THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE GROWTH AND DEVELOPMENT OF FINE-FIBER COTTON

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Abstract. This article examines the influence of external environmental factors on the growth and development of fine fiber cotton.

Keywords. Agrotechnical measures, herbivorous bugs, seed planting, cotton, seedling thickness.

Аннотация. В данной статье рассматривается влияние внешних факторов окружающей среды на рост и развитие тонковолокнистого хлопка.

Ключевые слова. Агротехнические мероприятия, растительноядные, прополка поля, посадка семян, хлопчатник, толщина всходов.

Introduction: Uzbekistan is one of the world's leading countries in cotton production, and two main types of cotton are cultivated in the country: medium-fiber (Gossypium hirsutum) and fine-fiber (Gossypium barbadense) varieties. Fine-fiber cotton varieties are distinguished by their superior fiber quality. However, these varieties are adapted to hot climates and can therefore be cultivated only in the southern regions of Uzbekistan. In addition, their yield and fiber output are somewhat lower compared to medium-fiber cotton varieties.

Medium-fiber cotton, which accounts for more than 95% of global cotton fiber production, surpasses other cotton types in terms of productivity and fiber output. Nevertheless, its fiber quality—compared to that of fine-fiber cotton—is shorter, coarser, and less strong [2]. Of the cotton fiber produced worldwide, 9.41 million tons are exported, of which 38.2 percent—or 3.592 million tons—is exported by the United States, placing it first in the world in cotton exports. Furthermore, 82 percent of the cotton fiber produced in the United States is exported [1].

Today, nearly 200 million people in 84 countries are engaged in sowing cotton seeds on 32–33 million hectares of land, producing and processing cotton. Uzbekistan ranks sixth in the world in cotton production, following China, India,

the United States, Pakistan, and Brazil. Previously, Uzbekistan held third place in cotton fiber exports, after the United States and India; however, in recent years, due to the development of domestic cotton-processing industries, the country has shifted to sixth place [2,6].

At present, global demand for high-quality cotton fiber is increasing. This necessitates the adaptation of each cotton variety's planting density, irrigation regime, and fertilization practices to the specific conditions of each region, making it a pressing and important task.

A. Haydarov recommended that for the "Andijon-37" cotton variety, when using water- and resource-saving technology—specifically the 60×15–1 planting system, which is an important element of this technology—cotton seeds should be sown under film, and transparent film should be laid in the furrows during irrigation. Under these conditions, the optimal plant density should be 95–100 thousand plants per hectare [3].

According to Kh. Tursunov, in the light gray soils of the Andijan region, to obtain high and quality yields from the newly introduced "Andijon-37" cotton variety, the optimal plant density should be 113–114 thousand plants per hectare when sown in single rows, and 144–145 thousand plants per hectare when sown in double rows [4]. S. Kh. Yuldoshev reported that good results were obtained when the plant density was 114 thousand plants per hectare, whereas when plant density reached 171 thousand plants per hectare, yield decreased due to excessive plant crowding and increased lodging. Based on the obtained data, it was concluded that in typical gray soils with deep groundwater levels, the optimal plant density for medium-fiber cotton varieties should be 120–130 thousand plants per hectare.

According to the results of the conducted experiments, phenological observations recorded in early June showed no significant differences between the variants. Plant height increased by 2–3 cm as plant density increased. After topping (pinching) was performed, differences among the variants became evident. According to phenological observations recorded in September, the height of the medium-fiber "Bukhara-102" variety ranged from 93.0 to 105.2 cm at a plant

density of 90–100 thousand plants per hectare, and from 95.0 to 109.0 cm at a density of 110–120 thousand plants per hectare—i.e., an increase of 2.0–4.0 cm with increasing density; in cases where topping was not performed, height increased by 10.0–15.0 cm.

As plant density increased, the number of fruiting branches per plant decreased by 1.5–2.0 units; fruiting elements decreased by 1.3–1.7 units; the number of bolls decreased by 1.3–2.2 units, including 1.2–1.8 open bolls. However, when chemical or manual topping was carried out, compared to the untreated control, the number of fruiting branches increased by 0.8–1.3; fruiting elements by 2.7–4.3; bolls by 2.5–4.0, including 2.6–3.2 open bolls. Moreover, chemical topping produced 2.0–2.5 more fruiting branches, fruiting elements, and bolls than manual topping.

The same pattern was observed in the fine-fiber “Surxon-103” variety, with results slightly higher than those of the medium-fiber variety. In September, the plant height at 120–130 thousand plants per hectare was 95.0–110.2 cm, while at 140–150 thousand plants per hectare it was 100.6–115.0 cm, showing a 5.0–6.0 cm increase with higher density; without topping, height increased by 11.0–15.0 cm.

In the “Surxon-103” variety, as plant density increased from 120–130 thousand to 140–150 thousand plants per hectare, the number of fruiting nodes per plant decreased by 1.0–2.0 units; fruiting elements decreased by 1.4–1.7 units; bolls decreased by 1.5–3.5 units, including 2.0–3.0 open bolls. When chemical and manual topping were performed, compared to the untreated variant, the number of fruiting nodes increased by 0.3–1.6; fruiting elements by 0.6–2.1; bolls by 2.7–4.5, including 2.3–3.0 open bolls. Chemical topping produced 2.3–2.7 more fruiting nodes, fruiting elements, and bolls than manual topping.

It is well known that stink bugs (mirids) suck the sap from cotton leaves and fruiting bodies, causing them to die. When cotton is damaged by stink bugs, the leaves become perforated, and the fruiting bodies—squares, flowers, and bolls—shed prematurely. During phenological observations in July, both formed and shed fruiting elements were counted. According to the obtained results, in the medium-fiber “Bukhara-102” variety, 20.4–26.6 fruiting elements developed, while 5–9

fruiting elements were damaged and shed. In the fine-fiber “Surxon-103” variety, the number of shed fruiting elements was similarly recorded as 6–8 units.

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