HIGHER SCIENCE AND EDUCATION OF THE REPUBLIC OF UZBEKISTANINNOVATIONS MINISTRY

NAMANGAN ENGINEERING AND CONSTRUCTION INSTITUTE

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Farming and basics of plant science

laboratory exercises in science performance-related

STYLESHOW

Namangan-2024

The working program of the discipline was developed on the basis of the _____ curriculum of the OO`MTV, approved at the meeting of the Institute's Scientific Council No. ____ on _____.

The work program of the science was discussed at the meeting of the Department of Computer Science and Engineering on "___"_____ in 2024 and was recommended for discussion at the Faculty Council.

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The Scientific and Methodological Council of the National Institute of Medical Sciences (Minutes of the meeting No. ___) was considered and recommended for use at the meeting of the Scientific and Methodological Council of the National Institute of Medical Sciences (Registration No. _____) on “___” _____2024.

Reviewer(s):

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ENTRANCE

Village farm knowledge of the field relevant in the directions studying students of farming scientific basics and main laws, soil features and them management methods, seed planting, in exchange planting, farming system, of the soil salinity and swamping and from erosion protection in doing reclamation importance, has a vision of studying the achievements of science and advanced manufacturing to be, to use land wisely, to increase soil fertility, and to obtain good quality and high harvest to take aimed at events, of the soil salinity, swamping and to erosion meeting, of the soil reclamation status assessment and ways to improve, as well as our government's efforts to develop agriculture decisions taken and actions taken in recent years by knowledge and application of the modern farming system, its componentsand of farming general issues, of the soil salinity, swamping and erosion prevent to take and against in the fight applicable events, salty, swampy and to erosion encountered from the lands effective use on the surface knowledge and to skills has to be necessary.

In the current era, agriculture is developing more rapidly than ever before. "Farming" and "reclamation" The role of science is incomparable.

Farming science new progressive technologies working release with of the soil potential fertility to increase to walk supply if so, reclamation and science, with all its potential, is improving the quality of soil fertility and It serves to increase its effectiveness. These dual disciplines have their own unique method and styles with the whole village farm the basis of development creates.

This because, "Village" farm products storage and initial work Students in the "Technology" educational program learn the theoretical and practical aspects of these disciplines. perfect the basics knowledge necessary.

Students learn these subjects through lectures, laboratory exercises, and independent study. by completing work and going to farms in our region for internships full-fledged they learn.

"Farming" and "reclamation" sciences according to laboratory training to go related educational and methodological manual the same to the goal dedicated.

1-Laboratory work

Subject: Soil structure determination and his/her forms study

Tasks:

1. N.I.Savinov style according to soil structure to determine learn;
2. Given soil samples according to soil structure determine;
3. Posters according to structure forms learn and picture draw;
4. To practice conclusions give;
5. Report Submit.

Purpose of the work. The composition of the soil is made up of mineral elements, water and air. Water is an important part of soil, providing nutrients for plants, and air is respiration of the root system and provision of oxygen to aerobic microorganisms necessary for. Both of them depend on the natural properties of the soil. The following of the soil properties with Let's get acquainted.

The content of the work. Soil nutrients necessary for plant lifeand water source. Its structural condition affects its fertility important from factors is one.

The mechanical elements of the soil stick together and form particles of various sizes. and forms lumps (aggregates) of the shape. Its mechanical elements aggregates harvest to do property structure harvest to do feature that is called. In Soil Science of the soil structure when it is said, his/her every kind form and large soil to aggregates (into pieces) separated return feature From an agronomic point of view, it is not washed away by water, that is, only firm lumps are considered the best. Such lumps to the water resistant, from them organization find soil and solid structural soil Structureless soils are made up of small pieces of soil that easily crumble under the influence of water. structured will be.

Soils of pieces large-small looking, following to types:

- diameter 10 mmm from big pieces – slowly, slowly structural;
- diameter 0.25 mmm from 10 mmm until the pieces that are – macrostructural;
- diameter 0.01 mmm from 0.25 mmm until was pieces – rough microstructural;
- particles with a diameter of less than 0.01 mm – fine microstructured soil divided.

Cuttings measuring 1 to 3 mm are agronomically suitable for water. resistant the best small piece accepted as done.

Since the volume of capillary-free pores in a soil with a strong structure is large, All rainwater and irrigation water is absorbed and stored well. and it has much better air exchange than fine-grained soil. That's why for structural in the soil water and air enough to be because of favorable conditions are created for microorganisms to live, resulting in plant life for necessary was nutrients accumulate.

Strong structure permanent It won't happen. SHE IS following factors under the influence of: a) mechanical factors – in the fields tractors, people and animals walk, work under the influence of the working bodies of the weapons; b) physico-chemical factors - precipitation and rainwater and calcium absorbed by the humus under the influence of ammonium and hydrogen ions contained in them and magnesium leaching and a decrease in soil structural strength; under the influence of air displaced by water during irrigation, especially during flood irrigation due to the crushing of soil particles; c) biological factors - aerobic bacteria under the influence soil the pieces pasting standing humus decomposition, as a result soil small fragmentation under the influence violation possible.

Annual and perennial crops in crop rotation to restore soil structure Grasses are planted, and organic fertilizers are also applied to the soil. Structured clumps are formed to do and them reinforcement for humus layer will be updated.

Planting annuals and plowing the land with a chipping plow in the fall fields upper layer small particles structure partially will be restored. Driving The time-tested plow loosens the soil to fine particles. top layer plants The main body is anaerobically digested organic matter. decomposition on account of to the humus rich bottom of the layer soft solid lumpy soil overturned throws.

Academic KKGedroyts to the mind according to, structure harvest in being two factor: energetic developed root system soil pressure and soil thickening plays a decisive role. The thickening, freezing and Drying occurs under the influence of 2- and 3-valent cations. All of these factors soil restructure restoration and important in storage role plays.

As mentioned above, soil structure plays a role in increasing its fertility. is one of the important conditions. But it is always changing, so its dynamics following to go and disruption and recovery process order to put their ways determination necessary.

The work to perform style. Soil structure status of learning one how many methods there is, they inside NISavvinov style the most comfortable is considered.

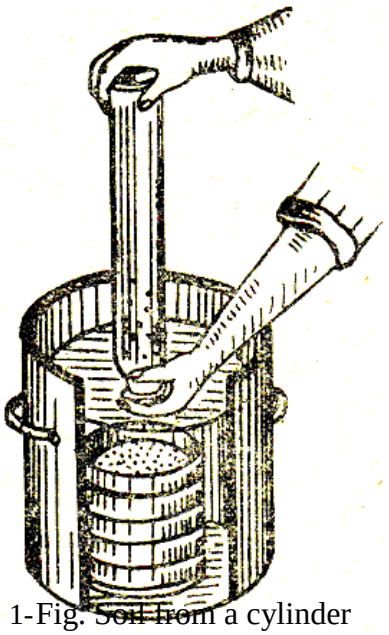
NISavvinov method. This method is named after KATimiryazev Moscow Village farm academy farming in the department working issued is, she is the soil to wash with transferable macroaggregate to the analysis based.

Soil structure status of learning this in the method:

a) verifiable from the field soil sample taken, in the air dried. Then from it 2.5 kg take, every kind eyed sieved and the following 8: larger than 10 mm; 10-5; 5-3; 3-2; 2-1; 1-0.5; 0.5-0.25 and smaller than 0.25 mm to the faction are separated. The sieves low towards powdery particles collectible diaper is placed, being eaten at the time

soil particles incited not leaving for above sidecovered with a lid;

b) ten since after every one faction on the scales



1-Fig. Soil from a cylinder To the sieve of NISavvinov transfer

separately is weighed and percent amount calculating will be released, in this 2.5 kg soil 100% thataccepted;

c) To determine the percentage of durability of aggregates weighing 50 g, the average sample is taken. This for every one through a sieve in grams expressed faction Half of the soil is removed from the bottom of the sieve. The holes of the bottom sieve are filled with To avoid this, the average sample is taken from a fraction with a diameter smaller than 0.25 mm. may not be taken (although it is taken into account when calculating the sample average). Average the sample is taken twice;

g) taken average sample water filled 1l yes to the cylinder is inserted and 10 minute This is done to prevent mechanical damage to the pieces during subsequent operations. air out return for will be done.

After 1-2 minutes, even though most of the air has been released from the soil, also, little part large in the gaps bubble in the form of preserved remains, remaining air To do this, water is poured up to the top of the cylinder and the top is covered with a covered with a mirror, quickly brought to a horizontal position, then back to a vertical position After that, the air is released from the soil in the form of small bubbles. begins;

d) 10 minutes after the soil sample is placed in the cylinder, cover it with a mirror. closing quickly will be overturned and soil large particles down until it falls This in case one how many second hold will be raised. Then cylinder own in case brought,soil his/her to the bottom sinking expected. This work 10 times repeated.

The cylinder was not sturdy when it was tilted. aggregates and diameters from 10 mm older The structure of the pieces splits into parts;

e) 5 pieces with a diameter of 20 cm, a height of 3 cm and holes of 0.25; 1; 2; 3; 5 mm in diameter The sieve is lowered one above the other into a cylindrical tub filled with water. The sieve above the water level 5-6 from the edge cm to be above necessary (Figure 1);

j) cylinder ten after being knocked over once then brought onto sieves. Under water The window opens and the soil mass falls into the upper sieve. Even distribution of soil The cylinder is pushed on the surface of the sieve without removing it from the water. The basic mass (0-25 mm) 40-50 seconds after falling on the sieve surface, the cylinder is filled with water under another window with locked and unlocked is taken;

h) The soil mass that has been sieved is sieved; for this, the upper sieve is used from water Without removing the sieves, all the sieves rise 5-6 cm and quickly fall again. They are immersed in water. They remain in this state for 2-3 hours until the pieces fall back into the sieve. second holding will be raised. Then sieves package slowly rises and quickly again The upper sieves (5, 3 and 2 mm) are removed after shaking ten times, bottom and additional accordingly again five times shaken and from water remove is taken;

i) in sieves pieces washer of the device water flow with big porcelain are washed in a bowl, after the excess water is removed, they are first pulled placed and unnamed small placed in cups;

k) The cups are placed in a water bath and after the soil has dried well, each which one are weighed separately.

In factions of solid lumps percentage amount grams number by 2 multiplication with is determined. 0.25 mmm from small was soil particles percentage

The percentage of much larger fractions is found by subtracting the sum from 100. The data obtained Table 1 writing will go.

Practical assignments. Soil structure laboratory style according to clearly structure according to the pictures provided after the study (see pages 13-14-15)forms is studied and their picture is drawn.

Necessary equipment and weapons. Soil samples, diaper and cover was, holes 10; 5; 3; 2; 1; 0.5 and 0.25 mm diameter sieves with a glass screen, 1 liter cylinder with a diameter of 7 cm and a height of 45 cm, 8 large and 9 small porcelain dishes beaker, technical scales and weighing stones, water bath, diameter 30-40 cm, height 30-35 cm container or cylindrical to the bathroom .

1-jadval

Tuproqning agregat holatini aniqlash

(natijalar yozib olinadi)

Tuproqning nomi	Namuna olingan joy	Namuna olingan vaqt	Quruq tuproqni elash uchun olingan namunaning vazni, g	Fraktsiyalarning o'lchami, mm	Quruq tuproqni elash					Ho'l tuproqni elash uchun olingan namunaning vazni, g	Ho'l tuproqni elash				
					CHinni kosachalar		Agregatli kosachaning vazni, g	Agregatlarning sof vazni, g	Agregatlaming miqdori, %		CHinni kosachalar		Agregatli kosachaning qurilgandan keyingi vazni, g	Agregatlaming qurilgandan keyingi vazni, g	Agregatlaming miqdori, %
					nomeri	vazni, g					nomeri	vazni, g			
				10 dan yirik											
				10 dan 7 gacha											
				7 dan 5 gacha											
				5 dan 3 gacha											
				3 dan 2 gacha											
				2 dan 1 gacha											
				1 dan 0,5 gacha											
				0,5 dan 0,25 gacha											
				0,25 dan kichik											

2-Laboratory work

Topic: Determining the bulk density of soil and its total porosity,phases size calculation

Tasks:

1. Style manual according to of the soil volumetric mass determination style with get acquainted;
2. Natural status intact soil from the layers samples bring;
3. Quoted in samples of the soil humidity determine;
4. Then metal cylinder inside of the soil absolute dry weight find;
5. Metal cylinder size determine;
6. Received information according to of the soil volumetric mass calculating find;
7. Then of the soil general hollow and phases size count;
8. Received the results to the table write;
9. To practice conclusions give.

