Based on the Parameters of the Combined Agricultural Plastic for Field Crops

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ABSTRACT

In the article the construction scheme of the machine that drops the agricultural plastic on the fields suitable for climatic conditions has been developed in Uzbekistan and also its main parameters are based on theoretical science and their values are determined according to theoretical expressions. According to the results of this theoretical research, it is possible to create an experimental model of the machine.

Keywords: combined agricultural plastic mat, a field, a crop, an elastic pipe hanger, a spherical disk feeder, an elastic rod, a spool

Introduction. In the Strategy for Agricultural Development of the Republic of Uzbekistan for 2020-2030, "... The tasks are set out to reduce public participation and establish mechanisms for increasing investment attractiveness, rational use of land and water resources, improving productivity on farms, and improving product quality, which aims to modernize, diversify and increase the flow of private investment capital to support the sustainable growth of the agricultural and food network. Therefore, various reforms are being undertaken in agriculture in the republic to save water and energy in the cultivation of agricultural crops, improve soil productivity and crop yields.

In these areas, melon crops are cultivated in a variety of ways. One of the most effective methods of cultivating crops in our country is to plant crops under a plate. The resulting embryo was allowed to develop in nutrients and then inserted into her womb, where it was implanted. Currently, planting crops under agricultural plastic is not mechanized in the republic and is now being carried out by hand because specialized equipment is not manufactured. This, in turn, causes a sharp increase in labor costs and other expenses, and the solution is a pressing scientific problem. (Matthew 24:14; 28:19, 20) Jehovah's Witnesses would be pleased to support more than the gec of Jehovah's Witnesses. In this case, the planting seasons will not only vary, but also their planting schemes will vary. This requires various agricultural plastic-dropping devices that comply with these conditions and fields [1-21].

Methods. Due to the soil climate of our country, it is necessary to develop a plate-dropping device that matches the regions and seasons where crops are cultivated.

In an effort to solve this current scientific problem, a preliminary constructive scheme of a combined agricultural plastic faller has been developed by us. The constructive

scheme of the combined plate drop place is presented in Figure 1.

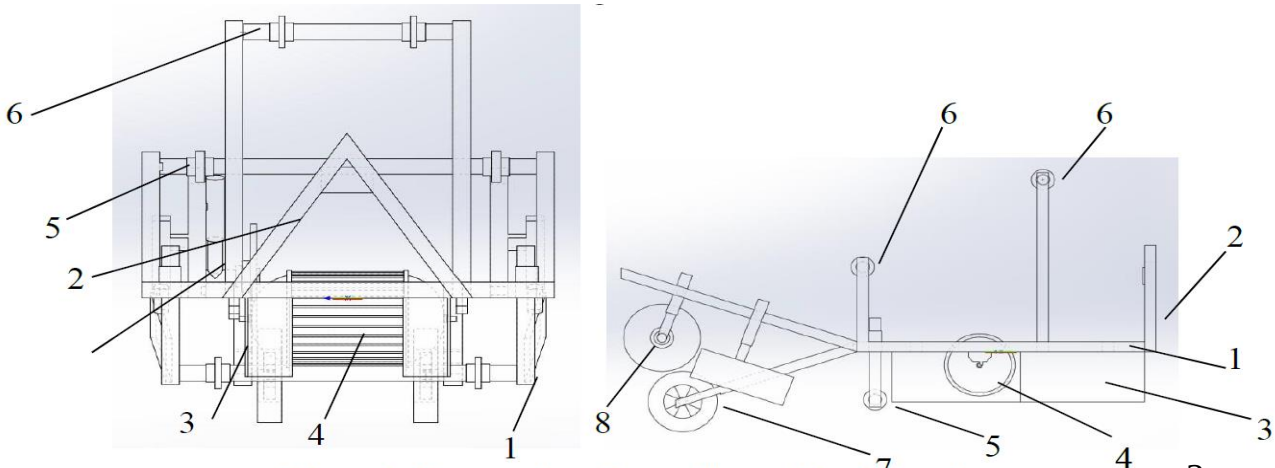

Figure 1. Constructive scheme of a combined plate drop

Combined plate dropper rama consists of 1.ossetia device 2, floor lift 3, elastic mosquito wheel 4, plate hook 5, elastic pipe hook 6, clicking wheel 7 and burrowing 8.

