INTENSIVE DRIP-IRRIGATED GARDEN WITH INTER-ROW CULTIVATION WORK IS TO DETERMINE THE SCOPE OF THE BODY THEORETICAL RESEARCH RESULTS

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Аннотация. В данной статье параметры широкозахватный плоскореза работающего междурядья интенсивного сада с капельным орошением теоретически обоснованы на параметрах обеспечивающих качество работы на уровне агротехнических требований.

Annotation. In this article, the parameters of the comprehensive flat-cutter which works between the rows of an intensive garden with drip irrigation are theoretically based on the parameters that ensure the quality of work at the level of agrotechnical requirements.

Kalit so'zlar: Intensiv bog', kultivator, ildiz tizimi, himoya zonasi, samaradorlik, keng qamrovli yassi kesgich, sferik disk, tuproq surgich tekislagich.

Ключевые слова: Интенсивный сад, култиватор, корневая система, зона защиты, эффективност, широкозахватный плоскореза, сферический диск, разравнивател почвы.

Keywords: Intensiv garden, cultivator, root system, protection zone, efficiency, comprehensive flat-cutter, spherical disc, soil pusher leveler.

Introduction. The rapid growth of the world's population leads to an increase in the need for natural fruit and vegetable products of the population, which is becoming an increasingly acute problem. Therefore, China, the USA, Germany, Spain, Russia, Turkey, in order to ensure the food security of the population on a global scale, to organize intensive orchards and vineyards in agricultural production, and to create modern energy and resource-saving techniques and technologies working in them are leading the way and achieving many positive results. In recent years, our republic has been paying great attention to the establishment of high-technology drip-irrigated intensive orchards and vineyards, using advanced foreign experiences in the field of agriculture. In particular, according to the decision of the Cabinet of Ministers No. 458 of 2021,

the members of agricultural associations, participants of fruit and vegetable clusters and business entities will receive a subsidy to cover a part of the costs of purchasing intensively grown seedlings and cuttings in local conditions was approved [1].

The Scientific Research Institute of Agricultural Mechanization and the Tashkent Institute of Irrigation and Agriculture Mechanization Engineers National research university Bukhara Institute of Natural Resources Management of the Institute in cooperation with ,ofin order to improve tree root development in intensive orchards, get a high yield from orchards and fight against various diseases, with high-quality soil cultivation and weeding of rows of fields the design of the machine for intensive garden interrow cultivation with drip irrigation was developed. On the basis of the conducted research, a wide-ranging flat-cutting working device was adopted for processing between intensive garden rows, and theoretical studies were conducted to determine the optimal values of this working body.

Materials and methods. In order to determine the specified parameters of the drip-irrigated intensive garden interrow machine, we used the researches carried out by Tukhtakuziev A., Imomkulov K.B., Toshpulatov B., Abdulkhaev Kh.G., Musurmanov A.T., Utaganov. [1-5].]

Results and discussion. The comprehensive flat cutter body during the work, intensively cultivates the soil between the rows of the garden up to 8-12 cm without damaging the tree roots, and completely cuts the weeds between the rows during the cultivation. The extensive flat-cutting working body consists of a column 1, a jig 2, right 3 and left 4 knives installed on it (Pic. 1). The column is fixed to the frame of the car by means of a special bracket.

The following are a comprehensive planar cutting tool and the parameters that affect its performance.

α_i – grinding angle of the chisel, ° ;

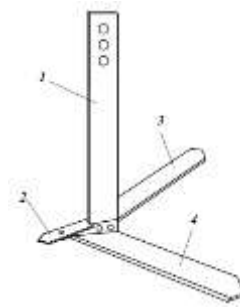b_i – the width of the chisel, m ;

L_i – the length of the working surface of the chisel, m;

β_p – the angle of entry of the blade into the soil,° ;

$2\gamma_i$ – opening angle of the working body, ° ;

B_i - the coverage width of the comprehensive flat-cutting body, m;

b_p - working body wing coverage width, m;

1- column; 2- chisel; 3-right and 4- left blades

Picture 1. Comprehensive flat-cutting body

In this case, we use the scheme presented in Picture 2 to determine the coverage width B_i of a comprehensive flat cutter working between intensive garden rows, and we get the following
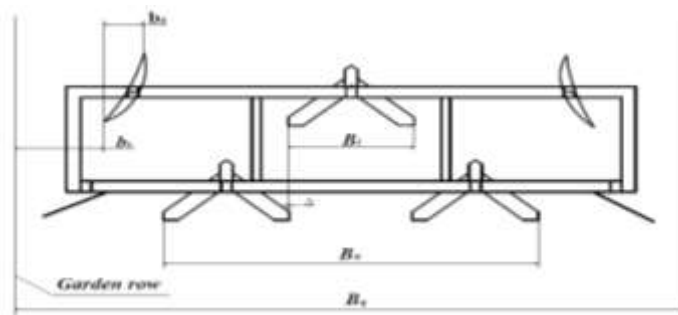
expressions from it.

