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MIXING AMELIORANTS IN SOIL WITH DIFFERENT ACTIVE DISK WORK BODIES

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Abstract

The article examines the degree of mixing of the soil ameliorants. Mixing is done with a new active disk machine, combining kinematics of tiller with a horizontal axis of rotation and displacement of soil from disk work bodies. The disk of the machine are of a different shape - cut along the periphery and a circular saw. Experiments were conducted on heavy sandy-clay soils with a clay content 56.6%, with 21% humidity and a constant speed of 4 km/h.
The study aims to determine the extent of mixing soil with different discs of the machine. After the study is built diagram characterized the distributions of the improvers.
Established was that the cut disk allocated improvers more depth and a circular lower, which It is due to more cut peripheries (more low contact with the soil). Thus, according to the requirements which we have, we can select the appropriate disk which satisfies them.

Key words*: tillage, soil, active machine, ameliorants.*

INTRODUCTION

Economic importance of soil is determined by its generalized characteristic fertility, which is its ability to provide the necessary plant nutrients, water and air. Soil fertility depends on its condition, which quantitatively expressed by its properties, porosity, density and humidity.
The amendment of these properties due to its structure and construction impacts to which it is subjected.
One of the soils are damaged by heavy metals, improper fertilization and are threatened by erosion.
Ameliorants are materials that are added to the soil, the main function of which is to improve the physical and chemical properties of the soil, as well as its biological activity.
Their incorporation into the soil is essential for the growth and development of crops.
The aim of the study was to determine the extent of mixing of ameliorants soil with active disk machine for surface treatment of soil, combining kinematics of rotary cultivators with a horizontal axis of rotation and horizontal displacement of soil from disk working body with two different types of discs.

MATERIALS AND METHODS

As imitation ameliorants used is a mosaic, it can be separated from the soil and to define the mixing easier.
Mosaic is spread evenly over stubble with hand, several sites measuring 1 m^2.
The tractor with active body working on messy ameliorants, then place the box without bed with dimensions 400 x 300 x 300 mm. Box stuck into the soil and every 2 cm to 12 cm are sifting mosaic and weighting method determines the quantity and the corresponding soil layer.
Crop residues and weeds on the surface of the field is not controlled as in the selection of
Experimental field is respected for they are relatively evenly distributed.
The experiments were conducted in this condition because essential to the dynamics of the process has soil with its properties.
The machine (Dallev, 2013) is equipped with two different types of discs – cut (Dallev et all, 2015) and circular disk (Ivanov et al., 2015).

Figure 1. Distribute ameliorant prior to the test

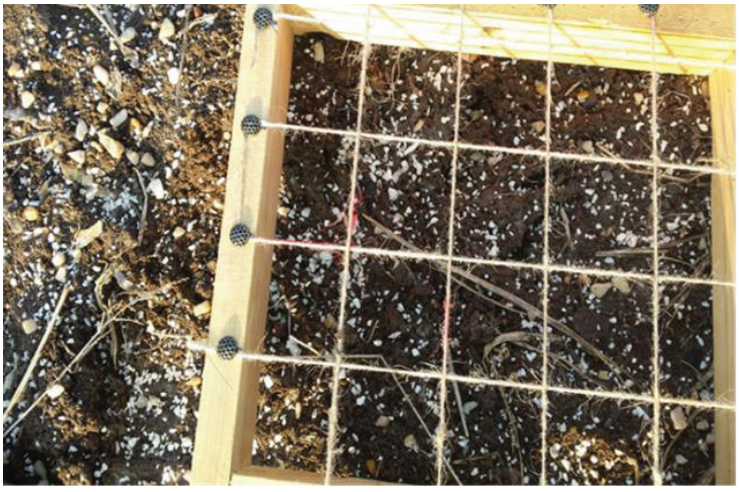

Figure 2. Distribution of crop residues and weeds

Figure 3. Cut disk

Figure 4.Circular disk

RESULTS AND DISCUSSIONS

The experiments were conducted in the village Bryagovo region. Plovdiv, heavily sandy - loam soil with containing loam- 56.5%.
The machine is aggregated with a tractor MTZ-80, v - speed is 4 km/h and is controlled by GPS Garmin 12.

From the graphics better able to discern that in the cut disk concentration ameliorants in layers 4 to 10 mm, and when circular from 0 to 6 mm. This is due to the fact that circular saw has a larger cut-out portion, i.e., smaller contact area with the soil.

