Soybean Crop in Romania, Bulgaria and the Republic of Moldova: Current Situation and Perspectives

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Abstract

In the past decade Europe and the EU in particular are facing a major deficit on soy protein. In the case of certified non-GM soy protein this deficit is even broader. EU counts for 0.4% of worldwide soybeans acreage. Soybean imports – grain equivalent – represent 95% of the European annual consumption of 38 million tons. The EU accession of the countries from the Danube region and the association treaties signed by other Eastern European countries have created new opportunities to increase the acreage of soybeans, the region being known for very favorable conditions for this crop. Romania, Bulgaria and the Republic of Moldova represent an important reservoir of conventional soy protein from the perspective of soybeans breeding capabilities and growth potential. In all three countries breeding and cropping soybeans have a history of 100 years.

Today, Romania, Bulgaria and the Republic of Moldova are following this long tradition through breeding and registering new soybean varieties well adapted to local cropping conditions. The agriculture research communities from these three countries are continuously challenged to supply local farmers with high yield and new traits genetics, as well as to develop or improve the cropping technologies for soybeans.

In the past 7 years the soybeans acreage stagnated or slightly decreased in these Danube region countries. Recently, a growing interest of the farmers in the region to increase the soybeans area can be observed. However, to maintain this trend, farmers should benefit from incentive schemes for soybeans as well as demonstration platforms, training and know-how transfer programs. Romania, Bulgaria and the Republic of Moldova have a soybean cropping potential of 0.8-1 million hectares. This potential may generate a minimum of 2 million tons representing 5% of the EU annual consumption, respectively 30% of non-GM soybean annually used in the EU.

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Keywords: soybeans, Danube region, soy cropping areas and demo platforms, soy potential and growth, soy breeding.
1. Introduction

In the past decade Europe and the European Union in particular are facing a major deficit on soy protein. Currently, 38 million tons of soybeans are used for feed and food production in Europe each year. European Union counts for 0.4% of world-wide soybeans acreage. Soybean imports – grain equivalent – represent 95% of the European annual consumption of 38 million tons (Figure 1).

Out of this consumption, approximately 5 million tons are GMO-free and currently mainly imported from overseas (Brazil, Canada or China) and partly sourced from Europe. Depending of yields per year, approximately 2-2.5 million tons of GMO-free soybeans is currently produced in Europe and typically utilized in the domestic production of each country. In addition to this quantity, around 2 million tons of soy is produced in Ukraine, but mainly GMO.

In mid-term perspective (5 years) the potential of soybean production in Europe - excluding Ukraine - amounts more than 5 million tons of GMO-free soy, sufficient to meet the present demand of GMO-free soybeans in the European Union. This reflects 15% of current production capabilities in Europe. Significant potential for the production of soybeans exists in Central and Eastern European Countries, both in member states of the European Union, such as Romania, Bulgaria, Hungary and Croatia, and in countries outside the EU, like Republic of Moldova, Ukraine and Serbia. The contribution of the Danube Region in increasing soybeans acreage in the European Union is reasonable due to the long tradition of soybeans breeding and research, large scale production potential and ideal farming conditions in this area.

Fig. 1. Worldwide soybeans production.

2. Materials and Methods

This paper on soybean growing in Romania, Bulgaria and the Republic of Moldova was completed based on information provided by the National and European agricultural authorities and databases. In addition, an important contribution in concluding this study was the access to multiple opinions of breeders, agriculture experts and farmers in the area as well as workshops, seminars, meetings and conferences on soybeans in Romania, Bulgaria and the Republic of Moldova or at European Union. A considerable role in gathering information and data came from the travels to demonstration platforms and field days in Romania and Bulgaria in 2014.

The scope of my work was to assess the current soybeans cultivation status in the Eastern area of Danube region and to determine the perspectives of this crop in Romania, Bulgaria and the Republic of Moldova.

Reducing EU’s dependency of GM-soy imports from overseas while promoting the cultivation of GMO-free soybeans and enhancing value generation and income opportunities in Eastern and Central European countries is worthwhile undertaking. The production of soybeans and the supply and use of soybeans protein can be regarded as a socio-political and environmental ‘hotspot’ in terms of a sustainable development of EU’s food systems.
3. Results and Discussions

3.1. Current soybean growing situation

Since the EU accession of Romania and Bulgaria the acreage of soybeans registered a decrease followed by a relative stabilization for several years. The Republic of Moldova presented a different trend, the acreage of soybeans slightly increasing constantly (Figure 2).

Among the factors influencing this situation we recognize the historical reasons such as: change of ownership, land fragmentation, lack of working capital and agriculture machinery, less developed agriculture infrastructure, less or no access to soybean markets. In addition, the situation was also affected by the unbalanced crop rotation, the insufficient economic stimulus for soybean producers and livestock breeding (the basic soya consumer) and the lack of specialized soybean processing facilities. The criteria for soybean crop evaluation are based on the level of productivity and efficiency while protein quality and quantity are underestimated. It is worth to mention at peak Romania had more than 0.5 million Ha of soybean in the late 80-s and Bulgaria had about 0.1 million Ha in the late 70-s.

