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EFFECT OF PACLOBUTRAZOL AND OTHER CHEMICALS ON YIELD AND QUALITY OF MANGO CV. BANGANPALLI

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Abstract: The experiment was conducted in an orchard with 11-year old plants in the first evaluation cycle. Mango Trees were subjected to different concentrations of paclobutrazol and other chemicals with factorial randomised block design. Among the different treatments use of Paclobutrazol and other chemicals was significantly better in getting more number of mango fruits per tree as compared to the control. More yield (88.53kg, 107.67kg) and maximum fruit weight (625.20g and 588.53g), were noticed with P_3S_3 (PBZ @ 4 ml m^{-2} + NAA@ 25ppm). more pulp weight (547.93g and 493.46g) and more pulp to seed ratio (16.0 and 18.80) were noticed with P_3S_3 (PBZ @ 4 ml m^{-2} + NAA@ 25ppm). The maximum reducing (6.12% and 6.43%), non-reducing (12.38% and 13.17%) and total sugars (18.50% and 19.60%) were noticed with the P_3S_1 which was at par with P_3S_2 (PBZ @ 4 ml m^{-2} + Borax – 0.6%). Therefore the conclusion from these results is that Paclobutrazol and other chemicals are effective in yield and quality improvement in Banganpalli mango.

Keywords: Paclobutrazole, other chemical, yield and Quality parameters.

Introduction

Mango occupied a pre-eminent place amongst the fruit crops grown in India because of its great utility. Mango exhibits wide variations in flowering and fruiting due to its strong dependency on environment for flowering, particularly on cool winter temperatures and the age of the flowering shoots (Shankara Swamy, 2012; Ramirez and Davenport, 2010). There are several reasons that can be attributed for low productivity, but among them, the major cause is the dominance of vegetative phase over the reproductive phase, especially under tropical conditions. The improvement in productivity in modern agriculture system is increasingly dependent on manipulation of the physiological activities of the crop by chemical means. Alternate bearing is one of the major problems in mango production all over the World. Attempts are being made to overcome this problem during the last decades. Though several remedial measures have been suggested, none of these was successful until the advent of the plant growth retardant Paclobutrazol. In commercial mango plantations, it is

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desirable to control the vegetative growth to get uniform and regular flowering and improves fruit quality. The concerted research work has been carried out on use of paclobutrazol to overcome the alternate bearing problem in mango from early eighties till date in almost all the mango growing countries of the World. Paclobutrazol is one of the most important growth retardant which restricts vegetative growth and induce flowering and improves fruit quality in many fruit species including mango (Yadav *et al*., 2005). The first report about the use of PBZ on mango came from India in Dashaheri and Banganapalli (Kulakarni, 1988). Moreover, induction of early flowering results in early maturity of the mango fruits which fetch the higher price in the market as compared to late maturing mango fruits. Keeping these points in view, the present investigation was planned to study the effect of Paclobutrazol and other chemicals on yield and quality characteristics of mango cv. Banganpalli

Material and Methods

The investigation on the effect of Paclobutrazol and other chemicals on yield and quality of mango cv. Banganpalli was carried out at on farm research trials of CRIDA, Hyderabad at Amarachinta village, Mahaboobnagar district of Andhra Pradesh during 2013-14 and 2014-15. It lies at 16° 22' 0" North latitude, 77° 47' 0" East longitude at an altitude of 311m from mean sea level. Rainfall 1053.2 mm and 658.9 mm rainfall was received during 2013-14 and 2014-15 out of which >93% is during South West monsoon. The minimum temperature was 17.29^{o}C and 16.3^{o}C and maximum temperature was 30.63 and 30.72 ^{o}C. The soil of the orchard selected is a red soils with a pH of 6.7 and electrical conductivity of 0.6 d S m^{-1}. It had 131.63 Kg, 16.7 Kg and 179.84 Kg per hectare of available nitrogen, phosphorus and potassium contents respectively. The orchard has a uniform topography.

