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FLOWERING AND POLLINATION STUDIES AT SOME STRAWBERRY CULTIVARS

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Abstract

Efficient pollination is fundamental for guaranteeing productivity of strawberry. The objective of this study is to investigate the effects of flowering and cross-pollination fruit set and seed number per fruit.The study carried out has revealed the main characteristics required for a good pollinizer, including: flowering, high viability and fertility of pollen grains, corresponding to high germinability.

Key words: *strawberry, flowering, cross-pollination, pollen germination, fruit set*

INTRODUCTION

Intraspecific hybridization is the main method for creation of strawberry variability, but to obtain seedlings with superior characteristics of their genitors and to avoid inbreeding is necessarily to use a large parental base. Comparative with other fruit species, the strawberry has the advantage of a short generative cycle. The low genetic recombination is often responsible for a relatively breeding low efficiency. That's why to obtain valuable combinations of characteristics, a big number hybridization it has to be made [7].
The main elements that influence the fruit setting are: the calendaristic date of flowering, its duration and environment conditions. This study emphasizes the hybridization compatibly of 9 strawberry varieties: 'Premial', 'Alba', 'Miss', 'Record', 'Mira', 'Onebor', 'Honeoye', 'Benton', 'Elsanta', 'Cambridge Favourite'.

MATERIAL AND METHOD

Investigation had been made in spring 2012, at Research Institute for Fruit Growing Pitesti and they consist in making controlled hybridization between 9 varieties with different characteristics: earliness, productivity, fruit quality and disease resistance. The following operations: selection of the flowers for pollination, flowers isolation; pollen conservation, pollination and achenes extraction, were made
For statistical processing has been used the number of days starting with the fist of January till flowering beginning [6].
Concerning statistical interpretation, there were calculated arithmetical average, the minim (the most earliest value of the flowering and of the ripe maturity), the maxim (the most late value of the flowering and the ripe maturity), amplitude (days), variability coefficient (s%) and standard deviation.
The way of calculations for determination of the variability coefficient (s%) was based on known methods [2,1] that admit arbitrary the next values:
- 0-10% - the variation coefficient little;

- 10-20% - the variation coefficient average;
- 20-30% - the variation coefficient big.

RESULTS AND DISCUSSIONS

The beginning of flowering is characteristic of each variety, being genetic determined. It takes place year by year, in the same succession, always the same, indifferently from the evolution of weather conditions from the beginning of the vegetation.

In 2012, the beginning of flowering tooks place on April 24th ('Premial') and on May 5th ('Mira'). The duration of flowering was between 9 days at 'Premial' and 20 days at 'Cambridge Favourite', ending on May 21st (Table 1).

Regarding the ripening fruits, the earliest variety was 'Premial' that with full ripening on May 25th and the latest variety was 'Record' that was full ripened of July 7th (Table 1).

Table 1. Phenological observations of strawberry cvs. flowering

No.	Cultivar	Early flowering	Late flowering	Early ripening	Full ripening
1	Premial	04.24	05.03	05.18	05.25
2	Honeoye	04.28	05.12	05.20	05.28
3	Miss	04.29	05.17	05.22	05.30
4	Benton	01.05	05.16	06.01	06.05
5	Cambridge Favourite	05.01	05.21	05.26	06.02
6	Elsanta	05.02	05.21	05.28	06.03
7	Onebor	05.03	05.18	05.28	06.04
8	Record	05.03	05.20	06.03	06.07
9	Mira	05.05	05.18	05.27	06.04

The average date of flowering at all strawberry varieties was on May the 1st, and the average data ripening was June the 1st.

The amplitude between the earliest and the latest value of flowering is 11 days, and between the earliest ripening and the latest ripening 13 days (table 2).

The variation coefficient (s%) has values between 2.69 and 2.83, that shows a little variation. According to the literature, in case of characteristics with a low variation coefficient value, exist the possibility of there inheritance [3] (table 2).

Tabel 2. Early flowering and fullt ripening index (days),coefficient of variation (%) and standard deviation

Year 2012	Flowering	Fruit ripening
Average: days	121.67	153.78
date	05.01	06.01
Minimum	115	146
	04.24	05.25
Maximum	126	159
	05.05	06.07
Amplitude	11	13
Coefficient of variation (%)	2.69	2.83
Standard deviation	3.28	4.35

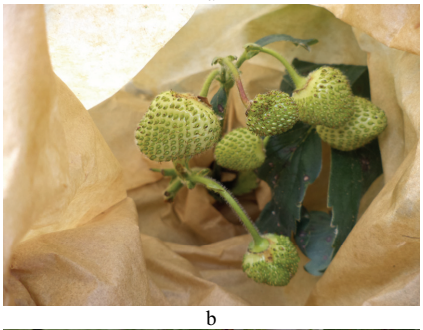
Dates concerning number of the pollinated flowers, number of set fruit and number of achenes / fruit, are presented in table 3. So, in the spring of 2012, were made 11 hybrid combinations, being artificial pollinated 779 flowers, resulting 623 hybrid fruits, and finally 20,510 achenes. Number of pollinated flowers on combination was between 24 ('Miss' x 'Premial' and 'Premial' x 'Miss') and 210 ('Benton' x 'Onebor').

The set fruit ranged from 50% ('Miss' x 'Premial') and 100% ('Record' x 'Mira').

Table 3. Cross combinations

No.	Cross combinations	No. of pollinated flowers	No. of fruit set		No. of achenes /fruit
			No.	%	
1	Miss ×Premial	24	12	50%	28
2	Premial × Miss	24	20	83%	34
3	Record × Premial	40	37	93%	13
4	Premial × Record	80	77	96%	9
5	Record × Mira	30	30	100%	26
6	Mira × Record	27	21	78%	47
7	Benton × Onebor	210	149	71%	36
8	Onebor × Benton	120	107	90%	46
9	Mira × Honeoye	44	37	84%	66
10	Benton × Cambridge Favorite	120	102	85%	34
11	Elsanta × Cambridge Favorite	60	31	52%	15
	Total	779	623	-	-
	Average	-	70.81		32.18

a



b

c

Photo 1. 'Miss' x 'Premial' cross pollination in open field

CONCLUSIONS

The study concerning the compatibility at hybridization of the 9 varieties of strawberry has shown that there are large differences of compatibility between varieties, there having different behavior as maternal or paternal genitors.

The full percent of fruit set was recorded at combination 'Record' x 'Mira', while 'Mira' x 'Record' had only 78% fruit set.

The combination 'Miss' x 'Premial', achieved the lowest percentage of fruit set (50%), while 'Premial' x 'Miss' recorded a percentage of 83%.

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