RESULT OF DIVERSE STORAGE STRUCTURES ON POTATO TUBER ROTS AND WEIGHT LOSS IN POTATO (SOLANUM TUBEROSEUM L.) VAR. KUFRI BADSHAH

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Received-20.01.2016, Revised-28.01.2016

Abstract: Four different storage structures were evaluated viz., cold storage, country cold storage, heap method and rustic cum diffuse light storage. After 100 days of storage period, rottage incidence and weight loss were recorded. Minimum rottage incidence and weight loss was found in cold storage that is 16.31 % and 8.30 % followed by rustic cum diffuse light method 33.75 % and 12.35 %, country cold storage having 46.99 % and 20.70 % and maximum rottage incidence and weight loss was found in heap method 62.71 % and 27.45 % respectively.

Keywords: Cold storage, Country cold storage, Heap method, Rustic cum diffuse light storage

INTRODUCTION

Potato (Solanum tuberosum L.) is one of the most nutritious sources of food in the world. It has been recognized as a wholesome food and the richest source of energy in most of the countries of the world where, it forms an important part of the human diet. Fusarium dry rot is one of the most important diseases of potato, affecting tubers in storage and seed pieces after planting. Fusarium dry rot of seed tubers can reduce crop establishment by killing developing potato sprouts, and crop losses can be up to 25%, while more than 60% of tubers can be infected in storage. However, average annual crop losses attributed to dry rot have been estimated at 6 to 25 per cent (Chelkowski, 1989) and found that more than 60 per cent of tubers in storage can be affected (Carnegie et al., 1990). Fusarium sp. that causes dry rot and spread readily among tubers during handling and planting which results in seed tuber rots and poor plants stand (Hooker, 1981). However, other diseases as charcoal rot (Macrophomina phaseolina) may cause 10-70 per cent tuber rottage in eastern plains depending upon the period of harvest and presence of predisposing factors (Thirumalachar, 1955). The first symptoms of Fusarium dry rot are usually dark depressions on the surface of the tuber. In large lesions, the skin becomes wrinkled in concentric rings as the underlying dead tissue desiccates. Internal symptoms are characterized by necrotic areas shaded from light to dark brown or black in colour. This necrotic tissue is usually dry (hence the name given as dry rot) and may develop at an injury such as a cut or bruise. The pathogen enters the tuber, often rotting out in the center. Fusarium dry rot is caused by several fungal species in the genus Fusarium. Fusarium sambucinum (teleomorph Gibberella pacticaris) is the most common pathogen causing dry rot of stored tubers, but other Fusarium species are also known to cause dry rot, particularly F. solani var. coeruleum and F. avenaceum. However, F. sambucinum is may be the probably the main causal agent of dry rot, but F. solani var. coeruleum may also be present and affect the potato crop. Fusarium dry rot is both seed and soil-borne and is present in most potato growing areas. Spread is associated with damage through seed cutting, grading or harvesting. Wounds created during these processes allow the Fusarium fungi to enter the tuber and spread. Temperatures of 15 to 20°C and high relative humidity aid the growth of Fusarium dry rot. Lower temperatures and humidity retard the fungus but dry rot development continues even at the lowest storage temperatures (As shown in photograph).

Many storage rots are incited by wound parasites. Therefore, avoidance of mechanical injuries at harvest and post-harvest stages, by improving the technology would go a long way in reducing tuber decay. Hence different storage structures have been evaluated in reducing the rottage incidence and weight loss in potato crop.

MATERIAL AND METHOD

In Gujarat, potato crop is sown in the month of November and harvested in March. The tubers are usually kept in heaps and country storages for one month to three months period. The experiment was conducted at Potato Research Station, Deesa, SDAU. The tubers are heaped covered with dry potato halms of one feet to two feet layers in the field itself under tree shade. Some of the farmers store the tubers in country cold store and rustic cum diffuse light store for a period of three months. Healthy tubers of Kufri Badshah variety was selected and stored in cold storage, country cold storage, heap method and rustic cum diffuse light method to study
the storage behaviour against different potato tuberots. Twenty kg potato tubers of variety Kufri
Badshah was kept in the beginning of March. Apparen
tly unbruised and undamaged tubers of uniform sized
(40-60 g) were kept under different storage structures.
Stored potatoes were examined at 10 days interval for
100 days in respect to dry rot, charcoal rot and soft rot
diseases. Here sprouts were not removed, but the tubers
showing even the slightest sign of rottage were critically
examined and rotted tubers were discarded from stocks in
each observation.

