AMERICAN JOURNAL OF BOTANY AND BIOENGINEERING
https://biojournals.us/index.php/AJBB
ISSN: 2997-9331

Article

Identification of Economic Characters and Agro-biological Characters of Cotton at Various Growth Stages

Sh.U. Rakhmonov[1], G.Q. Diyarov[1], Z.T. Bolqiyev[1]

1. Research Institute of Cotton Breeding, Seed Production and Agrotechnologies of Cultivation, Samarkand Scientific Experimental Station
*Correspondence: email@gmail.com

Citation: Sh.U. Rakhmonov, G.Q. Diyarov, Z.T. Bolqiyev. Identification of Economic Characters and Agro-biological Characters of Cotton at Various Growth Stages. American Journal Of Botany And Bioengineering 2026, 3(2), 88-92.

Received: 10th Nov 2025
Revised: 21th Dec 2025
Accepted: 14th Jan 2026
Published: 20th Feb 2026

Abstract: A feature of the progressive development of this article is an assessment of major economic traits of cotton and agobiological properties of cotton during the developmental process. An assessment of various cotton phenotypes in respect to productivity potential, stress tolerance, and biotic and abiotic features. These results provide a scientific foundation to improve cotton cultivation efficiency and appropriate variety selection and agronomy management.

Keywords: To Understand more about mainly geographicarea, growth period, agronomic traits, agronomic characteristics, productivity and environmental each variety planted, cotton Eco-biological variety testing plot, plant height, number of fruiting branches, and number of bolls

---

Introduction. Crop varietal selection is very important in the agricultural sector of Uzbekistan especially in cotton production. The biological properties, developmental phases, and agrotechnical features have to be studied in the intraspecific and interspecific diversity of cotton varieties to enable the identification of high-yielding varieties resistant to stress factors and adapted to specific climatic conditions [1,2,3,4].

The increase in the number of plants and the formation of varieties appear at different rates, and this is largely due to the genetic characteristics of a particular variety and the condition created by the environment. The traits related to crop growth such as plant height, number of true leaves, fruiting branches, number of flowering and boll

formation, need to be clinically assessed under field conditions to identify such economically high value cotton genotypes [4].

The purpose of the present work was the analysis of the developmental characteristics of various cotton varieties grown under the conditions of the ecological variety-testing nursery in the Samarkand region and the identification of difereces in their agrobiological and economic traits.

Materials and Methods. Materials and Methods. The research had been carried out within the ecological variety-testing nursery of the Samarkand region during the 2025 growing season. Twelve cotton varieties with diverse genetic potentials were selected for the study. All the varieties were planted individually maintaining agrotechnical practices as per norms.

The following agrobiological parameters were observed and assessed during the study: seed germination, pace of plant height growth (until June 1, July 1, and August 1), number of true leaves, formation of fruiting branches, number of squares, number of bolls (established and dropped).

All indicators were calculated as averages by variety. The sensitivity of the varieties to conditions of growth and development, years of the years, their productive potential and the level of ecological pliability were evaluated based on these data.

Results and Discussion. It was found out that there were significant differences between cotton varieties and lines for development stages, some agronomical characteristics and economically useful characters. Such differences relate primarily to the genetic features of the varieties and, in the second place, the degree of their adaptation to the environmental conditions (soil, climate, agrotechnical structure).

Several scientific experiments on the study of agrobiological indexes of varieties of cotton, definition of their phases of development and assessment of their potential productivity have been carried out. Varietal selection, ecological testing, and the efficiency of agrotechnical measures are broadly documented by researchers of various scientists [1].

