

CONSERVATION SOIL TILLAGE AND ENVIRONMENTAL ISSUES

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Introduction: Along with the positive factors of the conservation tillage system, it impose the use of pesticides in greater quantities, which affects negatively soil microbiological activity and affects the agricultural environment. Within SAUM (The department of Soil Science and Agroecology) were highlighted several positive aspects of conservation tillage implementation, less were investigated environmental aspects and imposed problems. In the sustainable agriculture, the efficiency of conservation tillage system should be based on energy inputs evaluation, along with the characteristics of soil vitality.

Aims: Comparative agroecological research of conventional and conservation soil tillage systems by evaluating energy efficiency, soil respiration and cellulolytic activity.

Materials and Method: The research (2005-2016) was carried out in long field experience, on carbonate chernozem with loamy texture. During 2014-2015 years have been studied the energy structure and efficiency of basic cereal crops production: winter wheat and corn in the conventional - plowing and conservation - No-tillage variants, DES Chetrosu - SAUM, Chisinau.

The energy efficiency of cereal crops agroecosystems was performed based on the determination of energy indices: net energy, energy efficiency and specific energy (energy consumption per kg production). Indices were calculated based on energy conversion inputs and outputs - crops yield. Soil respiration was determined according to the Ştatnov V. method, and cellulolytic activity by incorporating linen tissue in soil.

Results: Energy efficiency evaluation for winter wheat crop showed that in conservation system net energy (average for 2014-2015 years) was greater with 69,5%, energy efficiency increased by one unit or 42,2%, and specific energy (energy consumption per kg production) decreased by 30%, compared with conventional system. There was established a higher energy efficiency in No-tillage system, mainly caused by yield level that was higher by 38.2%, comparative with conventional variant. There were obtained data and diagnosed some regularities of carbon chernozem soil respiration and cellulolytic activity.

Conclusion: Conservation soil tillage system - No-tillage in the early years of implementation, comparative with conventional, ensured a higher energy efficiency in winter wheat and corn agroecosystems. Previous research, and that realized in 2016 year showed that soil cellulolytic activity in winter wheat agroecosystems under conservation system is less with 20%, comparative with plowing variant. Chernozem soil respiration research established that parameter is directly influenced by soil moisture, and it is higher in favorable climatic years. It was established that year of herbicides application inhibits soil respiration, and during the second year of applying soil respiration decreases on the all variants, comparative with corn. In the single corn system (30 years) soil respiration is less than in crop rotation.

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