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Bluebush Seed

CLEANING, DRYING and STORING

By C. V. MALCOLM, B.Sc. (Agric.), Soils Division

BLUEBUSH (Kochia brevifolia) is a perennial plant which occurs naturally in Western Australia. In the past it has attracted little attention, but in recent years it has created interest as a highly nutritious and salt tolerant plant well adapted to certain salt affected soils in the wheatbelt. A previous article (Bulletin No. 2630) by Smith and Malcolm drew attention to its use. One of the problems in establishing bluebush is to obtain seed supplies.

With the advance of warm weather, bluebush begins to make rapid growth, with flowering and seed production commencing in late November and continuing into July. Seed may be collected during this period, dried as quickly as possible, and stored ready for sowing. An account has already been given of collection methods (Bulletin No. 2732). Aspects which have not received much attention are those relating to seed treatment and storage.

Bluebush seed is very sensitive to curing and storage conditions. Incorrect handling of seed after harvesting can mean the difference between 90 per cent. and 10 per cent. germination, which adversely affects establishment of seedlings.

CLEANING

Harvested samples contain a variable amount of leaves, insects, and trash, the percentage of seed varying with the nature of the bushes from which the sample is taken and the vigour with which they are shaken. It is easy to collect a clean sample from bushes heavily laden with ripe seed. Rubbishy samples may be cleaned by sieving and winnowing.

Winnowing a dirty sample

During winnowing, the material which blows away is the seed and some provision must be made to catch it. Cleaning may be carried out either before or after the sample has been dried. Very rubbishy samples may be cleaned both before and after drying.

DRYING

Once the sample has been harvested it should be dried as quickly as possible to

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prevent seed deterioration. During hot weather this can be achieved by spreading the seed thinly on a shed floor and turning it to speed drying. Removal of green leaves or twigs by cleaning straight after harvesting facilitates drying.

Turning the seed to speed drying

On flowering bluebushes the whole flower ripens on the bush. Shaking of the bushes during harvesting results in a fair proportion of unripened and partly ripened flowers being included in the sample. These flowers ripen during the drying process and the following figures (see Table I) indicate that they germinate equally as well as seed which ripens on the bush.

<table>
<thead>
<tr>
<th>Type of Sample Prior to Drying</th>
<th>Per cent. Germination when Dried</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unripe</td>
<td>92</td>
</tr>
<tr>
<td>Half ripe</td>
<td>89</td>
</tr>
<tr>
<td>Ripe</td>
<td>90</td>
</tr>
</tbody>
</table>

The seed of bluebush when collected is enclosed in the ripened flower. The white or pink petals become dark brown and papery when dry and act as wings to allow the wind to carry the seeds easily. In this article the word "seed" rather incorrectly refers to the whole ripened flower.

STORING

Early experience showed that if good bluebush seed was kept in an open container in the laboratory its ability to germinate gradually decreased to nil at the end of 12 months. Tests showed the presence of a water soluble substance in the seed coverings which was detrimental to germination. This factor was suspected of possibly affecting seed storage. Testing indicated that keeping the seed very dry was a means of maintaining its viability.

To emphasise the necessity for correct storage of bluebush seed the results of an experiment designed to discover the best method of storing will be of interest. In the experiment the following treatments were used:

Seed Treatments.
(a) Whole seeds untreated.
(b) Whole seeds washed and dried rapidly.
(c) Seeds with wings, etc., removed (threshed seed).

Storage Conditions.
(1) Humidity 9% (relative humidity at 20° C.).
(2) Humidity 54% (relative humidity at 20° C.).
(3) Humidity 84% (relative humidity at 20° C.).

Some seed treated in each of the three ways was stored at each humidity. Germination tests were carried out over a period of two years.

The results as percent germination are summarised in Table II.

From the table it may be seen that humidity is the major factor affecting the storage of bluebush seed. If the seed is kept very dry it maintains its viability to about 60 per cent. of the initial level even after two years. If, on the other hand, the atmosphere is at all moist (54 per cent. relative humidity at 20° C.) the seed becomes useless after three months. Some
TABLE II

<table>
<thead>
<tr>
<th>Time Stored, Months</th>
<th>Humidity per cent</th>
<th>Per cent. Germination</th>
<th>Seed Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

Per cent. Germination

|             |                  |                     |
|             |                  |                     |
| 0           | 84               | 34                   |
| 1           | 65               | 33                   |
| 3           | 32               | 0                    |

slight benefit is indicated from threshing in the case of seed stored under moist conditions.

These studies indicate that the viability of bluebush seed can be maintained only if it is stored under particularly dry conditions. It should be mentioned that the seed used in this trial had already been stored over a drying agent for 4-5 months and may, therefore, have lost some freshness.

STORAGE METHOD

In order to keep bluebush seed sufficiently dry to maintain maximum viability it must be stored in a closed container in the presence of a drying agent. A suitable arrangement is shown in the following diagram. The drying agent recommended is calcium chloride. The commercial grade can be purchased for about 4s. 6d. per lb. from major chemical firms.

![Diagram of storage method](image)

Storing seed with a drying agent

Let us follow the storage method step by step. Suppose we have a 44 gallon drum three-quarters full of bluebush seed. (Any fairly airtight container will be suitable). Place a pound of calcium chloride in an open tin on top of the bluebush seed. The tin should not be more than three-quarters full. Gradually the calcium chloride will take up water from the air in the drum and the bluebush seed will become progressively drier.

Eventually the calcium chloride will dissolve in the water it is absorbing and the tin will contain a concentrated solution of calcium chloride. Before all the calcium chloride has dissolved it should be removed from the drum and placed in its container in a moderate oven to dry out. The heat must be maintained for several hours for drying to occur. The dried calcium chloride should be allowed to cool down and then replaced on the bluebush seed.

The regeneration process may be repeated as often as necessary without spoiling the calcium chloride. Once a month may be sufficient but the actual time depends on the amount of seed, amount of calcium chloride, moisture content of the seed and the tightness of the cover on the drum. When not in use calcium chloride may be stored in a sealed container such as a screw-top jar.

If it is not possible to use the calcium chloride storage method, extreme care should be taken to clean out leaf matter from the seed sample, and to dry the sample very thoroughly. It may then be stored for a limited period in a cool dry place.

SUMMARY

(1) Newly collected bluebush seed should have as much rubbish as possible cleaned out of it by sieving and or winnowing.

(2) The seed should be dried out as thoroughly and rapidly as possible.

(3) The dried seed should be stored in a closed airtight container in the presence of a drying agent such as calcium chloride.

(4) The calcium chloride should be regenerated by drying it in an oven.

REFERENCES


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