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THE EFFECT OF ORGANIC FERTILIZERS ON THE GROWTH DYNAMICS OF THE MEDICINAL AND ORNAMENTAL PLANT SCHISANDRA CHINENSIS.

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Abstract. This article provides a comprehensive analysis of the effects of organic fertilizers on the growth dynamics of Schisandra chinensis. Schisandra chinensis is a medicinal and ornamental liana, and its productivity, fruit quality, and richness in biologically active compounds are directly dependent on soil fertility, particularly on the supply of organic fertilizers. Based on the conducted experiments, the growth dynamics of the plant were evaluated under different treatments: the first variant served as the control (no fertilizer applied), the second variant involved the application of well-rotted cattle manure, the third variant used vermicompost (biohumus), and the fourth variant applied poultry manure. The results demonstrated that the third variant (vermicompost application) was the most optimal.

In this variant, compared to the control as well as the second and fourth variants, plant growth and development, fruit yield, and the content of biologically active compounds were significantly higher. The differences observed among the experimental variants were clearly influenced by the application of vermicompost as an organic fertilizer. Furthermore, yield calculations showed that the productivity of Schisandra chinensis in this variant was 25–40% higher than in the other variants, with fruits being larger, of higher quality, and more uniform in color.

Phytochemical analysis of the fruits revealed increased levels of biologically active substances, including schizandrin A, vitamins B and C, gomisin A, B, and C, as well as certain flavonoids, compared to the other variants, which has been scientifically substantiated.

Keywords: Schisandra chinensis, growth dynamics, variants, agrotechnics, organic fertilizers, liana, biologically active compounds, vermicompost (biohumus), phytochemical analysis, gomisin, flavonoids.

Introduction. In our country, special attention is being paid to the propagation of traditional and non-traditional, promising, introduced medicinal plants and to the establishment of their plantations. Modern demands require the cultivation of multifunctional plants that possess medicinal, spice, and ornamental value, as well as the creation of a sustainable raw material base for their use. Consistent reforms are being implemented in the protection of medicinal plants, the rational use of natural resources, the establishment of medicinal plant plantations, and their processing.

In this regard, the President of the Republic of Uzbekistan signed Resolution No. PQ-251 dated May 20, 2022, "On Measures to Organize the Cultivation and Processing of Medicinal Plants and Their Widespread Use in Treatment" [1]. This resolution outlines key objectives aimed at organizing the cultivation and processing of medicinal plants, supporting the establishment of cultivated medicinal plant plantations, and promoting the widespread use of medicinal plants for disease prevention and treatment. In particular, it sets target indicators for the establishment of medicinal plant plantations on forest fund lands of the Republic of

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Karakalpakstan and the regions during 2022–2026, expanding the cultivation and processing of medicinal plants, and promoting their use among the population.

Research Object and Methods. The scientific object of the study is the non-traditional medicinal and ornamental plant Schisandra chinensis. In natural conditions, this plant is mainly distributed in East Asia, including China, the Korean Peninsula, Japan, and the Far Eastern regions of Russia, where it grows well in humid, shaded forest and foothill areas, as well as along riverbanks [3]. Under the climatic conditions of our country, it does not occur naturally and is cultivated under managed conditions.

Among the population, Schisandra chinensis is known as Chinese magnolia vine, Far Eastern magnolia vine, or Schizandra. Life form: a perennial liana (a climbing, twining vine). Stem: can grow up to 8–12 m in length, woody in nature, sometimes reaching up to 2 cm in diameter. Leaves are simple, petiolate, glossy on the surface, with smooth margins, and emit a sweet-alkaline scent when crushed, reminiscent of lemon aroma [4–5]. Flowers: bloom in May–June, white or pale pink in color, with a pleasant fragrance. Fruit: a compound berry; bright red, consisting of 20–50 small berries arranged on a grape-like cluster [6] (Figure 1).

The main reason for the health-beneficial effects of Schisandra chinensis lies in its content of unique compounds, particularly lignans known as schizandrins. These compounds impart





strong adaptogenic properties to the plant. Schizandrins also exhibit antioxidant and anti-inflammatory effects, protecting cells from damage [7]. They play an important role in improving liver function and protecting the nervous system. Adaptogens are substances that help increase the body's resistance to stress [8]. Schisandra plays a significant role in combating stress and maintaining physiological balance in the body. It reduces physical and mental fatigue, enhances endurance, and helps the organism adapt to adverse environmental influences [9] (Figure 2).

Figures 1–2. General appearance of Schisandra chinensis and an extract prepared from its raw material.