In the technological process of a combined plate dropper, a floor is removed using a floorhead 2 installed in its front, followed by an elastic mosquito gallbladder that grinds and smoothes the cuts on the top surface of the 3 floors, and the clicking wheels shed the frames on 6 plates and elastic pipe hooks to the floor surface. Burlaps on both sides of the bed agricultural plastic, which is embedded on the surface of the floor, are thrown away by the soil.

The advantages of the proposed combined plate dropper are that the work organs installed on the device are also able to be adjusted to the necklace and are explained by the installation of an elastic mosquito wheel. It will be possible to obtain a floor of different sizes by changing the working organs in the device frame to different widths. The elastic mosquito wheel mounted on it is also able to expand to the chest, efficiently grinding the cuts on the floor and densifying the soil relatively. In our country, melon crops are grown by obtaining floors of different sizes depending on soil climatic conditions. As a result, this device is suitable for all conditions and has the ability to obtain quality floors of various sizes and to clean the soil efficiently and fill the agricultural plastic.

By applying the proposed combined plate dropplace, 50% of water consumption and 60%7of labor costs will be reduced. There is also the possibility of filling the agricultural plastic with this device in thermos method.

Results. The proposed combination agricultural plastic cover is its floor pick-up device and is a roller with elastic spikes that grinds lump and compacts the soil. The main parameters of the floor remover and elastic rod reel are as follows:

B_n – is the width of the floor; H_n – the height of the floor; a – the angle of deviation of the floor receiver in the transverse position relative to the horizon; l_n – length of the floor; $d_{эч}$ – is the diameter of the coil with an elastic rod; d_{mc} – is the diameter of the cylindrical part of the elastic spool, $B_м$ – is the width of the machine.

The width of the floor receiver can be determined by the following expression [2]

$$B_n \geq \frac{K\varepsilon_n\left(2a - H_n\right)}{2\varepsilon_n - K\left(2a + H_n\right)},$$

(1)

In this case, K – is the coefficient of stability to ensure complete overturning of the plate;

ε_n – the width of the egate interval;

a – processing depth;

H_n – floor height.

According to expression (1), when K=1,27, ε_n = 60 cm, a=20 cm and H_n = 15 cm, the minimum covering width of the case should be B_n = 37,9 cm.

The diameter of the coil with elastic pin $d_{эч}$ was determined from the condition of light

rolling over the unevenness found on the edge of the brush [2] (Fig. 2):

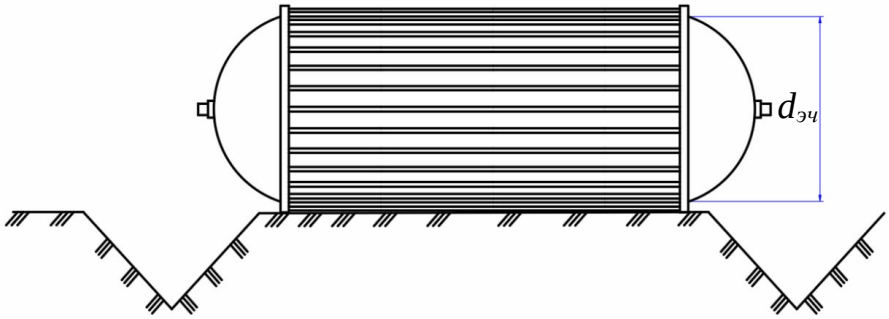

Figure 2. The scheme for determining the diameter of the coil with a rubber pin

$$d_{эч} \geq h_{нб} ctg^2 \frac{\varphi_1 + \varphi_2}{2}, \quad (2)$$

where $h_{нб}$ – is the largest height of unevenness found on the foothills; φ_1, φ_2 – are the external and internal friction angles of the soil, respectively.

(2) into account when cutter of the disk diameter as follows is defined [3]:

$$d_{ц} \geq h_{нб} ctg^2 \frac{\varphi_1 + \varphi_2}{2} + 2h_{гл}, \quad (3)$$

where $h_{гл}$ – is the intermediate distance from the elastic located along the perimeter of the coil to the cylinder part of the coil.

