Basing the Parameters of the Planting Machine for Semi-Automatic

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Abstract: This article provides information on the necessary technologies and techniques for planting in our republic and is devoted to the development of a device for increasing seedlings by further improving this recommended method. At that time, the technology of aerozization was developed. Despite the diversity of requirements for the use of forestry seedling machines, the latter was characterized by a general technological scheme of work. Planting is carried out using standard seedlings (cuttings and seedlings) grown in forest nurseries. In the following years, artificial forest plantations began to be created on large areas by planting large-sized seedlings. In such conditions, tractor-mounted hole diggers, as well as special digging machines for planting and transplanting large seedlings with soil, are aimed at widespread use.

1 INTRODUCTION

The results of research conducted in recent years on the reclamation of sand forests show that planting with granular seeds is more effective, as the safety and germination of crops increases by 2-2.5 times, which makes it possible to turn the developed sandy areas into forestry areas and strengthen the mobile sands of Arol and Kyzylkum and increase the speed of afforestation. The positive features of granular seeds include their less removal from the planted line by wind-sand flow, less ingestion by field rodents, ease of planting with existing forestry and agricultural seeds, as well as ultra includes light aircraft. Note that the "Hang planer" with a total load capacity of 200-250 kg can carry out aerial planting at a speed of 40-60 km/h, which is on average 10 times higher than the speed of ground vehicles.

The problem of fixing and afforestation of shifting sands is also complicated by the complexity of the relief, high flow and the steepness of the slopes of the dunes, which make the latter almost inaccessible to existing vehicles (Nedashkovsky, 1977; Leontyev, 1962; Sabirov, 2011; Shatalov and Efimtsev, 1984; Zima and Malyugin, 1976; Bartenev, 2015; Mirzakhodjaev et al., 2024; Mirzakhodjaev et al., 2024; Mirzakhodjaev et al., 2024; Khudayorov et al., 2023; Khudayorov et al., 2023; Khudayorov et al., 2023; Mirzakhodjaev et al., 2021; Mamatov et al., 2021; Mirzaev et al., 2019; Khaliknazarov and Ibrokhimov 2024 ; Khaliknazarov et al., 2024; Turdiboyev et al., 2022; Khaliknazarov et al., 2021; Bokiev et al., 2021; Muhammadiev et al., 2020; Anarbaev et al., 2020; Yunusov et al., 2020; Rakhmonov et al., 2020; Rakhmonov et al., 2020; Turdiboyev et al., 2023; Davirov et al., 2020; Akhmetov et al., 2024; Akhmetov et al., 2023; Zhanikulov et al., 2022; Akhmetov et al., 2021; Irgashev et al., 2021; Obidov et al., 2021; Eshpulatov et al., 2021; Eshpulatov et al., 2021; Ashirov et al., 2021; Farmonov et al., 2020; Djiyanov et al., 2024; Djiyanov et al., 2024; Djiyanov et al., 2022; Isakova

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et al., 2024; Astanakulov et al., 2023; Irisov et al., 2024; Aslonov and Irisov, 2023 ; Irisov and Xamidov, 2023; Irisov and Bekmurodov, 2023; Alimova et al., 2024; Saidova et al., 2023).

That is why in the 40s and 50s of the last century, large-scale scientific and production experiments were conducted on sowing saxovol seeds on sand dunes with the help of PO-2 and AN-2 aircraft. Overall positive results were achieved (Leontyev, 1962; Sabirov, 2011),

It should be noted that at that time the technology of erotization was not fully developed. The difficulty was that it was necessary to equip airfields or runways at work sites for the aircraft. The high cost of flight hours and the lack of runways, as well as scientifically based developments, have been a serious obstacle to the widespread use of aerosis in forestry production.

2 MATERIALS AND METHODS

Planting machines are divided into the following groups according to the type of planting areas in forestry: on empty land, for specially established forest plantations, sandy and stony soils, large-sized tree planting and seedling planting (Shatalov and Efimtsev, 1984).

Each type of afforestation area requires special soil treatment, a certain type and size of seedlings for planting, and a scheme for planting seedlings. It is used in machines for planting forestry seedlings on agrotechnical demand. The general requirements for them are as follows: correct placement of seedlings and the root part of seedlings in planting areas, ensuring planting depth and density, maintaining the specified distance between seedlings in a row (planting stage) and seedlings including doing no harm.

Despite the diversity of requirements for the use of forestry seedling machines, the latter is characterized by a general technological work scheme (Bartenev, 2015). Planting is carried out using standard seedlings (cuttings and seedlings) grown in forest nurseries.