The study was conducted on experimental field plots in the Tashkent region, where comprehensive data on seed germination, growth and development, bioecological characteristics, and cultivation agrotechnics of the plant were thoroughly investigated. Generally accepted research methods were applied in the study [2].

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Organic fertilizers were tested under different variants while observing the dynamics of plant growth and development. The first variant served as the control (no fertilizer applied), the second variant involved the application of well-rotted cattle manure, the third variant included vermicompost (biohumus), and the fourth variant used poultry manure. Based on phenological observations, the dynamics of height growth were monitored in 50 model plants across four variants with three replications, and the growth and development of Schisandra chinensis were experimentally evaluated (Table 1).

Results and Discussion. Under the conditions of Uzbekistan, spring planting of Schisandra chinensis is considered the most optimal, since although the plant is cold-tolerant, young seedlings are sensitive to severe winter frosts.

Based on phenological observations conducted in 2025, at the beginning of the growing season (April 1), the average plant height in the control Variant 1, where no organic fertilizer was applied, was 5.2 cm. In Variant 2, where well-rotted cattle manure was applied, the average plant height reached 8.1 cm, which was 2.9 cm higher than in Variant 1. In Variant 4, with poultry manure application, the average plant height was 10.6 cm, exceeding Variant 1 by 5.4 cm and Variant 2 by 2.5 cm.

In Variant 3, where vermicompost was applied, the average plant height reached 15.5 cm, which was 10.3 cm higher than Variant 1, 7.4 cm higher than Variant 2, and 4.9 cm higher than Variant 4. Comparative analysis among the variants showed that this treatment produced the highest values. This pattern of differences in plant height growth among the variants was also maintained in subsequent years.

During phenological observations conducted in June, July, and August, rapid growth in plant height was observed in all studied variants due to high air temperatures. However, the highest growth dynamics were consistently recorded in Variant 3 with vermicompost application.

By the end of the growing season, according to observations carried out on December 1, plant height varied proportionally among the treatments. In the control variant without organic fertilizer, the average plant height was 80.2 cm. In Variant 2 with cattle manure application, plant height reached 99.6 cm, which was 19.4 cm higher than the control. In Variant 4 with poultry manure application, the average plant height was 120.1 cm, exceeding the control by 39.9 cm and Variant 2 by 20.5 cm.

The greatest plant height was recorded in Variant 3, where vermicompost was applied, with an average of 151.3 cm. This value was 71.1 cm higher than the control, 51.7 cm higher than Variant 2, and 31.2 cm higher than Variant 4. These results indicate that the differences among the variants were influenced by the effects of the different organic fertilizers applied **(Table 1).**

Conclusion. Based on experiments conducted on low-fertility soils of the Tashkent region, it can be concluded that the growth dynamics of Schisandra chinensis were most pronounced in Variant 3, where vermicompost was applied. In this treatment, the average plant height reached 151.3 cm, which was 71.1 cm higher than in Variant 1, 51.7 cm higher than in Variant 2, and 31.2 cm higher than in Variant 4. The observed differences among the variants were clearly influenced by the application of vermicompost as an organic fertilizer.

These results indicate that for successful growth and development of the selected species under open-field conditions, the application of vermicompost at a rate of 5 t/ha ensures intensive height growth of Schisandra chinensis. In this variant, compared to the control as well as the second and fourth variants, plant growth and development, fruit yield, and the content of biologically active compounds were significantly higher. Yield calculations showed that plant

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productivity in this variant was 25–40% higher than in the other treatments, and the fruits were larger, of higher quality, and uniform in color.

Furthermore, phytochemical analysis of the fruits demonstrated that the contents of biologically active compounds, including schizandrin A, vitamins B and C, gomisin A, B, and C, as well as certain flavonoids, were higher compared to the other variants, which was scientifically substantiated.

The Effect of Organic Fertilizers on the Growth Dynamics of Schisandra chinensis (2025)

Table 1

Variants	**Organic fertilizers**	**Plant height (by month and day), cm**								
		1.04	**1.05**	**1.06**	**1.07**	**1.08**	**1.09**	**1.10**	**1.11**	**1.12**
1.	Control (without fertilizer)	5,2	8,3	20,1	31	50,6	60,8	65,1	70,3	80,2
2.	Well-rotted cattle manure (10 t/ha)	8,1	15,6	26,2	48,8	69,5	78,1	87,2	95,1	99,6
3.	Vermicompost (biohumus) – 5 t/ha	15,5	27,7	49,1	80,3	110,8	130,5	141,1	147,8	151,3
4.	Poultry manure – 5 t/ha	10,6	17,3	37,5	54,4	78,6	95,8	95.2	115.9	120,1

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