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INFLUENCE OF TECHNOLOGICAL MEASURES ON WATER-PHYSICAL PROPERTIES ON DRAINED PEAT

Weight moist peat significantly reduces its permeability to air-drying, on the contrary, promotes gas exchange. Therefore, organic soil has its importance aeration. For air regulation, mode peat soils should not have maximum exposure to moisture saturation it as low soil moisture, since the latter is the threat of dehydration plants. So peat soil to improve aeration needed, mainly due to the exchange of the moisture from the air and soil movement standing pool of water in the stream. It is particularly important is the oxygen that is in the soil solution [1, 2, 3].

High crop yields can be formed only under certain moisture content in the soil. Its absence and excess leads to deterioration of soil fertility, and simultaneously reduce plant productivity. The intensity of the use of organic soil is possible only after removal of excess soil and surface water in the spring and maintenance during the growing season optimum moisture content in the arable soil layer [4, 5]. For most crops the optimal soil moisture in the topsoil (0 – 30 cm), where the bulk of the roots of the plants should be 55 – 75% , and for perennial grasses – 75 –80 % of full moisture capacity (FW). [6]. It is believed that for the top layer of soil humidity in the optimal range, groundwater level must be maintained in an average growing season for grasses 65 - 80 cm, grain – 80 – 90 cm and cultivated – 100 – 110 cm [7].

Given the above relationship, during the vegetation period in different arrays with different cultures topsoil moisture peat soil by the same level of groundwater has relatively small fluctuations. Because of this need to maintain, optimal soil moisture during the growing season, and this is one of the important tasks Reclamation of peat soils.

Conditions and method of research. Research conducted during the 2011-2014 years. In the NSC "Institute of Agriculture NAAS" on drained peatlands floodplain r.Irpin Kiev region. Soil test sites characterized by the following parameters: depth of peat – 1,1 – 1,9 m, the degree of decomposition – 55 – 62% , ash content of 30 – 32 % sol.- pH 5,3 – 5,5, the gross nitrogen content – 2,8 – 3,0% , phosphorus

0,76 – 0,92% potassium 0,09 – 0,15% . Research areas sown area of 32 m^2, accounting 25 m^2, three-time repetition.

Monitoring the water regime of soil carried out by measuring groundwater levels in wells and gauge defined active humidity (0 – 30 cm) soil. The levels measured in groundwater wells gauge every five days during the growing season (April-October). Soil moisture was determined gravimetrically-thermostat (to constant weight) three times during the growing season in the plow (0 – 30 cm) soil layer GOST ISO 11465-2001. The ground selected drill M.O. Kaczynski to determine the density and total capacity.

In test plots used for organic soils recommended technology for growing crops in rotation. Fertilizers made under annual crops once before sowing as follows: under perennial grasses - three times during the growing season when every slope - K_{150}, $P_{45}K_{150}$, $N_{120}P_{45}K_{150}$ in row –$P_{45}K_{150}$; under grain – $P_{45}K_{60}$. Nitrogen experiments made in the form of ammonium nitrate, phosphate fertilizers made in the form of superphosphate, potassium – magnesium.

Weather conditions during the research on rainfall and thermal conditions were quite different, and temperatures over the years has been more on research1,7-3,8 °C from norm and rain accounted for in 2011 – 294 mm, 2012 - 430, 2013 - 169 and 2014 - at a rate of 240 mm 357 mm, the level of groundwater for years respectively at a depth were 90, 58, 67 and 75 cm from the soil surface.

Results. The conducted monitoring of soil water regime from different cultures showed that the depth of groundwater (table. 1) is significantly dependent on the mode of Irpin drying-wetting systems and weather conditions.

Table 1. The depth to groundwater research areas cm from the soil surface

Year	Month							Average
	april	may	june	july	august	september	october	
2011	95	85	90	80	90	85	70	85
2012	75	85	95	90	60	70	75	79
2013	10	50	70	80	85	75	80	64
2014	60	40	65	70	75	80	95	69
Average	60	65	80	80	78	78	80	74

In 2011 groundwater level fluctuations were significant at the beginning of the growing season, was 85-95 cm. In the summer months, they were 80-90 cm, the fall of groundwater level up to 70 cm,

due to precipitation. Overall, during the growing season groundwater levels were close to optimal performance and averaged 85 cm from the soil surface.

