Base the Parameters of the Prikat

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Abstract: The article presents the results of a theoretical study on the basis of the parameters of a prikatka, which buries seeds of small-seeded vegetable crops planted in many rows to the same depth in a tapered way on the basis of agrotechnical requirements for the bushes prepared for planting and compacts the soil on the sides.

Keywords: vegetable crops, small-seeded crops, ordinary sowing, pineal erect rolling.

Access. Today, in our Republic, scientific and research work is being carried out, aimed at developing new scientific and technical solutions of energy-resource-efficient planting technologies and weapons that implement them. In the cultivation of small-seeded vegetables, in particular, planters that sow seeds in many rows in a strip method, and furrowers in the form of knotted coils are used more often for burying, their scientific study is one of the urgent problems. In the conducted scientific research, seeds of small-seeded vegetable crops were planted in rice fields prepared for planting, based on agrotechnical requirements, in many rows at the same depth in a strip method, the parameters of the cone-knotted screw compacting the sides of the soil and soil burial are based on it.

Analysis and results. The main function of the cone seed drills is to bury the seeds planted in many rows in a strip method at the required level and to compact the soil.

In our theoretical studies, the main parameters of the cone-knot filter are its B_{ny} - total coverage width, $D_{n\ddot{y}}$, D_{n1}, D_{n2} – in line, average, large and small diameters, Q_y – the total vertical compressive force given is assumed.

The total coverage width of the cone-knotted pins is the transverse distance between the sowers, We determine it by the distance between the sower jaws and the number of rows of seeds to be planted in one field. Figure 1 shows the scheme of seed burial by cone-knotted beetles.
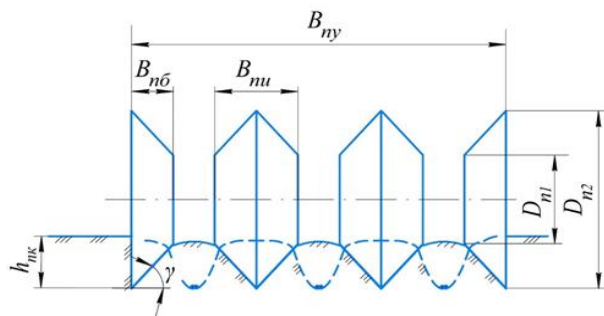

Figure 1. Scheme of seed burial by cone-knotted beetles

$$B_{n\delta} = 0{,}5[B_{\kappa} - (b_{\varkappa c} + 2S_{\varkappa c})] \qquad (1)$$

and

$$B_{nu} = B_{\kappa} - (b_{\varkappa c} + 2S_{\varkappa c}). \qquad (2)$$

According to expressions (1) and (2), the total coverage width of pins installed in one section:

$$B_{ny} = n B_{\kappa}, \qquad (3)$$

where n is the number of seeds installed in one section or rows in one strip, units.

When obtaining the results, the calculations made by taking B_{κ}=0,1 m, $b_{\varkappa c}$=0,025 m, $S_{\varkappa c}$=0,004 m and n=3 should be $B_{n\delta}$=3,35 cm, B_{nu}=6,7 cm and B_{ny}=30 cm let's find out.

We determine the average diameter of the cone-knotted plug, provided that there is no pile of soil in front of it, according to the following expression (Fig. 2).

According to him

$$D_{n\dot{y}} \geq \frac{2h_{n\dot{y}}}{1 - \cos\alpha_0} = \frac{h_y}{1 - \cos\alpha_0}, \qquad (4)$$

where α_0 is the angle of immersion of the cone-knotted pin into the soil, °.
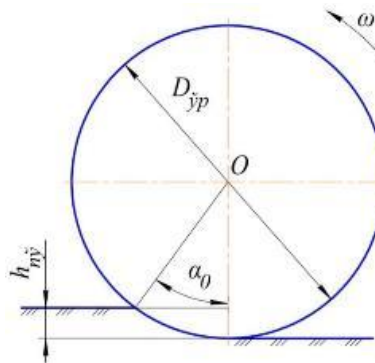

Figure 2. Scheme for determining the average diameter of a cone-knotted pin

We determine the diameters of the small and large bases of the cone-knotted pin according to the known value of its average diameter $D_{n\dot{y}}$

$$D_{n1} \geq \frac{h_y(1 + \cos\alpha_0)}{2(1 - \cos\alpha_0)} \qquad (5)$$

and

$$D_{n2} \geq \frac{h_y(3 - \cos\alpha_0)}{2(1 - \cos\alpha_0)}. \qquad (6)$$

taking $\alpha_0 = 20°$, according to expressions (4), (5) and (6), medium and large diameters, respectively, at least 24,12; we determine that it should be 24,87 and 25,62 cm.

We determine the vertical compressive force applied to the cone-knotted pin by the following expression, under the condition that it should sink to a specified depth.

$$Q_y = 0{,}25 q_0 (d + K V_n^2)[B_\kappa - (b_{\text{ж}} + 2 S_{\text{ж}})] D_{n\check{y}} \times$$

$$\times \left[\sqrt{2 D_{n\check{y}} h_y - h_y^2} - (D_{n\check{y}} - h_y) \arcsin \frac{\sqrt{2 D_{n\check{y}} h_y - h_y^2}}{D_{n\check{y}}} \right] +$$

$$+ 0{,}5 q_0 (d + K V_n^2)[B_\kappa - (b_{\text{ж}} + 2 S_{\text{ж}})] D_{n\check{y}} \times$$

$$\times \left[\sqrt{2 D_{n\check{y}} h_y - h_y^2} - (D_{n\check{y}} - h_y) \arcsin \frac{\sqrt{2 D_{n\check{y}} h_y - h_y^2}}{D_{n\check{y}}} \right]. \tag{7}$$

where q_0 is the volume compression coefficient of the soil; K – proportionality coefficient; d is a dimensionless coefficient.

q_0 = 2,4·10^6 N/m^3, d = 0,9, K = 0,08 s^2/m^2, $B_{n\delta}$ =0,0335 m, B_{nu} =0,067 m, in the calculations carried out according to the expression, taking the values, the total vertical load applied to the cone-knotted pin at movement speeds of 1,5-2,0 m/s should be in the range of 176,5-199,4 N we determine that

In conclusion: Small, medium and large diameters of cone-knotted pin, in line, 24,12, 24,87 and 25,62 cm, the total coverage width of the pins is 30 cm and when the total vertical compressive force applied to them is in the range of 176,5-199,4 N at movement speeds of 1,5-2,0 m/s, The seeds of small-seeded vegetable crops, sown in many rows, are buried according to agrotechnical requirements.

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