

THE EFFECT OF REGALIS CONCENTRATION ON THE SHOOT CHARACTERISTICS OF PEAR VARIETY PASSE CRASSANE

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Abstract

The effect of Regalis (Prohexadione Calcium) on shoot growth was evaluated on pear variety Passe Crassane. Three different doses of Prohexadione Calcium were applied: 50 ppm, 100 ppm and 150 ppm. Treatments were compared with control without treatments. 4 foliar treatments were applied with the first one 5 days after petal fall and the others every 10 days after. Significant differences between the control and the treatments were observed.. Final shoot length was generally reduced by treatments by 14.5% to 22% as compared to untreated trees. The length of the shoots was not significantly different between 50 ppm and 100 ppm.

Keywords: Regalis, pear, shoot length.

Introduction

Several techniques have been employed to avoid excessive shoot growth as different types of dwarfing rootstocks, dormant and summer pruning, root pruning, root restriction, stem girdling or sawing, limb bending, breaking or reducing fertilization and irrigation. Alternatively or additionally, plant regulators may be employed for the reduction of shoot growth (Asin, Mass, Musacchi, Pages, Sansavini, Sugar, Vilardell.).

Plant growth regulators that inhibit the development and growth of shoots have been used to reduce the amount of shoot growth and subsequently increase yield. They can be well integrated into orchard production systems. Gibberellin biosynthesis inhibitors have a key role in cell elongation (5,8). The most used growth retardant is the Prohexadione-calcium (Regalis) that has low toxicity and persistence in the plant. The inhibitory effect of Prohexadione-calcium (Regalis) is based on the formation of growth-active gibberellin (8) that leads to a reduction of longitudinal shoot growth.

Trials with Prohexadione-calcium to control vegetative growth of apple, pear and plum trees were demonstrated by other authors (1,8).. The objective of this research was to quantify the efficacy Prohexadione-calcium (Regalis) at three different concentrations, on three treatment times, on pear cultivar Passe Crassane.

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:

Control without treatment

Treatment with 50 ppm (a.i.) Regalis

Treatment with 100 ppm (a.i.) Regalis

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 length of shoots, the number of the nodes, the length of internodes and number of leaves of new growth (current growing season) on 15 randomly selected extension shoots (selected randomly on each tree) was measured at the end of growing season, on 10 October. Differences between means of each treatment were analyzed by the Duncan and Dunnet's multiple range test ($P < 0.05$).

Results and Discussion

Vegetative growth is the parameter the most obviously affected by Prohexadione-calcium (Regalis) applications. The inhibitory effect of the Prohexadione-calcium (Regalis) formation of growth-active gibberellin (8) leads to a reduction of longitudinal shoot growth.

Table 1 summarizes the results of several experiments with 'Passe Crassane', in which the effects of different dosages of application had been evaluated. Final shoot length was generally reduced by treatments by 14.5% to 22 % as compared to untreated trees. The length of the shoots was not significantly different between 50 ppm and 100 ppm. Our results that the successful effects of Regalis use in pear was difficult to achieve confirmed the results of other researchers (3). The treatment of the pome fruit trees with Regalis both a single application of 250 g ha^{-1} (a.i.) or a split treatment with $2 \times 125 \text{ g ha}^{-1}$ (a.i.) led to an average reduction of shoot growth by approximately 40% (9).

Tab1. Effect of Prohexadione –calcium (Regalis) on the length of shoot (cm)

Treatments	Means
V0(control)	28.173 a
V1	23.953 b
V2	23.992b
V3	21.396b

* Separation by Duncan's multiple range tests, at $P < .05$

Tab 2 shows that number of nodes was not significantly differ between non-treated trees and treated trees, while the increase in shoot length in absolute terms was different between treatments. This means that the treatment with Regalis inhibits growth of the shoots but did not prevent the formation of the buds. For this reason the average number of the buds is equal in treated trees and untreated ones.

Tab2. The mean number of nodes per shoots

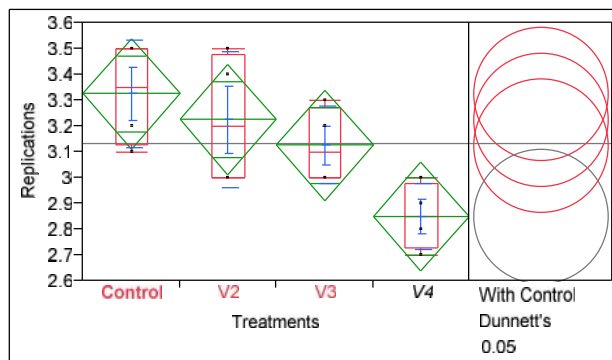
Treatments	Means
V0(control)	8.0107
V1	7,278
V2	7,588
V3	7,501

Evaluation of the data from Table 1 with Table 3 shows that the increase of the shoot length is proportional to the increase of internodes length. This means that the buds formed on the trees treated with Regalis have less competition from the apical dominance of the growing shoot. Consequently, the possibility of their differentiation in flowering must be greater. This has been confirmed by other authors. Excessive vigor could be considered to competitively inhibit flowering through hormonal control (6).

Tab3.The mean length of internodes (cm)

Treatments	Means
V0	3.325 a
V1	3.225a+
V2	3.125a
V3	2.85b

* Separation by Duncan’s multiple range tests, at $P < .05$



As can be seen in Tab.4 the numbers of the leaves were almost equal in all the treated and untreated trees.

Analyzing Tables 1 2 3 and 4 we found that f Regalis has not significantly affect the number of nodes and consequently the number of buds and the number of leaves. This confirms that only shoot growth and internodes length may be controlled by Regalis application.

Tab.4 the mean number of leaves per shoot

Treatments	Means
V0	17.3121a
V1	17.3458a
V2	16.7142a
V3	16.5113a

So, the use of Regalis reduces the apical dominance of the growth of the shoots and maybe promotes the differentiation of flowers on the lateral buds.



(A)



(B)

Figure1. A-treatment with 150 ppm Regalis; B-Without treatment

Conclusions

Final shoot length was generally reduced by treatments by 14.5% to 22 % as compared to untreated trees. The length of the shoots was not significantly different between 50 ppm and 100 ppm.. To define the right application doze and the timing more researches and experiments are required.

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