Efficiency Of New Defoliants In The Cotton Production

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Abstract.
In the experimental set-up of the influence of various agrotechnical measures on defoliation efficiency of the Navruz variety, the best results in the Tashkent province were received under the irrigation rates of 65-65-60% from FC, fertilizers rates of N150P100K75 kg ha\(^{-1}\) and both plant densities (90-100 n 110-120 thousand plants ha\(^{-1}\)) when applying the defoliants UzDEF with the rate of 7.0 l ha\(^{-1}\) and Auguron-extra 0.15 l ha\(^{-1}\). Under application of fertilizers with the rate of N200P140K100 kg ha\(^{-1}\), in the set-up with a theoretical plant density of 110-120 thousand plants ha\(^{-1}\) and application of UzDEF with the rate of 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), and the set-up with a theoretical plant density of 90-100 thousand plants ha\(^{-1}\) application of UzDEF 7.0 and Auguron-extra 0.15 l ha\(^{-1}\) the highest results on defoliation, ripening of cotton bolls and yields have been obtained. The best results have been obtained when applying the irrigation rates of 75-75-65% from FC, in the experimental set-up of fertilizers application rates of N200P140K100 kg ha\(^{-1}\) and plant density, application of UzDEF with the rate of 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), in the experimental set-up with a theoretical plant density of 110-120 thousand plants ha\(^{-1}\).

Introduction.
Intensification of the economic reforms in agriculture of Uzbekistan during the independence years, development of farming forms of land management and creation of convenient conditions and benefits to the farmers, breeding of the short-duration cotton varieties adapted to the various soil and climatic conditions as well as carrying
out all agrotechnical activities, including cotton defoliation in the large agricultural areas of Uzbekistan, allows to complete the cotton harvest in October[1]. It is known that provision of cotton defoliation works in the right time and of highly quality accelerates the natural physiological processes, in particular activates enzymes, thus causing abscission of ca. 90-95% of cotton leaves, opening of bolls increases by 15-20%. At the same time, the portion of the primary cotton harvest increases by 20-25% of the general yield, thus creating the possibility to deliver from 80 to 90% of the high-quality raw cotton to the State, while the economic benefits of the farmers increase on a per hectare basis[2,3]. The necessity for conducting defoliation activities is also dictated by the need to cultivate the second main agricultural crop, winter wheat, in its optimal dates, in the area of more than 800 thousand ha in the cotton fields of the country.

**Material and methods**

Scientific research has been carried out in accordance with the following methodological manuals: "Methodology for field experiments with cotton", 1981[4], "Methodological instructions on testing of defoliants", 2004[5], "Methods for field experimentations", 2007[6], as well as "Methods of determining the properties of the cotton-fiber", 1972[7], adopted by the Cotton Research Institute and according to GOST 3274, 0-72, GOST 3274, 5-72, GOST 2182, 0-76.

The experimental design was a split plot with four replications of each of four defoliation timings. Each plot consisted of 12 rows, totalling 7.2 m wide by 30 m long. Conventional tillage was used as were standard cotton management practices for irrigation, fertilization and insect pest management. All agrotechnological measures were conducted at the same time and methods for entire field experimental plots, except defoliants type, norm and application date.

Defoliants were applied using a high clearance research sprayer. Before chemical defoliants were applied, crop maturity was assessed by measuring the percent bolls open on the plant. This value was calculated by first randomly selecting ten plants per plot and counting the total number of bolls per plant then dividing that number into the number of open bolls per plant. This measurement was repeated just prior to harvest.

Percent defoliation was measured 7 DAT and again at harvest using a visual rating system with zero equal to no defoliation and 100 equal to complete defoliation. The two center rows of each plot was harvested, weighed and ginned and lint yield and percent lint were determined. Statistical data analysis was carried out according to Dospekhov (1979).

**Results**

The influence of various external factors and agrotechnical activities on the efficiency of the cotton defoliation has been studied in scientific research works by many scientists, based on which the relevant practical recommendations have been developed. Some researchers studied the application efficiency of the cyanamide-
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Efficiency of new defoliants in the cotton production[9]. T.Zokirov, I.Vasilevskiy, U.Ikromov studied the efficiency of cotton defoliation by chloride-magnesium and free cyanamide with various application rates of nitrogen fertilizers (125, 175 and 225 kg ha\(^{-1}\)).

