The Andhra Agric. J 57(1):107-108, 2010

Sulphur and Zinc Nutrition in Bt Cotton

Key words : Bt cotton, SulphoZinc, Seed Cotton Yield, Staple Length

Intensive cultivation of high yielding crop varieties, extensive use of fertilizers and non-application of organic manures are the reasons for micronutrient deficiencies in many crops. Sulphur containing important amino acids are necessary for chlorophyll formation. Zinc is also vital for the oxidation process in plant cells and helps in the transformation of carbohydrates and regulation of sugar in plants. Synergistic and antagonistic effect of S and Zn were reported by Bahl *et al.* (1986) and Shukla and Prasad (1979), respectively in groundnut. With introduction of Bt cotton, micronutrient deficiency complaints are increasing. Hence, an attempt was made to study the effect of S and Zn on growth, yield attributes and seed cotton yield of Bt cotton under irrigated condition.

The experiment was conducted during the *Kharif* season of 2007-08 at Regional Agricultural Research Station, Warangal on sandy loam soil having pH 7.2, Ec 0.20 dsm^{-1}, organic carbon 0.37 %, medium in available phosphorus and high in potassium. The experiment was laid out in a 3 time replicated randomized block design having 7 treatments (Table). The recommended level of nitrogen (120 kg ha^{-1}), phosphorus (60 kg ha^{-1}) and potash (60 kg ha^{-1}) was applied to the crop. Bt cotton hybrid Mallika was sown on 22.06.2007 adopting an inter- and intra-row spacing of 90 x 60 cm. For Sulphur and Zinc requirement Gromor SulphoZinc was used. Gromor SulphoZinc contains 65 % elemental Sulphur and 22.5 % of zinc oxide (containing 18 % Zinc). As per the treatments SulphoZinc, Zinc sulphate and Elemental Sulphur were applied basally. P was applied in the form of DAP. Cotton crop received uniform cultural practices during the course as per recommendation. A total precipitation of 878 mm spread over in 63 rainy days was received during the crop growth period. Crop was irrigated during boll maturity and boll bursting stages. The seed cotton yield and other yield attributing parameters *i.e*. number of monopodia / sympodia / boll number $plant^{-1}$, boll weight and staple length were recoded at harvest.

The mean data on yield attributes, yield and staple length are presented in Table. Number of monopodia and sympodia $plant^{-1}$ significantly not influenced by Sulphur and Zinc fertilizers. The treatments were at par in respect of monopodia and sympodia. These results are in contrast to the findings of Brar *et al.,* (2008), where increased monopodia and sympodia were recorded with application of 5 kg Zinc ha^{-1} over no application.

Boll number $plant^{-1}$ was significantly not influenced by Sulphur and Zinc fertilizers in cotton. Lower boll number (T_6–39.83) was recorded with 25 kg ha^{-1} elemental Sulphur application, where as elemental Sulphur (15 kg ha^{-1}) + Zinc sulphate (21.25 kg ha^{-1}) application resulted in higher boll number (T_7–49.83). Application of NPK only (T_1) resulted in 45.8 bolls per plant. Boll weight was significantly not influenced by Sulphur and Zinc fertilizer application. Application of different sources of Sulphur and Zinc in varied quantities significantly not influenced seed cotton yields. Numerically higher seed cotton yield (3646 kg ha^{-1}) was recorded in Sulphur (15 kg ha^{-1}) + Zinc sulphate (21.25 kg ha^{-1}) applied treatment (T_7) followed by no application of Sulphur and Zinc (T_1- 3493 kg ha^{-1}). Staple length was not significantly influenced by Sulphur and Zinc fertilizer application. Positive response of Sulphur in mustard (Rana *et al.,* 2005), groundnut (Singh *et al.,* 2005) and Sugarcane (Shukla and Lal, 2004) were reported, but the same was not observed in Bt cotton.

An overall consideration of the results shows no response to Sulphur and Zinc fertilizer application in Bt cotton cultivated in sandy loam soils.

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Table. Number of monopodia, sympodia and boll number plant^{-1}, boll weight (g), seed cotton yield (kg ha^{-1}) and staple length (mm) as influenced by sulphur and zinc fertilizers in Bt cotton.

Treatment	No. of monopodia plant^{-1}	No. of sympodia plant^{-1}	Boll number plant^{-1}	Boll weight (g)	Seed cotton yield (kg ha^{-1})	Staple length (mm)
T_1– NPK only (120:60:60kg ha^{-1})	1.94	27.67	45.8	4.85	3493	31.54
T_2– NPK + 12.5 kg ha^{-1} SulphoZinc	1.88	28.38	43.9	4.87	3378	31.76
T_3– NPK + 25 kg ha^{-1} SulphoZinc	1.90	28.73	45.5	4.85	3441	30.16
T_4– NPK + 37.5 kg ha^{-1} SulphoZinc	1.86	28.37	40.4	4.80	3022	32.45
T_5– NPK + 25 kg ha^{-1} Zinc sulphate	1.83	29.87	46.2	4.88	3386	31.26
T_6– NPK + 25 kg ha^{-1} Elemental Sulphur	1.89	28.72	39.8	4.81	3257	31.45
T_7– NPK + 15 kg ha^{-1} Elemental Sulphur+ 21.25 kg ha^{-1} Zinc sulphate	1.85	29.39	49.8	4.79	3646	31.81
S Em ±	0.05	1.17	2.6	0.11	285	0.39
CD (p = 0.05)	NS	NS	NS	NS	NS	NS

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(Received on 08.10.2008 and revised on 27.10.2009)