Faba beans (*Vicia faba*) – a traditional leguminous crop in Bulgaria*

Mariya Sabeva, Siyka Angelova & Yana Guteva

Institute of Plant Genetic Resources "K. Malkov", 2 Druzhba str., 4122 Sadovo, Plovdiv Distr., Bulgaria; e-mail: sabeva_m@abv.bg (corresponding author)

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Abstract. The main task of the current study was collecting faba bean local landraces, because they are still grown and maintained in the home gardens and small farms almost in the whole country. They were visited and an inventory of over 20 regions have been performed and seeds from about 100 accessions of local populations, old varieties and forms have been collected. The collected accessions were classified by duration of the growing season, plant habit and height, mass and colour of the seeds and content of crude protein.

Key words: bean, crop, faba, legume, plant genetic resources, population

Introduction

Faba bean (*Vicia faba* L.) originated in the Middle East. It is grown as a food for people and for animals in China, Africa and some Mediterranean countries (Ladizinsky 1975; Duke 1981). Faba bean has a long tradition of cultivation in the agriculture of the Old World, being among the most ancient plants in cultivation and also among the easiest to grow. Along with lentils, peas, and chickpeas, they are believed to have become part of the Eastern Mediterranean diet around 6000 BC or earlier. In Egypt faba bean is a staple food prepared in different ways (Bond & al. 1985).

In our country, the traditional grain legume crops that are still grown are mostly common bean (*Phaseouls* spp.), pea (*Pisum sativum* L.), chickpea (*Cicer arietinum* L.) and faba bean (*Vicia faba* L.) as a minor legume crop in home gardens using seeds of local forms. In Bulgaria, faba bean is grown mainly for food of people, using both green pods and dry seeds. The breeding programs with faba bean are aimed at creating forage varieties – dry seeds and silage with low tannin content, reduced anti-nutrients and weight of 1000 seeds 250–300 g. It has been found that the crude protein content in the different origin species and forms faba beans ranged from 20 to 41 % of dry matter. The higher content of protein is found more in winter varieties than in the spring ones, which is influenced by genetic and ecological factors. Our villages have been depopulated and therefore data collection and storage of seeds is necessary. Local farmers keep seeds in freezer, jars and bags. Previously collected data shows that only local sources of faba bean and beans are maintained in many places for personal use in gardens (Koeva & al. 2002; Angelova & Stoilova 2009, Angelova & al. 2014).

The aim of investigation is to enlarge the genetic basis of grain legume collection with germplasm of Bulgarian origin.

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Material and methods

Activities:

- Inventory of the existing and stored seed material of local plant genetic resources from *Vicia faba* in *ex situ* collection.
- Determining itineraries and organizing expeditions
- Interviews with farmers based on questionnaire (origin, maintenance usage, recipes for meals and traditions in broad bean).
- Collecting of seeds.

Experimental data:

- Passport information about new accessions (FAO/IPGRI, 2001)
- *Ex situ* collection and characterization (UPOV 2003)
- The collected accessions were classified by duration of the growing season, plant habit and height, mass and colour of the seeds and content of crude protein.
- Seeds reproduction for exchange and storage *ex situ*.

Results and discution

The grain legume collection at IPGR-Sadovo, contains over 5000 accessions. The faba bean is represented by 770 accessions (Table 1). Currently in Bulgaria are preserved and are maintained mainly local PGR of faba bean and beans. Local PGR of beans have collected 90 % in the recent years within several implemented projects. Other grain legumes like pea, lentil, vetch, chickpea are still grown in some places in the country, but faba bean is grown mostly in private gardens. Faba bean is one of the oldest legumes grown in the past and today as a food plant (Angelova & Stoilova 2009; Angelova & al. 2014)

Table 1. *Vicia faba* **collection in IPGR- Sadovo.**

VICIA FABA	Introduced	BG origin	Long term conservation	Middle term conservation	Working collection
	589	103	492	200	60
TOTAL ACCESSION			**692**		

During the period 2009–2012, a lot of expeditions were conducted and about 20 districts in the country were visited. The organization of a large number of expeditions in this short period was motivated by two main reasons:

- Our villages have been depopulated and therefore data collection and storage of seed is necessary. Local farmers keep seeds in freezer, jars and bags
- Preliminary information gathered on local plant resources shows that growing local populations of faba beans and beans can still be found in many places in North Bulgaria – mostly for personal use in gardens

More than 80 accessions of faba bean (local populations and forms) were collected. In many areas, where in the past *Vicia faba* was a traditional crop, at the moment it is grown or sown on very limited areas. In many visited places it is already abandoned. The disappearance of this crop is the result of depopulation and/or aging of the inhabitants of the villages. Moreover, there is no economic interest in it because the market offers many varieties of peas, beans, etc. It is grown only in small areas in personal gardens. Finally we visited all areas where traditionally faba bean has been grown and is still preserved. A larger number of accessions were collected from the following areas:

Northern Bulgaria – Veliko Tarnovo (*Lyaskovets, Kilifarevo, Djulyunitsa*, *Polikraishte*, *Svishtov*), Pleven (*Stejerovo, Balgarene*)

Southern Bulgaria – Plovdiv (*Sadovo, Kochovo, Mominsko, Bolyarci, Bogdanica*, *Popovica*), Pazardjik, Yambol, Burgas (*Gramatikovo, Bulgari*); Kustendil.

For all collected accessions was prepared passport information by specified sample.

