

RESOURCE-EFFICIENT TECHNOLOGIES GUARANTEED EFFICIENCY

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ANNOTATION

In agriculture, special attention should be paid to reducing the cost of the product using innovative technologies that minimize the cost of fertilizers, fuels, and lubricants, mechanization services for the placement of fertile varieties in conditions of appropriate soil and climate based on the integration of science, education and practice.

РЕЗЮМЕ

В сельском хозяйстве нужно выделить особое внимание на снижение себестоимости продукта применяя инновационные технологии, которые минимизируют затраты на минеральное удобрение, горюче-смазочные материалы, услуги механизации размещению плодородных сортов соответствующим почвенно-климатическим условиям на основе интеграции науки, образования и практики.

Key words: soil, bentonite, water, fertilizer, crop varieties, cotton, rotation.

Ключевые слова: почвы, бентонит, вода, вариант, хлопчатник, период вегетация

Introduction. The aim of work is to develop a technology for the use of non-conventional agro-ore material (bentonite clay) to save irrigation water and mineral fertilizers depending on an irrigation scheduling in the cultivation of early, highly-productive and high-quality yields of upland cotton varieties in conditions of the light sierozem soils of the Andijan province.

The object of study is light sierozem soils, upland cotton varieties “Andijan-37” and “Sultan”, bentonite clay.

Scientific novelty of research is the following:

for the first time in conditions of the light sierozem soils of the Andijan province, a resource-saving agrotechnology for the use of unconventional agro-ore as an addition to mineral fertilizers before soil plowing at a rate of 6000 kg ha⁻¹ and during the budding phase of cotton varieties at a rate of 750 kg ha⁻¹ has been developed;

Literature review. Comprehensive soil improvement, increasing yields and economic efficiency is one of the important issues for the future development of agriculture.

optimal water consumption has been identified, up to 25% reduction of the use of mineral fertilizers in the cultivation of cotton varieties achieved due to the use of non-traditional agro-ore (bentonite), which resulted in increase of soil water-holding capacity;

the impact of the effective use of non-traditional agro-ore as resource-saving agrotechnologies in the cultivation of cotton varieties "Andijan-37" and "Sultan" on their irrigation scheduling, fertilization and on growth, development and yield has been determined;

the effect of using non-traditional agro-ore as supplements to mineral fertilizers once every three years before soil fertility, agrophysical, agrochemical properties as well as on the 10-15% increase of economic efficiency of resource-saving technology has been determined.

It is very important to make right choice of cotton varieties reliable to the local climate, fast ripen, highly productive, stable to diseases and vermins; to locate them reliable to the zones, to seed cotton in double rows, to till the soil and get ready for seeding, thin cutting, applying growth controlling minerals; cutting cotton plant top, fertilizing, eliminating qualified effective agritechnical processes on time.

Growth confirming minerals effect elevating of plants sprouting capacity, their stability to drought and activity, diseases and vermins of agricultural crops, their ripening speed elevating (Kalinin, Meregenskiy) [1].

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There exist lots of factors to increase crop productivity but the most decisive part have meliorative state of soil, fertilizer, crop variety and crop rotation. Without fertilizing cotton productivity can not run over 12-14 centner per hectare, when fertilized with mineral it can reach 20-30 centners and with organic fertilizers 30-33, with crop rotation it reaches 35-40 centners /hec. (J.Akhmedov, K. Mirzajonov, 2007). Having studied the scientific conclusions of a number of scientists we experimented Sulton and Andijan-37 cotton varieties in Asaka, Izboskan districts of Andijan region and in Andijan Agriculture Institute experimental campus in 2011-2014. We studied growth, vegetation and agritechnical processes and those varieties.

Research methodology. Studying were carried out in the field conditions of Uz.S.V.I. (Uzbekistan scientific verification) based on "Methods of carrying out field experiments" (2007).

Field experiments were located out at 12 variants, general area of 200 m², 100 m², in total; 8 rows and 3 repetitions [2].

