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Preservation of local grain legume species for food in Bulgaria

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ABSTRACT

In connection with IPGR participation in various national and international projects during the recent years, investigations have been conducted, in order to create a database of available old plant materials of grain legumes of Bulgarian origin. Different areas throughout Bulgaria with diverse relief, soil and climatic conditions have been visited. From the literature review and collected from previous studies data we identified the specific areas these crops occupy traditionally in the home garden and are sentimentally linked to family traditions. Questionnaires were developed, which intended to complement and update the existing information about location, farmer's name, number cultivated species, usage, cooking recipes and storage. In this respect, numerous interviews with local people were conducted and were visited community centers, museums, schools and other organizations and institutions.

Keywords: Grain legume, local varieties, utilization, variability

1. INTRODUCTION

Large set of grain legumes have traditionally been grown in our country (2,3). The National Gene Bank of Bulgaria stores about 9000 specimens of this group. The collections are presented by 10 botanical geniuses and contain diverse plant material. The structure of various collection types includes old varieties and populations; selection lines - donors; mutant forms; wild species; newly selected varieties and commercial ones of Bulgarian origin, Europe and all the world (2-4,12).

During the recent years, the efforts of our researchers have been focused on collecting and storage of all materials from native origin, which are supported and used at the Institute for Plant Genetic Resources (IPGR) in Sadovo, Bulgaria (9,12,15).

The aim of this publication is to determine the diversity of native varieties, populations, forms which are of Bulgarian origin such as bean, pea, faba bean, vigna (cowpea), chickpea , all grown in small farms and home gardens.

2. MATERIAL AND METHODS

In connection with IPGR participation in various national and international projects during the recent years, investigations have been conducted, in order to create a database of available old plant materials of grain legumes of Bulgarian origin (2,12).

Different areas throughout Bulgaria with diverse relief, soil and climatic conditions have been visited. From the literature review and collected from previous studies data we identified the specific areas these crops occupy traditionally in the home garden and are sentimentally linked to family traditions (4,12,13).

Questionnaires were developed, which intended to complement and update the existing information about location, farmer's name, number cultivated species, usage, cooking recipes and storage. In this respect, numerous interviews with local people were conducted and were visited community centers, museums, schools and other organizations and institutions.

3. RESULTS

Most of the old native Bulgarian materials of grain legumes, can only be found in the Gene Bank at the Institute of Plant and Gene Resources (6,8,9,15). The samples of Bulgarian origin consist about 30% and are collected in the period from 1954 to 2014.

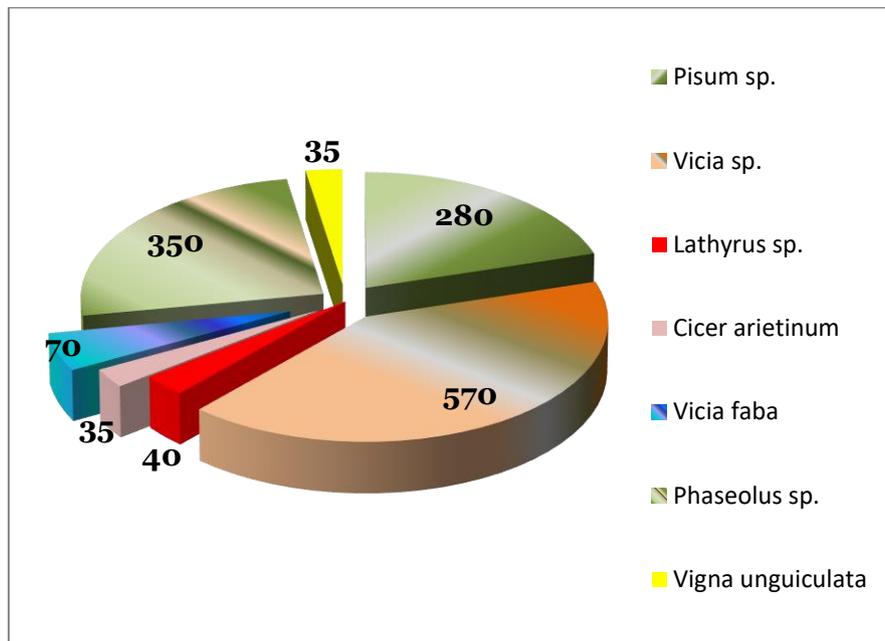


Figure 1. Grain legumes accessions with Bulgarian origin

However, there are still regions in Bulgaria where are grown and maintained old native varieties, populations and forms of bean, faba bean, chickpeas and cowpea. These areas are sparsely inhabited, the population is elderly and the heritage which has been survived over the time and related with it traditions is decaying constantly.