Paclobutrazol concentration was calculated based on the diameter of the tree, and applied @ 2ml $m^{-1,}$ 3ml m^{-1} and 4ml m^{-1} of canopy diameter. The required paclobutrazol was dissolved in 10 litre of water and poured in the holes (10-15cm depth) which were made in the soil around the collar region of the tree on september 1st of 2013 and 2014. A foliar spray of KNO_3 was applied during last week of October 2013 and 2014. 10 litres of NAA @25 ppm (25mg NAA dissolved in 20 ml of ethanol, diluted it to1litre of water and make up to 1 liters) solution was sprayed on trees during fruiting stage for controlling fruit drop. 10 litres of spermidine @ 0.02mM (2.9 mg of spermidine dissolved in 1 litre of water to get 0.02 mM of spermidine) was prepared and sprayed on trees during full bloom stage. 10 litres of borax @ 0.6% solution was prepared and sprayed on trees during full bloom stage during 2013 and 2014.

The total weight of fruits produced by a tree was recorded to obtain the fruit yield tree^{-1} and expressed in kilograms.

An average of 5 fruits per tree was considered for calculating the average fruit weight after harvest.

An average of 5 fruits per tree was considered for calculating the average pulp weight after harvesting and expressed in grams. Pulp to seed ratio was calculated from ratio between ripe pulp weight and seed or stone weight.

$$\text{Pulp to seed ratio} = \frac{\text{Pulp weight}}{\text{Seed weight}}$$

Reducing, non reducing and total sugars were present in the mango pulp samples were determined by the method of Lave and Eyoss (AOAC, 1980).

Results and discussion

Yield parameters

Among different paclobutrazol concentrations, significantly the highest yield per plant was noticed with the treatment P_3 (83.32, 87.89) in the year 2013-14, 2014-15 respectively (Table 1). Significantly the less yield per plant was found with the treatment P_4 (40.74, 39.28) in the year 2013-14, 2014-15 respectively.

With respect to interaction effect, the more yield per plant was found with P_3S_3 (88.53) which was statistically at par with P_1S_3 (83.74), P_2S_1 (86.71), P_2S_2 (82.31), P_2S_3 (83.57), P_3S_1 (81.54) and P_3S_2 (84.40) in 2013-14, whereas during 2014-15 season the more yield per plant was observed with the treatment P_3S_3 (107.67) followed by P_2S_3 (89.20), P_2S_1 (86.86). Significantly the less yield per plant was noticed with the treatment P_4S_4 (36.60, 35.70) in the year 2013-14, 2014-15 respectively. This may be due to paclobutrazol hasten photosynthetic activities where more assimilates were accumulated, thus mango fruit yields significantly increased Our results confirms with Kulkarni (1988), Burondkar and Gunjate (1993), Kurian and Iyer (1993a); Singh and Dhillon (1992); Singh (2000), Tandel and Patel (2011) and Burondkar *et al*., (2000).

Among different paclobutrazol concentrations significantly more mature fruit weight was noticed with the treatment P_2 (495.57, 451.40) which was statistically at par with the treatment P_3 (474.07, 437.90) in the year 2013-14, 2014-15 respectively (Table 2). The lowest mature fruit weight was found with the treatment P_4 (334.91, 312.70) in the year 2013-14, 2014-15 respectively. With respect to interaction effect, the more mature fruit weight was found with P_3S_3 (625.20, 588.53) followed by the treatments P_2S_3 (541.30, 504.63), P_2S_1

(522.10, 475.43) in the year 2013-14, 2014-15 respectively. Significantly the less mature fruit weight was noticed with the treatment P_4S_4 (299.97, 263.30) which was statistically at par with P_4S_3 (338.37, 296.70) during 2013-14, 2014-15 seasons respectively. Plants treated with paclobutrazol at 4ml per meter canopy recorded the heaviest mature fruit, highest edible portion when compared with the control. Same results found with Babul and Rahim, 2012 in Mango.

Physical parameters

Among different paclobutrazol concentrations significantly more pulp weight was noticed with the treatment P_2 (409.20, 350.80) which was statistically at par with the treatment P_3 (393.14, 343.08) in the year 2013-14, 2014-15 respectively (Table 3). The lowest pulp weight was found with the treatment P_4 (256.84, 203.10) in the year 2013-14, 2014-15 respectively. Interaction between paclobutrazol concentrations and other chemicals was found significant for pulp weight. The more pulp weight was found with P_3S_3 (547.93, 493.46) in the year 2013-14, 2014-15 respectively. Significantly the less pulp weight was noticed with the treatment P_4S_4 (222.97, 169.79) which was statistically at par with P_4S_3 (261.83, 203.64) during 2013-14, 014-15 seasons respectively. The results were clearly pointed out that the paclobutrazol improves the pulp weight over control. Similar results were noticed by Tandel and Patel (2010), trees treated with paclobutrazol in mid September increased pulp: skin ratio and reduced stone weight in all the cultivar. Improvement in above parameters was also observed by Desai (1993) with paclobutrazol treatment.

