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ADAPTIVE - LANDSCAPE MODEL OF AGRICULTURAL ECOLOGICAL BIOTECHNOLOGIES

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Abstract

The adaptive lanscape model of agricultural ecological biotechnologies is based on the rules and mechanisms of steppe ecosystems that functioning in natural regime, which implies the insurance of a lower difference between local practiced agroecosystem and natural steppe ecosystems. Therefore, the basic principles of agricultural ecological biotechnologies are: agroecosystem adaptation to the landscape conditions, agroecosystem biologization,pedogenetical ambience conservation and renaturation of zonal pedogenetical process.

INTRODUCTION

In spite of the fact that ecological agriculture became an basic topic of the guvernamental programs, and also an UE priority, till nowadays on different decision levels and especially of production, the agricultural ecological practices are simplistic perceived. The views are reduced to the non using of fertilizers or synthetical plant protection products, manure aplication etc. In ambiental chapter, the ecological agriculture is reduced just to the soil amelioration and sustaining of the soil productive function, of biodiversity and soil structure etc. [3]. But in fact, the ecological agricultural practices presents complex systems not less sophisticated than agricultural industrialized systems.

MATERIAL AND METHODS

According to the law CE 834/2007, key subsystems of agricultural ecological technological systems remain characteristic components of intensive technologies: crop rotation; soil processing; fertilization; seed/planting material and sowing; management of fertility factors (production); protection against weed/pests/desease/; harvest.

According to the content of technological systems the main components of the regional ecological agricultural model are: landscape adaptation of agroecosystems; biologization of agroecosystems and biodiversity promotion of agricultural ecosystems; pedogenesis ambience conservation and renaturation of pedogenesis processes;

restoring of the volume/balance and biochemical circuit of substances; enlarged reproduction of the soil fertility; restoration of soil functions and their trend insurance of natural evolution [2].

Due to promoting the above named technological ecological systems, is basing on systems and ecological natural cycles. Hence the performance indices of technological ecological systems are: high degree of performance and intensity, according to the ecological agricultural principles; combining the ecological aims with the economical one; utilization at the maximum efficiency of the natural potential and reduction of the material and financial costs to obtain one production unit; reduction/avoidance of the soil degradation processes; ensure the integrity of the production process; emphasis placed on hygienic, ecological and biological production quality; promoting a new agricultural ethic.

In base of the above ideas, was developed the support of the agricultural ecological technologies (Figure 1).