The plant height of 2/3 of the studied accessions ranges from 81 cm to 100 cm. The rest of them are lower than 80 cm or higher than 100 cm. Most of the samples are of a medium and large seed size, with 3–4 seeds per pod and a size of the pod of 80–90 mm length and 3–15 mm width. Each plant forms from 5 to 16 pods. The number and weight of seeds per plant varies widely. The weight of seeds shows strong variability – the weight of 100 seeds varies from 15.7 to 202.1 g (Fig. 4). The content of crude protein varies widely, from 26 % to 38 % in grain dry matter (Fig. 3). The old traditional plant materials are grown, conserved and adapted to the conditions of the environment with specific regional characteristics.

As a result of the evaluation by morphological and economic traits the collecting local populations and

forms were divided into groups according to plant height, number of branches, size of leaves, size of pods, size and colour of seeds. The largest part of the studied accessions were with height of plants from 81 to 100 cm (Fig. 1). Predominantly, the accessions are with 3–4 seeds in pods. Each plant forms from 5 to 16 pods. Regarding the size of the pod, prevailing accessions are of medium length and width. The number and weight of seeds per plant varies widely. With the strong variability is weight of 100 seeds – 15.7 to 202.1 g (Fig. 4). Crude protein content ranges from 26 to 38 % of dry matter (Fig. 5). All newly collected samples successfully survive winter – from 92 to 95 %. One sample from Svishtov region has performed very high biological potential, very good qualities and winter resistance.

Assessment of those indicators is very necessary for the breeders and the farmers to make their choices. Faba bean are grown in plains, foothills and mountain areas. Farmers sow the seeds in the autumn and plants successfully survive winter (Fig. 6).

Conclusions

Faba bean is included in the structure of the home garden almost in the whole country. Used populations, forms and varieties are of Bulgarian origin. There is a variability in the phenotype of plants: height, number and size of the pods, shape, weight of 100 seeds, size and colour. Passport data base information is created – origin, seeds owner, type of plant material, utilization and type of farming. Participants in the research project have collected various recipes for local dishes with faba bean.

Fig. 6. Faba bean: **1–3.** Local forms of seeds; **4.** Collecting missions.

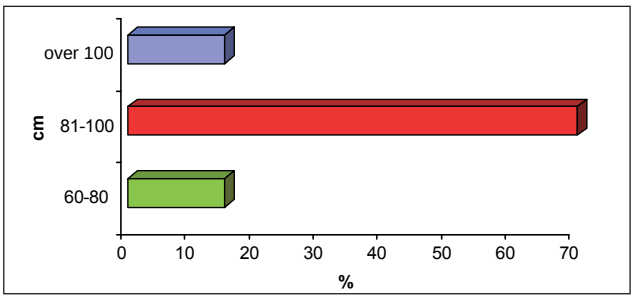

Fig. 1. Height of plant (cm).

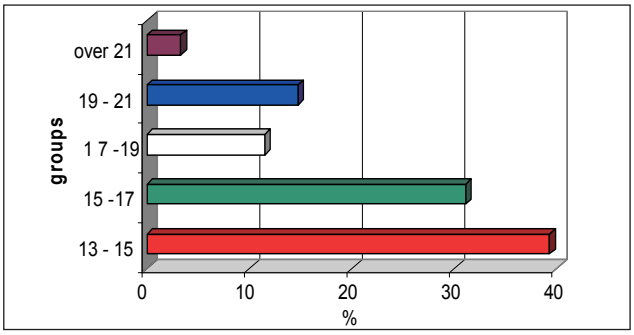

Fig. 2. Width of pod (mm).

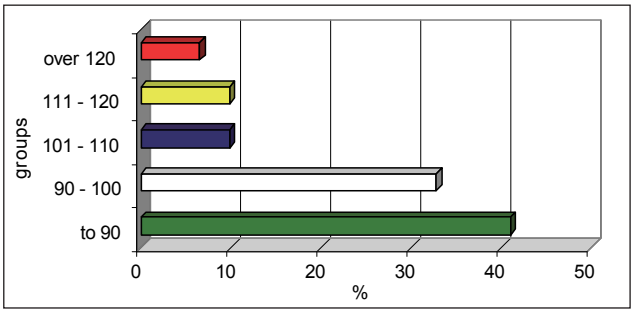

Fig. 3. Length of pod (mm).

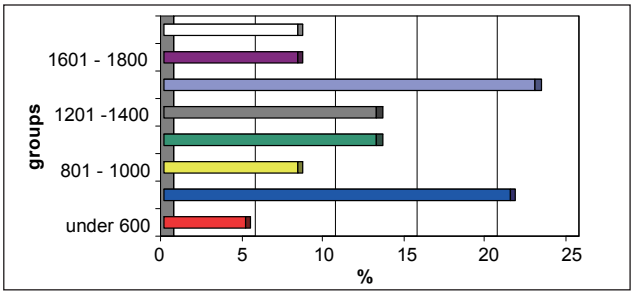

Fig. 4. Mass 100 seeds(g).

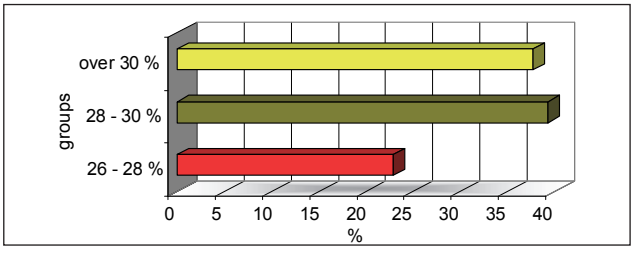

Fig. 5. Content of crude protein – % of dry matter.

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