The bean (*Phaseolus vulgaris*) stands out with the greatest diversity of native variety, populations and forms. It has three main subspecies: *vulgaris*, *nanus multiflorus* (4, 7, 14). The used seed material varies in massiveness, shape and coloration within the regions of Bulgaria. Differences were observed in habitus, number of leaves and early ripeness. All native resources of beans are used for green and dry grain.

In the fields - a wide area occupy the following species:

1. **Climbing bean** – high pillar-like: *Raykin*, *Maichin*, *Rogach*, *Jerusalem*, *Zlatna korona*, *Koschnitza*;
2. **Bush bean** – low stem: *Mastilen*, *Cher Starozagorski (Baklyanka)* *Lastovichki*.

At the beginning, the native plant materials have extraordinary regional importance. Due to their good taste and through continuous exchange of seeds they spread across the country and beyond it. Such an example from the past is for *Smilyan beans*, *Raykin*, *Cher Starozagorski*. At the moment the production of *Smilyan beans* is concentrated mainly in the region of Smilian, less in villages of Mogilitza, Gorna Arda and others in Smolyan region; *Raykin* – in Koprivshtitsa, Panagyurishte, villages of Hvojna and Pavelsko and *Cher Starozagorski* - in Plovdiv, in Stara Zagora and in Pazardzhik. In Razlog and all over Pirin mountain region can be found a population of white-colored beans, medium-large and flat in every garden. Because of its good taste, the species has spread to the towns of Svishtov and Nikopol (situated on the Danube Plain), where except for the yards, *Raykin* beans is grown in the small farms, too.

The bean is cultivated in the yards and in the farms of owners of bigger or smaller plots (*on farm* conservation). Typical for native forms is the fact that most of them have local name. For example, for *Ph. coccineus* - *Bivolar*, *Dundina kulka*, *Sophenka* and for *Ph. vulgaris* - *Kadunka*, *Gulest*, *Mamulski*. The same native species of *Ph. vulgaris* is called very often different name in different regions: *Elenski roga* (Velingrad), *Zlaten* (Smilian), *Rodopski* (Trojan). The name is also associated with the color and the pattern of seeds: *Orlovi nokti*, *Vežan beans*, *Muten beans*, etc.



Ph. coccineus -on farm conservation in the home garden village Smilyan

The original native species are preserved mostly in the foothill and in the hilly areas of Bulgaria. They are major crops there, because are adapted to the soil and climatic conditions. Representative in this regard are the regions of Central Balkan, Western and Central Rhodopes, Srednogie, where the diversity of shapes and varieties exist even nowadays.

Faba bean (*Vicia faba* L.) is a traditional crop for the country, whose higher genetic diversity is preserved in Bulgaria. However, there are regions where it has already been neglected or is sown very limited. Native populations and bean forms differ in morphology and in economic features: small, medium and coarse grained, rounded or flat with beige green, light brown to dark brown coloration. It should be noticed, that this crop has a very wide adaptability to the environmental conditions and there is no regional distribution of different populations; they are spread almost throughout the country: Strandja-Sakar, the Thracian Plain, the Danube Plain, Western Bulgaria, the North Coast and Dobrodzha region. More important place in the farmers home garden is given to the faba bean in the areas of Pazardzhik, Plovdiv, Svishtov, Tarnovo, Pleven, Varna, Southern Black Sea coast (near the town of Tsarevo and Rezovo river).

There are no local names for this crop, neither strict preference for inhabited areas, as for the bean. All cultivated plant materials have winter resistibility and are sown in autumn, even in mountainous areas with 1000 m. altitude. The greatest diversity of populations is in terms of plant height (from 50 cm to 120 cm) and seeds size (from 45 g to 156 g per 100 seeds). It is important to point out, those farmers, who grow faba bean, select for their own garden just on these two indicators.



