

Article

Optimizing Defoliation to Enhance Yield in Medium Fiber Cotton Varieties

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Abstract: This study investigates the growth and yield characteristics of S-8290 and S-6775 cotton varieties in the grassland soils of the Fergana region. Despite the extensive cultivation of these varieties, detailed comparative growth data under specific defoliation conditions are sparse. The research aims to fill this gap by evaluating plant height, leaf number, and bud development under two defoliation backgrounds. In S-8290, with 50-60% cotton opening, the plants averaged 92.7 cm in height, 33.3 leaves per stem, and 12.7 buds, with 55.5% opened and 1.6% half-opened. For S-6775, pre-defoliation plants were 96.3 cm tall with 36.0 leaves and 12.5 buds, of which 33.9% were opened and 2.5% half-opened. Under 50-60% defoliation, S-6775 plants averaged 96.8 cm in height, 36.8 leaves, and 12.3 buds, with 53.6% opened and 1.9% half-opened. These findings provide valuable insights into the optimal defoliation conditions to maximize yield and quality in these cotton varieties.

Keywords: Cotton varieties, S-8290, S-6775, Defoliation, Fergana region

1. Introduction

In addition to the creation by our scientists of early ripening, high-yielding cotton varieties that fully meet the requirements of the world market, resistant to diseases and pests, the development of resource-saving agrotechnical measures suitable for the soil and climatic conditions of the regions, as well as for quality harvesting during the ripening period. It is important to apply cotton defoliation agro-management depending on various factors depending on the biological characteristics of the varieties and to develop their optimal rate and duration.

In the conducted experiments, the biological condition of cotton was determined based on the instructions before cotton defoliation. After all, the morphological condition of the plant is influenced by air temperature, soil fertility, soil moisture, the level of nutrition of plants and other external factors. Determination of the biological condition of the cotton before defoliation is one of the main factors in studying the effectiveness of the applied defoliant.

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2. Materials and Methods

In order to determine the biological condition of cotton before defoliation and to evaluate the effectiveness of the acceptable standards and periods of applied defoliant and for the purpose of scientific study, during the past years, our researches have shown that the meadow of the scientific experimental station of the Scientific Research Institute of Cotton Selection, Seeding and Cultivation, located in Kuva district of Fergana region, is heavy in terms of texture and mechanical composition. sand, low salinity, seepage water was carried out in soil conditions at a depth of 1.6-1.8 meters [1].

The depth of the seepage water in Fergana region is also different, it is located at a depth of 1.0-3.0 meters depending on the relief along the length of the large Fergana canal in the Kuvasoy and Margilan cones. The degree of mineralization is 0.8 l/ha based on dry residue. It does not have a horizontal flow and is located at a depth of 1-2 meters.

The soils of the region are completely different from each other. The total land area of the region is 511,000 hectares, of which 55.6%, i.e. 284,000 hectares, is arable land. There are 44.2 thousand hectares of original gray soils in the irrigated areas of the gray soils region, 43% of which are arable lands. Pale gray soils make up 61,000 hectares and 33% of it is arable. 10,000 hectares of gray-meadow soils, 70% of which are plowed. 14,500 hectares of meadow soils, 70% of which is plowed. The main soil of the desert region is grassy soil and makes up 237.5 thousand hectares. 72% of it is arable land.

Most of the farming is done in the desert region. The agro-climatic districts of western Fergana or Ko'kan (Uchkoprik, Buvaida, Uzbekistan, Beshariq, Dangara. Almost all of Furqat and Baghdad districts) the majority of Altariq district, the main part of Rishton, Koshtepa, Yozyovon, Kuva districts. Most of the territory of the province is irrigated land, and the remaining part is sands that are being developed. Thus, 30% of irrigated soils in the region are not saline, and the remaining 70% are saline to varying degrees for one reason or another.

