RESEARCH ON SEGREGATION OF FORM AND COLOR GRAIN CHARACTERS IN F2 HYBRID GENERATION OF *PHASEOLUS VULGARIS* L. SPECIES

CERCETĂRI PRIVIND SEGREGAREA CARACTERELOR FORMA ŞI CULOAREA BOBULUI, ÎN GENERAŢIA HIBRIDĂ F2, LA SPECIA *PHASEOLUS VULGARIS* L.

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Abstract. *In the South - East of Romania has a great potential for growing garden beans, so that explains that during the initial collection of biological material (in 2005) was found many cultivars with pronounced morphological and physiological variability. If the grain morphological characters were considered the results of crosses between parental types showing different characters in the shape (round grain or flat grain) and color (light grain or color grain). The hybrids obtained in the F1 generation showed intermediate characters from parental forms only five hybrids produced. These hybrids were crossed among themselves to see how segregated pairs characters of shape and color grains. To see if this segregation is purely coincidence or it is a legitimate segregation, we applied χ2 test (for comparing the theoretical distribution of characters followed by the experimental).*

Key words: segregation of characters, french bean

Rezumat. *În zona de Sud – Est a României există un potenţial deosebit de cultivare a fasolei de grădină, motiv care explică faptul că în perioada de colectare a materialului biologic iniţial (adică în anul 2005) s-a găsit un număr mare de cultivare cu o variabilitate morfo-fiziologică pronunţată. În cazul caracterelor morfologice privind bobul, s-au avut în vedere rezultatele încrucişărilor între formele parentale prezentând caractere diferite în privinţa formei (bob rotund sau bob aplatizat) şi a culorii (bob deschis sau bob colorat). Dintre hibrizii obţinuţi, în generaţia F1 au prezentat caractere intermediare faţă de formele parentale doar cinci dintre hibrizii obţinuţi. Aceşti hibrizi au fost încrucişaţi între ei pentru a observa modul de segregare a perechilor de caractere privind forma şi culoarea boabelor. Pentru a vedea dacă această segregare are un caracter pur întâmplător sau este vorba de o legitate a segregării, am aplicat testul χ^2 (pentru a compara distribuţia teoretică a caracterelor urmărite cu cea experimentală).*

Cuvinte cheie: segregarea caracterelor, fasole de grădină

INTRODUCTION

The literature mentioned as responsible for the color grains several genes, among which the most important are: ASP - for opaque skin, rough (H. Lamprecht, 1960), B - for the white skin with purple tinge (Br, Vir), Bip and bip in combination with Arc - extend the color of skin, C with P - yellow skin, Cma (M,

RMA) - uniform drops, which not segregates; Cr - mottled skin, Cres - drops or spots on the skin; Crho - diamond spots; cst - and with stripes on seeds - creamy, The (prpse) with TPV produces seeds brown wrapper, with a strong effect of linkage with green pods with purple stripes, Cr (r) - White skin , Cav - folds in skin, only homozygous, J (Sh) with P gives yellow-brown skin or light ocher, L - inhibit or restrict the partial coloring of skin, with t - bleaching occurs entirely, L and L in combination with z Z and give more color spots, P - Basic color gene Points - points on skin, T - one color and t - (z - l) - skin model, St ts - without streaks, St Ts - st Ts and ts st - full stripes, V (BL) - from violet to black, v - Brown, Z - the size of the background skin spots at the stained - L and T - is spot number 7 .

The aim is to study segregation of traits shape and color grains in F1 and F2 generations, for the hybrids derived from different genitors in terms of these morphological traits.

MATERIAL AND METHOD

Experimental method was hybridological analysis, based on visual observation of shape and color grains of hybrids obtained in F1 and F2 hybrid generations, compared to parental forms.

To see if this segregation is purely coincidence or it is a legitimate segregation was applied χ2 test (for comparing the theoretical distribution of characters followed by the experimental).

