Effect of Foliar Spray and Soil Application of Boron on Performance of Mateera in the Arid Region

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The native crops like *mateera* support livelihood in the hostile climatic conditions where vegetable crop diversification is not much feasible. However, limited attention was paid for its nutrient management and other crop production aspects. *Mateera* requires hot and dry climate and a long growing season preferably with warmer days for cultivation both as rainy and summer season crop.

Boron applications have been reported to promote flowering, fruit set and yield in some fruit trees (Hanson et al., 1985; Nyomora et al., 1999; Perica et al., 2001; Usenik and Stampar, 2007). Boron has a role in pollen germination and growth, however it does not completely explain the increased fruit set and yield. Boron also plays a role in female reproductive organs. A possible mechanism is that after accomplishing its role of stimulating pollination and fertilization, boron is required for retention of fruitlets, possibly by influencing sink strength of the developing embryo through auxin-mediated events. Thus, the accumulation of carbohydrate in the flowering shoots is enhanced and it is utilized for fruit set (Nyomora et al., 2000; Jutamanee et al., 2002). Foliar boron application is an efficient way to increase the boron content of fruit trees and boron uptake of leaf surfaces is higher than that of fruits (Peryea, 1994). Foliar treatments are more effective under dry conditions due to the low root absorption rates from dry soils (Rufat and Arbones, 2006). Response to boron application seems to be related to different factors such as environmental conditions, species, cultivars, cropping level, fruit size, time of application and nutrient status (Nyomora et al., 1999; Usenik and Stampar, 2007).

In olives, foliar boron applications made immediately prior to flowering or during the period of floral bud initiation significantly increased fruit set and yield (Perica et al., 2001). In almonds, however, boron should be applied immediately postharvest (in September) for optimal effect on tissue boron concentration, fruit set and yield in the following season (Nyomora et al., 1999). In the fall, applications of boron appear to move from leaves to flower buds in the fall and into flowers during the following spring (Hanson et al., 1985).

The objective of this study was to determine the effect of foliar applied boron on fruit set and quality of mateera under the arid climatic conditions of the north western Rajasthan.

Keeping in view, a field experiments was conducted at ICAR-CIAH, Bikaner research farm with *mateera* cultivars "Thar Manak" during 2014 in the *kharif* season to investigate the effect of boron application on *mateera* crop. The *mateera* crop received differential doses of different boron as per schedule of treatments. The six treatments consisting of control, 50 ppm boron foliar application at 25, 35 and 45 days, 100 ppm boron foliar application at 25, 35 and 45 days, 2 kg/ha borax soil application at time of planting, 4 kg/ha borax soil application at time of planting and 6 kg/ha borax soil application at time of planting were replicated 3 times in a randomized block design. Crop was raised as per standard packages and practices of *mateera*. supplementary irrigation was applied in furrow as and when required.

Application of boron had significant effect on yield of *mateera*, TSS and average fruit weight of *mateera* (**Table 1 and fig. 1, 2, 3**). Spray of 100 ppm boron foliar application at 25, 35 and 45 days gave maximum fruit yield (312 q/ha) followed by 50 ppm boron foliar application at 25, 35 and 45 (297 q/ha) as compared to control which was 223 q/ha yield. Maximum TSS and dry matter pertcent (9.32% and 5.96%) were recorded where 6 kg/ha borax soil application at time of planting was applied. Same trend was observed for percent yield response of different treatments as observed in yield. Maximum percent yield response (40.13%) was observed when 100 ppm boron foliar application at 25, 35 and 45 days were applied followed by 50 ppm boron foliar application at 25, 35 and 45 days (32.99) as compared to control, whereas, application of 2 kg/ha borax soil application at time of planting gave minimum percent yield response (10.34%) followed by 4 kg/ha borax soil application at time of planting (19.55%) as compared to control. This may be due to more fruit set/plant and more partitioning of carbohydrate to *mateera* as a result of balance nutrition in the treatment receiving boron application. Similar result were reported when

applications of foliar boron alone or together with some micro nutrients such as iron and zinc have been suggested to increase fruit set, yield and nut quality in hazelnuts (Painter and Hummer, 1964; Shresta et al., 1987; Solar and Stampar, 2001; Tous et al., 2005; Olsen, 2007).

