

## SUMMARY

**For the dissertation work 6D080100 – Kamzina Gulim Orazbaevna on the topic "Productivity and fodder qualities of grain depending on application of mineral fertilizers on sandy soils of the East Kazakhstan region", prepared for the degree of Doctor of Philosophy (PhD) in the specialty "Agronomy"**

### **Relevance of the research topic.**

One of the main conditions for ensuring the national security of the country and the formation of a strong state, its long-term successful development and economic growth is food security.

An urgent issue in the animal husbandry of the East Kazakhstan region is to increase the production of inexpensive and high-quality feed, which can be realized on the basis of intensification of field feed production. Perennial grasses play an important role in creating a solid forage base and biologizing agriculture, they are cheaper than other forage crops, which has a positive effect on soil fertility.

One of the main grasses is wheatgrass, characterized by high yield, good forage advantages, flexibility, winter hardiness and drought resistance. Therefore, in the conditions of the Abai region, a comprehensive study of the influence of the method of sowing seeds, the seeding rate and nutritional background on the yield and quality of green mass, hay and wheatgrass seeds is relevant.

Comb-shaped (broad-leaved) wheatgrass– *Agropyron pectinatum* (Bieb) Fzvel), a perennial loose shrubby herbaceous plant with a highly developed fibrous root system, occupying a leading place among hayfields and pastures with a specific gravity of 60% due to its ecological plasticity. It also has a significant share in the composition of forage crops on natural pastures. Due to the possibility of obtaining green mass and hay for a long time, interest in this crop has been growing recently.

Wheatgrass seeds have been considered the basis of the future harvest for centuries, seed quality plays an important role in crop formation, farmers have always paid great attention to their quality. Seeds prepared for sowing, along with known sowing qualities, must have high yield qualities.

Plants form high-yielding and high-quality seeds only in the presence of favorable growing conditions, therefore the role of each agrotechnical approach is very important.

Fertilizers play an important role in increasing the yield of seeds of perennial grasses, which account for 50% of the complex of all factors affecting the growth and development of forage crops.

Unfortunately, in the conditions of the Abai region, the effect of mineral fertilizers on the seed productivity of wheatgrass crops and issues of production process management remain unexplored, which determined the relevance of research.

When growing comb-shaped (broad-leaved) wheatgrass to obtain seeds with the rational use of agrotechnical techniques, thanks to vegetative reproduction, stable homeostatic agropopulations are formed that can maintain high seed yields for several years. However, with a long growing season and long-term cultivation, as a result of the formation of a large volume of annual plant mass, this crop is associated with high absorption of nutrients from the soil, the need for nutrients also increases.

Depending on the yield level, the mode of use, the type and level of soil fertility, the dosage of mineral fertilizers used and the wheatgrass moisture regime, the consumption of essential nutrients may vary significantly.

Taking into account soil fertility, it is necessary to develop a rational mineral nutrition system using optimal doses of fertilizers in order to provide wheatgrass plants with sufficient nutrients and maintain long-term production potential. An analysis of the practice of using mineral fertilizers shows high efficiency and differentiation of fertilizer doses depending on the type and fertility of the soil and the economic purpose of the grass field. When growing for seeds, unlike grass for green mass and haylage purposes, fertilization contributes to the formation of high seed yields, stimulating the good development of generative organs.

Therefore, the analysis of the use of mineral fertilizers in wheatgrass culture, depending on the dose of mineral fertilizers, determines their different effectiveness. In connection with the above circumstances, a comprehensive study of the effect of the method of sowing seeds, seeding rates and doses of mineral fertilizers on the yield and quality of green mass, hay and wheatgrass seeds is relevant.

#### **The purpose of the dissertation research:**

Development of a complex of agrotechnical techniques to determine the optimal method of sowing, seeding rates and doses of mineral fertilizers that ensure the yield and quality of green mass, hay and wheatgrass seed plants by improving the agrophysical properties of sandy soils of the East Kazakhstan region.

#### **Research tasks:**

- determination of the optimal wheatgrass sowing method for the yield and quality of green mass, hay and seed plants;
- determination of optimal sowing rates for the yield and quality of green mass, hay and wheatgrass seed plants;
- determination of optimal doses of mineral fertilizers for the yield and quality of green mass, hay and wheatgrass seed plants;
- determination of the economic efficiency of the use of fertilizers.

