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CONSERVATIVE TILLAGE: MANAGEMENT OF PLANT NUTRITION

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Article deals with the influence of conservative tillage on plant nutrition. Proved that for such cultivation optimized profiles of temperature and water the soil, improving iyihni biological and physical properties, and this contributes to the accumulation and efficient use of soil water plants. It has also an important role in providing nutrients optimum plant growth and development.

Conservative tillage, management of plant nutrition, plant remains, nutrients, fertilizers.

Modern economic demands in agriculture of Ukraine stimulate famers to search for energy-save plant growing technologies. Unstable prices on crop products and it increasing constrain to revise plant growing technologies and every its elements. Only new principles in plant growing are the method for development of this field and they give positive economic effect. These principles base on achievement of science and technique included new sorts and new hybrids and qualitative fertilizers, etc. but these technologies have to influence on soil fertility and plant nutrition positively.

Decreasing of agrotechnologic press on soil is one of these methods. These are mini-till technologies and no-till technologies. It demands long-time action and great changes in traditions. In the one position this method can be applied widely. But in another position it demand same agronomic substratum and ecological base and social-economic elucidation. Especially we may to give attention to processes in soil in conditions of these technologies. Which do changes in plant nutrition take place in soil?

Optimization of water regime in soil.The mechanic breaking of deep soil layer increases physical water evaporation. No-till technology decreases water

evaporation. Thus, additional water is accumulated in soil. And larger soil layer with productive water is formed. The stubble decreases speed of by soil wind even it is tilled to 5 sm. This wind causes decreasing of soil moisture too. Therefor left of plant residues or tilling of plant residues causes lower soil temperature in comparative to open soil. It increases water accumulation in soil too, in summer especially.

Plant residues cause better water infiltration in soil. It degree depends from pores bulk in soil. If soil porosity is low infiltration of rain water will be limited. But under ploughing slimy soil fraction moves with water and it can stop up pores in soil. This process can obstruct water movement down the soil profile. In the result water will flows horizontally when rain falls intensively.

Accumulation of great plant residues us a result of dying of plant roots causes formation of additional pores for rain water and increases it infiltration.

Condensation of soil water in condition formation of 5 sm organic-mineral mulch by disc till or stubble plough optimizes soil water regime and plant water supply too. It process is impotent in hot time especially. Ovsinsky I. said this layer can let in warm up air to lower and cold soil layers. In the result, moisture condenses and this process supplies plant with water. Future more, stubble on field surface keeps additional snow such us water source and gives effective temperature isolation form winter frost. Therefore, conservative soil tillage in condition of plant residues management can supply effective accumulation and using of soil moisture by plants.

Optimization of soil temperature regime.Organic-mineral mulch in condition of no-till tillage decreases temperature changes in soil top layer in day. It provides biologic activity and water absorption by plants and nutrients absorption by plants. Scientists determined that soil temperature was lower in condition of no-till tillage than in condition of ploughing. Moreover, stubble keep off snow from blowing that supplied additional soil heat isolation. They investigated that temperature difference could be 15ºC in comparative to soil uncover of snow. The adherents of traditional tillage say that temperature increased slowly in could

spring under NO-till. This slows down plant sowing that caused plant lag in heat summer and yield decreasing. In another side, researchers mark that growth processes into plants predominated under plant development. This causes formation of strong root system which compensates primary plant lag in conditions of water deficit and higher temperature and increasing of crop yield and yield quality. In conditions with soil cover of plant residues temperature difference can be 20ºC to uncover soil under aggressive solstice. This acts positively on activity of root system and microflora and mezofauna.

3. ***Improvement of biologic properties of soils.*** Environment for microflora and mezofauna is stable thanks to decreasing of deep of mechanic breaking of soil. The background of sufficient organic substances from plant residues increases action of microflora and mezofauna. This increases microbiologic activity of soil. In soil uncover of plant residues these processes slow down through nutritive deficit. Moreover, more optimal water regime and temperature regime influence positively on action of microorganisms and increases their quantity.

Need to point out that more of them need necessary quantity of O_2 for their vital activity. Indicate conditions can be making only in upper layer of soil. After torning over soil layer by plow it becomes more compact during same time and it holds less oxygen that is anaerobic conditions. This causes aerobic death, thus, ammonification depression. Therefore, unhumic organic residues can be in soil under traditional tillage even next autumn. Accumulation of plant residues on soil under conservative tillage caused by microflora and mezofauna is remade to more simple organic compounds. This causes enrichment of organic-mineral complex of soil.