2012 groundwater levels had fluctuated, during the growing season and averaged 79 cm from the soil surface. In early spring, 2013 in March dropped a significant amount of rain that led to raising the level of groundwater in April to 10 cm, and some areas of floodplain r.Irpin general were flooded. In May groundwater level sank to 50 cm, allowing us to start preparing for sowing and sowing hold during the growing season groundwater level on average fluctuated within 70-85 cm. This phenomenon positively affected the harvest and preparation of soil for sowing winter grain. In general, the level of groundwater contributed to growing crops on peat soils.

2014 was quite warm and dry. Therefore, the level of groundwater over-wetting affect drainage system with which maintained during the growing season groundwater level. Therefore, in April, the groundwater level was 60 cm. In May, when precipitation fell within the normal rate, the level rose to 40 cm. In June, groundwater level sank to 65 cm from the soil surface. On average for the growing season, groundwater levels were in the range of 70-80 cm.

Monitoring the humidity of the soil under perennial grasses showed (table. 2, 3), with aging vegetation soil moisture for 2 – 3% decrease compared to the margins of the first year of use. This phenomenon is due to the deterioration of water and soil physical properties and aging vegetation, and consequently the surface layer less accumulated moisture.

Table 2. Effect of farming practices on arable humidity and aeration (0 - 30 cm) soil under perennial grasses, the average for 2011-2013,% of full moisture capacity

Crop rotation	Timeline selection	Fertilizer	Herbs first year of cultivation		Herbs fourth year of cultivation	
			humidity	aeration	humidity	aeration
1 – 6-th field - sowing perennial grasses + radish oil, 7-th - peas, oats + perennial grasses	June	without fertilizers	42,3	44,5	66,0	28,3
		$N_{90}P_{45}K_{150}$	53,1	41,3	67,0	37,2
	July	without fertilizers	39,2	48,7	49,3	42,2
		$N_{90}P_{45}K_{150}$	42,7	47,8	37,6	51,9
	September	without fertilizers	41,0	45,9	53,4	38,8
		$N_{90}P_{45}K_{150}$	46,9	44,2	49,1	42,4
LSD_{05}			0,57	0,63	0,64	0,58

Table 3. Water-physical parameters peat soils, floodplain r. Irpin average 2011-2013 year, (0-30 cm layer)

Culture	Densitythe composition of the soil,g/cm^3	Total moisture,%	Porosity,%	Humidity, % full moisture capacity	Aeration, %
Annual culture	0,402	209	84,0	82,5	69,3
Perennial grasses first year	0,375	222	83,3	74,8	62,2
Perennial grasses fourth year	0,335	249	83,4	84,9	70,9

Regarding air regime, it is largely dependent on rainfall, fertilizer and length of growing perennial grass mixtures. The degree of aeration was within acceptable limits and was in the background without fertilization 41.3% PV, while the herbs growing in the fourth year it was 10 - 15% more. In addition, the degree of aeration changed and during the growing season, with the first selection, he was less than a second and third.

The degree of aeration on the contrary increased with aging vegetation, as increased porosity and the pores are filled with more air. In areas where fertilizer is not made, the humidity was higher compared to making a full dose of fertilizer. Also, an increase in soil moisture to the fourth year of growing herbs.

As for soil moisture under annual crops (tab. 4) note that they usually have been provided with moisture, but the lack of rain early in the growing season, they are a bit had received it. Note that less culture influenced the soil moisture compared to fertilization system. However, during tablespoon carrots grown after grasses humidity was higher compared with carrots after dining table beet in the rear rotation. In the air mode under cultivated crops most affected fertilizer system. The biggest aeration was observed at the beginning of the stairs, while vegetation is somewhat reduced. Humidity under annual crops more dependent on weather conditions, the growing season. To some extent, also influenced by the density of the soil cover plants.

At the beginning of the growing season, moisture was low, and during the growing season during the intensive growth of plants is increased, due to the intense growth of the vegetative mass that obscures the surface and thus reduced her physical evaporation of moisture from the soil, which greatly affects positively the development of the plant. So during winter rye in June 2011 at the site of humidity without fertilization was 44,9 mm from the PX, then in July,

accordingly, it was higher and amounted to 60,0 mm from the PV, in July of 2009 – 53,4 mm.

