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ECONOMIC ASSESSMENT OF GROWING OF CORN HYBRIDS OF DIFFERENT FAO GROUPS IN THE CONDITIONS OF THE STEPPE OF UKRAINE

The production of grain products occupies an important place in the production of agricultural products. The largest specific weight in the structure of sown areas and gross product collections is occupied by cereals compared to other agricultural crops. Grain farming occupies a basic place in the agricultural production of Ukraine and guarantees its food security. The production of corn grain has an important national economic importance, therefore the efficiency of production, which is determined by certain indicators, allows to assess the real state of production, thus prompts to look for new ways to increase it - this is an important task and an urgent issue today. With this in mind, corn now belongs to one of the crops that have become the most profitable for agricultural production. The main advantages of growing corn are a wide market and a positive production economy [1].

The task of the presented research was to analyze the practical aspects of profit accounting, analysis of the cost of production of corn per grain when using innovative corn hybrids at different sowing times in the Northern Steppe.

The work used the following hybrids of Ukrainian selection, entered in the State Register of plant varieties suitable for distribution in Ukraine: Stepovy, Oleshkivskyi, Tronka, Gilea. Originator: Institute of climate-oriented agriculture of the National Academy of Sciences

In accordance with the data of the technological maps and additional regulatory materials, we have calculated the economic costs and their efficiency when growing corn hybrids of different FAO groups for grain.

According to the results of the analysis of the economic indicators of the cultivation of corn hybrids, on average for the years 2021–2023, the highest value of gross production per 1 ha was obtained by sowing the hybrid Oleshkivskyi (FAO 280) for sowing on 25.04 and 05.05 - 45.60 and 43.55 thousand hryvnias /ha respectively. In this version, the lowest cost price of one ton of grain was also set at 2.38 and 2.56 thousand UAH/t, respectively.

The cost of gross production from 1 hectare for different sowing periods was the maximum for sowing on April 25 and amounted to UAH 41.02 thousand/ha, it was slightly lower for the sowing period of May 5 - UAH 39.50 thousand/ha, and even lower for sowing on April 15 - 38.50 thousand hryvnias/ha. The lowest cost of gross production was for sowing on 15.05 - UAH 34.86 thousand/ha. Taking into

account the production costs of growing corn, it should be noted that the most profitable and the least expensive agricultural measure was the sowing time. Due to the increase in the yield of corn grain and the reduction of technological costs, the net profit amounted to 14.89–23.87 thousand hryvnias per hectare.

The Oleshkivsky hybrid (FAO 280) had the highest conditional net profit for sowing on April 25 – 27.10 thousand UAH/ha. The highest conditional net profit of the Tronk hybrid (FAO 380) was for sowing on April 25 – 23.87 thousand UAH/ha. The highest conditional net profit of the Gilea hybrid (FAO 420) was for sowing on April 25 – 19.94 thousand UAH/ha. The precocious hybrid Stepovy (FAO 190) had the highest conditional net profit for sowing on April 15 – 20.18 thousand UAH/ha.

New hybrids, new technological techniques or their complex, used in specific environmental conditions, require an objective economic assessment of their advantages or disadvantages. The technology of growing corn hybrids should be economically efficient, that is, it should use all production resources in order to obtain high-quality agricultural products with minimal labor, material and financial costs.

A comparative analysis of the effectiveness of different methods of growing corn for grain in terms of net profit showed that the yield of corn grain is closely dependent on the weather conditions of the year, especially on the amount of precipitation.

Thus, in the favorable weather conditions of 2021, the highest grain yield of corn hybrids over the years of research was observed.

The grain yield was 16.8–33.6% higher than in 2023 and 37.3–93.9% in the most critical year in terms of rainfall in 2022.

The Oleshkivskyi hybrid had the most stable yield in 2021 according to the sowing period (8.11–8.67 t/ha), and there was also high stability in conditional net profit (29.10 – 31.88 thousand hryvnias/ha).

