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GROWTH, DEVELOPMENT AND PRODUCTIVITY OF GREEK SHAMBALA (TRIGONELLA FOENUM-GRAECUM L.) IN SURKHANDARYA REGION

Boqmagil tahqir ko'z-la pir dehqon aytadur,
Bu ekinlar ihra o'smas hech giyoh behudaga!
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Abstract:

This article presents information about the growth development and medicinal properties of Greek Shambhala (Trigonella foenum-graecum L.) in the conditions of the Surkhandarya region, which is an annual forage legume, the oldest used medicinal plant and a traditional spice. This review presents preliminary observations and analysis of the growth, development, yield and medicinal properties of Greek Shambhala.

More than 100 phytochemicals have been isolated from Greek Shambhala seeds, including polysaccharides, saponins, alkaloids, phenolic acids and flavonoids. Fenugreek extract and its bioactive compounds have shown excellent antidiabetic and antiobesity activity in animal and human studies. There is not enough scientific research in Uzbekistan on the productivity and medicinal properties of Greek Shambhala.

Keywords: Greek Shambhala, fenugreek, growth, germination, development, geographical distribution, row spacing, planting, legumes, medicinal.

ENTER

Decree of the President of the Republic of Uzbekistan dated November 26, 2020 "On measures to expand the volume of scientific research on the cultivation and processing of medicinal plants, the development of their seed production" in Resolution No. PQ-4901 to create a unified database of scientific research on the cultivation and processing of medicinal plants in the territories of the republic, the study of advanced scientific developments of foreign countries, the establishment of cooperation with leading scientific institutions, the use of modern technologies, the scientific implementation of developments in the republic and the strengthening of the effective use of existing opportunities and the President of the Republic of Uzbekistan dated May 20, 2022 "On measures to organize the widespread use of medicinal plants in the cultivation and processing and treatment". cultural cultivation and processing of medicinal plants, and the objectives of supporting the creation of cultivated plantations of medicinal plants, as well as ensuring the fulfillment of tasks for the widespread use of medicinal plants in the prevention and treatment of diseases, are determined.

Greek Shambhala is an ancient and multi-purpose culture in different geographical latitudes. Species of Greek Shambhala have been identified on five continents: Asia, Africa, Europe and Australia; it is often grown in North America, West and South Asia, Australia, Russia, the Middle East, and northwest Africa. Potential areas of Greek Shambhala production are Southeast Asia, Japan, Central Asia, Africa and a large part of South America.

Greek Shambhala (Trigonella foenum-graecum L.) is an annual medicinal legume plant. It is grown on all continents, in different soil and climatic conditions. Recently, there has been a growing interest in the production of Greek Shambhala, especially in North America and Europe (Basu et al., 2008; Hussein et al., 2011; Kinji and Rahdari, 2012; Soori and Mohammadi-Nejad, 2012).). One of the most well-known features of this crop is its ability to increase soil fertility by sequestering atmospheric nitrogen, resulting in less need for nitrogen fertilizers for downstream crops (Basu et al., 2004; Khan et al., 2014; Kolodziej and Zejdan 2000).

To enhance this feature, the soil beneath legumes is inoculated with the appropriate Rhizobium bacteria to ensure proper nodule formation. Inoculation is recognized as an agronomic factor that promotes plant growth and

reduces production costs by reducing the need for expensive artificial nitrogen fertilizers (Ndakidemi et al., 2007). Another study (Naimuddin et al. 2014) reported that germination is accelerated by inoculation of Rhizobium seeds.

Fertilization treatment and Rhizobium inoculation treatment resulted in higher seed yield than the control variant. Inoculation of Rhizobium meliloti is especially important in the cultivation of fenugreek, when the plant is grown in adverse conditions, for example, in a greenhouse. excessive soil salinization (Abd-Alla and Omar, 1998) or changes in seed quality (Wierzbowska and Zhuk-Golaszewska, 2014). Planting time and row spacing are two important agrotechnical factors that directly affect yields. In general, early planting dates are preferred because of the expected positive effects on seed germination, growth and development, the length of the growing season, and ultimately yields. (Matelić and Evđović, 2007; Pandita and Randhava, 1994; Sheoran et al., 2000).

In addition, an optimal planting date paves the way for a more efficient use of time, light, temperature, precipitation and other environmental factors (Maletik and Evdžović, 2007). Recommendations for row spacing when growing fenugreek are ambiguous. The following row distances were tested in the study: 15, 20, 25 and 30 cm (El Awad and El Fahal, 2006); 18 cm (Basu et al., 2008); Belt systems with widths of 25 cm (Sadeghadeh-Ahari et al., 2009), 30, 40, 50 and 60 cm (Khan et al., 2005) or 20-60-20 cm (Kołodziej and Zejdan, 2000) were tested.

Agronomic factors that determine plant growth and productivity include plant weed control and pathogen control. Once planted, fenugreek seeds germinate quickly, but the plants grow relatively slowly compared to many other legumes, meaning that fenugreek plants cannot compete effectively with spring weeds. Therefore, mechanical or chemical weed control is very important. However, to date, agrotechnical methods of weed control in fenugreek fields in Uzbekistan have not been developed. There is also a lack of information on seed treatment and an adequate agronomic approach to controlling pathogens during fenugreek plant growth and their impact on yields.

Description. The number of recorded species of Greek Shambhala in the literature varies considerably, but older taxonomies, such as the Linnaean system, clearly emphasized the existence of 260 species [1]. Among the mentioned species of Greek Shambhala, they are mainly known for their medicinal and pharmaceutical properties: T. foenum-graecum, T. balansae, T. corniculata, T. maritima, T. spicata, T. occulta, T. polycerata, T. calliceras. , T. cretica, T. caerulea, T. lilacina, T. radiata, T. spinosa. Among them, T. foenum-graecum is widely cultivated throughout the world [2].

