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Present status and future prospects of faba bean production in Yugoslavia

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SUMMARY - The cultivation of faba bean in Yugoslavia is done on about 3000 ha. In the course of the last decades the size of the faba bean sown area as well as the seed production and quantity of green mass have fluctuated. This is the result of the expansion of the planted areas of common beans and soybean which are very much in demand in the market. The faba bean production had been traditional in many regions of Yugoslavia before World War II, mainly sown in small individual parcels and gardens. The seeds had been usually used for human food. In Yugoslavia there are large numbers of faba bean populations mainly of autochthonous origin. They are polymorphic populations with large grains, a typical property of grain legumes of Mediterranean origin. The majority of them belong to the *equina* and *major* types, and some of them to the *minor* one. Because of the considerable variability of some important properties found within the autochthonous populations, they can be useful as initial material for creation of new varieties of faba bean.

RESUME - "Situation actuelle et perspectives de la culture de la fève en Yougoslavie". La culture de la fève en Yougoslavie s'étend sur une surface d'environ 3.000 ha. Lors des décennies passées, il y a eu une fluctuation de la surface semée en fève et de la production de graines et de masse verte. Ceci est la conséquence de l'expansion de la surface cultivée en haricots verts et soja dont les graines sont très appréciées sur le marché. La production de fève était traditionnelle dans de nombreuses régions de Yougoslavie avant la deuxième Guerre Mondiale ; elle était alors cultivée dans des petites parcelles et des jardins potagers. Les graines étaient normalement utilisées pour l'alimentation humaine. En Yougoslavie, existent de nombreuses populations de fève qui sont principalement d'origine autochtone. Il y a des populations polymorphes à grandes graines, propriété caractéristique des légumes secs d'origine méditerranéenne. La plupart d'entre elles appartiennent aux types *equina* et *major*, et certaines sont de type *minor*. En raison de la variabilité considérable parmi les populations autochtones en ce qui concerne certaines propriétés importantes, on considère qu'elles peuvent être d'utilité en tant que matériel initial pour la création de nouvelles variétés de fève.

Introduction

The improvement in the production of grain legumes in Yugoslavia was a very important task during the last decades. There was a deficit of plant protein for human consumption and animal feed. Therefore, grain legume area expanded and research in this field became more significant. It is estimated that in Yugoslavia there are about 2500 ha sown with pure crop of faba bean and about 500 ha in association with hybrid sorghum or with maize.

Faba bean had been a traditional crop before the second World War, mainly sown as a spring crop, where grains were used for human food. Today, in our country, faba bean is mostly used as an animal feed.

It is known that the small seeded varieties of faba bean are spread in Northern Europe and Eastern Asia, while the large seeded ones are spread in the Mediterranean basin and Western Asia as autochthonous landraces.

According to research in our country, the autochthonous landraces already examined in Yugoslavia be-

long to the large-seeded varieties of faba bean, except a few which are small seeded ones.

Considering the fact that the research on faba bean in Yugoslavia has not been developed on a large scale, the local populations have not been sufficiently studied and their variability has not been greatly used in breeding. However, some Yugoslav regional institutes have already enlarged the programme of research of faba bean. The main goal of the research is to contribute to the improvement of faba bean production by obtaining new varieties, using the collected autochthonous populations and introduced varieties as basic material in breeding.

Data regarding previous research on faba bean in Yugoslavia

There are few publications on faba bean in Yugoslavia. We shall take into consideration some of them which can be interesting for our research programme.

Aladzhaycov's (1974) research on faba bean shows that among 10 studied autochthonous populations from the regions of Macedonia, 8 populations were resistant to diseases. The yield of grain varies significantly among populations. The average yield was 5.78 t/ha. The quantity of grains was 47.89% of pods. The best populations concerning resistance to diseases, the early maturity and the productivity of grain were those of Valandovo, Gostivar and Novo Selo.

From 1985 to 1987 Chergan and Vimer (1988) collected 34 autochthonous populations of faba bean in Slovenia. The research showed that there exists a considerable range of variation both between and within populations. These populations of faba bean are interesting as a basic material in order to obtain cultivars. *Minor* type was represented by only one accession, *major* (13 accessions) and *equina* (20) being the most frequent.

