Influence of Technology and Environment on the Pollen Germination Capacity in Cherry

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Abstract

Pollen of four cherry cultivars ('Lapins', 'Kordia', 'Sylvia', 'Regina') was collected and examined with microscope to determine its germination capacity. It was observed that pollen fertility varied from 18.7 % to 80.1 %. Environmental conditions of the studied area as well as applied treatments affected pollen germination capacity. Due to the high maximum temperature recorded in 13.03.2018, bud formation was induced 18 day earlier than in the previous years, growth started on March 31st, when the temperature was 21.5°C. Regarding production, the highest yield was obtained in 'Regina' variety 9.7 kg/tree, 'Kordia' 9.3 kg/tree, 'Lapins' 8.8 kg/tree and Sylvia 8.2 kg/tree. In autumn of the previous year, the trees were fertilized with urea, in a concentration of 3 kg per ha, and in the spring with CROPAID, in a concentration of 5 liters per ha. The results show that germination percentage was much higher in the pollen collected from the treated trees than in the untreated ones.

Keywords: cherry, cultivars, germinability, pollen

Introduction

Sweet cherry is a fruit tree with high economic importance, due to the nutritional, commercial and technological value of the fruits. Being the first fresh fruit of the year, with a high content of vitamins, mineral salts, sugars and other nutrients cherries are one of the most valuable fruits. There are also some other early fruits, starting with the second half of May until July, without competing with other fruit tree species. As previous studies show, pollen germination capacity depends on various conditions, like environmental factors, or fertilizer management would be more appropriate of species and varieties grown (Cordea, 2014; Ercisli, 2007; Zheng *et al.*, 2016).

Aims

The main objective of this study was to investigate pollen germinability of some sweet

cheery cultivars grown in the environmental conditions of Cluj-Napoca city, in 2018.

Materials and Methods

The experiment was carried out in SC FERMA STELUȚA SRL Cluj Napoca, in a recently established orchard, in 2011. Trees were planted at 4 m distance between the rows and 1.5 m between trees in a row, getting a high density of 1666 trees/ha. The plantation has been equipped with a fertilization system with automatic programming and anti-hail support system. In autumn the trees were fertilized with urea, and in spring with CROPAID (natural plant antifreeze). The tree canopy was manipulated according to Zahn Spindel technique. Varieties planted were: 'Lapins', 'Kordia', 'Sylvia' and 'Regina', grafted on Gisella 5 rootstock. Flowers were collected in April, before

Table 1. Germinability percentage of studied varieties

Variety	Germinability percentage (%)
GerLapins with treatment	69.3%
Lapins without treatment	24.1%
Kordia with treatment	58.1%
Kordia without treatment	32.5%
Sylvia with treatment	32.6%
Sylvia without treatment	18.7%
Regina with treatment	80.1%
Regina without treatment	27.8%

Figure 1. Pollen grain germination of 'Regina' cherry cultivars with treatment (a) and without (b) treatment (source: original), microscope magnification 10X **Figure 2.** Pollen grains germination of 'Sylvia' cherry cultivars with treatment (a) and without (b) treatment, (source: original), microscope magnification 10X

opening, from 10 trees of each cultivar, of each variety obtaining a petri box of pollen.

Results and Discussion

Pollen germinability in the four cherry varieties tested under pedoclimatic conditions of Cluj-Napoca was different. The viability rate varied from 18.7 % to 80.1 %. The highest percentage of

viability was recorded in 'Regina' variety while the lowest percentage of viability was observed in 'Sylvia' variety (Tab. 1).

In trees where no treatments have been applied, a low percentage of germination can be observed which leads to a low percentage of fruit binding, thus affecting fruit production.

Conclusion

The results of the present experimental work have led to the conclusion that environmental conditions and applied treatments (urea and CROPAID) affected positively pollen germination capacity. As consequence of the treatments applied, both the germination percentage and the fruit binding percentage had higher values.

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