Section 10. Agriculture

Muratkasimov Alisher Sattarovich,
Senior Researcher,
The Gallaaral Scientific Experimental Station
Research Institute of cereals and legumes,
Yusupov Khasan Yusupovich,
Candidate, of Agricultural Sciences
The Gallaaral Scientific Experimental Station
Research Institute of cereals and legumes,
Umurzakov Abdukarim Abdukhamivoch,
The Gallaaral Scientific Experimental Station
Research Institute of cereals and legumes,
Senior Researcher
Gafurova Laziza Akramovna,
Doctor, of Biological Sciences, Professor
Soil Science Department, Biology Faculty
National University of Uzbekistan named after M. Ulugbek,
E-mail: alisher.muratkasimov@mail.ru

WAYS OF RATIONAL USE OF DRY SIEROZEMS

Abstract: The results of studies on the study of the effectiveness of organic and mineral fertilizers, absorbents and biologically active substances, while preserving the fertility of the soil of the country's dry fields with partial provision of moisture, feeding of grain crops after new arable land, economical use of soil moisture.

Keywords: irrigated lands (bogars), typical serozem, yield, moisture, crop rotation, organic and mineral fertilizers, root nutrition, tillage, agrotechnology, humus, yield increase, efficiency.

Introduction

Under the influence of global climatic influences around the world, Uzbekistan, like countries located in dryland regions in peculiar soil and weather conditions due to a stable harvest from agricultural crops, while providing the population with food products of rainfed lands, currently scientifically based use of 751.4 thousand of ha of arable land remains a requirement of time [3].

By the Decree of the President of the Republic of Uzbekistan dated February 7, 2017, it was adopted the strategy of the five priority development directions of the Republic of Uzbekistan in 2017–2021.

In item 3.3 of the third priority direction of this program (modernization and accelerated development of agriculture), the urgency of effective use due to additional reserve of rainfed lands is indicated with further strengthening of food security of our country and expansion of production of ecologically clean products.

In solving the above-mentioned urgent problems, the improvement of agro technical developments recommended for the cultivation of spiked crops in rainfed lands and the widespread introduction of scientific success are the main objectives of the research carried out within the framework of the applied project KHA-9–054–2015, planned for 2015–2017.

According to stationary experiments conducted in steppe-hilly regions (280–360 mm) semi-rainfed lands, intensive soil cultivation for cereals that are grown extensively for 60 years and plowing at a depth of 20–22 cm, as well as in variants without organic and mineral fertilizers, the content of organic substances (humus) decreases from 1.2–1.3% to 0.58–0.65% (0–20 cm) [2, 5, 7].

The main decisive factor in agriculture, as well as the preservation and improvement of soil fertility, the cultivation of environmentally friendly agricultural products in all rainfed regions (plain, steppe, piedmont and mountainous) is the introduction of short rotation schemes (2.3, 4 field) crop rotation for farms [6].

Materials and methods

The study of organic and mineral fertilizers, polymeric absorbents, accumulating soil moisture (absorbing) and biologically active substances in the new plowland of rainfed lands for cultivation of spiked crops and their influence on soil moisture and mineral nutrition regime, growth and development of winter wheat are the tasks of this study.

The soils of the experimental fields are loam, with water and wind erosion typical of sierozem and their arable layer (0–20 cm) consists of 0.55–0.88% humus, 0.18–0.20% nitrogen, 0.16–0.18% of phosphorus and 1.6–1.8% of total potassium, the pH of the soil medium is 7.9–8.0 [8].

All agrotechnical measures for growing soft wheat of "Bahmal-97" variety were made on the basis of agrotechnical recommendations developed by the scientific research institute of cereals and legumes of the Gallaaral scientific-experimental station [4].

Phenological observations, the number of plant bushes, the dynamics of accumulation of dry and raw biomass, soil moisture, analysis of the nutrient content of wheat in the vegetative period, and other results of field experiments were affected by the variance analysis based on the "Field Works Methodology" (1985) of B. A. Dospekhov [1].