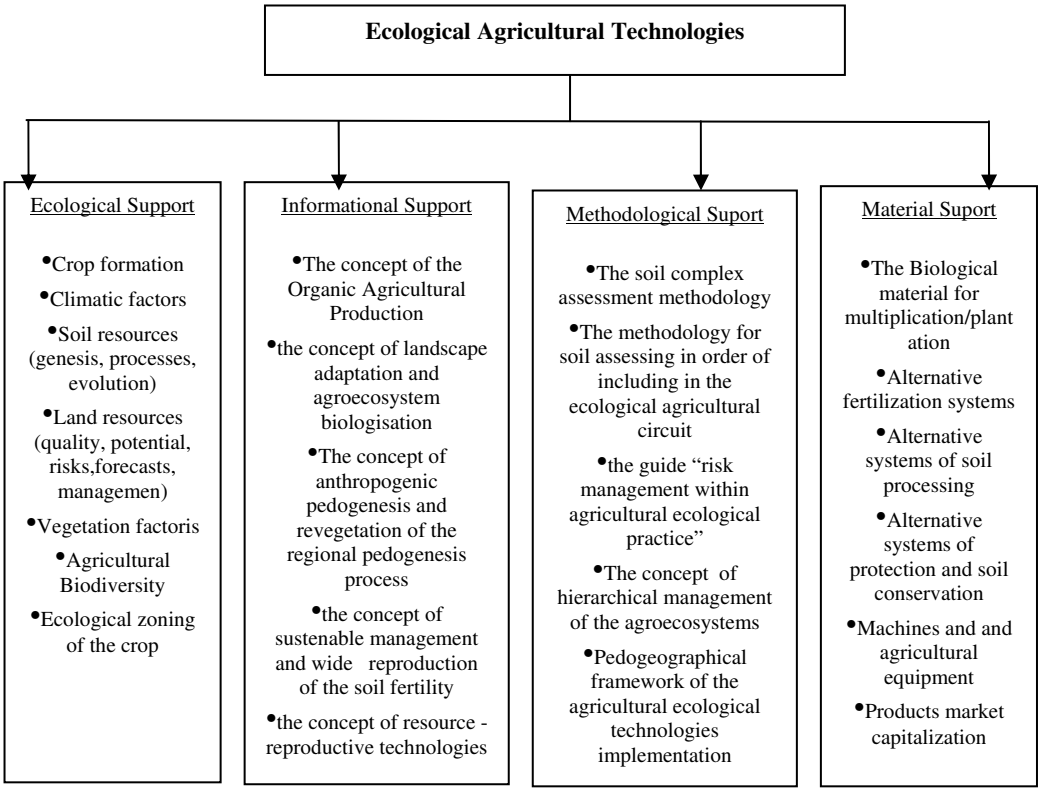

Fig. 1. The support of the agricultural ecological technologies

RESULTS AND DISCUSSION

At present in the world exist several models of agricultural ecological practices: biologic, including biodynamic, organic and organo-vegetal. These were developed in different periods in Europe, being conformed to the bio- and pedoclimatical framework of the region space. The achievements from naturalist pedology field, especially achievements registered at the compartment of pedogenesis theory and aplication of the soil physical principles for the pedogenesis process evaluation [1], created the conceptual-methodological framework of developing one special adaptive landscape model used for the carpato-danubiano-pontical region (Figure 2, Table 1).

CONCLUSIONS

1. The adaptive lanscape model of agricultural ecological biotechnologies is based on the rules and mechanisms of steppe ecosystems that functioning in natural regime, which implies the insurance of a lower difference between local practiced agroecosystem and natural steppe ecosystems. Therefore, the basic principles of agricultural ecological biotechnologies are: agroecosystem adaptation to the landscape conditions, agroecosystem biologization, pedogenetical ambience conservation and renaturation of zonal pedogenetical process.

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Table 1

Hierarchical levels of implementation of the ecological agricultural technologies

Hierarchical level	The involved technogen factors	Landscape functions	Intrinsic factors	Evaluated parameters
0 00	Biological characteristic of the plants. Physical traits which cause the biological potential use of the plant.	Soil – support for the plants. Soil – development environment for the root system. Soil – water/air/heat/nutrition provider.	Granulometric composition. Apparent density. Cohesion and penetration resistance.	Granulometric composition. Apparent density. Differential porosity.
1 10	Idem + solar radiation + temperature. Physical traits which favors the radiation potential exploitation.	Soil – surface receiving solar radiation, transformer and heat provider.	Termical adsorption capacity. Specific heat. Thermal conductivity.	Humus content and component. Granulometric composition. Differential porosity.
2 20	Idem + water resources (rainfall, irrigation) Physical trats determining water resource valorisation.	Soil – surface participating in water circuit within nature. Soil – water storage, reservoir and supplier.	Permeability for water. Hydraulic Conductivity. Water capacities (maximal – molecular, field, capilar, total).	Granulometric composition. Apparent density. Differential porosity.
3 30	Idem + transformation of substance and biogeochemical circuit constitution of substances. Physical traits which determine the sens and intensity of transformation processes of substances and the constitution conditions of biogeochemical substances circuits.	Soil – storage and transformation space of organic debris. Soil – space for the substances interaction from the big geological circuit with the small biological circuit.	Hydrothermal regime. Airhydrical regime. Oxido reduction regime.	Differential porosity
4 40 401 402 4021 4022 403 404	Idem + practiced technologies. Physical traits which determine practiced technologies. Irrigation. Fertilization. Mineral fertilization. Organic fertilization. Process system. Protection and conservation measures.	Soil – space of substances migration – accumulation. Soil – space of fertilizers / amendment administration – transformation. Soil – body of modeling thru agricultural processing.	Porous space (volume, size, stability, continuity).	Granulometric composition. Apparent density. Structure, hydro-stability.