Table 4. Effect of farming practices on arable humidity and aeration (0-30cm) layer of soil under crops annual crops average for 2011-2013,% of full moisture capacity

Crop rotation	Timeline selection	Fertilizer	Culture			
			carrots dining		rye	
			humidity	aeration	humidity	aeration
1 – 5-th field - perennial grass crops + radish oil, 6-th - carrots, 7-th - rape + perennial grasses	June	without fertilizers	56,7	1,4	52,1	42,5
		$N_{90}P_{45}K_{150}$	59,5	36,4	59,6	34,0
	July	without fertilizers	48,4	34,1	58,4	34,3
		$N_{90}P_{45}K_{150}$	51,9	43,6	65,0	31,2
	September	without fertilizers	47,7	40,5	63,9	28,3
		$N_{90}P_{45}K_{150}$	58,1	44,0	74,0	22,3
LSD_{05}			0,6	0,7	0,9	0,7

In general, the degree of humidity and aeration of the soil usually did not drop to the lower limit of optimum performance and was in the acceptable range. Analysis of the water regime of soil under crops shows that in the year with excessive natural moisture (2013), when rain fell during the growing season average 110% rule, soil moisture was also higher than the previous year's study. Especially increased soil moisture was observed in the selection of the third ground, which caused a lot of rainfall, which in September fell 253% rule.

Making Fertilizer little effect on soil moisturizing and moisture dependence in some plants were observed. One can only note that it does not fall below the break capillaries and humidity did not exceed the smallest capacity. As for aeration, it was observed the opposite pattern.

Conclusion. Moisture active layer of soil under crops of agricultural crops rarely decreased below the 40% of full moisture capacity (lower limit of the optimum moisture content) and not more than 80 – 83% (the upper limit of the optimum moisture content). Aeration also decreased the critical point of 5 – 10% was in the optimal range. These figures were provided optimum drainage work-wetting systems floodplain r.Irpin, when the excess moisture in the soil drainage system assigned to it, and for its lack of on the same network additionally supplied to the field.

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Наведено результати наукових досліджень щодо впливу технологій вирощування культур на водно-фізичні показники в умовах осушуваних органогенних ґрунтів. Встановлено, що зі старінням трав вологість ґрунту на 2-3 % зменшується порівняно з травостоями першого року. Під однорічними культурами деякий вплив на вологість мало удобрення, що підвищувало її. Ступінь аерації збільшувалася зі старінням травостою, тому зростання пористості впливало на збільшення повітря в ґрунті. Рівні ґрунтових вод в середньому знаходилися в оптимальних межах для вирощування сільськогосподарських культур.

Ключові слова: *торфовище, повна вологоємність, аерація, ґрунтові води, сівозміни, використання, багаторічні трави, удобрення, однорічні культури, продуктивність.*

Приведены результаты научных исследований о влиянии технологий выращивания культур на водно-физические показатели в условиях осушаемых органогенных почв. Установлено, что со старением трав влажность почвы на 2-3 % уменьшается по сравнению с травостоями первого года. Под однолетними культурами влажность зависела от удобрения. Степень аэрации увеличивалась со старением травостоя, поэтому рост пористости влиял на увеличение воздуха в почве. Уровни грунтовых вод в среднем находились в оптимальных пределах для выращивания сельскохозяйственных культур.

Ключевые слова*: торфяник, полная влагоемкость, аэрация, грунтовые воды, севообороты, использование, многолетние травы, удобрения, однолетние культуры, продуктивность.*

The results of scientific studies on the impact of technology of planta growing on water-physical parameters in conditions of drained organic soils. Found that when herbs are aging soil moisture decreases of 2-3% compared to the first year of grass. During annual crops, fertilizing some effects on humidity. The degree of aeration increased with aging vegetation, so the growth of porosity influenced the increase of air in the soil. Levels of groundwater on average were in the optimum range for growing crops.

Keywords: *peat, full moisture capacity, aeration, soil water, crop rotation, use, perennial grasses, fertilizers, annual crops, productivity.*

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