Results and Discussion

The content of perennial precipitation was 362.0 mm and in 2014–2015. In 2015–2016 agricultural years this indicator was respectively 362.3 and 400.6 mm, the average multi-year annual temperature of 11.6 º C, by years 10.4–11.2 ºC, the average multi-year relative humidity of 50%, in the corresponding years was 70–73%. In May 2015, the amount of precipitation is less by 13.3 mm relative to the average perennial sediment, the air temperature was +20.7 ° C and relative to the multi-year average temperature was higher by + 8.3 ° C. Conversely, in May 2016, the amount of precipitation compared to the perennial was 31.7 mm higher, and as a result, strong damage to the crops was observed in yellow rust disease, and as a result of a sharp increase in air temperature in the third decade of May, the yield dropped sharply.

The number of variants of field experiments was 9 with a threefold repetition. The volume of experimental plots was 200 m^2. Organic and mineral fertilizers (phosphoric, potassium), as well as absorbents of the experiments were given under the plow in the second half of April before the raising of new arable land. In July, the soil was treated at a depth of 14–16 cm with a flat cutter against weeds. Before sowing winter wheat, the soil was surface treated by harrowing and 2.5 million seed seeds of wheat of "Bahmal-97" variety were sown on ha of area.

In order to study the dynamics of soil moisture in new arable land, samples were taken from a depth of 0–160 cm.

On May 29, 2015, the moisture content in the arable layer of the soil (0–20 cm) was 11.2–13.8% in variants, and the moisture reserve in the depth of 0–160 cm averaged 2936.0–3177.3 m^3/ha. Because of a decrease in precipitation and a sharp increase in air temperature in the summer season, there is a noticeable decrease in the moisture reserve in all layers of the soil.

By the time of sowing of winter wheat crops (October 25, 2015), the moisture content of the arable soil layer was recorded on average by 4.3–5.4% (105.8–133.1 m^3/ha), and in layers 0–160 cm the total The moisture reserve is 5.8–8.32% (1209.0–1636.2 m^3/ha).

At study of moisture distribution in experimental variants, its content in control plots in the arable layer was 5.2–13.4% (133.1–1309.9 m^3/ha), in deep layers of soil (120–160 cm) 5, 7–13.6% (331.1–775.4 cm^3/ha), these parameters in the variants with the supply of phosphorus and potassium fertilizers with the calculation of 40 kg/ha, 20 and 40 kg of polymeric absorbent hydrogel for a new arable land were in arable beds 13.6–13.8% (331.8–336.8 m^3/ha), and in layers 0–160 cm the total moisture content was 14.2–14.5% (3058.5–3099.7 m^3/ha) (20.05.2015).

By the sowing season of winter wheat seeds (25.10.2015) in variants with a hydrogel absorbent soil moisture in 0–160 cm soil layers compared to the control variant of the experiment was higher by 145.0 m^3/ha.

It should be noted that in the variants with feed of 40 kg/ha of phosphorus and potassium fertilizers and 10 t/ha of local fertilizer depths of 0–160 cm of soil, the moisture reserve was much higher compared to other options. The moisture content in the deep soil layers (0–160 cm) of this variant during the season was 8.5–15.2% (455.6–833.0 m^3/ha), and in the 0–160 cm layers, 8.2–15.0% (1620.1–3177.3%).

As it was shown by conducted analyzes, from the raising of new arable land to the sowing of winter wheat, the content of physically evaporated moisture from the soil was 6.6–8.4% or 1317.0–1720.5%. The content of lost moisture from new arable land due to physical evaporation was 48.1–56.8% compared to its initial content.

Summarizing, it can be said that more than half of the natural moisture of the new arable land, accumulated because of precipitation in the rainfed fields, is lost through evaporation.

In October, 2015, as a result of an increase in precipitation by 53.1 compared to the multiyear averages, it was possible to carry out high-quality sowing in the arable layer of the soil (0–20 cm). Seeds of winter "Bahmal-97" variety suddenly green in November and warm winter days.

The moisture content in the arable layer of the soil in the experimental variants before the sowing of winter wheat (1.11.2015) was 9.7–11.2%, the moisture reserve of 0–160 cm was 7.6–9.6% or 2075.6–2346.2 m^3/ha.

