Abstract: This work is dedicated to the problem of ecological agriculture. The analysis of existent technologies of minimum till of soil is conducted. The more similar examples to ecological agriculture are separated on the example of such system implanted in PE "Agroecology". We offer a system of concepts of till of soil for maintaining its fertility and growing ecologically clean products of crop production. We light up the problem of insufficient maintenance of moisture and ways of destruction of non-arable sole by mechanical and biological character. We offer an example of technological operations of till of soil that is implanted for ecological and biologically restorative agriculture.

KEYWORDS – SYSTEM, CONCEPT OF AGRICULTURE, SOIL, BIOLOGICAL BALANCE, TECHNOLOGY

Raising of problem. There are hundreds of technologies of till of soil in a world agricultural production. There are thousands of machines and mechanisms – they vary on operation principles, but work of their majority is sent to the solution of one aim: to form in the overhead layer of soil the best terms for the vegetation of cultural plants. Well-known scientists in agriculture and technicians conduct the search of construction for optimal soil processing machine, to satisfy all biological, technical, power and other requirements to technologies. Recently the most meaningful and influential is the factor of ecologization of technologies for production of goods for agrarian sector. Next to it, let’s not to forget that life-giving potential for biologically active soil is not endless. Watching for application of modern intensive technologies of growing economically profitable cultures (corn, sunflower and others), there is an inconsiderable idea considering ground resources, that we left for next generations.

One of the examples of "wise" labor on soil is trials that are founded in PE "Agroecology" of Shishaky district, Poltava area. They started, on the first look, the row of simple principles of land-tenure, and strictly following them during a few decades, this enterprise is capable of maintaining its stable and high harvests of ecologically clean products.

Systematization of technological operations of the mechanized till of soil for the terms of ecological agriculture with maintaining its biological resources and receiving stable high harvests is actual both for the economies that engage in an agricultural production. Negative and unconquerable in this technology is over compression of soil and, as a result, visible reduction to the productivity of cultures.

Aim and research tasks. The aim of our research is development of the system of principles of the mechanized till of soil using ecological technologies with development of requirements to the working organs of soil processing machines. For achieving such aim we need to solve next tasks: to conduct the analysis of the existing technologies of till of soil that is used in an enterprise; to offer the methods of mechanical influence on soil taking into account general requirements; to work out the complex of machines for implanting, as a systems of ecological agriculture.

Analysis of basic researches and publications where the decision of problem is founded in. There are some well-known various technologies of growing agricultural cultures. Only on some of them we’ll turn our special attention, as, unlike classic, they have a row of positive signs for the analysis of technologies, that is implemented in PE "Agroecology".

No - Till is the system of agriculture, that got to Ukraine from South America [3]. It’s built on bringing in of the active biological symbiosis between vegetable, animal and the world of natural micro natural habitat of the field surface. General positivism of the introduction results of this technology changes on complications that are needed to be overcome in the process of her formation in the real terms of Ukraine. Negative and unconquerable in this technology is a necessity of the protracted (up to10 years) renewal of biological potential of soil, as a result – inscrutability of proprietors in long-term reduction to profitability of agricultural production. Experience showed that the input of such land-tenure without previous long-term preparation reduces the productivity of grain-growing during 2-3 years of application up to 7-10 c/hectare. Such approach to this technology makes principles that is propagandized and realized in countries with the inculcated technologies of similar agriculture. It seems, the profaned method that appeared effective on the 140 million hectares of earth in the whole world (approximate 10% of all agricultural lands) is completely destroyed and is ineffective in our country. Because in reality, advantages of method that was especially advertised by the salespeople of the imported technique were not confirmed in practice.

From our opinion, widespread and well-known technologies of till of soil for comparing to such that are inculcated in PE "Agroecology" are unacceptable or insignificant.
Results of researches. The "old systems" of till of soil lead to increasing of exploitation of the ground resources and their degradation. In such agricultural process exists high degree of risks. The special attention should be dedicated to the new system of concepts on that biological agriculture is based:

1. Ploughing is a harmful component during till of soil, in particular in droughty and small moist regions [4].
2. Vegetable rests are a valuable product and must be on the surface of soil, as mulch [5].
3. A presence of negligible quantity of the uncultivated plants is not forbidden.
4. Scorching of vegetable rests (mulch) is forbidden. A presence of the permanent ground cover is necessary.
5. Biological processes that pass on the surface of soil must be taken into account with a greater attention which will provide high fertility of soils.
6. Biological fights against insects-pests and complete prohibition of the usage of synthetic chemical substances.
7. Water and wind erosions are the symptoms of wrong methods of treating this exact field or ecosystem.

