PROPOSALS FOR IMPROVING THE PROCESS OF SEED DISTRIBUTION

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ABSTRACT

The paper presents theoretical studies performed to adapt a universal drills for sowing of seeds for different sizes by improving their distribution process, changing the distributor groove.

INTRODUCTION

Theoretical studies conducted in an attempt to provide a drill seeds of different sizes that can be used to establish the cultures in the nursery or light soils, in accordance with the uniformity of the sowing depth, keeping the seeding constant, the uniformity of the distribution of seed row [2, 5].

Any universal drill has in its construction components of the devices shown in figure 1.

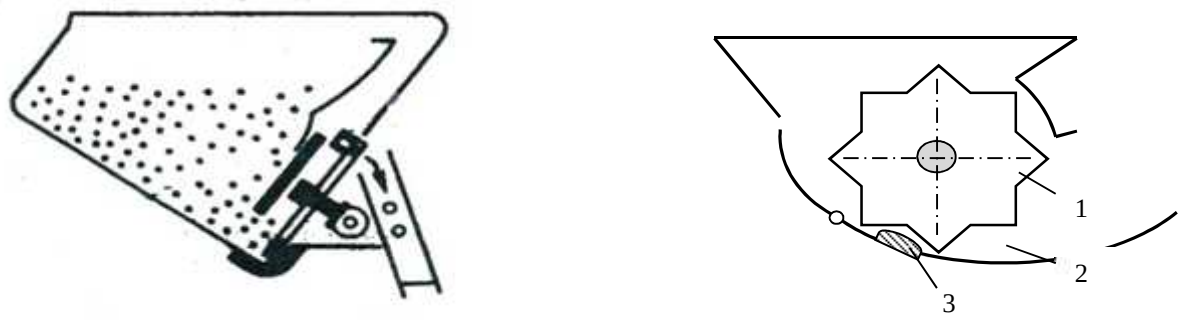


Fig. 1 - Parts of a sower- a) seed box; b) dispensing devices; box of adjustable position 2, 3 volumes of distributed to a rotating see

MATERIAL AND METHOD

The possibility of using universal seeder for sowing of seeds of different sizes is reduced because each type of seed depending on crop has its propertiegs. Thus the relief angle or the angle of the flow is different, as well as its surface (rough, smooth, with bristles, etc.).

For these reasons, the uniformity of the distribution is small, so a time between the seed and the amount of seed per unit area delivered. [1,3],

To this end was studied distributor groove camera settings used in the construction of distribution of drills with mechanical distribution shown in the figure below.

Distributor with inclined grooves and the dosing volume variable, L the length of the distributor, D-outerdiameter α- the angle of the grooves is based on the cone and ensures that the alignment of the seed distribution thereof.

Seed box is provided with a mechanical stirrer placed in the bottom of the enclosure to help to supply continuous power distribution apparatus.

Calculations on the sowing box sowing machine must determine their optimal volume space Drills pathway between two consecutive feeds, orifice size flow of seeds etc.

Fig. 2 - Distributor used in the construction of INMA drill

These elements and their relationships are related to the rule of calculation of seed per hectare, the distance between seeds in a row, the sown area, working capacity of the machine etc., and monitored most Drills.

To calculate the quantity of seed using the following equation [5]:

$$qm = \frac{\Sigma qi}{n} [g] \quad (1)$$

Where: qi- seed mass;
n number of distribution boxes.
Sowing instability constant speed was calculated with formula [8, 62, 96]:

$$i = \frac{\sqrt{\frac{\Sigma(N_m - N_i)^2}{n}}}{N_m} \cdot 100, [\%] \quad (2)$$

In case of:
Nm - arithmetic average mass of three repetitions;
Ni - arithmetic average mass for each repetition;
n number of repetitions.

The amount of seed distributed to regulate the minimum flow, maximum flow rate and the flow rate typically on the scale on the gearbox without taking into account the characteristics of the seeds is shown in Table 1.

