

COMPARATIVE BEHAVIOUR FOR A NEW ASSORTMENT OF DWARF FRENCH BEANS IN IAȘI AREA

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Abstract.

In the present paper are presents eight new bean garden varieties, under production conditions from Moldova Agricultural Society from Tiganasi, Iasi, from official catalog of seed varieties of the EU, in order to promote their crops. In 2012, have been made observations and biometric measurements agro-productively main features: early and total production of pods, production dinamic and seed production per hectare etc. The best results for early production (due on 11/06/2012) have been obtained by cultivars: Maxidor (5958.38 kg/ha), Saxa (5910.45 kg/ha), Scylla (5811.02 kg/ha) and Cassandra (5766.33 kg/ha). Total production distinguished themselves cultivars: Scylla (13136.94 kg/ha), Minidor (12977.64 kg/ha) and Slenderette (11920.95 kg/ha).

Keywords: assortment, dwarf french bean, comparative crop

While promoting sustainable vegetable growing, variety is perhaps the most important biological factor of production, which is directly related to ecological plasticity and consumer preference (Ruști G., Munteanu N., 2008). At the same time, cultivation is an element of expression biodiversity crops, under a permanent change in the range of cultivation (Dumitrescu M. et al, 1977; Dumitrescu M. et al, 1998). Present study submit a new assortment of dwarf garden bean of eight varieties of high production, which are included in the official catalog of varieties of the EU. Romanian varieties registered in the official catalog to provide the European Commission (DG SANCO) for inclusion in EU Common Catalogues, which can be marketed throughout the EU. These varieties are submitted for registration in the List of Varieties Eligible for Seed Certification, published by the Organization for Economic Cooperation and Development (OECD).

MATERIAL AND METHOD

The research have been made at the Moldova Agricultural Association from Tiganasi, Iasi County, in 2012. The biological material used in the experience was represented by an assortment of eight garden dwarf bean cultivation: Jutta, Scylla, Maxidor, Saxa, Minidor, Slenderette, Bergold și Cassandra (Catalogul oficial, 2012, Popescu V., Atanasiu N., 2000, Ruști G., 2007.).

The experience placed in an experimental stationary after autumn cereals. Soil preparation works were performed in accordance with appropriate technology conventional crops (Voican V., Lăcătușu V., 1998). The sowing was done on 23.04.2012, using own seed obtained in 2011 from previous experiences. Crop establishment was done with the SUP 15 to 37.5 cm distance between rows and 5-6 cm between plants in the row at a depth of 3 cm, resulting in a density of 420,000 to 500,000 (Chaux Ch., Foury Cl., 1996, Fouillox G., Bannerot H., 1992, Munteanu N. et al, 2003). The amount of seed used to establish a crop of thousand seed weight (MMB) varied between 89-170 kg / ha. During 2012 were carried out observations and biometric measurements to ensure the achievement of a general characterization of assortment (Stoleru V. et al, 2010). Have also been analyzed early production (assessed on June18), the total at the end of the growing season (from July 2). Production data were processed by specific methods (Jitareanu G., 1994).

RESULTS AND DISCUSSIONS

A brief characterization of agrobiological set is presented in Table 1. In the assortment studied can be say that varieties precocity varied from extra-early (Bergold) at early (Maxidor, Saxa and Cassandra) and semi-early (Jutta, Scylla, Minidor and Slenderette), which determined enlargement

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Assortment characterization of dwarf bean in comparative crop

Variety	Precocity	Production potential (t/ha)	Plant			Pod characteristics					Seed	
			height (cm)	type	resistance ^z	form	length (cm)	diameter (mm)	colour	weight (g/plant)	color	MMB ^y (g)
Jutta	semi-early	10-12	40-45	erect shrub with four branches	CL	round	9-10	7-8	green	18-23	white	280-290
Scylla	semi-early	11-14	45-50	erect shrub with four branches	BCMV, CL	round	10-11	8-9	green	22-26	white	265-270
Maxidor	early	9-11	35-40	erect shrub with four branches	XCPH, CL	round	10-11	8-9	yellow	17,5-20	white	254-268
Saxa	early	9-10,5	40-45	erect shrub with four branches	BCMV, XCPH	cylindrical	9-10	6-7	green	16,5-21,5	light brown	390-410
Minidor	semi-early	12-14	45-50	erect shrub with four-five branches	BCMV	round	8-9	7-8	yellow	21-24	white	254-270
Slenderette	semi-early	10-12	40-45	erect shrub with five branches	XCPH, CL	round slightly flatt	10-11	8-9	green	20-24	white	280-290
Bergold	very-early	7-9	35-40	erect shrub with five branches	CL	cylindrical	8-9	7-8	green	13-16	white	200-215
Cassandra	early	8-11	40-45	erect shrub with five branches	BCMV	cylindrical	10-11	7-8	green	15,5-18	white	240-260

^zBCMV – *Bean common mosaic virus*, XCPH - *Xanthomonas campestris pv. Phaseoli*, CL - *Colletotrichum lindemuthianum*

^yThousand seed weight (MMB)

conveyer for garden bean crop in Moldova area but also ensure a concentration of production in a very short period to promote mechanized harvesting work. Regarding for each cultivar yields can say that it falls within biological variety, but under application of appropriate technologies, including ensuring the rule of three time irrigation of 300 m³/ha. Thus, production potential varies widely from 7.9 t/ha (Bergold) to 12-14 t/ha (Minidor, Scylla).

