

THE PHENOTYPISATION OF SOME QUANTITATIVE CHARACTERS IN ROUMANIAM AND SOUTH AMERICAN BEAN CULTIVARS, IN SIMILAR ENVIRONMENTAL CONDITIONS

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Abstract: In similar environmental conditions, the average height of plants, the average number of bean pods/plant and bean pod average length registered close values in cultivars of *Phaseolus vulgaris*, originated from Romania and from Chile, while for bean pods weight/plant and bean seeds weight/plant significant differences were obtained.

INTRODUCTION

We appreciate that a comparison between some bean cultivars, grown in similar environment conditions, may offers useful data for next action of selection and melioration, by hybridisation. For this, many bean cultivars from Chile, Bolivia and Romania were grown in the same conditions, in the field of Agriculture Research Station "Podu Iloaie", Iasi county (in Romania).

THE AIM OF INVESTIGATIONS

The aim of this work is to realise a comparative analyse on the manifestation of certain quantitative characters in 14 bean cultivars with different origin (six Romanian cultivars and eight South American cultivars), but grown in similar experimental conditions.

MATERIAL AND METHODS

The studied biological material was constituted by individuals of *Phaseolus vulgaris* species, respectively six cultivars originated from Romania (*Diva*, *Star*, *Vera*, *Ami*, *Avans*, *Ardeleana*) and eight from Chile (*Chile Orfeowia*, *Chile Pinto 114*, *Arroz Tuscola*, *Chile Tortola*, *G 21212*, *Dor 364*, *Bat 882*, *Bat 477*) which were cultivated in the experimental field of Agricultural Centre Podu Iloaie. We made metric determinations of plant height, number of bean pods/plant, weight of bean pods/plant, weight of bean seeds/plant, bean pods average length. The statistical data (the mean, the standard error of the mean, the ponderate mean and the standard error of ponderate mean) were performed using the method described by RAICU et al. (1973).

RESULTS AND DISCUSSIONS

The analysis of processed data (Table 1 and Table 2) evidences a series of particularities in phenotypic expression of the bean cultivar of different origins, but grown in the same conditions, particularities which will be discussed below.

Concerning the plant height, the limits of variation of this parameter in Romanian

Table 1. The average values of some quantitative characters in six Romanian cultivars

Cultivar	Plant height (cm) x±sx	Number of bean pods/plant x±sx	Bean pods weight/plant (g) x	Bean seeds weight/plant (g) x	Length of bean pods (cm) x±sx
<i>Diva</i>	36.20±3.14	5.30±1.58	38.00	160.00	7.80±0.57
<i>Sior</i>	50.20±3.16	7.20±0.85	22.00	87.00	7.23±0.37
<i>Vera</i>	46.77±5.16	7.40±1.22	17.00	98.00	7.30±0.73
<i>Jani</i>	51.90±2.30	6.60±1.05	12.50	104.00	5.98±0.34
<i>Avans</i>	41.80±2.48	10.80±1.74	27.00	56.00	7.98±0.39
<i>Abdelcarna</i>	41.66±5.15	13.10±4.21	75.00	235.00	7.04±0.84
	Ponderate mean ± standard error of ponderate mean:44.77±3.56	Ponderate mean ± standard error of ponderate mean:8.40±1.77	Ponderate mean:31.91	Ponderate mean:123.33	Ponderate mean ± standard error of ponderate mean: 7.22±0.54

Table 2. The average values of some quantitative characters in eight Chilean cultivars

Cultivar	Plant height (cm) x±sx	Number of bean pods/plant x±sx	Bean pods weight/plant (g) x	Bean seeds weight/plant (g) x	Length of bean pods (cm) x±sx
<i>Chile Orfeovsca</i>	46.40±2.47	8.60±2.22	189.00	216.00	6.66±0.52
<i>Chile Pinto 114</i>	46.70±1.81	3.00±0.69	38.00	36.00	7.85±0.45
<i>Aroze Tuscola</i>	43.80±1.63	8.10±1.38	41.00	54.00	6.93±0.63
<i>Chile Turbola</i>	46.70±4.61	2.30±0.33	15.00	10.00	6.76±0.33
<i>G 21212</i>	38.70±1.09	6.80±1.15	46.00	39.00	8.07±0.62
<i>Dor 364</i>	25.00±2.39	4.90±0.65	44.00	46.00	8.68±0.72
<i>Bar 881</i>	47.70±1.42	10.80±1.80	134.00	161.00	7.74±0.59
<i>Bar 477</i>	47.80±1.93	10.30±1.94	94.00	113.00	9.50±0.61
	Ponderate mean ± standard error of ponderate mean:42.85±2.16	Ponderate mean ± standard error of ponderate mean:6.85±1.27	Ponderate mean:75.12	Ponderate mean:84.37	Ponderate mean ± standard error of ponderate mean:7.78±0.55

cultivars ranged between 36.20 ± 3.14 cm (*Diva* cultivar) and 51.90 ± 2.30 cm (*Ami* cultivar), the ponderate mean registering 44.77 ± 3.56 cm, comparatively with Chilean cultivars, in which the ponderate mean and the standard error of ponderate mean were 42.85 ± 2.16 cm (with 4.29 % lesser than in Romanian cultivars). Also, in Chilean cultivars, the variation of this character registered a greater amplitude (from 25.00 ± 2.39 cm, in *Dor 364* cultivar, to 47.80 ± 1.93 cm, in *Bat 477* cultivar).

The balanced mean of average weight of bean pods/plant of Chilean cultivars was 2.35-fold greater than that of Romanian cultivars, namely 75.12 g, comparatively with 31.91 g. Also, the amplitude of variation was considerably greater in Chilean cultivars (from 15.00 g, in *Chile Tortola* cultivar, to 189.00 g, in *Chile Orfeowia*) than in the Romanian cultivars (from 12.50 g, in *Ami* cultivar, to 75.00 g, in *Ardeleana* cultivar).

On the contrary, the average weight of bean seeds /plant is superior in Romanian cultivars (the ponderate mean was 123.33 g), with a variation of the means from 56.00 g/plant, in *Avans* cultivar, to 235.00 g/plant, in *Ardeleana* cultivar. In Chilean cultivars, this parameter had a balanced mean of 84.33 g/plant (with the variation limits of means much greater, respectively from 10.00 g/plant, in *Chile Tortola* cultivar, to 216.00 g/plant, in *Chile Orfeowia* cultivar).

Another quantified character was the average length of bean pods, that in Chilean cultivars varied between 6.66 ± 0.52 cm (*Chile Orfeowia* cultivar) and 9.50 ± 0.61 cm (*Bat 477* cultivar), the balanced mean \pm standard error of balanced mean/Chilean cultivars being 7.78 ± 0.55 cm, while in Romanian cultivars this parameter registered values from 5.98 ± 0.34 cm (*Ami* cultivar) to 7.98 ± 0.39 cm (*Avans* cultivar), with values of 7.22 ± 0.54 cm, for the balanced mean \pm standard error of the balanced mean .

The differences registered at the level of means of analysed characters seems to be expression of cultivars genotypes, if it is considered that the cultivation and growth conditions were the same for all cultivars, fact that is in accordance with data of BĂRA et al. (2003).

CONCLUSIONS

The cultivars with different origins grown in similar environmental conditions displayed different behaviours under the aspect of the manifestation of certain quantitative characters.

The height of plants for the two provenances registered close values of means, the differences between balanced means being less significant.

Significant differences were noted for average weight of bean pods/plant and for average weight of bean seeds/plant.

We consider that the variations appeared in manifestation of analysed parameters are, in principal, the result of the genotypic expression of cultivars.

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