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INSTITUTE of BIOLOGY AND MEDICINAL PLANTS
MINISTRY OF AGRICULTURE AND WATER MANAGEMENT
OF TURKMENISTAN
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EFFECT OF FERTILIZERS INTO PHYSIOLOGICAL AND BIOCHEMICAL INDICATORS OF COTTON IN SALINE SOILS

Scientific-production manual

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In the scientific-practical guide, have been written and described the research results on the effects of fertilizers on the physical and biochemical indicators of growth of cotton in saline soils.

Use of mineral and organic fertilizers in saline soils help to increase water, substance, and energy metabolism in cotton, and it promotes the growth of biochemical phenomena, reduces the harmful effect of the soil, and increases the stability of the crop to the salt of the soil.

Guide is intended for the Cotton Landowners, Professionals, Teachers, Graduate Students and students.

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INTRODUCTION

Honorable President Gurbanguly Berdimuhamedov puts forward great tasks for implementation in the agriculture rapid development, large-scale reforms in the industry of our country in the prosperous period of our state.

In the successful implementation of the cotton sector to organize the work on a scientific basis, to achieve a high yield of cotton, to obtain and achieve a high quality of cotton crop required.

It is well known, the main focus on the agriculture of our country is focused on the cotton industry. This sector has great strategic importance in the development of the zinc in the national economy.

The future growth of cotton farming in the world market is in line with the growing demand for natural fiber.

Production of high-quality product and its competitiveness in the world market at competitive prices increases its simplicity. A village engaged in cotton cultivation contributes to the improvement of the living standards of the population;

In this regard, to develop the cotton industry on a scientifically basis, the advancement of science, the cultivation of cotton, the world's leading technologies in this area, widespread application of best practices in production, cotton to improve the agro technics of cultivation.

The soil and climatic conditions of our country belong to the tropics that the water evaporating from the soil is 5-6 times more than the rainfall the evaporation of groundwater as a result of accumulation in the upper layers of the soil a certain part of the area is saline to varying degrees. That therefore, improving land reclamation and reduction of salinity of saline soils, to increase the difficulty, to use fertilizers more efficiently and effectively, that is the necessary conditions for increasing the productivity of crops on the ground creation is important. In the cotton industry, in order to reduce the lost productivity due to as well as the study of the scientific basis of the salt stability of cotton is considered a key issue in academic research.

Soil salinization of agricultural crops, including cotton, which is the main crop in our country, poses a major obstacle to increasing. On saline soils when sowing, a full germination is not possible at first.

On saline soils sown seeds germinate later than in unsalted areas. The young plant of sprouted cotton in saline soils grows and the test becomes weak. That is why one of the young plants part dries up after the first water development. As a result, weeds the density of the crops during the harvest, the root per hectare based on the achievements of a number of sciences and productions.

A well-known scientist on saline soils is strong in the water regime of plants as the concentration of n increases that changes occur, and that they are normal foods.

"It simply came to our notice then. In soil for the growth of plants with an increase in the amount of salts combinations of the necessary Ca, K, Fe, P, N and other elements it is difficult to move from soil to plants. As a result, plant food the normal rule of mitigation is violated.

The lack of water-soluble salts in the soil not only has a detrimental effect on plant growth, but also adverse effects on the survival of cramps, including microorganisms do. Soil salinity reduces the number of microorganisms, reduces their activity, resulting in normal plant nutrition does not pass and the yield is reduced. Cotton in moderately saline soils 9 yields are 30–35%, and in highly saline soils it is 60–70%. decreases to.

Fertilization of mineral and organic (organic) fertilizers to the soil is his by increasing water permeability and reducing soil salinity helps to reduce the secret. The amount of rot in the soil increase in water vapor, decreases in evaporation from the soil, and promotes good moisture retention in the soil.

In well-drained soils, moisture is well maintained; cotton and other crops are unique, accustomed to sprouting and growing well. In a well moisture manure carbon dioxide formed in the soil by the dissolution of gas exchange in plants, especially the phenomenon of photosynthesis of great importance in its normal passage. Plant nutrition contains other elements such as nitrogen, phosphorus,

potassium to increase the productivity of plants further enhances the importance of fertilizers.

Along with the course, increase the mineral nutrition of plants large amounts of microorganisms fall into the soil. In addition, organic fertilizers applied to the soil help to strengthen. Nutrients - nitrogen, phosphorus, potassium, and the activation of the potassium's biological cycle increases root nutrition.

1. INFLUENCE of ORGANIC AND MINERAL FERTILIZERS TO THE PHYSIOLOGICAL AND BIOCHEMICAL PHENOMENA OF PLANTS

When organic and mineral fertilizers are used properly improving the important agricultural characteristics of the cotton has a great effect on its smoothness. These fertilizers serve primarily as a main source of nutrients in growth and development of plants. With the manure, all the soil needed for cotton micro - and trace elements fall on the soil. Table 1 shows the quantity of nutrient elements 1 ton of cattle manure and their influence to the physiological and biochemical effects in plants.

