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# Biology of soybeans and soybean varieties grown in Karakalpakstan

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***Abstract:*** *in order to develop the optimal sowing time, ensuring high and stable yields of soybeans of the "Nafis" variety in the Aral sea region,field experimental were carried out on the experiment plot of the Karakalpakistan scientific experimental station of the rechearch institute of grain leguminous crops. The experience in multi-factorial. Sowing was carried out in three sowing dates 1st,2nd,3rd ten daysof april. The results of the study showed that when cultivating soybeans of the Nafis variety in the aral sea region in order to oblain the highest grain yielts, sowing should be carried out in the first the day april.*

**Keywords.** Aral sea, soybean, sowing, yielts, carried out, experimental, april, grain, contain, protein, plant, agriculture, agrotechnology.

## Introduction

Soybean is like an annual herbaceous plant (Glicina hispida L.)Belonging to the family oflegumes (Fabacea L.). ***Soybean*** is a young plant in Uzbekistan. Its grains contain 30-52% protein, 17-27% fat, and 20% carbohydrates [1].

In recent years, the attention to the soybean in the Republic of Uzbekistan is growing. While soybean protein is used as a source of nutritious protein feed in livestock and poultry, an environmentally friendly product is obtained in the food industry. Soybean-planted fields improve soil microflora by providing the soil with pure nitrogen.

With the introduction of soybean cultivation, the problem of protein deficiency can be solved, the production of vegetable oil can be increased and livestock can be provided with quality, protein-rich fodder. At the same time, the fertility of the soil in which the soybean is planted can be achieved by the accumulation of biological nitrogen in the soil as a result of the activity of nitrogen-fixing bacteria in its roots.

***Biological properties.*** During the growth and development of the soybean, it goes through the following developmental stages: greening, branching, budding, flowering, legume formation and maturation. The passage of the phases and the conditions required for will depend on the biology of the varieties. In particular, the technological measures taken have a significant impact on the growth of the soybean.

In order to study growing peculiarities of soybean in saline soils along the Aral Sea research was conducted in the experimental fields of Karakalpak Scientific Experimental Station of the Uzbek Research Institute of Cereals and Legumes and the Karakalpakstan Institute of Agriculture and Agrotechnologies. The relief of the test site is flat, the mechanical composition of the soil is moderately heavy gray loam. Alfalfa is sown before crops. The field was plowed in the fall and saline washing was carried out. In the experimental layout scheme of the soybean, the varieties were placed with four repetitions. Planting depth was 5-6 cm, the method was planted in wide rows, 60 cm between rows.

The object of the experiment was "Orzu", "Selekta-302", "Tumaris", "Nafis" varieties of soybean, sowing was carried out in the I, II and III decades of April.

Prior to planting, soil samples were taken from the experimental site based on generally accepted methods for performing agrochemical tests to determine soil salinity. Soil samples were mixed with five proportions of distilled water and filtered in the laboratory of the institute to

prepare a soil solution and agrochemical analysis was carried out to determine salinity of our experimental site was 0.13%.

***1-picture. The period when the soybean varieties produce 2-5 leaves***

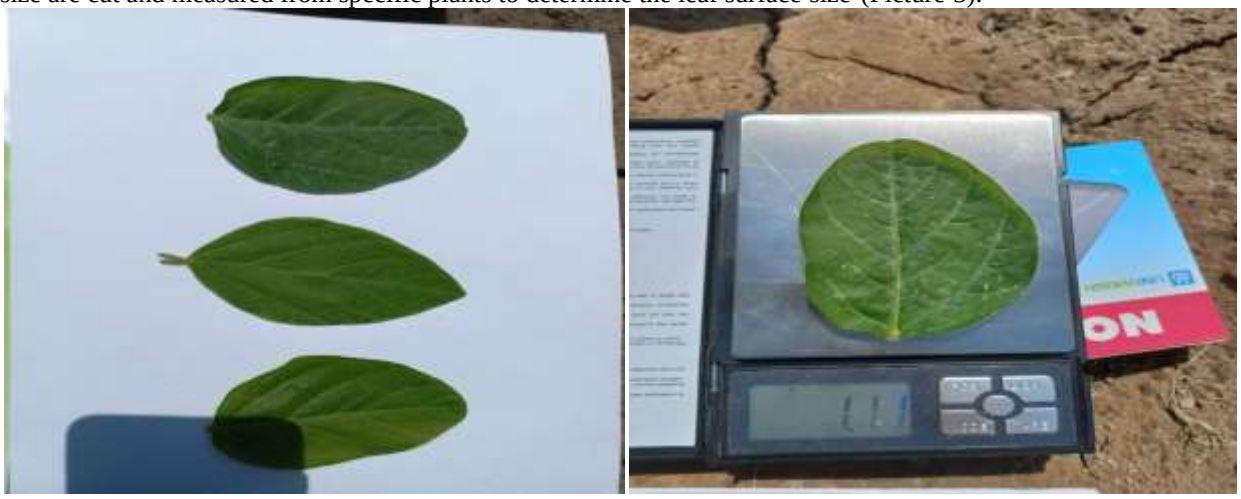
In our experiment, the planting material was 1st class seeds, and when we studied the developmental stages of the growers according to the VIR methodology, it was found that there were a lot of 5-point growths, which in turn was positive for field germination. In the laboratory, we use the following indicators to determine the germination of seeds. Sand is used to determine the germination and growth energy of the seeds, it is moistened and placed in a sandy loam, then
100 seeds are sown (in four turns). It is washed before placing and heated well to avoid damaging the seeds. Seeds are placed on the rostil with a calculator or by hand using a marker. There are 4 samples in the rostil, with their numbers on the labels, the time when calculation of germination and growth energies was conducted. Seeds of field crops are often germinated at a stable temperature of 20 degrees. We checked the seeds twice for germination. In the first, growth energy was detected, and in the second, germination was detected. The growth rate of seeds is checked daily in the research.
Kuleshov I.I. [5] showed that field germination of seeds was directly related to laboratory germination, and that the lower the laboratory germination, the greater the difference between it and field germination. In our experiment, the difference between laboratory germination and field germination was average 12-13%.
In the process of individual growth and development, seed crops undergo phenological stages of organogenesis. Each of these periods and stages is characterized by the appearance of new organs and a single external morphological feature. Like all grain legumes, the soybean plant undergoes periods of germination, branching, budding, flowering, legume formation, and ripening. The conditions required for the passage of time depend on the biology of the variety. In addition, the technological measures applied to it also have a significant impact.

