INFLUENCE OF PLANTING DENSITY AND PINCHING PERIODS ON DRY MATTER ACCUMULATION IN THE ANDIJAN-35 COTTON VARIETY

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Abstract: The study examines the influence of planting density and pinching periods on the growth and development of the Andijan-35 cotton variety under the serozem soil conditions of the Andijan region. It also focuses on the accumulation of dry matter depending on different pinching periods.

Keywords: serozem soils, Andijan-35 variety, pinching periods, planting density, dry matter accumulation.

The study investigated the dynamics of dry matter accumulation in the Andijan-35 cotton variety depending on planting density and pinching periods. According to literature data, dry matter accumulation in cotton is directly influenced by agronomic practices throughout the entire growing season. It was established that for the accumulation of 1 gram of dry matter, the plant evaporates 500–600 grams of water, meaning that each plant evaporates water 500–600 times its own mass [114; http://arizona].

According to the scientific research of U. Toshmukhamedov, at a planting density of 36 plants per 1 m², light intensity decreased by 20,000 lux (lumens), which in turn reduced the photosynthesis rate by 12.9 mg/dm² compared to plots with 8 plants per 1 m². It was also found that reduced lighting negatively affected cotton yield: when shaded with one layer of gauze, plant mass decreased by 24.3 g, and with two layers of gauze, by 41.5 g. Additionally, crop quality decreased: with one layer of gauze, fiber yield decreased by 3.3%, the

mass of 1,000 seeds by 1.0 g, and fiber strength by 0.4 g/s. With two-layer shading, these values decreased by 4.8%, 3.0 g, and 0.5 g/s, respectively [115; http://earthpapers.net].

The effect of planting density on dry matter accumulation during the summer was analyzed. According to the results: On June 1, the dry matter mass was 9.6 g at a planting density of 80,000–90,000 plants per hectare. When the density increased to 100,000–110,000 plants per hectare, this indicator decreased to 8.8 g. In the variant with 120,000–130,000 plants per hectare, the dry matter mass was 8.3 g. When analyzing dry matter accumulation during the budding and flowering stages, the following was observed:

At 80,000–90,000 plants per hectare, the dry matter mass ranged from 34.7 g to 71.6 g (data from July 1 and August). When the density increased to 100,000–10,000 plants per hectare, the dry matter mass decreased to 32.5 g to 70.3 g. In the variant with 120,000–130,000 plants per hectare, these indicators were 31.4 g to 68.4 g. Thus, it was established that an increase in planting density leads to a decrease in dry matter accumulation in the plants.

During the maturation period of cotton, the total dry matter accumulation at a planting density of 80,000–90,000 plants per hectare was as follows:

- In the variants with pinching at the 11th–12th, 13th–14th, and 15th–16th fruiting branches, as well as in the variant without pinching, the dry matter accumulation was 134.3 g, 130.5 g, 133.0 g, and 140.2 g, respectively.
- At a planting density of 100,000–110,000 plants per hectare, the dry matter accumulation was 125.6 g, 126.9 g, 128.6 g, and 127.9 g corresponding to the same pinching periods.
- In the variant with 120,000–130,000 plants per hectare, dry matter accumulation was 5.4–8.5% lower compared to plots with 80,000–90,000 and 100,000–110,000 plants per hectare (see Table 1).

The reason for this is the increased nutrient competition among plants at higher planting densities, which affects the net photosynthetic productivity. As a result, the nutrients absorbed through the root system are more intensively directed towards the development of both vegetative and generative organs, contributing to an increase in dry mass.

Table 1

Dry Matter Accumulation in the Andijan-35 Cotton Variety During the Maturation Period Depending on Planting Density and Pinching Periods (g), 2023

No.	Pinching Treatment	Stem	Leaf	Boll	Cotton	Total
80,000–90,000 plants/ha						
1	No Pinching	35.8	26.9	19.3	52.3	134.3
2	Pinching at 11th–12th Branch	32.9	26.5	18.3	52.8	130.5
3	Pinching at 13th–14th Branch	32.2	27.9	18.9	54.0	133.0
4	Pinching at 15th–16th Branch	34.4	29.8	19.8	56.2	140.2
100,000–110,000 plants/ha						
1	No Pinching	32.2	26.7	18.0	48.7	125.6
2	Pinching at 11th–12th Branch	31.7	25.5	17.9	51.8	126.9
3	Pinching at 13th–14th Branch	28.0	27.2	20.5	52.9	128.6
4	Pinching at 15th–16th Branch	30.0	27.8	19.0	51.1	127.9
120,000–130,000 plants/ha						
1	No Pinching	29.7	26.5	16.7	47.8	120.7
2	Pinching at 11th–12th Branch	29.9	25.8	17.8	50.8	124.3
3	Pinching at 13th–14th Branch	32.0	25.9	17.0	49.7	124.6
4	Pinching at 15th–16th Branch	29.8	26.9	17.5	48.7	122.9

This indicates that the total dry matter accumulation was higher in the variants where pinching was conducted at optimal times. The greatest accumulation of dry mass occurred specifically in the reproductive organs, i.e.,

in the cotton fiber. Similar results were obtained in experiments conducted in other years (see Appendix 3).

According to the data from the table above, at a planting density of 80,000–90,000 plants per hectare, the Andijan-35 variety showed the highest dry matter accumulation at the early developmental stage—during the 2–3 true leaves phase. However, during the budding and flowering phases, this indicator was higher in the variant with a planting density of 100,000–110,000 plants per hectare, amounting to 32.5–70.3 g, respectively. Overall, in variants with 80,000–90,000 plants per hectare, dry mass accumulation increased steadily.

During the cotton maturation period, dry matter accumulation depending on planting density and pinching periods showed that:

- In variants with a planting density of 80,000–90,000 plants per hectare, the highest dry mass accumulation occurred in the stem, leaves, bolls, and fiber.
- In variants with 100,000–110,000 and 120,000–130,000 plants per hectare, during the phases of the 11th–12th and 13th–14th fruiting branches, dry matter accumulation ranged between 130.5–133.0 g.
- Variants with a planting density of 80,000–90,000 plants per hectare showed a tendency for greater dry mass accumulation.

Conclusions: Planting density significantly affects dry matter accumulation, the higher the plant density, the lower the dry matter accumulation. The optimal planting density for the Andijan-35 variety is 80,000–90,000 plants per ectare, as higher densities result in competition for light and nutrients. Future research should focus on optimizing pinching periods and additional agronomic practices to enhance the productivity of the variety.

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