Table 1

Foodstuffs stored in cattle classes and their Effects on physiological and biochemical phenomena occurring in plants

Macro and micro elements	**Conservation of manure in 1ton of dry matter**	**Influence on phenomena In physiological and biochemical processes occurring in plants**
1	2	3
Nitrogen	20kg	It is in the part of proteins, enzymes, nucleic acids, to chlorophyll, vitamins, and alkaloids. Slow growth of plants and the leaves are light green or yellowish in color transition is a major sign of nitrogen deficiency. The nitrogenous level of nutrition shows activity of protein and other synthesis nitrogenous organic compounds, defines developmental phenomena. Lack of nitrogen, especially influences on the development of vegetative tests. Photosynthesis activity due to nitrogen deficiency decreases, the leaves, branches become weak, which is restricts the formation of yield tests, as a result the yield is reduced and the content of the product proteins are reduced.

Phosphorus	8 - 10 kg	Composed of complex proteins, it has a main role in a metabolic changing of energy of plant. The Sun involved in the phenomenon of photosynthesis has a great role in the respiratory phenomenon and forms of adenosine tropospheric acid (ATA) in plants. ATA accumulated in oxidative phosphorylation and adverse events expended intake of nutrients from the soil, and synthesis of manure. In phosphorus deficiency and energy metabolism is disrupted, plant growth retarded. Formation of yield declines, their maturity is delayed, and the quality of the crop declines.
Potassium	24 –28 kg	Participates in the synthesis of carbohydrates in plants, to the water retention capacity of cells, tissues has a positive effect, increases resistance to conditions of the environment and diseases of the plants. The edges of the leaves turn brown is the main symptom of deficiency. Edges of leaves and the ends begin to burn, brown, and twisted, the flat and flat sides of the leaf are colored spots appears. In potassium deficiency, cells do not grow normal, so in the form of curved leaves, becomes bubble-shaped. In potassium deficiency the leaves of the cotton has bronze (brown gold) cover.
Calcium	28 kg	It has a key role in the normal course of photosynthesis and in the movement of carbohydrates, in the nitrogen assimilation of plant. It participates in the formation of the cell shell, in the keeping of organoids conservation, and water supply. Calcium deficiency primarily affects the root system of the plant affects: root growth slows down, root hairs do not form, and the roots are covered with resin and rot. There is also leaf growth in calcium deficiency weakens, they form chlorosis spots, then the leaves turn yellow and dry out prematurely.

Magnesium	6 kg	It is part of the chlorophyll, and participates in the phosphorus movement, carbohydrate metabolism in plants, influences on activity of oxidizing - restorative phenomena. Vegetation is green in magnesium deficiency the amount of chlorophyll in the specimens is reduced, the leaf chlorosis occurs on the edges of the vessels (the veins remain green). Magnesium is sharp in its deficiency the surface of the leaves is rough and they are twisted and wrapped.
Sulfur	4 kg	The main amount of sulfur in plants is protein sulfur cysteine, cysteine, and methionine amino acids and in other organic compounds-in enzymes, vitamins, and mustard and garlic fats. Sulfur participates in plants in nitrogen and carbohydrate metabolism and respiration, in the synthesis of fats.
Boron	20-40 kg	Boron has a great influence on carbohydrates and protein metabolism and other biochemical phenomena. In its absence, biosynthesis, in particular, of carbohydrates movement, formation of crop tests, vegetation phenomena such as fertilization and harvesting is disturbed. First of all young growing stem damages and dries up its growth points.
manganese	200-400 g	It participates to the respiratory, photosynthetic phenomena of plants, and it is in the composition of oxidizing - restorative phenomena. It has a great importance in the assimilation of nitrate in the form of nitrate and ammonium. The formation of spot chlorosis in the leaves arrival is a major symptom of manganese deficiency. Chlorosis spots between the veins on the leaves formed, and then the damaged parts dry up.
Copper	20-30 g	It includes in the several oxidizing-restoring enzymes in plants and it participates in photosynthesis, carbohydrates and protein metabolism. Copper in cereals deficiency creates a disease called "white carnage". The disease loses the color of the leaves and becomes pale with the passage and drying of the tips of the leaves it starts suddenly. Damaged plants do not form yield tests. Cotton yields are worsening in copper decreases. Harvest stems aren’t in a form if the copper is too much deficiency.

