0.18	0.0006	0.0008	0.25	103.00

**CONCLUSION:**

Among the treatments, application of 150%RDF+ foliar spray of micro nutrient @ 250 g ha<sup>-1</sup> at 25 & 45 DAS (T<sub>10</sub>) favourably increased the growth component viz., crop growth rate, relative growth rate and days to fifty percent flowering which resulted in increased seed yield as compared to other treatments during the season. This is followed by application of 125% RDF+ foliar spray of micro nutrient @ 250g ha<sup>-1</sup> at 25 & 45 DAS (T<sub>9</sub>). The least value for growth components were recorded under the treatment control (T<sub>1</sub>).

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