

# Importance of Mineral Fertilizers in Winter Wheat Crop Rotation

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**Abstract:** The order and timing of irrigation of winter cereal crops, the number of irrigations, the irrigation rate, the climate of the region, the soil hydrogeological conditions, as well as the biological characteristics of the variety being planted and the level of agricultural technology used are determined. In crop rotation for winter wheat, it is very demanding on predecessors and soil fertility and fertilization.

**Keywords:** winter cereal crops, crop rotation, nitrogen, phosphorus, potassium, mineral fertilizer, mineral fertilizer.

In order to fully provide the population of our republic with domestically grown grain products, in recent years, more than 1 million. 250 thousand hectares of irrigated areas have been planted with cereal crops in our country. High-quality and high-yielding grain crops depend on the correct selection of varieties by region, timely and high-quality implementation of agrotechnical measures, irrigation regime, and the effective use of modern irrigation technologies and methods.

The order and timing of irrigation of winter cereal crops, the number of irrigations, the irrigation rate are determined depending on the climate of the region, the hydrogeological conditions of the soil, as well as the biological characteristics of the variety being planted and the level of agricultural technology used. When rotating winter wheat, it is imperative to take into account the requirements of predecessors.

Cleaning the field from weeds, timely irrigation of moisture-accumulating crops before planting, applying fertilizers, preparing the soil for planting, and harvesting the predecessor crop earlier to sow winter wheat at optimal times. Crop rotation in irrigated areas gives good results when placing winter wheat after three-year alfalfa, cotton, corn planted for grain and silage, legumes, potatoes,

vegetables, and melons. Winter wheat is a good predecessor for cotton, corn, vegetables, melons, potatoes, fodder crops, root crops, legumes, which are grown in irrigated areas.

Winter wheat is very demanding on soil fertility and fertilization. It absorbs 3.7 kg of nitrogen, 1.3 kg of phosphorus and 2.3 kg of potassium for the production of 1 s of grain and, accordingly, straw, fertilization increases the yield of winter wheat on all types of soils. When winter wheat forms a grain crop of 60 s / ha, its nutrient requirements are on average 200-220 kg of nitrogen, 60-80 kg of phosphorus, 130-140 kg of potassium. In irrigated areas, mineral fertilizers are applied before plowing, during sowing and during the growth period of winter wheat. When winter wheat is grown in irrigated areas, it is very demanding on mineral fertilizers, especially nitrogen fertilizers, the plant absorbs nitrogen most of all during the tillering and heading phases. When nitrogen nutrition is normal during this period, the ear develops well, the number of ears and grains in it increases. In the southwestern part of Uzbekistan, nitrogen is recommended at 180-200 kg/ha, phosphorus at 90-120 kg/ha, and potassium at 180 kg/ha, phosphorus at 90 kg/ha, and potassium at 60 kg/ha on meadow and gray soils. In the cultivation of winter wheat, mineral, organic fertilizers, and compost are widely used in the main fertilization, the rates of their application vary depending on soil conditions and varieties. The main fertilization is carried out before sowing. Rotten or semi-rotten manure is applied at a rate of 20-40 t/ha before plowing the land. If the land is not plowed after fertilization, 30% of the nitrogen contained in the manure is lost within a day or two. Applying phosphorus fertilizers as part of the main fertilization increases the yield and grain quality. The annual rate of mineral fertilizers is distributed as follows: 80% of phosphorus fertilizers, all potassium fertilizers are applied before plowing the land, 25-30% nitrogen fertilizers are applied before sowing with cultivation, and 20% phosphorus fertilizers are applied to the rows after sowing. 70-75% of nitrogen fertilizers are applied as two feedings in early spring. Feeding during the earing phase, taking 20% of the annual nitrogen fertilizer rate from spring feedings, improves the quality of grain and straw, and increases the plant's resistance to brown rust.

When growing winter wheat, it is of great importance to apply granulated superphosphate at a rate of 50-70 kg per hectare or 30-40 kg of ammophos in rows with sowing. In numerous experiments, when granulated superphosphate is applied at a rate of 50 kg per hectare in non-irrigated areas, an additional grain yield of 2.7-3.4 times is obtained.