The indicated standards of local and foreign defoliant were applied to experimental options for medium-fiber cotton varieties with 30-40 and 50-60% opened period, and it was planned to determine their optimal application rate and duration, and based on this, the morphological development characteristics of medium-fiber cotton maintained in the experiment were scientifically studied. analyzed. Scientific research "Methodology of field experiments with cotton " (1981), "Methods of conducting field experiments" (2007) and "Methodological instructions for testing cotton defoliant" adopted by the State Chemical Commission of the Republic of Uzbekistan (1993, 1994, 2004) adopted by UzPITI) was conducted on the basis of manuals [2].

3. Results and Discussion

It is known that before applying defoliation measures to cotton, it is necessary to determine their morphobiological condition. Because, as F. Teshaev pointed out, it is important to study the morphobiological condition of cotton before defoliation. Because the effectiveness of defoliant depends more on these indicators [3].

According to N. Kholmurodov in his manual, it is necessary to pay attention to the selective variety of cotton during defoliation, because the foliage and branching of some cotton are not the same [4].

Plants first shed their leaves after the end of their growing season. Many scientists have conducted research on the theory of shedding of cotton leaves. In particular, according to T.S.Zokirov, A.Imomaliev, Sh.Teshaev and others, shedding of cotton leaves is a physiological, biochemical process, which mainly occurs as a result of changes in metabolism. A decrease in moisture and auxin in the leaf cell, and an increase in salts and ethylene are important factors in leaf shedding [5].

K.A. Timiryazev said the leaves on the plant, depending on their number and quality, deliver the main nutrients to the plant, just like the root. However, during the ripening period of the cotton crop, the leaf becomes insignificant. Many scientists studied it and expressed their opinions and conclusions [6]. V.G. Golov conducted a study on the application of free cyanamide at the rate of 15.0 kg/ha to cotton in the form of a 40% working solution in Navoi region. As a result of the study, 79.8% of the leaves were shed after six days and 90.2% after twelve days after the suspension sprayed on cotton [7].

Taking into account the morphobiological status of cotton varieties before cotton defoliation, the morphobiological status of medium-fiber cotton varieties S-8290 and S-6775 was determined, and the obtained data were analyzed based on the results of 2020. According to this, it is planned to cultivate medium-fiber cotton varieties S-8290 and S-6775 in the conditions of meadow-sedge soils of Fergana region, and defoliate them in periods when the bolls are 30-40, 50-60% open [8].

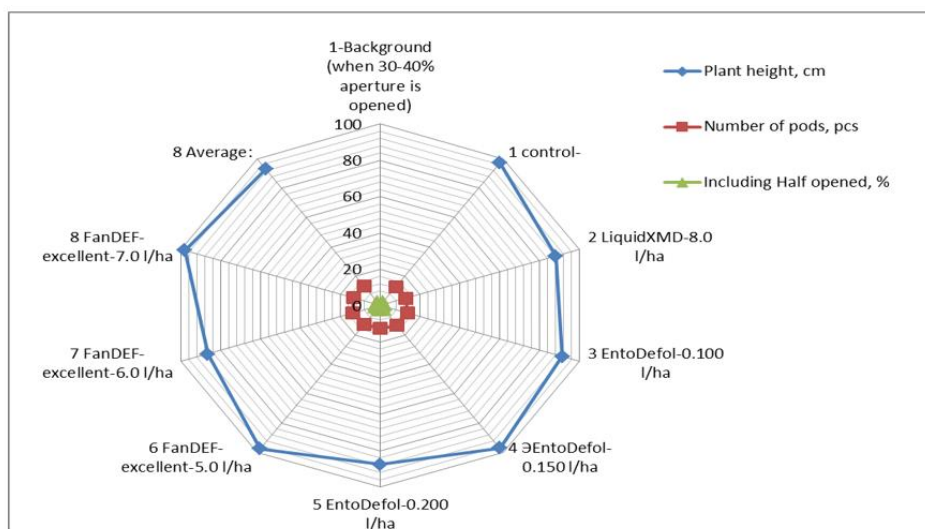


Fig. 1. Vegetative indicators of the plant in the background of planned defoliation when the bolls of the cotton variety open 30-40%.