In the experiment Andijan-37 and Sultan cotton varieties were sowed at scheme 90x15-1-2. The variants were cultivated in LFCD (Limited field contained dampness) soil umidity during growing period 60-70-60 % and 70-70-60% in two different watering regimes, two seedlings density 100-110 and 120-130 thousand per/hect. , two kinds of fertilizers NPK 150-105-75 and NPK 200-140-100 kg/hect. There 70% of a year limit of phosphorous and 50% of potassium minerals were used before autumn tillage, the rest norm is used during germination of 2-3 real leaves budding and flowering of cotton plant. In both watering regimes with NPK 150-105-75 kg/hect. Variants cotton plant seeds were capsuled with bentonite powder , sowed and before budding the crop was fed with bentonite powder at 750 kg/hect. repeatedly. The number of branches of the plant, buds and their forming, seedling density (thickness), norms of fertilizing, were investigated according to watering regime and agricultural minerals.

Before watering made the most reliable condition for growth and vegetation of plants and for the plants of other soil condition concerning to 70-70-60 percent watering regime variants and agricultural mineral powder used variants soil humidity [3].

Primary conclusions: -limited field humidity capacity of the field experimental soil (LFCD) in 0-100 cm layer made 24 % and mass weight made 1,35 gr cm³ a little superiority of Sultan variety vegetation at the beginning of progressing period over Andijan-37 and capsule with bentonite was noticed;

-Cotton plant varieties were fertilized with NPK 150-105-75 kg/hect. mineral at 750 kg mixed with bentonite, in two different in comparison to variants LFCD 60-70-60% and 70-70-60% in both soil humidity variants watered with bentonite it effected fruitfully and maintained saving humidity in cotton plant rows, cavity of soil, water conductivity features during vegetation period in comparison to usual soil humidity variants

-In the experiment in the soil condition fertilized with NPK 150-105-75 kg/hect. adding 750 kg bentonite concerning to both variants LFCD in both watering regimes diminishing soil capacity and improving its cavity considerably increased its water absorbing capacity[4]. Soil layers watered in 60-70-60% soil humidity in comparison with LFCD showed the highest capacity of water absorption . Water absorption of soil in fertilized soil was 74,6 m³ in comparison to the starting point of vegetation period it was 80,5 m³/hect;

-in cotton plant cultivation use of NPK 150;105;75 kg/hect with minimal doses of bentonite made reliable condition for growth and vegetation of cotton plants. Efficacy of fertilizers increased the process to 25%.

Analysis and Results. -In Andijan region light grey soil conditions fertilizing cotton plants in vegetation period at NPK 150-105-75 kg/hect with minimal dose of bentonite 750 kg/hect was observed to be the most agricultural process. It gave the opportunity to diminish technology resource use, water, fertilizer, fuel, cotton plant seeds application [5].

Based on the research results on the development of optimal norms for the use of unconventional agro-ore as a supplement to application of mineral fertilizers in order to increase cotton yields in conditions of light sierozem soils:

A "Recommendation on the use of agro-mineral bentonite to provide cotton with additional water and fertilizer" for farmers have been developed and approved (Reference of the Ministry of Agriculture, №02/020-227 from August 27, 2018). This recommendation is widely used as a guideline in the agricultural departments and farms of the Andijan province;

Agrotechnology allowing to ensure saving of mineral fertilizers during production cultivation of cotton varieties "Andijan-37" and "Sultan" has been introduced on an area of 61.6 ha in light sierozem soils of the Altynkul district (Reference of the Ministry of Agriculture, №02/020-227 from August 27, 2018). Mixing of 750 kg ha⁻¹ agro-mineral bentonite clay with mineral fertilizers (N₁₅₀P₁₀₅K₇₅ kg ha⁻¹) during cotton budding phase allows reducing application of mineral fertilizers by 25%.

This resource-saving agrotechnology was implemented in the 45 ha of the Markhamat district and 50 ha of the Izboskan district, the Andijan province (Reference of the Ministry of Agriculture, №02/020-227 from August 27, 2018).

The use of agro-mineral bentonite clay at a rate of 6 t ha⁻¹ (once in three years) before soil plowing in autumn with irrigation regime by a scheme of 1-2-1 (at 70-70-60% Fc) leads to savings of 870 to 920 m³ ha⁻¹ of water, obtaining an additional yield of 3.8 - 4.0 t ha⁻¹ of cotton yield, which is by 0.4-0.45 higher compared to the yields obtained with traditional agricultural technologies.

