MINISTRY OF AGRICULTURE AND WATER MANAGEMENT
OF TURKMENISTAN
TURKMEN AGRICULTURE INSTITUTE

FEEDING OF COTTON AND WINTER WHEAT BY LEAVES

Scientific-production manual

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According to theresults of the researches on the additional feeding of cotton and winter wheat leaves, there is given some information about the additional feeding of these crops in the production conditions in this manual.

This manual is for grain farmers and specialists.

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INTRODUCTION

In the prosperous period of our sovereign state, under the prudent leadership of our esteemed President, great work is being done in all spheres of our national economy, as well as in the radical transformation of agriculture.

At present, the main task of the agricultural sector is to create sustainable food abundance in our country, to make a worthy contribution to strengthening the economy of our country by entering the world markets with finished products. The successful implementation of these tasks is of great importance for the widespread introduction of science and technology into the industry and the introduction of new technologies. Turkmen leader said. **"The agro-industrial sector cannot grow rapidly without relying on science".**

In this regard, the creation of high-yielding, weather-resistant varieties, resistant to diseases and pests of agricultural crops, as well as improving the methods of breeding on a scientific basis, as well as improving the methods of crop cultivation are scientifically urgent.

As is well known, in order for agricultural crops to grow normally and to reap a bountiful harvest, they need to be provided with not only nitrogen, phosphorus, potassium, but also about 20 macro- and microelements (nutrients) during their growth. They are: N, P, S, K, Sa, Mg, Fe macroelements, B, Su, Zn, Mn, Mo, Co, I, Ni, W and others belong to micronutrients, Ag, Cd, As, Pt and others ultramicroelements. Many of them are irreplaceable elements and play a special role in the life of each plant.

Nitrogen - accelerates plant growth. By incorporating all the proteins in the plants, it has a great impact on the accumulation of their biomass, especially the cotton crop and the abundant harvest of wheat grains, the quality of the crop. Due to the lack of nitrogen in the wheat, the growth of the plant slows down, the leaves turn pale green and dry prematurely, leading to weight loss, thinning of the grains, and deterioration of the quality of the bread.

Phosphorus - accelerates the work of the root system of the plant; intensifies the work of the branch and flower; affects early flowering and fruiting; improves cold resistance and energy supply. When phosphorus is deficient, the growth of the plant slows down, the yield decreases, and reddish-purple color appears on the leaves.

Potassium - increases the plant's resistance to cold, regulates energy supply, helps the wheat not to fall, does not fall asleep; increases the resistance to strong growth of the cotton root, drought; It promotes the growth of starch, protein in the grain, improves the quality of the product, and increases the resistance of crops to diseases. When potassium is deficient, proteins accumulate, slowing down carbohydrates, slowing growth, degrading grain quality, leading to graying of the leaves and the appearance of rust spots on them.

Magnesium - promotes the formation of chlorophyll on the leaves of the plant, has a positive effect on the acceleration of the work of photosynthesis, increase in productivity, activates enzymes, and helps in the absence of chlorosis.

Manganese - promotes the normal accumulation and growth of the plant by influencing the accumulation of sugar in the plant and its action.

Boron - increases crop yields, increases plant resistance to fungal diseases, and drought tolerance.

In view of the above, it is very important to feed the crop regularly with minerals and micronutrients to get a high yield of winter wheat. In particular, the supply of nutrients to the crop in the required amount of nutrients during the winter wheat harvest is at the heart of the future harvest.Even in the absence of nitrogen or phosphorus fertilizers during the fertilization period, the number of stalks of wheat is low, the crop lags behind in growth, and a certain part of the crop is cold in winter, resulting in reduced yields.

About 70-80% of the nitrogen accumulates in the leaves and stems of the plant until the buds germinate, and the main part of the protein in the grain is converted to nitrogen due to the accumulated nitrogen.

1. RULES OF BASIC FEEDING OF COTTON AND WINTER WHEAT WITH MINERAL FERTILIZERS

The amount of mineral fertilizers used to feed winter wheat depends on the amount of grain planned to be harvested from each hectare of wheat. If it is planned to harvest 30 centners of grain per hectare, the norm of nitrogen, phosphorus and potassium fertilizers should be established by the following method.

