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Based on the Results of Experimental Research of the Cellular Disc of a Mechanical Plant

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Annotation: This article presents the methodology and results of laboratory experiments on a mechanical seeder that sows onion seeds in rows

Keywords: Sowing unit, conveyor, variator, cell, disc, roller, seed, parameter, leveling, distribution.

The use of energy-saving technologies and equipment for sowing and growing onion seeds is one of the leading fields in the world. “Considering that 92.1 million tons of onions are produced worldwide and that the volume of onion production is increasing by 2-3% annually” [1], it is necessary to introduce into practice machines that are high in work quality and resource-saving in sowing onion seeds. In this regard, it is important to ensure that the seed consumption during sowing onion seeds is within the established norms and to use planting equipment with high seeding accuracy in the cultivation of high-quality onions.

Scientific research is being conducted in the world to develop new scientific and technical solutions for resource-saving technologies and equipment for sowing onion seeds in the established norms without damaging them. In this regard, based on the technological characteristics of onion seeds, special attention is paid to the optimization of planting processes, the improvement of constructions of mechanical planting devices, the development of an energy-resource-saving machine that reduces labor costs in agrotechnical activities, and the justification of its technological process, parameters and work modes.

Based on the above, a single-row experimental version of a mechanical seeder for sowing onion seeds in rows was developed and experimental studies were conducted.

The influence of the speed of the unit (conveyor) on its performance indicators

In the experiments, the conveyor speed was changed from V_a=*1 m/s* to V_a=*1.6 m/s*. The graph in Figure 1 shows that as the conveyor speed increased, the longitudinal distance between the seeds also increased. For example, with an increase in the conveyor speed from V_a=*1 m/s* to V_a=*1.6 m/s*, the longitudinal distance between the dropped seeds increased by 7-15 cm. This is explained by the fact that after the seeder dropped one seed, the conveyor moved a longer distance at the time of dropping the next seed.

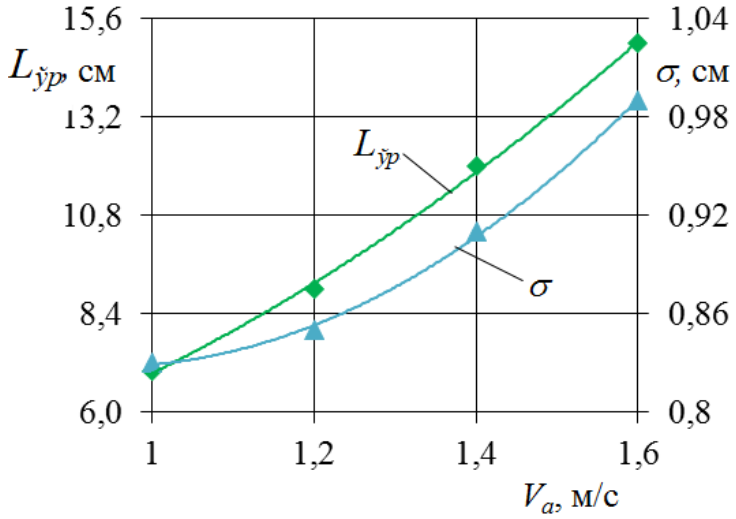

Figure 1. Graph of the longitudinal distance between seeds (Lωr) and its standard deviation (±σ) versus conveyor speed

The graph in Figure 2 shows that the number of onion seeds dropped decreased with increasing conveyor speed. For example, as the conveyor speed increased from V_a=*1 m/s* to V_a=*1.6 m/s*, the number of seeds dropped decreased from 1.72 to 1.12.

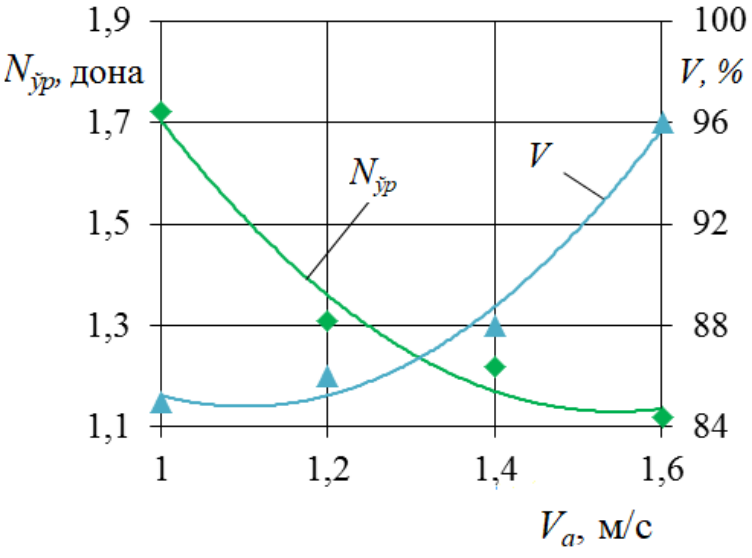

Figure 2. Plot of seed yield (N) and variation (±V) versus conveyor speed

The presented analyses show that in order for a seeder to plant onion seeds in accordance with the established agrotechnical requirements, its speed of movement should be V_a=*1.4 m/s*.

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