It is necessary to develop agronomic technologies that provide high-quality, low-cost, competitive, world-class cotton production, which is due to the fast, rational and effective use of man, canal and natural resources.

S. X. Yuldashev, GA Ibrahimov [1989] Demonstrate good growth, development, and high yield of seedlings, and, thus, long-term cultivation, schematic, and planting seeds. If the seedlings are just a tequila in the field, the elements will freeze and the food will be freezing. The intensity of the thickening of the horns produced by the fibrous thicknesses is partly due to the degradation rate.

Observations and analysis of the study "Agrochemical, agro-physical and microbiological characteristics of soil" Mathematical and statistical analysis with the help of "Field Experience Tools" was performed on the basis of Microsoft Excel software.

Local and combat mineral fertilizers, nitrogenous aggrades, various compost, population waste, hygiene, vegetable residues and fattening Various methods have been employed by researchers S. Boltayev (2018) and D. Tungusheva (2006).

In the case of cotton shelling, NPK 150-105-75 kg / ha (750 kg / ha) supplemented with ore nitrate ore pre-cultured in accordance with the established standards of mineral fertilizers (Fig. 3).) in variants of 6000 kg of bentonite per hectare, there is a different impact on the development of Andijan-37 and Sultan varieties, depending on irrigation arrangements. As shown in the original observational data (Table 1) conducted at the time of the survey, plants in control options (Figures 1 and 4, 7 and 10) eventually developed poorly. In addition, the sperm water lags behind growth and development as a result of the adverse effects of the adhesives formed by the spring joints.

In the three years, the bentonite weighing in 6,000 kg has resulted in rapid growth of yields, high density, freezing rainfall and lubrication of fine-grained material. Increasingly microbiological processes, as a result of which the ylar are often loaded with advanced substances essential for life activity. Clearly, the high impact of these processes is clearly visible in the experience of 2015, and as a result of the rapid development of cotton innovations, the most results have been achieved. This time the average was also reflected in the 3-year results. For example, early and strong germinated cotton plants with noise variants (3 and 6, 9 and 12 sheets), on average, at June 1, 15.9 and 15.6 cm, 15.6 and 16.1 cm, respectively. , still 750 kg / ha bentonite in unused variants (2 and 5, 8 and 11 vol.) in 3 years 2.9 and 2.4 cm, 2.5 and 3.1 cm, NPK 200-140-100 kg The improved control variants (1 and 4, 7 and 10 sheets) increased by 3.4 and 3.0 cm, 3.0 and 3.1 cm, respectively, in 3 years. Colostrum, backpacking machine is more comfortable for cotton wool, it is more suitable for moisture, as well as the steam control in these variants is 3.0-3.2 cm higher and the leaves are 2.1-2.3 cm high. there are many (Table 1).

In conclusion, it is possible that the plants used a high level of soil and salvage factors due to the bentonite effect of 6,000 kg (3 and 6, 9 and 12 pp.), With 25% less fertilizer use before the harvest. 750 kg / ha of bentonite has not been used yet (2 and 5, 8 and 11 var.) And compared to the control options (1 and 4, 7 and 10 var), which are fed on NPK 200-140-100 kg / ha. The development of plant growth was accelerated by 3-4 days. Fertilizer NPK 150-105-75 kg / ha In the case of submergence, 750 kg of bentonite per hectare (2, 5, 8, and 11 var) was particularly evident during the later period. In both the growth and developmental precursors, the growth of both varieties (Andijan-37 and Sultan) and the harvesting process occurred in a rather severe manner.

Table 1

Bentonite Andizhan-37 and Sulton Cotton Navigation Influence on Growth and Development, average 3-year.