#### **Methods of research:**

The zoned variety wheatgrass comb (*Agropyron cristatum*) was taken as the object of the study Karabalykskaya 202, various methods of sowing, seeding rates and doses of mineral fertilizers. The soil for the study was selected according to GOST 28168-89, soil samples were taken at the beginning of the granary okulation period and at a depth of 0-30 cm at full maturity. Agrochemical characteristics of soils: agrochemical properties of soils by phases during the growing season of the

granary in soil samples and soil humus by the Tyurin method, total nitrogen by the Keldahl method, determination of the main nutrients in the soil was carried out according to the relevant GOST 26205-91 standards by the Machigin method with modified mobile phosphorus, exchange potassium in a flame photometer-according to GOST 26205-91, determination of indicators the technological quality of the grass according to the relevant GOST and was carried out according to generally accepted methods.

Statistical data processing was carried out using Excel.

#### **Basic principles to be defended:**

Wheatgrass sowing methods, seeding rates and the effect of various doses of mineral fertilizers on field germination, development and yield of wheatgrass seeds in the farm "Lana" of the Beskaragai district of the Abai region;

- Yield and quality of green mass, hay and wheatgrass seeds depending on mineral fertilizers;
- Economic efficiency of optimal doses of mineral fertilizers.

#### **Characteristics of the main research results.**

- For the first time, a geobotanical study of sandy soil pastures of the steppe zone of the Abai region was conducted;

- have been studied the agrophysical properties of the soils of the farm "Lana";

- The influence of the optimal sowing method on the yield and quality of green mass, hay and wheatgrass seed plants has been established;

- have been determined the optimal norms of mineral fertilizers for the yield and quality of green mass, hay and wheatgrass seed plants;

- has been determined the economic efficiency of the use of fertilizers in the "Lana peasant farm".

#### **Substantiation of the novelty and significance of the results obtained.**

##### **Scientific innovation:**

As a result of assessing the impact of various sowing methods, seeding rates and doses of mineral fertilizers, a technology has been developed that ensures the formation of highly productive agrocenoses of comb-shaped (broad-leaved) wheatgrass on sandy loam and sandy soils of the Abai region. An economic assessment of the methods of growing wheat is given.

##### **The practical significance of the results obtained.**

Based on the conducted research, a technology for growing a combed (broad-leaved) wheatgrass crop for fodder and seed purposes is proposed, providing additional yield per unit area, optimal sowing methods, sowing rates and doses of mineral fertilizers are determined. The use of mineral fertilizers on sandy soils of the Lana farm in the Beskaragai district of the Abai region had a positive effect on soil fertility and the yield of wheatgrass crops, compared with traditional cultivation, the proposed technology increases the productivity of feed and seeds by an average of 25%.

Using of optimal sowing methods, sowing rates and doses of mineral fertilizers in the cultivation of wheatgrass has shown high economic efficiency. High rates were recorded in a parallel sowing variant of 30 cm and 45 cm, the

dosage of mineral fertilizer was in the N80 P50 K40 variant. Here, the cost per 1 ha of crops amounted to 28250 tenge in the control variant, and the Dose of mineral fertilizer amounted to 40300 tenge per 1 ha in the N80 P50 K40 variant, the profit from 1 ha in the control variant amounted to 29750 tenge, and the Dose of mineral fertilizer in the N80 P50 K40 variant amounted to 51700 tenge, and profitability increased to 128.0.

**Compliance with the directions of scientific development or government programs:** the work was carried out under state registration No. 103 "introduction of precision farming technologies to increase the productivity of forage lands in the arid steppe zone of East Kazakhstan" in accordance with the thematic research plan of the Semipalatinsk State University named after Shakarim under program 019.

The doctoral student's contribution to the preparation of each publication. During the course of his dissertation, the doctoral student contributed to the work on the selection of the research object, the definition of the purpose and objectives of the work, the preparation of the program and research methodology, conducting phenological observations of pasture and field plants by season, data collection, processing, analysis, and publication of articles.

**Publishing and passing criticism of the work.** The results of the dissertation research were annually heard and discussed at a meeting of the Department of Agronomy of Semipalatinsk State University named after Shakarim. The main results and results of the work have been published in the form of 8 articles in domestic and foreign scientific publications. Including in publications recommended by the Ministry of Education and Science of the Republic of Kazakhstan (UNCC) – 3 and in foreign publications included in the SCOPUS – 1 database, in the materials of international scientific conferences – 4.

**The structure and scope of work.**

The dissertation work consists of an introduction, 4 sections, a conclusion, recommendations at work, a list of references and appendices. The general text section is represented by computer text on 97 pages, contains 21 tables, 22 images. The list of references consists of 136 literature sources and includes 10 applications.