Forming and introduction of the system of agriculture, following the marked principles, must renew the lost potential of soil for the reliable providing of population with the products of agrarian production.

Well-known optimal terms for the vegetation of plants mainly describe agrochemical and biological requirements. Scientists and experts set their optimal indexes for the terms of growing may be described schematically (Pic. 1). As known, the seed of plant, having biological potential to the growth, must get in conditions suitable for the beginning of vegetation and free access to the nutritive elements. Well-known scientists-biologists assert that on the initial stages of development, a plant gets feeding using roots only from water solutions. Therefore their access to water in its different form is pretty actual within the limits of physical location.

An urgent problem that appeared before the farmers of south and central part of Ukraine is reduction of atmospheric precipitations during a year. This tendency exists during few decades and, maybe, is related to the global climatic changes. One of ways of providing plants moisture is its maintenance and accumulation in soil. The insufficient amount of precipitations, or rather their annual unevenness, leads to (pic. 1) the fact that atmospheric moisture due to the excessive moistening of superficial layer of soil doesn’t have the opportunity to get into the deeper layers due to existing of non-arable sole. Formed because of the same type of risks. The special attention should be dedicated to the new system of concepts on that biological agriculture is based: till of soil during a few years, a non-arable sole becomes water- and air unreachable. Forces atmospheric moisture to evaporate and wash up from an upper level, and from lower – due to the lack of addition to the ground supplies it becomes inaccessible for the plants root system.

Well-known technologies of destruction of undesirable waterproof layer are chisel plowing, splitting and other types of deep till of soil. Together with the positive signs of these technologies we should mention its high enough power consumption of the process and destruction of structure of soil, that it is related to water- and air reachability of corresponding layers.

The positive example of practical realization of avoiding the "old systems" of till of soil isn’t used. Plough till is considered harmful and impermissible in general. A technological process of growing agricultural cultures (including cultivated ones) is based on well-known and effective operations:

- pre sowing till is executed by flat carving paws with hard stacks contained in the combined aggregates with two- or three repetition on the depth of sowing;
- pre sowing till, in case of absence of using organic fertilizers is conducted by disk machines on a depth of not more than 5-7 cm;
- leveling of the field;
- complete prohibition of the usage of synthetic substances of plants defense;
- harvesting using well-known technologies with fragmentation and even spreading of the nourishing rests.

Till using disk machines allows to conduct mixing of dry organic fertilizers with soil only on a surface. Then appears compost – accessible for plants and atmospheric moisture during their vegetation. The layer of soil that is situated below isn’t destroyed, not over thickened and keeps water- and air reachable channels, doesn’t violate the biological natural habitat of this level.

Pre sowing till, in case of absence of using organic fertilizers, doesn’t need the previous leveling. The combined aggregates of original construction with the hard stacks of flat carving

Pic.1. A chart of layers and agrotechnical conditions are to the germination of seed

<table>
<thead>
<tr>
<th>Size fractions in soil</th>
<th>Wetness</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-15 mm</td>
<td>10-12%</td>
</tr>
<tr>
<td>2-5 mm</td>
<td>10-18%</td>
</tr>
<tr>
<td>&lt;2 mm</td>
<td>&lt;10-18%</td>
</tr>
</tbody>
</table>

subsoil sole

dampness in the atmospheres

dampness in the soil
Paws are guaranteed to process soil on the depth of sowing. Their repeated use is related to the necessity of the provoking of steppe, that it is also described in well-known agronomical works. Such technology is also keeps inviolable the basic layer of soil, allows providing plants with organic feeding directly in the zone of their roots. Balance of moisture is created due to its accumulation in deeper layers and their availability for the root system.

Prohibition of the usage of synthetic substances of plants defense allowed using biological potential of the vegetable and animal world directly in the field. A fight against steppe is needed on the stage of germination of seeds. Due to the increasing potential of water resource it is possible to postpone the timing for sowing, that is needed for mechanical elimination of absolute majority of undesirable plants.

The implemented technology gave for the enterprise an opportunity to get stable high harvests and considerably to decrease their prime costs. The main advantage, that is most actual in the modern terms of rural agriculture, is possibility to get ecologically clean products which can compete not only in Ukraine, but also in the world society.

**Conclusion.** We conducted analysis of technologies similar to implemented in an enterprise showed a necessity for: 1. Creation of the system of machines built on ecological principles of agriculture and directed to restoring biological potential of soil and its maintaining for a future generation. 2. Further perfection of construction of the combined soil cultivating aggregates by developing of conception of the guaranteed minimum superficial till. 3. Application of existent agricultural machines and world advanced experience for creating conditions for ecological agriculture in the country.

**BIBLIOGRAPHY**