Determining the cross profile of manmade pawl and furrow before creating longitudinal pawl between cotton rows

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Abstract. This article outlines the results of the theoretical research based on the parameters of the working organs of the parameters of the construction of longitudinal pawl-creating device between cotton rows.

1. Introduction

The general land area of our Republic is 44890 thousand hectares. 50.4 % of them are agricultural land. Because of increasing technical improvements rapidly, modern science achievements of agriculture advanced using of experiences in agriculture and scientifically based on agriculture system-intensive degree of production is increasing. This can allow improving soil productivity [1].

Irrigated lands in our republic are productive, they consist of 3.8 million hectares. 98% of agricultural products are grown in our country [2,3].

Cotton areas of irrigated lands according to natural climate and soil condition, mechanic content of the soil, technology of cultivation, types of machines, agro techniques demands are divided into three parts. First before irrigating longitudinal and cross pawl should be created, after irrigating on the purpose of cultivating cotton row cross pawls should be destroyed [4, 5, 6, 7, 8, 9].

Creating pawls device is considered furrow between cotton row which is an impact on soil rising agro and energetic indications [10, 11, 12].

2. Materials and Methods

The process of creating cross pawl between cotton rows are made during vegetation third after...
cultivation and before creating irrigating furrow. In this period profile of cotton rows intervals are described with uneven relief, it will be in the view of furrow and garden-bed.

In the research work furrow deepness \( (h_e) \), furrow layer deepness \( (n) \) and corner of the garden-bed side near furrow \( (\varepsilon) \) were determined.

Above mentioned indicators, researches were carried out in the rows with intervals 60 sm fields of “Muhammad Chorukiy” in the village Bogikalon which is the Bukhara district of the Bukhara region. There were done sizing works by the help of profiler in side plan between 5 sm to take field profile.

All results which were taken from field experiences and coordinates system abscissa axis \( (X) \) between cotton rows \( (A) \) and deepness of furrow \( (h_e) \) according to its ordinates \( (Y) \) were collecting. The experiment results are shown in figure 2.

As it seemed from 2-picture furrow deepness minimal middle and maximal price 9.2 sm 10.5 sm, 11.8 sm was determined.

Determine such pawl profile all experiments which were taken from fields were analyzed ordinates \( (Y) \) in a coordinate system and the abscissa \( (X) \) axis and wideness of cotton rows pawl height were collected (figure 3).

Middle values of results were taken, formed pawls profiles were built and through it pawls across the surface were determined (figure 4).
In figure 4 formed pawls between cotton rows which have 60 sm. wildness was determined by \( h_n = 24.3 \) sm. This data refer to the device to determine demanding soil layer forming pawls.

3. Results and discussion

Pawls altitude was identified according to the use scheme between cotton rows garden-bed in picture 5. According to this

\[
h_n = \frac{A}{2} \tan \varphi_m
\]  

(1)

In this \( h_n \) is the altitude proportion to top of garden-bed of f forming pawls between cotton rows; 
\( A \) is the wideness of between cotton rows (\( A = 60 \) cm) 
\( \varphi_m \) is the corner of the soil natural spill. 

If we accept according to the given information \( \varphi_m = 35^\circ - 40^\circ \) in literature [13, 14, 15], (1) altitude of pawl’s height will be 25.2 cm.

Now we determine the cross-line surface of forming pawl. It consists of the sum of two surfaces, that is

\[
S_{gen} = S_n + S_e
\]  

(2)

In this \( S_n \) is the upper triangular part surface of pawl; 
\( S_e \) is the low furrow surface part of the pawl.

5-according to the scheme in the picture

\[
S_n = \frac{Ah_n}{2}
\]  

(3)

Or we consider on (1)

\[
S_n = \frac{A^2}{4} \tan \varphi_m
\]  

(4)

Cross profile of cotton rows’ intervals will change legally [16, 17, 18]. \( z = \frac{h_n}{2} (1 - \sin \frac{2\pi}{m}) \) we see it according to this example \( S_e \).
\[ S_y = \int \frac{h_y}{A}(1 - \sin \frac{2\pi x}{A}) dx = \frac{h_y}{2} A \]  

In this, \( h_y \) is the deepness of furrow between cotton rows [19, 20, 21], \( m \) (4) and (5) we considered them (2) example will be following.

\[ S_{yw} = \frac{A^2}{4} \tan \phi_m + \frac{h_y}{2} A = \frac{A}{2} \tan \phi_m + h_y \]  

4. Conclusion

The above calculations showed that the surface of the cross-sectional area with a width of 0.6 m and a fence depth of 0.10 m between the rows of cotton was \( S_{gw} = 0.106 \text{ m}^2 \) (1055 cm²).

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