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ANALYSIS OF WORKING BODIES OF SOWING AND CULTIVATOR PLANTS

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Abstract: This article analyzes the working bodies of seeders and cultivator seeders, their structure, operating principle, and factors affecting their efficiency. The possibilities of improving the quality of sowing by improving the constructive characteristics of the working bodies in modern agricultural machinery are shown.

Keywords: sowing machine, cultivator, seeder, working body, seed metering device, disc harrow, depth, efficiency.

INTRODUCTION

One of the main factors of effective production in the agricultural sector is the quality of the sowing process and the optimal condition of the soil. Modern technologies show that equal and accurate placement of seeds to the specified depth increases productivity by 20–25%. Therefore, scientific analysis of the working bodies of sowing machines and cultivator seeders, improvement of their design parameters is an urgent issue. With the help of cultivators and seeders, the soil is loosened, leveled, seeds are sown and partially covered. The role of each working body in these processes is invaluable. For example, the sowing device distributes seeds at a constant rate, and harrows and discs place them at the required depth.

MAIN PART

1. Working bodies of sowing seeders

The sowing seeder consists of the following main parts:

Seed box (bunker);

Sowing device (doser);

Seed discharge pipes;

Coulter (seed placement part);

Harrow and press wheels.

The main work in the seeder is done by the coulter. It opens a crack in the ground surface and places the seed at the required depth. The coulters come in different shapes: disk, blade, whip, anchor, etc. Disk coulters give good results in wet soils, as they reduce soil adhesion. The spreading device serves to distribute the seed in a uniform manner. Their main types are: mechanical (roller, bucket, gear) and pneumatic (using air flow). The pneumatic system provides high accuracy, since it distributes the seed under the same pressure.

2. Working bodies of cultivator seeders

Cultivator seeders are used not only in pre-sowing, but also in post-sowing cultivation. Their working bodies include:

Lancet knives (teeth);

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Disk or spiral harrow;

Soil levelers and press wheels.

The main task of the cultivator is to remove weeds, aerate the soil, and retain moisture. The angle of entry of the working bodies into the soil, the number of teeth and the spacing are selected depending on the type of soil. For example, on sandy soils, the number of teeth should be more, and on silty soils, the angle should be smaller.

3. Structural analysis of working bodies

The efficiency of each working body is determined by its structural parameters:

The depth of the coulter is recommended to be in the range of 3–6 cm;

The angle of deviation of the teeth is in the range of 15–25°;

The pressure of the press wheel should be 0.05–0.1 MPa.

The experimental results show that if the distance between the coulters is 12–15 cm, the seeds are placed at the same depth and the seedlings germinate at the same time. In disc coulters, the soil is less disturbed, which preserves moisture.

4. Modern technological solutions

Currently, GPS-controlled seed drills, pneumatic dosers and electric actuator cultivators are widely used. They automatically control the depth of sowing;

control the seed rate in real time;

detect deviations from the course. Such systems increase labor productivity by 1.5–2 times and reduce seed consumption by 10–12%.

CONCLUSION

The working bodies of seeding and cultivator seed drills are one of the most important mechanical parts in agricultural production. Their correct selection and structural improvement directly affect the quality of sowing, yield and resource efficiency. The use of disc harrows, pneumatic spreaders and automated control systems will further increase efficiency in the future.

Therefore, a scientific analysis of the working bodies of agricultural machinery and their adaptation to soil conditions is one of the priority areas of modern mechanization.

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