Var.№	June		July			August			
	Growth, sm	Chin leaves, piece	The growth of main Stem, sm	Harvest bough, piece	Bud, piece	The growth of main Stalk, sm	Harvest bough, piece	The element of harvest. piece	Unripe Cotton Bell, piece
1	12,5	3,5	51,6	6,0	8,1	87,1	11,2	10,5	6,6
2	13,0	3,9	53,2	6,3	8,4	90,0	11,7	11,6	6,8
3	15,9	5,2	58,8	7,3	10,3	94,6	12,6	12,54	7,5
4	12,6	3,6	50,8	5,9	8,6	86,3	11,4	10,9	6,6
5	13,2	3,9	53,2	6,3	9,1	89,9	12,4	12,2	6,9
6	15,6	5,4	59,8	7,1	11,0	93,9	13,4	13,3	7,6
7	12,6	3,6	52,0	7,3	9,5	96,1	12,4	12,7	6,8
8	13,1	3,6	54,3	7,4	9,9	97,8	13,1	13,4	7,6
9	15,6	5,6	61,5	8,3	12,6	100,6	14,3	14,7	6,8
10	13,0	4,1	51,7	6,9	10,2	97,6	12,5	12,3	7,6
11	13,1	3,9	54,1	7,9	11,6	98,3	13,1	13,6	7,9
12	16,1	5,5	61,7	8,6	13,7	102,4	14,8	14,5	8,3

Cotton varieties with an average of 61.5cm and 61.7cm for 3 years have been used less than 25% of pre-cultivation, with 6,000 kg of bentonite per hectare, and 70-70-60% of irrigation water per ChDNS (9 and 12). 8.3 and 8.6, respectively, and 12.6 and 13.7, respectively (Table 1).

It should be noted that although both varieties of cotton have almost the same growth and development rates, the formation of shoals in the Andijan-37 cotton species is 1.1 times lower than that of the Sultan.

Consequently, due to the positive properties of bentonite, the base height of the cotton varieties is 7.2-10.0 cm higher than the control variants (7 and 10) fed by the NPK 200-140-100 kg / ha, and the yield and yield are 2, respectively. The formation of more than 2-3,5 pieces was ensured.

Similar results were observed in the variants fed by these varieties of irrigation with the addition of 750 kg / ha bentonite to NPK 150-105-75 kg / ha, during the nesting period. cm. 7.9 and 11.6 units of shingles were formed in 7.4 and 7.9 harvest branches. Consequently, in the soil environment as a result of the positive benefits of additional application of 750 kg of bentonite, the base height of the Andijan-37 cotton variety is 2.3 cm (7 pp.) Relative to its control variant, which is fed by NPK 200-140-100 kg / ha. , The head height of the Sultan's cotton variety is 2.4 cm higher than its control variant (10 pp.). The yield and magnitude of the crop of the Andijan-37 cotton variety are almost identical to that of the control varnish. , Providing more formation in 4 pieces.

Growth, development and yield of cotton varieties Andijan-37 and Sultan, cultivated in 60-70-60% of irrigation capacity of LFMV, control variants of mineral fertilizers at NPK 200-140-100 kg / ha (1 and 4 pages) were significantly lower than those used for bentonite. Because in these variants the germination of the seeds germinates 5-6 days late due to the slow and late germination. As a result, during this observation period, lower data on all indicators of cotton were obtained than for other options. In the control variants, 70–70 of the LFMV were fed in all variants of cotton fertilizer during the ripening period, with NPK 150–105–75 kg / ha supplemented with 750 kg / ha of bentonite and 6,000 kg of bentonite per hectare supplemented with a 25% reduction in driving rate. In the order of irrigation of -60%, there was a decrease in the indicators compared to the irrigation options. Because of the fact that 60% of the soil moisture content in this irrigation procedure is set in the first 60–65 days in the limited field moisture content and the limited soil moisture content before flowering varieties, the bentonite values are not fully visible. According to the August 1 observations on the growth, development and yield of cotton varieties, there were significant differences in variations in height of the head stem. For example, the growth, development and yield of the Andijan-37 and Sultan cotton varieties, fed on the control variants (7 and 10 pp.), Fed on fertilizer NPK 200-140-100 kg / ha and irrigated 70-70-60% of the LFMV. The yield of bentonite was significantly lower than the variants used, and the base height of the plants was 96.5 and 97.6 cm for 3 years, and during the shelling of cotton, NPK added 750 kg of bentonite per hectare at fertilizer rates of 150-105-75 kg / ha. fed or driven The plants with 6,000 kg of bentonite per hectare in addition to mineral fertilizers (8 and 11; 9 and 12 var.) grew rapidly due to the positive properties of bentonite and the height of the stem was 97.8 and 100.6 respectively; The

Sultan grew by 1.7 and 4.5 cm, 0.7 and 4.8 cm higher than its control variants of 98.3 and 102.4 cm, respectively.