The result showed that spray of 100 ppm boron foliar application at 25, 35 and 45 days followed by 50 ppm boron foliar application at 25, 35 and 45 days alongwith recommended dose of NPK and micronutrients is helpful in the production and quality of *mateera* in the sandy soils of hot arid region.

Table Effect of boron application on performance of mateera

Treatmants	Yield (q/ha)	TSS	% DM	DM yield (q/ha)
Control	223	8.33	6.00	13.38
50 ppm boron foliar application at 25, 35 and 45 days	297	9.73	5.20	15.42
100 ppm boron foliar application at 25, 35 and 45 days	312	8.65	5.14	16.06
2 kg/ha Borax soil application at time of planting	246	8.74	5.40	13.29
4 kg/ha Borax soil application at time of planting	267	9.05	5.86	15.62
6 kg/ha Borax soil application at time of planting	280	9.32	5.96	16.68

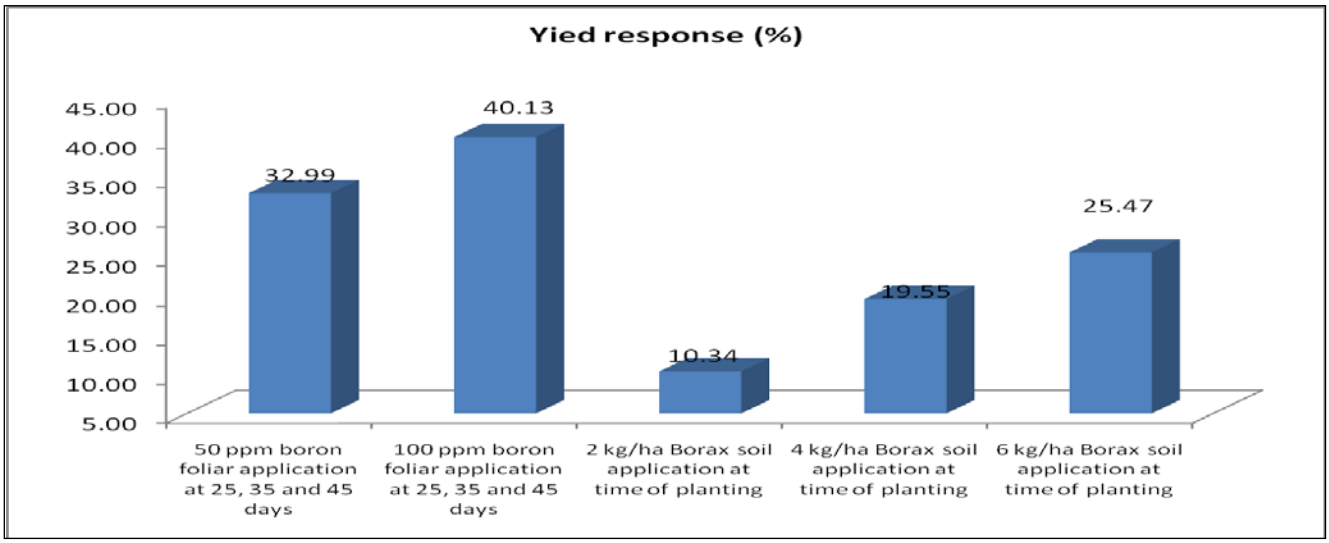

Fig. 1: Effect of boron application on percent yield response of mateera

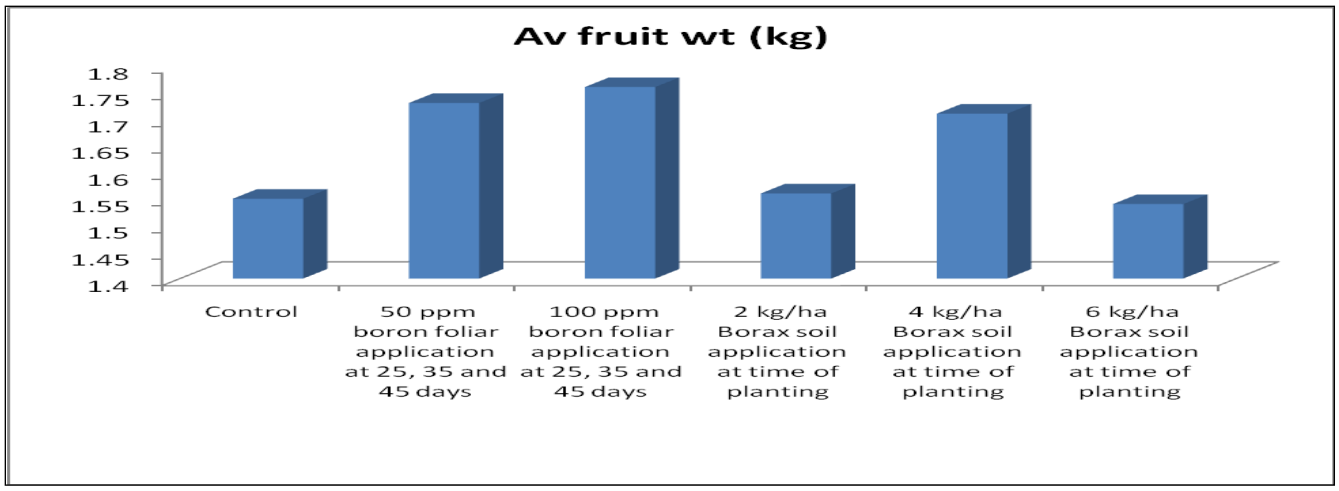

Fig. 2: Effect of boron application on average fruit weight of mateera

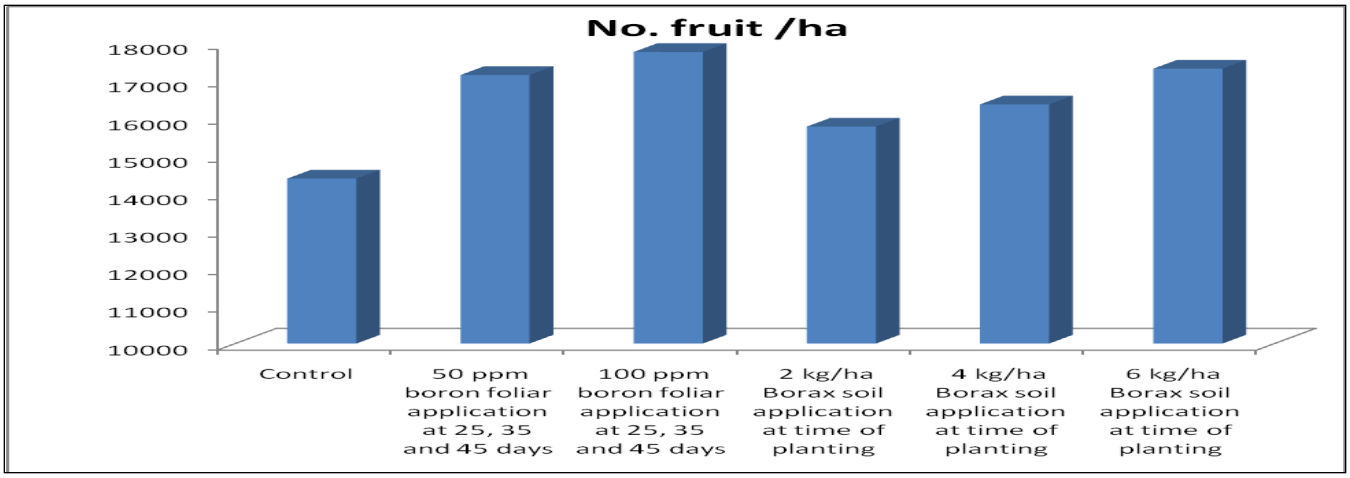

Fig. 3: Effect of boron application on number of fruit/ha of mateera

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