THE PRODUCTION CAPACITY OF AN ASSORTMENT OF CLIMBING GARDEN BEAN CULTIVATED IN ROMANIA

CAPACITATEA DE PRODUCȚIE A UNUI SORTIMENT DE FASOLE URCĂTOARE DE GRĂDINĂ CULTIVAT ÎN ROMÂNIA

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Abstract: *Research was organized at the Vegetable Research Station Bacau, during 2003-2005 period. Biolological material consist of four Romanian cultivars: Aurie de Bacau, Verba, Violeta de Iasi and Dragomir.*

Results are referring to dynamics of yield (during harvesting) period and level of early and total yield. The highest early yield were obtained by cultivars Aurie de Bacau (18,80 t/ha) and Verba (17,10 t/ha). For total yield, the best results were obtained by the cultivar Verba (48,69 t/ha) and Aurie de Bacau (44,57 t/ha).

Rezumat: *Cercetările au fost organizate la Staţiunea de Cercetare Legumicolă Bacău, în perioada 2003-2005. Materialul biologic constă din patru soiuri româneşti Aurie de Bacău, Verba, Violetă de Iaşi şi Dragomir.*

Rezultatele se referă la dinamica producţiei (în timpul recoltării) şi nivelul producţiilor timpurii şi totale. Cele mai timpurii recolte au fost obţinute de soiurile Aurie de Bacău (18,80 t/ha) şi Verba (17,10 t/ha). La producţia totală, cele mai bune rezultate au fost obţinute de soiurile: Verba (48,69 t/ha) şi Aurie de Bacău (44,57 t/ha).

The production capacity is the main agronomic characteristics of an assortment. The production is a character that is appreciated for each plant and in generally it represents the quantity of harvest. Due to the fact that it is quite difficult to establish and would not be utile for the production process, this character is establish per surface unit.

The production or commercial harvest, or what is capitalized reported at one plant, surface unit or time unit, define what is called especially in agrarian economy, productivity, in this peculiar case the varieties (cultivar) productivity.

The present experience aimed toward the appreciation of the production capacity at surface unit, so the productivity of an assortment of varieties (cultivars) that are currently utilized in Romania.

The observations made on productions, realized repeatedly by the researchers and presented in the literature underlined that the productivity of some plants is higher than the average value obtained at population level. This is very

well scientifically justified, but its variability can suggest that the influence of environmental conditions (the one realized in the cultivation technology) is rather high.

For the accomplishment of the goal the following objectives had been analyzed:

- the analysis of production's dynamic and phases;
- the analysis of early production;
- the analysis of total production.

MATERIAL AND METHODS

For the accomplishment of the proposed goal and objectives, during 2003-2005, in the experimental field from V.R.D.S. Bacau, was established a comparative culture with four varieties of climbing garden beans certified in Romania (table 1).

The experience was organized in an arrangement of randomized flats with three repetitions. Each parcel had a dimension of 1,6 m x 6 m = 9,6 m^2 (≈ 10 m^2), corresponding with the norms of experimental techniques for the crops with low density. On each parcel were planned 35 nests, with three plants.

Table 1.

The experimental variants in comparative culture of climbing beans in open field and greenhouse

Variant		Characterization
nr	specificare	
1	Aurie de Bacău	plant with middle vigor, light violet flowers, yellow pods of 17-19 cm length, wide
2	Verba	plant with high vigor, white flowers, green pods of 22-24 cm length, wide
3	Violetă de Iaşi	plant with high vigor, violet flowers, violet pods of 16-18 cm length, cylindrically
4	Dragomir	plant with middle vigor, white flowers, green pods of 14-16 cm, cylindrically

RESULTS AND DISCUSSIONS

1. Results regarding the production's dynamic and phases

The phases of harvests mean the quantity of harvest realized in a certain period of time and offers information regarding the assurance of the market for a certain date or for a certain period. The obtained results regarding the phases of the harvests are presented in table 2.

Table 2.

Pod's harvest echelon within the assortment (mean values 2003-2005)

Variant		Data of harvest's evaluation t/ha					
nr	Specification	Until 10.06	10.06-20.06	20.06-30.06	30.06-10.08	10.08-20.08	Total
1	Aurie de Bacău	7,3	11,5	11,6	9,2	4,9	44,5
2	Verba	6,4	10,7	10,7	11,3	9,5	48,6
3	Violetă de Iaşi	6,2	9,0	9,9	8,8	5,6	39,5
4	Dragomir	3,8	7,4	8,1	8,5	5,3	33,1
-	Media experienței	5,9	9,6	10,1	9,4	6,3	41,4

The dynamic of harvests means the level of total (cumulated) harvest realized from the beginning of harvest until a certain date (table 3).

For the varieties of climbing beans the early production is reported in the moment in which at least 30% from harvest can be realized. Taking into consideration the experimental dates but especially the average production, on appreciate that the early production can be considered the harvest realized until 20.06. In these conditions, the earliest variety is Aurie de Bacău, with 18,8 t/ha, followed by Verba (17,1 t/ha) and Violetă de Iaşi (15,2 t/ha).

