

SOY PLANT AND ITS SPECIFIC MORPHO-BIOLOGICAL STRUCTURE, COMPOSITION AND ITS PLACE IN THE FOOD INDUSTRY

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ABSTRACT

This article provides information on the origin, foreign and domestic varieties, distribution, place and economic importance of the soybean (*Glycine max*) plant belonging to the leguminous family, as well as its growth, development and cultivation.

Keywords: soybean, oil crops, food, morphology, vitamins, protein, nitrogen, legumes.

INTRODUCTION

It is no secret that the soybean plant (*Glycine max*) has joined the list of plants with high nutritional value, such as wheat, lentils, beans, corn, peas, lentils, barley, and oats. [1,2].

If we look at the history, the soybean plant originated in China and has been cultivated for more than 5000 years. Currently, leguminous crops occupy the largest areas in terms of area, and the annual gross production volume of soybeans in the world market is 276.5 million tons. Soybean cultivation areas are 111.3 thousand hectares across the globe [3,4,5].

LITERATURE ANALYSIS AND METHODOLOGY

In recent years, along with developed countries, great attention has been paid to soybean cultivation in our republic. In particular, the President's decision "On measures to organize soybean planting and breeding of soybeans in the republic in 2017-2021" is a clear example of this.

Soy is a cheap and useful product that replaces meat and dairy products in terms of nutritional value. It is used in food, confectionery, and even in agriculture as a nutritious and high-quality feed for livestock.

The original origin of soy belongs to China, Korea and Japan. Currently, Brazil, the USA and Argentina are the countries with the highest cultivated area in the world. [6].

Soy belongs to the family of legumes (Fabaceae) and is an annual herbaceous plant. Cultivated type (*Glycine Max*) is widespread in agriculture.

The wild type (*Glycine ussuriensis* Rge) is distributed in nature. Cultural type is divided into 4 subtypes:

- 1) Korea type - *G ssp. karajensis*;
- 2) Manchurian type- *G ssp. Manchuria*; 3) Indian type- *G ssp.indica*;
- 4) Chinese type - *G ssp. Chinesis*.

The root of the soybean plant has an arrow root system and a well-developed root system. The lateral roots are long and reach 1.5-2 m. Nodule bacteria live symbiotically in the root system. The stem is rough, stiff, growing upright, with a pointed top, height from 25 cm to 35 cm. Its

grass is green, and it emerges from the ground with two seed-bearing leaves. Branching starts from the bottom of the stem. [7].

The color of the stem of the plant is green and there may be spots. The diameter of the stem is 4-22 mm, the leaves have a three-sided odd feather-like structure, and there are side leaves. The shape of the leaf is large, wide, and the seeds are of different shapes and sizes. Like other plants, the largest leaves are at the top of the stem or at the bottom of the stem. Some small and thin leaves are located at the tip of the soybean stem. The surface of the leaf is smooth or wrinkled, its color is green, dark and light green, yellow-green, silver-green. When fully ripe, the leaves turn yellow and fall off. Side leaves are located at the base of the leaf. The flower of the soybean plant is located in a curved, small 7-11 mm short hairy flower band. The calyx is green, the crown leaves have 5 wings, white and purple. A flower has 10 pollinators and 1 seed. The ball is in the form of a shingle, located in the axils of the leaves. There are 13-20 flowers in the inflorescence. Some inflorescences are short and have up to 3-6 flowers [11].

Currently, there are early, mid-ripening, and late-ripening varieties of the soybean plant. Early varieties ripen in 90-100 days, medium varieties in 110-120, and evening varieties in 130-140 days. The vegetation period of a plant includes growth and development, germination, budding, budding, flowering, ripening, etc. Soybean grain needs 130-160% of its dry weight for swelling and germination. In 2-3 days after sprouting, the buds develop. Soybean seed leaves emerge 7-8 days after sowing. During the first week, the rhizome of the rhizome and the stalk of the gerbera grow by feeding on the seeds. Soybeans develop slowly during the initial growing season. The sprouted soybean grows up to 15-20 cm in 20-25 days. Three double leaves of soybean are formed 5-7 days after the plant germinates. The next leaves appear in 4-6 days [12].