Since winter wheat does not absorb nutrients evenly during the growth period, mineral fertilizers, especially nitrogen fertilizers, are applied several times as top dressing in order to provide plants with a constant sufficient amount of nutrients during the growth period. Applying nitrogen fertilizers several times during the growth period increases their effectiveness.

In irrigated areas of Uzbekistan, fields planted with winter wheat are plowed to a depth of 25-27 cm. However, in areas with low fertility, sand and gravel layers, the land should be plowed to such a depth that sand and gravel do not roll to the surface. In newly developed areas, the plowing depth should not exceed 20-22 cm in the first two ears. In subsequent ears, the plowing depth is increased by 2-3 cm. One of the important conditions for obtaining high yields of winter wheat is to grow previous crops in high agrotechnical conditions and harvest the crop on time. The period between harvesting and plowing should not be long. If this period is prolonged, the soil can dry out greatly. Therefore, the land should be plowed immediately after harvesting. In this case, when plowing is combined with harrowing, moisture is well preserved in the soil, and lumps do not form. When the soil is sufficiently moist during plowing, adding a harrow and a trowel to the aggregate after the plow makes the soil evenly fine and granular, creating soft layered soil. However, the condition of the soil after harrowing and troweling often does not meet the requirements for planting. In such soils, there are many clods, the porosity is large, and moisture is lost quickly. Therefore, after plowing, the land is worked once or twice with a cultivator or chisel harrow and trowel, as a result of which the clods are crushed, the soil is compacted, leveled, and ready for planting.

When preparing seeds for sowing, choosing large, heavy, uniform seeds with undamaged skin and kernels will yield an additional 3-4 c/ha compared to small seeds. If they are damaged in the seed

cleaning lines, their germination and growth energy decrease, and they often become infected with fusarium. The protein content of the seeds to be sown also affects the yield. If the seed has a high protein content, germination and development of plant growth organs and generative organs accelerate, and yield increases. Treating seeds with toxic chemicals and microelements gives good results. When treating seeds in a semi-dry way, instead of water, 110 g of zinc sulfate solution is mixed into 1 hectare of sown seeds or potassium permanganate is used in the same dose with zinc sulfate. Such microelements and toxic preparations are dissolved in 10 l of water and used for 1 ton of seeds. When seeds were treated in this way before sowing, an additional yield of 3-3.6 цe/ha was obtained. Seeds must meet the requirements of class I, II. At least 24 days before sowing, 1 t of seeds is treated with 2 kg of panocin or 1.5 kg of 2% raxil or 2-3 kg of vitovaks 200.

Winter wheat seeds begin to germinate at a temperature of 1-2 °C. With increasing temperature, these processes intensify, and the supply of nutrients to the sprouting sprout is accelerated. The favorable temperature for seed germination is 12-20 °C, and reaching a temperature of 30 °C reduces the germination of seeds in field conditions and the formation of weeds. When the soil is sufficiently moist in the surface layer, weeds are formed in 7-9 days at 14-16 °C. At a daily temperature of 10 °C, grasses germinate in 12 days, and at 20 °C - in 5-7 days after sowing. The optimal temperature for seed germination is 25 °C. Depending on the temperature, depth of sowing and humidity of the seeds, and other factors, the sowing-germination period can be from 7 to 50 days, and in the case of arable land, more. In irrigated areas, winter wheat seeds germinate in 6-8 days when sown in sufficiently moist soils at optimal times. The effective temperature during the germination period is 116-139 °C. The minimum temperature for the photosynthesis process is 3-4 °C. With an increase in temperature and other favorable conditions, carbon assimilation increases. At a temperature of 35-36 °C, the assimilation process slows down. When irrigated areas have sufficient moisture, temperature, and nutrients, a plant planted early and at the optimal time will produce 3-7 shoots in the fall. Plants that produce 2-5 shoots in the fall will overwinter well.

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