ORGANIZATION THE PROPER IRRIGATION OF WINTER WHEAT

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Abstract: The proper organization of winter wheat irrigation is one of the key agrotechnical practices aimed at producing high-quality wheat in today's agricultural landscape. Taking into account the depth of groundwater and the amount of precipitation, winter wheat is irrigated 3 to 5 times, with an irrigation norm of 500–600 cubic meters per hectare. In farms where liquid manure (sherbet) is used for irrigation, a guaranteed yield of 60–70 centners of high-quality winter wheat per hectare can be achieved.

Keywords: Winter Wheat, Irrigation, Irrigation Norm, Groundwater, Yield.

INTRODUCTION

Relevance of the Topic. The annual decline in water reserves across the Republic necessitates the proper organization of irrigation for agricultural crops. Among these, winter wheat stands out due to its significant water requirements. Proper irrigation management is one of the most critical agro-technical measures for achieving high-quality and abundant wheat yields. Before organizing irrigation and sowing, it is essential to understand the crop's water needs during its vegetative period (1, 2, 3).

METHODS AND MATERIALS

Field experiments related to this topic were conducted in the territory of ToshDAU farmers in the Orta Chirchiq district. The research revealed that the water demand of wheat varies across its growth stages as follows:

- Germination to tillering: 3–5% of total water requirement
- Tillering to stem elongation: 22–25%
- Beginning of stem elongation to flowering: 40%
- Grain formation: 33–35%
- Ripening: 2–5%

Approximately 80–85% of the wheat root mass is located within the 0–60 cm soil layer, while 15–20% extends deeper. As the root system penetrates deeper, the plant's water demand increases to support physiological processes (4).

RESULTS

Impact of Moisture Deficiency

Insufficient soil moisture disrupts all physiological processes in the plant, negatively affecting yield:

- During tillering: moisture deficiency impairs tiller formation, root development, and winter hardiness
- During stem elongation: growth slows, biomass accumulation decreases, and the number of spikes drops
- During heading: fewer spikelets and grains per spike
- During flowering and grain filling: grains become smaller, and the 1000-grain weight significantly decreases. In hot conditions (30–35°C), wind may cause incomplete grain filling and increase sterile spikes
- During ripening: water demand is minimal (5–6% of total), and excess moisture may prolong the growth period and reduce grain quality

Optimal Soil Moisture Levels

To ensure normal growth and high grain yield, soil moisture should be maintained at:

- 70% of field capacity during early growth stages
- 75% during heading, flowering, and grain filling
- 65% during ripening

Irrigation Practices

In open fields, pre-sowing moisture accumulation irrigation is applied 10–15 days before sowing at a rate of 1000–1200 m^3/ha. During the growing season, considering soil texture, groundwater depth, and precipitation, winter wheat is irrigated 3–5 times at 500–600 m^3/ha.

For wheat sown between cotton rows, irrigation is done 10–12 days before sowing or immediately after sowing. Subsequent irrigations follow the same pattern as in open fields.

To reduce water consumption and improve irrigation efficiency, furrow spacing should be 60–80 m, with a wetting depth of 50–60 cm. Irrigation norms depend on soil texture and range between 500–600 m^3/ha. Duration should not exceed 7–10 hours. The final irrigation during the milky ripening stage should be stopped once water reaches the end of the field.

Juice Irrigation Method

During flowering and grain filling, the crop's demand for water and nutrients increases. Farmers are advised to apply the juice irrigation method:

- For every 3 hectares, dig one trench of 3×4×1.5 m
- Apply 3–5 tons of manure per hectare

- Mix manure in the trench and irrigate at night to enhance water use efficiency

This method increases yield by 3–5 quintals per hectare. In areas with shallow groundwater, irrigation frequency can be reduced to 1–2 times.

Manure contains nitrogen, phosphorus, potassium, and micronutrients. When applied to soil or used in juice irrigation, it decomposes with microbial activity, releasing carbon dioxide, which enhances phosphate solubility and improves moisture retention, increasing drought resistance.

Nutrient Management

By analyzing the nutrient content of manure and considering agro-cartographic indicators, mineral fertilizer rates can be adjusted accordingly. With proper juice irrigation, farmers can achieve 60–70 quintals of high-quality winter wheat per hectare.

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