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IMPACT OF SPRING SOWING PERIOD OF VEGETABLE SOYBEAN ON SOWING PERIOD OF REPEATED CROPS

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Abstract

This article provides characteristics of zoned varieties of vegetable soybeans included in the State Register of Agricultural Crops of Uzbekistan, recommended for cultivation in the territory of the Republic of Uzbekistan, and also developed sowing periods for repeated vegetable crops.

Keywords: vegetable soybean, sowing time, sowing scheme, green beans, repeated crop, technical maturity, biological maturity, early ripening, proteins, fats.

Introduction

With the development of farms, there are prospects for increasing the area of cultivation of vegetable soybeans in the main (spring) and repeated (summer) sowings as the main or combined crop. Cultivation of ultra- and early ripening varieties of vegetable soybeans will allow obtaining early products and will make it possible to free up fields in time for repeated cropping. At the same time, the problem of increasing soil fertility will be solved, since vegetable soybeans promote the accumulation of nitrogen in the soil due to the activity of nitrogen-fixing bacteria living on its roots [4; 6].

Including vegetable soybeans in your diet will enrich your food with proteins and other nutrients that your body needs. Food products such as vegetable soybean soups, purees, fresh soybean salads, soy meat, soy milk, chocolate, and butter will be much cheaper without compromising on taste or nutritional value. At this time, vegetable soybeans are not yet available in the markets [1; 3].

Soybeans are a non-traditional crop in Uzbekistan. Expanding the range of vegetables makes it possible to diversify the population's diet, as well as provide very valuable nutritious feed for livestock. This requires the development of agricultural technology for growing and introducing new varieties of vegetable soybeans.

In the Republic of Uzbekistan, a strategy of actions for 2017-2021 was approved in priority areas, UP-4947 of February 7, 2017, which notes "... further optimization of crop areas aimed at placing potatoes and vegetable crops on the released lands."
In this regard, it is necessary to use vegetable soybeans for sowing in a repeated crop, conduct research on growing vegetable soybeans and obtain two harvests per unit of land area per year, and also conduct an economic assessment [2; 5; 7].

Material and research methodology

The research was conducted according to the VIR vegetable growing methodology. Experiments on vegetable soybeans were laid out in 2008-2010 and 2012-2017, 2020-2023.

Vegetable soybean variety Izumrud. Patent received in 2023. Early maturing variety. The first harvest of green beans in technical maturity is carried out already on the 63rd day after germination. Biological maturity of seeds occurs on the 82-86th day. Pods are formed only in the lower part of the stem (35-40 pcs).
The yield at technical maturity is 17.2-18.9 c/ha. Green seeds are used as food. The weight of 1000 green beans is 675 g. Ripe seeds are also suitable for consumption similar to grain soybeans. Marketability meets the requirements of the world market. The seeds contain a significant amount of protein and fat.
The variety is universal. It is successfully combined in crop rotation with vegetable and grain crops. Improves soil fertility. It is suitable for sowing both in spring and summer sowing and forms a full harvest. Fruits in technical maturity (green) and biological maturity are a high-calorie product for preparing salads, porridge, soups and other dishes. The green mass of plants is nutritious feed for animals.

Vegetable soybean variety Universal. Early maturing variety, flowering period is 20-30 days. Flowers are white. Bush height is 40-60 cm. Bush foliage is average. Beans are formed at the base of the first - second branch and have very short internodes. Leaf is whole, oval, with a pointed end. Pulp is weak. Bean length is 5 cm, width is 1.1 cm. 1-3 seeds are formed in each bean.

One plant produces 25 to 65 beans, 90% of which are two-seeded. Seeds in the technical maturity phase (green beans) are green, shiny, flat-oval, 1.0 cm long and 0.7 cm in diameter. The period from mass flowering to technical maturity is 20–30 days, and biological maturity of seeds is 55–60 days.

