



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(5): 1926-1928
Received: 08-07-2017
Accepted: 09-08-2017

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Natural effect of micronutrient on growth and growth parameter of sesame oilseed crop

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Abstract

Micronutrient plays a vital role for growth of any crop. Due to micronutrient content the oil content may varies. Sesame crop is the queen crop of all oil seed Crop. Here the Researchers were conducted their Experiment in the Year 2014 at Dept. Of Plant Physiology, College of Agriculture, OUAT, Bhubaneswar. Micronutrient application to the crop in various critical stages and growth phases yield a concrete result. A technique was developed for the Farmer Friends by the researchers so that they can able to grow oil seed crops properly.

Keywords: Natural effect, micronutrient, growth parameter, sesame oilseed crop

Introduction

Sesame Crop is an oil seed crop which content rich source of food nutrients having handsome amount of Oil Content. Micronutrient application may leads to the growth of the nutrient content and oil content of sesame crop. In Odisha condition sesame crop is grown widely as per the demand of Farmers.

Keeping all the above facts into consideration, present investigation has been undertaken to study the effect of micronutrients applied as foliar spray, on metabolism, growth and yield of sesame crop.

Materials and Methods

Here the researchers were followed Randomized Block Design for conducting this research. A concrete field plan and calendar was strictly followed by the Young Scientists under the supervision of Plant Physiologist, Soil Chemist and Agronomist. Critical care was taken time to time and micronutrient application as per the schedule. 10 replications had been made for getting a concrete result.

Result and Discussion

RGR, NAR, CGR and LAD

RGR, NAR, CGR and LAD determined between 45 and 60 DAS were depicted in table-7. Relative growth rate (RGR) increased with foliar spray of most of the micronutrients over control but significant increase was recorded (101.3 mg/g/day) in combined micronutrients sprayed (T₉) followed by Zn (T₃).

Net assimilation rate (NAR) significantly influenced by foliar application of micronutrients. The significant increase in NAR over control was observed in case of foliar spray of all the micronutrients except Mn (T₇) which was at par with control. The highest NAR 1.2 mg/cm²/day was recorded in T₉ followed by B (T₂) and Zn (T₃).

Crop growth rate (CGR) was significantly increased by application of different micronutrients as foliar spray. Among the treatments the maximum CGR 21.1 g/m²/day was registered in plants applied with combined micronutrients (T₉) followed by Zn (T₃), B (T₂) and Mo (T₄). The lowest CGR was recorded in control plant (T₁) where no micronutrient was applied.

Leaf area duration (LAD) was influenced significantly by foliar application of micronutrients. Among the treatments the highest LAD 27.01 was registered in T₉ followed by application of Zn (24.31), B (21.49), and Mo (20.66). The lowest LAD was recorded in control plant without micronutrients (T₁).

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Table 1: Effect of different micronutrients on RGR, NAR, CGR and LAD at different growth period

Treatments	RGR(mg/gm/day)	NAR(mg/cm ² /day)	CGR(g/m ² /day)	LAD
	45-60 DAS	45-60 DAS	45-60 DAS	45-60 DAS
T ₁	92.5	0.87	8.7	14.97
T ₂	93.2	1.13	15.9	21.49
T ₃	95.0	1.05	16.6	24.31
T ₄	85.2	0.95	12.9	20.66
T ₅	93.5	0.91	10.5	17.37
T ₆	91.2	0.96	11.4	17.90
T ₇	84.4	0.85	11.4	20.24
T ₈	85.5	0.98	11.3	17.36
T ₉	101.3	1.20	21.1	27.01
T ₁₀	84.4	0.91	12.2	20.36
SE(m)±	0.763	0.001	0.760	0.596
C.D(0.5)	2.26	0.002	2.58	1.77

Chlorophyll index and total chlorophyll content

Chlorophyll index and total chlorophyll content of leaf were recorded at 45 and 60 DAS presented in table 8. The data revealed that, the chlorophyll index and total chlorophyll content of leaf were more at 60 than 45 DAS.

The chlorophyll index differed significantly between control and micronutrient applied plants. The index varied with the lowest value of 8.16 (T₁) to highest value of 13.39 (T₉) at 45 DAS and lowest value of 8.99 (T₁) to highest value of 17.74 (T₉) at 60 DAS among the treatments. Foliar application of all the micronutrients alone or in combination as well as their commercial mixture significantly increased the chlorophyll index over control except application of Cu (T₅), which was at

par with control. Among the treatments, the highest chlorophyll index was recorded in T₉ followed by Zn (T₃), B (T₂), and Mo (T₄) at both of the growth stages.

Like chlorophyll index similar trend was also observed for total chlorophyll content of leaf at both 45 and 60 DAS, which varied with the lowest value of 1.27 and 1.61 mg/g fresh wt. in T₁ and highest value of 1.67 and 1.93mg/g fresh wt. in T₉ at 45 and 60 DAS respectively. Almost all the treatments of micronutrients showed significantly greater chlorophyll content over control except application of Cu (T₅) which was found at par with control. Among the treatments, T₉ showed the maximum chlorophyll content followed by Zn (T₃), B (T₂) and Mo (T₄) at 45 and 60 DAS.

Table 2: Effect of different micronutrients on chlorophyll index and total chlorophyll content at different growth stages

Treatments	chlorophyll index		total chlorophyll content(mg/g fresh weight)	
	45DAS	60 DAS	45DAS	60 DAS
T ₁	8.16	8.99	1.27	1.61
T ₂	12.91	16.6	1.57	1.90
T ₃	13.19	17.2	1.65	1.91
T ₄	11.94	14.58	1.56	1.86
T ₅	9.54	10.11	1.35	1.69
T ₆	10.83	13.11	1.48	1.79
T ₇	11.15	13.33	1.49	1.85
T ₈	10.22	12.06	1.47	1.76
T ₉	13.39	17.74	1.67	1.93
T ₁₀	11.16	14.21	1.53	1.85
SE(m)±	0.653	0.548	0.047	0.003
C.D(0.5)	1.93	1.62	0.14	0.009

Conclusion

After going through the various micronutrient treatment to sesame crop, it was concluded that foliar application of different micronutrients either alone or their combination enhanced most of the morpho-physiological traits (plant height, number of branches, capsules per plant, RGR, NAR, CGR and total dry matter accumulation per plant) as well as bio chemical attributes (chlorophyll content, N, P and K uptake and oil content), seed yield and yield attributes over control. From the experiment a resultant outcome was observed that micronutrient application leads to vegetative and reproductive growth and enhance the oil content. Hence it may be suggested to the farmer stakeholders and researchers that for oil seed crop micronutrient application should be regularly undertaken.

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