Loss estimates
Four random samples were taken from every lot of
potatoes. The diseased tubers were sorted out and
counted on number and weight basis at 10 days interval.
The weight of rotted tubers was done on pan balance.
The per cent weight loss and per cent rottage incidence at
each date were calculated. Total percentage weight
losses due to all diseases were calculated by formula given
by Chester, K.S. (1950).

\[
W_3 = \frac{W_1 \times 100}{W_2}
\]

where
W₃ = Total weight of diseased tubers of particular disease
W₂ = Total weight of the sample

RESULT AND DISCUSSION
A perusal of the data presented in Table-1 and 2
revealed that minimum dry rot incidence of 5.26 per
cent was recorded in the cold storage method after
100 days of storage period followed by rustic cum
diffuse light storage (10.82 %), country cold storage
(14.20 %) and heap method storage (19.77 %). Charcoal
rot infection was not observed in cold storage
storage, rustic diffuse light storage, cold storage
and heap method of storage, respectively. Weight loss due to
dry rot was 4.90, 5.55, 5.95 and 8.05 per cent in country
cold storage, rustic diffuse light storage, cold storage
and heap method of storage, respectively (Fig.: 2).

Table 1. Effect of different storage structures on per cent rottage incidence and weight loss in var. Kufri
Badshah

<table>
<thead>
<tr>
<th>Storage period (days)</th>
<th>Cold Storage</th>
<th>Country Cold Storage</th>
<th>Heap Method</th>
<th>Rustic Cum Diffuse Light Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Rottage incidence</td>
<td>% Weight loss</td>
<td>% Rottage incidence</td>
<td>% Weight loss</td>
</tr>
<tr>
<td>10</td>
<td>0.000</td>
<td>0.000</td>
<td>2.180</td>
<td>0.900</td>
</tr>
<tr>
<td>20</td>
<td>0.526</td>
<td>0.220</td>
<td>2.190</td>
<td>0.950</td>
</tr>
<tr>
<td>30</td>
<td>1.052</td>
<td>0.550</td>
<td>2.730</td>
<td>1.150</td>
</tr>
<tr>
<td>40</td>
<td>2.105</td>
<td>1.150</td>
<td>1.640</td>
<td>0.650</td>
</tr>
<tr>
<td>50</td>
<td>1.578</td>
<td>0.770</td>
<td>4.920</td>
<td>2.100</td>
</tr>
<tr>
<td>60</td>
<td>2.105</td>
<td>1.140</td>
<td>6.010</td>
<td>2.600</td>
</tr>
</tbody>
</table>
Table 2. Effect of different storage structures on per cent rottage incidence and weight loss in var. Kufri Badshah

<table>
<thead>
<tr>
<th>Storage condition</th>
<th>Storage period (days)</th>
<th>% Rottage incidence</th>
<th>Total rottage incidence (%)</th>
<th>% Weight loss</th>
<th>Total weight loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold storage</td>
<td>100</td>
<td>5.26</td>
<td>11.05</td>
<td>16.31</td>
<td>2.35</td>
</tr>
<tr>
<td>Country cold storage</td>
<td>100</td>
<td>14.20</td>
<td>20.95</td>
<td>11.84</td>
<td>~.99</td>
</tr>
<tr>
<td>Heap storage</td>
<td>100</td>
<td>19.77</td>
<td>25.42</td>
<td>17.51</td>
<td>62.71</td>
</tr>
<tr>
<td>Rustic cum diffuse light method</td>
<td>100</td>
<td>10.82</td>
<td>10.19</td>
<td>12.74</td>
<td>33.75</td>
</tr>
</tbody>
</table>

Where, DR = Dry rot, CR = Charcoal rot, SR = Soft rot.

Fig. 1. Indicates the Total Rottage Incidence (%) in different storage structures.

Fig. 2. Indicates the Total Weight Loss (%) in different storage structures.
ACKNOWLEDGEMENT

Author is highly thankful to Dr. S. R. S. Dange (Retd. Prof & Head) Dept. of Plant Pathology, C. P. College of Agriculture & Dr. R. L. Patel (Retd. Director of Research & Dean), Sardarkrushinagar Dantiwada Agricultural University, Dantiwada, Late Dr. N. H. Patel (Retd. Research Scientist), Potato Research Station, Deesa, SDAU, Dantiwada, Gujarat for providing the required facility for the conducting the experiment.

REFERENCES