In the experimental set-up of the influence of various agrotechnical measures on defoliation efficiency of the Navruz variety, the best results in the Tashkent province were received under the irrigation rates of 65-65-60% from FC, fertilizers rates of N\(_{150}\)P\(_{100}\)K\(_{75}\) kg ha\(^{-1}\) and both plant densities (90-100 and 110-120 thousand plants ha\(^{-1}\)) when applying the defoliants UzDEF with the rate of 7.0 l ha\(^{-1}\) and Auguron-extra 0.15 l ha\(^{-1}\). Under application of fertilizers with the rate of N\(_{200}\)P\(_{140}\)K\(_{100}\) kg ha\(^{-1}\), in the set-up with a theoretical plant density of 110-120 thousand plants ha\(^{-1}\) and application of UzDEF with the rate of 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), and the set-up with a theoretical plant density of 90-100 thousand plants ha\(^{-1}\) application of UzDEF 7.0 and Auguron-extra 0.15 l ha\(^{-1}\) the highest results on defoliation, ripening of cotton bolls and yields have been obtained.

The best results have been obtained when applying the irrigation rates of 75-75-65% from FC, in the experimental set-up of fertilizers application rates of N\(_{200}\)P\(_{140}\)K\(_{100}\) kg ha\(^{-1}\) and plant density, application of UzDEF with the rate of 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), in the experimental set-up with a theoretical plant density of 110-120 thousand plants ha\(^{-1}\). It is noticed that similarly high results have been obtained in the set-up with fertilizers application rates of N\(_{200}\)P\(_{140}\)K\(_{100}\) kg ha\(^{-1}\), theoretical plant density of 110-120 thousand plants ha\(^{-1}\) and fertilizers application rates of UzDEF with 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), as well as under the plant density of 90-100 thousand plants ha\(^{-1}\) and reduced rates of UzDEF7.0 l ha\(^{-1}\) and Auguron-extra 0.15 l ha\(^{-1}\). Similar results have been obtained on the Bukhara-8 cotton variety in the Bukhara province.

The relationship between the cotton defoliation and bolls opening was established when implementing various agrotechnical activities and applying defoliants. For example, in the Tashkent province, the fertilizer application rate of N\(_{150}\)P\(_{100}\)K\(_{75}\) kg ha\(^{-1}\) on Bukhara-102 and defoliants Sadaf with the rate of 7.0 l ha\(^{-1}\) and Auguron-extra 0.15 l ha\(^{-1}\), the subsequent defoliation of cotton leaves amounted to 76.0-80.4 %, and boll ripening – to 83.4-85.1 %. The fertilizer application rate of N\(_{200}\)P\(_{140}\)K\(_{100}\) kg ha\(^{-1}\) and Sadaf with the rate of 8.0 l ha\(^{-1}\) and Auguron-extra 0.20 l ha\(^{-1}\), the subsequent defoliation amounted to 76.8-79.4 % and boll ripening – to 84.2-86.2 %. The high positive correlation between these indicators, r was equal to 0.890±0.050 (Fig. 1).

Applying the differentiated rates of UzDEF and Auguron-extra under various rates of irrigation, fertilizer and plant density, the correlation coefficient was positive and high (0.928±0.038). The study showed changes of the biometric indicators of cotton plants under the influence of the various agrotechnical activities, an increase of cotton yield due to the differentiated application of the defoliant rates, bolls opening and increase of the mass of 1000 seeds. The relationship between these factors and cotton yield was established. Nevertheless, during the studies in 2006-2008, the correlation coefficient between the leaf area index and yield amounted to 0.889±0.5, between the number of bolls and yield 0.94±0.08, indicating a high relationship between these indicators.
Figure 1: Correlation relationship between cotton defoliation and bolls ripening (the Tashkent province, 2006-2008)

Figure 2: Correlation relationship between cotton yields and bolls ripening (the Tashkent province, 2006-2008)

Increase of the cotton yield is related to the increase in the mass of 1000 bolls, and a correlation coefficient between these factors was $r=0.75\pm0.14$, indicating a high
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In addition, the correlation between the degree of boll opening and yield was \( r=0.94-0.98 \) (Fig. 2). Thus, the high results were achieved under the application of defoliants UzDEF with the rate of 8.0 l ha\(^{-1}\) as well as PolyDEF and FanDEF 7.0 l ha\(^{-1}\), applied during the bolls opening of 70-80\%, after the first harvest. Namely, there is subsequent defoliation at 80.2, 80.5 and 80.3 \%, bolls opening at 87.8, 88.3 and 88.6 \% and cotton yield of 4.51-4.46-4.50 t ha\(^{-1}\), respectively.

References


