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THE INFLUENCE OF THE ANGLE OF SETTING THE FERTILIZER TRANSMISSION PART OF THE UNSYMMETRICAL SIDE OF THE FERTILIZER BETWEEN THE COTTON ROW ON ITS PERFORMANCE INDICATORS

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ABSTRACT

This article provides information on the study of the influence of the setting angle of the symmetrical side of the fertilizer transfer part of the working body that applies fertilizer between cotton rows to the direction of movement on its performance. In order for the fertilization depth and soil spreading to the side to be at the level of agrotechnical requirements, and the traction resistance to be minimal, the methods of determining the angle of installation of the symmetrical side of the fertilizer transfer part of the fertilizer transfer body with respect to the direction of movement are explained.

Keywords: Fertilization depth, lateral spreading of the soil, fertilizer transfer part, organomineral fertilizer, drag resistance.

INTRODUCTION

One of the leading places in the world is the improvement of the technology and technical means of applying a mixture of organic and mineral fertilizers to the zone where the roots of plants develop. Applying a mixture of organic and mineral fertilizers to the zone where the plant root system develops allows to increase their effectiveness by 10-30% and reduce the amount of fertilization by 10% [1]. About 900 million in the world. cultivation of various agricultural products on the hectare area [2], of which 118 mln. It is important to create and produce energy-resource-efficient and high-quality work bodies that apply a mixture of organic and mineral fertilizers, taking into account the high demand for crop care [3] per hectare.

In the experiments, the influence of the setting angle of the symmetrical side of the fertilizer transfer part of the working organ, which applies organic-mineral fertilizer between the rows of cotton, to the direction of movement, to the side scattering of the soil, the depth of fertilizer application, and the impact on traction resistance. This angle was changed from 25° to 40° at intervals of 5° based on the results obtained in theoretical studies and experiments were conducted. Aggregate speed was set at 4 and 6 km/h, fertilization depth was 15 cm.

The results obtained in the experiment are presented in Table 1 and Figures 1-3. It can be seen from them that with an increase in the installation angle of the symmetric part of the fertilizing body in relation to the direction of movement, the fertilizing depth decreased at both movement speeds of the unit, its mean square deviation increased, and the lateral spreading of the soil first increased and then decreased. For example, with a change in the installation angle of the symmetrical side of the fertilizer transfer part from 25° to 40° in relation to the direction of movement, the depth of fertilization at a speed of 4 and 6 km/h is 16.2 cm to 14.9

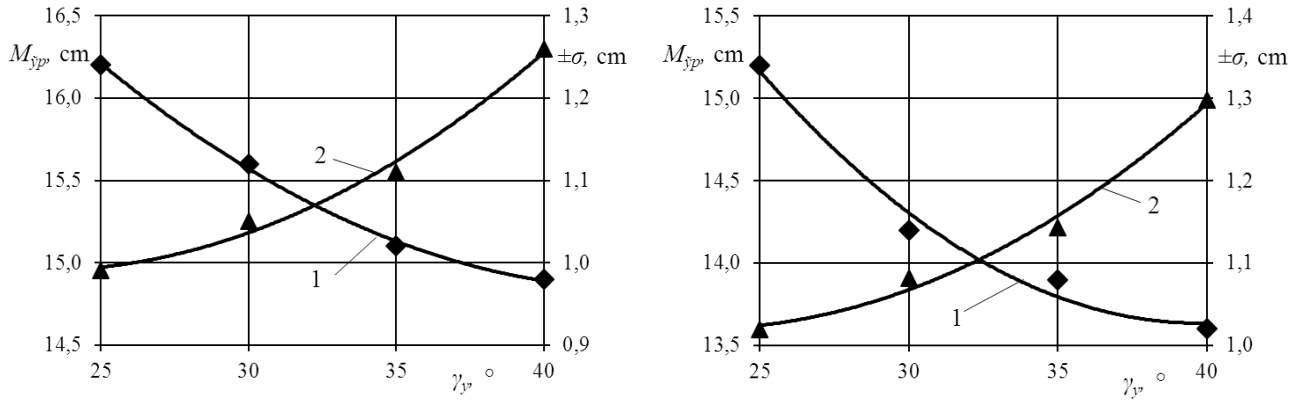
cm and 15, decreased from 2 cm to 13.6 cm, and its root mean square deviation from ±0.99 cm to ±1.26 cm and from ±1.02 cm to ±1.30 cm, respectively, and soil lateral