ADJUSTMENT POSSIBILITIES SEED FLOW

		Viteza de lucru / km/h			
		3.8	***6.2***	***8***	***10***
100	***Debit maxim***	***534***	***515***	***515***	***508***
65		***344***	***341***	***340***	***323***
60	***Debit uzual***	***307***	***306***	***305***	***295***
55		***276***	***273***	***Gradaţia pe cutia de viteze***	***Caracteristicile debitului***
50		***234***	***233***	***231***	***220***
45		***202***	***197***	***197***	***194***
40		***169***	***167***	***166***	***163***
20	***Debit minim***	***13***	***13***	***13***	***12.7***

To achieve those proposed to consider the possibility of replacing parts or removing them from construction drill follows:
- Agitators type fingers can be replaced with a mechanism of movement (vibration) box of seeds during work;
- Seed distribution apparatus can be made as groove cylinders with inclined channels made of plastic mounted in boxes from the same material; [4]

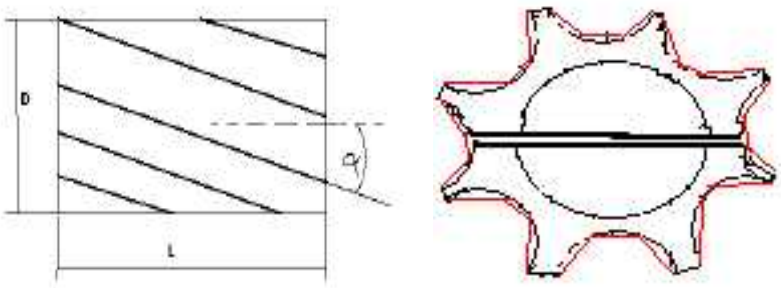
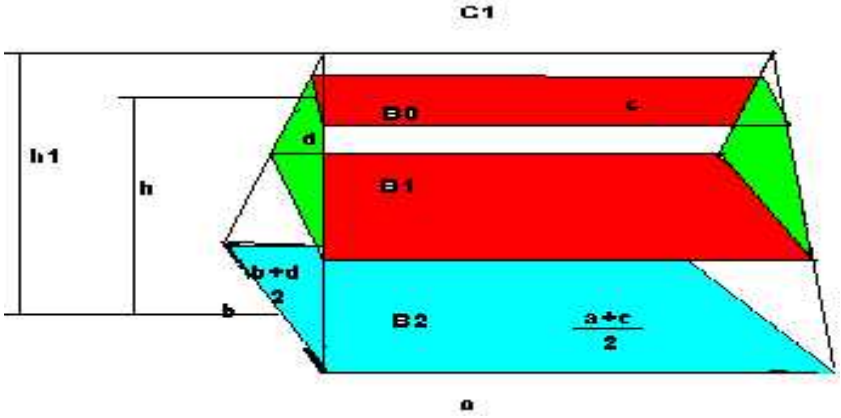


Fig. 3 - Aparat de distribuţie tip cilindru cu caneluri înclinate

To achieve angled grooves and increased flow capacity of seed from the cavity formed between the fingers distributor proposed to amend the cup and using the prismatic form presented in Figure 4.



