

INFLUENCE OF UV IRRADIATION ON COTTON GROWTH AND DEVELOPMENT

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Abstract. *In this work, the growth and development of cotton plants by day was studied for the first time. Exposure to UV rays was discovered to accelerate the growth and development of cotton variety “Tashkent - 6”. With ultraviolet (UV) irradiation, the appearance of fetal elements increases. UV irradiation of cotton bushes leads to an increase in yield up to 55-60%.*

Keywords: *cotton irradiation, UV irradiation, cotton fields, quantity of fruit elements, cotton development.*

Introduction

Any plant grows and develops under the influence of various external factors. External factors include visible light, air composition, other electromagnetic waves, soil composition, fertilizer, etc. All plants grow under normal weather and climatic conditions of their environment. The environment for plants is considered to be the composition of air, water, soil and a complex of light and radiation rays coming from the sun, moon and other cosmic bodies like stars, comets and other cosmic objects emitting various electromagnetic waves [1-4].

The purpose of this work is to study the effect of UV irradiation of cotton bushes on their yield.

The development of science in the modern world has the effect that the slightest changes in the environment can lead to changes in the growth and development of agricultural plants [1-7]. Scientists, studying the influence of ultraviolet rays on higher plants, at one time indicated that “Even 20 minutes of ultraviolet (UV) irradiation of cotton leads to an increase in yield by up to 35-45% [5], however, such experiments were carried out on an experimental plot of cotton fields . We managed to create an installation capable of irradiating hundreds, thousands of hectares of cotton and other agricultural crops [6]. Based on this invention, we provided assistance to more than 20 cotton-growing farms, where the yield of cotton fields was increased to 54-63%, and the timing of their ripening the average was reduced to 27 days.

Research methods.

In this work, we tried to show what parameters change under UV irradiation of cotton bushes. To do this, we conducted a large number of experiments, where we recorded changes in the growth, leaves, buds, flowers and bolls of the “Tashkent-6” cotton variety.

In this work, the task was to determine the effect of ultraviolet irradiation on the fruit-forming ability of cotton. Experiments were carried out on hundreds of hectares of cotton fields, where part of the cotton bushes were irradiated with ultraviolet rays, while the other part of the field remained unirradiated. To irradiate the cotton field, UV lamps of the OBN-150 brand (bactericidal lamps) with a power of 150 watts were used. Irradiation was carried out from the period of germination of cotton bushes until the opening of the bolls, lasting 20-25 minutes. To do this, an electric current converter was connected to the battery of the processing tractor, and from it to the UV lamp (Fig. 1).

The UV irradiator was attached to a processing tractor, the movement of the tractor or a simple cart, which could move through the cotton field, was time controlled. UV irradiation was carried out from the moment of emergence of germination leaves until the opening of the first bolls. At the same time, records were kept of the number of bud leaves, boll flowers and cotton growth.



Figure 1. Scheme of irradiation of cotton with ultraviolet rays

Results and discussion

In Fig.2. The dependence of cotton growth on time (days of development) of the “Tashkent-6” variety is shown. From Figure 2 it can be seen that the growth of cotton under UV irradiation is 25% greater than without irradiation.

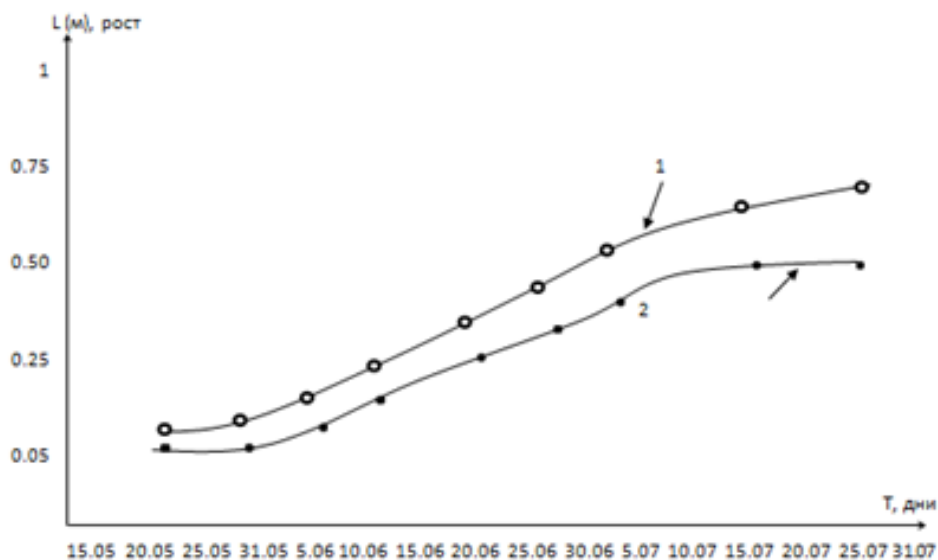


Figure 2. Dependence of cotton growth on time of the “Tashkent-6” variety. For bushes irradiated with UV rays, curve 1. For non-irradiated bushes, curve 2.