However, the year 2021 was the most optimal in terms of rainfall, which made it possible to obtain the largest conditional net profit from the medium-season hybrid Tronk (FAO 380) – 32.59 thousand UAH/ha for sowing on 05.05.

There was also a high conditionally net profit of the medium-ripening hybrid Gilea (FAO 420) for sowing on 05.05 - 31.77 thousand hryvnias/ha.

The smallest conditionally net profit was for the pre-matured Stepovy hybrid (FAO 190) for sowing on April 25 - 23.20 - 25.58 thousand UAH/ha. The yield of this hybrid was quite stable and the net profit was stable. This hybrid has the lowest genotypic yield potential and has a high level of stability of its manifestation under different growing conditions.

In 2021, with favorable weather conditions, on average, the maximum conditional net profit (30.24 thousand hryvnias/ha) and profitability (159%) were observed during the sowing period - May 5.

A comparative analysis of the cultivation of corn for grain by years of research in terms of conditional net profit showed that the amount of yield and economic indicators of production was significantly influenced by the weather conditions of the year. Thus, the year 2022 was the most unfavorable in terms of the amount of precipitation and the temperature regime for growing hybrid corn in this agro-

ecological zone, so the economic indicators of growing corn were radically different from 2021 and 2023.

In 2022, on average for hybrids, the maximum conditional net profit (16.19 thousand hryvnias/ha) and profitability (87%) were observed during the sowing period of April 25. Conditionally net profit this year decreased in most hybrids by 2-3 times, and in some hybrids (Tronka, Gilea) the profit varied within the unprofitable limits. However, it was possible to minimize drought losses by early sowing dates, and sowing on April 15 and 25 made it possible to obtain a conditional net profit in most hybrids in the range of 12–17 thousand UAH/ha. In a dry year, the highest profit during the late sowing period (May 15) was shown by the Stepovy hybrid – 9.23 thousand UAH/ha. This hybrid, despite lower yield potential under favorable weather conditions, is most adapted to dry conditions and can be used at a late sowing date (May 15) even in dry years. In a dry year, the highest conditionally net income (16.27–24.58 thousand hryvnias/ha) and profitability (86–133%) was observed in the Oleshkivskiyi hybrid, which showed a high level of homeostaticity, however, yielded in terms of profitability and profitability (7 .00 thousand hryvnias/ha and 37%, respectively) of the precocious hybrid Stepovy (9.23 thousand hryvnias/ha and 49%, respectively) for sowing on May 15.

Thus, in years with low reserves of moisture in the soil for the spring pre-sowing period, it is necessary to use hybrids from FAO 190-290 with planning of early sowing periods.

Conclusions. The efficiency of corn cultivation is determined by the level of profitability, the value of which depends on the price of the final product and its cost price. The value of the profitability of growing corn in the conditions of the Northern Steppe (GTKV-IX = 0.69–0.89) showed that profitability fluctuated over the years of research, both its increase in years with favorable weather and its loss in dry years were observed. The maximum level of profitability was observed in 2021 (130–172%), the minimum level of profitability was observed in 2022. In dry years, it is risky to use hybrids with FAO 380-420, especially during the late sowing period in May, which can lead to significant production losses (-1.19 thousand hryvnias/ha for the Hylei hybrid during the late sowing period). The use of corn hybrids adapted to the agro-ecological conditions of the Northern Steppe and the use of sowing dates corresponding to the genotype makes it possible to obtain a guaranteed net profit in the range of 31.45–32.59 thousand UAH/ha in years with favorable weather conditions and 17.01 – 24.58 thousand hryvnias/ha in dry years.

References:

1. Vozhehova R., Marchenko T., Lavrynenko Y., Piliarska O., Zabara P., Zaiets S., Tyshchenko A., Mishchenko S., Kormosh S. Productivity of lines – parental components of maize hybrids depending on plant density and application of biopreparations under drip irrigation. *Scientific Papers Series “Management, Economic Engineering in Agriculture and Rural Development”*. 2022. Vol. 22, Iss. 1. P. 695–704.