



Efficiency of Defoliation on Low Salt Fields

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Annotation: A high effect was established in comparison with the liquid HMD defoliant, control, with the use of FanDEF defoliant at a rate of 5.0-6.0 l/ha, UzDEF 6.0 l/ha on moderately saline, as well as at a rate of 7.0 l/ha UzDEF and FanDEF on non-saline and slightly saline soils with an opening of 45-50%, boxes of the Sultan variety in the conditions of the Andijan region. In the conditions of slightly saline soils of the Andijan region, during the opening of 45-50% of the bolls of the Sultan cotton variety, the use of defoliants UzDEF and FanDEF with a norm of 7.0 l / ha, leaf fall was 90.0-86.9%, opening of the bolls 91.5-89.1%, the yield of raw cotton is on average 30.5 q/ha.

Keywords: Meadow-saz soils, seeds, cotton, budding, ovaries, boll, cotton variety Sultan, defoliants UzDEF, FanDEF and Liquid HMD.

Introduction: In the world today, on an area of more than 1 billion hectares, humanity is engaged in agriculture. Of these, cotton is sown on an area of 31.8 million hectares and 25 million tons of cotton fiber are obtained. Cotton is sown on an area of 1 million 33 thousand 629 hectares in Uzbekistan and 3.1 million tons of cotton are grown. In addition, salts in the soil have a great negative effect on plants, these are 952.2 million hectares, which account for almost 39% of the areas used in agriculture.¹

In many leading countries of the world, in order to accelerate the opening of a biologically mature box and accelerate physiological processes, for artificial dropping of cotton leaves during opening of bolls 40-45 and 50-60%, as a result of scientifically grounded, timely and economical use of mild and semi-soft acting defoliant 2M-4X (2-methyl-4-chlorophenoxyacetic acid), defoliant, herbicide diuron and hormonal defoliant thidiazuron, harvesting of raw cotton is achieved before the onset of rainy days. From this point of view, scientific research on the effectiveness of defoliants to accelerate the opening of cotton bolls is considered relevant.

In the republic, special attention is paid to the use of defoliants for artificial leaf fall, which ensures an early, high and high-quality harvest of raw cotton before the onset of rainy days. However, scientific studies have not sufficiently studied the effect of defoliants on the opening of bolls in saline soils and the optimal rates of their use. In the action strategy for the further development of agriculture in the republic for 2017-2021, an important task was noted "in clause

¹ <https://www.citiindia.com/wp-content/uploads/2018/Cotton-Data>; <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/soil-salinity>; <https://agrostory.com/info-centre/agronomists/rasteniya-protiv-zasoleniya-pochv/>



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3.3, important strategic tasks were considered aimed at the use of intensive methods in agricultural production, first of all, water and resource-saving modern agricultural technologies, to a significant extent to increase exports in the agricultural sector”² to improve the effectiveness of defoliants used in conditions with varying degrees of soil salinity, to harvest raw cotton in a short time, to improve the efficiency of defoliation in cotton fields, these studies are considered important.

The degree of knowledge of the problem: Many local and foreign scientists worked on the development of optimal norms and terms of defoliants in different reclamation conditions, depending on various factors, as well as with the determination of the physiological and biochemical effects of defoliants on cotton. Conducted research including И.Рабинович, А.Пругалов, Ю.Ракитин, Г.Яровенко, Т.Зокиров, А.Имомалиев, Ш.Тешаев, И.Раҳматов, Ф.Тешаев, М.Тураев, Т.Тураев, Б.Рахматов, М.Юлдашов, О.Синдаров, Х.Абдурахмонов, С.Алланазаров, У.Абдурахмонов, as well as M.Bange, R.Long, S.Byrd, J.Dai, H.Dong, M.Du, N.Muhammad, S.Malik, M.Makhdum, O.Çôpur, H.Stephen, S.Wright, R.Hutmacher, P.Zhang.

However, scientific research has not been carried out sufficiently on weakly and moderately saline soils; from this point of view, it is considered necessary to conduct experiments in fields with varying degrees of salinity.

