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DEVELOPMENT OF TECHNOLOGICAL AND TECHNICAL REQUIREMENTS FOR TWO-PASS TECHNOLOGY OF CULTIVATION OF GRAIN CROPS

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The existence and development of any society fully depends on the level of providing people with food, which represent organic matter, which in the vast majority gives farming. Scientists predict that in the twenty-first century humanity 90% will be provided with food at the expense of agriculture, because it is that unique and irreplaceable, besides a unique method of concentration of solar energy in the organic matter of green plants. Thus agriculture is the primary to create wealth for humanity.

Key words: power module, tractor, complex, soil, crop, grain, straw, fertilizer, technology, wheat.

Introduction. A comprehensive study of the requirements for the cultivation of grain is the basis for the development of high yielding cultivation technologies. Requirements for temperature, moisture, light, providing nutrients, etc. during the growing season are constantly changing. The agronomist will reach the planned harvest, if will be able to combine the technology of cultivation with specific conditions of the year and to introduce appropriate adjustments. It's necessary to know the optimal parameters of natural factors.

Problem. Largely, in growing crops is necessary to scrimp and save not only seeds, but also fuel. It is necessary to perform as possible to save time and increase productivity at the expense of nutrients. First - you need to use more organic fertilizers, namely: manure, compost, liquid organic fertilizer and compost, the second is to use a mobile technological complex with the energy module, preferably a crawler, not to tamp the soil and keep more moisture and not destroy the soil structure. Mobile technological complex is built out of process modules and power module. The energy module will be used to perform multiple operations.

Analysis of recent researches and publications. No-till (zero tillage) is a technology efficient agriculture where no tillage and crop residues remain on the soil surface. Weighty is the argument that while implement the system no-till conditions are created under which the soil becomes resistant to degradation by water and wind, through surface protection plant residues or growing plants. This is characterized by maintaining the content of organic matter and humus, reducing loss of soil moisture through evaporation, and most importantly, saves energy and fuel. The most serious problems are the high prices for purchasing of technical equipment [1].

The purpose of the research. The purpose of this study is to minimize the number

of passes of the rolling technological complex on the field, when all the necessary operations with agro-technical requirements and in compliance with the calendar for growing crops. This mobile technological complex is capable to perform all necessary agricultural operations namely sowing and harvesting.

The results of the research. For growing crops, for example winter wheat, offered "Two-pass technology". This technology includes the set of all operations that are performed in normal cultivation winter wheat. That is, all necessary operations will be executed in sequence, but only for two passages. Technology gives you the opportunity to save money and increase productivity ; -the performance depends on the seeding rate, tillage, the quality of seed, care, planting, organic and mineral fertilizers, which ensure the sterility and uniformity of germination giants with the necessary density of plants. Fertilizers will be made by the new technology along with seeds and still depend on weather conditions. Mobile technological complex is built on a modular principle. On caterpillar power module are mounted process module. Mobile technological complex practically rams the soil in comparison with the wheel. Power module must have an engine capacity of more than 450 h.p. , enough to perform the following operations to be executed by one complex. The efficiency lies in the fact that we have the opportunity to use the same energy module, which was used at sowing, and at harvest that makes it possible to save fuels and lubricants(fuels and lubricants). The equipment modules are mounted easily and cling on power module. Sowing with simultaneous application of mineral fertilizers and herbicides. It is proposed to use such seed to meet all agricultural requirements of quality and "two-pass technology." The first pass is performed following range of fully integrated operations: 1.Preparing the fields for planting. 2.Sowing. 3.The application of herbicides. 4.The application of organic fertilizers. 5.Seed's hardening in the soil. 6.Rolling. Choosing a particular method and time of fertilizer application should be considered in determining those factors as properties of the soil cancel planned yield, farming system and the results of agrochemical soil analysis for nutrients and other indicators. It is therefore proposed that this method of sowing on below specified technologies called "Seed capsule" (Fig.1).Under favorable conditions, seedlings emerge in 7-9 days after sowing. Herbicide – 1, meanwhile, dissolves in the soil and stops all wild grass and weeds, the herbicide acts on the 8 – 10th day after soil application. Total weeds loss occurs within 2 to 4 weeks, when the seeds of the wheat is in the tillering stage. Organic fertilizer – 2, is decomposed and feeds on the nutrients of wheat seeds – 3, to optimize the growth and start climbing. This method is achieved by the uniformity and completeness of the stairs sturdy plants, so they could like, better overwinter and give high yield. After 13-15 days, when the plant produces 3-4 leaves at a depth of 2-3 cm is formed the tillering node is the phase of tillering (underground shoots). By winter, the plant should form a 2 to 4 shoots. For this you need 40-50 days of autumn vegetation. The root system is deepening to 50-70cm. Winter wheat is a culture of high potential yields. It was found, that among winter crops, winter wheat is one of the most demanding soil and growing conditions. Gives high yields on humus soils with a deep humus

layer and favorable physical properties, sufficient reserves permissible for her nutrients and moisture, with neutral reaction of soil solution (pH 6-7,5). It is the main cereal zones of Forest-steppe and Steppe.