φ_1 =30 ^{0}, φ_1 =40 ^{0}, h_{nb} =100 mm, $h_{гл}$ = 90 mm acceptance by doing and them to expressions (2) and (3) put, we get $d_{эч} \geq$204 mm and $d_{mc} \geq$384 mm.

The width of the coil with an elastic pin V – is determined based on the width of the floor screed B_n . Taking into account the possibility of using this machine for vegetables and fruits, the minimum width of the reel should not be less than 70 cm. Taking into account the width of the roller, the width of the floor receiver, the total width of the machine is determined by the following condition

$$B_м \geq \left(\frac{K в_n (2a - H_n)}{2в_n - K(2a + H_n)} \right) + в_г, \quad (4)$$

where $v_г$ – coil width, m .

B_n=37,9 cm and s=5 cm, putting the values in expression (4), we determine that $V_м$ =145,8 cm should not be smaller.

In order to determine the spherical disk of the combined agricultural plastic hopper, the following condition must be met [4]

$$D \geq \frac{d_{ў}\left[1 + \cos(\varphi_{1ў} + \varphi_{2ў})\right] + \frac{2h}{\cos\beta}}{1 - \cos(\varphi_{1ў} + \varphi_{2ў})}, \quad (5)$$

where $r_д$ – is the radius of the disc, m;

$r_ў$ – radius of plant remains, m;

$d_ў$ – diameter of plant remains, m.

where d – is the compression angle of plant residues, degrees;

$\varphi_{1ў}$ $\varphi_{2ў}$ – angles of friction of plant residues on the blade of the disc harrow and the field surface (soil), degrees.

From this expression, it can be seen that the diameter of the disk harrow depends on the diameter of the plant residues encountered in its path, the depth of processing, the angle of installation relative to the vertical, and the friction angles of the plant residues.

The expression (5) differs from the expressions [4] known from the literature by taking into account the angle of installation of the disk fan relative to the vertical.

$d_ў$ =3 cm, $\varphi_{1ў}$ =30°, $\varphi_{2ў}$ =40°, h =10 cm, b =20° [4], calculations made according to the expression (5) the diameter of the disc pump is at least D =509 mm showed that it should be. Based on this result, we take the diameter of

the disc as 500 mm.

Values of the combined agricultural plastic feeder to expressions (1), (2), (3), (4) and (5) *B p* =37,9 cm, $d_{эч}$ =20 cm, d_{mc} =38 cm, $V_м$ =145,8 cm and *D* = 50 cm. The parameters of the combined agricultural plastic depressor determined in these theoretical studies serve to develop its experimental model.

Discussion. 1. The angle of installation in relation to the direction of movement of the soil sliding.

We determine this angle by the following expression the soil does not stick to the working surface of the soil shaker and does not sleep in front of it much

$$\gamma = \frac{\pi}{4} - \frac{1}{2}\varphi, \quad (6)$$

φ – angle of friction on the working surface of the soil sliding soil, º.

accepting φ = 30-35º [ ] (6), we determine that the angle of installation of the soil in the direction of movement of the soil shaker must be between 27º30′′30′—30º.

2. Determination of the coverage width of the soil sliding

We determine the width of the soil sliding bs using the scheme listed in Figure 3. According to him

$$S_1 = S_2, \quad (7)$$

$$S_3 = k_{ю}(S_1 + S_2) = 2k_{ю}S_1 = 2k_{ю}S_2, \quad (8)$$

in this case, S_1, S_2 – is the faces of the soil intersections that can be dug up to form a push; S_3 – the face of the soil chest, m², which is attached to the top of the push; k_{yu} – is the coefficient that takes into account its softening when the soil is pushed into the push.

