The Pharma Innovation Journal 2022; 11(7): 1734-1736

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(7): 1734-1736
© 2022 TPI
www.thepharmajournal.com
Received: 08-05-2022
Accepted: 17-06-2022

Mishra PV
College of Horticulture, Junagadh Agricultural University, Junagadh, Gujarat, India

Varu DK
College of Horticulture, Junagadh Agricultural University, Junagadh, Gujarat, India

Corresponding Author:
Mishra PV
College of Horticulture, Junagadh Agricultural University, Junagadh, Gujarat, India

Effect of chemicals and agro-techniques on *Hast bahar* flowering of pomegranate

Mishra PV and Varu DK

Abstract
The present investigation entitled "Standardization of *hast bahar* in pomegranate (*Punica granatum* L.) under Saurashtra region" was carried out at Fruit Research Station, Lalbaug, Junagadh Agricultural University, Junagadh during 2020-21 and 2021-22. The experiment was laid out in Randomized Block Design, consisting ten treatments each replicated three times. The treatment modules were comprised of combination of different agro-techniques, chemicals and non-chemical treatments. The result revealed critical disparity among the treatments for different characters. Significantly minimum days were required for flowering (4.17 days) in foliar application of paclobutrazol 2000 ppm and girdling in first fortnight of July + application of FYM 2.5 kg/tree and lime 2.5 kg/tree in first fortnight of August (T_3). The higher fruit set percentage (69.50%) was registered in light pruning and root pruning in second fortnight of June + foliar application of ethrel 2 ml/L in second fortnight of August + soil application of paclobutrazol 2.5 g *a.i.*/tree after withdrawal of rainfall + resting period of 40-45 days after withdrawal of rainfall (T_9).

Keywords: *Hast bahar*, agro techniques, pomegranate, chemicals

Introduction
Pomegranate (*Punica granatum* L.) is an old, favourite, beloved plant and fruit. It is claimed to have originated in Iran (Morton, 1987) [5]. The scientific name *Punica granatum* L. is derived from name *Pomum* means apple and *Granatus* means grainy. Pomegranate fruits are mainly used for table purpose. It is used traditionally as a medical remedy because all parts of plants have various metabolites. Pomegranate has exceptionally colourful and marvelous history. Historians have placed this fruit on the fifth position in the list of oldest cultivated fruits, along with olive, grapes, date palm and fig (Zohary and Spiegel, 1975) [12].
The flowering pattern of pomegranate crop depends on the prevailing climatic conditions. Inherently, it has tendency to bear flower throughout the year; consequently leads to multiple harvests with poor yield. To obtain higher fruit yield during a particular period, the pomegranate plants are given a resting period by which the natural tendency of the tree is altered with artificial means. Therefore, one of the most important things making crop regulation in pomegranate essential is peculiarity of flowering, especially under tropical and subtropical climates. Depending on the availability of water resources, flowering can be regulated in May-June for *Mrig bahar*, September-October for *Hast bahar* and January-February for *Ambe bahar*. Generally, *hast bahar* is used in areas where plants can be thrown into rest before September. *Hast bahar* has several advantages like; export qualities of fruits, less incidence of disease pest, fruits fetch good market price due to non-availability of other fruits at that time. On the other hand, it also faces several disadvantages such as imposition of water stress is difficult prior to flowering. Therefore, flowering in this *bahar* is very difficult to induce. So, in present investigation effort was made to induce flowering in *hast bahar* with the use of various agro-techniques, chemical and non-chemical agents.