Work purpose. Soil volumetric weight structure intact absolute dry soil weight his/her to the size with the ratio of is expressed.

Volumetric weight of the soil structure, structure, mechanical composition, humus storage, and its density, depending on tillage and irrigation conditions and hollow represents. Soil volumetric weight determination this layer in the soil water reserve, food elements and the air calculating find for necessary.

Method of work. a) Soil samples are taken with special metal cylinders. The volume of soil samples can range from 50 to 1000 cm ^{3}. What is the volume If it is large, the volumetric weight is determined with such accuracy. It is 10 cm tall and has a volume of 1000 cm ^{3} from cylinders used acceptable;

b) to the magazine soil layer, cylinder and aluminum the number of the glass is written;

c) The inner diameter and height of the cylinders are measured and calculated using the following formula in it of the soil size is determined;

$$V = \frac{\pi \cdot D^{2}}{4} \cdot h$$

this on the ground:

V-soil size, cm ^{3};

π -the ratio of the circumference to the diameter is 3.14 (a constant number);The inside of the D-cylinder diameter, cm;

4–permanent size;

h-cylinder internal height, cm.

g) empty cylinder and aluminum glass on the scales is weighed;

d) the cylinder is immersed in the soil in an upright position, then the soil compaction is stopped. If If the soil is dense, gently tap the cylinder with a light wooden hammer. possible;

j) simultaneously measure soil moisture and absolute dry soil inside the cylinder A sample from a layer used to determine the weight is taken.

A sample was taken to find the volumetric weight in order to determine the moisture percentage. of the place in itself or cylinder from the pull then from him sample can be obtained.

Wet earthy aluminum glass on the scales is weighed, then 105 ^{0} yes to the thermostat is placed and to a constant weight dried until it arrives;

h) from dried then earthy aluminum of the glass weight is determined;

i) The weight of the evaporated water in the beaker (a) is calculated (wet soil The weight of the cup with absolutely dry soil is subtracted from the initial weight of the cup. subtracted);

k) The moisture content of the soil sample is determined (in percent). For this on the thermostat dried earthy glass with empty glass weight It is necessary to know the absolute dry weight of the soil (b), which is determined by the difference. Then following out of proportion The percentage of moisture is determined by:

b – 100 % $$P = \frac{a \cdot 100}{b}$$

a - P

l) in the cylinder (C) is calculated (wet earthycylinder weight with empty cylinder weight difference between);

m) following out of proportion cylinder with taken in the soil of water weightis defined as:

C – 100 % $$a_1 = \frac{C \cdot P}{100}$$

a_1 – P

n) in the cylinder absolute dry of the soil weight following to the equation appropriatefound:

$$C_1 = C - a_1$$

o) this layer of the soil volumetric weight is defined as:

$$dv = \frac{C_1}{V}$$

Received information following to the table (Table 1) writing is taken.

Table 1

Soil volumetric weight determination schedule

Options	Layer, cm	Soil volume, (V), cm ^{3}	Cylinder-wet in soil g weight (C), g	Soil-of humidity percentage, r	In the cylinder absolutely dry of the soil weight (C_1), g	Soil volumetric weight $\left(d\upsilon = \frac{C_1}{V}\right)$, g/cm^3

Driving in the layer of the soil volumetric weight 1.1 from 1.5 until, expulsion and at the base of the layer it varies from 1.4 to 1.7. The arable layer soil the volumetric weight is determined several (2-3) times, because tillage, irrigation etc., it changes frequently, while the bottom of the driven layer is only once enough to determine will be.

Soil general hollow and phases size calculation

1. Soil general hollowness in the sheep formula according to is:

$$P_{um} = \left(1 - \frac{d}{D}\right) \cdot 100$$

in this

Rum - total porosity of the soil, %;d -

of the soil volumetric mass, g/cm ^{3} ;

D - your soil comparison mass, g/cm ^{3} ;

Example. Uzbekistan typical gray soils conditions for of the soil volumetric average mass 1.4 g/cm ^{3} , relative mass and 2.7 g/cm ^{3} that accepted, it without of the soil general hollowness how much will it be?

Solution.

1. Soil general hollowness following formula according to is defined as:

$$P_{um} = \left(1 - \frac{d}{D}\right) \cdot 100 = \left(1 - \frac{1.4}{2.7}\right) \cdot 100 = 48 \text{ cm}^3;$$

2. Soil hard phase following formula according to is:

$$V = \frac{d}{D} \cdot 100 = \frac{1,4}{2,7} \cdot 100 = 51.85 \ cm^3;$$

in this V – soil solid phase size, cm ^{3} ;

3. Soil liquid phase size calculation:

$$V_c = d \cdot W = 1.4 \cdot 15 = 21.0 \text{ cm}^3;$$

in this V_c - soil liquid phase size, cm ^{3} ;

W - of the soil humidity, to the weight relatively % at (e.g. 15%).

4. Soil air phase size calculation:

$$V_h = Rum \ V_c = 48\text{-}21 = 27 \text{ cm}^3;$$

in this V_h – soil air phase size, cm ^{3} .

Independent work for practical assignments

Students independent performance for of the soil volumetric mass determination 2-in the table cited information is carried out on the basis of.

Required equipment and tools: numbered cylinders and aluminum cups, woodento weave, ruler, technician scales and scales stones, dryer wardrobe.

2-jadval

Tuproqning hajmiy massasini aniqlash uchun dastlabki ma`lumotlar

Variantlar	Qatlam, sm	TSilindrning hajmi, (V), sm^3	TSilindrdagi nam tuproqning og'irligi, (S), g	Tuproq-ning namlik darajasi, (R), %	TSilindrdagi absolyut quruq tuproqning og'irligi, (S_1), g	Tuproqning hajmiy og'irligi, ($dv = \frac{C_1}{V}$), g/sm^3	Tuproqning namlik darajasini aniqlash						
							Stakanning nomeri	Bo'sh stakanning og'irligi, g	Ho'l tuproqning stankan bilan og'irligi, g	Quruq tuproqning stankan bilan og'irligi, g	Tuproqdan bug'lanib ketgan suv miqdori, g (a)	Absolyut quruq tuproq og'irligi, g (v)	Tuproqning namlik darajasi, (R)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Eskidan haydaladigan och tusli bo'z tuproq	0 – 10		811,7				1	20,1	76,2	70,0			
	10 – 20		820,1				2	20,8	74,8	68,2			
	20 – 30		870,4				3	21,6	81,6	75,4			
	30 – 40		909,2				4	20,4	88,9	81,0			
	40 – 50		914,6				5	21,1	90,7	84,3			
	50 – 60		918,5				6	19,9	92,3	86,7			
	60 – 70		921,6				7	21,8	87,9	81,5			
	70 – 80		926,1				8	21,0	83,8	76,7			
	80 – 90		931,4				9	22,4	89,7	80,8			
	90 – 100		937,0				10	21,5	90,3	82,6			
	0 – 50												
	0 – 70												
	0 – 100												

Izoh: TSilindrning hajmi quyidagi formula bo'yicha aniqlanadi: $V = \frac{\pi * D^2}{4} * h$

Bunda: V – tsilindrning hajmi, sm^3; D – tsilindrning ichki diametri, sm; h – tsilindrning balandligi, sm

3-Laboratory work

Subject: Determining the field moisture content of the soil and its total moisture contentreserve, optimal and physiological useful parts calculation

Tasks:

1. Style manual according to soil humidity determination deadlines, methods, sampling method get to know;
2. From the field soil samples bring and on the thermostat drying way withof the soil field humidity determine;
3. Soil account in the layer wet reserve count;
4. Soil humidity to the weight, to size relatively in percentage, mmm at, m^3 or in tonslearn to express;
5. portions of soil moisture reserves count;
6. Received the results to the table pour;
7. Practice for Give conclusions.

Work purpose. Soil humidity absolute dry of the soil weight or to the size relatively percent with expressed water is the amount. Humidity in the soil water knowing the reserves, irrigation and determining the timing and methods of land cultivation is determined for.

The work to perform style. Check to the method looking, of the soil humidity every kind within the period and various in depth is determined. Every kind soils and agrotechnical in funds humidity dynamics to know important importance has. This for Soil moisture is determined several times during the growth period of plants. Some in inspections of the soil humidity every one from watering before and then repetition is determined.

In the conditions of irrigated regions of Uzbekistan, every 1-2 m deep After a 10 cm layer, samples are taken at 0-10, 10-20, 20-30 cm, etc. When taking, alternate the bottom of the plowed layer with the non-ploughed layer. not to send very important. That's why for land 25 or 35 cm in depth When plowing, samples from the following layers: 0-5, 5-15, 15-25, 25-35 cm, etc. to take recommended.

There are several methods for determining soil moisture: 1) drying in a thermostat; 2) alcohol drying; 3) V.E.Kabaev method; 4) paraffin; 5) pycnometer; 6) gammascope drying; 7) KNCHijova type on the instrument fast drying; 8) carbide drying and others.

Below are some of the most commonly used methods for determining soil moisture: statement is given.

To determine moisture, a sample is taken from the soil layers with a special drill or special deep (cut) from is taken. First without drill to the ground known is inserted to a depth, to separate the soil in the cartridge from the layer below it The soil layer to be determined is turned over and carefully removed. The sample is placed in a beaker and mixed. Spoons from different parts of the beaker with average sample is taken and in advance pull placed aluminum to the glass

The soil is placed in a container and covered with a lid. The amount of soil (30-40 g) The sample should not exceed ¾ of the volume of the beaker. The sample should be taken from each designated layer. It is taken 2-3 times. The resulting sample is averaged for the entire layer being tested. humidity detection gives.

Sample soil pit (cut) from layers according to knife with cut is taken. Next affairs drill with sample received such as will be done. Water less evaporation sample for land search or taken in the evening.

The cups with soil are placed in a shady place, protected from the sun, and then in a room dried.

On the thermostat dry soil humidity determination

This for:

a) with lid numbered aluminum glasses (a) of weight is determined;

b) soil sample (b) glasses with together is weighed;

c) wet of the soil pure weight is defined as:

$$v=ba$$

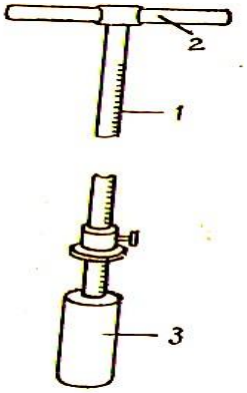
g) soil sample on the thermostat 105^{0} at temperature unchanging up to weight about 5-6 hour dried and then in a desiccator cooled;

d) absolute dry soil (g) yes of the glass weight is found;

e) absolute dry of the soil weight found:

$$d=to$$

1-picture. Thermostat



2-Fig. Soil for moisture determination sampling drill: 1-line barbell; 2nd position; 3rd cylinder

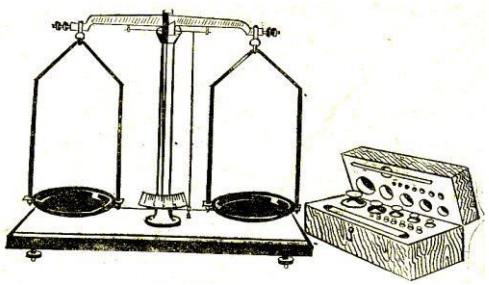


Figure 3 Technical scalesstones with

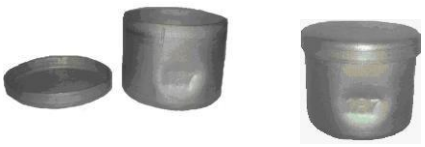


Figure 4. Aluminumglasses

j) wet soil (v) and absolute dry soil of the sample weight (d) betweendifference looking, steamed amount of water is defined as:

$$e=vd$$

h) following out of proportion soil humidity amount percent on account of is defined as:

$d - 100$ $\qquad x = \frac{e \cdot 100}{d}$

$e - x$

Received information Table 1 writing is taken.

Table 1

Soil humidity percentage determination

Sample taken place	Sample taken time	Earthenware glass-please	Sample taken layer, cm	The glass weight, g			Soil pure weight, g		Steamed of water weight, (e), g	Humidity percentage
				empty (a)	with moist soil,(b)	absolutely dry earthy, (g)	wet (v)	absolute dry (d)		

Soil general wet reserve, borderline wet capacity and optimal humidity calculation

1. Soil general wet reserve following formula according to is defined as:

$$Wow = A \cdot d \cdot h$$

in this *Wow* – of the soil general wet reserve, m ^{3} /to or to/for;

A - soil moisture in a certain layer, by weight, %;d - of the soil This in the layer volumetric mass, g/cm ^{3} ;

h – of the soil account layer, cm.