Table 3

The dynamic of pod's harvest within the assortment (mean values, 2003-2005)

Variant		Data of cumulative production evaluation (t/ha)				
no	Specification	10.06	20.06	30.06	10.08	20.08
1	Aurie de Bacău	7,3	18,8	30,4	38,6	44,5
2	Verba	6,4	17,1	27,8	39,1	48,6
3	Violetă de Iaşi	6,2	15,2	25,1	33,9	39,5
4	Dragomir	3,8	11,2	19,3	27,8	33,1
-	Media experienței	5,9	15,6	25,7	35,1	41,4

The analysis of early production

The early production in comparative culture was analyzed for each year of production 2003, 2004 and 2005.

The results regarding the early production in the three analyzed years are synthetically presented in table 4.

Table 4

The early production obtained in the three experimental years within the assortment

Variant		Production (t/ha) per year of harvest			
nr	Specification	2003	2004	2005	Media
1	Aurie de Bacău	23,20	16,78	16,42	18,80
2	Verba	19,00	16,23	16,08	17,09
3	Violetă de Iaşi	19,32	13,28	13,00	15,21
4	Dragomir	13,06	9,86	10,68	11,21
-	Experience media	18,65	14,04	14,05	15,58

The media of experience for the three years was of 15,58t/ha, the higher early production was obtained in 2003 year, 18,65t/ha. As a media for the three years, the highest early production was obtained by the variety Aurie de Bacău (18,80t /ha), followed by Vebra (17,10t/ha), Violetă de Iaşi (15,21t/ha) and Dragomir (11,21t/ha).

The early production analyzed as a media for the three experimental years id presented in table 5.

The media of production on the three experimental years revealed the differences of production between the experimental variants in average experimental conditions. From the dates presented in table 4, we concluded that between these three experimental years there are evident differences, and through the variance analysis it results that this differences are significant.

This is the reason why it is necessary to see how these production differences are significant and the level of multi-annual productions.

Table 5.

The analysis of early multi-annual production

Variant		Production		Differences t/ha	The significance of differences
no	Specification	t/ha	%		
1	Aurie de Bacău	18,80	121	3,22	**
2	Verba	17,09	110	1,51	
☐	Media experienței	15,58	100	0,00	
3	Violetă de Iaşi	15,21	98	-0,37	
4	Dragomir	11,21	72	-4,37	000

DL 5% = 1,57;
DL 1% = 2,38;
DL 0,1% = 3,83.

The analysis of total production

A synthesis of the production results regarding the quantity of pods obtained in comparative culture at the three varieties, in the three experimental years 2003, 2004 and 2005 is presented in table 6.

Table 6.

The total pods production obtained in comparative crops (2003-2005)

Variant		Production t/ha per cultivation year			
no	Specification	2003	2004	2005	Media
1	Aurie de Bacău	47,80	43,20	42,70	44,57
2	Verba	48,60	48,80	48,40	48,60
3	Violetă de Iaşi	41,60	39,80	37,70	39,70
4	Dragomir	30,60	35,70	33,00	33,10
☐	Media experienței	42,15	41,88	40,63	41,55

The experimental dates show that in the three experimental years the total production of pods vary in wide limits, between 48,80 t/ha and 30,60 t/ha, respectively in the from of an amplitude of 18,20 t/ha, which represents almost 44% from the experimental average production.

The analysis of the total multi-annual production prove the measure in which the experimental results presented, have a value for the average environmental conditions and thus valid for the majority of the experimental years. The statistical analysis revealed how the productions realized in media by the experimental variants and their differences are statistically assured.

The results of the multi-annual media of the total production of pods obtained in comparative culture in open field as well as its mathematic analysis is presented in table 7.

Table 7.

The analysis of total multi-annual production

Variant		Production		Differences t/ha	The significance of differences
nr	specificare	t/ha	%		
2	Verba	48,60	117	7,05	**
1	Aurie de Bacău	44,57	106	3,02	*
4	Media experienței	41,55	100	0,00	
3	Violetă de Iaşi	39,70	96	-1,85	
4	Dragomir	33,10	80	-8,45	000

DL 5% = 3,96;
DL 1% = 5,33;
DL 0,1% = 7,09

In the three experimental years the classification of the four varieties is the one presented in table 7. The multi-annual average productions vary between 48,60 t/ha (Verba variety) and 33,10 t/ha (Dragomir variety). The experimental media was 41,55 t/ha.

CONCLUSIONS

The early production vary quite large from one year to another, but the genotypic differences between the varieties are sufficient higher to establish that in all these experimental years the classification of the experimental variants depending on the production value was kept. The differences statistically assured compared with the experimental media showed in all these years that the variety with the higher production is Aurie de Bacău and the variety with the lowest production is Dragomir.

In the case of total production on appreciate that in the classification of assortment the first place is taken by the variety Verba, followed by the variety

Aurie de Bacău. As you can see these two varieties make "exchanges of places" when comparing with the early production. This proves that the production potential at the variety Verba is more evident in the first half of the harvesting period, when it realized a inferior early production comparing with the variety Aurie de Bacău.

The presented results allow us to affirm that the variety Verba is a variety with a large production potential and the variety Aurie de Bacău is an early variety, with a high production potential. The variety Violeta, with a production around the average can be maintained in the top of cultivated varieties, for the quality, but especially the aspects of pods. The variety Dragomir, although considered as a perspective one, did not prove its superiority comparing with the other analyzed varieties.

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