It is not difficult to notice that the growth of bushes irradiated with UV rays is much higher than that of non-irradiated bushes [3]. From Fig. Figure 3 shows that the number of true leaves on one bush of cotton variety “Tashkent-6” is significantly greater throughout the entire growth period for irradiated bushes.

This indicates that under UV irradiation, the ability to produce leaves on bushes increased more than that of non-irradiated bushes.

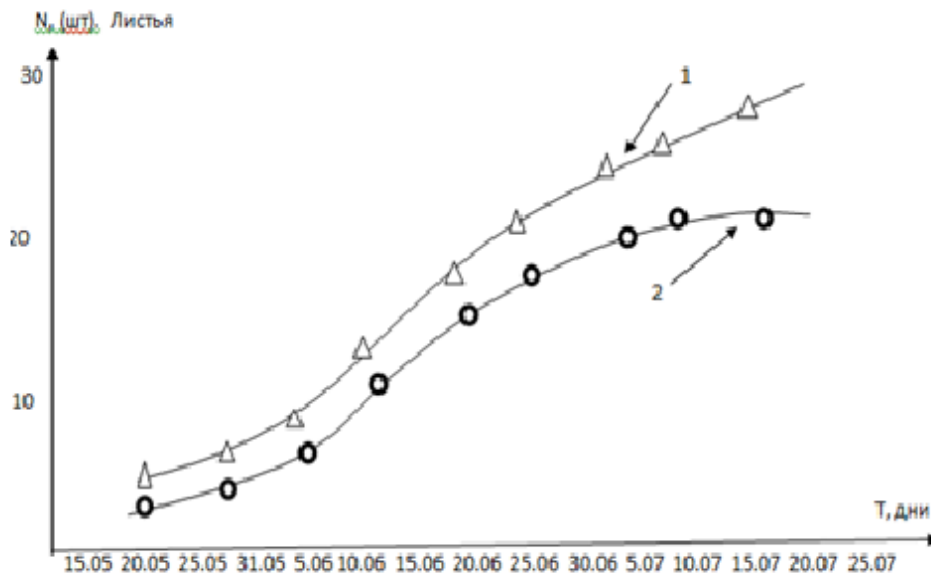


Figure 3 shows the dependence of the number of true leaves on the development of cotton variety “Tashkent-6”.

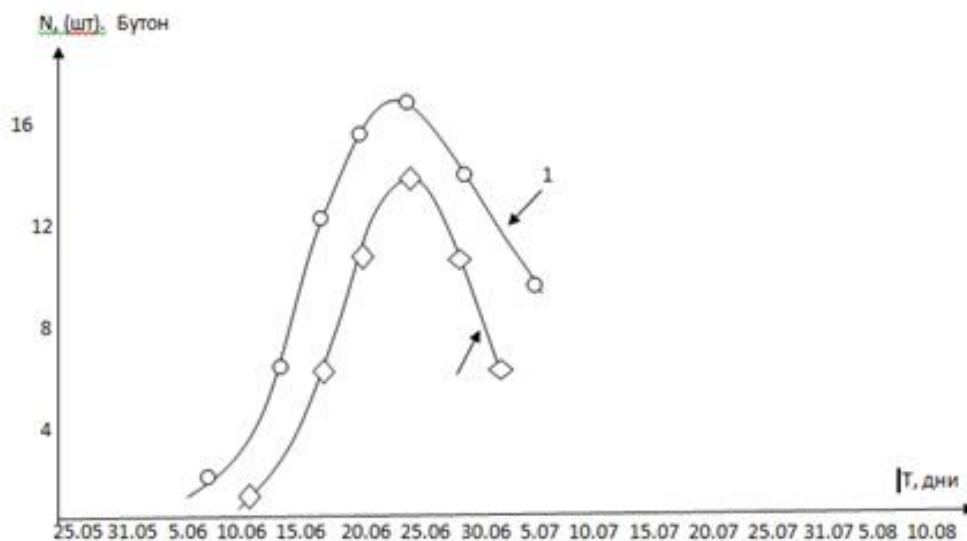


Figure 4. Dependence of the number of true buds on the development time of cotton variety “Tashkent-6”. For those irradiated with UV rays -1, for non-irradiated -2.