2. Soil general wet stock mm to convert following formula according to is carried out:

$$W_{mm} = \frac{A \cdot d \cdot h}{10} \quad \text{or} \quad W_{um} = A \cdot d \cdot h \cdot 0.1$$

3. Soil productive humidity following formula according to is defined as:

$$W_m = \frac{(A - k) \cdot d \cdot h}{10}$$

in this *Wm* – of the soil productive humidity, mm;

k – wither humidity, weight relatively % at.

His amount as follows found:

$$k = MG \cdot 1.34$$

in this case *MG* - maximum hygroscopicity, to the weight relatively % at, his/her amountevery kind 0.5-12% on soils until.

1.34 – coefficient

4. Soil borderline wet capacity as follows is:

$$A_{umh} = \frac{P}{d}$$

in this $Oh_{my.}$ – soil moisture capacity at the limit, in %; P_{um} - soil general hollowness, % on account.

1-example. Soil general hollowness 56 % volumetric mass 1.1 g/cm ^{3} if,its border humidity 56 : 1.1 = 50.9 % will be.

5. Soil optimal humidity to find.

Soil borderline humidity clear if, his/her optimal humidity calculationpossible:

$$Oh_{my.} = \frac{Ah,_{yes.} \cdot f}{100}$$

in this A_{op} – of the soil optimal field humidity, %

f – of the soil full wet to capacity relatively taken humidity percentage indicative coefficient (at this moisture content the soil begins to ripen) its amount f - 60 % equal to.

2-example. Soil full wet to capacity relatively his/her humidity percentage that is If the coefficient is 60%, then the optimal field moisture of the soil is the following amount: will be:

$$Oh_{my.} = \frac{Ah,_{yes.} \cdot f}{100} = \frac{50.9 \cdot 60}{100} = 30.5\%$$

Irrigation standards calculation

ABOVE of the soil humidity according to occupied to knowledge relying on crops irrigation standards can be calculated, namely:

$$m=(WV) \cdot d \cdot h+k$$

In this: m – irrigation rate, m ^{3} /to;

W – limited field wet capacity (CHDNS), to the weight relatively % on account; V– soil account in the layer irrigation took humidity, to the weight relatively % at; d – of the soil account in the layer volumetric mass, g/cm ^{3};

h - of the soil account layer, cm;

k - irrigation during to evaporate spending was water amount, his/her amount deficit (of "m") 10 % to equal.

To students practical assignments

The following information given if irrigation standard calculating find.

W=22 % H=15 %;

d=1.35 g/cm ^{3}; h=70 cm; k=10 % that is "m" of 10 % yes.

Necessary equipment and weapons: aluminum cups, earth drill, technician scales,stones, thermostat and others.

Here: V_1 - soil bulk density, in g/cm ^{3}; V – of the soil general size, cm ^{3} on account;

s- dry of the soil pure weight, g on account.

1. The tube should be placed in a water bath so that the water level in the bath is level with the soil in the glass. After the soil is saturated with water (the soil surface will be shiny) place it in a glass until the gravitational water drains completely is placed.

2. The soiled tube was weighed periodically every 10 minutes until a constant weight was reached. stand need:

$$f_1, f_2, \ldots f_n, \ g \ \textit{on account of}.$$

3. Caught remaining of water weight calculation, g on account of:

$$q = f_n - v \ g \ \textit{on account of}.$$

4. Soil dry from the weight certain (field) wet capacity what calculating release:

$$\beta = \frac{q \cdot 100}{c}$$

c - 100

q - β

5. Soil busy did from the size certain (field) wet capacity calculatingrelease:

$$\beta = \frac{q \cdot 100}{V}$$

V - 100

q - β

The following is a summary table to compare the main indicators obtained (Table 1).table) is compiled:

Table 1

Soil field wet capacity to determine related collection table

Soilname	Factions size, mmm	Soil volumetric weight, g/cm	Field wet capacity (β), %	
			By weight relatively	To size relatively

4-Laboratory work

Subject: Stranger of grass biological study of its characteristics and methods of combating it.

Tasks:

1. Style manual according to stranger of grass to farming causingstudy the harms;
2. Stranger of grass biological classification learn;
3. Stranger of grass gyerbarium samples, posters information according totheir morphological structure and biological features learn;
4. Cotton and clover inside growing weeds learn and picture draw;
5. Seeds collection according to stranger of grass seeds learn;
6. Stranger herbs into account to take and mapping methods learn;
7. Practice for Give conclusions.

Work purpose. Stranger of grass classification, types morphologicalstructure and from studying biological properties consists of.

The work to perform style. In this stranger of grass to groups division and every one to the group relative stranger of grass biological properties is studied.

Nutrition to the method looking at all stranger herbs for two: parasite and non-parasiticto groups divided.

Stranger herbs biological groups features

Parasite stranger herbs

Parasitic weeds have neither roots nor true leaves, therefore they other of plants stem and to the root without rotting take, These on account of is fed. They, mainly, from seed increases.

Stranger of the ants classification

Parasite plants		Non-parasitic plants	
Real parasites	HALF parasites	Less annuals	Many annuals
Stems	Rooted	Annuals: ephemera	Nappy roots
		spring stranger herbs:	
		a) underground	The Okilydzies
		b) evenin	Rhizomes
		g winterer	Rooted plants
Rooted		autumn	Rooted plants
		Two annuals	Onions
			Crawling growers

Real parasites

Of these all one annual to plants enters. Leaf and root It won't happen. The sedge has poorly developed, lanceolate leaves. This group includes incoming parasites almost everyone time other of plants juice on account of lives. Chlorophyll absence for all parasite in plants green color Because they live attached to plants, they are considered stem and root parasites. divided.

Stem parasites

Parasites this small to the group ivy-like plants (Cuscutaceae) to the family incoming of ivy all type These are considered quarantine weeds. They are thin stemmed and yoke to the stems divided.

1-picture. Zarpechak

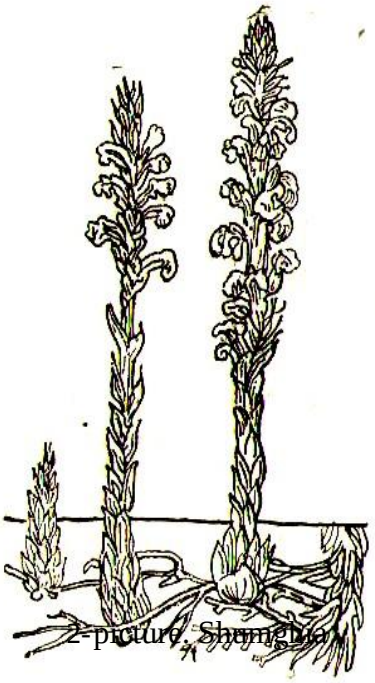
I n g I h k a p oh yes l I am a r p e h a k l a r. To Sebargadodder, small seeded dodder (Cuscuta epithymum)Moore). The most edge from the north outside everyone Same place including Medium In Asia also occurs. Alfalfa and yours trulymain stranger grass become other cultural in plants alsooccurs. Stem red, very thin, thread, indestructiblebecome pacifiers with stuck lives. Ball many floralcandle-shaped knot in the form of will be. The fruit is a pod, June-It blooms in August and ends in May. From the main light andstem from parts increases. One plant 2500 to the bottom seed finished, seed even soil on the surface fall if it remains also, 18 ^{0} at sprout comes out. Seed fertility in the soil 12-15 until the year is stored. New in the manure sprout outgoing seed many will be. From seed sprout after leaving then scallion stem every kind to plants wrapped up take, He lives without decay.

A m e r I k a oh yes l oh q she is r she is g' l I s e b a r g a z a rpe ch ag i. (C.trifolii Beyr) stem is light yellow It differs from the previous type in that it is other types also occurs.

Ciliated hemp, sesame and some stranger herbs It hurts. For now Tashkent from the Yuqori-Chirchik and Oqqu'rgan districts of the region found.

Z i g' irzarpe ch agi (C.epilimum Weihe) flax, clover, to the sea, beetroot and other crops and stranger harms the grass (Figure 1).

Y o' g o n root These are all In Uzbekistan and Medium Asia other in the countries The stem is thick, linear, red or blond in color will be. These almost tree and in the bushes parasitism does. One annual crops and stranger in the grass also



2-picture. Shamgiyo

The trees and shrubs are mainly covered with Lemann's cypress (C. Lemanni ana Bunge). occurs.

Root parasites. This includes all species of Shumgia. The most harmful of them are are: branched cannabis and tobacco Shumghiyasi (Orobanchus ramosa L.); sunflower Shumghiyasi (O. sumana Waeyer); Egypt Shumghiyasi (O. aegyptica); mute Shumghiyasi (O. muteli); clover Shumghiyasi that is yellow Shumghia (O. lutea).

In Uzbekistan Shumgyin two type: sunflower and Egypt Shumghiyasioccurs.

K she is n g a b oh q a r sh she is m g' I yes s I – Orobanche Friday Waeyer Friends of Shumghi (Orobanchaceae) to the family enters. SHE IS Medium In Asia, NORTH In the Caucasus spread. Basically sunflower at the root, rarely tomato, tobacco, cannabis, mockery and watermelon in crops parasitism does. Stranger from grass Wormwood andin the closet more occurs (Figure 2).

The stem is simple, unbranched, glabrous, glabrous, thickened at the bottom, tall It grows up to 25 cm. It blooms and bears fruit in the second half of summer. Almost It reproduces by seeds. One bush plant produces up to 60-150 thousand seeds. The seeds are very small will be. In the wind easy spreads. Soil reaction (pH) depending on sprout comes out. Crops from the root separated outgoing substance Shumghia of the seed sprout for output comfortable known to have been creates a soil reaction.

M I s r sh she is m g' i yes s I (Orobanchus aegyptiaca Russian) tomato, eggplant, potatoes, melons, watermelons, cucumbers, sunflowers, cabbage, mustard, peanuts, sesame and It damages the hardy sedge. Among the weeds: cowslip, black sedge, cowslip and harms others.

The Shumghias all type quarantine stranger herbs in line enters.

Half parasite stranger herbs

These In Uzbekistan Medium Asia other in the republics not spread.

Non-parasitic stranger herbs

Stranger herbs this of the group types very many. They of all green organswill be and independent lives.

Non-parasitic stranger herbs two big to the group: less annual and many annual to the grassdivided.

Less annual stranger herbs- whole in life one times harvest finished and of life long to the brevity looking, one annual and two-year stranger to the grass divided.

Against the most important weeds growing between cotton and alfalfaagrotechnical struggle measures features

One annual stranger herbs

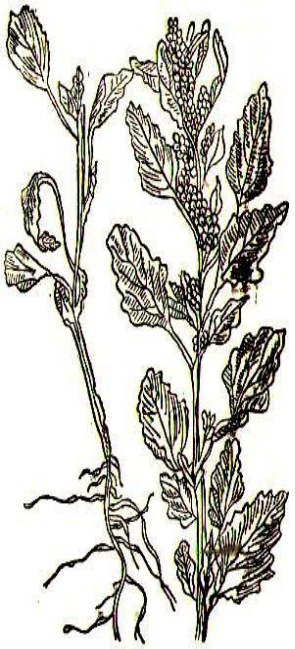
Annual weeds differ from perennial weeds in that they reproduce only from seed. Plants grown from seeds produce vegetative and generative organs. does. Harvest from the end and harvest from ripe then perish will be. Soil (land)from annual weed seeds spilled on the surface or mixed with the seed year new plants growing comes out. One annual stranger of grass root system often expulsion in the layer (25-30 cm) will be placed and easy It is being pulled. If they

harvest until the end from the fields if lost, one annual stranger from grass much easy get rid of possible. They very productivity with difference does. Their in the soil The collected seed retains its viability for a long time and gradually ripens over several years. germinates slowly. Therefore, the seed reserves of these weeds in the soil It is necessary to fight against them regularly. To do this, they must be removed before the seeds ripen. from the fields infection necessary.

Ephemerals and ground-covering annual weeds are extremely abundant among alfalfa. can grow. Grow between the first year and the seed alfalfa, until the first harvest or seed clover collecting until it is done seed ripening, the ground to bankrupt will be able to.

