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Physical-Mechanical Properties of Soil and Carrot Seed

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Abstract:

In the article, carrot seeds are sown in pre-prepared seedbeds in experiments with a multi-row seeder. The size and mass indicators of carrot seeds planted with the help of a seeder were determined and their values were presented in the tables. Experiments were carried out mainly on the seeds of carrot "Yellow mirzoi 304", " Red mirzoi 228" and "Super Kuroda" from Korea. In the experiments, the mass of 1000 seeds and their geometric dimensions were determined using a microscope using a special scale.

Keywords: Device, researches, vegetables, crops, carrot seeds, length, width, height, inclined plane.

Introduction. All over the world, including, carrot seeds are planted in the field. By planting the seeds in the field, the necessary conditions for the growth of the plant are created, and due to this, it is possible to achieve a high yield from the plant.

The dimensions of the field where carrot seeds are planted in the dissertation are as follows. The coverage width of the field is 70 cm, the width of the top of the field is 40 cm, the number of planted rows is 4 and the distance between the rows is 10 cm, and the planting pattern is $\frac{40+10+10+10}{4}$ views.

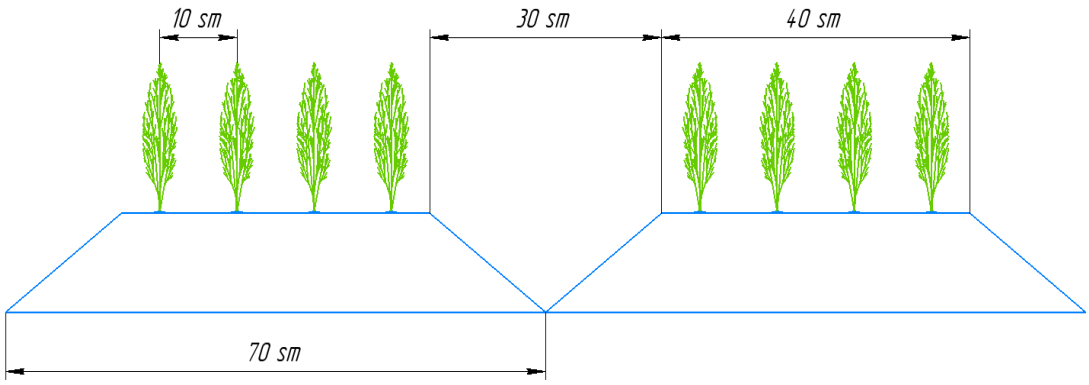


Figure 1. Scheme of placement of carrot seeds in a pod

Analyses and results.

Size and mass indicators of carrot seeds. Size classification of carrot seeds. The main dimensions of the seed are its length, width and thickness. In the experiments conducted to determine the size of carrot seeds, its main dimensions, such as length, width, thickness, were studied. The experiments were carried out in the following years on the seeds of carrot "Yellow mirzoi 304", "Red mirzoi 228" and "Super Kuroda" from Korea, which were planted in the fields of Uzbekistan (Table 1).

1- table Sizes of carrot seeds

№	Varieties	Indicators	$x_{max,}$	x_{min}	X	±σ	V, %
1.	Yellow mirzoi 304	length, mm	3,7	2,3	2,92	0,39	13,47
		width, mm	1,9	1,2	1,47	0,16	10,89
		thickness, mm	1,1	0,6	0,79	0,11	14,40
2.	Red mirzoi 228	length, mm	4,0	2,3	3,06	0,42	13,77
		width, mm	2,9	1,2	1,53	0,40	25,88
		thickness, mm	1,0	0,6	0,77	0,13	17,29
3.	Super Kuroda	length, mm	3,6	2,4	3,01	0,31	10,38
		width, mm	2,0	1,1	1,52	0,17	11,23
		thickness, mm	1,3	0,6	0,86	0,15	17,96

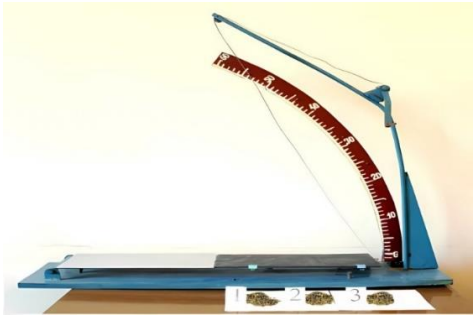
100 seeds from each of these varieties were extracted and their sizes determined. In the experiments, the large size of the grain is its length, and it ranges from 2.3 mm to 3.7 mm in the variety "Yellow mirzoi 304" and from 2.3 mm to 4.0 mm in the variety "Red mirzoi 228". , was found to vary from 2.5 mm to 3.6 mm in the Super kuroda variety.

