

BREEDING SOYBEANS TO IMPROVE THE PRODUKTIVITY AND ADAPTIVE TRAITS UNDER IRRIGATION

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Relevance. Soybean is one of the major agriculture crops in the world. Particularly rapidly spread its area of crops under irrigation, where it gives stable yields and a good precursor for other cultures.

To increase the gross yield of soybean seeds, the level of profitability of soybean production is necessary to increase the yield potential of varieties of different maturity groups, it is possible to simultaneously increase adaptive capacity.

Analysis of recent research and publications. The expansion of growing area provokes a saturation of soil pathogens harmful to soybean, and hence the need to create varieties, which resistant to diseases and pests. It is established that the use of resistant varieties is equivalent to an increase in acreage by 15-20%, and their implementation can reduce the need for about 14-15 of thousands tons of pesticides.

The purpose of research. The aim of research was to highlight the constant lines, using the improved method of selection on productivity and create new soybean varieties with high productivity and resistance to diseases.

Materials and methods. The studies was conducted in breeding nurseries of soybean of the Institute of Irrigated Agriculture of NAAS during 2007-2011. The starting material for studies were soybean lines selected from hybrid populations F₂, with further study in subsequent generations. Growing technology is conventional for conditions of irrigation in southern Ukraine.

Results and discussion. From high-performance hybrid combinations F₅ soybean (Yug 40 / Lambert, Yug 40 / Banana, 1814 (2) 90 / KS 9, Danaia / Phaeton, Izumrudna / Tresor and BY 5823 / Altair) allocated by using the improved method of selection on productivity (by number of productive nodes per plant), were selected the most productive lines with different duration of the growing season.

From the hybrid population Yug 40 / Lambert have been allocated four hybrid lines. By the trait "the number of seeds per plant" their excesses over the standard were 114.35-226.26%; by weight of seeds per plant – 124.53-193.07%; the yield – to 47.98-90.65%. Only two hybrid lines of this combination have formed a mass of 1000 seeds, more than the standard by 4.05 and 7.98%. Most of the lines of this hybrid population finished the growing season by twelve days later than standard.

Within population Yug 40 / Banana four hybrid lines were highly productive. Their excess over the standard Yug 40 by the number of seeds per plant accounted 110,90-159,68%; by weight of seeds per plant – to 105,52-162,92%; the yield – to 34,27-76,95%. Only one line of hybrid population Yug 40 / Banana was better than standard by 2.17% by the mass of 1000 seeds. All selected lines of hybrids F₅ from this combination ripened for 1-2 days earlier than standard.

From the hybrid population 1814 (2) 90 / KS 9 was allocated five productive lines. By the number of seeds per plant their excess over the standard were 138,88-169,31%; by weight of seeds per plant – 131,74-157,12%; by the yield – 45,48-66,36%. Only one line had weight of 1000 seeds at 6.39% more than the standard. Most lines of this combination completed their vegetation period in 3-4 days after standard.

Only one line of hybrid combination Danaia / Phaeton was highly productive. Its exceeding (in %) over the standard: by number of seeds per plant – 96.20; by weight of seeds per plant – 114.51; by yield – 45.79; by weight of 1000 seeds – 8,47. And the length of the growing season was by three days more than at standard.

Within the hybrid population Izumrudna / Tresor was allocated two productive lines. By the number of seeds per plant these hybrid lines were better than standard on 117,5-118,79%; by weight of seeds per plant – to 122.39-132.58%; by the yield to 51,09-55,45%; by the mass of 1000 seeds only one line exceeded the standard – on 6,69%. Dedicated lines of Izumrudna / Tresor ended their growing season by four days earlier standard.

Only one line hybrid combination BY 5823 / Altair stood out by the main productive traits. Its excess over the standard (in %) were: by the number of seeds per

plant – 120.23; by weight of seeds per plant – 109.55; by the yield – 37,38% and the growing season was at three days more than the standard.

As a result of the study of a soybean lines resistance to the Soybean mosaic virus, Bacterial blight, Septoria brown spot and Downy mildew, symptoms of a wrinkled mosaic virus and Septoria brown spot in these lines was not found.

The lines 8/33 Yug 40 / Lambert; 15/3 Danaia / Phaeton; 27/4, 27/5 Izumrudna / Tresor and 34/1 BY 5823 / Altair showed very highly resistant (9 points) to Bacterial blight. The lines 8/15, 8/25 Yug 40 / Lambert and 30/2, 30/11, 30/14 Yug 40 / Banana showed highly resistant (7 points), the lines 8/24 Yug 40 / Lambert; 41/16, 41/17 and 41/25 1814 (2) 90 / KS 9 showed average resistance (5 points).

The defeat of the soybean plant by downy mildew had the local nature in the form of leaf spot. Very high stability (9 points) to the disease had lines 8/15 Yug 40 / Lambert; 27/4, 27/5 Izumrudna / Tresor and 34/1 BY 5823 / Altair, high (7 points) - line 30/11 Yug 40 / Banana; 41/41, 41/49 1814 (2) 90 / KS 9 and 15/3 Danaia / Phaeton, average (5 points) - line 41/16, 41/17, 41/25 1814 (2) 90 / KS 9.

As a result of using the improved method of selection to the performance - by the number of productive nodes per plant, created two new varieties of soybean Sviatogor and Sophia, that in 2014 and 2015, respectively, were included in the State Register of Plant Varieties of Ukraine and are recommended to growing for the grain in the steppe zone.