

METHODS

Field investigations were carried out in 2015–2016 on irrigated light chestnut soil in the foothills of the Zailiysky Alatau with different levels of soil availability with mobile phosphorus.

Agrochemical characteristics of light chestnut soils: humus content—2.34–2.54%, alkaline hydrolyzable nitrogen—81.2–97.7 mg/kg and exchangeable potassium—320–340 mg/kg of soils. The experience scheme included the following variants: (1) control (without fertilizers); (2) N50 (nutrition in the phase of 3–5 leaves); (3) N100 (nutrition with N50 in the phase of 3–5 leaves + N50 in the phase of 5–7 leaves). The experiments are based on two backgrounds of mobile phosphorus supply according to Machigin: medium (30–35 mg/kg of soils)—background 1 and increased (40–45 mg/kg of soils)—background 2. Nitrogen fertilizers were added in the form of ammonium nitrate (34% rate of application). The objects of research were varieties of sweet sorghum—Kazakhstanskoe 16 and Kazakhstanskoe 20. Field experience was laid in 4-fold replication with the use of agricultural techniques adopted for this zone [20]. Follow-up analyzes of soil and plant samples were carried out according to generally accepted procedures: alkaline hydrolyzable nitrogen was determined by Kornfield; mobile phosphorus by the Machigin method; exchange potassium from the same extract as mobile phosphorus—on a flame photometer; total nitrogen, total phosphorus and total potassium in plants—after wet ashing of plant material from one sample—according to Kjeldahl, colorimetrically, on a flame photometer. The content of water-soluble sugars in plants under field conditions was determined on a manual refractometer of the brand ATAGO N1. Statistical processing of the research results was carried out according to the methodology of B.A. Dospekhov (1985) using the Agros program (version 2.09) according to S.P. Martynov (1999).