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Investigation Of The Effect Of Travel Speed And Tire Pressure On The Depth Of The Wheel Rut Of A Tractor With Adjustable Ground Clearance, On The Hardness And On The Density Of The Soil

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ABSTRACT

Cotton is cultivated in more than 80 countries around the world. The total world sowing area of cotton is about 35 million hectares, incl. in the Republic of Uzbekistan 1.4 million hectares. When performing field work on the cultivation of cotton on these areas, a special place belongs to universal row-crop tractors.

KEYWORDS

Soil Density, Irrigated, Tire Pressure, Agro-Technological.

INTRODUCTION

In the world, the high agrotechnical cross-country ability of a 3-wheeled universal row-crop tractor, until recently, provided it with the status of the main energy source for the mechanization of field work in cotton growing. However, they have significant specific disadvantages, the main ones being: negative technogenic impact on the soil, overloading of front tires, low lateral stability, low annual load, regulated only by the season of work on cotton.

The above disadvantages are to a certain extent absent in 4-wheeled tractors. Reducing the negative technogenic impact on the soil by reducing the total area of coverage with wheel tracks, reducing the maximum pressure on the soil in the area of the supporting area of the running gear, more rational distribution of the MTA masses along the axes and reducing wheel slip are an incomplete list of the advantages of these tractors over 3-wheeled tractors. However, due to insufficient agrotechnical clearance under the front axle

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beam, they cannot be used for inter-row cultivation of cotton crops.

In addition, the presence in the cotton growing zone of two types of tractors: 3 and 4 wheeled, leads to an unreasonable increase in the number of machines and, accordingly, the cost of their maintenance.

Based on the technology of cultivation of the main crop - cotton, the main requirement for a promising generation of cotton-growing tractors is their year-round loading due to their use in all agro-technological operations in cotton growing, from the main and pre-sowing soil cultivation, sowing, inter-row cultivation and care to harvesting and transportation of the cotton crop. - raw materials and other agricultural goods.

In the course of the first part of the laboratory-field studies, the influence of the tractor speed on the depth of the wheel track, on the hardness and on the density of the soil was studied.

Soil density is considered a determining factor in the growth and development of a plant, and ultimately in obtaining the expected yield. Since the whole complex of physical factors, water, air and thermal regimes and, consequently, the conditions of the vital biological activity of the cultivated culture, depend on the density of the soil. The optimal value of this indicator depends on the mineralogical composition, soil moisture, on the mass and number of tractor passes over the field, etc.

For the normal development of most crops, the soil density fluctuates within rather narrow limits, for example, for irrigated agriculture in the republic, where loamy and clayey soils prevail, it should be 1.0-1.3 g / sm3. At the same time, numerous researchers have established [1,2,3] that an increase or decrease in soil density from the optimal value by 0.1–0.3 g / sm3 leads to a decrease in yield by 20–40%.

Soil hardness is also considered one of the most important physical parameters of the soil, characterizing the level of its resistance to mechanical processing. Energy consumption for soil cultivation largely depends on the value of this indicator.

Soil hardness was determined on the track and outside the track of the mover in 6 replicates. Hardness measurements were carried out with a hardness tester to a depth of 0–30 cm for each variant of the experiments.

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Soil moisture was determined by the gravimetric method. The width and depth of the track were measured by the method of profiling the surface of the field for each experiment separately, following the tracks of the movers of the tested tractors.

