1728 Effect of solubor foliar spray on yield and quality of cotton

Dr. Sanganabasappa Angadi , University of Agricultural Sciences, Dharwad, India
Dr. Basavaraj Patil , University of Agricultural Sciences, Dharwad, India
Mr. Mahantesh Mudenoor , University of Agricultural Sciences, Dharwad, India
Dr. Basavaraj Yenagi , University of Agricultural Sciences, Dharwad, India
Mr. Manjunath Hongal , University of Agricultural Sciences, Dharwad, India
Mr. Kantesh Gandolkar , University of Agricultural Sciences, Dharwad, India

Cotton is an important commercial crop grown extensively in India under rainfed as well as in irrigated ecosystem. Cotton occupies an area of 9.16 m.ha with the production of 270 lakh bales. However, the productivity is significantly lower (501 kg/ ha) as compared to world average. The decline in cotton productivity is mainly due to retention of less number of squares, flowers and bolls and in turn affected cotton productivity. Among several constraints, micronutrients play an important role in changing growth and physiological characteristics of cotton. Boron (B) has been universally recognized as the most important micronutrient for cotton production. Its deficiency in cotton may cause small, deformed bolls; poor fruit retention; and reduced lint yields. Relatively small amounts of B are required to support the processes of growth and development of cotton fibers in the boll. The information pertaining to use of boron as foliar spray is not common among the farmers. Thus the trial was conducted to demonstrate Solubor, a high Boron containing product for increased yield and quality of cotton. MATERIALS AND METHODS

Field experiment was conducted at Agricultural Research Station, Malnoor, University of agricultural Sciences, Dharwad, Karnataka, India, under irrigation in medium deep black soil. The soil chemical properties of experimental site viz., pH (7.95), EC (0.25 dS/m), Available Nitrogen (180 kg/ha), Available P_2O_5 (12.60 kg/ha), Available K_2O (480 kg/ha) and hot water soluble boron (0.56 ppm) were analyzed following the standard methods (Page *et al.*, 1982). The treatments were laid-out in randomized complete block design with three replications and crop was supplied with the Recommended Dose of Fertilizer (120: 60: 60 N: P_2O_5: K_2O kg/ha). Solubor was sprayed thrice as per the treatments (Table 1) over an area of 18.90 m^2 at 15 days interval from square formation stage onwards. The observations on number of flowers formed and dropped per plant, number of bolls formed and dropped per plant, yield (q/ha) and quality parameters of cotton were recorded. RESULTS AND DISCUSSION

The number of flowers formed per plant did not show significant difference. Whereas, number of flowers dropped per plant differed significantly. Number of flowers dropped was low (3.53 to 4.6 flowers/ plant) in solubor and borax treated plots as compared to control (8.20 flowers dropped/ plant). However number of flowers dropped per plant were on par with each other due to spray of solubor and borax at all the doses. Similarly, number of bolls formed per plant did not show significant difference. Whereas, the number of bolls dropped per plant differed significantly. The number of bolls dropped per plant was significantly lower (2.46) with foliar spray of solubor @ 1.125 g per l of water, which was on par with spraying borax @ 2.714 g per l (3.00) and @ 2.036 g per l (3.20). The results are in conformity with the findings of Rosolem and Costa (2000).

Cotton yield differed significantly at any level of solubor and borax spray. Higher cotton yield (24.52 q/ha) was obtained by spraying solubor @ 1.125 g per l of water as compared

to the rest of the treatments. The yield increased is attributed to increased photosynthetic rate and better translocation of photosynthates from source to sink (Duli zhao and Derrick, 2003).

Similarly, the effect of solubor on quality of cotton is furnished here

1. Mean fibre length: staple length was not influenced significantly with the different levels of solubor and borax spray.
2. Uniformity ratio: foliar application has no considerable influence on uniformity ratio. In general the uniformity ratio was average to good.
3. Fibre fineness: solubor at all levels of application has improved the fibre fineness over borax spray and control. The micronaire values ranged between 3 and 3.9 (fine quality).
4. Maturity co-efficient: Borax @ 2.714 g per plant resulted in higher maturity co-efficient (79.41%) over control and other levels of borax and solubor. Maturity co-efficient are classified under average maturity.
5. Trash: Non-lint content was 2 per cent and it is classed under II grade.

