Broad Beans – potential for KI??

Background

Broad Beans are a relatively new crop on the Island. They are exciting as they appear to have good tolerance to waterlogging and can produce a high value grain, a virtue with our high freight costs. They also have the capacity to fix nitrogen and provide a break in the typical Kangaroo Island wheat-canola rotation.

In 2012 there was a significant yield difference between the best and worst Broad Bean crops. If beans are to cement their position in the KI crop rotation the reason for some poor performing crops needs to be identified.

What was done

Keith Bolto (AgKI Crop Trial Manager) organised Wayne Hawthorne, an esteemed pulse expert from Pulse Australia, to visit the Island on the 7th of November to look at bean and pulse crops. Included in the day were a group of key broad bean growers to show their problem and good paddocks, to discuss causes and possible solutions and any research trial needs.

The following notes summarises his report.

Results

In summary, the problems with most broad beans appeared to be associated with:

1. Poor or no nodulation in obviously poorer plants compared to better plants. Often better plants had few lateral nodules, but some collar nodules.
2. Extremely acidic soils (pH_{CaCl2} <5).
3. Shallow duplex soils over hard setting clay i.e. typically 10cm top soil over extremely tight clay.
4. Waterlogging patches and subsequent shallow root systems with no tap root.
5. Broad beans with poor growth after wet conditions, then subsequent weed (toad rush etc) problems that may have caused plant death from lack of moisture.
6. Sowing depth in some situations may have been too shallow. Deeper sowing would assist with tolerance to herbicides, but whether it would improve nodulation was unknown as soil pH is unlikely to be different at 5cm versus 2cm.

Neil Pontifex, Alan Mills, Wayne Hawthorne & Simon Veitch in a bean crop.

7. Belief that broad beans would grow on extremely wet soils where other crops like lupin, cereal or canola would fail. Note that broad beans will handle some wet conditions, provided they are well nodulated and disease is controlled, but there are limits.
8. Possibility that Molybdenum was required pre-seeding to assist nodulation. In some cases it was being foliar applied post-emergent after a tissue test.
9. Trace element deficiencies associated with low soil pH. In some cases these were being corrected by foliar applications after showing as deficiencies in tissue tests,
10. Late death of some plants or patches that were well podded, yet had died prematurely without fully finishing. Lack of moisture because of shallow root systems may have been involved. Foliar or root diseases or viruses did not seem to be an issue with these prematurely dying plants.
11. Radish as a weed in one paddock, controlled early by Terbyne®, but developed later with a thinner stand and irregular bean growth. There are few options for its control post emergent.
12. Beans on the shallow soils on KI will likely require a good finish to produce the large grain sizes required to achieve best prices.
13. Fertiliser type drilled at seeding might have had an impact on nodulation on the acidic soils, i.e. drilling an acidic fertiliser could be worse than drilling a neutral or alkaline one.

Take home messages

- Liming to help reduce some of the inherent nutritional problems of low soil pH.
- Application of Molybdenum pre seeding to assist with nodulation
- Improving nodulation by either increasing the number of rhizobia applied, ensuring rhizobia survival in those acid soils or ensuring both collar and lateral nodules develop
- Early tissue testing and subsequent nutrient correction with foliar applications to overcome some of the deficiencies associated with lower soil pH.
- Raised beds for water logging control in wetter areas, or sowing the beans into a 'hill' rather than a 'furrow'.
- Retention of cereal stubble to improve soil moisture status prior to and at sowing may assist with improving germination and nodulation.

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- Pulse Australia
- Kangaroo Island Pure Grain

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