Because of the ten hybrids obtained, only five were different from the parents for traits studied, application χ2 test was performed to, respectively: H1 - Inka ♀ x Carson ♂, H2 - Inka ♀ x Jutta ♂, H4 - Lingua di Fuoco♀ x Carson ♂, H5 - Lingua di Fuoco ♀ x Jutta ♂ şi H8 - Lingua di Fuoco ♀ x Movila Miresii ♂.

The statistical method of calculation was to calculate indices: number of grains observed number of grains calculated theoretically (e) difference (d) square difference (D2) and the ratio of square difference and number theory d2 / e.

χ2 test was performed formula: $\chi^2 = \Sigma d^2/e$

RESULTS AND DISCUSSIONS

From hybrids obtained in the F1 generation showed intermediate traits of parent plants (fig. 1 and fig. 2) the hybrids: H1 (Inka ♀ x Carson ♂); H2 (Inka ♀. x Jutta ♂); H4 (Lingua di Fuoco ♀ x Carson ♂); H5 (Lingua di Fuoco ♀ x Jutta ♂); H8 (Lingua di Fuoco ♀ x Movila Miresii ♂).

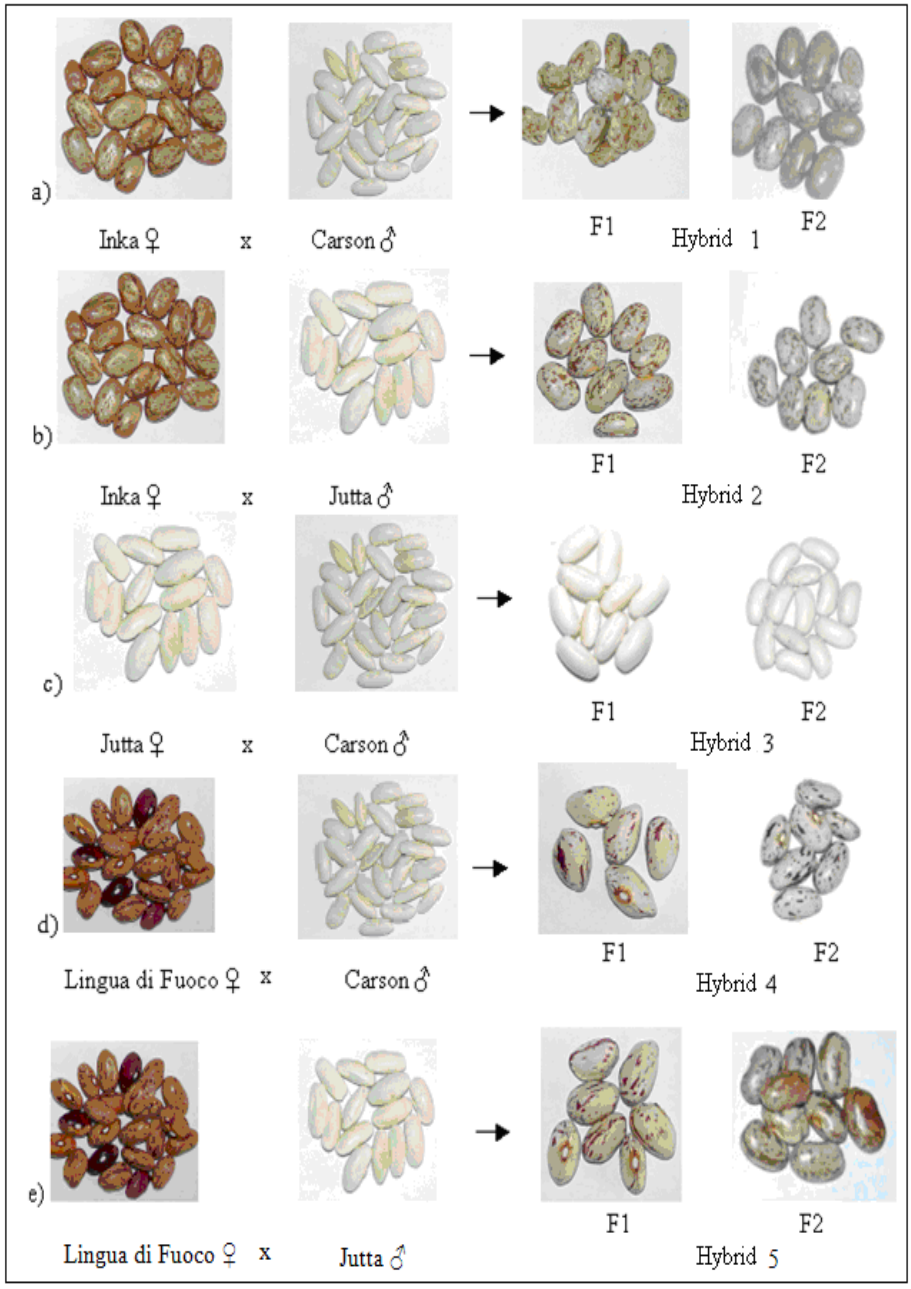

Fig. 1. Shape and color of the grains in hybrids H1 - H5, compared with parents

These hybrids were crossed among themselves to see how the segregation of pairs of characters on shape and color grains.