Interaction between paclobutrazol concentrations and other chemicals brought significant results on pulp to seed ratio during both seasons (Table 4). During first season more pulp to seed ratio was observed with P_3S_3 (16.0) which was statistically at par with P_2S_1 (14.7), whereas during second season the more pulp to seed ratio was noticed with P_3S_3 (18.8) followed by P_2S_1 (12.1). Significantly the less pulp to seed ratio was noticed with the treatments P_4S_4 (6.1) (6.2) in the years 2013-14, 2014-15 respectively. Plants treated with paclobutrazol at 4ml per meter canopy recorded the more pulp to seed ratio when compared with the control. Same results found with Babul and Rahim (2012) in Mango.

Bio chemical parameters

The data pertaining to the reducing, Non reducing and total sugars as influenced by different concentrations of paclobutrazol and other chemicals during 2013-14, 2014-15 (Table 5, 6 and 7). Among the different paclobutrazol concentrations, significantly the highest reducing, Non reducing and total sugars were noticed with the treatment P_3 (5.97, 6.20), (11.82, 12.34),

(17.79, 18.53) in 2013-14, 2014-15 respectively. Significantly the less reducing sugars, Non reducing and total sugars was observed with P_1 (5.36), (10.06), (15.96) in 2013-14 respectively, P_4 (5.62), (11.02), (16.64) in 2014-15 respectively.

Interaction between paclobutrazol concentrations and other chemicals brought significant results during both seasons. The highest reducing, non reducing and total sugars was observed with P_3S_1 (6.12, 6.43), (12.38, 13.17), (17.79, 18.53) which was statistically at par with P_3S_2 (6.10, 6.22), (11.73, 12.48), (17.83, 18.70) in 2013-14, 2014-15 respectively. Significantly the less reducing, Non reducing and Total sugars were noticed with the treatments P_1S_1 (PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 @ 3% + Spermidine @ 0.02 mM) in the years 2013-14, 2014-15 respectively. The paclobutrazol improved substantially the quality of fruits such as total soluble solids of ripening fruits over the control. Potassium nitrate application also plays an important role in maintaining these parameters and thereby could have improved the fruit quality. Potassium accumulation at post flowering stage also favoured the conversion of starch into simple sugars during ripening by activating 'sucrose synthase' enzyme, resulting in the highest total soluble solids content in fruits. The earlier works of Sarker and Rahim (2012) strongly confirm the trend of results obtained in the present experiment and it shows that these two chemicals, apart from stimulating the off-season flower induction; they play an advantageous role in influencing the quality characters of fruits which would like to get a better price for the produce

References

[1] A.O.A.C. 1980. Official Methods of Analysis. 13th Ed. Association of Official Analytical Chemists, Washington D.C., USA.

[2] Burondkar, M.M, Gunjate, R.T, Magdum, M.B, Govekar, M.A. 2000. Rejuvenation of old and overcrowded 'Alphonso' mango with pruning and use of paclobutrazol. Acta Hortic. 509, 681–686.

[3] Burondkar, M.M. and R.T. Gunjate. 1993. Control of vegetative growth and induction of regular and early cropping in Alphonso mango with paclobutrazol. *Acta Hort*., 341: 206-215.

[4] Desai, M.M. 1993. Regulation of flowering in mango (*Mangifera indica* L.) cv. Alphonso. *Ph.D. Thesis*, Gujarat Agric. Univ., S.K. Nagar (India).

[5] Kulkarni, V.J. 1988. Further studies on graft-induced off-season flowering and fruiting in the mango (Mangifera indica L.). J. Hortic. Sci. 63, 361–367.

[6] Kurian, R.M. and lyer, C.P.A. 1993a. Chemical regulation of tree size in mango (*Mangifera indica* L.) cv. Alphonso. II. Effects of growth retardants on flowering and fruit

set. *J. Hon. Sci.,* **68:** 355-60.

[7] Rahim, A.O.S. Osman, M.E. and Fritzk. B. 2012. Effect of paclobutrazol (PBZ) on floral induction and associated hormonal and metabolic changes of biennially bearing mango (*Mangifera indica* L.) cultivars during off year. *ARPN. J. Agri. Bio. Sci.,* **6**(2): 55-67.

