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Providing Students with Additional Information About the Glycine Hispida L. Plant and Its Cultivation Technology When Transitioning From "Biological Fundamentals of Agriculture" To Topics Related to Plant Science

Bakiev Dustmakhmat Tashmatovich

Associate Professor, Tashkent State Pedagogical University named after Nizami, Uzbekistan

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Abstract: This article aims to provide students with additional information about the technologies for growing the legume Glycine hispida L. plant when teaching subjects related to plant science in the Biological Fundamentals of Agriculture subject at higher educational institutions in the pedagogical field, including the Glycine hispida L. plant and its importance; the importance of legume crops in increasing soil fertility, effective use of arable land; land preparation for planting, methods of planting Glycine hispida L. seeds and their cultivation; planting dates; varieties of Glycine hispida L. to be planted; crop care, irrigation, feeding, measures to combat diseases and pests, harvesting and storing the crop.

Keywords: Cultivation technology, agricultural technology, repeated sowing, plow, horse-drawn cart, chisel tillage, harrowing, hilling, variety, seedlings, protein, animal protein, mature bacteria.

Introduction: In the Republic of Uzbekistan, as in all sectors, great importance is attached to the development of agriculture. Large-scale work is being carried out in the republic to increase the cultivation of

fruit and vegetable crops, improve their quality, effectively use land, increase soil fertility, as well as increase the planting of leguminous crops, plant more leguminous crops in plots, cultivate them, increase the planting of secondary crops, increase productivity, and export them to foreign countries [1].

Laws of the Republic of Uzbekistan aimed at the development of agriculture, decrees and resolutions of the President of the Republic of Uzbekistan, and numerous government resolutions have been adopted. Starting from the 2020-2021 academic year, admission quotas have been allocated for undergraduate education in Gulistan, Bukhara, Karshi, Namangan, Samarkand, Fergana, and Urgench state universities, along with existing agricultural universities, to train specialists in the agricultural sector.

It would be appropriate to provide students studying Biology at higher educational institutions in the field of Pedagogy with additional information on the importance of legumes in increasing soil fertility and the technology of growing Glycine hispida L. in the subject of Biological Fundamentals of Agriculture [2].

In addition to increasing soil fertility by increasing the area under legumes, increasing grain yield, providing livestock with feed, and providing students with knowledge and skills in plant science, it is also important to form entrepreneurial ideas and skills in them.

Students will be given the following information on the technology of growing legumes.

A person should consume oxygen, carbohydrates, vitamins, minerals and other substances in the daily diet. The more varied a person's diet is, the more active his life activity is, and the healthier his body is. Each of us realizes how important such nutrition is, especially when we are faced with daily fatigue, depression, neuro-psychological stress and negative effects of the environment. It should be noted that for the normal functioning of the human body, the need for protein should not be less than 0.7 g per kilogram of its weight per day [3].

Theoretical bases. Glycine hispida L. is cultivated in more than 60 countries in all regions of the world.

In developed China, with a population of more than a billion, and in Japan, Korea and other countries, where arable land is very small, the population's protein needs are mainly met by protein obtained from Glycine hispida L. grains.

The root of the common Glycine hispida L. species is well-developed, taproot, branched, penetrating the soil to a depth of 2 m, the main part of which is located in the arable layer (bacteria develop in the root zone).

Soybean is a plant belonging to the legume family. This crop originated in Asia and gradually spread throughout the world. The seeds of cultivated soybeans, which are commonly called “soybeans”, are a widely distributed food product in the world. annual plant of the legume family (Fabaceae).

The root system is taproot, penetrating into the soil to a depth of 1.5-2 m. The stem is strong, erect, strongly branches, does not lodge, forms a bush from 45 to 150 cm high. The leaves are trifoliate, usually fall off by the time of harvesting.

The inflorescence is a raceme of 3-8 flowers. The flowers are small, white or light purple, planted in the axils of the leaves in racemes of 3-5 flowers. Self-pollination predominates, due to the closed flowering, natural hybrids are rare. Beans have different shapes and colors, contain 1-5 seeds, usually do not crack. Stems, leaves, beans are covered with thick hard whitish or red hairs. Seeds are round, oval or oblong-flattened, depending on the variety have yellow, green, brown or black colors. Weight of 1000 seeds 100-400 g.

Soybeans contain macro- and microelements. Linoleic and linolenic acids - prevention of atherosclerosis, heart disease, osteoporosis. Phospholipids are responsible for metabolism, restore cell membranes, nervous system, help the pancreas and liver in their work. Vitamins A, E, strengthen the immune system. Estrogens restore hormonal balance, protect the female body from breast cancer, prolong youth. Soy products improve human attention and memory. Soy products are a faithful assistant in the fight against excess weight.