Zinc	125-200 g	It has a multifaceted positive effect in the exchange of matter and energy in plants. Zinc is part of several enzymes, growth phyto hormones – auxins. Plants growth in zinc deficiency may be retarded, photosynthesis, phospholipid phenomenon, synthesis of carbohydrates, proteins, phenolic compounds the normal replacement is disturbed, retards the stem growth. Chlorosis in plants and small leafiness occurs.
Cobalt	2-3 g	It is a microelement in a part of vitamin B12, plays a major role in biological evolution of molecular nitrogen. In the absence of cobalt, there are the same symptoms as lacking of nitrogen.
Molybdenum	2-2.5 g	This element has a great important role in the nitrogen nutrition of plants. It is molecular nitrogen in the conversion (soil, free-living nitrogen collector) to the family of microorganisms and legumes collecting biological nitrogen at the root of the respective plants of club bacteria has a positive effect on the activity and recovery of nitrates participates. Lack of molybdenum in cotton the symptoms are similar to nitrogen deficiency, i.e. the growth of the plants is suddenly weakened, and the plants turn green.
Iron	20-50 kg	It is in a part of oxidative-restorative enzymes in plants. It participates to the synthesis of chlorophyll, respiration in events, and metabolism. Lacking of iron there is a disintegration of chlorophyll and occurs chlorosis in cotton. The leaves loss their green color, turns white, and dries prematurely.

According to P.T.Smirnov, E.A.Muravi, in the first year of use of plants, they absorb 20-30% of nitrogen, 30% of phosphorus, 40%, 60-70% of calcium in 1 ton of semi-rotting manure. These indicators may be change depending on line and soil-climatic conditions [12]. Minerals when given with fertilizers, the effect of the course are further enhanced. When organic and mineral fertilizers are used in combination, their influence to plants can be increased. Dry soil-climatic conditions- effectiveness in the districts is significantly lower

than in the wetlands. Therefore, it is the main task to determine amount of organic and mineral fertilizers, and effect of plants to the physiological and biochemical phenomena in the dry climate of Turkmenistan and in certain saline soils.

2. OBJECT AND METHOD OF RESEARCH

At the experimental field of the Biology and Medicinal plants institute of the Academy of Sciences of Turkmenistan were conducted research cotton of the 133 medium and sort of 9871- I of medium fibers. Experimented at a rate of 20 t / ha in vegetation containers organic fertilizers and household fertilizers to be fed the norms of mineral fertilizers have been determined. Field experiences vary variants (without organic fertilizers, mineral fertilizers) in the variant (checking) given in the rule; with mineral fertilizers variants taught together in the amount of 20 t / ha, 30 t / ha, 40 t / ha- and, in 4 repetitions, were placed on special ponds in small ponds (ponds length 10 cm; sowing line-60 cm x 15 cm).

In the experiment, the stages of plant growth and growth the storage of dry matter was determined on the basis of method of N.N.Tretyakov [10]. To determine the composition of salt in soil was used a conventional aqueous traction method [9].

The absorbing power of the works is studied according to the new method in the ADP 440 plus Polari meter. Field experience is proven under the new method [8]. The activity of plant transpiration is Ivanov was carried out by the method of measuring the weight of the leaves (this method based on short-term evaporation of water from the leaf) [11]. Chlorine The amount of elephant is determined by the chlorophyll meter CCM 200 plus device. Pure photosynthesis by Kidd, Westom, Brigs developed methodology, obtaining the surface area of the leaf method (to cut the area of the leaf edge left on the paper). departure) was determined by [10]. The total amount of phenolic compounds the tree was transferred by the method of

Leventhal [4]. Soil is toxic and its (toxic) effect was based on biological identification.

3. CHARACTERISTICS OF SALINE SOILS

The amount of salts in the soil and the degree of their damage is very different. Different types of soil salinization do not have the same effect on the life of the ring. Salts are cations and anions. And they are formed by small combinations of cations and anions however, the fact that most of them accumulate in small amounts in the soil to the development of cultural plants, even if not more, it has a very detrimental effect on the growth and development of plants. There are also cases where they are found to be harmful. Scientists on the degree of harmfulness of salts in the soil ideas are divided into two groups, some of them thought which cations are harmful for plants, another group considers anions harmful. Perennial research as a result of which the chlorine ion from the anions is harmful to the plants the effect was found to be higher. In the soil, this ion conservation is the key to the growth and productivity of agricultural crops diversity. Chlorine salts, especially table salt (NaCl) even more harmful. Sulfuric salts (Na 2 SO 4 and Mg SO 4) are chlorine less harmful than salts. Salts are harmful for plants. The side effects often depend on their degree of solubility. No harm done and low-harmful salts (CA SO 4, CA SO 4 , Mg SO 4) dissolve slowly. They CA SO 4 and Mg SO 4 are hardly soluble, and CA SO 4 is almost insoluble. The remaining salts dissolve well (high or low) and their small amount of soil is also harmful to plants. Harmful effects of salt mixtures on plant organisms are small, and even their large concentrations have some detrimental effects is less than the detrimental effect of toxic salts in particular.