The first harvest of green beans at technical maturity is carried out on the 60-65th day after germination. Biological maturity of seeds occurs on the 90-95th day after germination. The yield of beans at technical maturity is 11 t/ha, and at biological maturity it is up to 4 t/ha. The weight of 1000 green seeds is 690-720 g. At biological maturity, the seeds are hard, yellow in color, the weight of 1000 seeds is 255-270 g.

Sulton variety. Zoned in 2011. Medium-late variety. Green beans in technical maturity are collected 92-99 days after mass shoots. Biological maturity of seeds occurs 120-130 days after shoots. Beans are formed along the entire height of the stem, 80-130 pieces. The weight of 1000 green seeds is 760 grams. The weight of 1000 seeds in biological maturity is 250-300 grams.

Sowing dates from March 20 to April 30, from June 10 to July 20. The area of the plot was 12 m^2, the plots were four-row, 6 m long. The sowing pattern was 70 x 15 cm - control.

Soybeans are sown when a stable soil temperature of +12…+14^{0}C occurs to the seed placement depth (3-5 cm). Seeds should be sown in moist soil. The timing of sowing vegetable soybean seeds largely determines its yield.

The studies conducted in 2008-2010 and 2012-2015 at the Research Institute of Crops, Vegetables and Soybeans showed differences in the accumulation of the early ripening variety Universal depending on the sowing dates. The optimal time for sowing seeds and forming a high yield is the period from April 1 to 20. With these two sowing dates, the green beans of vegetable soybeans are harvested in July.

If it is necessary to free up the field for a second crop in late June and early July, it is possible, under favorable weather and climate conditions, to plant earlier, from March 20 to April 1. In this case, the somewhat low yield of vegetable soybeans will be compensated by the yield of the second crop. This makes it possible to free up the field for second crops.

When sowing from March 20 to April 1, the field is cleared in the first ten days of June and potatoes, cucumbers, carrots, radishes, watermelons, corn for green fodder, onions can be planted as a repeat crop. When sowing from April 10 to April 20, the field is cleared at the end of June and potatoes can be planted as a repeat crop, Table 1.

Table 1 - Effect of spring sowing time of vegetable soybean variety Universal on the sowing time of repeated crops

March			Aprel			May			June			July	
II	III	I	II	III	I	II	III	I	II	III	I	II	III
Sowing March 20									**Potatoes (mid-ripe), cucumber, carrot, radish, watermelon, corn for green fodder, onion**				
	Sowing on April 1st												
		Sowing on April 10							**Potato, cucumber, watermelon.**				
			Sowing on April 20						**Potatoes, onions.**				
				Sowing on April 30					**Onion.**				

Zoned soybean varieties Izumrud, Universal, Sulton are also suitable for summer sowing and cultivation in a repeated crop.

Studies have shown that when sowing vegetable soybeans of the Izumrud and Universal varieties in the second - third ten days of June, you can get a full harvest of both technical and biological maturity of beans.

When sowing the Izumrud and Universal soybeans in summer, the seeds have time to ripen before frost. When sowing in summer, the yield of these varieties is 20-30% lower than when sowing in spring.

When sowing the Sulton variety, which is later ripening, in the repeated sowing period, technical maturity occurs at the end of September and if there are no early autumn frosts, depending on the year, the seeds begin to ripen in October.

Conclusions

We recommend the optimal sowing dates in the Central zone on typical gray soils of Uzbekistan as April 10–20. It is not economically feasible to sow at a later date, since the onset of the technical maturity phase of vegetable soybeans is delayed until the end of August, which leads to delayed soil preparation and sowing or planting of repeated crops.

It should be noted that both in the early and later periods the soybean yield was slightly less: 20.03 – 33.2 c/ha, 1.04 – 35.6 c/ha, 30.04 – 36.1 c/ha. The highest yield was noted when sowing 20.04 – 38.5 c/ha. In the control variant 10.04 – 37.7 c/ha.

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