Researches concerning pollen’s germination of some grape vine varieties in conditions of D.S. Timisoara

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Abstract  Grape vine’s culture was of great importance not only for ancient people form different areas, but also for our ancestors. Out of researches done it results that grape vine was cultivated on the territory of our country even since 700-1000 years B.C.

According to FAO 2010 data the area cultivated in Romania in 2009 with grape vines was of 183814 ha, being on the 11th place in the world.

In this article we made some observations upon Burgund, Muscat Ottonel, Muscat Hamburg and Coarnă neagră grape varieties, which behave differently concerning the flowering process.

The research made pointed out a good flowering process and pollination for Burgund and Muscat Ottonel and differentiated ones for Muscat Hamburg and Coarnă neagră varieties.

Materials and Methods

Research was made in vine plantation of the Didactic Station Timișoara, were we observed 4 varieties of grape vine: Burgund, Muscat Ottonel, Muscat Hamburg and Coarnă neagră

For these varieties we observed their flowering and pollination processes.

The beginning, rhythm and ending of flowering rate is influenced by many factors among which are environmental factors, grape variety and agro-technical measures. Listed among environmental factors: temperature, humidity, light and nutrition regimen.

The beginning of flowering was noted when the first flowers opened, the middle of flowering was considered when they were open more than 75% of inflorescences, and the end was noted when opened with all the flowers.

Inflorescences harvest was made in the experimental field of discipline where experience located were made in the laboratory where pollen grains were put to germinate.

Midst for germination was solid, consisting of agar agar, sucrose and boric acid. At a pH too acid or an incorrect autoclaving agar remains in semi-state, the midst being not proper for use. Nutritional role of environment in the germination of pollen grains vine is influenced by germination temperature.

In all four varieties has been used fresh pollen.

Pollen was assigned to the blades, by which we count grains and measured them.

The first reading was performed after 3 hours and 6 hours, 12 hours and 24 hours. Excess moisture in the soil and air physiological causes outside of delay flowering, and discharge of liquid sugar from the stigma. Hasten its failure causes flowering, and dehydration of pollen grains and stigma. Under 40% RH, flowering does not occur or occurs very slowly.

Results obtained

Flowering vine in DS Timisoara in 2011 started when air temperature was 16°C. Analyzing the flowering is noted that the first day open only a few flowers on the inflorescence in 3-4 days intensifying the flourishing about 15-22% of the flowers and the following day, the seventh day about 70-80% bloom of their total.

Flowering depends according to variety, inflorescence position on the shoot and the root hub or
Flowers of inflorescences opened during 4 days at Muscat Hamburg and black horns. Regarding the duration of flowering it ranged from 7 days for Burgundy and 9 days for Muscat Hamburg and Coarnă Neagră.

![Inflorescence and pollen at the vines](image)

**Fig. 1 Inflorescence and pollen at the vines**

**Table 1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Nr.of days/inflorescence</th>
<th>No.of days/variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burgund</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>M. Ottonel</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>M. Hamburg</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Coarnă Neagră</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

The essence of processes during flowering is not given by flower blooming and pollination, but by fecundation.

Fecundation is done when pollen grains get on stigma and find proper conditions for germination.

Pollen grains germinate when exine is bursting near germinative pores. Exine’s bursting is due to midst released water’s diffusion speed, which is absorbed by pollen.

Our researches refer to pollen grains’ diameter determination (table 2) and its capacity to germinate (table 3).

We can see that mature pollen grains have a shape similar to wheat grains. On the surface of fertile pollen grains there are observed 2-3 longitudinal gutters of which will open 2-3 germinative pores.

Concerning pollen grains’ shape of Burgund and Muscat Ottonel varieties there were more normal shaped pollen grains, meaning 39 of 62, respectively 85 of 119, while for Muscat Hamburg and Coarnă neagră, varieties known for their floral deficiencies, there were less normal shaped pollen grains, meaning 15 of 69, respectively 41 of 128.

Pollen is in general uniform as size for fertile grains, while smaller pollen grains of acorn shape or almost of round shape are sterile and don’t have germinative pores.

According to variation limits of pollen grains for grape vines, we can see that normal pollen grains have length dimensions of 30 microns for Burgund variety and 26 microns for Muscat Ottonel variety, while their width is of 16 microns for Burgund variety and 15 microns for the other varieties.
In table 3 we present data referred to pollen’s germination. For Burgund and Muscat Ottonel varieties 62.0 %, respectively 71.72 % of pollen grains germinated, normal percentages, while for Muscat Hamburg and Coarnă neagră varieties the percentages of germinated pollen grains were much lower at 21.74 % and 28.09 %.

Germination dynamics was different for Burgund and Muscat Ottonel varieties, most of the pollen grains germinated after 3 ore, 34 respectively 84 and very few pollen grains germinated in the interval 3-6 hours.

For Muscat Hamburg and Coarnă neagră varieties pollen grains’ germination was extended up to 12 hours.

Conclusions

Flowering and fruit binding phenophase is decisively for the amount and quality of vine grapes’ production. In general, grape vine has an overloading tendency, which is why in most cases there are no major problems concerning the number of binded fruits.

References