So, when the bolls of the S-8290 cotton variety are 30-40% open, in the background where defoliation is planned [9], the average height of the plant is 92.9 cm, the number of leaves on the bush is 35.5, the number of bolls is 13.2, of which 35.7% are open and half it was found that the number of those opened was 2.1%.

In the background of cotton variety S-8290 with 50-60% of the pods opened, the average height of the plant is 92.7 cm, the number of leaves on the bush is 33.3, the number of pods is 12.7, of which 55.5% are opened and half-opened are 1.6 % was determined [10].

In cotton variety S-6775, the average height of the plant before defoliation is 96.3 cm, the number of leaves on the bush is 36.0, the number of pods is 12.5, of which 33.9% are opened and half-opened ones are 2. It was found to be .5%. In the second background (50-60%) of this variety, the average height of the plant is 96.8 cm, the number of leaves on the bush is 36.8 pieces, the number of buds is 12.3 pieces, of which 53.6% are open and 1.9% are semi-open. was noted in the observations (tables 3.2.1-3.2.2) [11].

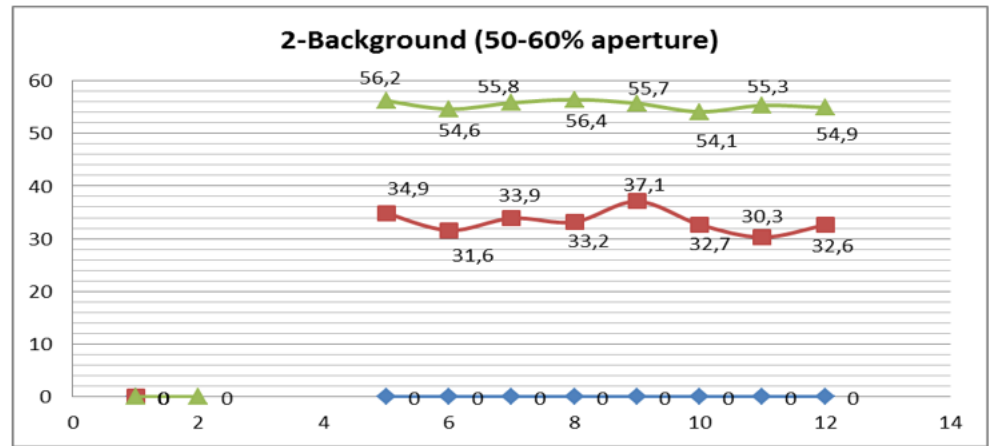


Fig. 2. Vegetative indicators of the plant in the background of planned defoliation when the bolls of the cotton variety open 50-60%.

According to the results of the analysis, the cotton bolls of the S-8290 and S-6775 varieties are 30-40% opened in background 1, and compared to the S-6775 cotton variety, the height of the main stalk is 3.4 cm lower in the S-8290 cotton variety, and the number of leaves is lower [12].

It was found to be 1.8% higher.