Such differences in the growth and development of cotton varieties were also reflected in the formation of harvest kings, harvest elements and shoots. Specifically, cotton varieties used in control options fed NPO 200-140-100 kg / ha (1 and 4 pp.) And cotton milling period NPK 150. At fertilizer rates of 150-105-75 kg / ha, 750 kg of bentonite per hectare was fed and 6,000 kg of bentonite per hectare of mineral fertilizers before driving, and 60-70-60% of the LFMV irrigated variants (1-6 pp.). harvest Mentor LFMV 70-70-60%, compared with the average irrigation, irrigated order options 3 in up to 1,2-2,5, bottoms lack of 0,6-0,8 units. During the germination of the Andijan-37 and Sultan cotton varieties, NPK fed 13.1 grain yields in both variants with fertilizer rates of 150-105-75 kg / ha with 750 kg of bentonite per hectare and irrigated 70-70-60% of the LFMV. 13.4 and 13.6, respectively, yielded 7.6 and 7.9, respectively, respectively. Although these variations were not high in the variants of cotton, NPK increased the mineral fertilizer efficiency by increasing the nutrient content in the bentonite soil, which was added between 750 kg / ha to a minimum of 150-105-75 kg. The positive characteristics of bentonite in full-blown irrigation variants of 6,000 kg / ha and 70-70-60% of the LFMV irrigation variants are evident. In these variants, cotton varieties are watered at 70% field moisture till maturity and the soil retains moisture at 70% due to improved bentonite physical properties such as soil mass, porosity, permeability and sufficient nutrients with nitrogen, phosphorus and potassium. As a result, the process of harvesting cotton varieties of these variants was higher than the other variants and resulted in high and high yield. For example, the kings of harvest yield 14.3 and 14.8 units of Sultan varieties per year, with 6,000 kg of bentonite per hectare, reduced by 25% per year before driving, and with 6,000 kg of bentonite per hectare. 14,7 and 14,5 pieces of crop, 6,8 and 8,3 pieces were formed, and the yield of Andijan-37 varieties increased by 1,9 units, the yield elements and appellations - by 2,0 units. king 2.3 pcs, hosi Controls and ko'saklari increase of up to 2.2.

In summary, during the first time in the field of cotton milling, NPK was fed at 150–105-75 kg / ha fertilizer rates (750 kg per hectare), or 6,000 kg of bentonite per acre of fertilizer (3 years). Andijan-37 and Sultan created favorable soil conditions for the growth and development of cotton varieties with nutrients and high productivity. It was also shown that during the cotton harvesting period NPK at the rate of 150-105-75 kg / ha fertilizers can be grown with a 750 kg bentonite supplemented crop, increasing the efficiency of mineral fertilizers by 50-60% and producing a high cotton crop.

List of used literature:

1. Methods of field experiments. UzPITI. 2007
2. Boboev F. Toshtemirov A. Effects of water and nutritional regimes on the productivity of cotton varieties. "Water and Resource Agro Technologies in Agriculture of the Republic of Uzbekistan". Proceedings of the international scientific-practical conference. Tashkent, 2008. 369-370 pages.
3. Jumanov D., Muminov K., Toshtemirov A. Water and harvesting. Journal of Agriculture of Uzbekistan. Tashkent, 2004. No. 3, pp. 23-24.
4. Mamadjonova NA, Tuhtasinova S. Morpho-biologics and agrotechnics May 2016 S. 291–293.
5. Mamadjonova NA, Isashov A. Farmers' Recommendations on the Use of Bentonite from Agroma in Supplementing Cotton with Extra Water and Fertilizers // Recommendation. - Tashkent, 2018. B. 30.
6. Н.А.Мамаджонова. Water and resource-saving agrotechnologies for the cultivation of soil varieties in the conditions of gray soils. Journal of Critical Reviews ISSN- 2394-5125 VOL 7, ISSUE 15, 2020. DOI: <http://dx.doi.org/10.31838/jcr.07.14.196>