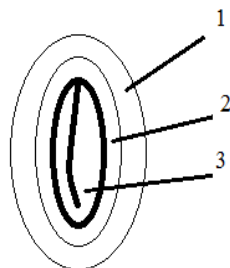


Fig. 1. Seeds in a capsule: 1 - herbicide; 2 - organic fertilizer; 3 - wheat seeds.

To a lesser extent its requirements are soil specific to the area of marshy woodlands. According to our data, the density of productive stalks is in the range of 580 - 600 pieces/m² over seeding rate from 2 to 5 million/ha. Research Institute of grain farming suggest that the high-quality preparation of the soil and optimum moisture seeding rate 3; 4; 5; 6 million/ha gave the same yield. According to I. Foltin in Europe get almost the same yields when sown 2.5 and 5 million germinating seeds per 1 ha. In England collect up to 60 kg/ha of grain, even at the density of 60 plants per 1 m². According to others, at the seeding rate of 100 kg/ha spring is formed in almost 700 of productive stems. As you can see, the yields are less dependent on the number of plants per 1 m², and more about the number of productive stems. Therefore, the proposal of N. Savitsky, relative to determine the seeding rate for optimal stebleton made in 50 years, and still unfulfilled, deserves more attention the plant density is not only a frame of the spatial construction of the overground part of plants, but their root system. Therefore, crops that are optimized by the number and uniform placement of plants and stems, have the best conditions of soil, light and air supply. It is particularly important in reducing environmental stress when grown using intensive technologies. According to some scientific research institutions and land varieties, the optimum seeding rate of winter wheat varieties in the range of 4-6 million/ha [1]. In the ontogenesis of wheat there are 12 stages of organogenesis and such phenological phases: germination, sprouting, tillering, booting, emergence, flowering, formation and poured grains, dairy, wax, and full ripeness. Seed germination, stage of germination and tillering occur in the fall, during the 1st and 2nd stages of organogenesis, the latest phenophases and stages of organogenesis in the spring and summer of next year. The duration of the vegetation period in the autumn and 40-50 days in the spring and summer - 90-110 days. The mass of 1000 seeds is 35-50g [1]. The seeder should produce the distribution of seeds over the whole area sown. When sowing winter wheat, it is desirable to use a mobile technological complex, which corresponds to the agrotechnical requirements and needs. Seeders operate at a zero level. Working units of the apparatus is able to carry out pre-sowing land preparation, to sow crops and to make the necessary fertilizer, after which the leveling and compacting of the soil. To working tools of the device are spring harrows, several rows of flat-cutting legs and rod rollers [1]. In the second

pass, the following list of operations: 1. Mowing ears of grain. 2. Treadeth of crops. 3. Throwing across the field nourishing plant residues. 4. Spraying fields with liquid organic fertilizers. 5. Grinding of nutrients of plant residues. 6. Nutrient mixing of plant residues with the soil. 8. Rolling plancast roller. For all these operations, is recommended the complex, which is capable in one pass to mow, to thresh and clean the grain from the ears and straw. He is able to do more spraying straw liquid organic fertilizer (this will serve as the glue to straw not fanned by the wind on the field), it will stay wet on the field and will serve as organic fertilizer on the field. For combine complex which uses the caterpillar power module, which was used at planting. Caterpillar power module has a GDP front and rear, which is able to give rotational speed in the range from 360 – 1050 turn/min, and a total capacity of 250 HP., enough to rotate the two shafts rotary threshing machine. Is wheeled caterpillar power module is maneuverable in turns and has a high tractive power on the hook. The hopper Assembly module which will accumulate the grain will be attached to the tractor three-point scheme (the triangle) hanging, in order to balance the tractor. Hydraulics to turn the auger, which will crumble and the load the grain into the vehicle. The hopper will cling to the container for liquid organic fertilizer, which is mounted on support wheels and consists of a rod and three nozzles through which will spray straw, evenly distributing liquid organic fertilizers. Just behind the bar will go heavy disc harrow with chamomile discs to wet straw, mix and grind together with the ground. Slat roller will go last. It will align and compact chopped straw. Structural scheme of Combine complex" are shown in (Fig.2.)

