TESTING FOR BITTERNESS IN ALBUS LUPIN SEED

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Summary

- The Australian albus industry relies on continuing to be able to supply 100% sweet seed.
- It is important that growers annually bitterness test all grain traded or kept for seed.
- Due to closure of the Eastern Australia Albus Breeding Program, Industry and Investment NSW is no longer conducting bitterness seed testing for albus lupins.
- The bitterness seed test is now available through Futari Grain Technology Services, Narrabri.
- There is a zero percent industry recommended sowing threshold for bitterness contamination in seed.
- NSW albus lupin traders are stringently UV testing grain received from growers.

The export human consumption market for albus lupins is around 30,000 to 40,000 tonnes annually. The price premiums offered to growers above domestic feed markets are very valuable. Our ability to continue to supply sweet seed to this market and to the growing domestic market will ensure the future viability of the albus industry. High alkaloid levels make seed taste bitter, less palatable and the seed may be toxic to humans and livestock. Alkaloids in seed have been removed from albus lupins by plant breeding to allow the grain to be eaten by humans and suitable to be fed to animals.

Over time the bitter gene has escaped into the older, public sweet albus varieties and is now causing low level contamination. This is due to the albus lupins ability to cross-pollinate, with foraging honeybees being the main vector. Bees are known to forage 2-3 kms and can carry pollen between plants within that range. If a bitter-contaminated albus crop (or volunteers from a previous crop) is grown within 2 km of a sweet crop, there is a serious risk that pollen will be transferred resulting in contamination. The bitter gene is a wild form with more fitness, and producing more seeds. Once introduced into a sweet crop, it will increase the bitterness level significantly with each season grown. Commercially available seed grading equipment is not able to remove bitter seed, so purchasing new seed is the only option, once bitter seed is identified in a seed line.

If bitter seeds approach a frequency of 1%, then the average alkaloid level will exceed the maximum threshold acceptable for human and animal consumption (200 mg/kg seed). It is important that the whole albus industry adopts an alkaloid management strategy to ensure that any contaminated grain is not retained as seed, and doesn’t compromise the efforts of neighbours and the industry as a whole.

Industry-wide plan to eradicate bitterness

In order to preserve Australia’s reputation as a supplier of 100% sweet (low-alkaloid) albus lupins, bitterness in commercial crops is monitored on an annual basis. This is being achieved through the use of a quick seed test by traders using a ultra-violet (UV) lamp. The UV light causes any bitter seeds to fluoresce pink, making identification easy with a trained eye.

Testing at Wagga Wagga of commercial albus lupin seed samples from the 2005–2009 harvests showed that contamination remains widespread in NSW, with both of the old varieties (Kiev-mutant and Ultra) and all regions affected to some degree. In the past three years, less than half of all the samples tested had zero contamination. This emphasises the need for continued industry-wide testing.

The release of Luxor and Rosetta has created an opportunity to eradicate bitterness completely with isolation distances and on-farm hygiene to prevent the contamination of these new varieties. However, this cannot be achieved without full support of growers, agronomists and marketers.

Lupin trials being harvested at Wagga in 2005.
Photo: David Lucket
The recommended sowing threshold for bitterness remains at zero for 2010

All seed lots intended for sowing in 2010 should be tested again the following year. Consultation with industry, GRDC and Pulse Australia has led to the contamination threshold for sowing in 2010 remaining at zero (the same since 2005). The aim is to reduce the contamination level over time until the problem is eliminated. The adoption of new, disease-resistant, high-yielding varieties, such as Luxor and Rosetta, will assist this process.

Testing by Futari Grain Technology Services

Due to the closure of the Eastern Australian Albus Breeding Program in 2009, I & I NSW is no longer conducting bitterness seed testing. Growers can now have their seed tested for a fee of $30 by Futari Grain Technology Services, 34 Francis Street, Narrabri 2390, tel. (02) 6792 4588, contact Tracey Warren. Growers should continue get all albus seed lots tested annually, whether purchased or kept.

Traders participating in the UV testing scheme:

Growers who sell their albus seed through a trader should contact that company to arrange UV testing. All albus traders in New South Wales are equipped to conduct the test. The traders listed will also be able to assist growers so that any seed lots that may be contaminated can be exchanged for clean seed before sowing.

Agrigrain, Narrmorene, NSW (02) 6889 2200
Gilgandra Marketing Co-Op, NSW (02) 6847 1116
MC Croker, Wagga Wagga, NSW (02) 6934 4000
Wilson Bros Seeds, Balldale, NSW (02) 6035 1222

Certified Seed

In the long term, it is advisable to periodically replace farmer-produced seed with new Certified Seed. This ensures the genetic integrity of the variety, maintains a 100% sweet (low alkaloid) content, and ensures good agronomic characteristics. Certified seed is available from:

- **Luxor and Rosetta**
  - Viterra Seeds 1800 018205

- **Kiev Mutant**
  - Hart Bros Seeds, Junee (02) 6924 7206
  - Evan Moll, Gerogery (02) 6026 0580
  - Premier Seeds, Forbes (02) 6851 5573

**ACKNOWLEDGEMENTS:**
David Luckett (I&I NSW), Mark Richards (I&I NSW), Peter Matthews (I&I NSW), Wayne Hawthorne, (Pulse Australia)

**SOURCE:**
Information for this Southern Pulse Bulletin is drawn from

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