4. Optimization of physical properties of soils. Systematic conservative tillage causes optimization of soil bulk density because using of agricultural machines is decreased. Moreover, the properties of seed lying improve because seed is in tough with soil more. These processes optimize nutrition of young plant and growthof young plant. In another side, presence of apertures from plant roots optimizes condition for growth and development of root system of crops, from

vertical roots especially. Two zones of soil compression form in conditions of intensive soil tillage. They are layer 10-20 sm and layer 30-40 sm. In first layer slimy fraction is massed and in second layer is formed plow layer.

It is known mechanic soil tillage breaks natural soil structure and increasing of mineralization of organic matter. The source of organic matter is organic residues. This problem becomes deep in conditions of organic residues deficit. Therefore, decreasing of tillage intensity and left of plant residues held to form agronomic important structure and optimize soil water-holding capacityand mechanic solidity and soil porosity. These all influence on plant nutrition directly.

Thus, physical processes and chemical processes and biological processes pass in a different way under conservative tillage and ploughing. They take influence on management of nutrients. The change ratio between C and N through plant residues accumulation is one from important indexes. In these conditions decomposition is take place less intensively, with nitrogen deficient especially. As a result, nitrogen is used in addition by microorganisms. Then, rate of nitrogen may be corrected to increasing. Therefore, soil moisture increasing and low temperature changes mineralization of organic matter in soil. These processes can induce to nitrogen deficit for crops. These processes mass in transient time from traditional tillage to conservative tillage. In future, regular accumulation of organic matter and high intensity of microorganisms activity block tying together mineral nitrogen and it is sufficient in soil for plant growth. The way of situational decision is rates increasing and effective improvement of fertilizer application system in way of fertilizers forms selection and deep of fertilizer application and application times and application methods. In technic way it is opportunity to partial taking soil surface from plant residues and fertilizers application in band. Therefore, there is to need right method of fertilizer application. In the one side, broadcasting is need to use only in individual event under traditional tillage because fertilizers pills take place on soil surface (No-till) or in 0-10 sm layer. In these conditions demands increase to selection of fertilizers forms, to nitrogen fertilizersespecially. It is had to do to urea and ammonium sulfate. For example, urea in these conditions can

change quickly under influence microorganisms from line nitrogen components to ammonia and loses considerable part of nitrogen. The plant residues in these conditions take place on soil surface and speed up this process. Alkaline solution forms around urea pills and causes form of ammonia quickly. Thus, under No-till and conservative tillage nitrate fertilizers and ammonium-nitrate fertilizers are more optimal.

In these conditions additional complexity takes place application of phosphate fertilizers. It is known phosphate compounds are available weakly in soil solution because their application in broadcast causes their concentration in 5-7 sm soil layers. This can cause breaking of the optimal ratio between root system and vegetative plant part. In the drying period growth processes are slowed down by water deficiency. In these conditions root system of plants takes place in upper layer and does not remove this deficiency from lower layers. The change of traditional solid phosphate fertilizers to water-soluble phosphate fertilizers is very important in this field. And, transition to new technologies of crops growing is important too. These processes will be making weaker in conditions of god supplement by organic fertilizers under longer period of ploughing. Burt, liquid phosphate fertilizers application needs right machines and additional financing.

Selection of rational method of fertilizers application becomes more important under conservative tillage. Local fertilizers application and fertilizers application in bands are more right. But, risks to increasing of soil solution concentration around seeds and around roots of young plants. Especially, it is very important when fertilizers will apply during seed sowing. Not all modern seeder can give right distance between seed and fertilizer granule. And, seed can be damaged in germination period that it is grown on soil with moisture deficiency and with low organic matter content. Minimal distance between seed and fertilizer is 2.5-5 sm. That, increasing of this index decreases damage and makes safe higher fertilizers rates.

Thefertilizers application in bandin autumn is effective under conservative tillage. Intheseconditionssoils are more compact and have more moisture and less

air. Itdecreases losses of ammonia. But nitrogen losses can increase such as nitrates into light soils. And, form of nitrogen fertilizers takes important role.

The foliar fertilizers application takes important role under resource-save tillage because nutrients make up its deficiency that can be created insufficiency of methods of fertilizers application.

***Conclusions*.** The conservative soil tillage with management of plant residues ensures accumulation of soil moisture and effective it using by plants. In these conditions water soil regime and temperature soil regime are optimized. Biological soil properties and physical soil properties are improved. These conditions influence on plant growth and plant development positively.

Висвітлено вплив консервативного обробітку ґрунту на живлення рослин. Доведено, що за такого обробітку оптимізуються водний і температурний режими ґрунтів, поліпшуються їхні біологічні та фізичні властивості, а це сприяє нагромадженню й ефективному використанню ґрунтової вологи рослинами. Встановлено також, важливу роль поживних речовин у забезпеченні оптимального росту і розвитку рослин.

Консервативний обробіток ґрунту, управління живленням рослин, рослинні рештки, поживні речовини, добрива.