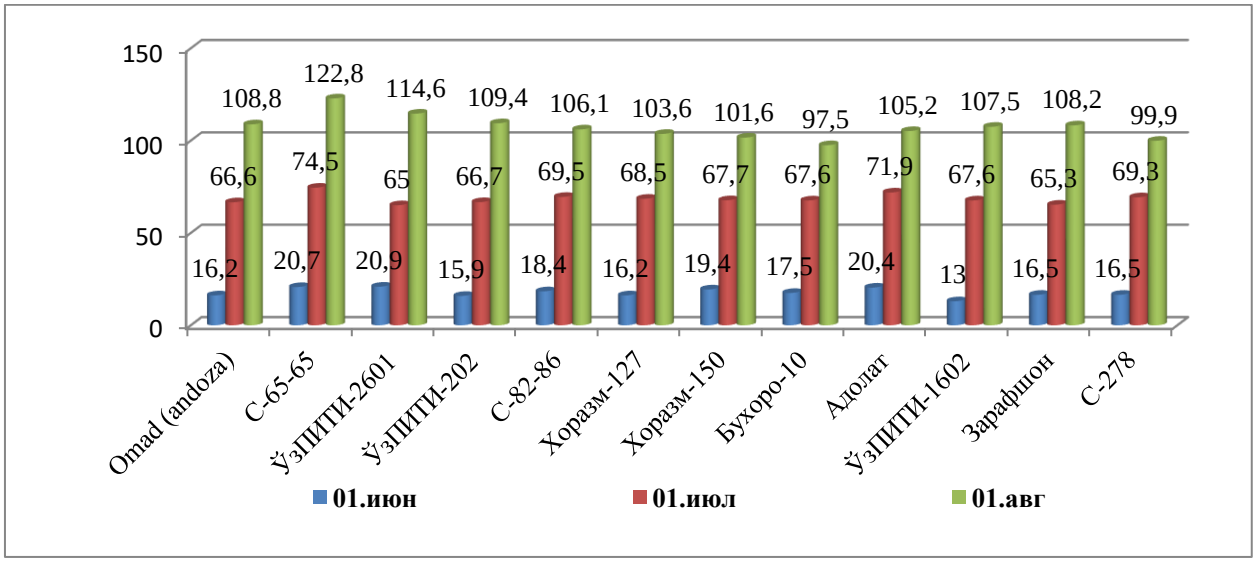

Figure 1. Plant height (cm) of cotton varieties at different growth stages (Samarkand, 2025).

Integrated minimal plant growth indicators were low (5.0–5.6 cm) as of June 1st. Nevertheless, growth really started to take off by July 1. Plant height varied from 60 to 75 cm, with the highest growth in the varieties S-65–65 (74.5 cm), UzPITI-1602 (72.2 cm), S-82–86 (68.6 cm), and UzPITI-2601 (66.6 cm) (Figure 1).

Results released 1 August showed ever stronger growth. The five highest plant heights were recorded (S-278 — 115.9 cm, UzPITI-1602 — 115.7 cm, Khorezm-127 — (113.0 cm), S-65-65 — 112.4 cm and Khorezm-150 — 112.7 cm). These varieties were identified with high photosynthetic activity and a strong biomass accumulation capacity indicating their potential utility for breeding programs.

In terms of the amount of fruitful branches (squares), on July 1 the maximal amounts (11.1 units) were recorded in UzPITI-1602, 10.3 units in S-65-65, 9.7 units in S-278, 9.2 units in Khorezm-150 and S-82-86 (versions) (sq,); These signs are indicative of early flowering and the establishment of a solid foot-hold for maximum production.

Table 1.

Phenological observations in cotton of various genetic potencies (Samarkand, 2025)

№	Names of varieties and lines	01 June		01 July			01 August			
		Plant height, cm	Number of true leaves, pcs	Plant height, cm	Number of fruiting branches,	Number of squares, pcs	Plant height, cm	Number of fruiting branches, pcs	Number of bolls, pcs	Number of squares, pcs
1	Omad (Standard / Control)	16,2	5,6	66,6	5,3	6,7	108,8	8,7	9,9	5,5
2	S-65-65	20,7	5,4	74,5	5,6	6,6	122,8	10,3	12,4	6,3

3	UzPITI-2601	20,9	5,4	65	4,9	7,2	114,6	9,3	10,5	6,4
4	UzPITI-202	15,9	4,5	66,7	5,2	6,6	109,4	9,1	11,5	7,2
5	S-82-86	18,4	5,2	69,5	5,7	5,7	106,1	11,0	12,2	6,2
6	Khorezm-127	16,2	5	68,5	5,4	6,1	103,6	9,2	13,0	7,6
7	Khorezm-150	19,4	5,2	67,7	5,3	6,3	101,6	9,4	13,2	7,8
8	Bukhara-10	17,5	4,7	67,6	5,2	7	97,5	7,7	10,7	4,6
9	Adolat	20,4	5,5	71,9	5,9	7,6	105,2	8,3	10,8	6,0
10	UzPITI-1602	13	4,1	67,6	5	6	107,5	11,1	15,7	7,1
11	Zarafshan	16,5	4,9	65,3	4,4	5,8	108,2	12,8	15,9	8,5
12	S-278	16,5	4,9	69,3	5,7	6,5	99,9	9,7	15,6	6,4
Highest value		**20,9**	**5,6**	**74,5**	**5,9**	**7,6**	**122,8**	**12,8**	**15,9**	**8,5**
Average value		**17,6**	**5,0**	**68,4**	**5,3**	**6,5**	**107,1**	**9,7**	**12,6**	**6,6**
Lowest value		**13,0**	**4,1**	**65,0**	**4,4**	**5,7**	**97,5**	**7,7**	**9,9**	**4,6**

