

# *The Results Of Experimental Studies Of Housings With Guide Plates For Processing Sowing Zones Of Melons And Gourds*

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**Abstract** – A combined unit has been developed for preparing the soil for sowing melons and gourds in one pass. The efficiency of the combi unit depends on the parameters of the housing with guide plates. The aim of the study is to substantiate the parameters of the housing with guide plates. The results of experimental studies of the case with guide plates for processing the sowing zones of melons are presented.

**Keywords** – Gourds, Soil, Hull, Guideplate, Irrigationfurrow, Stratum, Residualplant, Straingauge.

## I. INTRODUCTION

The weather and soil conditions in our country are very favorable for a rich harvest of melons. Therefore, it is advisable to grow melons on a large scale not only for the needs of the population of our republic, but also for sale to other countries. [1-7].

It is very important to introduce intensive technologies in horticulture, to increase land efficiency and productivity at low costs [8-10]. Therefore, it is very important to conduct experimental studies to substantiate the design parameters of the housings of the guide plates, which are processed in the planting zone of melons.

## II. LITERATURE REVIEW

The problems of high-quality soil preparation for sowing melons and gourds are considered in many scientific works [6-10]. Research on the creation of machines for melon growing, substantiation of the structures and parameters of their working bodies were carried out by V.I. Malyukov [11], A.D.Em, V.N. Zhukov, A.E. Kodirov [12], V.G. Abezin [13] and others. V.G. Abezin [13] substantiated and developed working bodies for pre-sowing soil cultivation and sowing melon seeds. The studies of F.M. Mamatov and I.T. Ergashev [10-11] are mainly aimed at the development of combined machines for preparing the soil for sowing in one pass of the unit. These studies did not consider the issues of seam turnover with the simultaneous formation of an irrigation furrow when preparing the soil for sowing melons in one pass of the unit. The above disadvantages can be eliminated by substantiating the parameters of the body with guide plates for preparing the soil for sowing melons and gourds in one pass of the unit.

III. MATERIALS AND METHODS

The object of the research is the guide plate bodies, processing the area of melons and gourds. The study of the technological processes of the combined machine-guided lamellar housings was carried out on the basis of literature sources [14-33] and the results of field tests.

Taking into account the results of theoretical studies, an experimental setup with lamellar bodies was developed for laboratory-field experiments, which are sent to the cultivated area for soil cultivation. The technical description of the device is given in table 1.

The research was carried out in the fields of the Sertepa state farm in the Kashkadarya region and the Research Institute of Agricultural Mechanization in the Yangiyul District of the Tashkent Region. Experimental studies have examined the influence of the length of the guide plate and the depth of processing on the characteristics of the bodies.

The completeness of burial of plant residues in the planting zone was determined by the mass of plant residues and weeds left unimmersed on the soil surface. The identification of unburied plant remains and weeds was carried out on sites 5 m long and equal to the width of the enclosure. Remaining unburied plant remains were collected and weighed with an error of 10 g.

Table 1. Technical description of the experimental device for tillage in the sowing zone

Name and unit of indicators	The value of indicators
Capture width, m	0,90-1,05
Processing depth, cm	20-27
Number of buildings, pcs.	2
Capture width of bodies, cm	45-52,5
Type of shell	Screw
Number of directional plates, pcs.	2

The burial depth of plant residues was determined by measuring the distance from the surface of the plow to the upper boundary of the plant residues by cutting the plow vertically along the width of the cover of the body. Two vertical cuts were made at each pass. The measurements were carried out with an accuracy of 0.5 cm and fourfold.

The energy assessment of the device cases was carried out in conjunction with their agrotechnical assessment. During the experiment, the total gravitational resistance  $R$  of the device, the path  $S$  of the device and the test time  $t$  were determined. The total resistance of the housings of the guide plates was determined by the stresses in the strain gauges installed on the suspension mechanism of the device.

IV. RESEARCH RESULTS

When implementing the proposed technology, i.e. the formation of an initial irrigation ditch with a high-quality turning of the blades is influenced by the width of the cover of the bodies, the length of the guide plate and the depth of processing.

When determining the influence of the length of the guide plate on the energy and quality characteristics of the housings, the processing depth was  $a = 25$  cm, the speed of the device was 1.72 m / s, the width of the cover of each housing was 52.5 cm, and the coverage of the device was 105 cm.

Experimental studies (Fig. 1 and Table 2) have found that the length of the plate, which determines the plow slope and plow profile, has a significant influence.

When the enclosures are operated without a guide plate, the pallets are generally stacked on the untreated surface of the field on the right and left respectively. In this case, an open field 103.2 cm wide and 31.8 cm deep is formed in the middle of the treated area. With the length of the guide plate  $l_2 = 40$  cm, cases of incomplete overturning of the plate were observed and an open ridge 91.6 cm wide and 29.8 cm deep was formed. With further increase in the length of the guide plate, the technological process proved to be reliable.