Application of borax @ 2.714 g per l and also solubor at all levels improved fibre length and maturity co-efficient, which can be attributed to better translocation of photosynthates from source to sink. The results are in conformity with the findings of Christos Dordas (2006).

The results obtained indicate that, solubor spray (1.125 and 1.875 g/l) improved the cotton yield by reducing flower and boll drop as compared to control and borax spray. The quality of cotton was not much influenced by foliar application. REFERENCES

Christos Dordas, 2006. Foliar boron application affects lint and seed yield and improves seed quality of cotton grown on calcareous soils. Nutrient Cycling in Agroecosystems, **76 (1):** 19-28.

Duli Zhao and Derrick M. Oosterhuis. 2003. Cotton Growth and Physiological Responses to Boron Deficiency. J. of plant nutr., **26(4):** 855-867.

Page, A.L., R.H. Millar, and D.R. Keeney. 1982. Methods of soil analysis Part-2. American Society of Agronomy/ Soil Science Society of America, Madison, WI, USA

Rosolem, C. A. and A. Costa. 2000. Cotton growth and boron distribution in the plant as affected by a temporary deficiency of boron. J. of plant nutr., **23(6):** 1-2.

Table-1: Response of cotton hybrid (NHH-44) to foliar application of solubor

Treatments	**No. of flowers formed/ plant**	**No. of flowers dropped/ plant**	**No. of bolls formed/ plant**	**No. of bolls dropped/ plant**	**Yield (q/ha)**
T1 – Control (RDF only)*	53.76	8.20	40.42	4.93	18.10^{b}
T2 – T1+solubor spray @ 1.5 g/l of water	53.86	4.00	46.46	3.73	20.73^{ab}
T3 – T1+solubor spray @ 1.875 g/l of water	53.00	3.53	47.26	3.46	23.00^{ab}
T4 – T1+solubor spray @ 1.125 g/l of water	53.66	4.26	47.60	2.46	24.52^{a}
T5 – T1+Borax spray @ 2.714 g/l of water	52.80	4.20	45.00	3.00	22.32^{ab}
T6 – T1+Borax spray @ 3.393 g/l of water	53.60	4.00	45.60	3.60	21.65^{ab}
T7 – T1+Borax spray @ 2.036 g/l of water	52.66	4.60	47.66	3.20	21.93^{ab}
S.Em±	1.60	0.567	1.99	0.286	
CD (0.05)	NS	1.748	NS	0.881	

* RDF: Recommended Dose of Fertilizer

* Yield was analyzed in DMRT

Table-2: Effect of solubor on quality parameters of cotton hybrid (NHH-44)

Treatments	**Span 2.5% (mm.)**	**Length 50% (mm.)**	**Mean (mm.)**	**Length (inch)**	**Uniformity ratio**	**Fineness (micronaire)**	**Maturity co-efficient**	Trash
T1 – Control (RDF only)*	23.04	10.42	21.30	27/32	45.22	3.17	75.70	2.0
T2 – T1+solubor spray @ 1.5 g/l of water	23.43	10.79	21.60	27/32	46.08	3.16	74.76	2.0
T3 – T1+solubor spray @ 1.875 g/l of water	23.18	10.70	21.30	27/32	46.36	3.05	77.04	2.0
T4 – T1+solubor spray @ 1.125 g/l of water	24.02	10.89	22.10	28/32	45.35	3.07	74.10	2.0
T5 – T1+Borax spray @ 2.714 g/l of water	23.46	11.14	21.90	28/32	47.49	3.40	79.41	2.0
T6 – T1+Borax spray @ 3.393 g/l of water	23.41	10.56	21.60	27/32	45.13	2.82	69.14	2.0
T7 – T1+Borax spray @ 2.036 g/l of water	23.39	11.18	21.60	27/32	47.80	3.15	74.60	2.0

* RDF: Recommended Dose of Fertilizer