As it is known, ***cotton*** consumes an average of 50 kg of nitrogen in its pure form (in the active ingredient) to form 1 ton of cotton crop. The ratio of nutrients to nitrogen: phosphorus: potassium should be 1: 0.7: 0.3, ie 70 kilograms of phosphorus and 30 kilograms of potassium per 100 kilograms of nitrogen.

To get 30 centners per hectare from this account, 300 kilograms of nitrogen, 210 kilograms of phosphorus and 90 kilograms of potassium must be given in the form of a pure food substance (an effective substance).

It is advisable to use 70% of the annual amount of phosphorus (in the form of phosphorus) and all the annual norms of potassium (in the form of potassium chloride) before plowing.

According to agro-technical requirements, 25% of the annual norm of cotton nitrogen fertilizers is applied in the form of urea in pre-sowing soil treatment, 10% in urea-sowing and 15% in urea-growing, 3-4 when the true leaf is formed (feed 1), the rest of the nitrogen It is recommended to give 50% in the form of ammonium nitrate in the 2nd and 3rd feeding - when it begins to bud and bloom. It is recommended to use 10% of the phosphorus fertilizer residue after the fall in the pre-sowing soil treatment and 20% during the flowering period of the cotton.

Winter wheat consumes an average of 35 kilograms of nitrogen in its pure form to produce 1 ton of grain. The ratio of nitrogen, phosphorus and potassium supplied is similar to that of cotton (should be 1: 0.7: 0.3, i.e. 70 kg of nitrogen per 100 kg of nitrogen and 30 kg of potassium should be used).

To get 30 centners per hectare from this account, 210 kilograms of nitrogen, 150 kilograms of phosphorus and 65 kilograms of potassium should be given as a pure nutrient.

It is recommended to use 80% of the annual amount of phosphorus (in the form of superphosphate) and the entire annual

norm of potassium (in the form of potassium chloride) before the fall. According to agrotechnical requirements, 25% of the annual norm of nitrogen fertilizers applied to winter wheat in the form of urea in pre-sowing soil treatment, 25% in the form of urea in the pre-sowing period, and the remaining 50% in the form of ammonium nitrate 2 and 2 It is recommended to divide the 2nd feeding into the 2nd feeding until April 15 (during budding, budding), and the third feeding until May 15 (during flowering).

Fertilizers need to be fertilized without delay when they are in high demand for nutrients to ensure a high yield of cotton. According to the distribution of the above-mentioned nutrients for agrotechnical periods, it is possible to determine the annual norm of fertilizers for the planned harvest.

If 20 tonnes of lessons are given per hectare of cotton and wheat fields, it is not recommended to reduce the nitrogen norm given to these crops by 50 kg per hectare, phosphorus by 25 kg per hectare and use potassium fertilizers.

2. THE IMPORTANCE OF FEEDING COTTON AND WINTER WHEAT BY LEAVES

In addition to the main feed during the growing season, cotton and winter wheat are added to the leaf by adding urea and a suspension consisting of micronutrients such as “Mers”, “Serebra agro”, “Edagum”, “Extrasol”, “Gumat potassium” and “Oxigumat”. feeding is of great industrial importance. This method is used in areas where high levels of alkalinity (pH) of the soil are low, where there is a shortage of microelements, when plants experience signs of water, phosphorus, nitrogen, potassium, and microelements, in drought, when the soil's air supply is reduced, when pests are damaged, when pests are damaged. use is also more effective.Experiments have shown that in the basic (root) nutrition of crops, the nutrients are not fully absorbed by the plant and a certain part of the fertilizer is washed and absorbed into the lower layers of the soil. However, when supplemented with plant leaves, most of the food quickly settles into it. Thus, in addition to feeding on the leaves of the crop, fertilizer is saved, and its resistance to drought and pests is increased.

The foliar feeding method is also more suitable for use in slow-growing, unhealthy, poor, nutrient-poor, saline soils. This is because

the weak plant feeds hard on its roots. In addition, in dry, unfavorable climatic conditions, it is convenient to feed on the leaves. But feeding the crop through the leaves does not completely replace root feeding.

2.1. Brief results of research on supplementary feeding of cotton by leaf

Research on supplemental feeding of cotton leaves was carried out on the farms of the S. Rozmetov Agricultural Joint-Stock Company of S. Niyazov district of Dashoguz province.