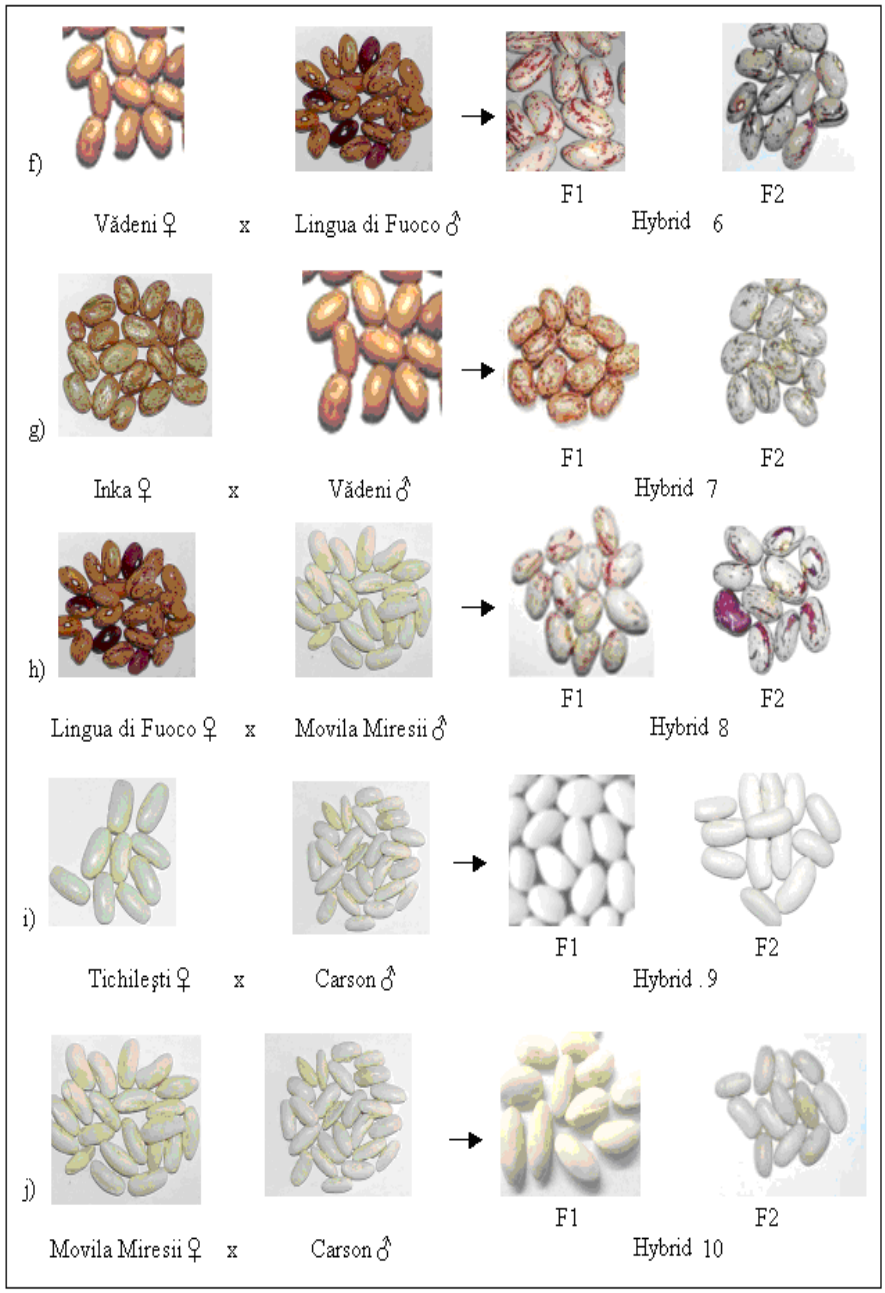

Fig.2. The shape and color grains of H6 - H10 hybrids compared parents

To see if this segregation is purely coincidence or it is a legitimate segregation, we applied the $\chi 2$ test (for comparing the theoretical distribution of characters followed by the experimental distribution).

Estimating the probability of repetition of these two pairs of characters of the seeds, using $\chi 2$ test for the 5 hybrids, we found that segregation of the two pairs of characters held in the ratio 9: 3: 3: 1 (table 1).

Table 1

Calculation results on grains shape and grains color using $\chi 2$ test

Hybrid	Data	Number of grains				$\chi^2 = \Sigma d^2/e$
		Round and colorful	Round and white	Flat and colorful	Flat and white	
H1	Observed	108	36	41	15	1.066
	Calculated (e)	112.5	37.5	37.5	12.5	
	Difference (d)	4.5	1.5	-3.5	-2.5	
	d^2	20.25	2.25	12.25	6.25	
	d^2/e	0.18	0.06	0.326	0.5	
H2	Observed	110	40	35	15	0.881
	Calculated (e)	112,5	37,5	37,5	12,5	
	Difference(d)	2.5	-2.5	2.5	-2.5	
	d^2	6.25	6.25	6.25	6.25	
	d^2/e	0.055	0.16	0.166	0.5	
H4	Observed	107	40	42	11	1.154
	Calculated (e)	112,5	37,5	37,5	12,5	
	Difference (d)	5.5	-2.5	-4.5	1.5	
	d^2	30.25	6.25	20.25	2.25	
	d^2/e	0.268	0.166	0.54	0.18	
H5	Observed	115	36	40	9	1.261
	Calculated (e)	112,5	37,5	37,5	12,5	
	Difference (d)	-2.5	1.5	-2.5	3.5	
	d^2	6.25	2.25	6.255	12.25	
