

Original Research Article

Effect of different Horticultural Techniques in Overcoming Alternate Bearing in Ambri Apple

Z. A. Bhat^{1*}, T. R. Rather¹, Kounser Javeed¹, H. U. Itoo¹,
Khursheed Ahmad Sheikh¹, G. H. Rather¹ and Shemoo Nisar²

¹Ambri Apple Research Centre, Pahnoo, Shopian, SKUAST-Kashmir, India

²Department of Fruit science, FOH, SKUAST-Kashmir, India

*Corresponding author

ABSTRACT

A field investigate was carried out at Krishi Vigyan Kendra- Shopian, SKUAST-Kashmir to consider almost the affect of distinctive horticultural strategies on fruit set, yield and return bloom in Ambri apple. Among the distinctive horticultural strategies the most noteworthy initial fruit set percentage (39.78%), final fruit set percentage (29.93%) and fruit weight (130.80g) was recorded with girdling treatment. Girdling treatment recorded most reduced fruit drop rate (35.40%). The think about assist uncovered that the most elevated fruit yield and return bloom was watched with Paclobutrazol (5g). In this way the think about revealed that Girdling is considered an imperative hone careful for advancing fruit setting and advancing productivity in terms of fruit weight as fruit set requires sweeping entireties of carbohydrates, which given by the photosynthesis of the current season's clears out and/or by the saves assembled in the midst of the winter. Furthermore, the positive affect of paclobutrazol which was reflected in overhauling the inspected return blossom and yield parameters may be credited to its positive affect of paclobutrazol as capable specific inhibitor of GA3 biosynthesis, may have limited the GA3 amalgamation in clears out and fruits.

Keywords

Fruit set, Return bloom,
Biosynthesis,
Paclobutrazol,
Fruit Drop

Introduction

The cutting edge apple is accepted to have been inferred from South western Asia where the Center- east or South Eastern Europe with the method being spread by Greeks and Romans (Bultitude, 3). Apple (*Malus × domestica* Borkh) is the foremost imperative mild fruit of Jammu and Kashmir state. Horticulturists utilized the term of “alternate and biennial” heading to portray generation of a heavy fruit trim one year taken after by a light crop the following year (Crane *et al.*, 5). Girdling has been, and is still, around the

world agricultural hone utilized to control tree development and advancement. Girdling comprises of departure of a strip of bark from the trunk or major limbs of a fruit tree, in this way blocking the slipping translocation of photosynthates and metabolites through the phloem. The best-known impacts of girdling are clearly brought nearly by collection of acclimatizes over the girdle (Chun *et al.*, 4).

They detailed that girdling treatment extended the C/N extent and carbohydrate substance in this way reduced the fruitlet abscission and extended the fruit maintenance

of citrus. Besides, it extended quantum yield and carbohydrate concentration totally different sprouting and vegetative shoots in citrus. Mostafa and Saleh (10) point by point that girdling moreover potassium sprinkle extended the in general number of fruits and yield weight per tree. Paclobutrazol (PBZ) can be a made plant development controller, which has been utilized in fruit tree crops to control vegetative advancement and to activate blossoming (Karki, 6 and Tripathi and Dhakal, 7). Moreover PBZ represses gibberellin synthesis and thus cell elongation (Aloni and Pasker, 2 and Rademacher, 14).

Materials and Methods

This study was carried out amid 2018-19 at Krishi Vigyan Kendra- Shopian, SKUAST-Kashmir Fourteen years old "Ambri" trees developed in loamy soil were committed for this study. The chosen trees were sound, about uniform in shape and size and productivity and gotten the same cultivation hones. Nine treatments including Flower thinning all, Flower thinning alternately, Fruit thinning all, Fruit thinning alternately, Paclobutrazol 5g, Paclobutrazol 10g, Ringing, Girdling and control (no treatment).

The test was laid out in randomized complete block design. Each treatment was replicated three times and each replicate was represented by two trees. The fruit of each treatment were collected at perfect improvement and were analyzed for distinctive parameters. Introductory fruit set rate was chosen as takes after: [(number of held fruits at harvest/total number of blossoms) x100]. The yield was assessed by increasing add up to number of fruits per tree with the normal fruit weight of ten haphazardly chosen fruits. The yield was communicated in kilograms per tree. Return bloom was decided as number of flower per shoot amid off year. The weight fruits was

measured by pan balance and normal weight was communicated in grams (g). Fruit dropping rate was decided utilizing the taking after formula:

$$\text{Fruit drop (\%)} = \frac{\text{Total No. of fruitlets} - \text{No. of fruits}}{\text{Total No. of fruitlets}} \times 100$$

Results and Discussion

The information on the impact of pruning intensities on initial fruit set, final fruit set, weight, return bloom and yield is displayed in Table 1. The information uncovered that greatest initial fruit set rate (39.78%), final fruit set rate (29.93%) and fruit weight rate (130.80g) was recorded with girdling treatment. Whereas as the most reduced initial set (28%) was recorded with Paclobutrazol (5g). Most reduced fruit set (12.87%) was recorded beneath control. The speedy affect of a girdle is to ruin the advancement through the phloem of photosynthates made by leaves. This increases foliar carbohydrates (sugars & starch) and plant hormones in over parts of the support which makes strides the blossoming (Roper & Williams, 11). Girdling treatment extended the collection of carbohydrate substance inside the upper parcel of girdle (Chun *et al.*, 4). The increment in carbohydrate level inside the clears out a well related with the fruit maintenance. The increase in fruit retention with girdling application may be credited to extended level of carbohydrates, especially in the midst of starting 4-6 weeks of overwhelming fruitlet abscission. Our comes approximately are maintained by the disclosures of Shao *et al.*, (13). They detailed that girdling treatment extended the C/N extent and carbohydrate substance consequently decreased the fruitlet abscission and extended the fruit retention of citrus.