Research methods and methodology: Determination of the optimal norms of applied defoliants when opening 45-50% of cotton bolls in soil conditions with varying degrees of salinity in the Andijan region. Scientific research was carried out on the basis of the "Methods of field experiments for cotton", "Methods for conducting field experiments" and Guidelines for testing cotton defoliants adopted at UzPITI, adopted by the State Chemical Commission of the Republic of Uzbekistan. The obtained data were processed on the basis of the technique "Method of field experience" by B. A. Dospekhov, mathematical static analysis based on the Microsoft Excel program.

The aim of this research study is to scientifically substantiate the acceptable standards of application of local UzDEF and FanDEF defoliants in the middle-fiber Sultan cotton variety grown in the conditions of different saline meadow soil of Fergana Valley and their effectiveness in cotton.

The main objectives of the study: to determine the areas of non-saline, slightly saline and moderately saline soils in the conditions of the Andijan region in these areas, to determine the effect of salts on the germination of seeds, the growth and development of the medium-staple cotton "Sultan";

to determine the leaf surface area of the cotton variety Sultan on soils with varying degrees of salinity;

determine the number of green, semi-dry and dry leaves, open and half-open bolls before and after defoliation of cotton with varying degrees of soil salinity;

to determine the effect of defoliants on the average weight of one box of raw cotton, harvested before harvesting cotton in 50 samples according to the options grown with varying degrees of

² Указ Президента Республики Узбекистан за УП-4947 от 7 февраля 2017 года «О стратегии Действий по дальнейшему развитию Республики Узбекистан»



saline soils, on the specific gravity of the 1-collection and the yield of raw cotton of the cotton variety Sultan; to determine the effect of the used defoliant on the technological indicators of the quality of cotton fiber of cotton cultivated on soils with varying degrees of salinity.

Research results: The land of Ulugnorlik Turaboy Hoji, located in the Mirzakhmedov massif of the Ulugnor district of the Andijan region, is a slightly saline old village land. The groundwater level is below 1.5-2.0 meters. The amount of humus in the experimental field was 0-30 cm, i.e. 0.654% humus, 0.051% nitrogen, 0.140% phosphorus, and in mobile forms NO₃ 8.5 mg/kg, P₂O₅ 19.1 mg/kg, K 160 mg /kg. In the lower layer of the experimental field, i.e. at a height of 30-50 cm, the amount of humus 0.574%, total nitrogen 0.048%, total phosphorus 0.128%, mobile forms of batteries, were poorly supplied with nitrate nitrogen, mobile phosphorus and exchangeable potassium.

Table №1

Early agrochemical properties of field soil (2019)

Soil layer, cm.	General forms, %			Mobile forms, mg/kg.		
	Humus	N	P	N-NO ₃	P ₂ O ₅	K ₂ O
0-30	0,654	0,051	0,140	1,77	8,5	19,1
30-50	0,574	0,048	0,128	1,63	5,6	16,2

Table №2

Salinity types and water-soluble salts on irrigated meadow-saz soils of the Mirzaakhmedov massif, Ulugnor district, Andijan region (2019)

Soil horizons, cm	Residue dry	HCO ₃	Cl	SO ₄	Ca	Mg	Na	Salinity	
	before sowing %							type	degree
0-30	0,85	0,021	0,016	0,58	0,16	0,042	0,031	c	lightly salted
30-50	0,783	0,02	0,017	0,494	0,194	0,036	0,022	c	
50-75	0,656	0,02	0,014	0,437	0,115	0,023	0,047	c	
75-100	0,596	0,018	0,011	0,395	0,123	0,033	0,016	c	
average	0,721	0,02	0,015	0,477	0,148	0,034	0,029		
end of growing season %								type	degree
0-30	0,886	0,021	0,019	0,591	0,167	0,045	0,043	c	lightly salted
30-50	0,806	0,02	0,017	0,5	0,2	0,039	0,03	c	
50-75	0,674	0,022	0,017	0,452	0,121	0,026	0,036	c	
75-100	0,623	0,025	0,014	0,401	0,126	0,036	0,021	c	
average	0,747	0,022	0,017	0,486	0,154	0,037	0,033		

Hydrometeorological observations in 2019 showed that January and February were warmer than in 2017-2018. In January and February, the average air temperature was 1.5 and 4.1 °C, respectively, and for perennials -0.7 and 2.4 °C, respectively. In January and February, the average air temperature was 1.5 and 4.1 °C, respectively, and for perennials -0.7 and 2.4 °C, respectively.



