YIELD STABILITY IN FABA BEANS (Vicia faba) UNDER DIFFERENT GROWING CONDITIONS IN NORTHERN EUROPE

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Introduction

Family Leguminosae constitutes the third largest family of flowering plants, including more than 750 genera and 20 000 species. Despite large number of accessions in gene banks, there is still lack a information on its performance (Upadhyaya et al. 2011). The role of legumes concerning human diet, animals’ nutrition, and farming system is increasingly important. To contribute to the sustainability of traditional European legume crops, it is required to identify underexplored cultivars and landraces with potential to be included in the breeding programs and/or in the current European farming scheme.

The field experiment to evaluated yield stability and protein yield in nine local genotypes and commercial varieties of broad beans (Vicia faba var. major) 'VF_001', 'VF_002' (landraces, Latvia), 'Aqua Dulce' (variety, Greece) and field beans (Vicia faba var. minor) 'Fuego', 'Gloria' (varieties, Sweden), 'Bauska' (landrace, Latvia), 'Lielplatone' (old variety, Latvia), 'Favel' (variety, Portugal), 'Jõgeva' (variety, Estonia) was conducted in four European countries for two years: Latvia (Institute of Agricultural Resources and Economics, Priekuli research centre and Pūre Horticultural Research Centre), Norway (NIBIO - Norwegian Institute of Bioeconomy Research), Estonia (Estonian Crop Research Institute) and Sweden (Swedish Research Institute).

In each site a randomized design was used to test each genotype in 4 replications in organic or conventional conditions according to field trial layout. Each plot was 2 m² large.

The main objective was to evaluate yield stability for genotypes of different origin and bead in different periods to gain a further insight in the adaptability of gathered genotypes

Statistical analysis: Data was analyzed according to Finlay and Wilkinson (1963). Genotypes with a slope larger than 1 are adapted to favourable environments, but the genotypes with a slope close to 1 would be stable in yield and might have wide adaptation frequency. Genotypes with relatively high average yield and a slope lower than 1 perform relatively well under unfavourable growing conditions. Eberhart and Russell (1966) proposed to evaluate the deviation from regression (s²) as an alternative parameter of stability

After two year monitoring in field sites, the highest yield for two years showed field bean landrace 'Bauska' and varieties 'Fuego', 'Gloria' (Sweden) and Latvian genotype 'Lielplatone'.

We observed positive effect to different environmental conditions. 'Bauska' showed same results in different environments, but other genotypes had better yield and protein in environments with better soil systems (b>1).

The south genotypes yield in Norden regions was lower than average, in some years we even harvest.

Conclusions

1. Yield stability was significantly influenced by indicated by agro – climatic conditions between years and genotype.
2. The best results showed ‘Bauska’ ‘Fuego’, ‘Gloria’ nad ‘Lielplatone’. The data obtained allow to select the most appropriate genotypes for further development of new cultivars as well as to obtain new food and feed products.

Acknowledgment

We thank all project partners for their work and effort in a two year period. We look forward to work with you again in the future.

Figure 1. Faba bean field

Figure 2. ‘Fuego’ seeds

Figure 3. Regression analysis for faba bean yield

Figure 4. Yield stability in faba beans

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