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RESEARCH ARTICLE

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Effect of foliar spray of growth retardants and nutrients on growth and yield of sorghum (*Sorghum bicolor.* Moench)

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ABSTRACT

A field experiment was conducted during *Rabi* 2009 at college of agriculture farm Bheemrayangudi, under rain fed conditions. To know the effect of foliar spray of growth retardants and nutrients on growth and yield in *Rabi* Sorghum (*Sorghum bicolor.* Moench) Application of KNO_3 -1% significantly increased the grain yield (1403.4kg/ha) as compared to control (945.0kg/ha) and plant growth retardants spray.The increase in the yield due to KNO_3 spray may be attributed to improvement in the yield parameters *viz.,* ear head weight and length, HI,100 seeds weight, and seed yield per plant. Among the plant growth retardants spray, significantly higher grain yield and yield attributes were recorded with lihosin 400 spray (1184.3 kg/ha) followed by CCC- 200 ppm spray(1154.4kg/ha) over control (945.0 kg/ha). It may be attributed to primary effect of lihosin on restructuring of plant so as to produce optimum photosynthetes and improving the source -sink relation there by improvement in the yield. which was evident from significantly increased 100-seed weight, ear head length and weight and seed yield per plant.

KEY WORDS : Source sink CCC, Lihosin, *Rabi* Sorghum, KNO_3

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INTRODUCTION

In India, sorghum(*Sorghum bicolor.* Moench) is an important grain and fodder *Rabi* crop and is grown in postrainy seasons on vertisoils. Postrainy sorghums are very crucial for food and fodder security in the drought prone areas of Maharashtra, Karnataka and Andhra Pradesh states of India as there is no alternative cereal grown during this season, The grain productivity of post rainy sorghum in India is very low 477 kg ha One of the reason for low productivity may be terminal drought due receding soil moisture situation. As a consequence, plant experiences progressively increasing degree of terminal moisture stress. Thus soil moisture stress assuming a major limiting factor for determining the growth and yield. Therefore, there is a need to identify suitable ameliorative measures to overcome the moisture stress effect. It is well established fact that exogenous application of PGRS and nutrients modifies the plant structure so as to improve the source and sink relation there by improvement in the yield under stress conditions. Keeping these views, the investigation was under taken to study the effect of foliar spray of growth retardants and KNO_3 on growth and yield in sorghum.

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MATERIALS AND METHODS

A field experiment was conducted during *Rabi* 2009 at College of Agriculture farm Bheemrayangudi, under rain fed conditions. The trial was laid out in RBD with three replications. There were 9 treatments including control, water spray and KNO_3 -1% spray. Plant growth retardant CCC (50,100 and 200ppm) and lIhosin(100,200 and,400ppm) were studied at three different concentration. M-35-1 cultivar was used for the study and the treatments were imposed at 45 DAS of the crop. The plant height was recorded from base of the plant to tip of the main stem. Total dry matter and its distribution in leaf, stem and reproductive parts, ear head weight and length , test weight, seed yield per plants were worked out from the tagged five plants and average was computed and presented in Table 1 and 2.

RESULTS AND DISCUSSION

The application of KNO_3 -1% significantly increased grain yield (1403.4kg/ha)over Control (945.0kg/ha) over all other treatments of plant growth retardants spray The increase in the yield due to KNO_3 spray may be attributed to improvement in the yield parameters *viz.,* ear head weight and length, HI, 100seeds weight and seed yield

Table 1 : Influence of plant growth regulators and nutrients on growth components of sorghum

Treatments	Plant height (cm)	Stem girth (cm)	Dry wt. of vegetative parts (g. plant^{-1})	Ear head length (cm)	Leaves per plant	Total dry matter (g. plant^{-1})
T_1-CCC-50ppm	272.6	1.45	125	17.9	2.9	172.2
T_2- CCC-100ppm	265.0	1.32	146	18.1	3.1	177.0
T_3-CCC-200ppm	261.1	1.31	105	19.3,	3.9	157.3
T_4-Llihosin 100ppm	274.4	1.49	118	17.9	2.9	163.2
T_5- Lihosin 200ppm	267.1	1.39	136	18.7	3.2	187.0
T_6 -Lihosin 400ppm	257.9	1.53	122	18.9	3.7	177.2
T_7 – KNO_3-1%	277.2	1.43	152	18.8	3.5	206.1
T_8- Water spray	271.4	1.20	119	17.5	3.0	165.9
T_9-Control	273.6	1.35	120	17.6	2.7	168.3
S.E. ±	5.9	0.05	10	0.32	0.28	8.77
C.D. (P=0.05)	NS	0.14	NS	1.0	NS	26.3

NS=Non-significant

Table 2 : Effect of plant growth regulators and nutrients on growth and yield of sorghum

Treatments/	Ear head length (cm)	Ear head weight (g. plant^{-1})	Seed weight (g. plant^{-1})	100 seeds weight (g)	Harvest index (%)	Yield (kg ha^{-1})
T_1- CCC 50ppm	17.9	47.4	37.7	2.48	22.0	983.2
T_2- CCC 100ppm	18.1	51.6	45.2	2.43	25.6	1025.6
T_3- CCC 200ppm	19.3,	52.0	39.6	2.64	23.1	1154.7
T_4- Lihosin 100ppm	17.9	44.8	35.5	2.36	22.2	964.2
T_5- Lihosin 200ppm	18.7	51.3	41.9	2.78	22.6	1049.4
T_6 -Lihosin 400ppm	18.9	53.0	43.2	2.86	24.2	1184.3
T_7 – KNO_3-1%	18.8	54.3	52.9	2.99	25.8	1403.4
T_8- Water spray	17.5	46.7	34.8	2.37	21.2	1053.5
T_9-Control	17.6	46.3	35.6	2.37	21.1	945.0
S.E.±	0.32	1.94	2.9	0.13	1.67	57.8
C.D. (P=0.05)	1.0	5.8	12.1	0.39	NS	173.2

NS=Non-significant

per plant. Further significant increase in the total dry matter accumulation and plant height was also recorded with KNO_3 1% spray. Thus it indicates that spray of $KNO_3$1% which supplies N and K which are effectively absorbed as anion and cation by plants, and might have delayed the senescence and promoted cytokinin activity, causing higher chlorophyll retention. This may secure higher photosynthetic activity in effective leaves and supplied to developing ear heads with current photosynthates for proper filling, resulting in higher yield. Besides increasing photosynthetic activity and effective translocation of assimilates to reproductive parts. Similar results were reported by Sarkar and Malik (2001) in grass pea, who reported improvement in yield and yield attributes due to KNO_3 spray.

Among the plant growth retardants spray, significantly higher grain yield and yield attributes were recorded with lihosin 400 spray (1184.3)followed by CCC 200 ppm spray(1154.0) over control. (945.0) This may be due to an inhibition of vegetative growth and thus making availability of food reserves for developing grains which was evident from significantly increased 100 seed weight, ear head length and weight and seed yield per plant. The reason is that yield depends on accumulation of photo assimilates and partitioning in different parts of plant. The growth retardants are capable of redistribution of dry matter in plants thereby bringing improvement in yield The similar results were reported in Potato by Hasan *et al.* (1989), who reported improvement in the yield and tuber size on spray of mepiquat chloride.

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