

The Use of Prohexadione-Ca on Control of the Alternate Fruit Production of Pear Cv.Passe Crassane

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Abstract:- The effects of Prohexadione-calcium (P-Ca) on return bloom and on control of the **alternate fruit production** in pear cultivar Passé Crassane were evaluated. A variety of treatment dosages and timings was applied to 4-5 and 6-year-old trees in 3 years of study. The aim of this study was to evaluate the efficacy of applying Regalis by foliar applications in Passé Crassane pear orchards to control the alternate fruit production. Regalis treatments ranging from 50 to 150 ppm were compared with control, without treatments. The first treatment was applied 7 days after petal fall and the others every 10 days after the first treatment. Three different dosages were tested: 50ppm, 100ppm, 150ppm. Data are collected in full flowering, after two weeks (after fruit set) and in harvesting. The data of 4 years show that the flower number was significantly different after the treatment of 150 ppm and 100ppm than the application of 50ppm and without treatment and the Prohexadione-Ca decrease the coefficient of alternate production of the pear cv. Passe Crassane. Results show that treatment with Prohexadione controls alternately producing of the pear cv. Passe Crassane.

Keyword:- Alternate fruit production, Prohexadione-calcium, pear, Passé Crassane

I. INTRODUCTION

Shoot growth control is of fundamental importance in pear. Excessive shoot growth directly competes with fruit growth for assimilates, particularly during the early stages of fruit development when shoot and fruit growth are maximal. This competition may reduce the number of fruit cells, thereby, limiting fruits from reaching their potential fruit size and adversely impacting yield (8).

In order to inhibit excessive vegetative growth in fruit trees are usually used the growth retardants. By other side, the inhibition of vegetative growth (exclusion of apical dominance) may be stimulating differentiation of flower buds. Early workers (6, 7) reported that Prohexadione-Calcium is a plant bio-regulator that is primarily used to inhibit excessive vegetative growth in fruit trees and reduces abortion of fruitlets, thereby increasing fruit set.

The production of the next shorter shoot length can be done with summer pruning or the use of Prohexadione-Ca. But the summer pruning registered the lowest return bloom and accumulated yield (3). While, Prohexadione-Ca did not have any significant negative effect on either return bloom or yield (3). Is evidence that endogenous GA can inhibit floral initiation and that GA can also inhibit floral initiation through effects on shoot growth (2). Also, the Prohexadione-calcium (Regalis) as a shoot growth retardant that inhibits gibberellins biosynthesis, may be used to improve the differentiation of flower buds and fruit set in fruit tree plants. Is evidence that endogenous GA can inhibit floral initiation and that GA can also inhibit floral initiation through effects on shoot growth (1). Other growth retardant as maleic hydrazide increased both endogenous cytokines levels and floral initiation to 'Japanese pear, *Pyrus pyrifolia* Nakai. Has also observed that Pro-Ca did reduce fruit weight in commercial orchards (1), although it appeared that there was no difference in fruit set. In apple, P-Ca applications increased fruit set and correspondingly reduced average individual fruit weight. Return bloom in the year following treatment declined with increasing P-Ca dosage, and appeared to be inversely related to fruit set in the year of treatment (9). In contrast, Costa et al. (9) reported a tendency for both increased fruit size and enhanced return bloom in apple. P-Ca applications alone did not affect return bloom in sweet cherry, although return bloom increased when ethephon was combined with P-Ca. Pro-Ca does not leave residue in plants because it is rapidly inactivated within the tree (7).

The objective of this research was to quantify the efficacy of Prohexadione-calcium (Regalis) on control of the alternate fruit production of pear cv. Passe Crassane.

II. MATERIALS AND METHODS

Investigations of Prohexadione-calcium (Regalis) effect on pear tree cv. Passe Crassane were carried out at the region of Peja, municipality of Kline, Republic of Kosova. The orchard was planted in the spring of 2009. Planting distance were 3 x 1.5 m. Trees were trained as slender spindle. A randomized complete block with four replications, four treatments and two trees per experimental unit was used as the experimental design. Regalis ranging of treatments were as follow:

1. Control without treatment
2. Treatment with 50 ppm (a.i.) Regalis
3. Treatment with 100 ppm (a.i.) Regalis
4. Treatment with 150 ppm (a.i.) Regalis

The first treatment was applied 7 days after the petal fall, the second 10 days after the first treatment, and the third 10 days after the second treatment

The flower numbers per tree, the number of fruits per tree were measured for each year and are summarized for the three years. Differences between means of each treatment were analyzed by the Duncan multiple range test ($P < 0.05$).