The flowering phase of soybeans begins 35-40 days after full germination, depending on the variety, different climatic conditions and planting time. It takes 40-60 days from flowering to pods ripening. The grain is fully ripe in 15-20 days.

Soybean is one of the most water-demanding plants among grain crops. In order to obtain a higher yield, it is necessary to fully meet the moisture requirements of soybeans. One hectare of soybean consumes 3200 m³ to 5500 m³ of water during the growing season [13]. Therefore, if the plant's demand for water is not met during the period of flowering and pod formation, the yield will decrease sharply [14]. Soya is considered a short-day plant, and light is of great importance for plant growth. The lack of light causes the extension of the vegetation period of the plant and the delay in yielding [15].

A light day length of 13-16 hours is considered favorable for most varieties of soybeans. Different varieties of soybeans have different requirements for light. For example, early morning varieties are less demanding on light, while mid-early and late-early varieties are more demanding on light. Soybean is a heat-loving plant, temperature is one of the necessary factors for its germination, flowering and ripening after the seed is planted in the ground [16].

Due to the fact that the soybean plant produces a large amount of above-ground mass, it has a high demand for mineral fertilizers. According to data, soybeans need 80-85 kg of nitrogen, 30-35 kg of P₂O, 36-40 kg of K₂O, and 60-70 kg of calcium from the soil to produce a ton per hectare and, accordingly, to form and accumulate above-ground mass. while absorbing. According to the

conducted experiments, soybeans absorb nitrogen, phosphorus and potassium in the largest amount from the flowering phase to the period of pod ripening [15].

The plant, in turn, requires phosphorus fertilizers at the beginning of the vegetation. Because at this time joints, branches and flowers are forming [16].

Soy is the most important protein and oil crop of world importance. Its seeds contain an average of 37-42% protein, 19-22% fat and up to 30% carbohydrates. The vegetative mass collected at the stage of bean filling is rich in proteins (16-18%), carbohydrates and vitamins. According to the amino acid composition, soy protein is close to chicken egg protein, and its fat is easily digestible and contains fatty acids that cannot be produced by the body of animals and humans. Due to its rich and diverse chemical composition, soybeans are widely used as food, fodder and industrial crops. In this respect, it is unmatched. Several hundred different products are obtained from soybean seeds [13].

Soybean oil is directly used in the food industry, as well as in margarine, lecithin, varnish, paints, adhesives, linoleum, plastic, plywood, printing materials, glycerin, fatty acids, tocopherols, insecticides in the paper, textile industry. and others are used in production. Medicines are made from soy lecithin. Soy milk is recommended for stomach ulcers, kidney disease, Graves' disease, liver cirrhosis, cholecystitis and other diseases [14].

Soybean cultivation is of great agrotechnical importance due to the symbiosis with nodule bacteria, which is able to absorb atmospheric nitrogen, a large amount of which remains in the soil after harvest. In addition, this plant helps to increase free-living nitrogen bacteria.

Thus, enriching the soil with nitrogen, many crops of soybeans, especially southern ones serves for good growth of winter wheat in the regions [15].

Soybeans, like all legumes, are especially rich in vitamins B1 and B2. Vitamin B1 in soybeans is 3 times more than cow's milk, B2 is 6 times more than wheat, barley, oats, buckwheat, and 3 times more than corn. B vitamins are unstable to high temperatures, so their amount is slightly reduced in heat-treated soy products. Vitamin C is also lost during cooking of soybeans [13]. The use of soy protein products in the meat industry, due to their high water and fat binding ability, can significantly reduce losses in the production of meat products, especially during their heat treatment. As a result, the cost of the product is significantly reduced, and the quality is improved.

CONCLUSION

From the literature review, it can be concluded that the high nutritional value of soybean grain is one of the main reasons for its strong position in the world. In particular, its role in the food industry and agriculture is incomparable. Today, the fact that soy plant protein content is close to animal proteins, it can be replaced by animal proteins has been reflected in the experiments. In addition, the fact that the soybean plant is economically important requires the creation of fruitful varieties of this plant that are resistant to various abiotic influences in our republic

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