Materials and Methods
The present investigation was carried out at Fruit Research Station, Lalbaug, Junagadh Agricultural University, Junagadh during 2020-21 to 2021-22. Ten different modules arising from different agro-techniques as well as chemical and non-chemical agents were allocated in randomized block design in three replications.
The treatments were soil application of paclobutrazol 2.5 g *a.i.*/tree in first fortnight of July + FYM 5 kg/tree in first fortnight of August + light pruning in first fortnight of September (T_1), soil application of paclobutrazol 5 g *a.i.*/tree in first fortnight of July + soil application of lime

2.5 kg/tree in first fortnight of August (T_2), foliar application of paclobutrazol 2000 ppm and girdling in first fortnight of July + application of FYM 2.5 kg/tree and lime 2.5 kg/tree in first fortnight of August (T_3), foliar application of GA_3 50 ppm in first fortnight of June + medium pruning in first fortnight of August + foliar application of multi-micronutrient grade-IV @ 0.5% in first fortnight of September & October + foliar application of panchgavya 3% in first fortnight of October (T_4), foliar application of cycocel 1000 ppm and KNO_3 2% in first fortnight of August and September + foliar application of multi-micronutrient grade-IV @ 0.5% in second fortnight of September and October (T_5), foliar application of ethrel 2 ml/L after withdrawal of rainfall + light pruning followed by defoliation (T_6), light pruning in second fortnight of June + soil application of paclobutrazol 2.5 g *a.i.*/tree after withdrawal of rainfall + resting of 45 days after withdrawal of rainfall (T_7), foliar application of ethrel 2 ml/L and root pruning after withdrawal of rainfall + 20-25 days resting after withdrawal of rainfall + foliar application of brassinosteroid 0.5 ppm twice (1^{st}: at flower initiation and 2^{nd}: 30 days after 1^{st} spray) (T_8), light pruning and root pruning in first fortnight of June + foliar application of ethrel 2 ml/L in second fortnight of August + soil application of paclobutrazol 2.5 g *a.i.*/tree after withdrawal of rainfall + resting period of 40-45 days after withdrawal of rainfall (T_9) and control (T_{10}). Biometrical observations on various flowering and yield parameters were recorded time to time.

Results and Discussion

Days to first flowering was counted from 1^{st} September in both the years. Data relevant to days to first flowering exhibited statistically significant variations among the different treatments. The earliest flowering was exhibited by foliar application of paclobutrazol 2000 ppm and girdling in first fortnight of July + application of FYM 2.5 kg/tree and lime 2.5 kg/tree in first fortnight of August (T_3) during both the years as well as in pooled.

Result might be due to application of paclobutrazol that reduces the vegetative growth by antagonize the action of gibberellins may be the reason of advancement in flowering in current experiment. It mainly inhibits the function of kaurene synthetase enzyme in gibberellic acid biosynthesis. It is true that level of carbohydrates increased due to increased chlorophyll metabolism and direct effect on carbohydrate metabolism resulted into early flowering. The results were found to be in line with those of Tandel and Patel (2011) [10], Burondkar *et al*. (2013) [1] and Solanki *et al*., (2021) [9] in mango; Tripathi and Dhakal (2005) [11] and Deshmuk *et al*. (2016) [2] in acid lime; Jain and Dashora (2007) [3] in guava. Further, earliness in flowering might be due to girdling, which suppresses growth flush and accumulation of more photosynthates on girdled portion by disruption in sugar transport in phloem can induce early flowering. This finding is in accordance with Rath and Das (1979) [7] and Shinde *et al*. (2014) [8] in mango, while it is in opposition with results obtained by Kumar *et al*. (2017) [4], who noticed earliest flowering in ungirdled litchi trees. It has been indicated by many workers that application of FYM improves various soil properties. Mosaddeghi *et al*. (2000) [6] noted that soil compactibility was decreased by incorporation of FYM. Likewise FYM, application of lime to the soil has well known effects on various soil physical properties. Since the soil in our region is heavy in texture; imposition of water stress is very difficult, lime might have helped to improve the water drainage and the texture of soil, which may be the cause of advancement of flowering in treated trees as compared to untreated trees.

Days required for fruit set was counted from the date of full bloom in both the years. As shown in Table 2, statistically non-significant variations was observed among the different treatments in both the years as well as in pooled.