A maternal (matochny) solution was first prepared for the study. To prepare it, 3 containers were taken, the first of which was filled with 4 kg of urea, dissolved in 20 liters of water, the second with 9 kg of superphosphate, 30 liters of water, the third with 5 kg of potassium chloride and dissolved in 20 liters of water. The solution in 3 containers was then re-prepared into a container and poured into a container of OWH sprayer and poured up to 300 liters of water to increase the total volume of the solution to 1 hectare. When cotton is just beginning to grow, different types of juices, thrips, and carrots are damaged by sucking their juices - and therefore the crops are delayed from growing for 15-17 days.

Table 1

Rules for supplemental feeding of cotton leaves

Cotton development phases	Elements of food	Rule, kg/ha	The rule of thumb, l/ha
2-3 real leaf when releasing	urea superphosphate Potassium chloride sulphate washing remedy	3-4 8-10 2,5-3,5 8-10 0,9	300
Period of aggravation	urea suoerphosphate Potassium chloride edagum	4-6 10-12 3-4 0,4	300
Flowering period	urea superphosphate Potassium chloride edagum	8-9 12-15 4-6 0,4	300

In case of need to combat them, add a solution of yellow sulfur to the solution prepared for additional feeding from the leaves. Although yellow sulfur is fungicidal in nature, it is known for its repellent properties for absorbent pests. Therefore, it is recommended to dissolve 10–12 kg of yellow sulfur in 30 liters of water and add 900g of synthetic detergent to it to increase the adhesion of the solution *(Table 1)*. In this way, as a result of the additional feeding of the cotton leaf, it grows rapidly, the resistance of the plants to the pests is strengthened, and the thin coating formed on the surface of the leaf prevents the leaf from being damaged. This leads to a decrease in the number of pests. It was also used to increase the efficiency of the leaves of the leaves of the soluble plants, i.e., when the air temperature was lower than 25 ° in the early morning and late evening.

It has been found that the solution used in the supplementary feeding of the cotton leaf is better when the biostimulator is mixed, i.e., the growth of the neck of the plant, the opening of the branches and elements of the crop, the opening of the cocoons are 1.5-1.8 times faster.

In addition to feeding on cotton leaves, its resistance to the effects of sucking pests increases *(Table 2).*

Table 2

The effect of sucking pests on supplemental feeding of cotton leaves (an avarage of 1 root per cotton when 3 4 leaves emerge)

No	Types	Before the experience			After 10 days experience			
		aphis	**Rusty claw**	**Tobacco louse**	**aphis**	**Rusty claw**	**Tobacco louse**	**Productivity s/ha**
1.	10 kg/ha superphosphate + kg/ha urea	8,1	2,0	3,3	4,3	1,9	2,3	28,1
2.	10 g/ha superphosphate + kg/ga urea + 5 kg/ha potassium chloride 0,4 kg/ha Edagum + 12 kg/ha yellow sulfur	9,2	2,6	3,2	2,9	1,1	1,4	29,6
3.	Investigation (conventional agrophone)	6,4	2,7	3,1	10,3	4,1	5,9	26,9

Research has shown that in the cotton fields where conventional agro-technical measures are carried out, cotton juice, cardamom and tobacco lice have doubled in 10 days. In the cotton-supplemented cotton fields using superphosphate and urea, the number of absorbent pests was reduced by 1.5-2 times, and when the solution was mixed with edagum and yellow sulfur, their number was reduced by 2.5-3 times. Yields increased by 1.2- 2.7 s / ha as a result of the reduction in the effects of absorbent pests.

Experiments have been conducted to determine the effect of cotton leaf feeding on yield.

When supplemented with 2,500 m^2 of tested cotton with superphosphate + urea, its yield was 44.3 kg in the 1st set, 4.5 kg in the 2nd set, 10.5 kg in the 3rd set and 59.3 in total. kg or 2.4 s / ha more were harvested (Table 3).