This phenomenon is called the "antagonism" of salts. Na Cl, Mg Cl salts are very harmful when taken separately, but, if Mg Cl, If Ca C l2 (harmful salt) is retained to a certain extent in Na Cl solutions, and then the harmful effects of these salts are reduced. Antagonism, in

particular, occurs in cations. Which is complicated in physiological relationships the causes of the phenomenon of antagonism have not yet been adequately studied is not. The differences in the salinity of soils with soil salinity
and changes in their composition are the growth and height of plants has a profound effect on exchange phenomena [13].

The effects of soil salts on plants scientists such as K.K. Gedroys, N.M. Tulaikov, W.A. Kovda, P.A. Genkel, B.P. Stroganow, and A.A. Shahov have studied in their research. Sulfur-chloride salinity in the soil is harmful to plants. It's salinity in the soil is higher than chloride-sulfate saline.

The soil samples were analyzed in the experiment field, the soil was taken different layer (0-30; 30-60; 60-90; 90-120; 120-150; 150-180 cm). The analyze of soil was carried out in a chemistry laboratory of the Soil Exploration Expedition of the "Turkmentaslama" institute of the Turkmenistan's Environmental Protection and Land Management State Committee and was determined cation-anion-composition.

(*Table2*). Soil by ponds samples were made on the basis of envelope methodology. According to the analytical results was found 0036-0.099% of chlorine ions and 0.458-1.195% of sulfate ions contain toxic salts.

4. TEST SECTION

The experiments lasted for 5 years (2010-2015) in vegetation containers, in moderately saline soils in the experimental field.

To determine the effect of soil salinity on the development of cotton and the rules of giving of organic and mineral fertilizers to the soil experiments of learning was held in vegetation containers.

Cotton Seeds were sowed in different soils which were taken from different depth of the cotton fields of Garadamak (0-30; 30-60;60-90; 90-120; 120-150; 150-180 cm) (*Table 2*).

Table 2

THE CATION-ANION COMPOSITION OF THE EXPERIMENTAL FIELD

T/b	Sample of taken soil, sm.	Salts %		Stored in % account							
				Cations				Anions			
		Dry residue	Total	Calcium Ca^{2}	Magnesium Mg^{2}	Sodium Na^{-}	Potassium	Acids CO_3	Hydrocarbons HCO_3	Chlorine ions	Sulfate ions
1	0-30	1,105	1,100	0,106	0,024	0,202	0,006	yok	0,030	0,092	0,640
2	30-60	0,860	0,856	0,062	0,030	0,168	0,002	yok	0,037	0,099	0,458
3	60-90	1,440	1,435	0.180	0,040	0,205	0,003	yok	0,034	0,064	0,909
4	90-120	1,805	1,799	0,246	0,051	0,230	0,004	yok	0,030	0,043	1,195
5	120-150	1,705	1,705	0,216	0,064	0,207	0,004	yok	0,024	0,038	1,152
6	150-180	1,700	1,696	0,266	0,027	0,198	0,003	yok	0,027	0,036	1,139

During the period when 1-2 leaves are formed in plants physiological and biochemical parameters were studied. It was given special attention to the osmose pressure as an important indicator when the seeds began accepting, swelling, swelling, and sprouting in water. There is a high difference of osmose pressure between the soil and the plant body if there is high amount of salt in the soil.

As a result of such a difference it becomes difficult to absorb dissolved nutrients from the water, and the plant loses moisture, and physiological drought occurs and dries the plant.

Figure 1. Definition of the absorbent force of the cotton growth in the adp440 plus polarimeter

So as we see, it is very important the quantity of osmose pressure in the growth of plants. When the osmose pressure of plant juice is above than the osmotic pressure of soil, plant grows normally and grows taller. The so-called hypertension osmoses pressure helps to suck water from the soil to the plants and the nutrients dissolved in them and lead in the cells of the plant a turgor situation arises. Regulations on water and mineral nutrition changes influence the growth of plants, and their yield. Strong soil salinization disrupts the nitrogen metabolism of plants, which has a toxic effect on them and

intermediate products of nitrogen metabolism (amines, ammonia, and diamonds) leads to accumulation [7; 14]. The next big one of the indicators is the amount of phenol compounds in the soil is cleared.

It is actively involved in plant respiration; it acts as a hydrogen conduit, having a major impact on the sediment. Beside them phenolic compounds are phytonutrient and increases resistance to angelic and bacterial diseases, phenol to pathogens after their associations have affected plants cases of arising in response have also been identified. Also they recover after mechanical damage to plants. They are very important in protecting cells from the radiation, free charge, and mutagenic, oxidized harmful effects. [5]. Plant growth under certain environmental conditions, active photosynthesis, which is an indicator of how well one feels, the surface area of the leaf characterizing the ligand was also taken into account.