	d^2/e	0.055	0.06	0.166	0.98	
H8	Observed	107	42	38	13	0.834
	Calculated (e)	112,5	37,5	37,5	12,5	
	Difference (d)	5.5	-4.5	-0.5	-0.5	
	d^2	30.25	20.25	0.25	0.25	
	d^2/e	0.268	0.54	0.006	0.02	

Thus, the hybrids H2 and H8, which $\chi 2 = 0.881$ and 0.834 respectively, included in the Fisher table between 0.58 and 1.01, meaning between probability P = 0.9 and 0.8, it can say that if we will repeat this experience we will obtain similar results in 90 to 80% of cases.

Similarly, it can say that for hybrids H1 (Inka ♀ x Carson ♂); H4 (Lingua di Fuoco♀ x Carson ♂); H5 (Lingua di Fuoco ♀ x Jutta ♂) the probability to obtaining similar results is 75 -80%.

CONCLUSIONS

1. Study on segregation of grain shape and grains color traits in hybrids produced, supplemented by comparing the theoretical distribution of the phenomenon that obtained experimentally ($\chi 2$ test) received a report of

segregation, like Mendelian theory, 9: 3: 3: 1, corresponding dominant relationship in case of dihybridization.

2. Hybrids obtained can be used in obtaining new lines of beans, grain shape and color traits watching as required and the results obtained for these traits until now.

3. It can make further studies on the relationship between these two traits studied and the protein content and resistance to pathogen or pest attack, also.

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