Ostoyitch (1989) indicated that among different kinds of associations of cereals and legumes as well as of pure crops, the association of hybrid sorghum and faba bean is the most productive association among 10 studied combinations. The amount of green mass produced was 53.64 t/ha, of dry material 12.36 t/ha and of crude protein 1.53 t/ha. The hybrid sorghum in pure crops yielded 43.34 t/ha of green mass, 9.38 t/ha of dry material, and 0.77 t/ha of crude proteins. Ostoyitch concluded that the association of faba bean with hybrid sorghum significantly increased the yields and the quantity of protein feed.

Results of our research during 1988

The purpose of the research

According to the tasks of the project 'Genetic breeding of cereals and grain legumes' proposed in cooperation with the ICAMAS and EEC, we have enlarged our research programme including faba bean in it. The basic aim of the programme regarding the breeding of faba bean is to increase the yield of grain, the quality of grain, the green mass and the resistance to diseases, pests and to unfavourable environmental ecological factors.

Applied methods

The basic methods in the research of faba bean consisted in collection and evaluation of this material, hybridization and selection within the hybrid progenies, comparative trials, etc.

Ecological conditions

Experimental field in Zagreb is on 45°49' north latitude and 15°59' longitude and 122 m height above sea level. Soil is alluvial. Fertilisation is 450 kg/ha NPK (8:26:26). Herbicides applied were Senchor plus Dual. Pesticide was Lebaycide. Meteorological conditions in 1988 were unfavourable for spring crops because of the lack of winter rains and scarce precipitation in April and June.

Results

Germplasm collection

A study on 7 domestic populations (Croatia) and 3 introduced varieties (France and Czechoslovakia) was carried out. The goal of this research was to get basic information about their genetic properties and their value for breeding. Difference among the cultivars regarding the flowering dates was 3-4 days. The French variety flowered later than the others. The interval between emergence and flowering was 56-60 days. The differences regarding the maturity were insignificant. The height of the plants was from 91-135 cm, the height of the lowest pod was from 12 to 23 cm, the mass of 1000-seeds was from 310 to 430 g. It should be mentioned that there were not essential differences among the compared populations and varieties. Further research regarding the economically important properties as yield and quality in order to utilise some of them in the creation of new varieties of faba bean is necessary.

Comparative trials

Five cultivars (2 local and 3 introduced varieties) in six randomized blocks were examined. The data show that the large-seeded cultivars flowered earlier than the small-seeded ones, but they matured several days later. The height of the plants ranged from 44.6 to 92.0 cm. The height of the first pod was 10-12 cm. The number of pods of the landraces varied from 8.9 to 17 and that of the introduced varieties, from 21.4 to 38.5. The weight of 1000-seeds ranged from 274 g (Sorawi) to 996 g (the population from Split). The yield of green seeds was from 8.00 to 24.86 t/ha. The Czech variety had the highest yield of grain.

Intraspecific hybridisation

Crosses were carried out between local and introduced varieties. Thirtyone flowers out of 82 flowers crossed gave pods. A total of 77 hybrid seeds were obtained. Two crosses showed 50% of fertilized flowers. In the next years the inheritance of the characteristics of agronomical value will be studied.

Degree of autofertility

The degree of autofertility was studied by isolating whole plants with bags. Fiftyfour plants of each one of the 3 varieties were isolated in such way (9 plants in 6 repetitions). The percentage of seed setting was: Sorawi 55%, NS-29-72-CSSR 28%, Oran 37%. As this results refer only to a few, introduced varieties, it will be necessary to study a larger number of varieties in our conditions.

Conclusion

Faba bean is cultivated in Yugoslavia mostly as a spring crop. A very small area is used as a crop in association with sorghum or with maize.

Faba bean is represented by many autochthonous populations with different characteristics in the specific ecological conditions of different regions. They were classified as ssp. *equina*, ssp. *major* and very few of them as ssp. *minor* (according to Chergan and Vimer, 1988).

Considering the genetical properties and large degree of variability, the populations of faba bean are interesting, important basic material to obtain new cultivars.

It will be important to study the winter sowing of faba bean in some of our regions with both domestic and introduced varieties, and enlarge the faba bean area.

An exchange of experience and seeds in the framework of an international cooperation in this field would be very important, especially through increasing number of entries in our germplasm collection.

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