Table 3 shows the growth of plants in saline soils to varying degrees, absorptive power, and information on the amount of phenolic compounds.

Table 3

Influence of soil salinity on some physiological and biochemical indicators of cotton

Species of soils according to layer	***Field of lives cm^2***	***The absorbing power of developments, MPa***	***The total amount of phenolic compounds***
0-30	*9,6*	*2,65*	*3,98*
30-60	*11,7*	*2,32*	*4,34*
60-90	*14,6*	*1,99*	*4,82*
90-120	*15,4*	*1,98*	*4,12*
120-150	*14,6*	*1,66*	*4,38*
150-180	*14,2*	*1,32*	*4,92*
Non saline soil	*22,9*	*1,98*	*3,86*

As can be seen from the data given in the table, if the chlorine and sulfate ions' amount is lower, the area of the leaves, the amount

of phenolic compounds is so high, and the osmose pressure in the soil increases decreases with the increasing of salt in the soil. It is possible to draw conclusions from the data obtained that is, the main indicator of soil salinity loops, when the suction power of the soil is higher than the suction power of the seed, seeds cannot absorb water and do not germinate.

Medium saline in the next round of vegetation experiment s which has a positive effect on the growth of cotton in soils the rate of delivery of organic fertilizers has been determined. In vegetation containers the soil in which the soil is needed to be tested extracted from the slurry layer and required mineral fertilizers (N-200, P 2 O 5 - 160 kg / ha, 800 g per soil) 214 mg of nitrogen and phosphorus, 43 mg of potassium and organic fertilizers 22.4 per 800 grams of soil, based on the volume of -20-30-40 t / ha; 33.6 and 44.8 grams of course) were added. Thus, experiments were performed in 4 variants.

1) Inspection - free of organic fertilizers, only mineral fertilizers (N-200, P 2 O 5 - 160 kg / ha);
2) Supply of mineral and organic fertilizers (N-200, P 2 O 5 - 160 kg / ha + 20 t / ha course);
3) Supply of mineral and organic fertilizers (N-200, P 2 O 5 - 160 kg / ha + 30 t / ha course);
4) Supply of mineral and organic fertilizers (N-200, P 2 O 5 - 160 kg / ha + 40 t / ha course);

Phenol tests were performed on the tested plants; the pure productivity of the photosynthesis has been studied. As a result of photosynthesis the organic mass of cultural plants and the yield associated with it is formed. The activity of photosynthesis is the solar radiation that plants receive coefficient, which is the area of the leaf, the vegetation to the density of the ring (sowing line), with carbon dioxide in the air.

An important definite feature of high-yield varieties a large number of assimilations of household valuable tests (yield tests) are spent on formation [1, 2]. Photosynthesis of plants classification of the laws and principles of productivity, the activation and enhancement of

its principles is modern is an important issue. Cotton studied varieties in scientific research purity of photosynthesis by biomass accumulation determined. This indicator is used for a certain period of time (overnight). de) increase in dry mass in a certain surface area of the leaf (m^2). based on the study of.

The best results in the data obtained from the experiments gels in the second variant, i.e. general agro technics of mineral fertilizers received at the rate of +20 t / ha in the amount given under. Table 4 presents specific data from experiments.

Table 4

Effect of organic and mineral fertilizers on cotton development and pure photosynthesis

Species	Plant growth and development					Photosynthesis clean productivity, (g / cm 2 / night-during the day)
	In 30 days		In 60 days			
	Heights (sm)	Quantity of leaves	Heights (sm)	Quantity of leaves	Quantity of buds	
Sort of 9871-I						
1	16,3	6,0	31,0	25,7	5,7	6,69
2	16,7	7,6	31,7	28,9	6,3	9,96
3	17,7	6,6	32,6	27,8	5,5	7,25
4	17,9	7,2	33,1	27,9	5,3	6,32
Sort of 133						
1	20,5	7,0	30,5	24,8	5,4	4,11
2	20,9	7,3	33,4	27,7	5,9	8,68
3	20,6	7,0	33,1	26,8	4,9	7,32
4	20,7	7,1	33,3	27,0	5,0	7,12

As can be seen from the data in the table, the second view of the experiment in which the plants are distinguished by dense foliage. This that the normal surface mass of the plant is formed, that while in turn, increased photosynthesis productivity testifies to the normal formation of elements (buds).

After the good results from the development experiments, the scientific inspections were continued in field conditions. However,

Preliminary studies have been conducted to determine the phytotoxic properties of in. On the basis of comparison in soil solutions of different concentrations the number of sprouted seeds of cotton (in purified water) is the main indicator of the. lag was 0.5 g / ml of soil solution.