III. RESULTS AND DISCUSSIONS

Table.1 summarizes the results of various experiments with «Passe Crassane», in which the effects of different dosages of application of Prohexadione-Ca has been evaluated for three continuous years and return bloom dynamics were evaluated between 2011 and 2014. P-Ca consistently reduced shoot elongation. The number of inflorescences per tree periodically decreased in untreated trees (20-25%) compared to the treated trees

The number of the inflorescences was significantly different between untreated trees and treated trees, only on 2013. On 2012 and 2014 was not significantly different between untreated trees and the treated trees. This indicates that the application of Prohexadione-Ca control the alternate fruit production on pear cv.Passe Crassane.

Table 1 Effect of various treatment dosage of Prohexadione–calcium application on control of the alternate fruit production of pear cv. Passe Crassane

Treatments	Years	R1	R2	R3	R4	Means
V0	2012	38.779	36.0843	39.6852	34.2235	37.188
	2013	24.0155	24.9561	31.3443	28.4395	27.1885
	2014	43.87997	45.09333	44.78626	45.35858	44.7795
V1	2012	44.0352	34.6011	39.3578	27.3404	36.3336
	2013	36.8920	41.7448	29.9914	33.7493	35.5944
	2014	54.16327	42.55931	48.41012	33.62871	44.6904
V2	2012	36.8920	41.7448	29.9914	33.7493	35.5944
	2013	44.0352	34.6011	39.3578	27.3404	36.3336
	2014	56.21198	49.36670	46.00242	47.79894	49.8450
V3	2012	40.4403	32.1750	28.8607	34.4353	33.9778
	2013	40.4403	32.1750	38.8607	34.4353	36.4778
	2014	48.69742	55.10314	39.58869	44.54910	46.9846

As shown in the data of the table 2, the application of the Prohexadione -Ca have a significant impact on the establishment flowers only after years with high production. Prohexadione -Ca increases the number of the flowers at the doses of 100 ppm compared to untreated trees and other dosage of treatments but this difference is significant only on 2013 after one very full bloom year. The number of flowers per trees on 2012 is smaller of 2013 and on 2013 is smaller of the 2014. The reason is that when the experiment started, on 2012, trees were only 3 years old.

Table 2 Effect of various treatment dosage of Prohexadione–calcium application on flower Formation of pear cv. Passe Crassane

The year	Treatments	R1	R2	R3	R4	Means
2012	V0	38.779	36.0843	39.6852	34.2235	37.188
	V1	44.0352	34.6011	39.3578	27.3404	36.3336
	V2	36.8920	41.7448	29.9914	33.7493	35.5944
	V3	40.4403	32.1750	28.8607	34.4353	33.9778
2013	V0	24.0155	24.9561	31.3443	28.4395	27.1885
	V1	36.8920	41.7448	29.9914	33.7493	35.5944
	V2	44.0352	34.6011	39.3578	27.3404	36.3336
	V3	40.4403	32.1750	38.8607	34.4353	36.4778
2014	V0	43.87997	45.09333	44.7862	45.35858	44.7795
	V1	54.16327	42.55931	48.41012	33.62871	44.6904
	V2	56.21198	49.36670	46.00242	47.79894	49.8450
	V3	48.69742	55.10314	39.58869	44.54910	46.9846

IV. CONCLUSIONS

Final inflorescences were generally smaller to untreated trees of pear cv.Passe Crassane, compared to treated trees with Regalis, only after the year of full fruit production. That means that the treatment with Regalis (Prohexadione –Ca) controls the alternate fruit production of pear cv. Passe Crassane.

The number of the inflorescences was different after the treatment of 100 ppm of Prohexadione –Ca than the application of 50 ppm and 150 ppm, but this difference was not significantly.

To define the right application doze and the timing more researches and experiments are required.

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