



Cotton Micronutrient Management and Precautions for Foliar Spray

A. Manikandan and Rachana Deshmkh

Micronutrients are nutrient elements that are essential for crop growth and their requirement is in small quantities compared to major nutrients such as nitrogen, phosphorus and potassium. Micronutrients include zinc, iron, copper, manganese, boron, molybdenum and chlorine. These are generally not applied and therefore the crop has to depend on the soil for meeting crop demand. Cultivation of high yielding hybrids with heavy nutrient requirements is leading to deficiencies. Most commonly reported micronutrient deficiencies are zinc and boron in cotton. The best strategy to overcome the nutrient deficiencies is to adopt balanced fertigation and applying fertilizers on the basis of soil test. Secondly, it is important to regularly apply organic manures such as farm yard manure, compost, vermicompost.

In situation, where nutrient deficiency symptoms are visible in the crop foliar spray is resorted to. Foliar spray of plant nutrients is target oriented and is basically done to correct a nutrient deficiency. One or two nutrient foliar spray may be needed during cropping season in case no soil application is done. Application of nutrients both as basal dose through soil application and mid-season foliar spray has synergistic effect on yield. For foliar spray, approximately 400-500 litre spray volume is required for one hectare and the maximum permissible limit is 0.5 – 1.0 %. In general micronutrients are applied as sulphates of Zn, Mn, Mg and borax or boric acid for B requirement. Before application, the recommended quantity of micronutrient fertilizers are mixed and ground well into fine size. The spray solution must be clear and transparent. In rainfed areas of Maharashtra state, micronutrient requirement of cotton met by foliar spray. They enhance plant growth attributes such as square and flower initiation, boll setting and development. Wise use of foliar spray of micronutrients (low rate at square and flower initiation; moderate rate at boll initiation; high rate at boll development) improved the effectiveness in sustainable cotton production. It is necessary to follow interval of 2 weeks between two spray. In cotton, foliar spray of micronutrients (Zn-2500g, B-1000g, Mn-2500g and Fe-2500g per 500 litre of water) is often preferred during square (45 DAS) flowering stage (60 DAS) and boll development (90 DAS).



Fig. 1. Micronutrient foliar spray- pH toxicity symptoms of cotton

Foliar spray of fertilizers under high relative humidity uptake of nutrients is maximum. The pH of spray solution should be neutral (6.5 to 7.0) to avoid plant injury. Toxicity symptoms such as brown isolated spots on leaves and stalk (Fig. 1). Salt burning and scorching of leaves are common. The pH of the micronutrient spray solution can be adjusted by using 0.25% of lime (1250gm of calcium hydroxide/ 500 litre of water). The pH of foliar solution mixtures of micronutrient is either acidic or alkaline. Chelated micronutrient is good alternative to micronutrient mixture for soil application and not as foliar application. Chelating agents comprise of Fe, Mn, Zn and Cu. Imbalance use of fertilizers and foliar spray at improper stage can cause injury to leaves and stalks. High nutrient concentration or unbuffered nutrient solutions causes burning symptoms on plant phenology.

Some precautionary measures to be followed are

Do's:

1. Quantity need to be followed strictly as per the recommended rate.
2. Proper mixing of micronutrient fertilizers is required before spray
3. Right stage of foliar application is amenable – After vegetative period (40-45 DAS).
4. Time of spray must be carried out: at early morning 6-9 am or late evening (5-7pm) in cool air.
5. Sprayer and its parts like spray nozzle, spray tank should be tide and clean.
6. Spray solution should be transparent.
7. Deficiency symptom of specific nutrient rectified by 3 spray or more

Don'ts:

1. Don't spray before establishment of crop.
2. Don't use any oxidized salts.
3. Don't combine with water soluble macro nutrient fertilizers (Like Urea, DAP, etc)
4. Don't mix with any herbicides (Like Glyphosate, etc) and plant growth regulators (PGRs).
5. Don't spray in abnormal weather conditions (Rain and after noon hours when high temperature).

Meetings/Seminar/ Workshop/ Symposia attended

- Dr. S.M. Wasnik, Principal Scientist, Extension attended Rural Advisory Programme Committee Meeting of All India Radio on March 29th November 2018 at Akashwani, AIR, Nagpur. Lists of scientists and topics for broadcasting during the next quarter period January –March 2019 was supplied to programme organizer for including scientists & topics
- Dr. Jayatn H. Meshram, Senior Scientist (Plant Physiology), ICAR-CICR, Nagpur attended International Cotton Advisory Committee (ICAC) – Research Associate Programme-2018 on “Best Production Practices for Yield Enhancement” under supervision of Dr. K. R. Kranthi, Head Technical Information Section, ICAC conducted between September 10-20, 2018 at the International Cotton Advisory Committee (ICAC), Washington D.C, USA.



*Left: Kai Hughes, Executive Director, ICAC, Washington DC, USA
Middle: Dr. J. H. Meshram, Sr. Scientist, ICAR-CICR, Nagpur
Right: Dr. Keshav Kranthi, Head, Technical Information Section, ICAC, Washington DC, USA*



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ICAR-Central Institute for Cotton Research
Post Bag No. 2, Shankar Nagar PO, Nagpur 440010
Phone : 07103-275536; Fax : 07103-275529;
email: cicrnagpur@gmail.com, director.cicr@icar.gov.in