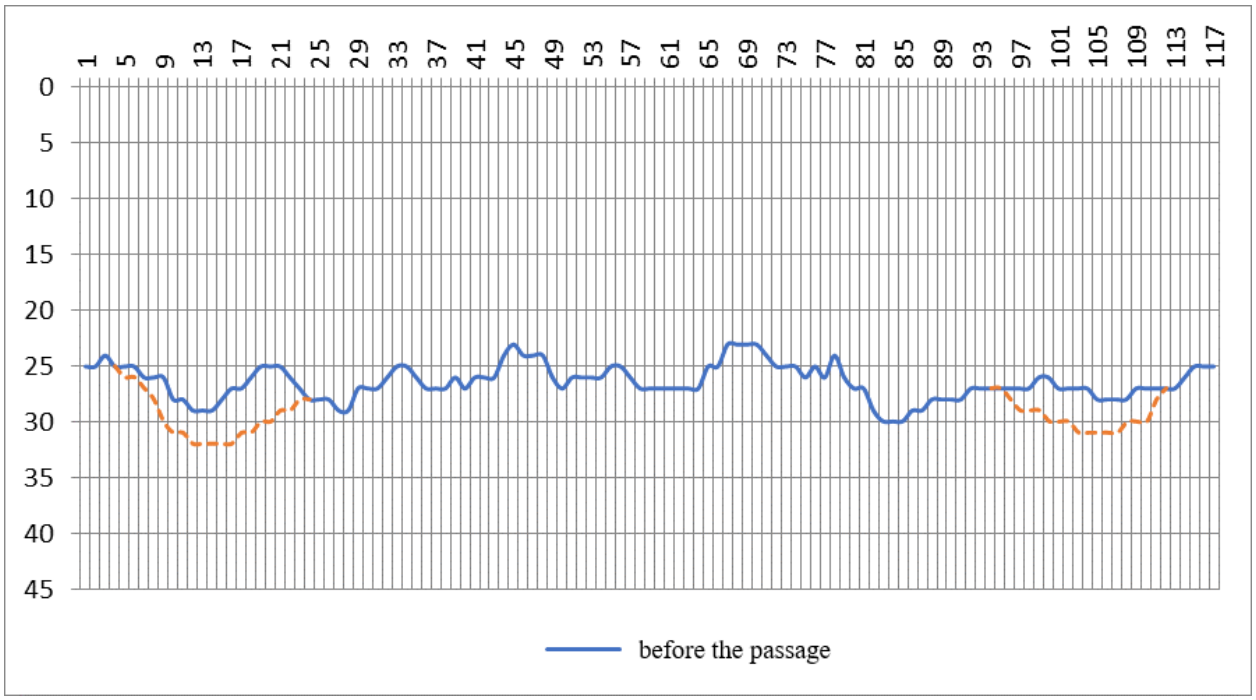

Fig. 1. Transverse profiles of the field surface before and after the passage of the TTZ-1033 tractor at a tire pressure of 1.7 MPa and travel speed 7.29 km / h

The greatest increase in soil hardness was noted after passing the front wheel of the serial three-wheeled tractor TTZ-811. The transition to four-wheeled tractors allowed to reduce the increase in soil hardness by 21% on average, and reduced the coefficient of coverage of tractor wheel tracks on the field surface by 27%.

