POLLEN FERTILITY AT DIFFERENT GENOTYPES OF SUNFLOWER

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Abstract

The aim of the work was research of pollen fertility at different sunflower genotypes. Hybrids, sorts and sunflower lines of different origins (Romania, Yugoslavia) are used in this project. There are 28 genotypes. Romanian sort RECORD was used as a standard. Investigation was parallel undertaker at two localities Fundulea (Romania) and Zaječar (Yugoslavia) for two years. Very important differences have been noticed in pollen fertility. The highest values were carried out by the lines AC/90-3719A, AC/90-3688A, AC/90-3851B, 865418/26 and by hybrids NS-H-52 and NS-H-OLIVKO.

Key word: sunflower, genotype, pollen fertility

Introduction

Vranceanu and Smith (1974) investigated the influence of climatic conditions to pollen fertility. They established that low or high temperatures during the period of flowering have a great influence to pollen fertility. Also, photoperiodism has an influence, especially the length of day light. Segala et al., (1980), proved that 50% of self fertility is related to self compatibility. Škoric et al., (1989) emphasized that environmental conditions have also influence to pollen fertility. Long rains, high temperatures, low relative air humidity and absence of bees are very unfavorable for pollination and fertilization.

As it is known the sunflower is entonomofil plant. The pollen fertility at sunflower has a great influence to self fertility. Fertilization of its flowers and forming of achenia at most of genotypes mostly depends on insect activity. Bees are the most important pollinators.

Favorable conditions for sunflower growth (optimal humidity, fertilization, vegetation area etc.) increase extraction of nectar that is very important for attraction of bees. The optimal temperature for flowering is between 20° and 26°C. Temperatures above 30°C affect pollen germination. Keith Mc Donll, (1972) found out that young bees yield certain stimulants which accepted by adult bees increase their activity in pollen collection.

Karl von Frisch (1967) studied the way of bees intercommunication and establish-hed that for such communication the following factors are important: type of pollen, pollen quantity, distance from pollen source etc. Germination of pollen is very important in both cases - open pollination and self pollination.

The aim of this research is determination of pollen fertility at different sunflower genotypes.

Material and methods

In this research genotypes of sunflower (cultivars, hybrids and lines) were of different origins (Romanian and Yugoslav). Altogether 28 genotypes of sunflower were examined. Romanian sunflower cv "Record" was used as a standard. The investigations were done at two localities: ICCPT - Fundulea, Romania and Center for Agricultural and Technological Research, Zajecar, Yugoslavia for two years. The pollen fertility was determined by the Alexander's method. Determination of pollen fertility was done with five pollen samples of each genotype.

Results

At genotypes with a high percentage of self fertility the pollen germination had an important role. The highest values of pollen fertility established at the locality of ICCPT Fundulea were at the following genotypes: AC/90-3719A, AC/90-3688A, AC/90-3851B, AC/90-3787, AC/90-3680B, AC/90-3654B, AC/90-3716A, 865418/26 and 46641/26 (table 1). These differences are considerable and are greater than standard for 36 to 60%.

The hybrids NS-H-52, NS-H-OLIVKO, SELECT, TURBO, DOMINO and FESTIV distinguishably differed in pollen fertility at both of the localities.

According to the standard, the differences are greater for 23 to 35% (table 2). The lowest pollen fertility values were measured at the locality Zajecar at lines AC/90-3661B, AC/90-3679B, AC/90-3709B, R-1131033/2 and Dž-238/1 (table 2).

Discussion

At favorable conditions pollen's grains germinate in 5 to 10 minutes. The environment conditions have a great influence to pollen germination. The air humidity and temperature at two year long period at the locality ICCPT, Fundulea were within normal limits without extreme values. At the locality Zaječar at the research period the climate conditions were not optimal during the period of flowering. These conditions had negative impact to pollen germination.

Conclusions

This research established considerable differences at pollen fertility at different genotypes of sunflower. High pollen fertility was established at the following lines AC/90-3719A, AC/90-3716A and AC/903688A at both of the localities. The hybrids NS-H-OLIVKO, NS-H-52, SELECT, FESTIV, TURBO and DOMINO had the highest percentage of pollen fertility.

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Table 1. Pollen fertility at different genotypes of sunflower in period 1991-1992., locality ICCPT - Fundulea, Romania

No.	Cultivar, hybrid or line		Pollen fertility (%)	% of standard
1.	Record (st)	RO	51.55	100
2.	Kolos	YU	60.95	118
3.	Turbo	RO	65.70	127
4.	Domino	RO	65.65	127
5.	Festiv	RO	64.25	125
6.	Select	RO	67.80	132
7.	NS-H-OLIVKO	YU	68.50	133
8.	NS-H-27	YU	59.40	115
9.	NS-H-43	YU	59.50	115
10.	NS-H-52	YU	69.85	135
11.	AC/90-3654B	RO	71.55	139
12.	AC/90-3680B	RO	71.45	139
13.	AC/90-3787B	RO	72.95	142
14.	AC/90-3851B	RO	73.70	143
15.	AC/90-3688A	RO	77.85	151
16.	AC/90-3670A	RO	64.85	126
17.	AC/90-3719A	RO	80.90	157
18.	AC/90-3716A	RO	70.20	136
19.	AC/90-3661B	RO	52.60	102
20.	AC/90-3679B	RO	52.50	102
21.	AC/90-3709B	RO	60.95	118
22.	R-1131033/2	YU	52.35	102
23.	DŽ-238/1	YU	57.85	112
24.	358931/3	YU	62.50	121
25.	46641/23	YU	68.65	133
26.	502441/2	YU	62.10	120
27.	865418/26	YU	69.40	135
28.	93221/22	YU	66.65	129

Table 2. Pollen fertility at different genotypes of sunflower in period 1991-1992., locality Zaječar, Yugoslavia

No.	Cultivar, hybrid or line		Pollen fertility (%)	% of standard
1.	Record (st)	RO	57.45	100
2.	Kolos	YU	61.10	106
	Turbo	RO	67.75	120
4.	Domino	RO	68.60	119
5.	Festiv	RO	69.55	121
6.	Select	RO	68.95	120
7.	NS-H-OLIVKO	YU	63.85	111
8.	NS-H-27	YU	62.30	108
9.	NS-H-43	YU	59.2	103
10.	NS-H-52	YU	59.60	104
11.	AC/90-3654B	RO	74.00	129
12.	AC/90-3680B	RO	78.85	137
13.	AC/90-3787B	RO	79.60	139
14.	AC/90-3851B	RO	72.40	126
15.	AC/90-3688A	RO	81.00	141
16.	AC/90-3670A	RO	75.90	132
17.	AC/90-3719A	RO	85.15	148
18.	AC/90-3716A	RO	85.45	149
19.	AC/90-3661B	RO	52.45	91
20.	AC/90-3679B	RO	52.75	92
21.	AC/90-3709B	RO	51.35	89
22.	R-1131033/2	YU	49.65	86
23.	DŽ-238/1	YU	49.25	86
24.	358931/3	YU	49.35	86
25.	46641/23	YU	57.75	100
26.	502441/2	YU	61.25	107
27.	865418/26	YU	64.90	113
28.	93221/22	YU	64.75	113