Table.1 Effect of different horticultural techniques on initial fruit set, final set, fruit drop, fruit weight, yield and return bloom in Ambri apple.

Treatment	Initial set (%)	Final set (%)	% drop	Fruit wt. (g)	Yield (kg/tree)	Return bloom (%)
Control	33.71	12.87	61.0	115.00	14.36	8.25
FT (all)	34.92	14.76	58.90	118.45	15.97	36.98
FT (alt)	33.91	15.15	56.20	116.54	15.09	24.23
Frt T (all)	33.97	15.13	55.0	120.28	14.07	35.63
Frt T (alt)	32.84	15.01	53.24	120.11	15.68	29.54
Paclobutrazol (5g)	28.00	20.52	39.42	90.50	16.05	37.91
Paclobutrazol (10g)	31.00	19.80	36.51	93.68	16.27	30.65
Ringling	34.24	20.85	39.63	126.95	15.19	24.80
Girdling	39.78	29.93	35.40	130.80	15.46	31.55
C D (5%)	1.9	1.23	3.4	4.6	3.7	2.3

Thus, our comes approximately may possibly be in assention with the finding of Mustafa and Saleh (10), who detailed that girdling alone or with potassium shower increase the fruit estimate and fruit weight in Balady mandarin orange. Girdling treatment recorded slightest fruit drop rate (35.40%) though as most noteworthy fruit drop rate (61%) was recorded underneath control. The study development revealed that the foremost critical fruit yield (16.27kg/tree) was recorded underneath Paclobutrazol (10g) though as most decreased fruit yield (14.07kg/tree) was recorded underneath fruit diminishing all. The most noteworthy return bloom was observed with Paclobutrazol (5g) and slightest return bloom (8.25%) was recorded underneath control. The progression affect of paclobutrazol on return bloom may be credited that Paclobutrazol as solid specific inhibitor of GA3 biosynthesis, appear have limited the GA3 mix in clears out and fruits. This will be due to paclobutrazol application diminished plant vegetative advancement until 60 days after

treatment of olive (Cruz *et al.*, 9). The comes around are in likeness with Lahav *et al.*, (8) who detailed a common increase in yield of the girdled branch was observed inside the to start with season, after girdling in avocado trees. Allan *et al.*, (1) detailed that girdling brought approximately in a more critical number of fruits, bigger and of alluring attractive estimate (>90 g) than the control, inside the moo chill peach cultivar, Florida sovereign. In this way, it can be concluded that particular green strategies can move forward the fruit set, physical parameters and return bloom of Ambri apple. Girdling made strides fruit set, decreased fruit dropping, updated speedier fruit advancement. Paclobutrazol extended fruit yield and return blossom.

References

- Allan, P., George, A. P., Nissen R. J. & Rasmussen. T. S. 1993. Effects of girdling time on growth, yield, and fruit maturity of the low chill peach

- cultivar Flordaprince. Australain Journal of experimental Agriculture 33: 781-785.
- B. Aloni, T. Paskkar. 1987. "Antagonistic effects of paclobutrazol and gibberellic acid on growth and some biochemical characteristics of pepper (*Capsicum annum*) transplants", *Scientia Hort.*, 33, 167-178.
- Bultitude, J. (1983). Apples: A guide to the identification of international varieties. MacMillan Press London..
- Chun, Y. L., W. David and E. G. Eliezer, 2003. Girdling affects carbohydrate-related gene expression in leaves, bark and roots of alternate-bearing citrus trees. *Ann. Bot.*, 92: 137–143.
- J. C. Crane, M. M. Nelson. 1972. "Effects of Crop Load, Girdling and Auxin Application on Alternate Bearing of the Pistachio", *J. Amer. Soc. Hort. Sci.*, 97(3), 337- 339.
- K. B. Karki. 2000. "Effect of Paclobutrazol on off year induction of flowering in mango", MS Thesis, TU. Institute of Agriculture and Animal Sciences, Rampur, Nepal.
- K. M. Tripathi, D. D. 2005. "Dhokal,. Effect of paclobutrazol on off-season flower induction in acid lime (*Citrus aurantifolia* Swingle) land races under Chitwan condition", *J. Inst. Agric. Anim. Sci.*, 26, 87-92.
- Lahav, E., Zamet, D., Gazit, S. & Lavi, U. 196. Girdling as a means of shortening the juvenile period of avocado seedlings. *Hort. Science* 21: 1038–1040.
- M. C. M. Cruz, A. F. Oliveira, D. L. Oliveira, J. V. Neto. 2011. "Flowering and vegetative growth of olive tree submitted to pruning and paclobutrazol application", *Brazilian Journal of Plant Physiology*, 23(2), 105-111.
- Mostafa, E. A. M. and M. M. S. Saleh, 2006. Response of balady Mandarin trees to girdling and potassium sprays under sandy soil conditions. *Res. J. Agric. Biol. Sci.*, 2: 137–141.
- Roper, T. and L. Williams, 1989. Net CO₂ assimilation and carbohydrate partitioning of grapevine leaves in response to trunk girdling and gibberellic acid application. *Plant Physiol.*, 89: 1136–1140.
- S. L. Kimball. 1980. "The physiology of tree growth regulators", *J. Arboric.*, 16, 39-41.
- Shao, L. H., L. Deng and L. Y. Qing, 1998. Effects of floral promotion or inhibition treatments on flowering of citrus trees and protein fraction in buds. *J. Trop. Subtrop. Bot.*, 6: 124–130
- W. Rademacher. 2000. "Growth retardants: Effects on gibberellin biosynthesis and other metabolic pathways", *Ann. Rev. Plant Physiol. Plant Mol. Biol.* 51, 501–531.