PHENOTYPIC STABILITY OF SOME CYTOPLASMIC MALE STERILITY INBRED LINES OF CARROT (*DAUCUS CAROTA L.)* IN SOUTH COUNTRY CONDITIONS

STABILITATEA FENOTIPICĂ A UNOR LINII CONSANGVINIZATE DE MORCOV (*DAUCUS CAROTA* L.) ÎN CONDIȚIILE DIN SUDUL ȚĂRII

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Abstract. *The investigation was carried out during 2006 – 2007 years, at ICDLF Vidra, when we studied 10 androsterile inbred linies of carrots (5 brown anther types of male sterility and 5 petaloid type of male sterility) regarding of male sterility stability for used them like matern genitors in F1 comercial hybrids. The studies of the plants has done in blossoming phenophase during these two years of experiments. The petaloid type of male sterility reflection they were been with much more stability comparative with brown anthers types of male sterility. The PMV5 line, petaloid type, was the most stable (98,7% male sterility plants), and the ABMV3 line, brown anther type, was the most unstable (78,6% male sterility plants)*

Rezumat. *In anii 2006 - 2007, la ICDLF Vidra, au fost studiate 10 linii consangvinizate androsterile de morcov (5 androsterile de tip „antere brune" si 5 androsterile de tip „petaloid") sub aspectul stabilitatii caracterului androsterilitate, in vederea utilizarii lor ca genitori materni ai hibizilor F_1 comerciali. Aprecierea plantelor s-a facut pe toata durata fenofazei inforitului, in conditiile de mediu din cei doi ani de experimentare. Liniile androsterile de tip petaloid s-au remarcat ca fiind mult mai stabile comparativ cu liniile androsterile de tip antere brune. Linia PMV5, de tip petaloid, a fost cea mai stabila (98,7% plante androsterile), in timp ce linia ABMV3, de tip antere brune, a fost cea mai instabila (78,6% plante androsterile).*

The heterosis effect were emphasized at carrots early (1943), but the peculiarities of the species concerning the floral biology and the reproductive system were a limitative factor to obtain the F1 comercial hybrids. It was possible after the identification of the androsterile plants, of brown anthers type by Welch and Grimbell in 1947 and the petaloid type by Munger in 1953 (Peterson and Simon, 1986). According as to identify of the male - sterile plants and to establish of genetic determinism for male sterility it was established the methods for obtain the carrot hybrids.

The male-sterility of carrot is nucleocytoplasmic and it is determined of the cytoplasmic factor (S_P type) in interaction with two dominant nuclear genes (M_s), for the petaloid type and of the cytoplasmic factor (S_A type) in interaction with two recessive nuclear genes (ms) in homozygotic state for the brown anthers type (Morelock, 1974).

From the outset it was put the problem of lines stability, in the those conditions, for the male sterility character because the male -sterile lines segregate for the partial fertility and modify the genetic constitution and the economic value of the hybrid seeds (Hansche and Gabelman, 1963; Barbara Michalik, 1978).

In the all conditions of the work, the petaloid male - sterility were more stable like the brown anthers male sterility (Eisa and Wallace, 1969; Chada and Frese, 1981; Gauchene, 1989; Elena Chira, 1998) and this is the reason for they are favorite for breeding, with all the drawbacks (the plants of petaloid type are less visited of the pollinated insects).

Because the carrot male - sterility is genetic determined but in the same time it is influenced by natural conditions, the main objectiv in the breeding program from ICLF Vidra was to identify androsterile sources for obtain inbred lines with more phenotypic stability in the south country conditions and to used them like matern genitors for create the F1 comercial hybrids.

MATERIAL AND METODS

With a view purposed achievement, at ICLF Vidra, in 2006 – 2007 years, the identified androsterile plants of carrots have beed studied for the phenotypic stability of male sterility character during the whole phenophase of blossoming.

The biologic material studied was represented of 6 inbred male- sterile lines (3 of brown anthers type and 3 of petaloid type).

To the opening flowers, from the main or equivalent inflorescences, were marked the male sterile plants of brown anthers type or the petaloid type, the plants were marked and were pollenizated with pollen from male - fertile analogous, in the sight to obtain of seed.

According as opening of the flowers from the superior order inflorescences, the plants were analizated about the flower type. Those who were identified with the fertile flowers (just the existence of one stamen blooming with viable pollen) they were eliminate from selection.

These plants represented the descents of stable homozigote male- sterile lines in the natural conditions from the previous years. The determinations were realised on 300 of seminal plants for each line of brown anthers type and on 250 of seminal plants for each line of brown anthers type.

The dates presented are the average values for those two years of researches. The experimental dates were analysed with the multiple comparisions method (the Duncan test), in the sight of establish the significance of the lines diferences, (Ceapoiu, 1968).

RESULTS AND DISCUSSIONS

Analysing the experimental dates obtained we noticed as in the period of two years of researches (with the temperatures exceeded 33^0C during the phenophases of blossoming) the androsterile linies with brown anthers L ABMV2 and L ABMV5 proved to be stable in the whole period of the blossoming phenophase and they have over 90% male - sterile plants, respectively 92,12 and 91%.

The male - sterile types with brown anthers LABMV1, LABVMV4 and LABMV3 segregated for partial fertility at 4 and 5 order of inflorescences. The

percent of the male- sterile plants was only 78,6% for the LABMV3 line. (Table 1, figure 1).

In the same conditions, the petaloid male- sterile lines were phenotypic stable with the male- sterile plants percents from 98,7% for LPMV5 line to 95,66% for LPMV11 line (Table 2, Figure 2).

The male - sterile lines with over 90% male - sterile plants can be considered stable lines. The brown anthers type of male -sterile line LABMV3 with 78,60% male - sterile plants will be eliminated and the lines LABMV1 and LABMV4 will be studied for descents in the next years.

Table 1

The male - sterile inbred lines of brown anthers type at carrot

No.	Code of mal - sterile line	Male- sterile plants %	Semnification *
1	ABMV2	92,12	a
2	ABMV5	91,00	a
3	ABMV1	85,44	b
4	ABMV4	84,88	b
5	ABMV3	78,60	c

*Variants having the same letters do not differ significantly for the level of P=5%

Fig. 1 – Brown anthers type of flowers at carrot

Fig. 2 – Petaloid type of flowers at carrot

Table 2

The androsterile inbred lines of petaloid type at carrot

No.	The code of male- sterile line	Male- sterile plants %	Semnification
1	PMV5	98,70	a
2	PMV3	97,33	a
3	PMV7	97,00	a
4	PMV30	97,00	a
5	PMV11	95,66	b

**Variants having the same letters do not differ significantly for the level of P=5%

CONCLUSIONS

The study of brown anthers type and petaloid type inbred lines at carrot in 2006 – 2007 period, in conditions from ICDLF Vidra, placed in the south of country proved following conclusions:

The petaloid type of androsterile inbred lines are phenotypical stable for this area, with 95% androsterile plants.

The LABMV2 and LABMV5 were the most phenotypical stable among the brown type of inbred lines, with 90% androsterile plants.

The petaloid type of androsterile lines are more phenotypical stable as the brown anthers type and they will be used like matern genitors to obtain the comercial hybrids of carrots.

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