Table 1: Influence of different treatments on days to first flowering in pomegranate under Saurashtra region

Treatments	2020-21	2021-22	Pooled
T_1	30.00	23.50	26.75
T_2	8.00	10.50	9.25
T_3	3.33	5.00	4.17
T_4	42.50	35.17	38.83
T_5	32.83	37.50	35.17
T_6	55.50	40.30	47.90
T_7	30.17	25.17	27.67
T_8	37.00	33.17	35.08
T_9	27.83	30.17	29.00
T_{10}	58.50	55.00	56.75
S.Em.±	1.81	1.43	3.00
C.D. at 5%	5.37	4.25	9.60
C.V.%	9.62	9.43	9.10

Table 2: Influence of different treatments on fruit set percentage (%) in pomegranate under Saurashtra region

Treatments	2020-21	2021-22	Pooled
T_1	14.77	13.96	14.36
T_2	11.77	11.43	11.60
T_3	13.43	12.83	13.13
T_4	11.97	11.67	11.82
T_5	13.27	12.87	13.07
T_6	12.00	12.00	12.00
T_7	11.13	11.32	11.23
T_8	13.09	12.89	12.99
T_9	11.67	11.89	11.78
T_{10}	11.99	12.19	12.09
S.Em.±	0.70	0.66	0.48
C.D. at 5%	NS	NS	NS
C.V.%	9.73	9.22	9.51

Conclusion

Based on the results obtained from the present investigation, it can be comprehended that the foliar application of paclobutrazol 2000 ppm and girdling in first fortnight of July with application of FYM 2.5 kg/tree and lime 2.5 kg/tree in first fortnight of August (T_3) performed better for flowering in pomegranate for *hast bahar* under Saurashtra region.

Reference

1. Burondkar MM, Rajan S, Upreti KK, Reddy YT, Singh VK, Sabale SN, *et al*. Advancing alphonso mango harvest seasaon in lateritic rocky soils of Konkan region through manipulation in time of paclobutrazol application. Journal of Applied Horticulture. 2013;15(3):178-182.
2. Deshmuk HK, Paithankar DH, Nimbolkar Dewangan RK, Awachare C. Effect of plant growth regulators and micronutrients on reproductive attributes of acid lime in hast bahar cropping season. Journal of Horticultural Sciences. 2016;11(1):63-66.
3. Jain MC, Dashora LK. Growth, flowering, fruiting and

yield of guava cv. Sardar as influenced by various plant growth regulators. International Journal of Agricultural Sciences. 2007;3(1):4-7.
4. Kumar A, Pandey SD, Patel RK, Srivastava K, Tripathi M, Nath V. Effect of girdling on flowering and fruiting of litchi in subtropics of Bihar. Indian Journal of Agricultural Sciences. 2017;87(3):397-401.
5. Morton JF. Punicaceae pomegranate. In: Dowling CF. ed. Fruits of Warm climates, Florida flair books. Creative Resources Systems, Florida, USA, 1987, 352-355.
6. Mosaddeghi MR, Mohammad AH, Hemmat A, Majid A. Soil compactibility as affected by soil water content and farm yard manure in central Iran. Soil and Tillage Research. 2000;55(1):87-97.
7. Rath E, Das GC. Effect of ringing and growth retardants on growth and flowering on mango. Scientia Horticulture. 1979;10(79):101-104.
8. Shinde VV, Dubale C, Haldankar PM, Parulekar Y. Effect of ringning on flowering and yield of mango var. Alphonso. Asian Resonance. 2014;3(3):115-117.
9. Solanki MB, Varu DK, Mishra S, Gohel B, Parsana JS. Effect of chemicals and agro-techniques on growth and flowering of mango cv. Kesar. The Pharma Innovation Journal. 2021;10(9):1212-1217.
10. Tandel YN, Patel NL. Effect of chemicals on growth, yield and economics of mango (*Mangifera indica* L.). Karnataka Journal of Agricultural Sciences. 2011;24(3):362-365.
11. Tripathi KM, Dhakal DD. Effect of paclobutrazol on off-season flower induction in acid lime landraces under Chitwan condition. Journal of the Institute of Agriculture and Animal Science. 2005;25:87-92.
12. Zohary D, Spiegel RP. Beginnings of fruit growing in the old world. Science. 1975;187:319.