Lentil Harvest Quality and Storage

By Bruce Barker, P. Ag

As reported in September’s Pulse Market Report, the quality of lentils is expected to be lower than normal in Western Canada. Most red lentil crops are expected to be No. 2 Canada but green lentils are expected to be Extra 3 Canada or lower. Those estimates are similar to what special crops processor and exporter Greg Simpson, CEO of Simpson Seeds at Moose Jaw, Saskatchewan sees coming off the field. There are very few No. 1 green lentils with the majority being a lower quality No. 2 to a good Extra No. 3, although he expects to see more No. 3 in areas that have a delayed harvest.

The Canadian Grain Commission (CGC) sets the official grading guidelines for lentil, which are used by lentil buyers, processors, and exporters to establish grades and prices. Lentils are designated in two classes, Red Lentils and Lentils other than Red. Buyers may further segregate a lentil based on size or other marketing. For example, on written request to the CGC, a variety name can become part of the grade name: No. 1 Canada, Laird.

For the 2016 lentil crop, the delayed and wet harvest weather may cause deterioration of the crop from bleaching, weathering, disease, and possibly heating during storage.

As the quality of lentil seed goes down, the market for the seed changes, especially with green lentils, where the product is primarily used as a whole seed where colour and visual appeal is very important. No. 1 and No. 2 green lentils are destined for premium markets that can afford to pay more, and these grades are expected to be quickly sold. Extra No. 3 heads to emerging markets that are more price sensitive, and No. 3 goes to primarily third world countries where a lower price is more affordable. Success in marketing these lower grades depends on exporter access to the markets where the grades are used.

Sample lentils are used primarily as livestock feed, and the price would be reflected in the value of the nutrients in the seed.

Simpson says that the grades are not black and white, and that there is a range of quality within each grade. Where possible, processors will work with growers to try to improve the quality through cleaning to remove cracks, splits, and mechanical damage, sorting to remove inseparable seeds, and blending to maintain consistency of a product sold throughout the year.

Additionally, international buyers have specific requirements that may be more stringent than CGC grade determinants. For example, No. 1 Canada green lentils may have up to two per cent peeled, split, and broken seed. In these premium markets, the buyers have very low tolerance for this type of damage (splits), and processors work hard to clean the products to customer standards.

Even Sample graded lentils can be upgraded depending on why the seedlot is downgraded. Frozen lentils are used as livestock feed, but if, for example, a seedlot was downgraded to Sample because of excess peeled, split, and broken seeds, it could be upgraded to No. 3 or better with careful cleaning and processing. In 2016,
hail in some areas of Saskatchewan may have bruised lentil seed, which may reduce it to a Sample grade and which may be difficult to upgrade to a No. 3.

In 2016, getting a representative harvest sample for marketing the lentil crop will be important for growers, as there will be a greater proportion of lower grade lentil on the market. This will help buyers assess and market your lentil crop at the best possible price and grade.

**Post-Harvest Storage to Maintain Quality**
Avoid unnecessary handling and use conveying equipment that is gentler on the lentil seed when moving. Belt conveyors cause much less damage than steel flighting augers. Lentils can also be damaged when dropped into a bin from significant height and it may be necessary to use equipment (i.e. bean ladders) to soften the drop. If using augers, use large diameter augers, run slowly and full.

Storage at 14 per cent moisture is considered safe for longer-term storage and is recommended for green lentil to minimize seed coat damage during handling. For red lentils, buyers prefer seed moisture content to be 13 per cent or less to improve the quality and efficiency of dehulling and splitting processes.

**Table 1. Moisture Content**

<table>
<thead>
<tr>
<th></th>
<th>Dry</th>
<th>Tough</th>
<th>Damp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Lentil</td>
<td>Less than 14%</td>
<td>14.1 to 16%</td>
<td>Greater than 16%</td>
</tr>
<tr>
<td>Red Lentil</td>
<td>Less than 13.1%</td>
<td>13.1 to 16%</td>
<td>Greater than 16%</td>
</tr>
</tbody>
</table>

Source: Canadian Grain Commission

Joy Agnew, Project Manager at Prairie Agricultural Machinery Institute says little research has been done on storing, aeration, or drying of lentils, but the same concepts that apply to wheat or peas also apply to lentils. The drier and cooler the grain, the safer it is during storage. The target temperature for all grains provided they are dry, is 15 degrees or lower.

This is illustrated by Noel White, formerly with the Cereal Research Centre with Agriculture and Agri-Food Canada at Winnipeg, who developed safe storage charts for different grains, including peas but not lentil [https://www.grainscanada.gc.ca/storage-entrepose/ssg-de-eng.htm](https://www.grainscanada.gc.ca/storage-entrepose/ssg-de-eng.htm). The pea storage information was extrapolated to green and red lentils.
Even when lentils are harvested dry, some form of aeration may be necessary to reduce the grain temperature in the bin to maintain safe storage and grain quality. This is especially important for green lentils that went into the bin at a high temperature. The green lentil seed coat oxidizes at a high temperature, quickly turning brown which results in a lower grade.

Agnew indicates that the same principles used with aeration and grain drying wheat or peas also apply to lentils. Aeration to cool the grain uses low airflow fans operated when the outside temperature is lower than the grain temperature. Natural air drying requires sufficient airflow to dry the grain and the air’s capacity to dry lentils will depend on the air temperature, air relative humidity, grain temperature, grain moisture content, and airflow rate.

Lentils are usually harvested in time to take advantage of good natural air drying conditions (warm and dry). Information in the Growing section of SPG’s website indicates that if a bin is equipped to adequately dry wheat with a natural air system, it will work for lentils.

If heated grain drying is needed, air temperatures should not exceed 45 degrees to preserve germination, and the sample should not be dried more than four to five percentage points per pass through the dryer. Lentil seed can be easily damaged in the drying process so caution is needed. Talk to your lentil buyers to ensure you are drying the crop safely without risk of damaging the grade.

Research is lacking on storing poor quality lentil, but the same principles of good handling and storage would likely apply. Cool and dry the grain to below 10 degrees if possible, monitor it with temperature cables and sampling, and sell as soon as possible.

As has been mentioned before, work with your buyer on best practices to harvest, store, and maintain your lentil grain quality. It is a relationship that benefits all in the pulse industry.

### Table 2. Suggested Number of Weeks for Safe Storage of Green and Red Lentil at the Specified Grain Moisture Content and Storage Temperature

<table>
<thead>
<tr>
<th>Temp (°C)</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>21</th>
</tr>
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<tbody>
<tr>
<td>25</td>
<td>31</td>
<td>16</td>
<td>13</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>55</td>
<td>28</td>
<td>23</td>
<td>13</td>
<td>7</td>
<td>4</td>
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<tr>
<td>15</td>
<td>100</td>
<td>50</td>
<td>40</td>
<td>20</td>
<td>12</td>
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<td>10</td>
<td>200</td>
<td>95</td>
<td>80</td>
<td>38</td>
<td>20</td>
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<tr>
<td>5</td>
<td>370</td>
<td>175</td>
<td>150</td>
<td>70</td>
<td>39</td>
<td>20</td>
</tr>
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- **Safe Long Term**
- **Safe Storage**
- **Safe Short Term**
- **High Risk - Unsafe or quality at risk**

Source: Extrapolated from Pea data (Sokhansanj 1995)
Red lentil will be similar to pea (M'Vicar, 2006)