The seeds of the aforementioned weeds remain dormant for a long time. and does not sprout immediately after ripening. The second and later stages of alfalfa the next harvest will not be contaminated with winter-spring annual weeds. This weed herbs seed late in the fall sprout comes out winter-spring one annual stranger herbs infection for old footless first times April end May at the beginning reap It is necessary to remove. At this time, most of the weeds have not yet germinated. Cotton is not found among other crops that are harvested because it is It is easily damaged during tillage and cultivation. Bedapoya winter- Quail should be moved to fields that are free of weeds in the spring to keep them free from weeds. It should be planted after cotton. Weed out the beds where weeds have grown too much. to do, and in old pastures to clear the fields of weeds and sow grass Spring harrowing helps create conditions for good growth big importance has.

White dog, my name, sheep's thorn, semi-finished product, to build, salt (3- picture) and others like late spring one annual stranger herbs It grows abundantly among cotton and alfalfa. Among the ephemerals and the ground spring one annual stranger from grass difference so, their lawn later,appears almost at the same time as the cotton grasses. This alien Grasses need the topsoil to be moist. They need favorable conditions are created between crops, because during the growing season, crops regular watered will be raised. Evening spring one annual stranger of grass most cotton from the lawn second until cultivation It is especially harmful during the period when the grass is The soil should be tilled as soon as it appears. Till the soil in a timely manner processing to give as a result stranger of grass sprout came out everyone The seed dies. Grass grows from the seeds in the soil. of being prevent to take for, of cotton all growth period Cultivation between rows after each irrigation during stranger herbs harvest way to the end not to put necessary.



3-picture. Shura (alabauta **)**

Alfalfa between late spring one annual stranger herbs ownon time mowing with increase and damage prevent to take possible. During the period between harvests (the fourth or fifth harvest, which is about a month) (weeds) do not have time to germinate and die before the crop is harvested. Alfalfa sparse to grow road not to put important importance has, because in this stranger herbs

development for comfortable conditions to the body is coming. Some one agrotechnical eventscurrent reach way with field wormwood (garlic) can be reduced.

This for:

1. Cotton-alfalfa in exchange in planting crops correct turn.
2. Alfalfa thickness normal storage.
3. Gullay when starting quail own on time reap to take.

The thorn bush to fertilization road not to put for quail low to mow.

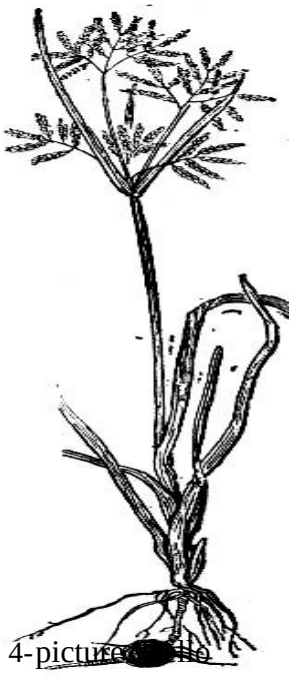
4. Quail cars with from below to harvest and herbicides effective to use opportunity create for the purpose clover planting for separated the fields to level well.

5. Footless If it is heavily and completely contaminated with mold, it is infected. plow the land and get rid of these weeds planting non-pest-resistant crops (e.g., grain) necessary.

Rooted many annual stranger herbs

Gumay rhizome fast growth with separated stands. This from the rootstock new Plants emerge easily. Grasses that grow from seeds emerge with shoots (stems). After two months, the young rhizomes will be 20-30 cm long. It goes deep. The mother of Gumay Taking this feature into account, the rhizome is formed to mow his lawn until he necessary.

With a stubbleless plow that cuts through the weeds in the fields Loosen to a depth of 20 cm and remove the rhizomes clean thoroughly necessary, then field lengthwise and crosswise two one-sided It is being plowed. When it rains land to the surface out remaining rhizomes rake taken, field outside remove is thrown, then the ground is plowed deeply. Coming to the surface of the earth the remaining rhizomes will completely die (dry out) by spring. The earth possible as much as possible deeper cultivation and soften,The rhizomes must be collected. Watered at the time water gathered (ring (be) remaining low in places sly especially good grows. This because of the fields leveling important is important.



4-picture

Q a m I sh rhizome other stranger to the grass than It is lost in a different way. It is swampy and extremely wet places wants. His rhizome 2 m and from it also in the pit will be placed. They every how from the depths easy growingcomes out and this with them against the fight makes it difficult.

To the reed against struggle measures of the following consists of. Reed many grown up The fields are plowed clean the next day, then, without irrigation, twice The soil is ploughed deep. Then cultivation is carried out with tools with sharp cutting parts. It is plowed as deep as possible in the fall, and then plowed again in the early spring. driven, stranger herbs rhizome land to the surface shaking release for heavy harrowed. After all types of processing then the rhizome is harvested and removed from the field. After the crop is planted and the field is developed, of course, estates through irrigated. From the estates irrigation in general suppress to irrigate

relatively size waters level less raises. From this except, row between If the soil is regularly tilled, the roots will not grow. Here too, the field good flattened to be, lows not to be very important, because such in the lowlands water has accumulated, reed can grow.

S alomalaikum vegetative organs (the organs from which new plants are formed) most of the nodes) (40-70%) of the land is located in the arable layer Therefore, the deeper the soil is plowed and the less it is left fallow, The nodes are so many perish will be.

Wrestling measures: remember irrigation, the fields well leveling, deep cultivation, winter cereals and alfalfa from planting consists of (Figure 4).

A jri q. The rhizome of this weed is mainly arable It is placed in the upper layer (20-22 cm). This is done during plowing and subsequent shaking processing in giving grass perish to do Relieves (5- picture).

5-picture. Ajrik

Rhizomes completely with digging to take necessary, because their small pieces left in the field under irrigated conditionsliving to remain and from them new plants growing output This weed is very common. in the fields gone by of summer dry in the months the ground rhizomes located in depth driving and It is recommended to harrow and till. In late autumn, it is necessary to do a deep autumn plowing. Heavy storms with two times – in the fall and in the spring – field lengthwise and crosswise It is being plowed. From harrowing
except, stranger herbs at hand uprooted, from the field outside remove
throw also good result gives. Remember irrigation and from it then from cultivation except, in the plow deep driving also stranger herbs of loss the most effective from the means one is considered. Fields rememberwhen watering row between processing to give rhizomes free to grow In partial shade, therefore, thick sowing of cereals and alfalfa this stranger to the grass against the most of the struggle good tool is considered.

Root bachkili many annual stranger herbs

The characteristic of this biological group is that they have a deep enter growing arrow root land on the face close in part budding side roots settles, this fresh from the roots little boy is formed.

What is the name of the place? The root is thin, penetrating 2-3 m deep. Out of your mind soil to the surface parallel without side roots comes out. Of them new When the roots are deep, only those that reach the surface of the earth When the roots are cut, the ivy will produce many new shoots. The depth of the root cut also plays a big role. How many roots The deeper the cut, the less the bark will be produced, and vice versa, the more shallow the cut, little boy That's all. many harvest will be.

Control measures: deep plowing, loosening the soil in spring and before planting. to thoroughly harvest and remove them from the field consists of.

To slow down the growth of ivy and to destroy it, deepen the rows Cultivation and dense planting of alfalfa and grain crops are of great importance. Irrigations with row between processing to give between time stretching not leaving need, because such under the circumstances stranger herbs very outbreak take growing It can be done.

A branched, lateral root system that grows to a depth of 7-22 cm. Unlike other root crops, it reproduces very quickly vegetatively. The earth to the surface close located side roots bent in place from buds new plants are formed. When the soil is plowed, especially many vats are formed, because at the roots The shoots are healthy. remains.

Effective measures to combat the fungus include: deep plowing of the soil, spring This includes planting grain in the fall and planting alfalfa in fields where weeds have grown. In Okuchnik land to take and between the lines with a cultivator deep work cockroach This helps to remove the lateral roots where the shoots are located. In all types of processing, the roots are collected and burned. Alfalfa and other crops lawn very thick become when it comes out also cockroach shaded, squeeze Sometimes it is an experiment to burn the stems of plants left in the garden. being seen, in this stranger of grass whole land above part seed with together is lost. Grain crops own on time grass to do required.

The red one has a root system that grows to a depth of 3-5 m. Main At a depth of 20-30 cm from the root, lateral roots branch out, from which new shoots are formed. After the above-ground organs die, the following year they will be in the soil itself. located at the roots buds grow begins. Vertical roots cut from the place also new shoots appearance will be, from them new guys is formed.

To licorice against in the fight the ground 25-30 cm in depth driving big important, in which the roots located in the 20-30 cm layer of soil are cut, The rows are dug as deep as possible and the harvested roots from the field outside remove throw necessary.

The YA ntoq has a root system that penetrates to a depth of 3-5 m. YAn roots located at a depth of at least 50 cm. Every year the above-ground part dies and the next from the shoots formed in the root neck in the years, mainly when the soil is plowed new bachkis appear. The deeper the soil is plowed, the fewer bachkis. growing comes out. English the remains burning send recommendation is being corn and shadowy other when plants are planted he is very squeezed grows.

It has a root system similar to all rhizomatous weeds, side roots was main you are reading expulsion layer under will be placed. NEW boys side at the roots harvest was from buds, more and soil to the surface close (22-28 cm until in between) located vertical roots harvest will be.

Wrestling measures: little without leaving (28-30) cm up to), deep driving, Also, of clover thick lawns with squeeze from putting consists of. Autumn and spring grain crops grass to do acceptable. Crops planted the fields stranger from grass well cleaning for agrotechnical struggle measures with together, chemical from measures also use necessary.

Methods for counting and mapping weeds Crops stranger grass let's go level into account to take

Weeds differ greatly in their biological properties and degree of damage. To successfully combat them, it is important to choose the right crops.at the level (many or little) has grown to take into account necessary.

Stranger grass pressure level two in stages is determined. First of all this The type of weeds on the plot, and then their quantitative composition, are determined. Weeds herbs existence two in the method: approximately and clear is determined.

Practical assignments

Task 1. Stranger grass the pressure estimate method with into account to take technique.

Stranger herbs number into account to take very easy and comfortable, this for AIMaltsev four ball from the scale used:

I score - any to the type incoming stranger herbs one by one occurs (all of grass 5% up to);

II score - stranger herbs less (all herbs) 5 from 25 % up to);

III score - weeds are more than 25% of the total grass, but are not cultivated from plants little;

IV score - stranger herbs are cultivated from plants many.

The results of the observations are recorded in a weed inventory and are updated everyprovides complete details about the agricultural practices carried out in a field. From this then diagonally across the allocated area walks and all the strangers he meets herbs and just now sprouted lawn to the register writing is taken, stranger burn every encounter a kind and is marked with the appropriate score. Then above According to the scale provided, a score is given for the extent to which the entire area is covered by weeds. is placed.

Stranger grass pressure all in exchange planting in the fields is determined. If The agronomic practices of a crop rotation field are the same and the same crop is planted there. if, stranger herbs into account to take for one record is being compiled. If this If the field is occupied by several crops or different agricultural techniques are used, then to be compiled records number crops of the type to the number appropriate will be. Stranger To verify the accuracy of determining the species composition of herbs, we used a variety of flowering plants. gyberarii (2-3 pieces of each species), including the field name and foreignname of the herb is displayed.

Observation on time field under the circumstances determination difficult was stranger herbs also In this case, they are included in the register and the gyberbari is written with a number, then clearly since then shown number designated name with replaced. A complete understanding of the level of weed infestation in the fields. So much yieldin order to his/her The layering is determined.

First (lower) tier low tall stranger grass, die height crops your neckFrom 1/4 part does not increase.

Second (medium) tier height crops stem your neck half more equalor are they equal was stranger herbs.

Third (high) tier height crops from the side high was stranger herbs.

Stranger herbs into account to take register

Region……

District…….

Farmer association …….

Farmer farm…….

In exchange planting……

In exchange to plant current to do and mastery time……..

Field number…….

Crop……..

Whole field size, to on account of……....

Pollution into account removable field (to on account)……..

Relief……..

Soil type, mechanic composition……..

From observation before next two year inside planted crops…….

The earth autumn Plowing system……

The earth crop from planting before work system…….…….....

The composition, quantity and application of fertilizers used in the last two years have been deadlines……..

To the ground fertilizer to put method and burial depth……

Crop planting (seeds planting time, method and burial depth)…..

Seed material (source, germination percentage, purity percentage, weeds)with seed contamination, type composition is displayed).

