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«НАУКА И ПРОСВЕЩЕНИЕ»**



НАУКА и ПРОСВЕЩЕНИЕ
МЕЖДУНАРОДНЫЙ ЦЕНТР НАУЧНОГО СОТРУДНИЧЕСТВА

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ANALYSIS OF TRENDS IN THE DEVELOPMENT OF PRECISION SEEDER DESIGNS IN THE REPUBLIC OF UZBEKISTAN

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Abstract: In order to obtain high profits in agriculture and reduce the cost of production, it is necessary to reduce manual labor, further improve the technology and mechanization of sowing. To improve the mechanization of sowing is the introduction of precision sowing technology, which has the advantages of standard sowing. Precision sowing ensures the placement of plants at a set distance over the area and makes it possible to reduce the labor costs of plant unity and reduce the cost of seeds and other seed materials.

Keywords: precision seeding drill, row crops, seeding, seeds, construction, soybeans, cotton.

During the visit of the head of our state to the Andijan region in May 2020, while inspecting the crops in the fields of the state farm, he instructed to plant soybeans between the rows of cotton. The agrotechnical event, which is considered a unique innovation, makes it possible to harvest soybeans and cotton at the same time. The method of planting soybeans between rows of cotton, or rather in the middle of cotton seedlings, allows rational use of land, water, mineral fertilizers and other resources. Therefore, it is not necessary to feed it additionally. Thanks to the resources spent on cotton cultivation, soybeans and yields are growing. As a result of planting soybeans in combination with cotton, firstly, soil fertility increases, secondly, the farmer's income increases, as cotton and soybean crops are harvested, and thirdly, the soil is prepared to increase cotton yields by 8-10 quintals per hectare in the coming years. This is because soybeans absorb pure nitrogen from the air with their roots and enrich the soil with nitrogen. As a consequence, the microflora of the fields sown with this crop improves, as a result of which a biologically and environmentally friendly system is formed.

With precise sowing, plant seeds are placed at a fixed distance in the area and full-fledged seedlings with low consumption of seeds and other seed materials, and this makes it possible to reduce the cost of labor resources for growing plants. It should be noted that when growing plants, thinning is the most important agrotechnical operation, since the delay in thinning leads to a slow and lagging in the development of plants and the ripening of the crop.

When cultivating cotton with complex mechanization of processes requires sowing, so that the target is provided with a given plant standing without additional involvement of human resources.

One of the most responsible agrotechnological operations in the cultivation of cotton is the sowing of cotton. The future cotton harvest depends on the correct sowing of the plant.

In this way, precise sowing with seeds, which was carried out by precision seeding drills. The seeder is aggregated with the cultivator's fertilizer, respectively, with a device for applying herbicides, so that fertilizers are applied simultaneously with seed sowing on the side of each sowing row and then the rows are sprayed with herbicides.

Specialized seeders are adapted for sowing seeds of one crop or a narrow group of crops that are similar in technological properties or requirements for growth and development conditions. Among the specialized

seeders, the following main groups can be distinguished – beetroot, vegetable, melon, cotton, forest [8].

Beet seeders (fig. 1 a) provide sowing of row crops with a row spacing of 45 cm. Most often they contain at least 12 sowing sections, the design of which differs from the design of sections of corn seeders in the layout, execution of individual nodes. Lump traps or additional sealing rollers are usually installed in front of the coulters of beet seeders [8].



Fig. 1. Special purpose seeders

a - beet seeder UPS-12 (JSC «Chervona Zirka», Ukraine);

b - vegetable seeder SVS-4/2x70 («Irbis», Ukraine);

d - double-line cotton seeder SDE-4B («Agricom» company, Tashkent)

With the improvement and universalization of the classification of precision seeders, it should be noted that the design and classification is becoming more conditional. Since, with the adjustable placement of the sowing sections along the width of the machine, the same universal row drills can provide high quality sowing of corn, beetroot, and other vegetable crops.

According to the layout of the nodes, rowed seeders are divided into monoblock, separate-aggregate and sectional (fig. 2) [5].

