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Short communication

Effect of nutrients sprays on fruit set and retention in mango post hybridization

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Mango (*Mangifera indica* L.) is one of the most popular and choicest fruits of the tropics. India ranks first in mango production and presently it is being cultivated in about 20 countries (Anon, 1). Mango hybridization is one important method for the improvement of mango. Success of hybridization depends on choosing the right parents and having more progenies for future selection. There is a heavy drop of hermaphrodite flower and young fruits after fertilization. In general, it may be stated that only 0.1% or less of hermaphrodite flowers develops fruit up to maturity. To reduce the fruit drop and to improve their retention, application of nutrients like calcium and boron as sprays are reported (Chen *et al.*, 3). Therefore, some studies on the similar lines are essential in mango to devise a strategy for achieving higher breeding efficiency. In this study seven mango cultivars namely, Dashehari (D), Chausa (C), Langra (L), Bombay Green (BG), Amrapali (A), Neelum (N) and Sensation (S) were selected and hand pollinated in 20 cross combinations. The spray treatment tried were T1: 0% calcium + 0% boron (distilled water); T2: 0% calcium + 2% boron, T3: 2%

Table 1. Effect of calcium spray on number of pollen tubes growing in the pistils of mango flowers after cross / self-pollination at 24 hours after pollination.

Cross/ self combination	Number of pollen tubes (in 10 flowers)					
	Stigma	Upper style	Mid Style	Base style	Ovary	Mean
Dashehari x Dashehari	3.50	3.00	1.75	0.75	0.50	1.90
Dashehari x Chausa	3.50	3.25	1.25	0.50	0.50	1.80
Dashehari x Langra	8.25	6.75	3.75	1.50	1.50	4.35
Dashehari x Bombay Green	9.25	7.25	3.50	1.50	1.25	4.55
Chausa x Chausa	1.50	1.25	0.50	0.25	0.25	0.75
Chausa x Dashehari	8.00	3.50	3.25	1.25	0.25	3.25
Chausa x Langra	9.25	7.75	5.25	2.00	1.50	5.15
Chausa x Bombay Green	3.50	3.25	2.50	0.75	0.50	2.10
Langra x Langra	4.50	3.50	2.25	1.00	0.50	2.35
Langra x Dashehari	9.75	8.25	6.25	1.75	1.75	5.55
Langra x Chausa	11.00	9.75	6.75	2.25	2.00	6.35
Langra x Bombay Green	5.25	4.75	3.25	1.00	0.50	2.95
Bombay Green x Bombay Green	4.00	3.50	2.00	0.75	0.50	2.15
Bombay Green x Dashehari	17.25	14.75	8.50	4.25	3.00	9.55
Bombay Green x Chausa	17.50	15.00	10.00	5.00	3.00	10.10
Bombay Green x Langra	19.75	17.50	12.00	4.00	3.50	11.35
Neelum x Neelum	34.75	25.75	14.75	7.00	6.75	17.80
Neelum x Dashehari	8.00	7.25	4.75	1.75	6.25	5.60
Amrapali x Amrapali	5.25	4.50	2.00	1.25	0.75	2.75
Amrapali x Sensation	16.75	14.25	9.25	3.50	2.75	9.30
Mean	10.03	8.24	5.18	2.10	1.88	
			CD at 5%			
Cross combination			0.91			
Position		0.63	1.81			
Cross combination x Position		1.41	4.06			

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Ca + 0% B, and T4: 2% Ca + 2% B. The pollinated flowers on the panicles along with some sections of canopy were sprayed with calcium chloride and borax solutions as mentioned above. Spraying was done in the early morning or in the late evening hours. These sprays were done twice, 1st at the time of flowering (50%) and 2nd spray after 15 days of fruit set i.e., at mustard stage of fruit development. Spraying was done in dry weather conditions. Different parameters were recorded, i.e. fruit set after 15 days of pollination, fruit retention at 45 and 90 days after pollination and microscopic observation of pollen tube growth using fluorescence microscope,

The experiments were laid out in completely randomized design. Two years pooled and subjected to statistical analysis. Data obtained in percentage were subjected to angular transformation before analysis. ANOVA was calculated to separate the means (Panse and Sukhatame, 5)