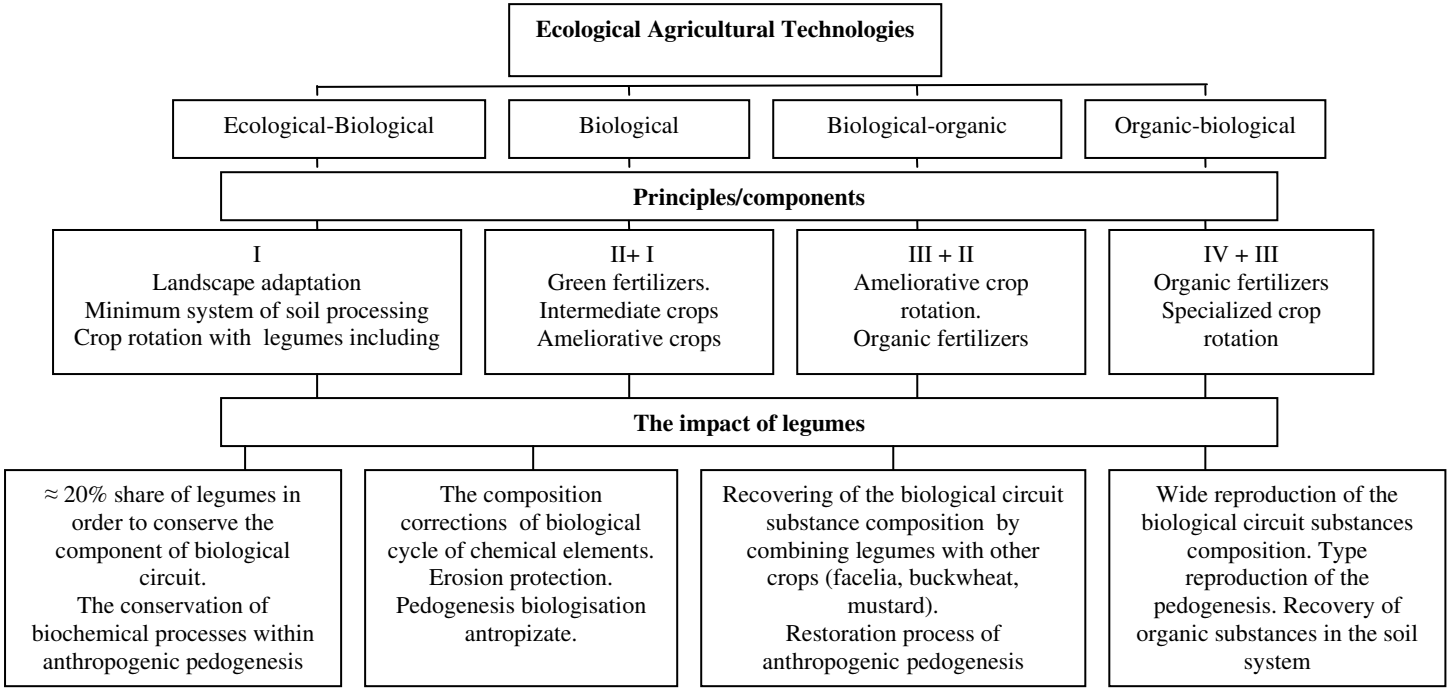

Fig. 2. Conceptual-methodological framework of the ecological agricultural technological resource implementation