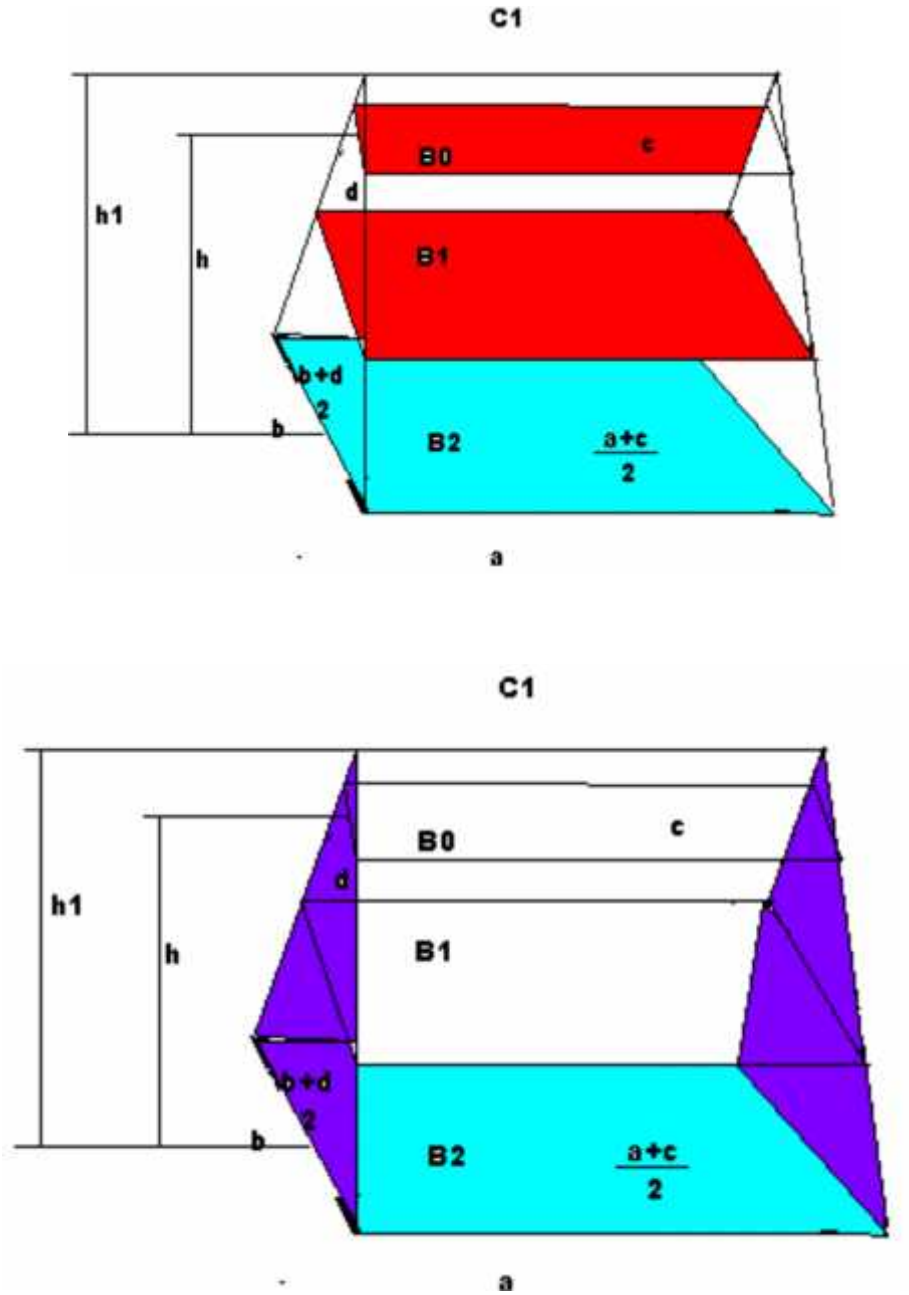


Fig. 4 – Proposed prismoid forme for realization of angled groove distributor

To calculate the volume between the grooves
Kepler's rule was used.
V = h[2(a*b+c*d)+a*d+bc]/6
Where: V represents the volume and, a, b, c, d, h are measured and reported in Figure 4.
To calculate the volume between the cylindrical grooves using Figure 5.

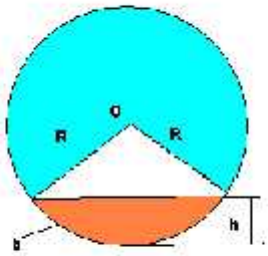


Fig.5 - Cylindrical grooves calculate the area using circular sector

A = 1/2b*r-1/2s(r-b) iar, (4)

V=A*l (5)

Wherein: A is the area of the circular sector

V is the cavity volume annular grooves

l is the length of grooves

s rope is circular segment

S = α0 / 360-b * r * πr2 / 2

r, b, α are measurable values

CONCLUSIONS

♉ Following the theoretical calculations revealed that respectivcircular cavities prismoidală volume is approximately equal, the difference is very small.

♉ Downloading seeds of cavidatea prismoidală slanted walls is continuing against thecircular wall that is grouped.

♉ seed flow is influenced by the flat shape of the cavity walls and the angle of inclination.

♉ Operation requires no additional training drill.

• We recommend using plastic dispenser manufacturing method thereof Rapid Prototyping with the possibility sectioning in two removable parts that allow quick replacement thereof depending on the size of the seed.

• It is also recommended creating a system that allows driving sleeve which limits the drive shaft movement instead of seeds that can be *mounted distributor.*

õ*Move sleeve covering the grooves to be achieved by driving a screw mechanism and gradually sector.*

REFERENCES

[1]. Sărăcin I., G. Marin, P. Olimpia, Florea G. (2009) - *Energy basis for agriculture, horticulture, forestry, Publisher Aius Printed - Craiova;*

[2]. Saracin I. Olimpia Pandia., Netoiu Constantin., 2010 - *Theoretical study of Achieving seeders for forestry nurseries of resinous, Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series, Vol. XL / 2, p. 556-560;*

[3]. Saracin I. Olimpia Pandia., 2010 - *Sowing for small seeds, Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series, Vol. XL / 2, pp. 561-565; [4]. Sărăcin I. 2002 -2004 - Universal easy drill for sandy soils, Contract NURC, no. 33451, Contract manager, University of Craiova;*

[5]. Scripnic V., Babiciu P. *1979 - Agricultural machines***,** *Ceres Publishing,Bucharest.*