The effect of calcium treatment on fruit set and its retention was noticed after 15, 45, and 90 days of pollination in allthe cross combinations. Furthermore, calcium promoted pollen tube growth from upper style region to ovary region in pistils of the entire cross combinations (Table 1; Fig. 1). Similar results have been reported by Chen *et al.* (3) in low bush blueberry. Earlier, Brewbaker and Kwack (2) and Ge et al. (4) reported better growth of pollen tubes after calcium spray might be due to the fact that calcium increased the actively growing pollen tubes by synthesizing pectic material for the cell wall. Similarly, boron spray on fruit set and its retention was also found effective in the entire cross combinations. Boron spray on mango flowers improved the pollen germination, due to which higher number of pollen tubes were recorded in stigma and upper style regions (Fig. 2&3). Vasil (7) reported better growth of pollen tubes with boron treatment. Similar results have also been reported in low bush blueberry by Chen *et al.* (3), and Wang et al. (8). It might be attributed to the positive effects of boron on pollen tubes, which was required for stigma receptivity and pollen tube extension. It was essential to form sugar-borate complexes, which promoted absorption, translocation and metabolism of sugars in pollen (Thompson and Batjer, 6).

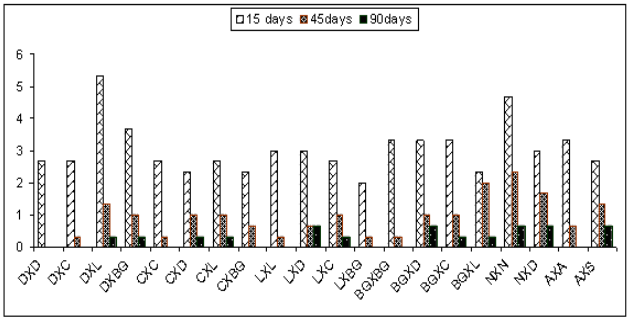

Fig. 1. Effect of calcium spray on fruit set and fruit retention (number) *in* mango after cross and self pollination at different duration (days).

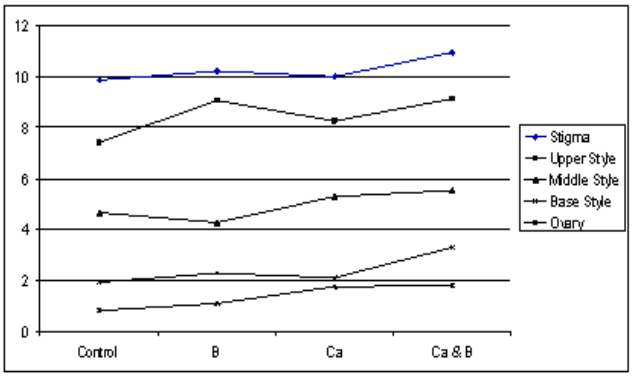

Fig. 2. Effect of calcium and boron spray on number of pollen tubes growing in the pistils of mango genotypes after 24 hours of hand pollination.

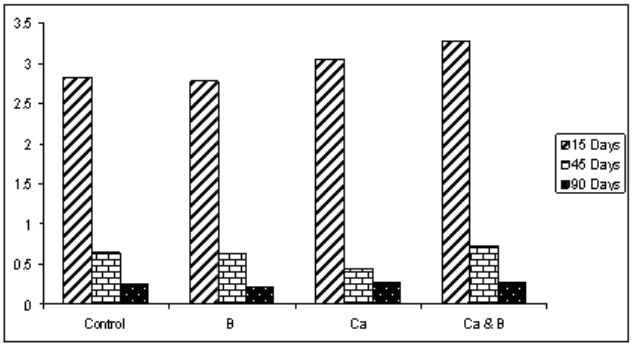

Fig. 3. Effect of calcium and boron spray on fruit set and fruit retention (number) *in vivo* in mango cultivars after cross and self pollination at different duration (days).

Combined spray of calcium and boron was found to be more effective in improving the pollen germination and pollen tubes in pistils in comparison to calcium or boron spray alone (Figs. 2&3). It might be attributed to the synergetic influence of calcium and boron as reported by Chen *et al.* (3) in low bush blueberry.

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