In the following years, artificial forest plantations began to be created on large areas by planting large-sized saplings. In such conditions, tractor-mounted hole diggers, as well as special digging machines for planting and transplanting large seedlings with soil are widely used. The process of manual planting of the planting material of the traditional type of forest planter consists of the following three operations: preparation of the planting area in the form of a permanent furrow or hole, feeding plants to the planting site at a certain time, intervals and thickens the root system of planted plants (Shatalov and Efimtsev, 1984; Zima and Malyugin, 1976; Bartenev, 2015). At the same time, it should be noted that in this case, the intermediate process related to separate separation (removal) of seedlings from the bunker and feeding to seedlings is not taken into account. This is because they perform this operation manually. In the development of automatic planters, it is necessary to take into account this intermediate process, which can be carried out using a special mechanism for individual separation and transfer to the handles of the planter or to the receiving place.

3 RESULTS AND DISCUSSION

The technological process of automated seedling planting is as follows. A special automatic device is installed in the traditional type of seedling planter to deliver the plants to the handles of the planter of the machine. This device should deliver plants from cassettes or directly from a pen. An automated planter must be serviced by at least two workers: a tractor driver and an operator who monitors the continuity of the technological process. Existing mechanized planters are serviced by workers, namely: tractor operator, planter and spacer. Thus, the automation of planting processes of sand-strengthening plant seedlings should ensure reliable operation in conditions of moving sand, increase the productivity of planting operations by at least 1.3-1.5 times, and reduce the number of service personnel from 4 to 2. Significant economic benefits are achieved by improving the quality of root systems, increasing the survival rate of seedlings by 15-20% and saving fuel and lubricants, and by avoiding repeated planting and intercropping with existing crops by 20-30%. Technology also achieves social benefits by improving the working conditions of production workers.

To achieve these goals, we use the principal scheme of the seedling machine (Bartenev, 2015; Mirzakhodjaev et al., 2024; Mirzakhodjaev et al., 2024; Mirzakhodjaev et al., 2024; Khudayorov et al., 2023; Khudayorov et al., 2023). The scheme of the planter (Fig. 1) is the basis for the design of many other types. It consists of a cross beam 1 with a fastening mechanism 2, a main frame 4 with a landing gear 5, compression rollers 6, a receiving table 7, seats for seedlings 8, supports 9 includes. Soshnik 3 is attached to the frame above. The transmission is carried out through the wheels of 10 chains 11. In this

construction, the movement is carried out from one of the compression rollers equipped with a star.

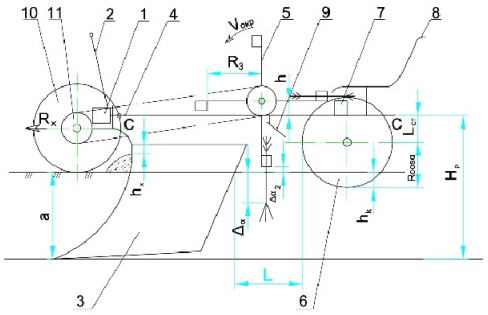

Figure 1: Scheme of the planter.

Based on the general scheme, it is necessary to understand the relative location of the working bodies in the technological sequence and their kinematic connection with the machine frame, which ensures their reliability.

the 1st century it is as follows:

AA- soil surface

BB- the bottom of the planting furrow (crack)

a - planting depth, cm

H_p - the height of the car frame above the bottom of the nest, cm

H_c - soil compaction height, cm

L - the distance between the roller ring and the back edge of the machine in the projection on the horizontal plane, m.

The height of the machine frame:

$$H_p = a + R_3 - Dh_p + Da_2 \quad (1)$$

where: R_3 is the radius of the planting device, cm

Dh_p - the height of the axle bearing of the planter (constructive size), cm

Da_2 - the distance of the lower edge of the holder (clamp) of the planting device to the soil surface, Da_2 = 2-4 cm.

Soshnik processing height:

$$H_c = D + h_x + Dh \quad (2)$$

Here: h_x is the height of the soil mound, cm

Dh is the reserve height of the pile to prevent the soil from falling from the surface layer through the upper edge.

In order to theoretically justify the main parameters of the working parts of the developed aggregate, their results are presented below.

4 CONCLUSIONS

The literature and patent sources on the existing constructions of forest planting machines, the type and parameters of the developed forest planting machine, which most fully meet the agrotechnical requirements for deep planting of sand seeds and seedlings, are based.

- good host plants in conditions of moving sand.

As an optimal type, a box-shaped opener with a sharp angle and parameters to the soil is offered.

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