Before the raising of new arable land (29.05.2015) against the background of $P_{40}K_{40}$ with 40 kg/ha of "Hydrogel" absorbent and 10 t/ha of manure, the total moisture content in 0–160 cm averaged 9.2–9.6% or 2304.6–2346.6 m^3/ha.

These indicators in the control variant without the supply of fertilizers and absorbents were 8.7% (1813.4 m^3/ha). In these variants, the content of accumulated moisture compared to the control was greater by 0.5–1.2% or 491.2–532.8 m^3/ha.

To the stage of ovary formation of winter wheat vegetation (23.04.2016) due to the increase in moisture as compared with the long-term norm by 21.6 mm, the moisture content in 0–20 cm of soil was 15.1–18.5%, in deep layers 0–100 cm was 10.5–11.3% (2276.9–2460.7 m^3/ha), and in 120–160 cm was 5.8–8.0% (315.2–428.8 m^3/ha).

At the stage of earwaxing of winter wheat of the "Bahmal-97" variety (06.05.2016) in all experimental variants, the moisture content began to decrease significantly and by the time of complete maturation in 0–20 cm soil layers was 3.9–6.8%, in 0–160 cm moisture content of 6.4–7.5% or 1353.1–1604.8 m^3/ha. By the end of the vegetation, the residual moisture in the control variants of 0–160 cm of soil was 6.8% (1451.0 m3 / ha), and in the cases with mineral fertilizers, polymeric absorbents and with 10 t/ha manure, this index was 7.5% (1604.8 m^3/ha).

At this stage in 0–160 cm soil layers the moisture reserve in variants with polymeric absorbents and manure showed the highest index in comparison with other variants.

Based on the results of the study of the distribution of soil moisture in 2015, the inter wheat "Bahmal-97" variety after the new arable during the vegetation in versions with 40 kg/ha of phosphorus and potassium fertilizers, as well as 10 t/ha of manure in comparison with the control options without fertilizers accumulated an average of 136–172.4 m^3/ha more moisture.

In field experiments in the phase of plant compounding in the control variant, their number averaged 203 pcs/m^2, against the background of $P_{40}K_{40}$ under the influence of 10 t/ha of fresh manure under new arable land increased by 25.4 pcs/m^2 compared to the control.

In the control variant of field experiments, i.e. in the variant without fertilizers and absorbents, the average grain yield was 9.8 centner per hectare. At the beginning of the spring growing season of winter wheat with feed of 40 kg/ha of phosphorus and potassium fertilizers for a new arable land, nutrient with carbamide nitrogen fertilizer, taking into account 40 kg/ha, the additional yield per hectare was 3.9 quintals or 139.7%.

Together with the simultaneous supply of phosphorus and potassium fertilizers to the new arable land and the absorbents "hydrogel" and "Aquasorb", taking into account 20 kg/ha and arable land with the simultaneous application of 40 kg of nitrogen fertilizer, yields increased by 3.9–5.1 c (139.7–152%). The use of organic fertilizers with increasing the soil fertility of rainfed fields and improving their chemical and water-physical properties is of great importance. According to the results of the current year's experiments, the additional yield due to application of 10 t/ha of manure increased by 6.3 c/ha. This indicator was 164.3% compared with the control.

During the spikes formation of winter wheat, plowing the arable land with simultaneous application of biologically active preparation "Bioazot" through the leaves with the calculation of 1 liter per hectare, the yield was further increased by 4.2 c, and in the variants with "Bioazot" and "Micro-O'stirgich" preparation with a calculation of 1.5 l/ha yield increased by 5.1 c.

It should be specially noted that the abundant precipitation of the spring months of this year compared with the long-term average rate, high air humidity leads to a severe infection of winter wheat with various diseases. And this, in turn, leads to a decrease in the effectiveness of mineral fertilizers introduced under a new arable land.

Conclusion

At headed grain and grain crops cultivation in a crop rotation system, the use of 10 tons of local fertilizer every three years, the annual application of $P_{40}K_{40}N_{40}$ together with the water-absorbing absorbents "Hydrogel" and "Aquasorb" (20 kg/ha) for a new arable land create the conditions for effective assimilation of natural moisture and nutrients and serves to increase net profit derived from farm land.

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