Pichture 2. Coverage of the flat-cutter working body

scheme for determining the width

$$B_u = B_q - 2b_h - 2b_d \tag{1}$$

and

$$B_u = 3B_i - 2\Delta \tag{2}$$

in this B_u – the total coverage width of the flat-cutter working bodies, m;

B_q – width between garden rows, m;

b_h – the width of the tree protection zone, m;

b_d – the coverage width of the disk that buries exposed tree roots, m;

Δ - overlap width of flat-cutter working bodies, m.

(1) and (2) we make the right sides of the expressions equal to each other, i.e

$$B_q - 2b_h - 2b_d = 3B_i - 2\Delta \tag{3}$$

Solving this expression with respect to B_i, we get the following expression to determine the width of the flat cutter workpiece

$$B_i = \frac{1}{3}\left[B_q - 2\left(b_h + b_d - \Delta\right)\right] \tag{4}$$

It is known from the literature [8]

$$b_d = 2\sqrt{\frac{h_D}{\cos\beta}\left(D - \frac{h_D}{\cos\beta}\right)}\sin\alpha \tag{5}$$

in this: h_D – depth of penetration of the disc into the soil, m;

β – the angle of installation of the disk relative to the vertical,°

D– the diameter of the disk, m;

α – installation angle of the disc relative to the direction of movement,°

taking (4) into account, expression (5) has the following form.

$$B_i = \frac{1}{3}\left\{B_q - 2\left[b_h + 2\sqrt{\frac{h_D}{\cos\beta}\left(D - \frac{h_D}{\cos\beta}\right)}\sin\alpha - \Delta\right]\right\} \tag{6}$$

Based on the known values of B_i and b_i, we determine the coverage width b_p of the blade of the working body.

$$b_p = \frac{B_i - b_i}{2} \tag{7}$$

or considering (6),

$$b_p = \frac{1}{2}\left\{\frac{1}{3}\left\{B_q - 2\left[b_h + 2\sqrt{\frac{h_D}{\cos\beta}\left(D - \frac{h_D}{\cos\beta}\right)}\sin\alpha - \Delta\right]\right\} - b_i\right\} \tag{8}$$

When the machine is operated without disc working bodies, comprehensive flat- cutting work has shown that the body coverage should be as follows:

$$B_u = B_q - 2b_h \tag{9}$$

$$B_i = \frac{1}{3}\left[B_q - 2\left(b_h - \Delta\right)\right] \tag{10}$$

and

$$b_p = \frac{1}{2}\left\{\frac{1}{3}\Big[B_q - 2\left(b_h - \Delta\right)\Big]\right\} \tag{11}$$

Analysis of research results. To expression (6) $B_q = 400$ cm, $b_h = 50$ cm, $h_D = 16$ cm, $\beta = 15°$, $\alpha = 40$, $D = 61$ cm and $\Delta=5$ cm putting the values, we determine that the width of the working body of the comprehensive flat-cutter should be 77 cm, to expression (8) $B_q = 400$ cm, $b_h = 50$ cm, $h_D = 16$ cm, $\beta = 15°$, $\alpha = 40$, $D = 61$ cm, $\Delta=5$ cm, $b_i = 8$ cm if we put the values, it follows that the width of the blade of the flat-cutter should be 36 cm. When the machine is operated without disc working bodies, it is found that the total coverage width is 300 cm, the coverage width of one working body is 100 cm, and the coverage width of the working body blade is 50 cm.

Conclusions. Based on the theoretical research the comprehensive flat-cutter working between the rows of an intensive garden with drip irrigation has a coverage width of 77 cm, the width of the blade of the working body is 36 cm and showed that when the machine works without disc working bodies, the total coverage width should be 300 cm, the coverage width of one working body should be 100 cm, and the coverage width of the blade of the working body should be 50 cm.

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