Cultural of the plant observation at the time development phase and height (cm).Field the time at which the contamination was detected and field number.

Table 1

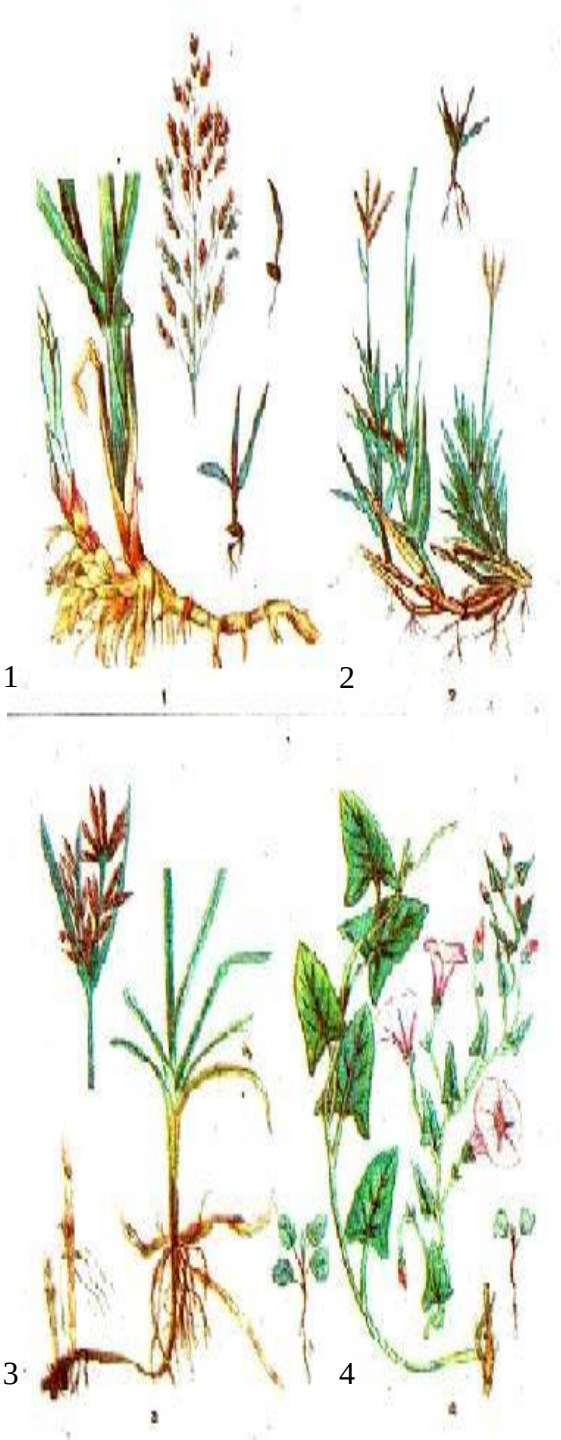
Stranger of grass observation at the time characteristics

Stranger burn name	Biological group	Height, cm	Layering	Development phase	Score

Square (crop) of contamination general Bali. Russianness crop flowering duringor him/her collecting from taking before is determined.

Task 2. Cotton in the fields widespread one annual and many annual stranger of grass(Figures 6-7) morphological structure learn and Draw a picture.

6-**Fig. A common pest in cotton fields annual stranger herbs.** 1-curly; Dog 2 guest; 3rd place bush; 4th wild gultajiro'roz.



7-**picture. Cotton in the fields many occurring many annual stranger herbs.** 1-gumay; 2nd division; 3-Hello; 4-Ivy.

Equipment and weapons *:* stranger herbs gyerbary, stranger herbs of the seed collection, this in the zone applicable herbicides collection, heavy solutions, filter paper, cups, spatula, magnifying glass, every kind rocky scales.

5-Laboratory work

Subject: In the soil water and salt amounts determination.

Tasks:

1. Based on the information provided, calculate the water and salt content of the soil.determine;
2. Received to the results according to salty wash standards mark;
3. Other agro-ameliorative events also mark.

Objective: To determine the amount of water and salt in the soil. reclamation to evaluate and salty washing rate from marking consists of.

Method of work. The amount of water in the soil depends on the mechanical composition of the soil and depends on its adsorption properties. The amount of salt and water in the soil determination, soil bulk density, moisture, salt content and calculated layer It is necessary to obtain information on the thickness. To determine the amount of water and salt, 1The weight of soil with a volume mass d of layer thickness h in the area is given by: expression through we calculate:

$$B = F \cdot h \cdot d$$

here

B-soil weight, to/for;
The area of F-1 is 10,000 ^{m2} ;h-
calculus layer thickness, m;
d-soil volumetric mass, t/m ^{3} .

If accounting layer 10 cm, soil volumetric mass 1.30 t/m ^{3} maybe 1 to on the field soil weight to the following equal to:

$$B = F \cdot h \cdot d = 10000 \cdot 0.1 \cdot 1.30 = 1300 \text{ t/ha.}$$

the weight of soil with a density of 1.30 t/m3 and a thickness of 10 cm $^{is\ 1}$ is 1300 tons per hectare. If 19.6% of it is humidity organization if so, 1 hectare amount of water W $_{c}$ to the following equal to:

1300 - 100%
W $_{c}$ - 19.6%

$$Toilet = \frac{1300 \cdot 19,6}{100} = \text{ t/ha or } 254.8 \text{ m}^3 \text{ to because}$$
$$254.8$$

1 m ^{3} water 1 ton to the weight has. Above calculations expression to the stateif we bring, we get the following:

$$Wc = \frac{B \cdot \lambda}{100} = \frac{F \cdot h \cdot d \cdot \lambda}{100} = \frac{10000 \cdot h \cdot d \cdot \lambda}{100} = 100 \cdot h \cdot d \cdot \lambda$$

here

W_c - the amount of water in the soil, m^3 /ha;d-soil volumetric mass, t/m^3;
λ-soil humidity, %.

Soil in the content salt amount Wt also exactly So expression usingis defined as:

$$Wt = 100 \cdot h \cdot d \cdot s$$

here

W_t - the amount of salt in the soil, t/ha;
s- soil in the content salt amount, %.
If the salt content of the soil is 0.85%, then in 1 hectare of landWt =

$100 \cdot 0.1 \cdot 1.30 \cdot 0.85=11.05$ ton salt would be That's it.

To students practical assignments

1 and In Tables 2 information according to in the soil salt and water amountscount and to the ground reclamation from the point of view price give.

1-table

In the soil salt and water amounts to determine circle information

Soil layers, cm	**Soil volumetric mass, t/m^3**	**Quantities, by weight relatively, %**		**Quantities, t/ha**	
		humidity	**salts**	**water**	**salt**
0-10	1.30	14.6	0.86		
10-20	1.38	20.4	0.62		
20-30	1.35	21.3	0.54		
50-100	1.39	21.8	0.62		
100-200	1.40	22.8	0.00		
0-100	1.42	23.4	0.76		
0-200	1.38	21.7	0.70		
	1.40	22.6	0.73		

2-table

In the soil salt and water amounts to determine circle information

Square number	Soil layers, cm	Soil volumetric mass, t/m ^{3}	Quantities, by weight relatively, %		Quantities, t/ha	
			humidity	salts	water	salt
Salted meadow soils						
1	0-10	1.35	18.3	1.12		
	10-20	1.40	19.6	0.82		
	20-30	1.42	20.1	1.02		
	30-50	1.45	19.2	1.21		
	50-70	1.41	19.6	0.96		
	70-100	1.40	18.8	1.10		
	0-100	1.41	19.2	1.06		
Salted gray soils						
2	0-10	1.42	19.6	0.62		
	10-30	1.46	20.4	0.81		
	30-50	1.38	21.2	0.92		
	50-100	1.36	20.9	0.75		
	100-200	1.42	22.6	1.04		
	0-100	1.42	20.8	0.83		
	0-200	1.41	21.7	0.94		
Salted hungry colorful gray soils						
3	0-10	1.36	20.6	0.72		
	10-20	1.40	21.4	0.91		
	20-30	1.42	21.9	0.85		
	30-50	1.39	22.2	0.91		
	50-100	1.38	23.6	1.14		
	100-200	1.41	21.8	0.93		
	0-100	1.40	20.8	0.86		
	0-200	1.44	22.7	0.94		

Necessary materials, equipment.

1. Style instructions – 15 piece;
2. Calculator – 15 piece;
3. Salt wash standards about information.

6-Laboratory work

Subject: Designing crop rotation and its rotation schedulesto compose study

Tasks:

1. Style manual according to in exchange planting soil fertility in progress importance, his/her scheme, rotation, his/her tables about Concepts take;
2. In exchange to plant application, him/her mastery about Concepts learn;
3. In exchange to plant design for how work to perform necessary learn;
4. Crop fields structure with get acquainted;
5. In cotton farming applicable in exchange planting schemes with get acquainted;
6. In cotton farming applicable in exchange plantings rotational tableslearn;
7. Someone – one farmer farm in the example of cotton – clover – grain – vegetable cropscrop rotation learn to design;
8. Received results according to own your conclusion give.

The purpose of the work. To improve the quality of crops and soil fertility, productivity increase provider system with related without of the farm perspective to the plan appropriate year after year and in the fields correct alternately planting in exchange planting that is called. In exchange planting agrotechnical importance of the soil water-natural and chemical properties from improving, from moisture and in the soil food from substances rational use, stranger grass, plant conditions to better combat pests, diseases, etc. from creating consists of.

The essence of crop rotation. Different crops leave different amounts of root residue in the soil. and nitrogen, affecting soil fertility in various ways. Mowing perennial grasses from taken then in the soil many in quantity (per hectare) 10-11 t up to) organic Alfalfa leaves a reserve of nutrients. When it is left in the ground for 2-3 years, it enriches the soil with 300-500 kg per hectare. Alfalfa enriches the soil with nitrogen. As a result of growing alfalfa in the same field for three consecutive years, Up to 800 kg of nitrogen per hectare accumulates in the soil (if it is from alfalfa hay fed to cattle). taken manure through nitrogen application to the field into account (if taken).

The accumulation of large amounts of organic residues in the soil when perennial grasses are planted as a result structural to recovery and of the soil water natural properties (of the soil) hollowness, water conductivity, wet capacity and others) to improve help giving humus (humus) the amount increases.

In monoculture, when only one-year-old crops are grown in the same field, many in cases of the soil natural chemical properties getting worse, she is weakened remains.

From this except, clover salty of lands reclamation status improves, size It is a kind of biological drainage that helps lower the water level. Very thick planted barefoot land on the surface water evaporation, therefore, land on the surface

Salt deposition is also reduced. In areas subject to wind and water erosion, alfalfaand other herbs are one of the reliable methods for combating erosion processes is considered.

May it be so. despite, cotton sowable in the districts only one clover with developing livestock farming providing It won't happen. Also, corn, salty and planting corn on the fields necessary.

Uzbekistan under the circumstances autumn intermediate crops peach, autumn rye, to the cold from autumn-winter and early spring to grow resistant peas and others can be used.

Alfalfa and corn are replaced by peas, cowpeas, peas, mung beans, wild peas, winter barley and rye with quail corn cob with together and dense planting method is applied.

Also, alfalfa can be used as a cover crop mixed with oats or barley. is planted.

Method of work. Production purpose and soil fertility restoration There are several crop rotation schemes according to the method. According to the purpose of the farm field, fodder, vegetable and special crop rotation difference will be done.

Crop rotation aimed at restoring soil fertility: crop and row spacing workable crops in exchange planting Plow in exchange planting, Plow and inter-row crop rotation, green manure crop rotation planting, grass and row between workable crops in exchange planting, grass field andThe garden is divided into crop rotations. In addition, rotations for a specific purpose According to the cropping pattern, cotton-alfalfa rotation, cotton-corn rotation, hemp-alfalfa crop rotation, grain crops in exchange planting, vegetable and grain crops crop rotation scheme will be, etc.

In crop rotation, a certain number of fields (8, 9, 10, 12, etc.) and crops There will be a fixed order of planting in rotation. For example, a ten-field rotation When sowing is used, the area planted with the crop is divided into ten equal parts. This crop Depending on the area allocated for it, it can cover one or more fields or a part of a field. to occupy part possible.

A field of crop rotation where several different crops are grown term (collective) field It is called. The composition of the field, as far as possible, depends on the soil conditions, land cultivation to the feeding system and the requirements for their care, as well as the soil Crops that are similar in many ways are selected based on their impact on fertility. The following fields should be established depending on the above requirements: can be: 1) wide rows of cultivated fields, which are ploughed; 2) fields planted with winter crops (wheat, barley, and rye); 3) spring crops fields where spring grain crops (wheat, barley, oats) are sown; 4) lalmikor Under normal conditions, annual grasses and inter-row tillable ground crops can be cultivated with a plow. busy was one can be planted in the field.