[8] Ramirez, F. and Davenport, T.L. 2010. Mango (*Mangifera indica L.)* flowering physiology. *Scientia Horticulture*, **126**:65-72.

[9] Shankara Swamy, J. 2012. Flowering manipulation in mango: A science comes of age. *J. Today's Bio. Sci.: Research and Review*, **1**(1): 122-137.

[10] Singh, Z, Janes, J, 2000. Regulation of fruit set and retention in mango with exogenous application of polyamines and their biosynthesis inhibitors. Acta Hortic. 509, 675–680.

[11] Singh, Z. and Dhillon, B.S. 1992. Effect of paclobutrazol on floral malformation, yield and quality of mango (*Mangifera indica* L.). *Acta Horticulturae*, **296**: 51-54.

[12] Tandel, Y.N. and Patel, N.L. 2011. Effect of chemicals on growth, yield and economics of mango (*Mangifera indica* L.). *Karnataka J. Agric. Sci.,* **24** (3): 362 – 365.

[13] Yadav, R.K, Rai, N, Yadav, D.S. and Asati, B.S. 2005. Use of paclobutrazol in Horticultural crops – A review. *Agric. Rev*., **26**: 124-132.

Table 1: Yield plant^{-1} as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	Yield plant^{-1} (kg)									
	2013-14					2014-15				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
P_1	65.31	69.04	83.74	71.04	**72.28**	64.04	67.17	82.38	69.76	**70.84**
P_2	86.71	82.31	83.57	77.20	**82.45**	86.86	79.34	89.20	76.00	**82.85**
P_3	81.54	84.40	88.53	78.79	**83.32**	82.80	83.55	107.67	77.54	**87.89**
P_4	42.75	43.00	40.62	36.60	**40.74**	41.00	41.13	39.29	35.70	**39.28**
Mean	**69.08**	**69.69**	**74.12**	**65.91**	**69.70**	**68.68**	**67.80**	**79.63**	**64.75**	**70.22**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		
Factor- P	1.225		3.556			1.716		4.979		
Factor - S	1.225		3.556			1.716		4.979		
Interaction (P × S)	2.450		7.112			3.431		9.958		

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control;
S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 2: Mature fruit weight as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	Mature fruit weight (g)									
	2013-14					2014-15				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
P_1	419.93	465.27	448.70	426.20	**440.03**	383.27	438.60	412.03	374.53	**402.11**
P_2	522.10	463.97	541.30	454.90	**495.57**	475.43	412.30	504.63	413.23	**451.40**
P_3	453.27	399.23	625.20	418.57	**474.07**	416.60	357.57	588.53	388.90	**437.90**
P_4	349.37	351.93	338.37	299.97	**334.91**	312.70	316.27	296.70	263.30	**297.24**
Mean	**436.17**	**420.10**	**488.39**	**399.91**	**436.15**	**397.00**	**381.18**	**450.48**	**359.99**	**397.16**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		

Factor- P	7.926	23.003	7.926	23.002
Factor - S	7.926	23.003	7.926	23.002
Interaction (P × S)	15.852	46.006	15.852	46.004

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control;
S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 3: Pulp weight as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	**Pulp wt (g)**									
	2013-14					**2014-15**				
	S_1	**S_2**	**S_3**	**S_4**	**Mean**	**S_1**	**S_2**	**S_3**	**S_4**	**Mean**
P_1	318.07	379.55	356.78	338.20	**348.15**	282.13	332.63	313.11	273.58	**300.36**
P_2	456.33	366.48	441.40	372.57	**409.20**	391.42	303.86	391.88	316.05	**350.80**
P_3	364.48	319.60	547.93	340.53	**393.14**	314.15	271.81	493.46	292.90	**343.08**
P_4	272.44	270.10	261.83	222.97	**256.84**	221.08	217.89	203.64	169.79	**203.10**
Mean	**352.83**	**333.93**	**401.99**	**318.57**	**351.83**	**302.20**	**281.55**	**350.52**	**263.08**	**299.34**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		
Factor- P	8.349		24.231			8.258		23.965		
Factor - S	8.349		24.231			8.258		23.965		
Interaction (P × S)	16.698		48.461			16.515		47.930		