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Precipitation fell respectively 17.0 and 14.6 mm for months and 17.0-21.0 mm for perennials. The average air temperature in March, April and May was 11.9; 17.0; 21.8 °C, which is slightly higher than the average perennial. Precipitation was 4.9 mm in March, 10.3 mm in April, and 3.6 mm in May. In June, July, August and September, the average air temperature was also close to the long-term average - 24.5 per month; 28.7; 26.0 and 20.4 °C, respectively.

Table №3
Data from Andijan hydrometeorological station for 2019

Months	2019 year temperature							
	2019 year °C				Average long-term °C			
	I	II	III	on average 1 month	I	II	III	on average 1 month
January	0,8	2,0	1,9	1,5	-0,7	-0,9	-0,5	-0,7
February	3,2	5,2	3,8	4,1	1,3	2,0	4,0	2,4
March	9,1	12,3	14,1	11,9	6,9	8,9	11,7	9,2
April	17,7	18,3	15,2	17,0	13,6	16,5	18,7	16,3
May	20,0	23,1	22,4	21,8	19,7	21,4	22,7	21,3
June	23,0	24,0	26,6	24,5	24,6	25,9	27,3	25,9
July	27,5	29,5	29,0	28,7	27,4	27,3	27,2	27,3
August	28,9	24,7	24,6	26,0	26,7	25,7	24,2	25,5
September	20,3	18,9	22,0	20,4	22,3	20,5	18,2	20,3
October	16,6	14,5	13,0	14,7	16,0	13,1	10,9	13,3
November	7,5	4,5	1,5	4,5	9,2	6,4	3,6	6,4
December	1,8	1,4	1,9	1,7	1,4	0,4	-0,2	0,5

Table №4
Данные Андижанской гидрометеостанции за 2019 год

Months	Precipitation in 2019							
	2019 year °C				Average long-term °C			
	I	II	III	Just 1 month	I	II	III	Just 1 month
January	4,2	10,8	2,0	17,0	5,0	6,1	6,1	17,0
February	1,6	13,0	0,0	14,6	7,7	9,2	3,8	21,0
March	0,5	1,2	3,2	4,9	7,8	8,5	7,8	24,0
April	4,1	0,3	5,9	10,3	5,0	6,3	5,7	17,0
May	0,0	2,9	0,7	3,6	4,6	5,4	4,3	14,0
June	3,1	0,6	0,5	4,2	3,9	3,7	2,5	10,0
July	2,0	0,0	0,0	2,0	2,1	1,4	0,9	4,0



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August	0,7	1,7	0,0	2,4	1,8	0,6	1,0	3,0
September	4,5	0,0	0,0	4,5	0,6	1,5	1,6	4,0
October	8,7	0,0	2,0	10,7	4,8	3,8	6,5	15,0
November	0,0	0,0	17,8	17,8	6,6	6,0	6,1	19,0
December	0,3	3,2	8,0	11,5	9,7	7,4	8,0	25,0

These figures averaged 25.9 over a multi-year period; 27.3; Were 25.5 and 20.3 °C, respectively. The amount of precipitation in these months was also close to the long-term average. However, 4.2 mm of precipitation fell in June compared to 2.0 in July, August and September, respectively; 2.4 and 4.7 mm respectively. It was noted that in 2019, in the Ulugnor district of the Andijan region, favorable conditions developed for the growth and development of cotton in areas with different reclamation conditions, a combination of weather temperature and effective temperature has a positive effect on cotton. In addition, the absence of weather fluctuations and precipitation during the defoliation period, as well as the fact that the average air temperature was above 20 °C, had a positive effect on the defoliants applied to cotton leaves, which determined the methodological accuracy of the experiments.

