The Comparing of Seed Loss of Four Types Usual Combine on Wheat Farms in Shoushter Region

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ABSTRACT

The evaluating of seed loss amount in 4 types of usual combines which consists of John deere (955), John deere (1055), Sahand (68s), class (68s) done for watery wheat in 5 farms and with 4 repeats, in different farming areas of shoushter by chance and analyses their dates by SAS software and with ANOVA method. Seed loss amount in thresh area is shown meaningful difference in around of 1% between different combines which marshal; John deere (955) with 0.73%, John deere (1055) with 0.38%, Sahand (68s) with 0.36% and class (68s) with 0.35% had casualty. Total seed loss between different combines is shown meaningful difference in around of 1%. John deere (955) with 8.15%, Sahand (68s) with 7.7%, John deere (1055) with 7.40% and Class (68s) with 5.05% had highest amount. With comparison of qualities casualty between harvester seen meaningful difference in rigid material between seeds in other characteristics un seen meaningful difference.

INTRODUCTION

Harvesting casualty often is manifold of this amount in Iran. If suppose harvesting downfall in around of 4%, harvesting wastage amount be around of 690000 ton [2].

Yavari and pordad evaluate the number of John deere 955 combines by chance in wheat farms of Kermanshah. In this study, recognize 17 quantitative and qualitative characters which consist of combine specification, its seed loss and quantitative and qualitative situation of product. The result of this study are shown that, there is seed loss in harvesting with combine in around of 105.42 kg/he which is equal with 7.2% and with observing technical points and farming issues, it decrease to 29.06 kg/he or 3.31% [7].

Asghari evaluated 2 types of class and John deere combines in 2 time of harvesting with 15 day distance on 2 figures of soft wheat. The results are shown that second time means harvesting with retardation have more casualty in compare with first time and casualty amount increase in around of 9 kg/he based on every retardation. Also class combine had fewer casualties in compare with John deere combine in both of harvest time because of having digitalis in head (Girandole), whereas John deere combine consist of buckle [1].

Mansori and minaee evaluated machine parameters effect on wheat casualty in John deere combine. In this study, the effect of combine progress speed, revolving speed of knocker cylinder, space between knocker cylinder and un- knocker page and revolving speed and casualty balance [4]. The results are shown that increasingly casualty of fly platform increase with increasing progress speed. Increasing revolving speed of knocker cylinder cause increase in seeds breakage and decrease in knocker casualty, as seeds breakage become more than twice because of increasing in knocker race. Increasing space in knocker area causes a little increase in knocker casualty but it had erratic decrease on wheat breakage. Increasing revolving speed of wind cause increase in casualty percent of insulator and cleaner areas [3].

Tavassoli and Minaee evaluated effective factors on knocker performance, insulator and cleaner parts and their effects on combine wastage and measured the casualty of John deere (955) in 7 different progress speed (from 1.3 until 3.5 km/h) which made by Iran- Arak for harvesting suitable waterfall wheat. The capacity of harvesting by John deere 955 estimated for 2.5 km * h and farm performance become 6 ton * hectare means 6.3 ton / h [6].

Mohd et al evaluate wheat casualty by harvesting with combine in Sodan and measured progress speed parameters, knocker era, the amount of opening sieve, adjusting fan and seed humidity. Their results are shown that of 55 combines which studied; their regulating weren’t similar to each other. The average of measured
casualty, in first year was 9% and in second year was 12.7%. They mentioned suitable humidity for harvesting in around of 9% until 14%. Lesser head casualty was 5.5 km/h and lesser knocker casualty was 900 eras / minute [5].

MATERIAL AND METHODS

This research does with field sampling method and with completing respective questionnaires. Farms chosen with based on dispersal in agriculture areas in 5 different areas and by chance. John deere 955, 1055, Sahand 68s, class 68s chosen with based on their generality in city. Dates analyzed by SAS software and ANOVA method by chance and compared group's averages with Duncan method. Thus design model is

\[ TD = AT + EM + R \]

\[ TD = \text{numeral amount of every seeing} \]

\[ AT = \text{Total average} \]

\[ EM = \text{the effect of machine type (method)} \]

\[ R = \text{reminder} \]

Machines Preparing:
Because some factors such as driver skill, product and farm condition ordering machine, correct speed in working parts, progress speed of machine, machine's work width are effective on harvesting performance.

In this research, below evaluation and adjusting done before sampling until mention factors be less effective in dates.

Table 1: Done adjusting on combine before harvesting functions and sampling.