Determine the phytotoxic state of the soil at a concentration of 23.6% with an increase in the concentration of the soil solution phytotoxic properties were found to be elevated (Table 5).

Table 5

Influence of the toxic properties of soil solution on the cotton seeds' germination and length of roots of cotton

Concentration of soil solution g/ml	**Growth (%)**	**Length of the root (%)**	**Toxicity level of soil solution (%)**
Control (dist,water)	100,0	100,0	-
0,5	97,1	76,4	-23,6
1,0	94,2	68,9	-31,1
1,5	93,9	59,1	-40,9
Soil solution with organic and mineral fertilizers			
0,5	100,0	95,4	-4,6
1,0	98,7	92,1	-7,9
1,5	96,4	89,0	-11,0

As can be seen from the table, as a result of the experiment, and the toxic effects of the soil in the form of mineral fertilizers was found to be declining from 23.6% to 4.6%. Cotton organic and mineral fertilizers in saline soils to the germination of the seed, to the stages of development, to the elements of the harvest field experiments were continued to study the collection. The two types of cotton- fine fiber 9871-I, and medium fiber 133 were tested. An experiment in medium saline soils 3 in 4 repetitions was carried out in the form of the area, each field area is 24 m^2.

1 - Inspection (without fertilizer);

2 - Soil with mineral fertilizers;

3 - Fertilized and manured soil (20 t / ha);

4 - Only organic fertilized soil (20 t / ha course).

Sowing was carried out alveolar, 5 seeds were sown in alveolar, and sprouted plants were recorded two weeks later the data are given in Table 6.

Table 6

Effect of organic and mineral fertilizers on field growth of cotton seeds in saline soils (%)

Species	**Sort of 133**	***Sort of 9871-I***
1	*81,2*	*82,4*
2	*84,4*	*90,0*
3	*94,0*	*93,6*
4	*86,8*	*90,8*

As in the table information shown in both types of varieties in the first non-fertilized form, the surface of growth area was found to be low. The best results for the growth were taken from the third type which was used mineral fertilizers and manure too.

In the first stages of the growth it should be noted that the germination was obtained. The other two types although the results are not bad, their performance is of the third type were lower than the figures. After 42 days after sowing research was conducted on a dry mass of organic and mineral fertilizers in plants to study the effect of accumulation and photosynthesis on pure productivity. The results were presented in Table 7.

Accumulation of dry weight in plants under field conditions study of cotton development in research and experimental forms high levels and the transition of physiological phenomena. Allowed to detect the wood and dry matter accumulation that there is a connection between them we can take high yields of cotton. In particular, in the third variant, which was given genetic and mineral fertilizers were taken high yields. Enlargement of leaf area, photosynthetic activity characterizing and contributing to the increase in the green mass of the plant is possible to use solar energy radiation effectively.

Table 7

Effect of organic and mineral fertilizers on saline soils on dry mass accumulation and clean production of photosynthesis

Species	Accumulation of dry matter					Area of leaves	Clean productivity of photosynthesis g / m^2/ night-during the day
	Leaves	Stem	Root	Buds	In a plant		
Sort of 9871-I							
1	10,77	7,02	1,86	0,34	19,99	1321,43	7,85
2	12,97	9,92	3,06	0,31	26,26	1262,86	8,41
3	14,99	14,02	4,65	2,18	35,84	1670,00	15,28
4	19,47	12,35	3,22	0,35	36,39	2178,57	13,12
Sort of 133							
1	11,34	6,23	2,61	0,31	20,49	1568,57	4,01
2	14,99	7,15	4,29	2,08	28,51	2200,00	9,79
3	13,43	9,65	3,55	0,38	27,01	1971,43	10,54

A well-developed root system required plants from the soil allows you to absorb macro- and microelements. In addition to the above indicators, in plants high levels of water exchange, especially daytime transpiration lilies were investigated. This phenomenon is caused by water exchange in plants acts as the main driving force. Transpiration's movement of minerals in plants and their synthesis of genetic material are carried out, among various tests water exchange is regulated (especially between leaves and fruits). Transpiration is also due to overheating the leaves on hot days are very important in protection. Activation of transpiration was measured in the morning, during the day and in the evening. During the measurement period, the air temperature ranges from 32 degrees (morning) to 40-44 degrees (daytime), weather the humidity was between 25-30% (morning, noon). The results are given in Table 8.

When dynamics of transpiration of day-to-day development of cotton studied, the moisture of the leaves in the early hours of the day is higher than the daylight hours in all tested forms. To protect the

plants from the drying when the temperature of environment is higher the transpiration's level low up. This figure rises in the evening.