Regarding biological characteristics of the species have been observed: plant height (cm), how branching and its habitus and biological resistance to specific pathogens (common mosaic virus, bean common burning). Plant height ranged from during the year very low limits between 35-40 cm (Maxidor, Bergold) and 45-50 cm (Scylla, Minidor). Dwarf bean plants studied in the experiment generally presented as a shrub with erect four to five offshoots, and good resistance to common mosaic virus (Scylla, Saxa, Minidor and Cassandra), common burning (Maxidor, Saxa, Slenderette) and colletotrichum beans (Jutta, Scylla, Maxidor, Slenderette, Bergold). In connection with pod form at technological maturity or consumption it can be said that it ranges from slightly flattened round (Slenderette) to round (Jutta, Scylla, Maxidor, Minidor) or almost cylindrical (Saxa, Bergold or Cassandra). At the mature pod color consumption can affirm that two cultivation have yellow pods (Maxidor, Minidor) and six are green (Jutta, Scylla, Saxa,

Slenderette, Bergold and Cassandra). Regarding this pod length ranges from 8-9 cm (Minidor, Bergold) to 10.11 cm (Scylla, Maxidor, Slenderette and Cassandra). The production per plant varies quite widely depending on the biological value of each variety between 13-16 g / plant (Bergold) to 22-26 g / plant (Scylla). Regarding to seed color at physiological maturity can be seen that all the varieties studied white seeds except Saxa cultivar that has brown seeds. Seeds weight is an indicator of variability is quite large depending on the cultivar but has direct influence on seed quantity per hectare. Thus, MMB varied from 200-215 g (Bergold) at 390-410 g (Saxa).

In 2012, early production from dwarf garden beans determined at 11.06 obtained on conventional system ranged from 1354.08 kg / ha for Bergold variety to 2615.81 kg / ha for Maxidor cultivar. The difference of the yield than average experience in this case (509.67 kg / ha) is considered positive, very significant. Distinct positive significant differences and significant (Table 2) were also obtained for varieties Saxa (386.19 kg / ha) and Cassandra cultivar (239.00 kg / ha). Bergold Variety achieved the lowest production of pods (1354.08 kg / ha), the difference of the average experience (-752.06 kg / ha) is very significant negative. Negative differences compared to the average experience cultivars have obtained Slenderette (-271.39 kg / ha) and Minidor (-130.30 kg / ha).

Table 2

The early yield of dwarf garden bean and significant differences than control

No.	Variant	Yield (t/ha)	% than control	Differences to control (kg/ha)	Significance
1	Jutta	2087,92	99,13	-18,22	
2	Scylla	2143,22	101,76	37,08	
3	Maxidor	2615,81	124,20	509,67	***
4	Saxa	2492,33	118,34	386,19	**
5	Minidor	1975,84	93,81	-130,3	
6	Slenderette	1834,75	87,11	-271,39	o
7	Bergold	1354,08	64,29	-752,06	ooo
8	Cassandra	2345,14	111,35	239	*
9	Control (experience average)	2106,14	0	0	

DL 5% = 168,49 kg/ha;

DL 1% = 315,92 kg/ha;

DL 0,1% = 505,47 kg/ha.

Jutta, Scylla, and Minidor cultivars achieved similar early yield to average of experience and production increases obtained are considered insignificant. Total production of pods obtained from the experience is presented in Table 3. This, varied in very wide limits, given the cultural and ecological plasticity cultivars. Total production ranged from 7090.66 kg / ha Bergold

to 13136.94 kg / ha cultivar Scylla, while the average experience had value 10439.02 kg / ha. Very significant positive differences compared with the experience average was obtained by Scylla variety (2697.92 kg / ha) and Minidor (2538.62 kg/ha). Significant positive differences have been made of Slenderette variety, with the difference of the average of 1481.93 kg/ha.

Negative differences compared to the experience average production have been obtained for

varieties Bergold (-3348.36 kg / ha), Cassandra (-1587.25 kg / ha) and Saxa (-1401.40 kg / ha).

Table 3

No.	Variant	Yield (t/ha)	% than control	Differences to control (kg/ha)	Significance
1	Jutta	10715,58	102,65	276,56	
2	Scylla	13136,94	125,84	2697,92	***
3	Maxidor	9781,02	93,70	-658	
4	Saxa	9037,62	86,58	-1401,4	o
5	Minidor	12977,64	124,32	2538,62	***
6	Slenderette	11920,95	114,20	1481,93	*
7	Bergold	7090,66	67,92	-3348,36	ooo
8	Cassandra	8851,77	84,80	-1587,25	oo
9	Control (experience average)	10439,02	0	0	

DL 5% = 835,12 kg/ha;
 DL 1% = 1565,85 kg/ha;
 DL 0,1% = 2505,36 kg/ha.