<table>
<thead>
<tr>
<th>Different parameters</th>
<th>John deere 955</th>
<th>John deere 1055</th>
<th>Sahand 68S</th>
<th>Class 68S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cutting height (cm)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>The average speed (km/hr)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Concave rotation (rpm)</td>
<td>900</td>
<td>900</td>
<td>1100</td>
<td>1100</td>
</tr>
<tr>
<td>Turning Circle stubble (rpm)</td>
<td>196</td>
<td>196</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>Space concave (cylinder and sub</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>cylinder) front</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space concave (cylinder and sub</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>cylinder) rear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specifying combine seed loss:

Natural seed loss:
Cadre in 4 points of Spilled wheat on earth measured before harvesting with using of 0.25 m²

Cutter Shoulder:
The seed loss of clip shoulder
The 0.25 of cadre located in 4 pints to evaluated seed loss of clip comb in combine race, back of clip comb and before existing of combine and by chance and then gathered all of clumps, head of clumps and spilled seed on floor. Then recognized downfall amount in clip comb in around of 1 after scale and deducting natural seed loss. The method of recognize clip casualty done like as combines method. Sampling does in handy method in harvesting race.

The Seed Loss of Concave Unit:
The tent in dimension of 4 × 4 located in combine and for calculating and estimating downfall in combine end and after Travers 10 m distance gather inside of tent and separated

Which Consistent of:
Mid – knock clumps and head clump (the casualty of knocker unit and ending sieve)
Knocking clumps which still there is seed in end of clump (Straw chaper's casualty)
The seeds which wholly separated and gathering in end of tent (sieve and fan casualty)
After separating, the seeds were scale and recognized unit's casualty in 40m area.
With considering compares between harvesting method and combine, harvesting casualty recognized wholly and in existing wheat in 500 gr of straw and stubble.
For evaluating casualties in harvesters, gathered outgoing straw with putting gunny in outgoing part of harvester and then mix seeds separated and scaled. Also in handy method in around of 500g sampling after harvesting functions reminds straw and stubble and recognized exist seeds amount in their inside.

Qualitative Casualty:
Qualitative casualty consists of weedy grasses and straw, other products, rigid material (stone and dust),
broken wheat and culm which is in harvesting wheat. Samples gather of harvesting wheat by 200gr and its foreign material separated and scaled.

All of casualty amounts (quantitative and qualitative) dividing on product performance to recognize their amount based on percent.

RESULTS AND DISCUSSION

With comparing different combines and with considering table 2, its clear that except of rigid material in seed storage, other characters have meaningful different in around of 1% between combines. John deere (955), John deere (1055), Sahand (68s), class (68s) have highest amount in total seed loss with average amount in 8.15%, 7.7%, 7.40%, 5.05%.

Dawnfall of separating unit have highest seed loss in John deere (955), John deere (1055), Sahand (68s) combines and then 68s combine consist next ranks. About downfall in Straw chaper, John deere 955 and Sahand 68s have highest seed loss amount and John deere 1055 and class 68s have next amounts. The downfall of knocker unit is highest amount about Sahand 68s and John deere 955 and then John deere 1055 and class 68s have next ranks. John deere 955 and John deere 1055, Sahand 68s and Class 68s have highest downfall about weedy grasses. But about culm and broken seeds in storage, John deere 955, John deere 1055 and Sahand 68s having first rank and Class 68s combine includes next rank.

Table 2: comparing averages seed loss of different combines in all characters (%).

<table>
<thead>
<tr>
<th>Combine type</th>
<th>Cutter (%)</th>
<th>Concave (%)</th>
<th>Straw chaper (%)</th>
<th>Cleaner (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>John deere 955</td>
<td>3°</td>
<td>1°</td>
<td>0.76°</td>
<td>0.91°</td>
</tr>
<tr>
<td>John deere 1055</td>
<td>2.8°</td>
<td>0.96°</td>
<td>0.73°</td>
<td>0.89°</td>
</tr>
<tr>
<td>Sahand 68S</td>
<td>2.7°</td>
<td>1.03°</td>
<td>0.79°</td>
<td>0.87°</td>
</tr>
<tr>
<td>Class 68S</td>
<td>2.6°</td>
<td>0.87°</td>
<td>0.67°</td>
<td>0.78°</td>
</tr>
</tbody>
</table>

There wasn't meaningful difference in rigid material of different methods in harvesting. In handy method only about culm amount has highest amount but other characters have lesser amount in different machines in all characters

The amount of seed in 500 gr of outgoing material compared of knocker part in different machines which their result are shown in table 3. John deere 955, John deere 1055, Sahand 68s, and Class 68s having next ranks with average amount in around of 0.86, 0.76, 0.48, 0.45.

Table 3: Comparing of average in different machines of harvesting in 500 gr material of seed amount character

<table>
<thead>
<tr>
<th>Combine type</th>
<th>Seed loss in 500 gr material of seed amount character (gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>John deere 955</td>
<td>0.86</td>
</tr>
<tr>
<td>John deere 1055</td>
<td>0.76</td>
</tr>
<tr>
<td>Sahand 68S</td>
<td>0.48</td>
</tr>
<tr>
<td>Class 68S</td>
<td>0.45</td>
</tr>
</tbody>
</table>

REFERENCES