Monoblock seeder designs are equipped with a common frame on which all working bodies are mounted. This type of seeders is equipped with one or two hoppers 1 (fig. 2 a), from which seeds are fed through seed lines 3 to the sowing machines 2, and from them directly to the coulters 4, and one sowing machine of such a seeder serves one coulter. This arrangement is typical for the previously produced MRI seeders of the company "Fahse", for many "Gerardo" seeders of Argentine production, etc.

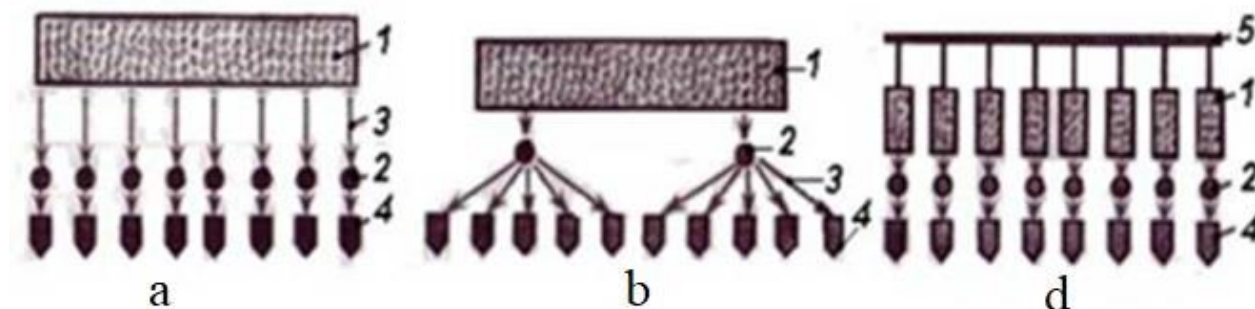


Fig. 2. Layout diagram of rowed seeders

a - monoblock; b - separate-aggregate; c - sectional;

1 - hopper; 2 - seeding machine; 3 - seed line; 4 - coulter; 5 - frame.

With the design, the presence of a common hopper makes it easier and simpler to fill it with seeds, increase the useful volume of the hopper. This can be seen, in the hopper of the MRI seeder of the company "Fahse" contained 670 kg of corn seeds. With a row spacing width of 75 cm and a seeding rate of 5 pieces per running meter of one full filling of the seeding hopper, about 30 hectares of field area [6, 8].

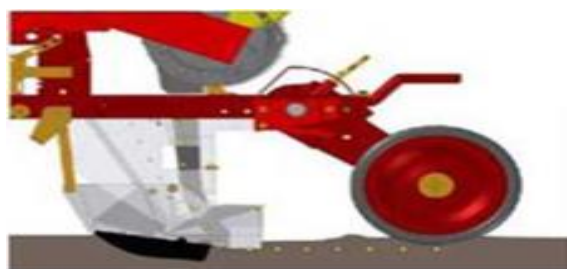
Separate-aggregate seeder designs consist of separate blocks (modules) connected in a single unit. Such seeder designs include one or more large-capacity hoppers 1 (fig. 2 b), from which seeds are supplied to centralized seeding machines 2. From the sowing machines 2 seeds are fed through seed ducts 3 (pneumatic seed ducts) into coulters 4. In rowed seeders with a similar arrangement, seeds are fed into several coulters from one sowing machine. According to this scheme, seeders of the "Cyclo" family of the "International Harvester" company, the EDX 9000 seeder of the "Amazone" company [7, 8] (fig. 3), etc. were manufactured.



Fig. 3. EDX 9000 precision seeder from "Amazone" company

Sectional seeder designs include separate sowing sections attached to the frame 5 (fig. 2 d) of the seeder. The section is equipped with a hopper 1 separately on each, a seeding apparatus 2, a drive mechanism, a coulter 4 and nodes for embedding seeds into the soil, and seeds can be fed into the coulter from the seeding apparatus both via a seed line (fig. 4 a) and without it (fig. 4 b). This arrangement of universally rowed seeders is one of the most common worldwide in recent times.

