Technical evaluation of planter in canola mechanize cultivation in north of Shoushter Region

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ABSTRACT

In evaluation of two types of planters of canola cultivation performed examination in shape of tape designs by split split plot in block model with three replication in Azad University, shoushter branch in Agronomy faculty in 2012. Basic factor namely the kind of planter machine in 2 levels: a1: tiny planter pneumatic Maschio Gaspardo in v5 model. a2: Taka machine tiny planter, secondary factor namely advance speed in 2 level. b1: with 3 km/h speed and b2: with 5 km/h speed. Measuring parameters: 1- Breakage percent 2- Implant depth 3- The uniformity of distribution and distribution of seed 4- The grow percent of seed 5- The capacity of farms. The result shows that the tiny planter pneumatic Maschio Gaspardo studies in 5 parameters. In this research, it has promience that Taka machine tiny granule which this feature meaning in 4 instances in 1% and in one case is 5%. Tiny planter pneumatic in comparison with Taka mechanic tiny granule not only causes decrease in the breakage percent in around of 4.67% and increases in the uniformity of implant depth in around of 25.5%. But also it cause the uniformity coefficient in linear season be green in around of 12.3% and the capacity of farm be in around of 20% in hour. Generally the results shows that the tiny planter pneumatic Maschio Gaspardo with v5 model is suitable than Taka machine tiny granule because of evaluating parameters in planting seed in canola.

INTRODUCTION

The canola recognize as a fatty seed in areas of mild north and consider as a fatty suitable plant for planting in climate conditions in Iran. One of important stages in canola farming is planting seed. [8].

Afzalnia [1], compared 2 types of usual working stage in aspects of different factors such as accuracy in implant depth, pay attention to providing suitable distance between planters, sided distribution of seeds, breakage percent of seed in laboratory and farm in Fars.

The result of comparison shows that there isn’t meaningful difference in laboratory and farm of aspects of breakage percent and implanting depth. Of seed's breakage percent aspect in farm, working row of Isfahan sanabol includes less breakage percent in other rank, the techno –hake performed better. The uniformity examination of seed distribution in using of pneumatic planters for products such as canola, creek, wheat and Ulf show that seed distribution by pneumatic planters is more exact and uninformative. [9]. The result of progress speed effect on uniformity in seeds distance in Maschio Gaspardo show that best uniformity of distance aspect between seeds emerges is in 5 km/h. [4]. Hamerchmid [2], found that better performance of pneumatic planters is in entrant mechanical damages to seeds and uniformity of seed distribution on rows. Adel Vahedi [8], shows that the linear working of seed is suitable in comparison with mechanical work row in cultivation of canola in north of Iran.

In now days, it’s better to done some studies in different produce stages such as entomb, planting, holding, harvest and gathering oil in improving production of canola.

In Iran, Uses of different tools for cultivating canola and with daily progressive technology introduces new machines to bazar. Because of, the Maschio Gaspardo is of new able machines and up to now it don’t compare with other common machines, so it is necessary it compare with new machines to chosen suitable planting machine with considering climate conditions of country and area.
MATERIALS AND METHODS

This examination done in shape of tape designs by split plot in block model with three replication in Azad University, shoushter branch in Agronomy faculty in 2012. Basic factor namely the kind of planter machine in 2 levels: a1; tiny planter pneumatic Maschio Gaspardo in v5 model. a2; Taka machine tiny granule, secondary factor namely advance speed in 2 level. b1; with 3 km/h speed and b2; with 5 km/h speed [3,4,5]

Measuring parameters:
1- Breakage percent
2- Implant depth
3- The uniformity of distribution and spray of seed
4- The grow percent of seed
5- The capacity of farms

Measurement Methods:
1- If breakage per cent and entrance mechanical damages to seeds
Breakage per cent and entrance mechanical damages of seeds are one of important parameters in evaluating system and transferring seed. Because the quality of planting seeds have direct effective on herb density and grown per cent. Breakage per cent according below equation:

\[ A = \frac{B}{N} \times 100 \]

A= is breakage percent.
N= the total number of outgoing seeds
B= is the number of outgoing breakage seed from position. Planting stage done after putting every machine in planting condition and closing packs under fall pipe, and calculate breakage percent for every machine with gathering the number of outgoing seeds from position and discriminating health seeds and breakage seeds for any machine.

2- The uniformity depth of seed location
After planting and growing all of seeds in 30 location of every area, take some herbs by chance and measured implant depth from positing seed until part of stalk which isn't grow because of lacking sun and so hasn't chlorophyll.

The uniformity coefficient of vertical distribution or depth of seed location calculated with using of sanapati and colleagues formula and karayel and Ozemerzi [6].

\[ S_e = (1 - \frac{Y}{D}) \times 100 \]

S_e = is the uniformity coefficient on distribution depth plant.
Y= is the average of subtracting dates from the average of regulating depth (cm).
D= is regulating depth or average of measuring depth (cm)

3- The uniformity of distribution and spray of seed
Every distance of herbs on parallel row calculated by Kolis after growing all of planting seeds in 30 area of middle lines and used of below equation for calculating the uniformity of distribution seeds:

\[ S_e = (1 - \frac{Y}{D}) \times 100 \]

S_e = is showing the uniformity coefficient on distribution depth plant.
Y= is the average of subtracting dates from the average of regulating depth (cm).
D= is the average of regulating distance between seeds on row (cm)