The types that showed the best results during the test were selected and organic and mineral fertilizers planted in saline areas. A convenient rule of thumb has been identified (generally accepted grazing in moderately saline soils with rote hydric measures layer 20 tons of organic fertilizer per hectare per year).

Table 8

Dynamics of daytime transpiration activity of cotton

Species	High degree of transpiration, g/m^2/h		
	Time, hour		
	9^{00}	**14^{00}**	**19^{00}**
Sort of 9871-I			
1 (control)	445,7	203,8	367,4
2	476,8	279,0	345,8
3	438,5	245,6	354,7
4	449,8	265,8	350,1
Sort of 133			
1 (control)	392,6	214,3	320,1
2	374,4	328,1	350,0
3	386,7	298,8	342,2
4	399,3	287,9	339,9

As can be seen from the results of the research, such a rule an increase in the concentration of carbon dioxide in the leaves increased photosynthesis activity in cotton leaves due to helps to prevent. This is because organic fertilizers dissolved under the influence of organisms they ensure the release of the tree and the chloroplast of the leaf they enrich the zone with this gas. Carbon dioxide under normal conditions photosynthesis due to low gas concentrations passes slowly. The concentration of carbon dioxide is the root of cotton if it is 5.2 nmol / in the system band, its amount in the air is 2 times lower. Chloroplasts are located on the cotton leaf sufficient amount of carbon dioxide into the cells of the mag and its accumulation here, as well as

the variety of these cells measures (improving crop care, specially developed) facilitating plant gas exchange through structured methods) The enrichment of carbon dioxide with cotton is important in improving the quality of life [3].

In Table 9 below, the proposed organic in the form of rib (organic fertilizer in the amount of 20 t / ha)

Table 9

Effect of organic fertilizers on saline soils on physiological and biochemical indicators of cotton

Species	Sort of cotton					
	Sort of 9871-I			Sort of 133		
	Pure productivity of photosynthesis g/m^2 day and night	**The surface of the apex area g/m^2**	**Area of leaf m^2**	**Pure productivity of photosynthesis g/m^2 day and night**	**The surface of the apex area g/m^2**	**Area of leaf m^2**
Control	12,59	89,8	0,125	12,19	100,0	0,101
Exam	16,61	87,7	0,241	26,05	98,4	0,211

As can be seen from Table 10, the net productivity of photosynthesis, the specific surface area of the leaf, the area of the leaf with the type of inspection in comparison it was higher in both varieties in the form of tests. Leaf changes in the structure of the wide surface area, the CO 2 uptake.

Table 10

Changes in photosynthesis productivity during cotton development

Species	Pure productivity of photosynthesis g/m^2 / day and night	
	31st of May	**4th of May**
Sort of 133		
Control	9,51	10,04
Exam	8,03	11,51
Sort of 9871-I		
Control	9,56	11,54
Exam	5,92	13,31

As a result, photosynthesis in plants facilitates fighting and accelerates growth.

Continuation of photosynthesis productivity studies, this indicator is high during the flowering and the growth of the plant in this period (July 4). Using manure prolongs the harvesting period of the plant. In practice during the growing of cotton using of 20 tons per hectare evidenced it.

Figure 2. Determination of the amount of chlorophyll on a cotton leaf with a CCM 200 plus

In the experiment, the effects of fertilizers to the amount of chlorophyll in the leaves of cotton have been studied. Because of the phenomenon of photosynthesis chlorophyll plays a key role in the transition (*Figure 2*). Cotton data on chlorophyll retention in leaf quoted in the table 11.

As can be seen from the table, the amount of chlorophyll in the cotton leaf in the control was higher than the in the test form, which is the use of organic fertilizers in the cells of the cotton leaf that it has a positive effect on the increase in the amount of stored chlorophyll indicates.

Table 11

Effect of organic fertilizers on the amount of chlorophyll in cotton leaves

Species	Index of chlorophyll retention
Sort of 133	
Control	24,0
Test	26,0
Sort of 9871-I	
Control	19,7
Test	24,8

When cotton is grown as a result of research annual supply of organic fertilizers along with mineral fertilizers the supply of the amount (20 t / ha) is given only to the development of cotton not only has a favorable effect, but also on its productivity and the quality of its fiber were also found to have a positive effect (*Table 12*).

Table 12

Effects of organic fertilizers on cotton yield and some valuable properties

Variant	The yield of a plant	Yield, s/ha	Weight of Cotton boxes	Fiber's	
				length	Income
Sort of 9871-I					
Control	80,64	28,6	3,23	37,4	29,1
Test	102,50	32,6	3,30	38,7	30,6
Sort of 133					
Control	130,80	33,6	4,96	38,8	33,5
Test	162,30	38,1	5,08	39,5	34,9

As can be seen from the table, in conditions of moderately saline soils, the weight of one cotton bud, the length of the fiber, the output of the fiber signs of economic value such as fine-fiber and medium-fiber in the form of tests (mineral fertilizers and a course of 20 t / ha per year) was high.