At each sowing section, a lump trap is provided in front of the coulter (fig. 5) to level the soil strip in the row area and prevent the dry topsoil from spilling into the furrow when laying seeds.



a



b

Fig. 4. Working bodies of sectional seeders

a – "Hatzenbichler" precision seeders;

b – seeders "Multikorn" of the company "Franzkleine"

Many foreign companies produce seeders with working sections made according to the "TRU-V" scheme, and with strip-shaped coulters (fig. 6).

Seeders of precise seeding by the type of traction there are classifications for tractor, manual (fig. 6 a) and horse. Currently, in modern production, horse seeders are practically not used, instead of them, seeders designed to work in a unit with tillers are becoming more widespread (fig. 6 b).

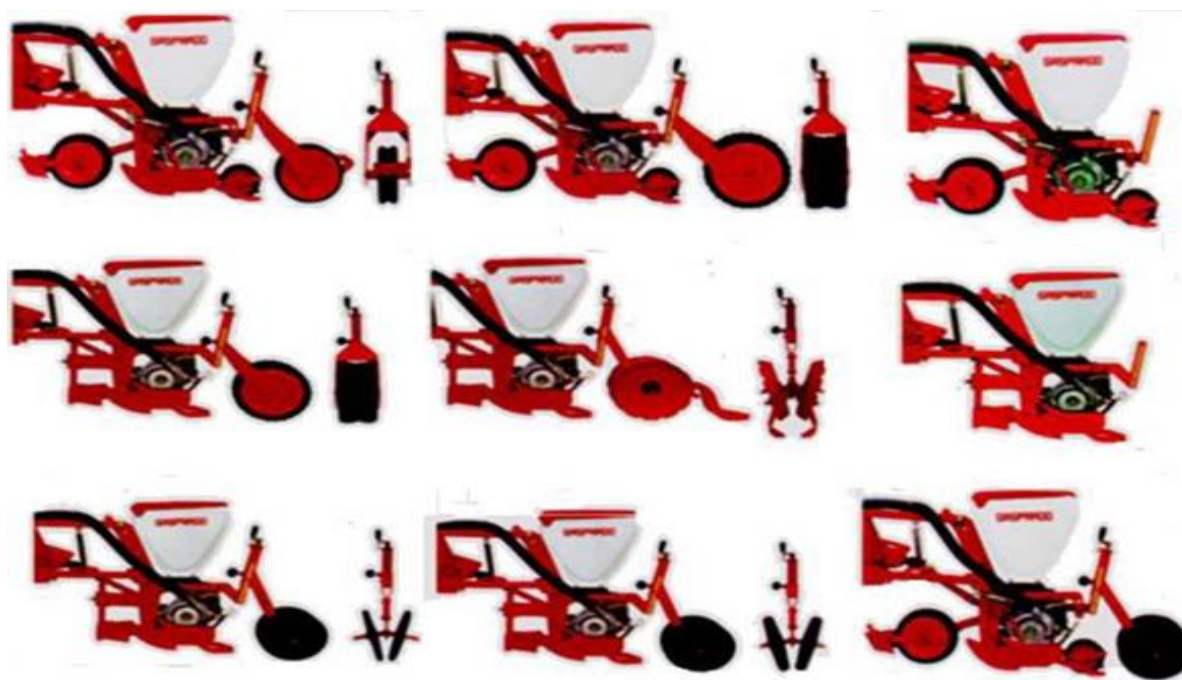


Fig. 5. Sowing sections of "Gaspardo" seeders

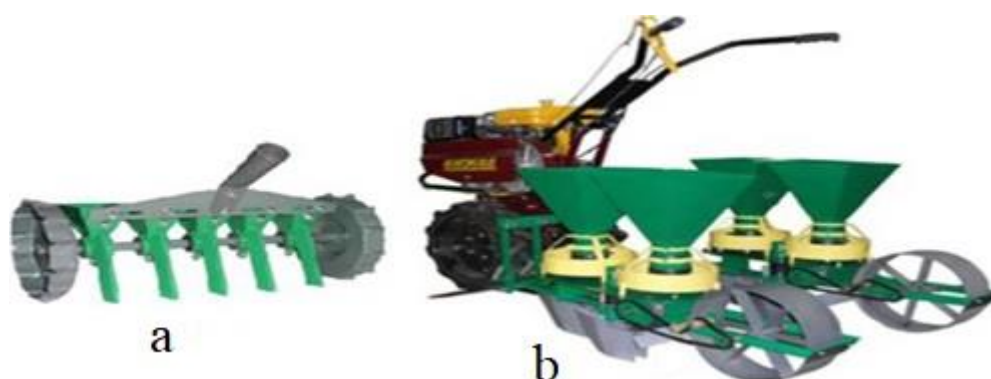


Fig. 6. Sections of "Hatzenbichler" precision seeders
a - working section "TRU-V"; b - working section with stripe-shaped coulter.

In private farms and small farms, manual seed drills and seed drills adapted to be aggregated with a tillerblock are used for seed growing. In large enterprises, tractor seeders are used in the industrial production of crop production (fig. 1, 3, etc.).

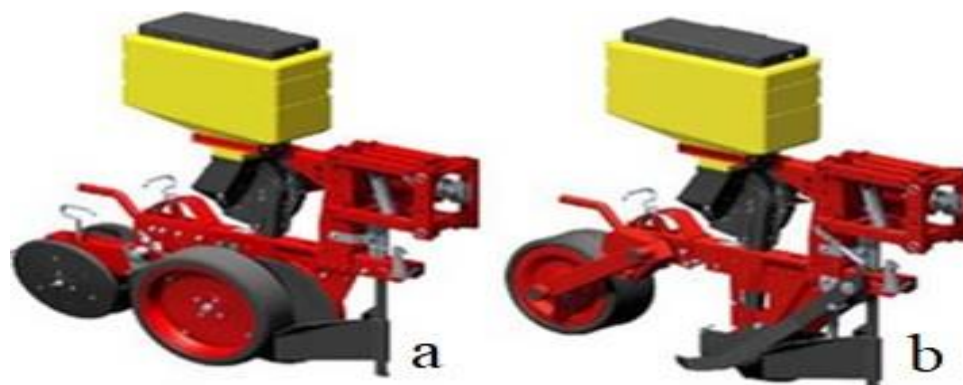


Fig. 7. Manual five-row seeder for sowing small-seeded crops SSC-5 (a) and SBC-4 seeder (b) for tillers (SPC «ROSTA», Ukraine)

