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## **The Effect of Planting Rates on the Germination of Cotton Varieties and Lines in Samarkand Region**

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### **ABSTRACT**

Today, field crops are suffering from severe climate changes and drought conditions. In cotton cultivation, one of the prominent issues observed during spring seasons is the rotting of cotton and line seedlings after continuous weeks of rain. Preventing this and planting varieties resistant to rotting have become crucial matters. Until the cotton develops its true leaves, it requires minimal water, and especially fuzzless seeds are more prone to rotting compared to fuzzy seeds. Rational use of agrotechnical measures during cotton planting significantly impacts the future viability, germination, and productivity of the cotton.

**KEYWORDS:** Cotton, true leaves, climate, precipitation, fuzzless seeds, line.

Currently, one of the negative factors affecting the increase in cotton yield is water scarcity during the vegetation period, and another is the lack of consideration of local soil and hydrogeological conditions and the real water needs of cotton during its growth and development phases in most farms. The process of furrow irrigation and the chemicals used to control weeds and pests partly wash into groundwater, worsening their ecological-meliorative state. The above reasons necessitate effective use of allocated water resources for irrigated lands and scientifically based agro-technological measures and irrigation methods that do not adversely affect the ecological situation.

The cotton cultivation technology should be adapted to the soil-climate conditions of each farming region. Especially, each variety of cotton should be improved to suit specific soil-climate conditions. One of the important agrotechnical measures is the preparation of soil, planting, emergence from the soil crust, and managing irrigation systems based on the characteristics of the varieties. This issue is also considered urgent.

Although Uzbekistan is the northernmost cotton-growing region in the world, thanks to the effective work of our country's breeder scientists, in recent years, it has become a leader in creating early-maturing, high-yield, and high-fiber-quality cotton varieties. Therefore, it is necessary to study and cultivate new promising varieties.

To obtain high-quality fiber and abundant yields, it is necessary to develop comprehensive methodological guidelines for cultivating new promising medium-fiber cotton varieties tailored to the natural climate, soil, meliorative, and hydrogeological conditions of each region and district in our republic. This involves selecting early-maturing, promising new cotton varieties that produce high and quality yields and creating scientifically based agrotechnical measures for their cultivation in the regions, districts, and farms.

Maintaining the physiological processes in cotton within normal limits, considering its biological characteristics during growth and development stages, is important for water supply. However, irrigation norms and timing for cotton are often determined based on soil moisture. The growth process of cotton is divided into three conditional stages: the first stage is from seed germination to flowering; the second stage is the flowering and fruiting phase; the third stage is the maturation of the bolls. The first phase is characterized by the rapid growth of the above-ground part of the cotton. In the second phase, the vegetative organs grow further, and fruit organs form and bolls appear. The third phase ends with the ripening of the bolls. These growth stages are determined by the water requirements of the cotton, as the water needs vary at each vegetative stage.

The agrochemical characteristics of the experimental field, including humus content, total nitrogen, phosphorus, potassium, and nitrate nitrogen in the plowed layer (0-30 cm), were determined using methods by I.V. Tyurin (1983), I.M. Malseva and L.P. Grisenko (1983), Grandval-Lyaju, V.P. Machigin (1983), and P.V. Protasov (1983).

Field germination of seeds, plant survival until harvest, and stand density were determined on 1 m<sup>2</sup> plots.

Our scientific research aims to select cotton varieties and lines adapted to the soil and climate conditions of the Payariq district in the Samarkand region, from preparation for planting to the harvest period, and conduct biometric and physiological experiments.

In the experimental field of the Payariq district of the Samarkand region, the soil in the 0-25 cm layer contains 1.20% humus, 0.12% total nitrogen, 185 mg/kg of mobile nitrate nitrogen, 0.21% phosphorus, 240 mg/kg of mobile P<sub>2</sub>O<sub>5</sub>, 1.64% total potassium, and 245 mg/kg of exchangeable potassium. In the deeper 25-50 cm layers, the mobile nitrate nitrogen and phosphorus decrease while the exchangeable potassium increases. The bulk density of the soil also increases with depth.

#### Germination and True Leaf Formation Periods of Cotton Varieties and Lines

Variety/Line	Planting Date	Germination Date	True Leaf Formation Date
Afsona	9.04	18.04	8.04
Zarafshon	9.04	19.04	10.05
C-278	9.04	19.04	9.05
Omad	9.04	18-19.04	10.05
Afsona (fuzzless)	09.04	19.04	11.05
Sulton-R1 (fuzzless)	09.04	19.04	09.05
Gulshan (fuzzless)	09.04	19.04	11.05
UZFA (fuzzless)	09.04	20.04	11.05
Line-1	22.04	29.04	18.05
Line-2	22.04	30.04	18.05
Line-3	22.04	30.04	18.05
Bukhara-102	9.04	20.04	10.05

The varieties for the experiment consisted of fuzzy and fuzzless seeds and lines. The selected varieties were planted in the first decade of April, and the seeds emerged fully by the end of the second decade and the beginning of the third decade of April. Due to high rainfall, the crust was broken twice, and about 1/10th of the seedlings in the fuzzless varieties rotted and died before

forming true leaves. By the end of the first decade of May, true leaf formation began, with the earliest being the fuzzless Afsona variety on April 8 and the latest being Line-3 in the middle of the second decade.

Rotting was more frequently observed in fuzzless varieties after germination. Planting fuzzy seeds in 1/10th of the area was more effective, as they suffered less damage and produced better yields. The Afsona, C-278, and Sul-ton-R1 varieties were observed to have higher biometric indicators and less damage from crusting in the Payariq district.

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