The soybean plant is heat demanding, the seeds germinate at 8-10$^0$C, 15-18$^0$C is required for full germination, and 20-22$^0$C is optimal. Flowering stops when the temperature drops below 17 degrees during flowering. The plant can grow up to 38-40$^0$C. Temperature is 1600-1700$^0$C forearly ripening varieties, 2000-2200$^0$C for medium ripening varieties, 2800-3000$^0$C for late ripening varieties. -4-5$^0$C frost can damage [6].
When soybean seeds are sown, the lower the air and soil temperatures, the slower the germination of seeds, and the higher the temperature, the faster the germination.
***Germination phase.*** Soybeans begin to swell when the water content reaches 90-150% by weight of dry matter. Two to three days after germination, the embryo ruptures the seed cortex and develops a vein. As the embryo develops, lateral veins and vascular hairs appear. The growth of the root complex depends on the physical properties of the soil, temperature, humidity and nutrients. Once the embryonic vein has formed, the hypocotyl elongates, the hypocotyl first splits the soil, and then the seed cortex sprouts. First a simple real leaf appears, then three leaves. In our experiment, this was observed after 13-14 days. Usually this period begins 8-10 days after planting. The first root buds appear 7-10 days after germination, and after two weeks they can meet the plant's need for nitrogen. When we studied the transition characteristics between varieties, we obtained the following indicators: in the germination phase there was almost no difference between varieties, all varieties germinated in 13-14 days, and in two weeks a pair of leaves appeared.
In our experiment, on April 28, 2021, the seedlings sprouted in full, and the varieties
"Orzu", "Selekta-302", "Tumaris" and "Nafis" germinated by an average of 93-97% (Picture 2).

*2-picture. Germination of soybeans in the field*

***The branching phase*** began when 3-5 complex leaves appeared in our experiment. (Pictures 6,7). During this time, the stem grows rapidly, then its growth slows down and the formation of leaves decreases. The lateral branches develop from the lower parts of the stem. Varieties with little or no branching may also occur. In our experiment, the branching phase is 23days when planted in the "Orzu" variety on April 10; when planted on April 20, it was observed for 22 days, and this period was found to be shortened to 1 day;

The yield-forming organ of a plant is the leaf. The better the leaf develops and the healthier it is, the more active the process of photosynthesis and the more complex organic matter is formed in the leaf. To predict the yield to be obtained, it is necessary to determine the leaf surface size of the plant. Leaf surface size is determined in several ways. In a soybean plant, pieces of a certain size are cut and measured from specific plants to determine the leaf surface size (Picture 3).



**3-picture.Determining the leaf surface size of soybean varieties**

## CONCLUSIONS

1. Indicators of soybean vegetation in all observations of saline soils along the Aral sea (germination, the degree of preservation of the number of bushes, the formation of leaf surface volume - leaf activity, yield, etc.) were found to be high in "Selekta-302" and "Nafis" varieties.

2. Experimental observations showed that among all the studied varieties, the stem heightof "Selekta-302" and "Nafis" varieties increased. In the first and third variants ("Orzu" and "Tumaris") the stems were lower than in the second and fourth

variants.

3. The low stem height of "Orzu" and "Tumaris" varieties is probably a biological feature of the varieties, because the agro-technological measures were the same for all variants (varieties).

4. The development of soybean leaf also depends on the biological characteristics of the varieties, and it was found that the second and fourth variants of the experiment were optimal.

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