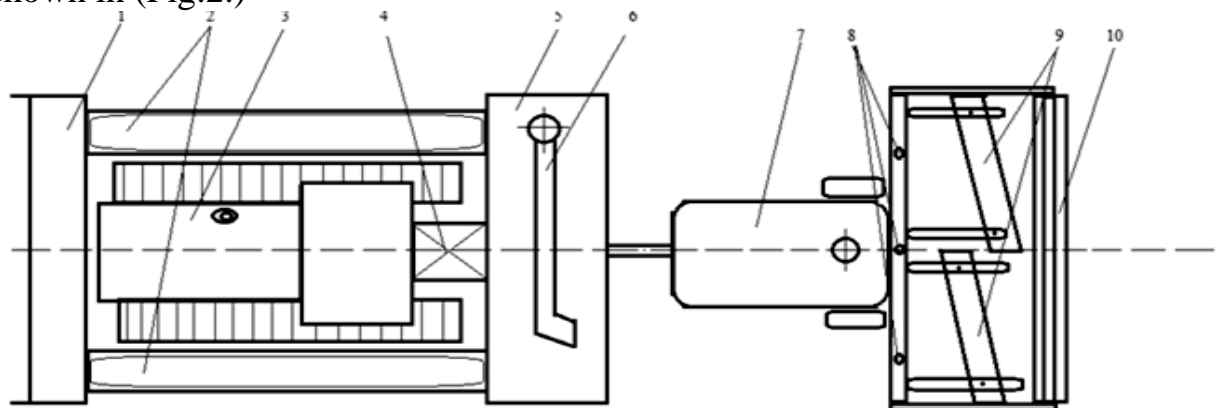


Fig.2. Structural scheme of the Grain complex: 1 - grain reaping machine; 2 - rotor threshing machines; 3 - crawler tractor; 4 - coupling; 5 - grain tank; 6 - grain auger; 7 - container for liquid organic fertilizers; 8 - injector; 9 - heavy disk harrow; 10 - slat roller.

So more info: beveled weight falls on the reaping machine – 1, there exist two conveyors, which move opposite each other. They direct this mass directly to a rotary threshing apparatus – 2 which are mounted on both sides of the crawler tractor – 3. There is the grain separated from the ears and straw and remains in the drum, straw and grind spikes fall on the field. Clean grain falls into the hopper 5, which is fixed to the tractor by hinged system – 4. Next, if necessary grain through the screw – 6 is unloaded to the vehicle. Thereon work with the grain is finished.

Before us still stands , to keep nutrients on the field , as much as possible, it is recommended immediately after collecting of the harvest to spray liquid organic fertilizers ,which are in containers – 7, and are splashed through jets- 8, which are situated on the rod. While using 40-60 t/ha of fertilizer unit works without latches. After introduction soil should be cultivated , for this we use a heavy disc harrow – 9, which is able to change the angle of attack. By harrowing with heavy disc harrows straw moves with the soil and crushed. So straw and liquid organic fertilizer helps and affects quick and qualitative decomposition of nutrients in the soil. Not to evaporate the moisture after a harrowing ,compact the soil with slat rink – 10 to close all the pores and cracks. Due to the fact that immediately after harvesting the treated soil, we protect the stubble from fire and excessive evaporation of moisture from the soil.

Conclusions: The proposed technology poses a challenge to the big number of specialists: as breeders and engineers, who'll create and improve this technology. You need seed (seeds) to be sown in a capsule with herbicides and fertilizers. For fertilizers and herbicides to dissolve in the soil, protecting grain from pests and diseases during germination, in the phase of tillering, and provide uniformity of germination. Using of this technology performs all necessary operations, i.e, the first pass of soil is crushed and at the same time sown seed (grain per capsule), become wrapped in soil and coccus . During the second pass of the mobile power tool moves across the field and performs the following sequence of operations: mowing down of straw, serves for two pipelines, which move opposite to each other. Straw together with uncut spikes through the conveyor gets to a rotary threshing drum. There it starts the process of threshing– clean grain falls into the hopper, and the rest of the straw falls to the ground where is watered with liquid organic fertilizer, in order not to inflate it in the field. Promptly the straw is treated with a heavy disc harrow mixing and crushing together with the ground. Given technology is aimed to save money and to deny all operations in the cultivation of crops.

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РАЗРАБОТКА ТЕХНОЛОГИЧЕСКИХ И ТЕХНИЧЕСКИХ ТРЕБОВАНИЙ ДЛЯ ДВУХПРОХОДНОЙ ТЕХНОЛОГИИ ОБРОБОТКИ ЗЕРНОВЫХ КУЛЬТУР

Ревенко Є.Є., Мальцев А.В.

Ключевые слова: энергетический модуль, трактор, комплекс, грунт, посев, зерно, солома, удобрение, технология, пшеница.

Резюме

Существование и развитие любого общества в полной мере зависит от уровня обеспеченности людей продуктами питания, которые

представляют собой органическое вещество, которое в большинстве дает земледелие. По прогнозам ученых в XXI столетии человечество на 90% будет обеспечиваться продуктами питания за счет земледелия, поскольку это пока еще незаменимый и кроме того уникальный способ концентрации солнечной энергии в органическом веществе зеленых растений. Таким образом земледелие является первичным в создании материальных благ для человечества.

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Summary

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