4- The percentage of growing plant
The number of germinate herbs in every meter of rows length counted by chancy for determining the percentage of growing plant, after germinate herbs and the percentage of growing plant calculated with considering name faculty and refined percentage and the number of planting seeds in location with focus on the number of seed in hectare.

\[ E = \frac{n \times V \times P}{N} \]

E=is growing percentage, n= is the number of growing herbs and N= is the number of planting seeds and v= ..... and p=

5- Field capacity (C_e)
Because the capacity of farm in examination areas (15 meter) is impossible, so the times of round trip and rounds and log in work measures is part of earth of examining farm in around of 100 meter and in same work conditions and in final, the farming effective capacity calculated with using of below equation:
\[ C_e = \text{the field capacity based on hectare in hour} \]
\[ W = \text{the width of machine's work based on meter} \]
\[ S = \text{progressive speed based on} \]
\[ \eta_f = \text{efficiency (%)} \]
\[ \eta_f = \frac{T_t}{T_e + T_a + T_h} \]
\[ T_t = \text{refined time or effective time of doing work (S)} \]

RESULTS AND DISCUSSION

Breakage percentage and mechanical damages which enters on seeds:

Table 1 shows the result of variance analyses and proved that there is meaning difference between planters of breakage percent aspect in 1% level whereas in comparing average, the ting granule pneumatic Maschio Gaspardo has superiority Taka machine with least amount breakage in around of 47% in compare with 5.13% (table 2).

Table 1: the analyses of variances in measurement parameters

<table>
<thead>
<tr>
<th>S.V</th>
<th>Breakage percent</th>
<th>Uniformity depth</th>
<th>Uniformity distribution</th>
<th>Percentage growing</th>
<th>Field capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replicate (a)</td>
<td>4/2**</td>
<td>5/4**</td>
<td>20/7*</td>
<td>23/32*</td>
<td>20/7*</td>
</tr>
<tr>
<td>Main factor</td>
<td>110**</td>
<td>30</td>
<td>279*</td>
<td>160*</td>
<td>289/60**</td>
</tr>
<tr>
<td>Error</td>
<td>7/5</td>
<td>5/00</td>
<td>11/12*</td>
<td>12/23*</td>
<td>28/3**</td>
</tr>
<tr>
<td>(a x b)</td>
<td>8/8</td>
<td>4/3</td>
<td>9/8</td>
<td>35/45</td>
<td>14/23</td>
</tr>
</tbody>
</table>

*, **: Significant at 5 and 1% probability levels, respectively  ns: Not significant

Table 2: the comparison of different parameters average in two types of canola planter

<table>
<thead>
<tr>
<th>S.V</th>
<th>Breakage percent</th>
<th>Uniformity depth</th>
<th>Uniformity distribution</th>
<th>Percentage growing</th>
<th>Field capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maschio Gaspardo</td>
<td>0/47</td>
<td>98/65</td>
<td>78/3</td>
<td>97/8</td>
<td>1/3</td>
</tr>
<tr>
<td>Taka</td>
<td>5/13</td>
<td>75/6</td>
<td>56/9</td>
<td>86/9</td>
<td>0/98</td>
</tr>
</tbody>
</table>

In Taka machine, the breakage of seed occurs in situation but in ting granule Maschio Gaspardo, the distribution of seeds done with using of disk page based on airing and for this reason, the increase breakage amount with increasing progress speed from 3 km to 5 km. so, the progress speed hasn't meaningful effect in creating breakage in seed (table 3). But mutual effect of progress speed and type of planter is meaningful is 1% level and with increasing progress speed the amount of breakage increases too (table 4).

Table 3: the comparison of different parameters average in progress and green percent

<table>
<thead>
<tr>
<th>S.V</th>
<th>Breakage percent</th>
<th>Uniformity depth</th>
<th>Uniformity distribution</th>
<th>Percentage growing</th>
<th>Field capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 km/h</td>
<td>1/47</td>
<td>98/65</td>
<td>73/3</td>
<td>8/7/8</td>
<td>0/9</td>
</tr>
<tr>
<td>5 km/h</td>
<td>3/13</td>
<td>75/6</td>
<td>56/9</td>
<td>7/69</td>
<td>1/12</td>
</tr>
</tbody>
</table>

Yield and its comparison with different planting

Figure (1) shows the average of grain yield for different treatments, the More grain yield was produced under Maschio Gaspardo (3450 kg/ha) compared to Taka planter (3120 kg/ha) seeding conditions.

Conclusion:

The results, shows that the tiny planter pneumatic Maschio Gaspardo has priority to Taka machine. This priority is meaningful in 4 cases in around of 1% and in 1 case in around of 5% the tiny planter pneumatic and comparison with Taka machine cause the decrease of breakage percent in around of 4.67% and increase of uniformity coefficient in planting depth in around of 25.4%, the uniformity coefficient in liner seasons of seeds in around of 12.3% and green percent in around of 20.2% and capacity of farm in around of 1.3 hectare. The increase of progress speed hasn't meaningful effect on breakage percent parameters, uniformity coefficient in planting depth and uniformity coefficient in liners season of seeds. But it causes the meaningful decrease in green percent and meaningful increase in capacity of farm. Generally the results shows that tiny planter pneumatic Maschio Gaspardo with V_5 model is suitable than Taka machine because of evaluated parameters in planting canola seed. grain yield for different treatments, the More grain yield was produced under Maschio Gaspardo (3450 kg/ha) compared to Taka planter (3120 kg/ha) seeding conditions.
**Fig. 1:** grain yield produced using different planting type

**REFERENCES**


