

## THE YIELD PERFORMANCE OF VARIOUS SOYBEAN GENOTYPES IN FIVE EXPERIMENTAL FIELDS IN ROMANIA AND BULGARIA IN 2015 AND 2016

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### Abstract

*In the last four years, the continuous development of the soybean acreage in Europe, mostly in Central and Eastern Europe, is challenging farmers to apply the adequate growing technology in order to maximize the yields and increase the quality of soybeans. At the same time, this situation is creating a new momentum for breeders for new and/or improved soybean genotypes.*

*The yield performance of various soybean genotypes will allow breeders and agriculture experts to recommend farmers the right variety for a specific soybean cropping area and the farmers to select the right variety for obtaining the best yields under current soybean growing technology.*

*The field experiments were carried-out in 2015 and 2016 in different climate conditions, 2015 being considered less favorable for growing soybeans, while 2016 was favorable to very favorable for this crop.*

*A wide assortment of soybean varieties from different maturity groups created by public and private breeders for all-over Europe had been tested in two experimental years under different and regional specific conditions in five locations in Romania (Central, East, South-East and South-West) and one location in Bulgaria (North).*

**Key words:** *experimental fields, maturity group, soybean genotypes, soybean growing technology, yields.*

### INTRODUCTION

In the last four years, the continuous development of the soybean acreage in Europe, mostly in Central and Eastern Europe, is challenging farmers to apply the adequate growing technology in order to maximize the yields and increase the quality of soybeans.

At the same time, this situation is creating a new momentum for breeders for new and/or improved soybean genotypes.

The yield performance of various soybean genotypes will allow breeders and agriculture experts to recommend farmers the right variety for a specific soybean cropping area and the farmers to select the right variety for obtaining the best yields under current soybean growing technology.

### MATERIALS AND METHODS

The scope of this paper was to bring information regarding the yield performance of various soybean genotypes into the attention of farmers and other interested parties.

A wide assortment of soybean varieties from different maturity groups created by public and private breeders for all-over Europe had been

tested in 2015 and 2016 under different and regional specific conditions in five traditional soybean areas (Figure 1): The Agricultural Research and Development Station Turda in Central Romania; The Agricultural Research and Development Station Secuieni in East Romania; The Agricultural Research and Development Station Caracal in South-West Romania; private farm Agrichim Fetești in South-East Romania and in Bulgaria in one location at private farm ET Pris Borislav Goranov Knezha in North Bulgaria.

The field experiments were carried-out in two experimental years in different climate conditions, 2015 being considered less favorable for growing soybeans, while 2016 was favorable to very favorable for this crop.

In two experimental years at ARDS Turda were studied 63 soybean varieties, out of which 22 replicated each year. The seeding was done on April 21-28 at 50 cm between rows and 60 g.g./m<sup>2</sup> seeding density.

At ARDS Secuieni were tested 49 soybean varieties (27 replicated), seeded on April 25-27 at 50 cm between rows and 50 g.g./m<sup>2</sup> seeding density.



Figure 1. The locations of experimental fields in Romania and Bulgaria in the years 2015 and 2016

At ARDS Caracal were studied 43 soybean varieties (25 replicated), seeded on May 9-13 at 70 cm between rows and 55 g.g./m<sup>2</sup> seeding density. In Fetești were tested 63 soybean varieties (24 replicated), seeded on April 14-28 at 37.5 cm between rows and 60 g.g./m<sup>2</sup> seeding density. In Knezha were studied 53 soybean varieties (17 replicated), seeded on April 18-19 at 70 cm between rows and 45 g.g./m<sup>2</sup> seeding density.

## RESULTS AND DISCUSSIONS

In Turda, in 2015, the average yield per experiment was 2,104.2 kg/ha with variation limits from 1,442.0 to 2,668.0 kg/ha. A number of 40 soybean varieties had been tested, out of which 19 produced more that the average. In 2016 the average yield was 3,970.2 kg/ha (variation limits 3,040.0-4,910.0 kg/ha) and 28 varieties (out of 49 tested) produced more that the average (Figure 2).