In crop rotation, crops planted the previous year before a particular crop are important. importance has. Them care in doing agrotechnical measures (the earth) work, fertilization, the crop care to do and etc.) then planted of the crop growth, development and to productivity positive impact will reach. That's why for this It is necessary to know several years of information about crop composition and agricultural techniques. In exchange to plant every how from the crop starting to take turns planning possible,

However, in irrigated areas, alfalfa is often planted, and in dry conditions, From the plow begins.

Crop rotation involves growing crops in succession for a certain period of time in each field. crop rotation with Usually, the number of fields in crop rotation is corresponds to the number of years of rotation. By years and fields during one rotation crop rotation schedule is called a table. In crop rotation, instead of the name of the crop, the group of plants that are included in it is used, for example, autumn, spring grain crops and other crops can be shown, these crops list of groups and their rotations ok scheme that is called.

Crops can be rotated annually or every few years. For example, cotton in exchange in planting one to the field chronic 6-9 until the year cotton is planted.

In exchange to plant design

The introduction of crop rotation consists of two periods: the application and the adoption period. consists of.

Apple juice what is it? q o' lla sh - to draw up a crop rotation project and implement it actually relocation, that is land to compose their work from doing consists of.

Apple juice what is it? o' zla sh tiri sh – determine the crops and take turns consists of a gradual transition to planting. To master crop rotation, a mobile plan is being compiled. This for 2-3 years, sometimes it takes more time is being done.

In exchange to plant design for following work to perform necessary:

a) land and water into account is taken, all from the lands productive use plan is determined;

b) farmer farms perspective in the plan in sight caught various village agricultural products the volume of cultivation is determined;

c) the productivity of the crops intended for rotation is calculated and So according to necessary in quantity product to take for crop fields is determined;

g) the demand for fodder for livestock is calculated, fodder crops for crop of the fields productivity, big or small is determined;

d) Depending on the size and division of the farm land each, depending on the number of crop rotations and soil-hydrological conditions The structure of crop fields for crop rotation is determined; one on the farm how many one different or diverse in exchange planting it can;

e) Depending on the crop rotation established on the farm, the size of the fields and number, Also, to them crops in turn planting is determined;

j) a plan for switching to crop rotation is drawn up; for this, a preliminary history of the fields, crops on duty previous of crops importance is determined;

aa) tillage, plant care, fertilization, each crop and weed, disease and pest control in crop rotation system is developed.

Crop rotation, taking into account the specialization of the farm in the conditions of Uzbekistan It is recommended to adopt the following structure of cultivated areas in the massifs: (to the table) see).

Pakhtakor on farms crop of the fields structure, %

Crops	Soils		
	high fertile and unsalted	less salty	average salty
Cotton	66.5-70.0	66-70	60-66
Alfalfa	20-22	20-22	24-28
Corn or corn	7-8	7-8	7-8
Others	3.0-3.5	3-4	3-4

Crop of the fields in the table shown to the structure appropriate below Uzbekistan cotton farming scientific research institute in the laboratory working issued and a studied crop rotation scheme with grass and inter-row tillage is given. Such in exchange in planting crops correct choice and turn with placement, Also, high at the level done increased agrotechnical The entire crop rotation process is carried out at the expense of activities (cultivation, irrigation, fertilization). High soil fertility is maintained during the rotation period. The gross yield of cotton The area of crop rotation per 100 ha increases by 10-15% and at the same time for livestock juicy and rough hay increases.

Students to do for practical assignments

The size of the fields, the number of fields and in turn of crops during planting turn determine (rotational tables compose and to the ground processing to give system working Get out.

To practice designing crop rotations, students are given concrete rotations. Crop area in hectares or as a percentage of the crop rotation area fields structure is given.

Below In tables 1-2-3-4 cited 3:7; 1:3:7; 3:4:1:3 and 1:3:1:4 in the system cotton-alfalfa-grain from crops consists of in exchange planting rotational tables learn to compose and copy the tables into a notebook.

Necessary equipment and weapons. In exchange planting rotational tables; any of the farm working release plan; drawings, colored pencils, calculator and others.

7-Laboratory work

Subject: Studying the structure of the irrigation regime for agricultural crops.

Tasks:

1. Get acquainted with the methodological manuals and learn from them the benefits of mineralized water.cotton to irrigate suitability determination methodology conscious get acquainted;
2. According to the given materials, mineralized water can be used for irrigation.determine suitability.

Objective of the work. To determine the suitability of mineralized waters for irrigating cotton. from determining consists of.

The content of the work. The quality of water depends on the amount of dissolved salts in it. related is, cotton and other crops in irrigation, his/her amount usually 3-4 g/lmore than not to be necessary.

Soil mechanic to the composition and water-physicist properties according to used of water permission attainable mineralization It's different. Light mechanic content It is advisable to irrigate soils with low mineralized water. Water suitability only of salts general to the amount related not, maybe their to the composition also For this reason, determining the suitability of waters for irrigation is based on easily soluble The amount of (harmful) salts must be taken into account. Chlorinated salts are much more harmful to cotton. is harmful, its amount should not exceed 1.0 g per 1 l of water. For plants chloride salts sulfate to salts It is more harmful than.

Irrigation for used of water in the composition chloride NaCl carbonated Na_2CO_3 and bicarbonate $NaHCO_3$ salts are common and should be given special attention. necessary.

the water contains up to 0.5 g/l of HCO3, then it is better to use them for irrigation . can be used freely, if the content of such waters is more than 0.5 g/l from use before will be improved.

Village farm crops in irrigation usable of water suitability the amounts of sodium salts NaCl, Na_2CO_3, Na_2SO_4 and gypsum $CaSO_4$ in its composition with is determined.

The work to perform style. Village farm crops irrigation for used of water suitability definition for from it chlorine ion and of salts general amounts to know necessary.

To irrigate given of water mineralization according to suitability NTMinashina offer reached following expression is calculated using.

$$\lambda_b = \frac{\upsilon \cdot (c_1 - c_2) - \delta \cdot x}{N}$$

here

λ_b - permissible mineralization of water, g/l;υ-soil moisture accounting layer for, mm;

c_1 -soil solution initial concentration, g/l;

c_2 -soil solution accounting period at the end concentration, g/l;

δ-calculus in the period size of the waters to evaporate waste to be amount, mm;

x-mineralization level of wastewater, g/l;N-

seasonal irrigation norm, mm;

Example: The following information shows the suitability of water for irrigation.define:

- accounting layer thickness h-0.8 m;
- of the soil volumetric mass d-1.3 t/m ^{3};
- of the soil borderline field wet capacity – to the weight relatively 23.4 %;
- of the soil season humidity throughout – field wet capacity 78 %;
- in the soil chlorine initial amount s_1 - 0.032 %;
- in the soil chlorine season at the end amount s_2 - 0.010 %;
- season during size of the waters evaporation – 3600 m ^{3} /ha;
- size of water chlorine ion according to mineralization X-0.30 g/l;
- seasonal irrigation norm N – 4700 m ^{3} /ha.

Solution: Initial season for of the soil accounting in the layer averagehumidity amount % at we define:

$$B = \frac{23,4 \cdot 78}{100} = 18.3\%$$

This to humidity B equal was of water size V following expression usingis defined as:

$$V=100 \cdot h \cdot d \cdot B$$

here

h-calculus layer thickness, m;

d-soil volumetric mass, t/m ^{3}.

So, V=100 · 0.8 · 1.30 · 18.3 = 1903 m ^{3} /ha or 190.3 mm. Soil average humidity and chlorine to the amount based on being studied term head and soil at the end solution concentration S_1 and S_2 what determination possible.

Soil average humidity B 18.3 % to and chlorine initial amount S_1 It is 0.032% of the dry weight of the soil, or 0.032 g of water per 18.3 g of soil. g chlorine it's true. 1l (1000g) chlorine in water amount is equal to the following.

$$C_1 = \frac{\lambda_1 \cdot 1000}{B} = \frac{0,032 \cdot 1000}{18.3} = 1,75\,\text{g/l}$$

Under study of the term at the end soil solution concentration S_2as follows will be.

$$C_2 = \frac{\lambda_1 \cdot 1000}{B} = \frac{0,010 \cdot 1000}{18.3} = 0.55\,\text{g/l}$$

S_1 and S_2 of values knew without, of the soil average in the humidity permissible chlorine content We determine the growth:

$$V \cdot C_1 - C_2 = 190.3 \cdot 1.75 - 0.55 = 228.3 \text{ g/mm}$$

During the season, the mineralization level of the spring waters is x 0.30 g/l. to evaporate m ^{3} /ha or 360 mmm as a result in the soil collectible chlorine amount $\delta \cdot x = 360 \cdot 0.30 = 108$ g/mm equal to.

The permissible increase in chlorine in the soil is 228.3 g/mm and the concentration of chlorine in the groundwater is 228.3 g/mm. from evaporation collectible amount 108 g/mm difference according to irrigated to the ground of falling chlorine borderline value can be determined:

$$228.3 - 108.0 = 120.3 \text{ g/mm}$$

This means that 120.3 g of chlorine per hectare is allowed to fall with each mm of water. Divide the result by the seasonal irrigation rate N to get the amount of water used for irrigation. mineralized chlorine ion according to to be placed amount calculation possible: that is

$$\lambda = \frac{V \cdot (c_1 - c_2) - \delta \cdot x}{N} = \frac{190.3 \cdot (1,75 - 0.55) - 108}{470} = 0,26 \text{ g/l}$$

In irrigation usable total water mineralization level road to be placed value g/l chlorine ion determined concentration according to following using a scale can be found:

1-table

Chlorine and dry residue concentration

Indicators	**Concentrations**								
Chlorine	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42
Dry residue	3.8	4.4	5.0	5.6	6.2	6.8	7.4	8.0	8.7

Since the permissible chlorine concentration in water is 0.26 g/l, The limit of total mineralization is 3.8 g/l, on the scale look.

Practical tasks. According to the information given in Table 2, irrigation permissible limits for chlorine ion and total mineralization of the supplied water concentrations count and of the waters quality improve measures mark.

2-table

The mineralization level of the water supplied for irrigation determination for information

Indicators	Quantities					
Soil accounting layer thickness yes, m	0.6	0.7	0.9	0.8	1.0	0.6
Soil volumetric mass d, t/m ^{3}	1.40	1.36	1.32	1.46	1.52	1.48
The boundary field of the soilwet capacity (CHDNS), to the weight relatively, %	24.0	23.4	22.7	24.6	21.4	22.3
Soil average humidity, (CHDNS) to relatively, %	76.0	75.0	80.0	65.0	75.0	70.0
Chlorine initial amount S_1	0.007	0.011	0.012	0.014	0.016	0.008
Season at the end in the soil chlorine amount S_2	0.030	0.036	0.032	0.042	0.053	0.038
Sizot of water evaporation, m ^{3} /ha	5600	3760	1460	1680	2280	3430
Sizot water mineralization X, g/l	0.40	0.20	0.35	0.48	0.44	0.48
Seasonal irrigation norm N, m ^{3} /ha	9000	4600	6300	7360	8600	9200

Necessary materials, equipment, equipment.

1. Style instructions – 15 piece
2. Calculator – 15 piece
3. Tables

Laboratory work

Topic 8. Main parts of sowing and transplanting machines , types and performance

Seed sowing methods. To obtain a high-quality and abundant crop, it is not enough to prepare the land to the required standard. To achieve the goal, it is necessary to sow seeds or seedlings of the crop that are suitable for the local soil and climatic conditions . This work is performed by sowing machines (seeders).

main requirements in this work :

1. Sow seeds in the field at the rate prescribed by the agronomist .
2. Spread the seeds evenly across the field .
3. The seed must be planted precisely to the depth specified by local authorities .

sows seeds in rows in a predetermined order . This order is determined by such parameters as the distance between the seed holes in the row s, the width of the adjacent rows v, and the depth of seed placement a. For high-quality sowing and subsequent high yields , the characteristics of the *seeds* being sown (germination , germination , degree *of* cleanliness from disease - causing microorganisms , almost uniform size , etc.) must meet certain requirements .

Some seeds (e.g., hairy seeds) can be coated (smoothed by coating the seed surface with a gummy substance) or dehaired to improve their germination. Seeds are calibrated (selected to be of uniform size) to facilitate seeding.