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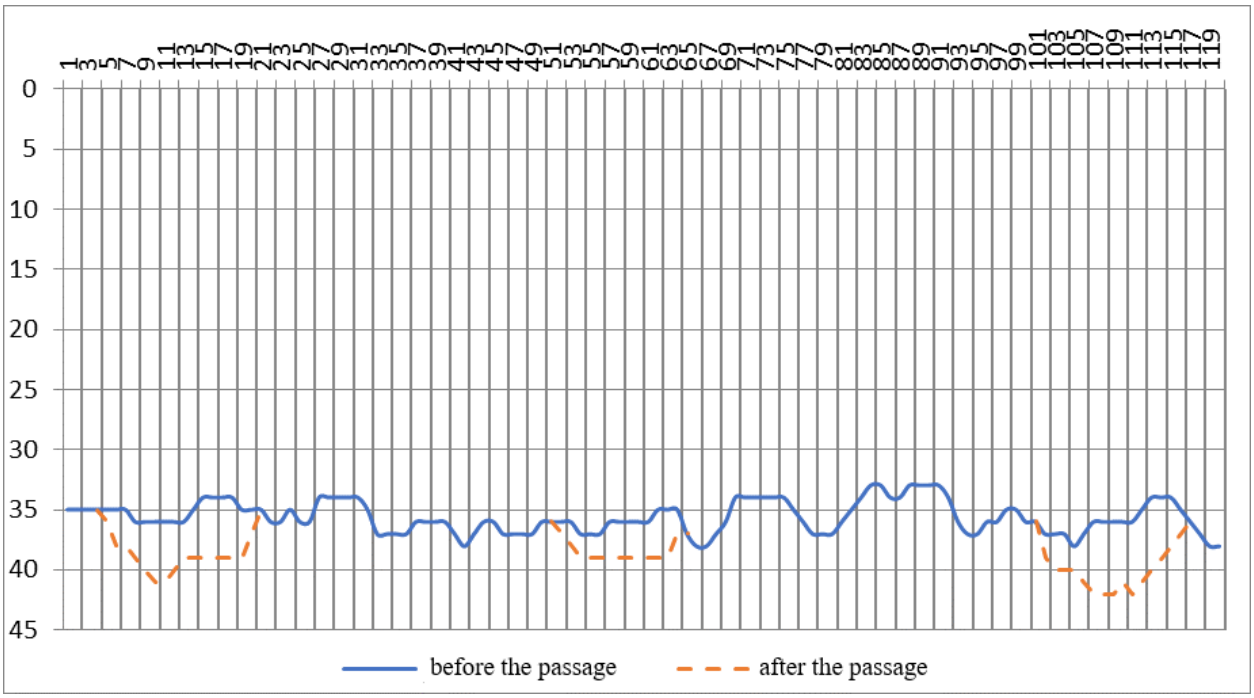

Fig. 2. Transverse profiles of the field surface before and after the passage of the TTZ-811 tractor at a tire pressure of 1.7 MPa and

travel speed 7.5 km / h

The depth of soil pressing by the front wheel of a tractor with a 3K2 wheel arrangement is, on average, 0.35 sm more than a tractor with a 4K2 wheel arrangement, and the soil density in the upper soil layer is 0.04-0.11 g / sm3 higher.

The greatest depth of the front wheel track remains after the first pass of the tractor. Depending on the speed and air pressure in the tire, the track depth of a tractor with a 3K2 wheel arrangement ranged from 4.4 to 6.0 sm, which is 0.15-0.56 sm more in comparison with the track depth left by a tractor with a wheel arrangement. formula 4K2, in which it ranged from 4.25 to 5.44 sm.

Thus, the results of the studies carried out have shown that in order to reduce the technogenic impact on the soil, it is advisable to use the

four-wheeled tractor TTZ-1033 instead of the three-wheeled TTZ-811 tractor.

REFERENCES

1. Bondarev A.G. Changes in the physical properties and fertility of soils in the Non-Chernozem zone under the influence of the running systems of agricultural machinery / Bondarev A.G. // Mechanization and electrification of agriculture. Moscow, 1983. - No. 5.
2. Kurbantaev R. Guzaning rivojlanishi va hosildorligiga tuproqzichligining ta'siri //

Pakhtachilik va donchilik. - Toshkent: DITAF, 1999. –№ 1.

3. Yushin, A.A. Influence of the running systems of tractors on the soil and yield. / Yushin A.A., Semenyuk I.M., Blagodatnaya Yu.N. // Mechanization and electrification of agriculture. 1982. - No. 2.
4. Akhmetov A.A., Akhmedov Sh.A. Investigations of the influence of the running system of a 4-wheel universal row-crop tractor on soil compaction // Agrotexnika dunyosi, 2018. - No. 01 (02).
5. Akhmetov A.A., Akhmedov Sh.A. Front wheel pressure on the soil of tractors with different wheel arrangement // Agricultural machines and technologies, scientific and theoretical journal, DOI: 10.22314 / 2073-7599-2018-13-1-27-33, Moscow, Volume 13 No. 1, 2019.
6. Akhmedov Sh.A. JUSTIFICATION OF PARAMETERS OF THE FRONT AXLE OF A COTTON TRACTOR WITH ADJUSTABLE CLEARANCE Text. / Sh.A. Akhmedov // Author. dis. Cand. tech. Spider. -L. 2019