SUMMARY

By cultivating agricultural crops in saline soils to varying degrees the issue of cultivating and reaping a high quality of them all the time remains an important issue. For many years some works are carried out about soil salinity control and plant salinization research, to study their nuclear properties, their choice of saline sustainable crops based on their results, to develop convenient methods of cultivation in these areas and implementation.

So it is important to create necessary conditions to decrease the salinity level of the saline soils, increase their fertility, and make fertilizers more effective and to use them efficiently, to increase the productivity of crops.

In this regard, our main task was to learn determination of using necessary organic and mineral fertilizers in saline soils in the dry climate of Turkmenistan to take high harvest, to study effects of fertilizers on biochemical phenomena of plants.

The experiments lasted for 5 years (2010-2015) and experience was held in growing containers, with moderately saline soils in the field. It was determined the effect of using standards of fertilizers on cotton which were sewed in moderately saline soils. Cotton seeds were sewed in different soils in Karadamak, soil were taken from depth (0-30; 30-60; 60-90; 90-120; 120-150; 150-180 cm).

During the research experiments of soils in the agrochemical laboratory it has been studied the changing of harmful salts of soil, effects of organic and mineral fertilizers to the physiological and biochemical indicators of cotton, to the roots, to the growth of the stem, to the surface of the leaf growth, to the clean photosynthesis, to the crop yields, to the quantity and quality of the crop. As this research was conducted the first time in our country, we think the taken results have great value.

CONCLUSION

During the many years carrying research the following results have been obtained:

1. Based on the experience of plant growth and field experiments the obtained results show the harmful effects of salts on saline soils come into being in the early stages of plant growth (swelling and germination of seeds).It shows, that plant growth may be retarded, and quality and quantity of the crop and water metabolism in plants, physiological and biochemical phenomena were disturbed.

The use of organic and mineral fertilizers in saline soils helps to keep the air and soil balance for the normal growth of cotton, disparages the toxic properties of the crop, increases soil fertility, and enriches soil nutrients.

2. The use of combined supply of organic and mineral fertilizers help to early growth of 9871-I sort and 133 sort of medium-fiber, enlargement of the leaf surface, important physiological and biochemical properties that affect pure productivity of photosynthesis which increase high yields.

3. The use of 20t per ha. manure in a year in cotton growth helps the resin increases the absorbing power plants during the formation of 3-5 true leaves, so it rises the root's water absorb ability and water-soluble nutrients and decreases the toxic properties of the soil.

4. It was noted that using 20t / ha per year manure with mineral fertilizers in the soils affects to the rising of water, matter and energy changes of cotton.

5. Organic fertilizers help to activate nitrates - enzymes (as nitrate reductase and others), and ammonia reacts to the oxidation of carbohydrates and with their products (keto acids) and organic fertilizers help to the formation of amino acids (as asparagine, glutamine, etc.). Thus, organic fertilizers some of the substances that are not available in plant nutrition for plants create some conditions to the transformation of some matters of plants into acceptable compounds.

6. The use of combined supply of organic and mineral fertilizers 20t / ha in the middle saline soils helps to increase cotton's ability to absorb carbon dioxide, and the amount of chlorophyll in the leaves, pure productivity of photosynthesis and it helps in its turn to increase the yield of the crop by 4-5 s / ha.

7. Positive results obtained in research give us to write such suggestions as following.

SUGGESTIONS

Soil salinization has a harmful effect on the growth of agricultural crops, including cotton. Finding such researches in inconveniently condition of environment (in saline soils) to learn the biological characteristics of cotton, physiological and biochemical study of phenomena and to change some technology of cotton cultivation gives opportunities to take definitely harvest from the plants. The use of organic and mineral fertilizers in salty soils has a positive effect on growth and high yield of harvest.

To the exact results obtained in many years of research we make the following proposals:

Reducing the salinity of moderately saline soils, improving the ameliorative condition, increasing the intensity, to increase the yield of cotton in 4-5 s / ha we recommend to use 200-220 kg nitrogen, 160-180 kg phosphorus per hectare with fertilizers at a rate of 20 t / ha (Once every 3 years).

In the southern regions of the country, when sowing, the seeds are planted on the edge, not on the ridge planting is recommended. This method provides the reducing of osmose pressure of the soil and as a the moisture content of the sown seeds.

Capture moisturizing water 4-5 days after sowing recommended.

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EFFECT OF FERTILIZERS INTO PHYSIOLOGICAL AND BIOCHEMICAL INDICATORS OF COTTON IN SALINE SOILS

Scientific-practical manual

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