To protect the sprouted seedlings from disease, the seeds must be poisoned with chemicals or otherwise disinfected before planting .

Some seeds with very hard shells are scarified (the shells are broken open to allow moisture to enter).

The sown seeds are covered tightly with soil , otherwise , any seeds that remain in the pod may not be able to absorb moisture and may not germinate.

fertilizer is also applied to the soil at the same time as the seeds (fertilizer is applied next to or deeper into the soil to prevent the seeds from burning their roots) .

The sowing method refers to the order in which seeds are placed across the field .

Seeds are sown by sowing using agrotechnical methods suitable for local conditions or by sowing by row , furrow , strip , nest and seedbed . The difference between these methods is in the *different* designation of the distance between seeds placed in each row *s* and the row width v .

order to fully nourish each root in high yield , it is necessary to allocate the area of \ *u200b*\ u200bv that its roots should occupy . Therefore, when determining the dimensions of *\u200b \ u200bv , the* properties of the soil and the strength of the crop are taken into account . These are related to such indicators as the depth of sowing of the seed, its germination , growth energy, soil composition , moisture, and temperature .

In row sowing (Fig. 65 *) , seeds* are sown continuously in parallel rows . The row spacing is *v* = 15 cm, the seed spacing in the rows is s = *1.5* ... 2.0 cm, and the planting depth is *a* = 2...10 cm. Grains, vegetables, etc. are sown in this method . In some regions, in order to increase the number of grain seedlings , ensure that the area where the seedlings are located and fed is not rectangular (rectangular), but closer to the shape of a square, and increase productivity, grain crops are sown in rows (v = 7.5 cm , s = 3 ... 4 cm).

sow the seeds, the seeder is moved across the field and in the direction of the sun, and half of the seed is placed in each direction. In this way, the forces obtained are evenly distributed over the field (Figure 65 *)* .

The method of sowing in rows (*Figure* 65) is used in areas with increased soil erosion , when sowing seeds of grain crops on the ridges, and when sowing onions and carrots on plowed land. The distance between rows *is* 25 cm.

sow - sowing method is used to sow seeds of non -hay plants, such as rye, in pastures by spraying them with an aircraft onto a flooded area (field) .

the wide row -sowing method , the seeds are placed continuously in rows of 45 ... 90 cm wide on irrigated lands (Fig. 65 *)* . This method makes it possible to cultivate the soil between the rows of crops sown.

of planting rows in a tape (Fig. 65 *)* is used in irrigated agriculture for planting vegetables , hemp , and in some cases, seeds . Each tape consists of 2-3 rows. The number and spacing of rows in the tape and the spacing of the *tapes* are determined taking into account the *characteristics* of the crop being planted and the possibilities of cultivation . In most cases , the spacing of rows in the tape is 5, 8, 10 cm, and the spacing of the tapes is at least 60 cm.

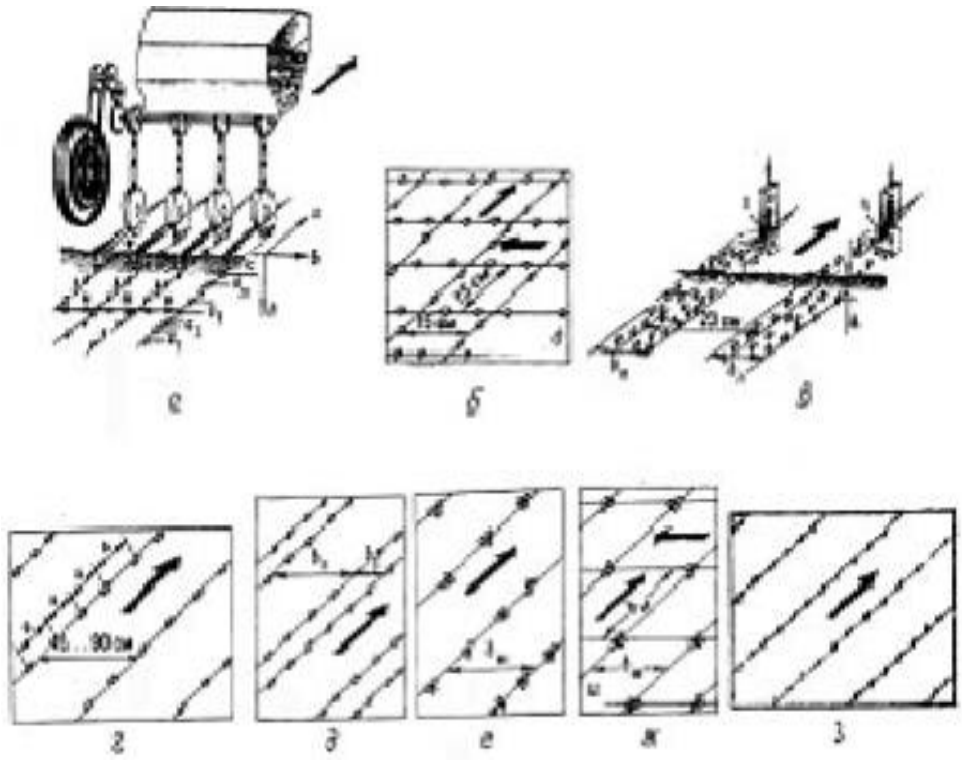


Figure 65 - Seed sowing methods

The nesting method (Fig. 65) allows you to get the planned yield with 2...3 times less seed than wide row sowing. The nests with seeds are placed in rows with a distance of *v* = 60...100 cm and are parallel to each other. The distance between the nests in the row (*s* =15...30 cm) is also selected depending on the agrotechnics of crop cultivation. This method is used to sow seeds, corn and other crops.

The square-nest sowing method (Fig. 65 - *j*) is a type of nest sowing, in which the distance between the nests in the row *is s* , and the width of the rows is *v (v* = *s* = 70…100 cm). After irrigation, the crops sown with this method (cotton, corn) are cultivated along the length and in the direction of the sun, combating weeds, and as a result, labor costs are sharply reduced.

seed sowing method (Fig. 65- *z*), the row width is *v* = 45...140 cm, and the distance between the seeds in the row (*s* = 5....20 cm) is equal to each other. This method saves seeds, reduces labor costs, and increases productivity.

The order and method of sowing seeds are selected depending on the properties of the soil . Most often, sowing seeds on leveled ground, in a furrow, in a furrow , in a *W* - shaped furrow, under a film is used . Below are the methods of sowing seeds in irrigated farming .

Sowing seeds on leveled ground is the most widespread method in irrigated farming (Fig. 66) . In this *method* , the working seeder, while moving on leveled ground, opens a furrow and throws seeds onto the ground. The harrow following the sower forms a ridge on the seeds that have been sown on the ground and covers them with soil . Then the harrow compacts the ridge by making the cross-section of the ridge triangular. The height of the triangular ridge is equal to the surface of the field.

The method of planting in the trench is used to plant seeds, corn, and other crops in saline or dryland areas (Figure 66) , because *the* salt concentration is lower at the bottom of the trench and the soil moisture is higher .

The method of sowing in a bed is used in the spring to properly use sunlight to warm the soil and to facilitate early sowing . Beds are often prepared in the fall, and seeds are sown on them using a specially equipped seeder (Figure 66-v). In some places, in order to direct sunlight directly onto the beds and to prepare the soil for planting faster , the beds are prepared by orienting them at an angle of 30° to the south (Figure 66 - *g*).

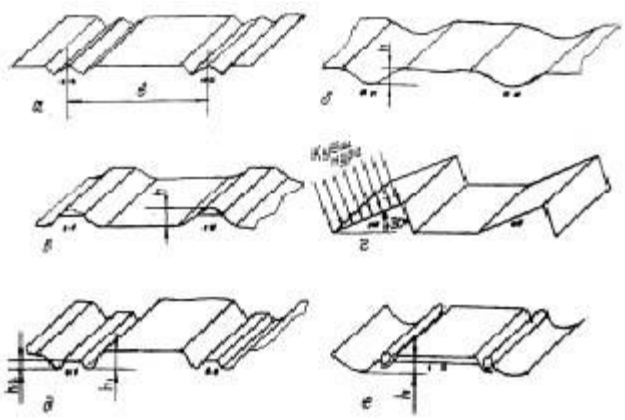


Figure 66. Sowing seeds in the ground

The W- shaped trench planting method (Figure 66 -*d*) is used in areas with strong winds and saline soils. *The W* - shaped trench has less salt in the bottom, and the mounds of soil on its sides protect the young seedlings from strong winds.

Sowing seeds under a film is very promising, because the soil in the film-covered area warms up quickly in early spring, allowing seeds to be sown 7...10 days earlier and quickly harvested in natural moisture. As a result, yields increase significantly (Figure 66).

Agrotechnical requirements. The following basic requirements are imposed on the operation of seed sowing machines. The change in the set seed rate $\pm$ should not exceed 3%. The seed should be evenly distributed over the field. The amount of seed sown in rows should not differ from each other by more than 6% when sowing cereals, 10% when sowing legumes, and 10% when sowing seeds. The damage of the sown seed to the sowing parts should be 0.2% when sowing cereals and 0.7% when sowing legumes.

Main parts of the seeder

Any seeder consists of the following parts (Figure 67): a metering unit *2* mounted on the bottom of the seed box *1* , a seeding unit *3* , a seeder *4* , and a seeding unit *5* .

The rotating metering unit *2* continuously separates the specified amount of seed from the box *1 and* throws it into the seed conveyor *3 , through which it reaches the seeder. The seeder 4* breaks the soil, prepares a furrow, compacts its bottom and places the seed falling there at the required depth, partially compacting it with the soil. The compactors (drag chains, shovels, etc.) mounted behind the seeder completely compact the seed with the soil and partially compact it.

Classification of seed drills. Depending on the type of crop, seed drills of different types are used to sow seeds of cereals, grains, corn , beets, vegetables, melons, and other crops .

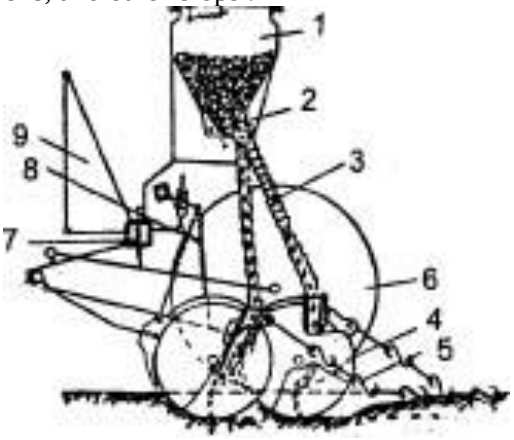


Figure 67. General structure of the seeder.

Among them there are special types that sow only one type of seed and universal types that sow several types of seeds similar to each other. Some combined seeders can also apply mineral fertilizer to the soil at the same time as sowing. Depending on the method of sowing , seeders are divided into types that sow in rows, According to the method of connection to the tractor , they are also divided into trailed and self- propelled types. Grain seeders are mainly trailed , and with the help of a special device, an aggregate with a large width of the seedbed is formed from several seeders, which are connected to a tractor with a large capacity . They can be used for sowing seeds in large fields . For crops that are sown in

limited areas (cotton, beets, vegetables) , self - propelled seeders are recommended .

location of the working parts, seed drills are divided into monoblock , modular and sectional types. A monoblock seed drill has a single frame, on which all the working parts are mounted (Fig. 68 *)* . The seed or fertilizer in the hopper 1 *is* separated by several metering units 2 *and* fed to the seed conveyor *3* It delivers to *4 people.*

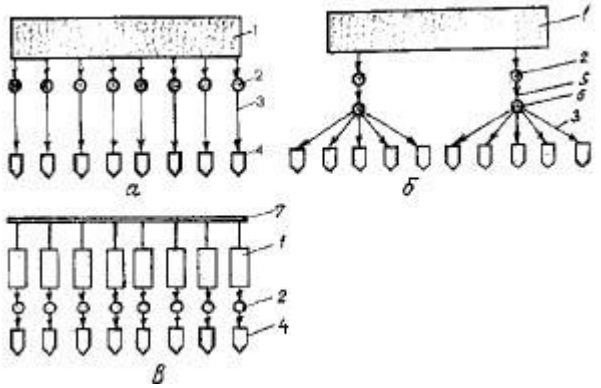


Figure 68. Arrangement of working beams.