Experiments were conducted on the dependence of bud formation on the development time of cotton variety “Tashkent-6”. From Fig.4. It follows that in irradiated and non-irradiated cotton bushes of the “Tashkent-6” variety, the accumulation of buds first grows, then begins to fit, however, there is always more in the irradiated bushes.

In Fig. Figure 5 shows the change in the number of flowers on bushes irradiated with UV rays and non-irradiated ones, where it is easy to notice that for irradiated bushes with UV rays and non-irradiated bushes the curves are similar, however, the curve of irradiated bushes is higher, this is evidence that during irradiation the cotton bushes began to bloom earlier, moreover, they had

more flowers than non-irradiated ones, indicating the activation of growth and development of cotton variety “Tashkent-6” under UV irradiation. At the end of the flowering period, the number of remaining flowers on the irradiated bushes turned out to be greater.

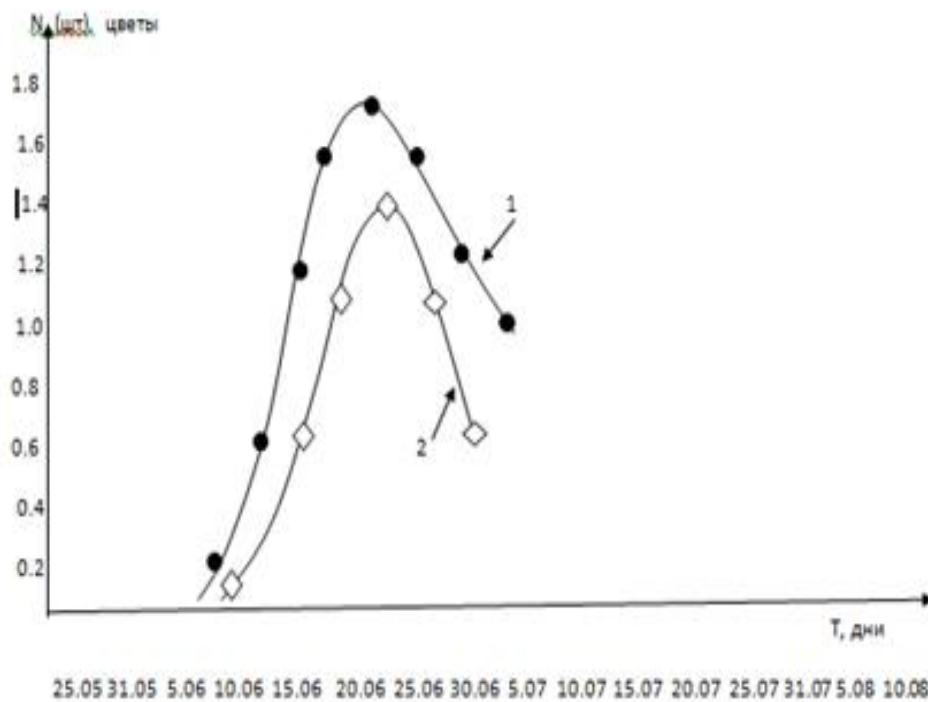


Figure 5. Dependence of the number of true flowers on the development time of cotton variety “Tashkent-6”. For those irradiated with UV rays -1, and non-irradiated -2.

Measuring the number of bolls on cotton bushes of the Tashkent-6 variety showed that when irradiated with UV rays, the process of boll formation accelerates. This phenomenon can be seen in the following graph, the dependence of the number of bolls on a cotton bush of the “Tashkent-6” variety.

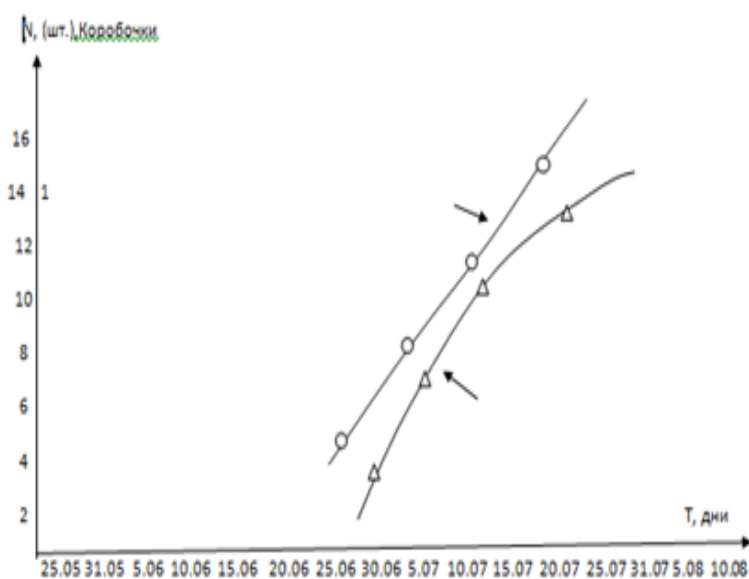


Figure 6. Dependence of the number of true bolls on the development time of cotton variety “Tashkent-6”. For those irradiated with UV rays -1, and non-irradiated -2.