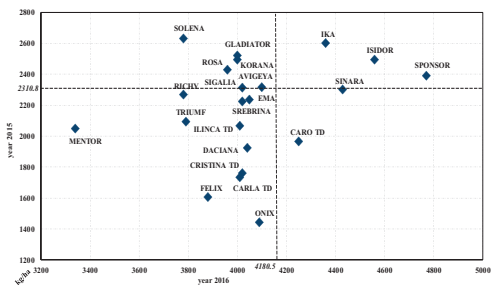


Figure 2. The yields obtained for the soybean varieties assortment (kg/ha, Turda, 2015-2016)

In Secuieni, in 2015, the average yield per experiment was 2,487.7 kg/ha (variation limits 1,463.0-3,388.0 kg/ha). An assortment of 36 soybean varieties had been studied, out of which 18 produced more that the average. In 2016, the number of tested varieties was 40 and 23 varieties had the yield above the average of 2,372.4 kg/ha (variation limits 1,522.0-3,677.0 kg/ha) (Figure 3).

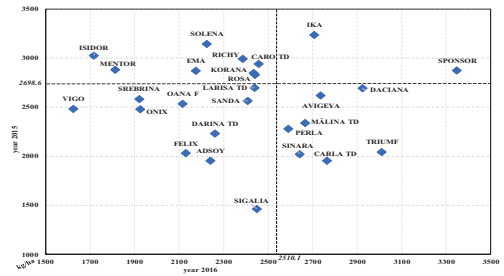


Figure 3. The yields obtained for the soybean varieties assortment (kg/ha, Secuieni, 2015-2016)

In Caracal, in 2015, was tested a number of 43 soybean varieties, out of which 22 produced more yield than the average of 2,792.7 kg/ha (variation limits 1,659.0-4,016.0 kg/ha). In 2016, were studied 41 varieties and the average yield of the experiment was 3,320.5 kg/ha (variation limits 2,753.0-4,716.0). 18 soybean varieties produced more then the average (Figure 4).

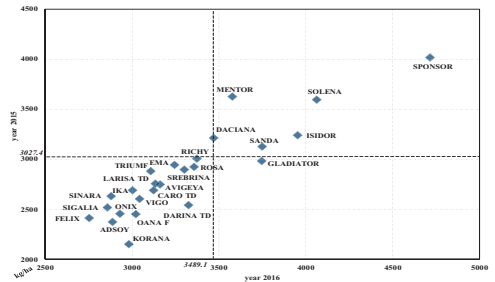


Figure 4. The yields obtained for the soybean varieties assortment (kg/ha, Caracal, 2015-2016)

In Fetești, in 2015 were tested 42 soybean varieties that produced an average yield of 3,106.0 kg/ha (variation limits 2,200.0-3,550.0 kg/ha) and 25 varieties produced more that average. In 2016, the average yield was 3,015.4 kg/ha (variation limits 2,565.0-3,576.0 kg/ha) and 20 varieties (out of 43 tested) produced more that the average (Figure 5).

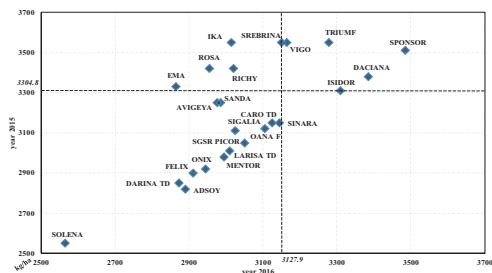


Figure 5. The yields obtained for the soybean varieties assortment (kg/ha, Fetești, 2015-2016)

At Knezha, in 2015, an assortment of 41 soybean varieties had been studied, out of which 23 produced more than the average (Figure 6).