The single large-capacity hopper *1 of modular seeders* is placed on a special trolley (*∂*Fig. 68). A single, high-performance, precisely operating central metering device *2* is installed in the hopper. The seeds separated from the hopper by the central metering device *2* are delivered to the distributor *6 through the* central pipe *5* using an air flow . From the distributor *6, seeds for sowing in each row* are transferred to the seeders *4 through* seed conveyors *3.* The seeders *4 are installed on a* separate frame in a certain order, forming a sowing block . The sectional seeder consists of sowing sections mounted on a common frame *7* (Fig. 68 *)* . Each section has a separate hopper *1* , metering device 2 , and seeders *4* . The rows can be changed by moving the sections on the frame . To use the rate controller in each section, the support posts must have a motion transmission mechanism . Special seeders are made that can plant seeds in single or wide rows in a sectional configuration.

Quantity takers

The seed meter serves to separate a certain amount of seed from the seed box and drop it into the seed hopper. The even distribution of the seed being sown across the field depends on the operation of the seed meter .

mechanical, pneumatic, and pneumatic types of seed metering devices . Mechanical seed metering devices such as galtaxi, disc seed metering devices, chumich seed metering devices, pirpyraxi, friction, and chutka seed metering devices are used in various situations . Recently , galtaxi , disc seed metering devices , and pneumatic seed metering devices are widely used . While the galtaxi meter continuously delivers seeds , the disc seed metering device distributes them individually , therefore , galtaxi meters are used in row- type seeding machines , and disc seed metering devices and pneumatic seed metering devices are used in single - seeding machines.

Galtaxi mone raters are divided into types with or without pins . Pin galtaxi mone raters are used for the application of mineral fertilizers .

The new type of roller is universal and is used in seed drills for sowing seeds of cereals and vegetables, as well as feathery seeds . Such a device consists of a new roller *2* , a stub *3* , a base *1* , a housing *4* and a coupling 5 *(* Fig. 69). The roller *2* is fixed to the shaft *6 with a pin and is* located inside the housing 4. *The* housing 4 *is* installed under the holes in the bottom of the seed box. A stub 3, which rotates freely inside the side wall of the housing, is *mounted* on the new side of the shaft , and a coupling 5 is freely mounted on *the* smooth handle .

The coupling bridge fits into a recess in the second wall of the housing. When the pulley rotates with the help of shaft 6 , its leading part *rotates* the pulley.

The smooth part of the pulley rotates inside the non-return coupling. The coupling

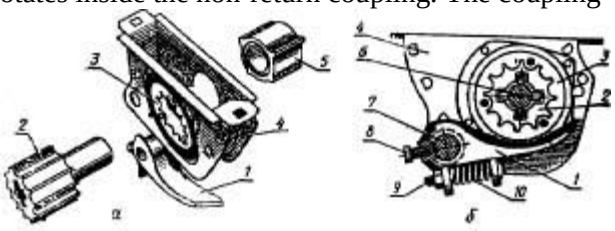


Figure 69 Quantity takers

The diameter of the roller is equal to the outer diameter of the rollers in the roller . Therefore, if the roller is moved along the roller relative to the end and the length of its working part inside the housing is changed , the gap created by the roller is occupied by the clutch, which is moved together with it, as a result of which the seed does not pass freely

through the hole. In order for the clutch to be in tight contact with the roller, its bushing is supported by a washer and a pin mounted on the shaft 6. *If* the length of the working part of the roller is changed, the volume of the rollers directly separating the seed , i.e. the amount of seed, changes.

The lower opening of the housing is closed by the bottom 1. The bottom 1 is fastened *to the* shaft *7* of the threshing mechanism with a bolt 8 , and the exposed end is cut off. Therefore, the seed, which is attached to the new crown on the drum, is threshed gradually , without falling out of the bottom all at once . This prevents the sown seed from falling to the ground .

To adjust the position of the tube *1* , an adjusting bolt 9 and a spring *10* are installed. If a large object accidentally falls on the tube , the spring *10* is *compressed* , and the gap between the roller and the tube expands , allowing the object to pass through , which prevents them from breaking.

When sowing seeds with a very smooth surface, the gap between the bottom and the roller should not exceed 1...2 mm to prevent the seed from slipping out of the gap. This is achieved by changing the degree of compression of the spring *10* with the bolt 9. *When* sowing large seeds of legumes, the gap is made 8...10 mm, otherwise the seed may be compressed and damaged. To expand the gap, the shaft *7* is turned slightly.

there is no risk of the seed coming out of the hole due to the friction between the roller and the base , the roller types pull the seed out along the base, that is, they work in the “bottom separation” scheme. Otherwise, if there is a risk of the seed coming out, the roller is turned upside down, lifts the seed up , removes it from the coulter , and drops it into the seed hopper. This is called the “top separation” method. This method can also be used to sow very small seeds.

amount of seed that the roller separates depends on the length of its direct contact with the seed in the box , if the roller is inserted into the housing more , the amount of seed that is separated also increases. In order for the Xgamma rollers to separate the same amount of seed, the length of their working part must be the same. For this, the rollers are moved to the same distance using the handle of the shaft *6.* If it is necessary to move the length of one roller, the box is moved slightly relative to the roller along the long hole .

To change the amount of seed being sown, firstly, the working length of the roller and secondly, its rotation speed are changed as needed. However , when determining the rotation speed, it is necessary to take into account the durability of the seeds to be sown. In order to ensure minimal damage to the seeds , it is advisable to set the roller rotation speed to a minimum and its working length to a maximum . Damage to seeds such as wheat and barley should not exceed 0.3%, and seeds of melon crops should not exceed 1.5% .

In order for a discriminator to separate seeds into individual grains , the seeds must be hairy, that is , their surface must be smooth , or the seed must be specially treated to smooth its surface (the seed is dehaired by chemical or mechanical methods or is coated with a glue).

Discs are divided into types that rotate in a vertical or horizontal rotation (Fig . 70 uk). In a vertical ukrotation , the cells are formed by removing the seeds from the seed coat .

The horizontal rotating disk flange has grooves made on ukits side (Figure *70*).

The disc seed meter consists of a disk *1* , a slider *2* , and a dropper *3.* The working process of such a dropper is as follows . A vertical disk *1 is mounted close to the bottom of the seed box, and* the cylindrical seed meter rotates continuously under the seeds, touching them. The seeds fall into the disk slots under the influence of gravity , rotate with them, and pass through the bottom of the dropper. The teeth of the dropper press on the seeds that could not completely fall into the slot and place them there , and the seeds that did not settle are removed from there by pulling them out. When they reach the window *5* at the bottom of the seed box , the dropper pushes them and sends them down to the seed conveyor .

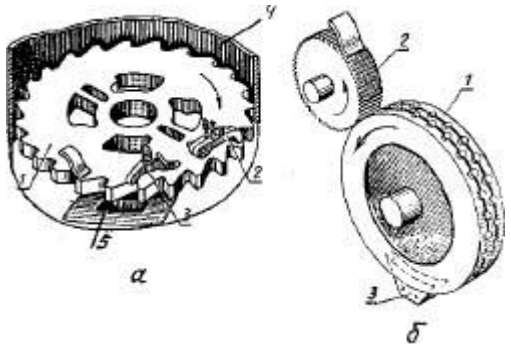


Figure 70. Vertical quantifiers

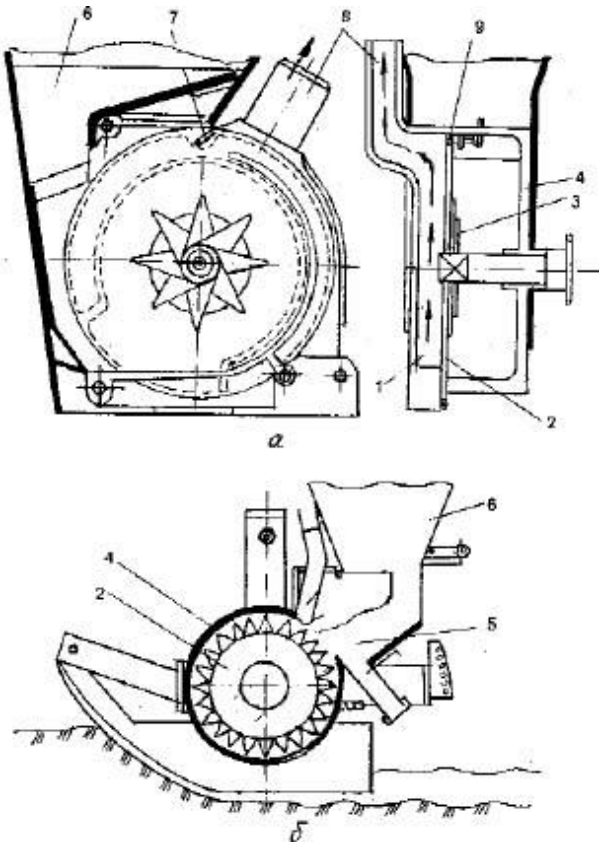
The size of the cells on the edge of the disk is selected so that one or more (2…4) seeds can be squeezed. Therefore, the size, number of cells, and disk diameter are taken differently depending on the conditions.

Adjusting the amount of seed released by such a dispenser to the desired level is done by changing the disk rotation speed and the number of cells (by covering the cells with a burner or by selecting a disk with the desired number

of cells).

rotating horizontally is installed at the bottom of ukthe seed box (Fig. 70 *)* . The seeds in the box fall into the grooves of the rotating disk by their own weight and, during rotation, encounter the slide 2. The teeth of the slide move against the seeds and remove the excess seeds that do not fit in the grooves . The spring-loaded ejector *3* , which is inserted into the narrow groove through the grooves in the disk , lowers *the* seeds onto the hole 5 in the bottom of the seed box and removes them through the grooves . The size of the grooves on the disk is made so that one grain of the seed being sown fits . The seed rate intended for sowing per hectare of area is changed by changing the rotation speed of the disk and selecting disks with different numbers of grooves .

The pneumatic seed separator is characterized by the fact that it separates the seeds from the seed pod in a certain amount and order, with almost no damage. The pneumatic seed separator can operate using vacuum or pressure above atmospheric pressure (Figure 71 *)* .



Symbol 71. Pneumatic doser

The vacuum-operated seed metering device (Fig. 71 *)* consists of a housing *4* , a disk *2* , a vacuum chamber *1* , a regulator *3* , a deflector *7* , a hopper *6* and a spreading chamber *5. Holes 9 are made on the edge of the disk 2* for removing seeds . The spreader *5* and the vacuum chamber *1* are located on opposite sides of the disk plane . The vacuum chamber does not completely cover the disk plane , but only touches the horseshoe-shaped edge of the disk (its border is shown in Fig. 71 *with* a dotted line). Thus, since the lower spring of the disk does not touch the vacuum chamber, the holes there are under atmospheric pressure. A special fan continuously removes air from the vacuum chamber through a pipe *8* .

seed meter is as follows. The seeds in the box continuously fall into the distribution chamber. As they are scattered by the spreader , one seed is pushed into each hole in the disk and sticks . The seeds that have settled in the holes rise to the top together with the disk , and the seeds that have not stuck to the holes are squeezed out by the action of the deflector *7* .

stuck in the holes, along with the disk, reach the vacuum below , they fall under their own weight .

To change the order and amount of seed separation from the seed , a disk with holes arranged in the desired order is selected and its rotation speed is changed .

Recently, pneumatic - mechanical seed spreaders have become widespread. Instead of installing one seed spreader per row of crops, like other seed spreaders , they separate the amount of seed (or fertilizer) to be sown for several (up to 24) rows in one place and then distribute it to each row using an air hose.

Laboratory of work the results submission order

All laboratory exercises are carried out based on the given assignments. In this of training purpose, to perform style, taken results: tables, calculation information, tasks given to students for independent completion, the end of the work of students in personal statements and other materials of the student general writing in his notebook will go.

In addition, the student must complete one sheet of paper for each laboratory session. Prepares short two-page reports and files them after the training is over The report must include the following information:is recommended:

1. Laboratory your work order number;
2. Laboratory your work topic;
3. Laboratory their work to perform for given assignments;
4. Work purpose;
5. The work to perform style;
6. To students independent to perform for given assignments;
7. In the laboratory done of affairs results;
8. Laboratory your work results according to student's personal conclusion;
9. At the end student's name, Sharif, signature and that's it of the day date is placed.

Teacher from student Upon receiving the report, it reviews it and evaluates the laboratory work separately, and records the total points on the student's account puts.

Everyone students laboratory work after submitting their short reports to the chair will be handed over.

Recommendation done literature list

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