The Effect of Thinning Flowering Buds on the Effective Fructification of the Pear cv. Abate Fetel in the Region of Vacaria City – Rio Grande do Sul State, Brazil

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Abstract
The majority of pears cultivars with high quality fruits do not have good adaptation to the climate conditions of the southern region of Brazil, mainly due to the chill hours not being enough to fully satisfy the dormancy requirements. The elimination of 50% of the flowering buds in the plants, theoretically should dispose a higher quantity of reserves to the remaining buds, offering a better physiological state for these flowering buds, avoiding flower/fruitlet drop, as the vigor and shoot development occur because of the carbohydrate quantities which are received. The present study aimed to evaluate the influence of flower bud thinning on the effective fructification increase of the cv. Abate Fetel. The experiment was developed at the Frutirol Agrícola company orchard at Vacaria city, Rio Grande do Sul State, on plants of the european pear cv. Abate Fetel, in August 2006. Eighteen plants were selected which received different treatments of bud thinning and six other plants, were kept as controls. The thinning treatments involved the removal of 50%, 70% and 80% of the flowering buds of the plants. After this, four branches were selected on each plant, counting the remaining buds. On the treated plants, only the buds on the branches were counted. The abortion levels were determined from the fruit counts. The experiment was conducted with randomized blocks, with six repetitions, and the percentages of fruits set was the variable analysed. The results indicated that a reduction of 80% of the buds guaranteed a higher percentage of effective fructification on the plants analysed. The other treatments did not show significant differences.

INTRODUCTION
Most of the cultivars of pear trees producing of fruits of high quality do not have good adaptation to the climatic conditions of the South area of Brazil, mainly, due to the winter cold conditions being insufficient to satisfy the dormancy requirements (Petri et al., 2001).

The limiting factors for the culture of European pears in the conditions of the south of Brazil is related to the lack of cultivars adapted to the climatic conditions of the area, lack of appropriate rootstocks and the floral abortion, that in certain cultivars and years it can reach as high as 100% of the buds (Nakasu and Leite, 1992). As noted by Camelato et al. (2000), even with a very large internal market, increase in the production of pears has not been happening, and as a consequence, more than 90% of the national consumption is supplied by imported fruits. The abortion of floral buds of pear trees is one of the most serious problems that have been limiting the expansion of the cultivation of this fruit in the south area of Brazil.
According to Veríssimo (2004), nutritional factors, with emphasis on carbohydrates, floral biology and stress can all be linked directly to the problem of floral abortion in the south of Brazil. The mobilization of the carbohydrates is directly tied up with climatic events, handling of the plant and nutrition. Herter et al. (2001), is studying the mobilization of carbohydrates to try and understand the current problems in the lack of the winter cold in fruits from temperate climates.

According to Byers et al. (2002), the competition for carbohydrates can cause a decrease in the number and size of fruits in the later stages of flowering. Still in agreement with the same authors, in standard environmental conditions and with normal management, the competition for carbohydrates can be reduced by the thinning of young fruits or flowers buds.

The present work had as an objective the evaluation of the influence of thinning of flowers buds on the increase of the effective fructification, productivity and profitability of the ‘Abate Fetel’ pears.

MATERIALS AND METHODS

The experiment was conducted at the orchards of the company Agricultural Frutirol Ltda in Vacaria City - RS, Brazil. The orchard of ‘Abate Fetel’, which was grafted on the rootstock Adams and planted at a spacing of 0.33 x 3.0 m, is located at 980 m altitude, with coordinates 50°42’ W and 28°33’ S. With relation to the winter cold, the climate of the area is considered average for the area with about 809 HF. Eighteen plants were selected these received different treatments of bud thinning and another six plants, maintained as controls (plants without thinning of fruits). In the thinning treatments, 50%, 70% and 80% of the flowers buds were removed manually, in the end of the winter of 2006, before flowering.

The fruit set was determined by counting the fruits remaining on the plants of the respective treatments. The experiment was made in randomized blocks, with six repetitions, and the measured variable was the percentage fruit set. For the analysis of the data, the Tukey’s test at 5% probability was employed.

RESULTS AND DISCUSSION

It was observed that the thinning intensity corresponding to 80% reduction in the number of flower buds guaranteed a higher percentage of effective fructification in the analyzed plants. The other treatments did not give significant differences to each other or to the control (Fig. 1). Theoretically, the elimination of a proportion of the flower buds on the plants, through thinning, should provide larger amounts of reserves, facilitating better physiologic structure for the development of the buds remaining, and so avoid or reduce flower/fruitlet abortion. Herter et al. (2002) have shown reductions in the percentage abortion, in relation to the control of about 20% with an intensity of bud thinning of 50%. Contrarily, Trevisan et al. (2005) have observed that the thinning of 50% of the flowers buds through pruning didn’t influence the index of floral abortion of Pyrus pyrifolia. With relation to the number of remaining fruits per plant, it was observed that there were no significant differences among the different thinning intensities.

The calculation of the productivity allowed us to identify differences among the treatments. In the plants where thinning was not accomplished (controls), the productivity was significantly less than in the plants where thinning was accomplished, independently of the thinning intensity (Fig. 2). Consequently, the profitability of the orchards showed the same behavior as that noted for the previous variable. According to Musacchi et al. (2005) the price paid, in Italy, for the pear ‘Abate Fetel’, is on average 0.45 Euro per kg, then the profitability of the orchards is increased with the intensity of the thinning. It can be observed, in Fig. 2, that with 80% thinning intensity, the profitability increases 55%. Even with intensities of thinning less than 80%, increases were observed comparative to the profitability of the control. This suggests that, thinning of flowers buds before their opening guarantees, besides larger production per hectare, larger profitability to the producer, when trees are planted at 10 thousand trees/hectare.
CONCLUSIONS

The thinning of 80% of the flower buds improved the fruit set, increased the productivity and, as a consequence, the profitability of an orchard of ‘Abate Fetel’ pears planted at 10 thousand trees/hectare.

Failure to thin the buds of ‘Abate Fetel’ reduces the productivity, fruit set and profitability.

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Literature Cited


Fig. 1. Effect of thinning flowering buds on the fruit set and fruit number of the pear cv. Abate Fetel. Averages followed by the same capital letter do not differ significantly for fruit number and those followed by the same lower case letter do not differ significantly for fruit set by the Duncan Test (P<0.05).

Fig. 2. Thinning effect of flowering buds on the productivity, profitability and profitability in percentage of the pear cv. Abate Fetel. Averages followed by the same capital letter do not differ significantly for fruit number and those followed by the same lower case letter do not differ significantly for fruit set by the Duncan Test (P<0.05).