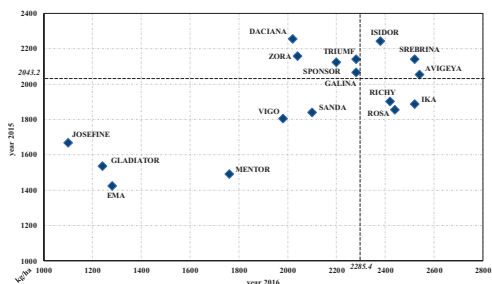


Figure 6. The yields obtained for the soybean varieties assortment (kg/ha, Knezha, 2015-2016)

In 2015, the average yield per experiment was 1,800.4 kg/ha (variation limits 945.0-2,314.0 kg/ha). In 2016, the number of tested varieties was 29 and 15 varieties had the yield above the average of 2,077.9 kg/ha (variation limits 1,100.0-2,980.0 kg/ha).

## CONCLUSIONS

In the experiments from ARDS Turda, the soybean yields were greatly influenced by the weather conditions of the agricultural year. The most favorable year was 2016, when the average yield was 3,970.2 kg/ha and 27 varieties produced more than 4,000.0 kg/ha, while 2015 was less productive, with an average yield of 2,104.2 kg/ha and 5 varieties produced over 2,500.0 kg/ha. With average yields over two experimental years above 3,000.0 kg/ha can be mentioned the following soybean varieties: Caro TD, Ilinca TD, Sponsor, Isidor, Gladiator, Sigalia, Sinara, Solena, Ema, Ika, Korana, Avigeya, Rosa and Srebrina.

Under the conditions of ARDS Secuieni, the soybean varieties of the tested assortment produced between 1,463.0 and 3,388.0 kg/ha (2,487.7 kg/ha on average) in 2015 and between 1,522.0 and 3,677.0 kg/ha (an average of 2,372.4 kg/ha) in the year 2016. By comparison with average yields per year, 18 varieties produced more (out of which 14 varieties significantly exceeded the average) in 2015 and 21 varieties produced more (of which 13 varieties significantly exceeded the average) in 2016. Yields more than 2,500.0 kg/ha (average of two years) have been harvested from the following soybean varieties: Carla TD, Caro TD, Larisa TD, Mălina TD, Perla, Daciana, Triumf, Sponsor, Sigalia, Sinara, Ika, Avigeya and Rosa.

Under the experimental conditions of ARDS Caracal the soybean obtained high yields, ranging from 1,659.0 to 4,016.0 kg/ha, averaging 2,792.7 kg/ha in 2015 and between 3,320.5 and 4,716.0 kg/ha with an average of 3,320.5 kg/ha in 2016. Compared to average yields, 22 varieties produced more in 2015 and 18 varieties were above the average in 2016. More than 3,000.0 kg/ha average in two years have been obtained from the following soybean varieties: Daciana, Sponsor, Gladiator, Isidor, Mentor, Solena, Ema, Sanda, Richy, Rosa and Srebrina.

In the experiments from Agrichim Fetești, on fertile soil and under irrigation conditions, soybean yields were constantly high (3,015.4-3,106.0 kg/ha yearly averages). More than 3,000.0 kg/ha - average in two experimental years - were harvested from the following soybean varieties: Daciana, Triumf, Oana F, Caro TD, Larisa TD, Sponsor, Isidor, Sigalia, Sinara, Ema, Ika, Sanda, SGSR Picor, Avigeya, Richy, Rosa, Srebrina and Vigo.

Under the conditions of ET Pris Borislav Goranov Knezha, compared with average annual yields per experiment, 23 varieties produced more in 2015 and 15 varieties were above average in 2016. The soybean varieties that produced more than 2000 kg/ha are the following: Daciana, Triumf, Sponsor, Isidor, Avigeya, Richy, Rosa, Srebrina, Ika, Sanda, Galina and Zora.

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