From Figure 6 it can be seen that the number of boxes on those irradiated with UV rays is significantly greater than on those not irradiated. In addition, measurements of the average weight of bolls taken after opening were found to be on average 39% greater than non-irradiated bushes. Fruit - an element of any cotton bush is determined by the sum of buds, flowers and bolls, for the creation of which leaves play a significant role. Therefore, the ability of a cotton leaf to create fruit elements can be determined. [9].

Figure 7 shows the dependence of the number of fruit elements per unit leaf of the cotton variety “Tashkent - 6”, from which it is easy to see that the capacity of the leaves of irradiated bushes turned out to be significantly greater than that of non-irradiated bushes.

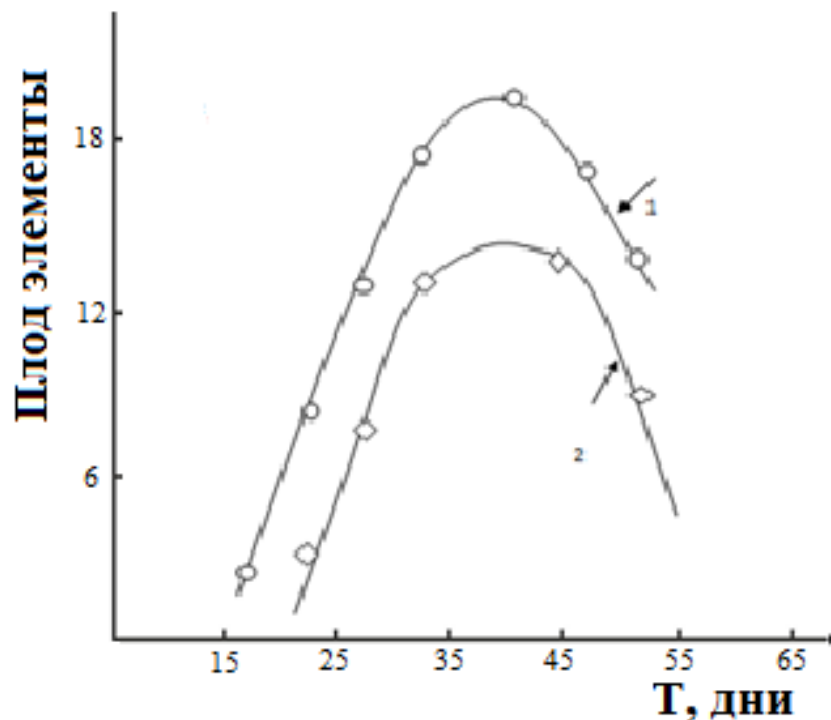


Figure 7. Dependence of the amount of true fruit elements on the development time of cotton variety “Tashkent-6”. For those irradiated with UV rays -1, and non-irradiated -2.

The significance of fruit elements per leaf from the growth time of cotton variety “Tashkent - 6”, irradiated - 1 non-irradiated. Thus, from the UV irradiation results obtained, cotton fibers from irradiated areas and non-irradiated areas were obtained. The semiconductor properties of these two types of fibers were studied, distinguishing the semiconductor properties, in particular the temperature dependence, the photoconductivity of cotton fibers obtained by UV irradiation of cotton bushes differs from cotton fibers obtained under normal natural conditions. [3,8,10]

Results and discussion

The presented scientific research results evidence the following conclusions:

- Exposure to UV rays helps accelerate the growth and development of cotton variety “Tashkent - 6”.
- Changing the dose of UV irradiation plays a role in creating cotton fiber with certain parameters.
- UV irradiation of cotton variety “Tashkent-6” promotes precocity.

- By UV irradiation of cotton, it is possible to obtain cotton fibers with certain parameters of the semiconductor material.

- UV irradiation of cotton bushes can promote the release of raw cotton fiber.

- UV irradiation of cotton bushes leads to an increase in yield up to 55-60%.

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