Table №5
The influence of defoliants on the opening of cotton balls in slightly saline areas, 2019

r.p	Options	Opening of boxes before defoliation, %	Opening of boxes, %					
			after 7 days, %			after 14 days, %		
			Opening	Opening speed	Difference from control	Opening	Opening speed	Difference from control
1	control	45,3	55,3	10,0		65,7	20,4	
2	Liquid HMD 8.0 l/ha	45,0	68,8	23,8	13,8	84,0	39,0	18,6
3	UzDEF-5,0 l/ha	46,6	66,6	20,0	10,0	80,4	33,9	13,5
4	UzDEF-6.0 l/ha	45,7	67,7	22,0	12,0	83,0	37,3	16,8
5	UzDEF-7,0 l/ha	45,5	73,3	27,8	17,8	91,5	46,0	25,6
6	FanDEF-5.0 l/ha	47,0	63,7	16,7	6,7	79,0	32,0	11,6
7	FanDEF-6.0 l/ha	46,9	67,1	20,2	10,2	81,0	34,1	13,7
8	FanDEF-7.0 l/ha	46,7	71,1	24,4	14,4	89,1	42,5	22,1

In the slightly saline zone, 14 days after cotton defoliation in the period of 45-50% opening, the number of opened buds in the control variant was 65.7%, half-opened 0.3%, and the bud opening rate was 0.3%. 20.4%. In the variant, using Liquid XMD 8.0 L/ha as standard, the



number of holes after 14 days of defoliation was 84.0%, semi-open 1.8%, and the opening ratio of 39.0% was 6% higher.

Table №6
Influence of defoliants on cotton yield, c/ha

№	Name of defoliants	norm л/га	Upon return			productivity	Optimal + -	Harvest weight	
			I	II	III			1	2
Slightly saline area 2019									
1	Control	-	28,1	28,6	27,5	28,1		71,1	28,9
2	Liquid HMD	8,0	28,6	28,3	28,9	28,6	0,5	84,5	15,5
3	UzDEF	5,0	28,3	28,9	28,1	28,4	0,3	80,1	19,9
4	UzDEF	6,0	28,9	28,6	29,2	28,9	0,8	85,3	14,7
5	UzDEF	7,0	29,2	29,7	29,4	29,4	1,3	90,3	9,7
6	FanDEF	5,0	28,6	28,1	28,3	28,3	0,2	78,4	21,6
7	FanDEF	6,0	29,2	28,3	28,9	28,8	0,7	81,7	18,3
8	FanDEF	7,0	28,9	29,2	29,4	29,2	1,1	89,5	10,5

HCP₀₅=0,68 c/ha, 2,37%

The highest results on the effect of defoliants on the opening of cotton buds were obtained on variants with the use of defoliants UzDEF and FanDEF at a rate of 7.0 l/ha. After 14 days of defoliation, the number of disclosures was 91.5-89.1%, semi-open 2.7-2.3%, the percentage of disclosure was 46.0-42.5%, the disclosure rate was 25, compared with the control, was 6-22 ,one%. above.

Conclusions

1. The dry residual content of water-soluble salts in the field soils of the “Улуғнолда Турабой хожи ери” farm averaged 0.721%, and it was found that these soils are of the slightly saline type in terms of melioration.
2. Before defoliation in a slightly saline area, plant height was 92.9 cm, number of leaves 31.3, yield 12.0, distance between stems on average 4.7 cm, distance between each stem on the yield of branches 6.25 cm, number of holes 8, 7, of which open 46.1% and semi-open 3.1%.
3. Even in the slightly saline area, the average yield in the control variant was 28.2 c/ha, the weight of the first crop was 71.1%, in the variant using Liquid XMD, the yield was 29.6 c/ha, the weight of the first crop was 84.5%. The highest results in this area were obtained using the defoliant variants FanDEF and UzDEF at a rate of 7.0 l/ha, yield 30.5-30.6 q/ha, first crop weight 89.5-90.3%.

Recommended for production environments: To increase the efficiency of defoliation, high-quality harvesting without increasing the cost of the cultivated crop of the medium-staple cotton variety Sultan on soils with different ameliorative conditions in the Ferghana Valley, it is recommended:



it is recommended to use differentiated application of FanDEF defoliant at a rate of 7.0 l/ha, UzDEF defoliant at a rate of 6.0-7.0 l/ha during this period on slightly saline areas;

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