1-Table The influence of the setting angle of the symmetrical side of the fertilizer transfer body relative to the direction of movement on its performance

T/r	Name of indicators	The angle of installation of the symmetrical side of the fertilizer transfer body relative to the direction of movement, °							
		25		30		35		40	
		Aggregate movement speed, km/h							
		4	6	4	6	4	6	4	6
1	Fertilizing depth, cm:								
	$M_{ŷp}$	16,2	15,2	15,6	14,2	15,1	13,9	14,9	13,6
	$\pm\sigma$	0,99	1,02	1,05	1,08	1,11	1,14	1,26	1,30
	□, %	6,1	6,7	6,7	7,6	7,4	8,2	8,5	9,5
2	Spreading the soil to the side, cm:								
	$M_{ŷp}$	24,7	26,1	32,4	34,2	31,1	32,9	28,7	30,3
	$\pm\sigma$	2,06	2,16	2,55	2,68	1,47	1,54	1,52	1,59
	□, %	8,33	8,27	7,86	7,82	4,73	4,70	5,29	5,26
3	Tensile strength, kN	0,81	0,87	0,72	0,78	0,79	0,85	0,98	1,06

scatter increased from 24.7 cm to 32.4 cm and from 26.1 cm to 34.2 cm, respectively, and then decreased from 32.4 cm to 28.7 cm and from 34.2 cm to 30.3 cm . This can be explained by the increase in the installation angle of the symmetric part of the fertilizer transfer body relative to the direction of movement, and its contact surface with the soil increases.

The traction resistance of the fertilizer application body first decreased and then increased with the increase of this angle, i.e., when the opening angle of the symmetrical side of the fertilizer application body changed from 25° to 30°, the traction resistance increased at the travel speeds of 4 and 6 km/h, respectively. decreased from 0.81 kN to 0.72 kN and from 0.87 kN to 0.78 kN, and then when this angle changed from 30° to 40°, the tensile resistance decreased accordingly