Analyzing the dynamics of production of pods per time harvesting and cumulative data for each period observed that there is a concentrated harvest period, which should be an advantage for mechanical harvesting of beans in the garden.

The data presented in Table 4 it is observed that the highest early yields have been achieved by early and very-early varieties. Thus, the first harvest (11.06), the highest yields have been achieved by: Maxidor (2615.81 kg / ha), Saxa (2492.33 kg / ha) and Cassandra (2345.14 kg / ha). At the second harvest (18.06), the highest yields were achieved by cultivars: Scylla (3667.8 kg / ha), Minidor (3642.19 kg / ha) and Slenderette (3542.18 kg / ha). The data presented in Table 5 it is observed that all cultivars have made production around 3000 kg / ha, but the total production reported the highest percentage in this time of harvest was conducted by variety Bergold (38.9%) and Cassandra (38.6%).

Regarding cumulative production until 18.06 on it is seen that the highest yields were achieved in the case Maxidor (5958.38 kg/ha) and Saxony variants (5910.45 kg/ha). At the third harvest (25.06), the highest yields were achieved by cultivars: Scylla (4715.33 kg / ha), Minidor (4013.28 kg / ha) and Slenderette (3942.31 kg / ha). Compared to the total highest percentage in this time of harvest was conducted by variety

Scylla (35.9%) and Slenderette (33.1%). Regarding to the cumulative production up to date 25.06 observed that the highest yields have been achieved in the case of Scylla (10526.35 kg / ha) and Minidor variants (9631.31 kg / ha). At the last harvest (2.07), the highest yields were achieved by cultivars: Minidor (3346.33 kg / ha), Jutta (2915.47 kg / ha), and Scylla (2610.59 kg / ha).

Compared to the total highest percentage in this time of harvest was conducted by Jutta variety (27.2%) and Minidor (25.8%).

CONCLUSIONS

1. The assortment studied behaves growing according to precocity cultivars from very-early (Bergold) at early (Maxidor, Saxa and Cassandra) and medium-early (Jutta, Scylla, Minidor and Slenderette), which makes conveyor extension for garden bean cultivation.

2. Two of the studied varieties are yellow pod and the others are green and pod shape in cross section is round, very slightly flattened round or cylindrical.

3. At physiological maturity, seed color is white in all varieties except Saxa cultivar that has light brown seeds.

Table 4.

No.	Variant	Harvesting time				Total yield (kg/ha)
		11.06	18.06	25.06	2.07	
1	Jutta	2087,92	2956,73	2755,46	2915,47	10715,58
2	Scylla	2143,22	3667,8	4715,33	2610,59	13136,94
3	Maxidor	2615,81	3342,57	2007,98	1814,66	9781,02
4	Saxa	2492,33	3418,12	2107,48	1019,69	9037,62
5	Minidor	1975,84	3642,19	4013,28	3346,33	12977,64
6	Slenderette	1834,75	3542,18	3942,31	2601,71	11920,95
7	Bergold	1354,08	2758,51	2015,63	962,44	7090,66
8	Cassandra	2345,14	3421,19	2245,84	839,6	8851,77

Table 5

Dynamics of cumulative pods production in 2012 (kg/ha)

No.	Variant	Harvesting time				Total yield (kg/ha)
		11.06	18.06	25.06	2.07	
1	Jutta	2087,92	5044,65	7800,11	10715,58	10715,58
2	Scylla	2143,22	5811,02	10526,35	13136,94	13136,94
3	Maxidor	2615,81	5958,38	7966,36	9781,02	9781,02
4	Saxa	2492,33	5910,45	8017,93	9037,62	9037,62
5	Minidor	1975,84	5618,03	9631,31	12977,64	12977,64
6	Slenderette	1834,75	5376,93	9319,24	11920,95	11920,95
7	Bergold	1354,08	4112,59	6128,22	7090,66	7090,66
8	Cassandra	2345,14	5766,33	8012,17	8851,77	8851,77

4. Thousand seed weight varied from 200-215 g (Bergold) to 390-410 g (Saxa).

5. The pods production per plant ranged quite widely depending on the biological value of each variety between 13-16 g/plant (Bergold) up to 22-26 g/plant (Scylla).

6. Early production determined at 11.06 ranged from 1354,08 kg/ha at Bergold cultivar to 2615,81 kg/ha at Maxidor variety.

7. Total yield varied from 7090,66 kg/ha at Bergold up 13136,94 kg/ha at Scylla cultivar.

8. Cumulative production of pods by harvesting time, reveals that there is a concentration of the harvest yield, which should be an advantage for mechanical harvesting of garden beans, especially in Saxa and Bergold cultivars.

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