The genus name Trigonella means "small triangle" due to the triangular shape of its small yellowish-white flowers. The species name is foenum-graecum, meaning "Greek hay", due to its initial introduction from Greece [1]. To this day, the plant is given different local names depending on the peoples, local language and culture in which this plant is grown or eaten. For example, fenugreek is called "hulba" in Arabic; in Persian it is called Shambhalila; in Greek it is called Tili, Tipilina, Trigoniskos, Tintelis, Tsimena and Moskhositaro; Boydana, Ulba and Khulba in Uzbek; in Armenian it is called Shambhala; in Chinese it is called Ku-Tou; In Ethiopia it is called Abish; in Japanese it is called Koroba; In England, it is called fenugreek or fenugreek; In Pakistani and Indian languages, it is called Methi; in Italian it was called Fieno Greco; in Russian it is called Pazzhitnik; and in French it is called Senegre [2,3].

Agrotechnics of cultivation. The agronomic production of Greek Shambhala is well studied and described in arid and semi-arid regions of the world and well documented in the primary literature [4,5]. Climatic and edaphic environmental factors (external conditions), as well as genetic structure (internal conditions) are of great importance for metabolic processes in the Greek Shambhala plant [6]. It is also believed that the regulation of the yield of the Greek Shambhala can be carried out by changing programs breeding or cultural treatments [6,7]. It has been established that the growth of Greek Shambhala crops was significantly enhanced by the application of phosphate fertilizers [8]. The plant has an uncertain growth pattern, and therefore it has been reported that the mutant population created by physical and chemical mutagens successfully produces plants with distinct and rapid growth [9,10]. Crops have been found to be affected by several biological factors, such as insects, fungi, bacteria, and non-biological diseases such as micronutrient deficiencies, floods, salinity, and standing water [11].

Place in crop rotation. Greek Shambhala, cotton and other crops are planted on empty lands. It is better not to plant hemp, rice, corn, legumes, vegetables and vegetables with the same roots as alfalfa.

Preparing the land for planting. The land for planting Greek Shambhala is plowed in the fall. Autumn plowing depends on the type of previous crop. Given the moisture content of the soil, after harvesting, it is possible to water the previous crop, after which it will be easier to cultivate the land. On clean lands, after watering, the soil is plowed to a depth of 28-30 cm. After watering, the soil overgrown with weeds is loosened to a depth of 7-9 cm using a plow with a special tipper or a plow without a plow. This action retains moisture in the upper part of the soil, protects the field from weeds and pests, and grass seeds turn green and then disappear when plowed.

Before plowing, mineral and organic fertilizers are applied. In the spring, the plow is harrowed, which retains moisture in the soil, and the field is cleared of grass. Instead of a harrow, it is better to use a dragger or plummola. When using these tools, the surface of the field is well leveled and the grain of the soil is preserved. Depending on the type and density of the soil, a light or medium-heavy harrow is used. If there are a lot of weeds, loosening is carried out. A harrow is attached to the cultivator, and then a trowel is pressed against the porous soil so that the seeds are sown evenly.

If the Greek Shambhala is planted in saline soils, the salt must be washed off. The land where the Greek Shambhala is planted should be flat and clean.

Insemination. Since the Greek Shambhala is a legume plant, it does not need a large amount of mineral nitrogen. Since Shambhala itself accumulates nitrogen, so Shambhala needs more phosphorus and potash fertilizers.

Like all medicinal plants, Greek Shambhala requires certain limited amounts of fertilizer in the recommended norms. At the initial stages of development, Shambhala has a great need for phosphorus. If there is enough phosphorus during this period, Shambhala will develop well in subsequent periods. The effect of potassium is less than that of phosphorus, so the result is better if they are used together. It is recommended to apply 80-120 kg of phosphorus and 30-80 kg of potassium per hectare, depending on the type of soil and productivity.

RESULTS. For the cultivation of Greek Shambhala (Trigonella foenum-graecum) in the conditions of the Surkhandarya region in the autumn season of 2021, the seeds were pre-sorted, the land was plowed and prepared for sowing. There was no need for stratification for early seed collection. In this case, the basis was early planting in the autumn period [12].

The height of the plant is up to 60 cm, the grass has triangular complex small leaves, the edges are slightly carved. Fruits grow on average up to 10 cm in length. They ripen 10-20 seeds.

We planted the seeds of Greek Shambhala on November 24, 2021. The width of the row spacing was planted according to the scheme of 60 cm. Seeds began to germinate on December 10 at the initial stage. Greek Shambhala sprouts slowed down during the winter season, like other crops, but continued to grow and develop even on warmer days. Shambhala retained its vitality on cold winter days. An important role in this is played by the high carbohydrate content. In early spring, he continued the stage of plant development and began the growing season on a large scale. The process of stem branching in Shambhala was observed, as in other legumes. In addition, as a result of the fact that the plant produces sympodial branches, from March 15, 2022, flowers from white to yellow began to appear on the branches of crops. The development of flowers occurred evenly. The development of the pods of the Shambhala plant developed after flowering and reached a length of 8-12 cm.

SUMMARY

Surkhandarya region recommends planting Greek Shambhala in November in soil and climatic conditions under which nodules develop well at the root of Shambhala, but in some cases, if Shambhala seeds are mixed with special nodule bacteria, more nodules form on the root, which leads to a good accumulation of nitrogen. The yield of Shambhala increases if 200-250 g of Tuganak bacteria are treated per hectare of seeds.

Our analysis of the relationship between the structure of the components of seed productivity showed that the main component of seed productivity in fenugreek is the number of seedlings, which indicates the need to include this feature in research technologies for the cultivation of fenugreek.

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