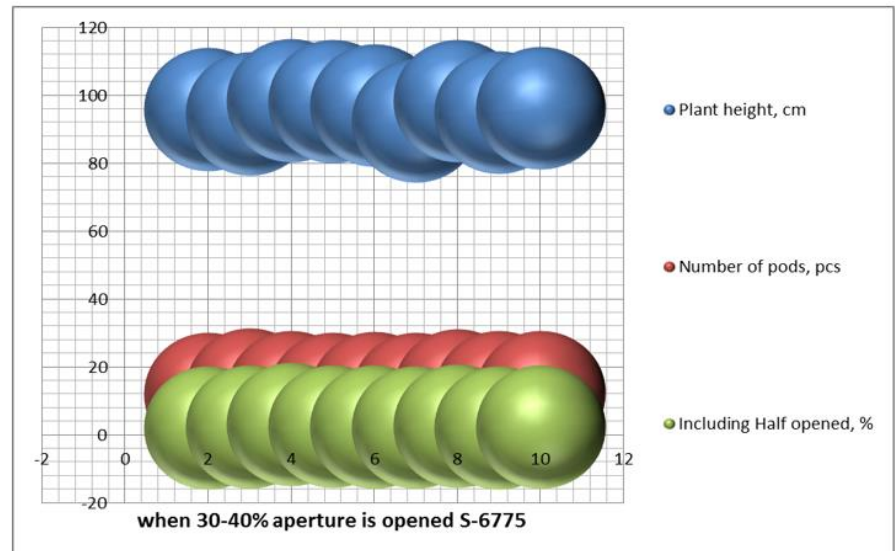


Fig. 3. Biological condition of cotton before defoliation of cotton variety open 30-40% S-6775.

In background 2 of the experiment (50-60%), compared to the cotton variety S-6775, the height of the main stalk is 4.0 cm lower in the cotton variety S-8290, the number of leaves is 3.5 less, and the number of bolls is 0.4 more. it was found that the opening of blisters was also 1.9% higher [13].

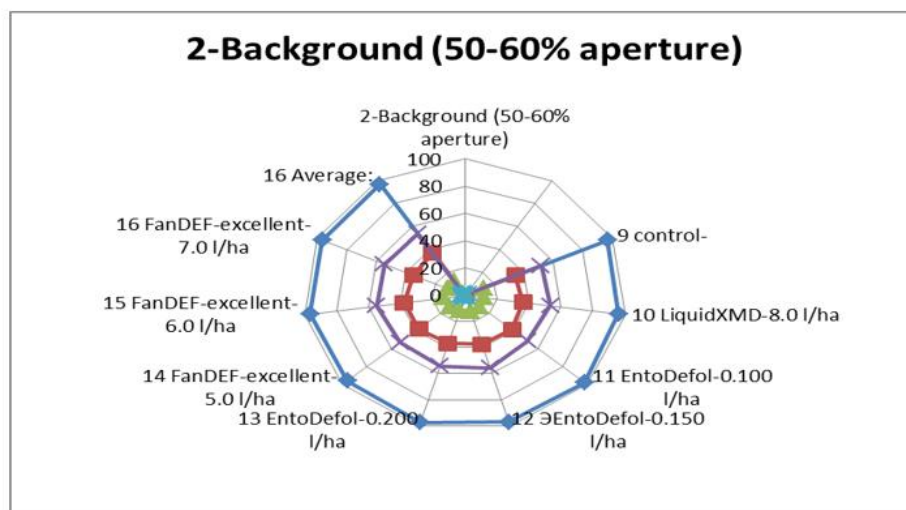


Fig. 4. Biological condition of cotton before defoliation of cotton variety open 50-60% S-6775.

Therefore, it can be seen from the analysis of the results that the variety S-8290 is a bit earlier than the variety S-6775 according to its morphobiological characteristics [14]. However [15], although the plant height and number of leaves are lower, it is distinguished by the number of opening of pods [16].

In general, the opening of the furrows was consistent with the condition defined in the program and indicated that defoliation could begin [17, 18].

4. Conclusion

The study effectively highlights the growth and yield characteristics of S-8290 and S-6775 cotton varieties under specific defoliation conditions in the grassland soils of the Fergana region. Key findings include that S-8290 plants averaged 92.7 cm in height with 33.3 leaves and 12.7 buds at 50-60% boll opening, whereas S-6775 plants showed similar trends with slight variations in height and leaf number. The optimal defoliation conditions significantly influenced the percentage of opened bolls, with S-8290 reaching 55.5% and S-6775 achieving 53.6% at 50-60% defoliation. These insights suggest that precise defoliation timing is crucial for maximizing yield and quality in these cotton varieties. The implications of this study underscore the importance of tailored defoliation strategies to enhance cotton production efficiency. Further research should explore the interaction of defoliation with other agronomic practices and its impact on long-term soil health and cotton quality under varying climatic conditions.

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