Glycine hispida L. is a versatile plant, and is included in the group of highly valuable crops due to the fact that its grain contains 50% oxalic acid and up to 28% oil. Today, more than 400 different products necessary for the national economy are produced from Glycine hispida L. grain. The grain is an environmentally friendly, high-quality raw material used in the food industry. 35% of the vegetable oil consumed by the population, which does not contain harmful substances, is obtained from Glycine hispida L. grain. After the oil is extracted, Glycine hispida L. isolate is obtained, and its protein content reaches 75%. It is used to prepare baby food, cookies, bread additives, proteins for the sausage industry, products for the confectionery industry (decaffeinated chocolates), coffee and its substitutes [4].

Industrial products are made from Glycine hispida L. waste that is not used in the food industry and animal husbandry. Various products are made from it; - building boards, fabrics, artificial fertilizers, soap, varnish, paints, rubber products, linoleum, the highest

quality and expensive car paints are obtained from the residues of Glycine hispida oil production.

In medicine, products made from Glycine hispida L. can be recommended for the following diseases: atherosclerosis, hypertension, heart ischemia, recovery period after myocardial infarction, chronic inflammation of the gallbladder, diabetes mellitus, chronic constipation, obesity, diseases of the musculoskeletal system (arthritis, arthrosis), allergic diseases. One kilogram of Glycine hispida L. grain can produce 4 liters of milk for humans and 8 liters for calves, as well as all the products produced by animals - milk, yogurt, cottage cheese, cheese, and meat (sheep, beef, chicken, goose).

In animal husbandry, no other forage crop has as many nutritional units as Glycine hispida L. It contains 138 nutritional units per 100 kg of grain, which is lower than that of corn, alfalfa, and other crops. Even 100 kg of its dry stalks contain 52 nutritional units. No other forage crop can surpass Glycine hispida L. in terms of nutritional value. In order to quickly fatten cattle and increase the daily weight of poultry in the world, products containing Glycine hispida L. are necessarily included in their daily diet.

Another feature of this plant is that, since it belongs to the legume family, it leaves behind 55-60 kg of pure nitrogen in the soil. Today, restoring soil fertility or maintaining it in its current state remains an urgent issue in our country. During the growth and development of Glycine hispida L., there is no need to apply large amounts of mineral fertilizers to the field, the plant itself is able to absorb and use nitrogen from the air.

The soil and climatic conditions of our country are very favorable for the cultivation of Glycine hispida L., and it can be grown as a main and repeated crop in all regions and Karakalpakstan. Glycine hispida L. planted as a repeated crop reduces the harmful effects of water and wind erosion, enriches the soil with organic matter, and reduces its secondary salinization. When it is planted in fields vacated by wheat crops, the microclimate of the crop field, the phytosanitary condition of the field, and microbiological processes in the soil improve. The yield of crops planted after Glycine hispida L. increases by 20-30 percent. Of the varieties planted as repeated crops in our republic, varieties with a growing season of 91-110 days are planted.

Glycine hispida L. cultivation technology. Glycine hispida L. is planted in alternating plantings. After itself, Glycine hispida L. leaves the soil fertile, free from weeds, enriched with organic matter and nitrogen. The water-physical properties and biological activity of the soil increase significantly after planting Glycine hispida L.

Soil cultivation. The depth of plowing of the beds planted with Glycine hispida L. on irrigated lands depends on the thickness of the cultural layer of the soil, groundwater, and the relief of the field.

If the field is contaminated with ajrik, ghumai and other perennial weeds with rhizomes, the soil is plowed with a 16-18 cm depth with a plow without a tine. Then the rhizomes are collected with a cultivator or chisel and burned. Before plowing, the annual rate of organic and potash fertilizers and 70-80% of phosphorus fertilizers are applied. On saline soils, after plowing, the soil is washed of salt, organic and local fertilizers are applied. During plowing, measures are taken against wind and water erosion. In early spring, harrowing is carried out to preserve moisture in the soil. When the land is plowed in the fall, it is leveled, if the soil is compacted due to salt washing, moisture-accumulating irrigation or rainfall, it is chiseled and harrowed. In some fields, a trowel can also be used.