According to the scheme listed in Figure 3

$$S_1 = S_2 = \frac{(2bc + h_c ctg\varphi_{ў})h_c}{2}, \quad (9)$$

and

$$S_3 = \left[b + (h_n - h_c)ctg\varphi_m\right](h_n - h_c), \quad (10)$$

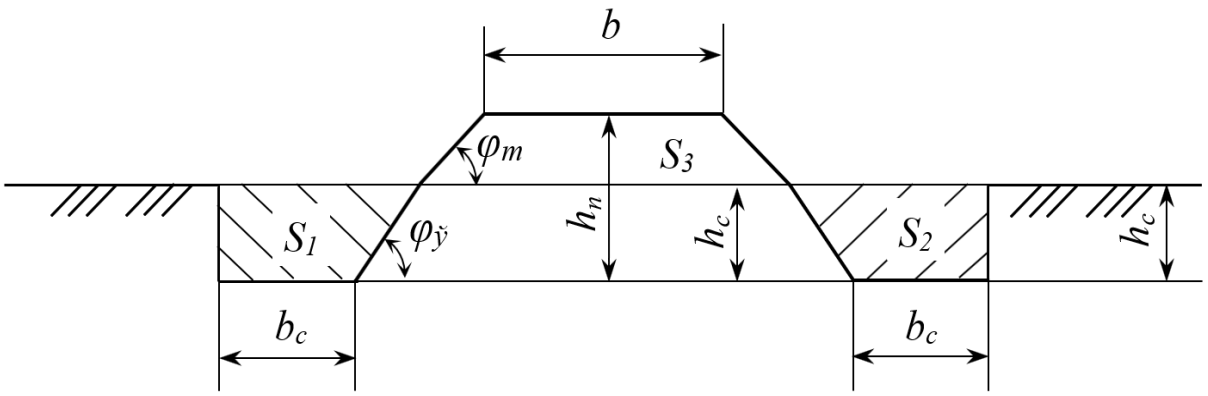

Figure 3. Scheme for determining the width of the soil sliding

There: b_c – the width of the soil sliding, m;

h_c – the depth of the soil sliding into the soil, m;

$\varphi_{o'}$ – the angle of soil deflection, º;

b – the width of the top of the push, m;

h_p – height of the push, m;

φ_t – the natural shedding corner of the soil, º.

Given (9) and (10) expression (8) will have the following view

$$\left[b + (h_n - h_c)ctg\varphi_m\right](h_n - h_c) = k_{ю}(2b_c + h_c ctg\varphi_{ў})h_c. \quad (11)$$

We define b_c from this expression

$$b_c = \frac{\left[b + (h_n - h_c)ctg\varphi_m\right](h_n - h_c) - h_c^2 ctg\varphi_{ў}}{2k_{ю}h_c}, \qquad (12)$$

The height of the feathers obtained for planting the seeds of crops should be 18-20 cm, the height of the top parts should be 120 cm. Using this information, fig. 3 has graphs of change built depending on b_c to h_c, "c" and "d". They show that an increase in h_c, φ_t and φ_y led to a decrease in b_c.

$\varphi_{o'}$ va φ_t burchaklar bir-biridan katta farq qilmasligini hisobga olib [ ], (12) ifodani quyidagi ko'rinishga keltiramiz

Given that the angles φ_o and φ_t do not differ greatly from each other [ ], (12) we bring the expression to the following view

$$b_c = \frac{\left[b + (h_n - h_c)ctg\varphi_{ўm}\right](h_n - h_c) - h_c^2 ctg\varphi_{ўm}}{2k_{ю}h_c}, \qquad (13)$$

there $\varphi_{o't}$ – the average value of soil dehydration and spillage angles, º.

(1.9) By placing the aforementioned values of b and h_p in the expression and accepting h_c=0,5h_p, k_{yu}=1,2 and $\varphi_{o't}$ =35º the device must be 42 inches [42 cm] wide.

The total comprehension width of the device, i.e. the distance between its soil surfaces, will be as follows according to the scheme in Figure 1.1 of B_k

$$B_к = b + 2h_n ctg\varphi_{ўm} + 2b_c \qquad (12)$$

or (13)

$$B_к = b + 2h_n ctg\varphi_{ўm} + \frac{\left[b + (h_n - h_c)ctg\varphi_{ўm}\right](h_n - h_c) - h_c^2 ctg\varphi_{ўm}}{2k_{ю}h_c} \qquad (14)$$

If we put the above values of b, h_p, $\varphi_{o't}$, h_s and k_{yu} in this expression, the device's comprehension width is 150 cm.

Therefore, to ensure the height and width of the feather according to agrotechnical requirements, the device must be 42 inches [42 cm] wide and its total comprehension width is 150 cm.

Conclusion. In conclusion, we can say that we can increase productivity by planting polys crops under agricultural plastic. Low costs make this project more profitable. The calculation shown above guarantees that working based on books and parameters will increase productivity. One of the important aspects was the reduction of manual labor through the implementation of this scientific project.

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