Table 3

Yield of the tested cotton field, s / ha

No	Types	Test area, m^2	The resultes of collection, kg			result, kg	productivity, s/ha
			first	second	third		
1.	10 kg/ha superphosphate + 8 kg/ha urea	2500	264,5	240,2	181,7	686,7	27,4
2.	10 kg/ha superphosphate + 8 kg/ha urea + 5 kg/ha potassium chloride + 400 g Edagum	2500	319,5	278,2	229,7	827,5	33,1
3.	Investigation (conventional agrophone)	2500	220,2	235,7	171,2	627,2	25,0

2.2. Results of research on supplementary feeding by winter wheat leaves

Research on additional feeding of winter wheat leaves was carried out in the Batko variety of wheat in the agricultural fields of the S.Rozmetov Agricultural Joint-Stock Company named after S. Niyazov of Dashoguz region. During the experiment, phenological observations were performed on winter wheat and the effect of supplemental feeding on the leaves was determined (Table 4).

Table 4

Results of phenological observations on winter wheat tested and yield

No	Types	Number of fruit stalks 1m	Length of spike, sm	Number of seed of spike	The weight of 1000 grain, g	productivity, s/ha
1.	kg/ha superphosphate + 7kg/ha urea	627	7,8	41	34,1	35,1
2.	4kg/ha superphosphate + 6 kg/ha urea + 3 kg/ha potassium chloride+400 g/ha Edagum	634	8,2	52	37,3	38,4
3.	Investigation (conventional agrophone)	612	7,4	35	30,5	31,7

As can be seen from the observations, as a result of the first type of experiment (7 kg / ha urea + 6 kg / ha superphosphate), the number of fruit stalks (sumps) per 1 m^2 area was 15 times higher than that in the analysis, the average length of the sumps was 0.4 cm. the number was an average of 6 grains. The weight of 1,000 grains averaged 3.6 g, and the yield increased by an average of 3.4 s / ha.

In the second type (6 kg / ha urea + 4 kg / ha superphosphate As a result of the test, + 3 kg / ha of potassium chloride + 0.4 kg / ha of Edagum), the average number of fruit stalks (sumps) per 1 m2 area was 22, that is, the average length of the sumps was 0.8 cm, and the average number of grains in the sump was 17. And the weight of 1,000 grains weighed 6.8 g, and the yield increased by an average of 6.7 s / ha.

The quality indicators of the grain harvested from the tested winter wheat fields were also determined. Wheat grains sown under the first type (7 kg / ha urea + 6 kg / ha superphosphate) were 0.7% higher in protein, 0.9% higher in gluten, and 4.6% higher in gluten.In the second type (6 kg / ha urea + 4 kg / ha superphosphate + 3 kg / ha potassium chloride + 0.4 kg / ha Edagum), the protein retention rate in the grain of wheat was 1.6% from the analysis, gluten 2, 8% and a

brightness of 6.7% were found to improve the nutritional quality of the grain *(Table 5).*

Table 5

Quality indicators of winter wheat grains supplemented by leaf (average,%)

No	Types	Protein storage	Storage of claycovinas	Shiny level
1.	urea, 7 kg/ha+ Superphosphate 6 kg/ha	14,6	29,3	63,1
2.	Urea, 6 kg/ha+ Superphosphate, 4 kg/ha+ potassium chlore, 3kg/ha+ Edagum, 0.4 kg/ha	15,5	31,2	65,2
3.	Investigation (conventional agrophone)	13,9	28,4	58,5

The results of the study show that in addition to the basic (root) feeding of cotton and winter wheat, supplementary feeding from the leaves ensures the normal growth and growth of these crops, especially in protecting them from pests, especially in terms of high quality showed.

Below is a summary of the research on the supplementary feeding of cotton and winter wheat leaves, as well as the recommendations for supplemental feeding of these crops in the production environment.

3. RULES FOR SUPPLEMENTARY FEEDING OF COTTON AND WINTER WHEAT BY LEAVES

To do this, a suspension consisting of urea and micronutrients is first prepared.

3.1. Procedure for Suspension Preparation

The procedure for preparing the suspension is as follows:

Preparation of pre-matched urea solution. 5 kg of urea is consumed per 1 ha. 5 kg of urea should be dissolved in 20 liters of water or 40 kg of urea in 160 liters of water. You should use 20 liters per 1 ha of the finished solution.

Preparation of preliminary superphosphate solution. 6 kg of superphosphate is consumed per 1 ha. 6 kg of superphosphate should be dissolved in 50 liters of water. To do this, the solution must be constantly poor, heated to 70 degrees, and its complete melting must be achieved. You should use 50 liters of solution per 1 ha of the ready solution.