Figure 2. Height of plant (cm)

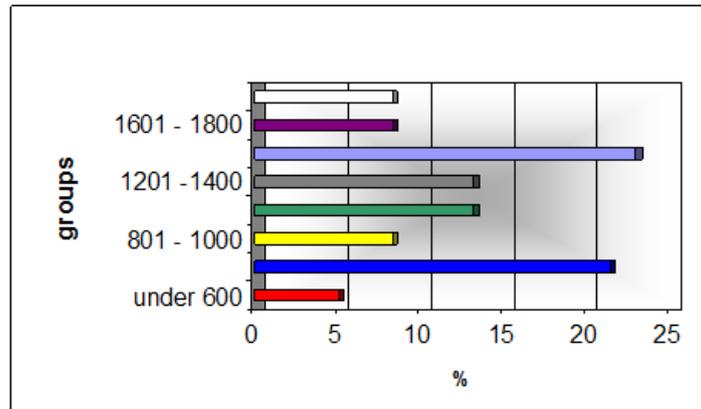


Figure 3. Mass 100 seeds (g)

The cultivation of old native varieties of the crop of **chickpea** (*Cicer arietinum* L.) is limited. Varieties such as *Obrazcov Chiflik 1, 2 and 3*, which have been widely grown in 1971-73 have extinct and as well as another 4-5 varieties during the period 1954- 1960. They are all stored in the Gene Bank of IPGR (2,9-11).

Very little number of native populations and varieties are cultivated lately, especially in areas used traditionally in the cuisine of local people in Svilengrad (villages of Levka and Pastrogor), towns of Haskovo, Harmanli, Hlebarovo and in the region of Strandzha-Sakar. Prevalent are the varieties with medium coarse seeds and bright in color. Forms dark in color to black, (10,11) typical for the region of Svilengrad situated on the Turkish border were collected during the period 2010-2012 (2).



Pea (*Pisum sativum* L) for canning, in most cases is cultivated from Bulgarian newly selected and foreign varieties (3,5). Of an interest for growing are mostly the old Bulgarian varieties and populations, which are adapted to soil and climatic conditions of the regions.

Widespread throughout the country has been the species *Ran 1* for more than 40 years. It is exclusively early and is preferred not only for growing at the home garden, but for the small farm as well. The variety is available for market consumption much earlier than broad bean, green bean and other green vegetables. Some native ecotypes are maintained in the towns of Petrich, Sandanski, Plovdiv and Gorna Oryahovo, which are large-seed and of good taste, as well as are late and often take the place of the early beans.

Cowpea (*Vigna unguiculata* L.) is not wide spread in Bulgaria, but it has traditionally been grown and used in South Bulgaria - Dimitrovgrad, Haskovo, Harmanli, Svilengrad and along the border area with Greece – Petrich - Sandanski. Cowpea is popular by various local names in sub-regions of its widely distribution, such as *Papuda, Rogach, Roglyo, Bebridzha, beans - lentils, Boboleshnik*. It grows in areas with poor soils and hot climate. Cowpea can be found in small plots of old native populations in our country, which are extremely drought-resistant and adapted to the regional climatic conditions. That is why, in many cases, this crop took the place of beans for dry grain. The main differences between the native species are in the seed massiveness, varying in weight from 9.1g to 27.20g (per 100 seeds)(3, 7, 9)



Grass pea (*Lathyrus sativus* L.) can also be found in Bulgarian flora. This species is cultivated and is grown for food in stead of dry beans in the region of Dobrodja (v.Preselci, v. Senokos etc.) This native population has been widely distributed by hand and has been supported by local farmers for many years. Grass pea is traditional plant for this region, which has a high resistance to biotic and abiotic factors. Besides for food, it is a valuable honey-bearing plant.(2,3,8)

The old varieties are valuable wealth, which keep the traditions of each nation, together with its identity. An establishment of partner networks and teams in situ, where is a variety of native plant resources, would encourage the development of programs that would provoke the interest of all stakeholders to preserve this national treasure. To achieve these goals would not be possible without the active participation of young people, students, scholars, teachers, regional bodies, NGOs, institutes, universities. The collected seed materials would be offered to the National Gene Bank for storage.

4. CONCLUSION

Our study shows that different regions of the country grow and maintain PGR with Bulgarian origin. There are places where they are present more and other places with limited farming or breeding area-specific forms and such where they are not found. Local PGR have greater plasticity, disease resistance and good adaptability to conditions where they are traditionally grown.

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