PLANTING MACHINE WORKING SECTION AND PARAMETERS FOUNDATION

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Abstract
The article presents the theoretical research results on the structure, operation and the machine working section some technological parameters for transplanting vegetable seedlings.

Keywords: planting machine, tomato, eggplant, bell pepper, planting machine, cam mechanism, productivity, resource-saving technology.

Introduction
Accelerated solution of the Republic agriculture technical re-equipment problem, that is, the agricultural machinery development, the machinery creation and improvement for cotton, grain, vegetables and other agriculture sectors, the issues of pursuing a single scientific, technical and investment policy, such as increasing the similar equipment competitiveness manufactured in our country, are included in the tasks of Resolution PD-2125 and PD-1758. Also, today the innovation projects' scientific and technical problems list for 2015-2016 includes the need to develop the planting machine design. [1, 2]
This is due to the fact that in tomatoes, eggplant, cabbage, bell peppers cultivation, sowing of these vegetables seeds in the greenhouse, seedlings, that is, from sowing to harvesting, many complex agro-technical and technological processes are carried out. This requires sufficient skills from vegetable growers and workers engaged in the field. At the same time, the implementation of planting's 100% mechanization remains a topical issue.

Materials and methods. The new cam-mechanism planting apparatus design and parameters review in accordance with the agro-technical requirements for tomatoes, eggplants, cabbage, bell peppers planting from vegetable crops.

Results and their analysis

Using the kinematic scheme of the working section of the seedling planting machine (Fig. 1), we consider the relationship of some of the following structural and technological parameters.

In this case, given that the pushing height of cam 2 is h, the pitch of the seedling bushes must be equal to α i.e $h = \alpha$, the frequency of rotation of the cam is $П_К$, and the frequency of planting seedlings is equal to n, i.e. $П_К = n$. Under this condition, the cam frequency is expressed by the machine speed v_m and the sowing step α :

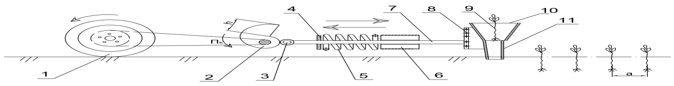

Figure 1. Kinematic scheme of the working section of the seedling planting machine
1 base wheel; 2 eccentric cams, 3 - rollers; 4- limiter;
5- spring; 6- bracket; 7- stock; 8- lekalo; 9- seedlings to be planted;
10 - funnel holder; 11-seedling outlet of the funnel.

$$П_К = \frac{v_m}{0{,}06 \cdot \alpha} \text{ ,min}^{-1} \qquad (1)$$

In that case $П_К$ The number i of engine extensions that provide the value can be found as follows :

$$i = \frac{0{,}06 \cdot \alpha \cdot n_{ков}(n_c \cdot F)}{v_m}, \qquad (2)$$

Here

$n_{ков}(n_c \cdot F)$ -frequency of rotation of the tractor (rear wheel), min^{-1}

According to the given procedure, we determine the parameter of the base wheel of the proposed seedling planting drill, that is, the path traveled (l), taking into account the slip coefficient (δ) in one rotation, it can be determined using the following formula.

$$l_{in} = l_o \cdot \delta \cdot = \pi \cdot D_{\hat{e}} \cdot \left(\frac{v_n - v_{\hat{e}}}{v_{í}} \right); \qquad (3)$$

Here: $l_o \cdot \delta = 2\pi d$

$D_к$ is wheel diameter

$v_н$ is theoretical speed of the machine

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$v_н$ = 0,75 km/h

v_x – the actual speed of the car

v_x = 0,72 km/h

Here l (l_n) is equal to

$$l\,(1n\,) = 2{,}2\cdot 0{,}1\cdot 3,\,14\cdot 0{,}61\left(\frac{0{,}21 - 0{,}20}{0{,}21}\right) = 0{,}02 \quad \text{m/sek;} \quad (4)$$

The development of the working body in the given scheme (Fig. 1) should be limited to a distance of 7-12 cm at the request of high-yield planting technology based on the forward rotation motion.

The step of the cam mechanism created for this purpose is found by the following formula.

$$l\ (1\cdot n) = N\cdot t\ \ \text{кул},$$

here: $N_к$ - cam circle number circle / min

t – cam step, sm

here $$N_к = \frac{l\,(1 - n)}{t_{кул}}$$ circle / sec,

l (1·n) we get from the calculation book above.

The t_c value is determined as follows due to the given.

if t_{cam} = 12 sm

t_{cam} = 12 sm= 0,07 м

we get a cam size of 10-25 cm.

$$N_K\ (10) = \frac{0{,}02}{1} = 0.02 \quad \text{circle / sec}$$

if $t_к$=12 sm

$$N_K\ (12) = \frac{0{,}02}{1{,}2} = 0{,}016 \quad \text{circle / sec.}$$

The number of extensions can be found as follows.

$$i = \frac{Z_2}{Z_1}\cdot\frac{Z_3}{Z_2} - \ldots\frac{Z_8}{Z_7} \quad \text{and etc.}$$

Conclusion

Such planting machines are not widely used in the country farms. With the development of planting machine improved design, rational planting schemes based on agronomists should be implemented in agriculture. Dramatically reduces the level of damage during transplanting, improves the quality of planting, maintains the completeness and full development of seedling bushes, increases productivity and productivity, significantly increases the cost-effectiveness.

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