Seeders when aggregating with tractors distinguish between mounted and trailed rowed seeders. Rowed seeders with a row spacing of 70 cm and a number of sections up to eight, as well as with a row spacing of 45 cm and a number of sections up to twelve, are usually made mounted (fig. 3, 5), which allows them to be more rigidly oriented relative to the direction of movement of the tractor. Seeders with a large number of sections are most often trailed (fig. 8) [3, 8].



Fig. 8. Trailed thirty-six-row seeder of the “John Deere” company

In the trailed version of the seeder design, seeders with a relatively small gripping width can also be made (fig. 9). At the same time, this design allows you to increase the structural mass of the machine, increase the volume of hoppers and the width of the grip.



**Fig. 9. Eight-row seeder "Great Plains PD 8070"
(row spacing 70 cm)**

With this design, the seeder is up to 6 m wide, and it is made with solid frames (fig. 9).

In recent years, vegetable seeders with pneumatic and pneumomechanical sowing machines have become widely used during the modernization of the seeder design. At the same time, the advantage of the design of pneumatic-type devices is the simplicity of the design, great versatility and the practical absence of crushing seeds, as well as the ability to work at increased speeds with improved seed distribution quality and the elimination of the need to calibrate seeds into fractions.

Thus, the analysis of existing designs of seeders allows us to determine the main distinguishing features, design features, on the basis of which research work should be carried out on their further improvement of the design of the seeder to increase the efficiency of their use.

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