![Fig. 2. Soybeans area in Romania, Bulgaria and the Republic of Moldova 2007-2014.](image)

Table 1. Historical soybean acreage in Romania and Bulgaria (1975-1989) (Ha).

<table>
<thead>
<tr>
<th>Year</th>
<th>Romania</th>
<th>Bulgaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>512,200</td>
<td>21,500</td>
</tr>
<tr>
<td>1988</td>
<td>413,600</td>
<td>23,700</td>
</tr>
<tr>
<td>1987</td>
<td>358,600</td>
<td>35,700</td>
</tr>
<tr>
<td>1986</td>
<td>309,600</td>
<td>51,200</td>
</tr>
<tr>
<td>1985</td>
<td>318,800</td>
<td>70,900</td>
</tr>
<tr>
<td>1984</td>
<td>292,300</td>
<td>71,700</td>
</tr>
<tr>
<td>1983</td>
<td>274,500</td>
<td>64,200</td>
</tr>
<tr>
<td>1982</td>
<td>269,000</td>
<td>68,800</td>
</tr>
<tr>
<td>1981</td>
<td>309,600</td>
<td>93,900</td>
</tr>
<tr>
<td>1980</td>
<td>363,500</td>
<td>94,200</td>
</tr>
<tr>
<td>1979</td>
<td>302,400</td>
<td>96,000</td>
</tr>
<tr>
<td>1978</td>
<td>202,500</td>
<td>99,200</td>
</tr>
<tr>
<td>1977</td>
<td>170,600</td>
<td>68,900</td>
</tr>
<tr>
<td>1976</td>
<td>155,200</td>
<td>56,400</td>
</tr>
<tr>
<td>1975</td>
<td>120,800</td>
<td>36,300</td>
</tr>
</tbody>
</table>
In the past two years in Romania there is an increasing interest of the farmers for soybeans, the soybean acreage growing from 67,400 in 2013 to 86,000 Ha in 2014. This trend is also recorded in the Republic of Moldova, the acreage increased from 42,000 Ha in 2013 to 65,000 Ha in 2014. Bulgaria remained far below the cropping potential, with less than 1,000 Ha in the past years.

In Romania, Bulgaria and the Republic of Moldova breeding and cropping soybeans have a history of 100 years. In 1876 soybeans have been cropped in Transylvania and Bukovina. From 1911-1913 first soybeans experimental fields have been established at Bucharest Central Research Station, continued in 1920 and resumed in 1931 at the Romanian Agricultural Research Institute. In Bulgaria, the Soya Experimental Station in Pavlikeni was established in 1925. From 1925-1941 the State Agricultural Experimental Field was conducting soybean studies and experiments in Bulgaria.

In the mid 30-s German companies had large area planted with soybeans in Romania, Bulgaria and Yugoslavia by providing seeds, inoculum and financing. In 1942 the program reached an acreage of 150,000 Ha.

Today, all three Eastern Danube countries are following this heritage through breeding and registering new soybean varieties well adapted to local cropping conditions.

Despite the low public financing of the re-search activities and the decrease of planted acreage, soy breeders were continuing the long tradition on soybeans. In the past ten years the research institutes or research stations from the three countries of Eastern Danube region (Figure 3) were breeding and registering new soy varieties.

![Fig. 3. Soybeans research and breeding institutes Romania, Bulgaria and the Republic of Moldova.](image)

Since 2004 in Romania the National Agricultural Research and Development Institute from Fundulea registered or renewed the registration for 7 soybean varieties: Daciana (maturity group 0, 2006), Oana F (maturity group 00, 2009), Romanesc 99 (maturity group 00, 2009), Columna (maturity group 00, 2009), Danubiana (maturity group I, 2009), Triumf (maturity group I, 2009) and Crina F (maturity group I, 2011) and the Agricultural Research and Development Station from Turda registered or renewed the registration for another 9 soybean varieties: Felix (maturity group 00, 2005), Perla (maturity group 000, 2009), Darina TD (maturity group 00, 2011), Cristina TD (maturity group 00, 2012), Eugen (maturity group 00, 2012), Malina TD (maturity group 00, 2012), Onix (maturity group 00, 2012), Carla TD (maturity group 00, 2013) and Larisa TD (maturity group 00, 2013). In same past decade, in the Republic of Moldova the Research Institute of Field Crops “Selectia” from Bălți registered 5 soybean varieties: Horboveanca (maturity group 000, 2004), Indra (maturity group 00, 2006), Enigma (maturity group 000, 2008), Deia (maturity group 000, 2010) and Magia (maturity group 00, 2013) and the Institute of Genetics and Plant Physiology from Kishinev registered 5 soybean varieties: Zodiac (maturity group 000, 2004), Albișoara (maturity group 00, 2010), Amelina (maturity group 00, 2010), Clavera (maturity group 00, 2010) and Nadejda (maturity
The same situation can be also observed in Bulgaria, respectively the Soybean Experimental Station in Pavlikeni registered 4 soybean varieties in the past ten years: Srebrina (maturity group II, 2004), Richy (maturity group II, 2009), Rosa (maturity group II, 2009) and Avigeya (maturity group I, 2011).