As the length of the guide plate decreases, the tensile resistance of the housings also decreases (Fig. 1). This is due to the fact that in the absence of a guide plate, the sling is subjected to a certain position only under the action of the body, and then turns over under the action of inertial forces. This reduces the plate pressure on the inverter and there is no resistance on the guide plate. With an increase in the length of the guide plate, its resistance to resistance and the magnitude of the friction forces on the working surface increase. This increases the energy consumption required to turn the pulley.

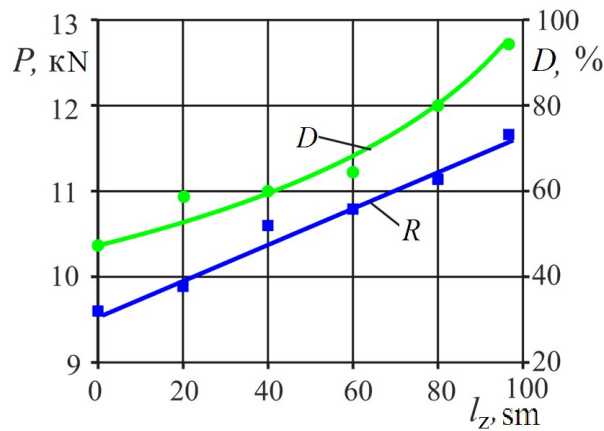


Figure 1. Gravitational resistance of the bodies R and the change in the mass of plant residues depending on the length of the plate, which determines the integrity of the burial D

With the length of the guide plate  $l_z = 93$  cm, each plate turned over at the border of its owner, the depth of the formed ditch in the middle of the processing ZONE was 9.8 cm. In this case, the guide plate is influenced from the beginning of lifting the plate to complete overturning, i.e. from 160 to 1700 rollover.

With the length of the guide plate  $l_z = 80$  cm, a groove 60.2 cm wide and 28.8 cm deep was formed, which meets the requirements of the proposed technology.

Table 2. Effect of guide plate length on device performance

Indicator name and resolution	Guide plate length, m					
	0	0,20	0,40	0,60	0,80	0,93
Unitspeed, m/s	1,72	1,72	1,72	1,72	1,72	1,72
Working depth, sm:						
$M_{cr}$	24,9	24,7	24,6	24,3	24,2	24,2
$\pm\sigma$ , sm	1,8	1,7	1,5	1,4	1,4	1,3
Cover width:						
$M_{cr}$	101,5	104,5	104,3	105,4	105,7	105,9
$\pm\sigma$ , sm	4,8	4,4	3,8	3,5	3,3	3,3
Furrowwidth, sm	103,2	96,2	91,6	78,2	60,2	21,6
Ridgedepth, sm	31,8	30,3	29,8	29,1	28,8	9,8
Completeness of burial of plant residues, %	49,8	59,3	66,0	79,5	90,3	92,3
Completeness of burial of plant residues, sm	3,3	3,9	7,2	10,4	11,3	13,2
Soil erosion rate, %	37,1	48,6	64,8	71,5	73,2	77,9
Gravity resistance, kN	9,6	9,9	10,6	10,8	11,1	11,6

When the device covers 105 cm, covers 52.5 cm and the length of the guide plate is 80 cm, the depth of the weeds changes along a convex curve (Fig.2). In the range of processing depths of 22-26 cm, the completeness of burial of plant residues was 91-93%, i.e. at the level of requirements. As can be seen from the graph (Fig. 2), with an increase in the processing depth a, the tensile strength R of the bodies increases. With an increase in the processing depth a from 22 to 30 cm, the ultimate strength increases by 15.3%.

Thus, it has been established that the depth of rational processing of bodies is within 22-26 cm, the completeness of burial of the mass of plant residues is within the agrotechnical requirements.

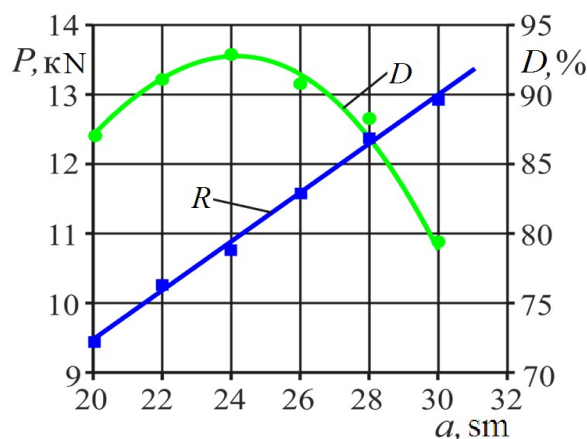


Figure 2. The gravitational resistance of the buildings  $R$  and the completeness of the burial  $D$  of the mass of plant residues vary depending on the depth of their processing.

## V. CONCLUSIONS

Regularities of the change in the tensile strength of the guide plate body are determined depending on its design parameters, operating mode and soil properties. Low energy consumption enables pallets to tilt relative to each other and form an initial sprinkler with a 52.5 cm hull width and 80 cm guide plate length.

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