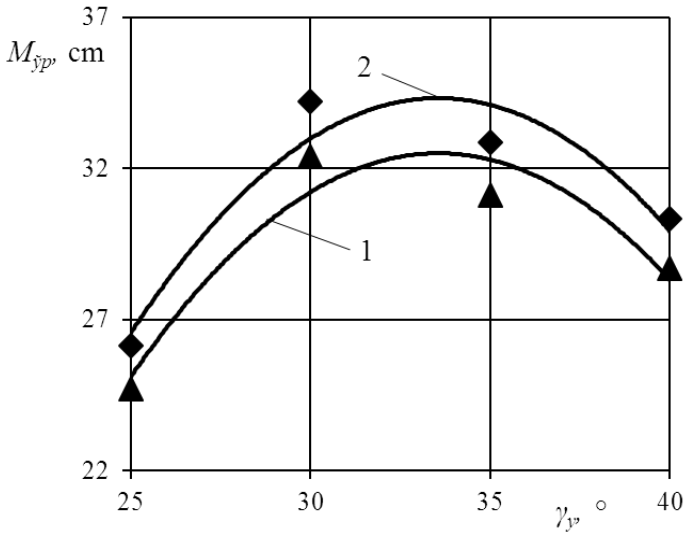


a) *b)*

a, b-when the speed of movement is 4 and 6 km/h, respectively

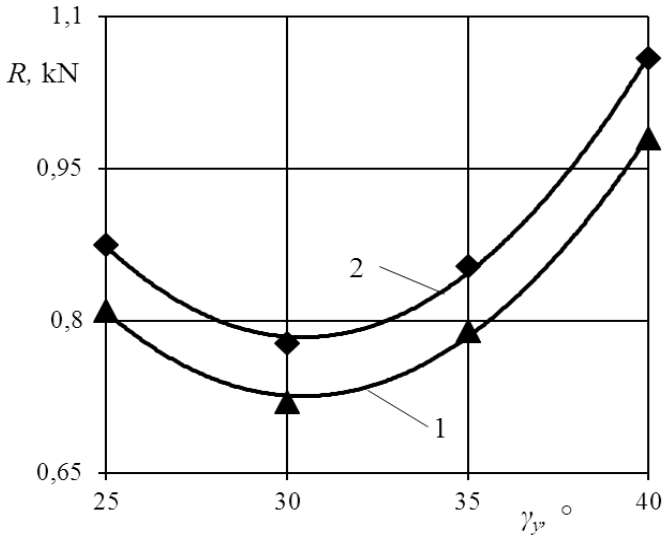
Figure 1. Graphs of changes in fertilization depth (1) and its mean square deviation (2) depending on the installation angle of the symmetrical side of the fertilizer transfer part of the working body in relation to the direction of movement

Increased from 0.72 kN to 0.98 kN and from 0.78 kN to 1.06 kN. This can also be interpreted as above.



1, 2 when the speed of movement is 4 and 6 km/h, respectively

Figure 2. Graph of change depending on the angle of installation of the symmetrical side of the working body that fertilizes the soil to the side with respect to the direction of movement



1, 2 when the speed of movement is 4 and 6 km/h, respectively

Figure 3. The graph of the variation of the traction resistance of the fertilizing working body depending on the installation angle of its symmetrical side in relation to the direction of movement

Graphical correlations presented in Figures 1-3 are shown by the method of least squares [116; pp. 249–253, 117; p. 31–36] can be expressed by the following empirical formulas:

a) for the case when the aggregate movement speed is 4.0 km/h

$M_{ýp} = 24{,}77 - 0{,}2732\ \gamma + 0{,}0036\ \gamma^2$ ($R^2 = 0{,}9968$), cm; (4.1)

$\pm\sigma = 1{,}4595 - 0{,}0411\ \gamma + 0{,}0009\ \gamma^2$ ($R^2 = 0{,}9899$), cm; (4.2)

$M_{ýp} = -52{,}025 + 4{,}885\ \gamma - 0{,}063\ \gamma^2$ ($R^2 = 0{,}9999$), cm; (4.3)

$R = 3{,}318 - 0{,}1704\ \gamma + 0{,}0028\ \gamma^2$ ($R^2 = 0{,}9978$), kN ; (4.4)

b) for the case when the aggregate movement speed is 6.0 km/h

$M_{ýp} = 24{,}279 - 0{,}2677\ \gamma + 0{,}0035\ \gamma^2$ ($R^2 = 0{,}9968$), cm; (4.5)

$\pm\sigma = 1{,}5033 - 0{,}0423\ \gamma + 0{,}0009\ \gamma^2$ ($R^2 = 0{,}9899$), cm; (4.6)

$M_{ўр} = -56{,}726 + 5{,}1293\ \gamma - 0{,}0662\ \gamma^2$ ($R^2 = 0{,}9999$), cm; (4.7)

$R = 3{,}5834 - 0{,}1840\ \gamma + 0{,}003\ \gamma^2$ ($R^2 = 0{,}9978$), kN ; (4.8)

in this γ – the installation angle of the symmetrical side of the fertilizer transfer body relative to the direction of movement (γ = 25°-40° between).

Based on the above analysis, it can be concluded that in order for the depth of fertilization and the spreading of soil to the side to be at the level of agrotechnical requirements, and for the resistance to traction to be minimal, the angle of installation of the symmetrical side of the fertilizer transfer part of the fertilizing body should be no more than 30° in relation to the direction of movement..

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