Figure 5. Conducting experience

When cut disk:

Table 1. Cut disk

Depth of layer, cm	0-2	2-4	4-6	6-8	8-10	10-12
Average distribution,%	6.7	7.3	42.1	33.2	6.4	4.3

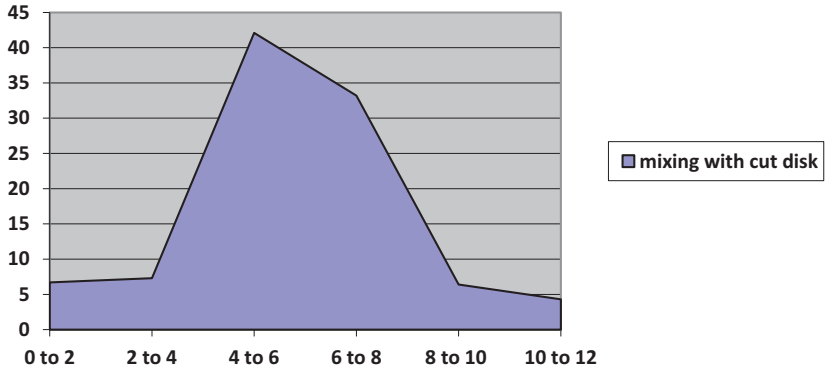

Figure 6. Degree of mixing with cut disk

Figure 7. Degree of mixing with cut disk

When circular disk:

Depth of layer, cm	0-2	2-4	4-6	6-8	8-10	10-12
Average distribution,%	12.4	22.1	37.9	20.4	5.3	1.9

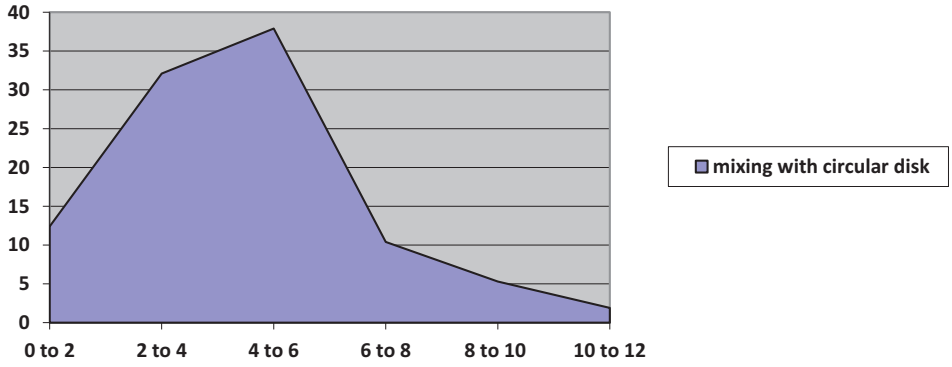

Figure 8. Degree of mixing with circular disk

Figure 9. Degree of mixing with circular disk

If we compare both types of displacement disc:

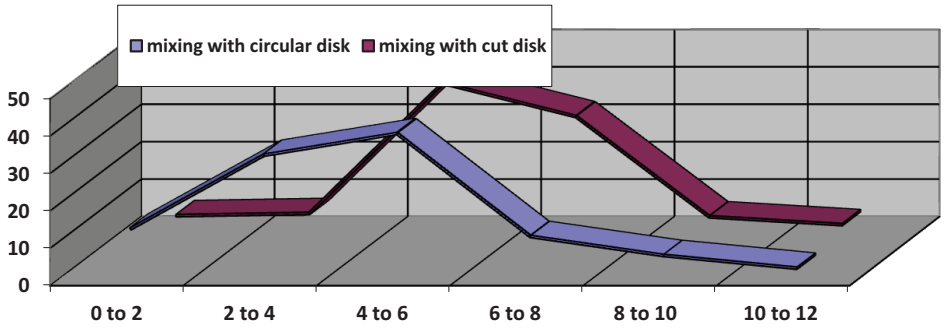

Figure 10. Degree of mixing with both disks

CONCLUSIONS

Certain areas are the mixing of the soil ameliorants with two disks - cut and circular. Depending on the needs of cultures concentration of soil improver can be managed by different types of discs.

ACKNOWLEDGEMENTS

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REFERENCES

Dallev M., 2013. Investigation of a working body surface tillage, abstract.

Dallev M., Ivanov I., 2015. Study of body for surface tillage in heavy soils with low humidity, Scientific Papers. Series A. Agronomy, Vol. LVIII, p. 45-48.

Ivanov I., Dallev M., 2015. Study of body for surface tillage in medium sandy - clay soils with low humidity. Scientific Papers. Series A. Agronomy, Vol. LVIII, p. 49-52.