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control;
S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 4: Pulp to seed ratio as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	Pulp to Seed									
	2013-14					2014-15				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
P_1	7.7	8.8	9.0	7.5	**8.2**	8.4	9.6	9.4	7.9	**8.8**
P_2	14.7	8.3	9.4	9.2	**10.4**	12.1	9.3	9.8	10.0	**10.3**
P_3	8.6	8.9	16.0	9.6	**10.8**	9.5	9.5	18.8	10.6	**12.1**
P_4	7.9	6.8	8.7	6.1	**7.4**	8.2	7.1	10.8	6.2	**8.1**
Mean	**9.7**	**8.2**	**10.8**	**8.1**	**9.2**	**9.6**	**8.9**	**12.2**	**8.7**	**9.83**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		
Factor- P	0.718		2.083			0.740		2.149		
Factor - S	0.718		2.083			0.740		2.149		
Interaction (P × S)	1.436		4.166			1.481		4.297		

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control; S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 5: Reducing sugars as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	Reducing sugars (%)									
	2013-14					2014-15				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
P_1	4.95	5.32	5.67	5.50	**5.36**	5.06	5.65	6.02	5.78	**5.63**
P_2	5.76	5.65	5.90	5.51	**5.71**	5.91	5.93	6.07	5.87	**5.95**
P_3	6.12	6.10	6.02	5.62	**5.97**	6.43	6.22	6.30	5.83	**6.20**
P_4	5.24	5.29	5.76	5.52	**5.45**	5.27	5.61	6.03	5.58	**5.62**
Mean	**5.52**	**5.59**	**5.84**	**5.54**	**5.62**	**5.67**	**5.85**	**6.10**	**5.76**	**5.85**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		

Factor- P	0.067	0.196	0.075	0.217
Factor - S	0.067	0.196	0.075	0.217
Interaction (P × S)	0.135	0.391	0.150	0.434

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control; S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 6: Non-reducing sugars as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	**Non reducing sugars (%)**									
	2013-14					**2014-15**				
	S_1	**S_2**	**S_3**	**S_4**	**Mean**	**S_1**	**S_2**	**S_3**	**S_4**	**Mean**
P_1	9.88	10.52	11.17	10.83	**10.60**	10.27	11.01	11.81	11.55	**11.16**
P_2	11.24	11.35	11.43	10.86	**11.22**	11.62	11.80	11.80	11.43	**11.66**
P_3	12.38	11.73	11.81	11.38	**11.82**	13.17	12.48	12.20	11.50	**12.34**
P_4	10.26	10.55	11.40	10.81	**10.75**	10.30	11.12	11.77	10.89	**11.02**
Mean	**10.94**	**11.04**	**11.45**	**10.97**	**11.10**	**11.34**	**11.60**	**11.90**	**11.34**	**11.55**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		
Factor- P	0.143		0.414			0.125		0.362		
Factor - S	0.143		NS			0.125		0.362		
Interaction (P × S)	0.285		0.828			0.249		0.723		

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control; S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control

Table 7: Total sugars as influenced by paclobutrazol and other chemicals in Mango cv. Banganpalli

Treatment	Total sugars (%)									
	2013-14					2014-15				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
P_1	14.83	15.83	16.83	16.33	**15.96**	15.33	16.67	17.83	17.33	**16.79**
P_2	17.00	17.00	17.33	16.37	**16.93**	17.53	17.73	17.87	17.30	**17.61**
P_3	18.50	17.83	17.83	17.00	**17.79**	19.60	18.70	18.50	17.33	**18.53**
P_4	15.50	15.83	17.17	16.33	**16.21**	15.57	16.73	17.80	16.47	**16.64**
Mean	**16.46**	**16.63**	**17.29**	**16.51**	**16.72**	**17.01**	**17.46**	**18.00**	**17.11**	**17.39**
	S.Em.(±)		C.D. @ 5%			S.Em.(±)		C.D. @ 5%		
Factor- P	0.201		0.585			0.191		0.555		
Factor - S	0.201		0.585			0.191		0.555		
Interaction (P × S)	0.403		1.169			0.382		1.110		

P_1 - PBZ @ 2 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_2 - PBZ @ 3 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_3 - PBZ @ 4 ml m^{-2} canopy (soil drenching) + foliar spray of KNO_3 (3%)
P_4- Control; S_1 - Spermidine @ 0.02 mM; S_2 - Borax – 0.6% ; S_3 - NAA@ 25ppm**;** S_4- Control