Comparison of local and foreign faba bean (*Vicia faba* L.) genotypes in organic farming

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Objective

In the Baltic region field beans are mainly used as a protein sourse for feed. Faba beans, especially, broad beans (Vicia faba var. major) are becoming more popular as a local niche product, grown by organic farming. Farmers are searching for better varieties to support the quality of the product and for their sustainable farm management. Whereas bean breeding was stopped in the sixth decade of the last century, now it is only foreign field bean varieties grown in Latvia. The objective of the experiment in Latvia was to evaluate the suitability of genotypes of different origins under organic conditions in Latvia

Materials and methods

The field trial of ten field beans (*Vicia faba* var. *minor*) and ten broad beans (*Vicia faba* var. *major*) varieties of different origin were carried out in an organic system in Priekuli research centre in 2015 and 2016.

The randomized plot design was used in this experiment. All accessions were sown in four replicating 3m^2 plots The sowing rate of field beans was 40 seeds and of broad beans 15 seeds per m^2.

During the vegetation period, plant phenology, yield and grain quality were evaluated

Field beans trial in organic field, at Priekuli research center in May 2015

Results

- The field bean genotypes yielded higher under organic farming. However, under unfavourable conditions loss in yield in comparison to broad beans was larger. Table 1.

Table 1. Average values of the traits of beans genotypes under organic conditions

Traits	Broad beans		Field beans	
	Vicia faba var. *major*		*Vicia faba* var. *minor*	
	2015	2016	2015	2016
Yield per m^2	236.1	149.9	432.8	271.4
Protein content, %	31.9	33.3	31.8	32.2
100 seed weight	146.0	118.8	70.5	63.6
Days to beginning of flowering	58	46	59	53
Days to maturity	132	110	129	117
Length of flowering period, days	18	17	18	19
Plant height, cm	79	74	104	86
Pod length, cm	9	9	7	8
Pods at the 2nd fertile node, number	1	1	2	1

- Weeds is one of the problem in organic farming for beans. Competitive ability against weeds was not evaluated, but the incidence of weeds was high in trial plots for both types beans.

Incidence of weeds at beginning of stem elongation stage

- Local field bean genotypes were the highest yielding, with good protein content but they maturated late in comparison to foreign comercial varieties, which were earlier and had shorter plants. Table 2.

Table 2. Performance of field beans (*Vicia faba* var. *minor*) genotypes under organic conditions

Variety	Type	Donor country	Yield per m^2, g	Days from sowing to beginning of flowering	Length of growth period, days	Protein, %	100 seed weight, g	Plant height, cm
Bauska	local genotype	Latvia	423.1	59	124	32.2	65.0	107
Lielplatones	variety, released in 1962	Latvia	418.5	61	126	32.5	53.9	103
Fuego	variety	Germany	406.9	55	122	30.5	68.9	98
Priekulu vietejais	local genotype	Latvia	376.5	58	126	32.7	63.8	99
Priekulu 32	local genotype	Latvia	371.9	54	122	32.2	77.6	95
Sving	variety	Sweden	344.2	54	122	32.4	69.2	86
Scirocco	variety	Germany	337.9	56	123	31.8	66.5	83
Gloria	variety	Sweden	309.4	58	122	33.3	60.9	96
Valmieras	local genotype	Latvia	302.3	55	127	31.9	67.2	85
Jõgeva	variety	Estonia	230.6	51	119	30.9	77.3	97

Field beans trial in organic field, at Priekuli research center in July 2016

- Local broad bean genotypes collected from amatuer gardeners were earlier than commercial varieties and showed good yield level and high seed quality. Table 3.

Table 3. Performance of broad beans (*Vicia faba* var. *major*) genotypes under organic conditions

Variety	Type	Donor country	Yield per m^2, g	Days from sowing to beginning of flowering	Length of growth period, days	Protein, %	100 seed weight, g	Plant height, cm
VF009	local genotype	Latvia	266.5	50	119	31.6	134.5	70
VF005	local genotype	Latvia	247.9	50	119	32.4	139.4	72
VF001	local genotype	Latvia	243.8	51	118	33.3	149.6	70
VF002	local genotype	Latvia	237.5	49	119	32.8	148.2	73
VF066	local genotype	Latvia	229.4	51	128	33.3	150.6	82
VF004	local genotype	Latvia	222.3	52	120	32.9	130.0	76
VF008	local genotype	Latvia	200.0	52	121	32.5	133.7	81
Gubbestad	variety	Sweeden	132.7	51	122	33.5	114.6	85
Favel	variety	Portugal	101.3	56	120	31.2	102.7	82
Aqua Dulce	variety	Greece	48.5	59	127	32.8	120.6	78

Conclusions

Local genotypes could be a good initial material for potential varieties, as some of them are already combine valuable traits

Local genotypes should be investigated more to ascertain their potential for commercial breeding

This project receives funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613781.