3.2. Perspectives

The EU accession of the countries from the Danube region and the association treaties signed by other Eastern European countries have created new opportunities to increase the acreage of soybeans, the region being known for very favorable conditions for this crop. Romania, Bulgaria and the Republic of Moldova represent an important reservoir of conventional soy protein from the perspective of soybeans breeding capabilities and growth potential.

The agriculture research communities from the three Eastern Danube region countries are continuously challenged to supply local farmers with high yield and new traits genetics, as well as to develop or improve the cropping technologies for soybeans.

In this respect, soybean breeders and re-searchers from Germany, Austria, Switzerland, Serbia, Romania, Italy, Bosnia and Herzegovina, Hungary, Slovakia, Poland and Bulgaria held a workshop in Freising, Germany. The workshop organized by Dr. Volker Hahn from the State Plant Breeding Institute of Hohenheim University and Matthias Krön from Donau Soja Association had the objective to identify the needs of soybean breeding in the Danube region and to set the priorities that will meet the current cultivation challenges. The participants identified the following high importance research and breeding objectives: agronomic characters (yield, lodging resistance, pod shattering resistance); weed control; environmental stress tolerance (drought tolerance, cold stress at flowering time); seed composition (protein content, protein quality - allergens and antinutritional). The medium importance objectives were the following: agronomic characters (disease resistance); disease resistance (bacterial blight/pustule, sclerotinia stem rot); environmental stress tolerance (temperature tolerance - heat stress tolerance and germination at lower temperatures); seed composition (protein quality – aminoacids, phytate, carbohydrates, antioxidants). These findings will be incorpo-rated into the future breeding programs in the region.

Since 2013 the European Commission under the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) launched the Focus Group on Protein Crops in order to support innovation and research, to increase the profitability of protein crops in EU and to support the development of EU-scale value chain. In 2014 the Focus Group experts from across Europe assessed the challenges of sustainable European agricultural production systems and identified the possible solutions. Among solutions there are: the access to best practices knowledge and manuals on how to grow; disseminating knowledge among farmers “what to do” and “what not to do” lists; demonstration platforms and practical demos; regulating the use of certified seeds not by putting up a blockade but by stimulating; regulations that stimulate the adoption of the cultivation of legumes by farmers; broadening the genetic base for European breeding; long-term public breeding programs.

Fig. 4. Farmer field day in Knezha, Bulgaria, August 21th, 2014.
In forthcoming years practical demos may and will become an important information and know-how transfer vehicle for farmers. This ‘hand-on’ approach will facilitate farmers’ access to practical knowledge and best practices. Main items to be addressed are: what are the most suitable soy varieties for a specific area and how can crop diseases, pests and weeds be best managed in a sustainable way.

At same time farmers will have the opportunity to select from various European genotypes the soy varieties that would comply with market demands regarding the quality for food or feed.

Most likely, in the next years the number of demonstration platforms and practical demos will significantly increase in Romania, Bulgaria and the Republic of Moldova.

4. Conclusions

The data and information gathered for this study indicate an important development potential for soybeans in Romania, Bulgaria and the Republic of Moldova.

The increasing demand on certified non-GM soy protein for food, feed and pharmaceuticals, the focus of the European Commission on crop diversification measures and the Greening policy may stimulate the interest of farmers for soybeans cultivation.

Recently we can observe a growing interest of the farmers to increase the soybeans area in the Danube region. However, to maintain this trend, cooperation is required between breeders, arable and livestock farmers, feed and food industries and retailers. The governments need to increase their support for protein production and processing in the region. The non-governmental organizations should also be among the stakeholders and take part in the dialogue. Last but not least, the farmers must be actively involved in the process as they produce the raw materials for the industry. This process is likely take some years as both the field production and supply chains need to be developed and improved at the same time.

Romania, Bulgaria and the Republic of Moldova have a soybean cropping potential of 0.8-1.0 million Ha. This potential may generate more than 2 million tons representing about 5% of the EU annual consumption, respectively around 30% of non-GM soybeans annually used in the EU.

5. Acknowledgements

This research was carried out with the support of Prof. dr. Gheorghe Valentin Roman, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania; Dr. Eugen Mureșanu, Agricultural Research and Development Station Turda, Romania; Dr. Georgi Georgiev, Soybean Experimental Station Pavlikeni, Bulgaria; Dr. hab. biol. Valentin Celac, Institute of Genetics and Plant Physiology Kishinev, Republic of Moldova; Dr. Maria Iacobuța, Research Institute of Field Crops “Selectia” Bălți, Republic of Moldova.

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