Cotton yield is reported to be maximally influenced by genetic and agrotechnical factors as well as associated with early flowering and boll setting. This means it is feasible to boost the yield potential of each cultivar by focusing agricultural practice on the individual crop variety type [2].

Furthermore, according to research by R.Yu. Ecological variety testing and determination of yield potential are included in criteria (Rakhimov2021 and other authors). Furthermore, these studies demonstrate that investigating development stages of other varieties can be a very vital element of productivity evaluation of these traits [3].

Conclusion. Research findings showed that there were considerable distinctions in agrobiological indices between cotton varieties and lines. Phenotypic plant type and seed yield performance revealed the best-performing varieties "S-65-65," "UzPITI-1602," "S-278," and "Zarafshan" as potential promising cultivars with a superior level of growth performance (growth rate), number of squares, and fruiting structures.

Using growth and development stage assessment, it became possible to assess the possibility of varieties to adapt to climatic conditions, their potential productivity and their early maturity. These results lay an excellent scientific foundation for breeding programs, farmer recommendations, and cotton variety selection.

REFERENCES

[1] M. T. Aminov, *Assessment of Agrobiological Characteristics and Yield of Cotton Varieties*. Tashkent, Uzbekistan: Fan Publishing House, 2018.

[2] I. Kh. Kholmatov, "Growth rate and developmental stages of cotton varieties," *Scientific Journal of Agrobiology*, no. 3, pp. 45–49, 2020.

[3] R. Yu. Rakhimov, "Efficiency of cotton varieties in ecological variety testing," *Bulletin of Agricultural Science*, no. 2(74), pp. 62–66, 2021.

[4] Ministry of Agriculture of the Republic of Uzbekistan, *Methodological Guidelines for State Variety Testing of Cotton Varieties*. Tashkent, Uzbekistan, 2020.

[5] A. A. Abdullaev and S. S. Karimov, "Evaluation of cotton breeding lines under irrigated conditions," *Uzbek Journal of Agriculture*, vol. 5, no. 2, pp. 33–38, 2019.

[6] N. T. Juraev, *Cotton Breeding and Seed Production*. Tashkent, Uzbekistan: Mehnat Publishing, 2017.

[7] B. R. Sultonov, "Influence of environmental factors on cotton productivity," *Agro Science Review*, vol. 12, no. 1, pp. 54–60, 2022.

[8] S. U. Rakhmonov et al., "Genetic variability in cotton cultivars under field conditions," *International Journal of Agricultural Research*, vol. 15, no. 4, pp. 201–208, 2021.

[9] G. Q. Diyarov, "Adaptive traits of cotton varieties in arid climates," *Central Asian Agricultural Studies*, vol. 9, no. 3, pp. 77–83, 2020.

[10] Z. T. Bolqiev, "Agrobiological indicators of cotton under ecological testing," *Journal of Crop Science*, vol. 18, no. 2, pp. 112–118, 2023.

[11] FAO, *Cotton Production Guidelines*. Rome, Italy: FAO Press, 2019.

[12] A. Smith and J. Brown, "Cotton growth dynamics under stress conditions," *Agronomy Journal*, vol. 110, no. 6, pp. 2501–2510, 2018.

[13] International Cotton Advisory Committee (ICAC), *World Cotton Outlook*, Washington, DC, USA, 2022.

[14] J. R. Meredith, *Cotton Breeding and Genetics*. Amsterdam, Netherlands: Elsevier, 2016.

[15] T. Khan et al., "Phenological assessment of cotton varieties in semi-arid regions," *Agricultural Sciences*, vol. 14, no. 5, pp. 389–397, 2023.