Preparation of suspension. For 1 hectare of winter wheat, sprinkle 230 liters of water with 20 liters of urea solution and 50 liters of superphosphate solution and sprinkle a total of 300 liters of suspension on 1 hectare of wheat field.

3.2. Terms and procedure for using the suspension

Cotton: It is recommended to use from the time of fruiting to the time of bumping.

In winter wheat:

First time- When 4-5 green leaves are formed in wheat, 400-500 grams of any of the above 1 microfertilizers and 5-6 kilograms of urea should be dissolved in 300 liters of water per 1 hectare. Add 5-6 kg of superphosphate solution to the solution.

Second time- it is necessary to dissolve 400-500 grams of any type of micro-fertilizer per 1 ha of wheat and 7-8 kilograms of urea in 300 liters of water per 1 ha of wheat during the period of wheat germination. Add 4-5 kg of potassium chloride solution to the solution.

Third time- at the onset of wheat, 400-450 grams of 1 type of micro-fertilizer per 1 ha and 10-12 kilograms of urea should be dissolved in 300 liters of water.

It is recommended to use the above prepared solutions and suspensions with 100 liters per hectare when spraying with planes and 300 liters per hectare when spraying with surface sprayers.

Spraying the suspension. Nowadays, OWH-type sprayers are mainly used in spraying suspensions. Before spraying with wheat, you need to adjust the speed and width of the sprayer and the solution consumption. Sprayers should be properly secured and the filters clean.

Suspension should be done by spraying the plants evenly with small drops at a pressure of 2-4 atmospheres.

When adjusting the working width of the sprayer, it should be placed at a height of 0.5-1.0 meters above the ground and at an inclination of 10-12 degrees from the axis according to the height of the sowing.

In order to increase the efficiency of the spraying process, it is recommended to use the spraying equipment in an integrated way and to establish a centralized preparation of the suspension. There are 10 OWH sprayers in the districts it is considered appropriate to establish a specialized technical team and to use at least 3 suspension fillers (pumps) at the suspension manufacturing center.

3.3. Follow safety precautions during the spraying

Employees should be familiar with labor safety regulations when using a suspension solution. Suspension workers should wash their hands with soap before meals and change the clothes they use after work. Workers are prohibited from eating, drinking and smoking at work. Adolescents under the age of 18, pregnant and lactating women are prohibited from spraying.

REFERENCES

1. Türkmenistanyň Prezidentiniň “Türkmenistany durmuş-ykdysady taýdan ösdürmegiň 2011-2030-njy ýyllar üçin esasy ugurlary” Milli mak- satnamasy. – A.: Türkmen döwlet neşirýat gullugy, 2010.
2. *Rozmetow K., Söýünow O., Halymow W.* Ösümlikleri ýapragyndan goşmaça iýmitlendirmek. – Aşgabat, 2012. – 25 sah.
3. *Rozmetow K.,* Ýollybaýew A*., Ataýew Ý.* Güýzlük bugdaýy ýapra- gyndan iýmitlendirmek boýunça maslahatlar. – Daşoguz, 2014. – 6 sah.
4. *Ýollybaýew A. we başgalar*. Daşoguz welaýatynda güýzlük bug-daýyň ösdürilip ýetişdirilişi. Gallaçy daýhanlar we hünärmenler üçin ylmy-önümçilik gollanmasy. – A.: TDNG, 2015. – 39 sah.
5. *Söýünow O.* Ösümlikleri goramak. – A.: Ylym, 2011.
6. *Söýünow O., Rozmetow K.* Täzelikler önümçilige ornaşdyrylýar. //Täze oba. – Aşgabat, 2012. № 5, 26-27 sah.
7. *Şamarow S., Taýlakow N.* Ösümlikleriň fiziologiýasy. – A.: TDNG, 2006.
8. *Анисимов А.А., Камонина М.С.*Влияние внекорневых подкормок на передвижение ассимилянтов.//Агрохимия, 1966, № 5.
9. *Дудко В.* Некорневые подкормка. // Поле августа, 2012, 6 -10 стр.
10. *Мацков Ф.Ф.* Внекорневое питание растений. – Киев: Наука, 1957.
11. *Фанфараони Ф.Д., Богачев Г.С., Белоусов В.К.* Внекорневая подкормка озимых. // Земледелие, 1964, № 8.

CONTEST

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