Seed preparation for sowing. For sowing, selected, cleaned, treated with anti-disease drugs, and inoculated with nitrate before sowing are used. Seeds are sprayed with panoctin, raxil preparations 20-24 days before sowing, at a rate of 1.5 and 2 kg/ha, respectively. On the day of sowing, seeds are inoculated with nitragin or rhizotorphine in a closed building or in the field with Glycine hispida L. at a rate of 200 grams per hectare.

Sowing time. In our republic, when the soil temperature warms up to 16-18o C, Glycine hispida L. seeds germinate evenly, evenly, and in a short period.

Methods and norms of sowing seeds. Glycine hispida L. is a crop that is planted in wide rows. When planted in dense rows, productivity decreases. Row spacing can vary from 50-102 cm. The density of the plants should be 300-400 thousand plants per hectare, which ensures high yields.

In irrigated lands in Uzbekistan, Glycine hispida L. is mainly planted with row spacings of 60 cm. Glycine hispida L. is also planted with row spacings of 45, 70, and 90 cm. In experiments, the grain yield of Glycine hispida planted in a 60 x 15 scheme was 4.3 c/ha higher than that of Glycine hispida planted in a 45x15x6 row spacing. Numerous experiments have shown that in the conditions of Uzbekistan, Glycine hispida L. yields are highest when the row spacing is 60 cm and the seeding rate is 80 kg/ha. Reducing the seeding rate to 60 kg/ha or increasing it to 120 kg/ha leads to a decrease in grain yield [2].

When planting early-ripening varieties, the sowing rate is set at 90-100 kg/ha, and late-ripening varieties at 60-

70 kg/ha. Glycine hispida L. seeds are sown to a depth of 4-5 cm. If the soil is loamy, the sowing depth is 6-8 cm.

Crop care. In irrigated farming, Glycine hispida L. rows are cultivated, the plant is fed, weeds are removed and watered, and diseases and pests are controlled.

Interrow cultivation begins when the plants have sprouted and rows have formed. Subsequent cultivation is carried out depending on the weed infestation of the field, soil compaction, and soil maturity after irrigation. Interrow cultivation is usually carried out every 10-15 days. The first cultivation is carried out to a depth of 6-8 cm, and subsequent ones to a depth of 10-15 cm.

Against weeds, Fosilad-super is applied at a rate of 2-4 kg/ha after seed germination. During the growth period, Glycine hispida L. is sprayed with 2-4, and Pivod herbicide is sprayed with 0.8-1.0 kg/ha before leaf formation or after sowing until germination. Spraying Treflan with 4 kg/ha 10-15 days before sowing seeds also gives good results.

Glycine hispida L. can be damaged by grasshoppers, spider mites, thrips, and scale insects. Summi alpha is used against pests at a rate of 0.25-0.30 kg/ha and karate at a rate of 0.15-0.25 kg/ha. Insecticides are used when insects are in a quantity that causes damage to the Glycine hispida L. crop [5].

Diseases such as artacnose, leaf mosaic, phytophthora, and root rot are common in crops. A number of other agrotechnical measures are used against them, including pre-sowing seed treatment, cleaning, drying, and disinfection of storage facilities.

Irrigation. Irrigation of crops varies depending on the mechanical composition of the soil and the level of groundwater. On gray soils with groundwater on the surface, it is recommended to conduct irrigation 5-6 times. In the case of Glycine hispida L., if not irrigated, it yields 4-5 c/ha of grain. Proper organization of irrigation in the conditions of Uzbekistan ensures high yields [6].

Harvesting. When the moisture content of the seeds of Glycine hispida L. reaches 14-16%, they are harvested and threshed with special combines. When the moisture content of the seeds exceeds 12%, the speed of rotation of the combine drums is reduced to 500-600 per minute, and the spacing of the drums is widened. Harvesting should be carried out in a short time, without damage. The seeds are cleaned and sorted. This work is carried out on special machines. The seeds are stored with a moisture content of no more than 14% [7].

CONCLUSIONS

In short, providing students with additional information about the Glycine hispida L. plant will contribute to the increased cultivation of leguminous crops in our republic, and the further increase in the yield of new promising varieties will contribute to the increase in grain and grain products, and ultimately to the increase in the well-being of the population.

Providing students studying biology with additional information on increasing the production of legumes in the Biological Fundamentals of Agriculture course will increase the understanding of agricultural sciences among future biology teachers preparing for general secondary schools, and will serve as a key resource for planting legumes in school experimental fields and personal plots, guiding students in their careers, and engaging in entrepreneurship in the future.

It is also important to provide students with additional knowledge in teaching agricultural sciences, guide them in their careers, and develop entrepreneurial ideas and skills in students.

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