

## Abstract

Soil cultivation as well as seed sowing are really important technological operations during cereal and sweet corn growing. It is observed that energy expenditure is limited (simplified) during the soil cultivation process simultaneously with the improvement of the seed sowing accuracy in terms of sowing depth as well as longitudinal distribution of seeds.

The goal of this research was to indicate the relationship between the applied ways of culture and sowing (procedures performed separately, combined, simplification of cultivation) and exploitive economic rates (energy expenditure, cost, technological and technical progress). The research problem was to state the influence of cereal seed sowing technology in field plant cultivation on exploitive economic rates of this technological operation. The second aim was to examine if the new techniques of simplification of cereal and sweet corn cultivation introduced nowadays requiring modern, expensive machines and tractors are economically reasoned taking into account current prices. The research methodology was based on examined groups: cultivators, seed units, cultivated seed aggregates, cultivated –seed- manurial, aggregates used full in soil which was not cultivated or fertilized as well as set aside soil. Three working width cultivated seed sets of 3, 6, 9 m were selected, which are equal to the ones used in Polish agriculture. Tractors joined with machines were chosen according to the ballast of the tractor engine, so that it was about 75% of nominal force. Survey researches conducted in four farms with the acreage of 90,134, 300 and 640 ha of farmland, supported the rightness of these assumptions. The farms had from four to five tractors with the engine power from 29/39 to 287/390 kW/KM, growing together with the acreage of the farm. The average engine power in an individual farm amounted to : farm A – 58/79, B – 114/155, C- 118/160, D – 154/209 Kw/km. The analysis of energy outlay, costs, technical and technological progress was conducted for twenty tractor-machine sets characterizing individual groups of analyzed machines. In all experiments the biggest amount of energy took place in the case of the machine with 3 m working width. The wider width of the planter as well as higher power of tractors, the lower costs of cereal seed sowing. The rate of technical progress rises clearly for machines with great working width corresponding to tractors with high power and adequate equipment. The lowest value of technological progress rate characterize planters with 3m working width, whereas the highest value of this rate correspond to an aggregate with 9m working width. The indicator vale changed within the great bounds. However, it decreased together with the growth in working width of the machines. The combination of cultivation and sowing technological process as

well as introducing the simplification of cultivation have their pros and cons. The advantages are connected with lower energy outlay and costs. One of the disadvantages is more complicated work organization, worse fitted working speed or working width of cultivated - seed component sets. The final selection of tractors and planters for farms depends on the farmer, who has to take into account capital outlay, soil and weather condition as well as ecological restrictions. Nowadays farmers use the professional services in terms of field works increasingly. Nevertheless, the prices of such services are clearly higher in comparison to the work done using their own equipment. That is why it is suggested to continue the research on the organization of service execution of field crops and sowing together with determining exploitive-economic rates and then comparing them with the work done using the farm equipment.

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