The seeds are slightly smaller in size. its width and thickness, respectively, the width of the variety "Yellow mirzoi 304" is from 1.2 mm to 1.9 mm, the thickness is from 0.6 mm to 1.1 mm, the width of the variety "Red mirzoi 228" is from 1,2 mm to 2.9 mm with a thickness of from 0.6 mm to 1.0 mm and Super Kuroda is from 1.1 mm to 2.0 mm wide with a thickness of from 0.6 mm to 1.3 mm it became known to change in the interval.

Determination of friction properties of carrot seeds. To determine the coefficients of static friction of seeds, it is known from the literature [4. 6] and the currently used method - the method of determining the minimum slope angle of seeds sliding on the friction surface was used.

To sow carrot seeds with a seeder, it is necessary to know the properties of friction of seeds on surfaces when determining the parameters of working parts and operating modes.

The friction of carrot seeds on unpainted steel, painted steel, rubber and plastic surfaces was determined in the "inclined plane" device (Fig. 2). When determining the friction angle using this device, the sample is placed on the friction surface, and the surface is gradually raised using the lifting mechanism until the sample placed on its surface starts to move..



1- "Sariq mirzoi 304" variety of carrot seed; 2- variety " Red mirzoi 228"; 3- "Super Kuroda" variety.

Figure 2. Determination of the friction angle of carrot seeds

The angle of inclination of the surface in relation to the bed, corresponding to the time of seed movement, is determined on the scale of the protractor. Then the coefficient of friction is found by the following expression:

$$f_{ishq} = \text{tg}\,\varphi\,, \qquad (1)$$

During the experiments, the moisture content of the seeds was 11.2 percent. The friction angle of the carrot seed was studied according to its location along the surfaces. In experiments it was found out (Tables 2-5) that the friction angle of the seed depends on the type of working surface.

Table 2 Angle of friction of a carrot seed on a base with an unpolished, grad.

№	Varieties	Friction angle, grad				V, %
		$x_{max,}$	x_{min}	X	±σ	
1	Yellow mirzoi 304	41^0	33^0	$38^010´$	2,41	6,56
2	Red mirzoi 228	43^0	32^0	$36^045´$	3,65	10,01
3	Super Kuroda	42^0	33^0	$37^030´$	2,7	7,23

Table 3 angle of friction on a base with a polished steel surface, grad.

№	Varieties	Friction angle, grad				V, %
		$x_{max,}$	x_{min}	X	±σ	
1	Yellow mirzoi 304	28^0	22^0	$26^020´$	1,79	6,96
2	Red mirzoi 228	30^0	22^0	$26^035´$	2,46	9,48
3	Super Kuroda	31^0	23^0	$26^005´$	2,89	11,10

Table 4 Angle of friction of a carrot seed on a base with a rubber surface, grad.

№	Varieties	Friction angle, grad				V, %
		$x_{max,}$	x_{min}	X	±σ	
1	Yellow mirzoi 304	40^0	34^0	$36^050´$	1,85	5,07
2	Red mirzoi 228	41^0	33^0	$37^010´$	2,40	6,48
3	Super Kuroda	41^0	31^0	$35^025´$	2,50	7,02

Table 5 The angle of friction of the carrot seed on the plastic base, grad.

№	Varieties	Friction angle, grad				V, %
		$x_{max,}$	x_{min}	X	±σ	
1	Yellow mirzoi 304	29^0	22^0	$24^0 35´$	2,30	9,45
2	Red mirzoi 228	30^0	24^0	$27^0 35´$	1,99	7,37
3	Super Kuroda	29^0	22^0	$25^0 15´$	2,58	10,26

Methods and Conditions of Testing.

During the experiment, when designing a device for planting carrot seeds, first of all, the physical and mechanical properties of carrot seeds, that is, their size; length, width, thickness should be determined. In our experiments, we conducted three different varieties used in our country: "Yellow mirzoi 304", "Red mirzoi 228" and "Super Kuroda" from Korea. In the experiment, when determining the size of carrot seeds, the average values were determined by taking the sizes of 100 carrot seeds of each variety.

To determine the coefficients of static friction of seeds, the method known from the literature and used - the method of determining the minimum slope angle of the seeds sliding on the friction surface was used.

Summary.

To sow carrot seeds with a seeder, it is necessary to know the properties of friction of seeds on surfaces when determining the parameters of working parts and operating modes.

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