Reliability of Pulse Crops in Central NSW

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Overview:
Benefits of pulse crops in a rotation include up to 50% grain yield increase and 1-2% protein increase in following cereal crops. However reliability of pulse crops is an issue and must be managed by matching pulses to the soil type, pH and drainage and minimising disease, insects and weeds. Variety selection, wider row spacing and stubble retention are identified as methods of minimising disease. Correct sowing time for the individual pulse, controlling insects and disease and ensuring hebicide plant back periods are observed, also improve pulse crop reliability. Col Mullen also recommends pulse crop area is limited to about 10% of cropping area until grower experience and confidence builds.

Benefits of **Pulse Crops**

Pulse crops can be a valuable and profitable break crop in a rotation as they act as both a disease control and provide nitrogen input for following cereal crops. They also offer an opportunity to control grass weeds economically. Benefit to the following wheat crop can often be up to 50% grain yield increase and 1-2% increase in grain protein. Reliability of crops can be managed to improve the profitability of pulse crops in their own right.

Requirements of Pulse Crops

All pulse crops have very specific requirements and must be matched to the soil type and individual paddock situation. For example, lupins favour sandy loam and loam soils whilst chickpea and faba beans favour the better class soils. Fieldpeas are the most adaptable to soil type. Albus lupins and chickpeas are very sensitive to poor drainage conditions.

A summary of the soil type, pH and drainage requirements for each crop are shown in the following table.

Table 1: Pulse Crop Soil Requirements

Crop	Soil Type	Soil pH ($CaCl_2$)	Exch Al% range	Drainage Tolerance (1-5)
Lupin - narrowleaf	sandy - loams	**4.2** min.	Tolerant	Tolerant (3)
Lupin - broadleaf	sandy - loams - clay loams	**4.6** min	up to 10%	Sensitive (2)
Fieldpea	Sandy - loams - clays	**4.6** min	up to 5-10%	Tolerant (3)
Chickpea	Loams - self-mulching clay loams	**5.2** min	Nil	Very sensitive (I)
Faba bean	Loams - clay loams	**5.4** min	Nil	Tolerant (4)
Canola*	Loams - clay loams	**4.8** min	0-5%	Tolerant (4)

[N]Non pulse comparison

Improving Reliability of Pulse Crops in Central NSW

The following points may be considered to minimise the risk and improve the reliability of growing these pulse crops:

- *Risk Exposure:* Consider limiting area of pulse crops to 10% of cropping area until confidence builds.

- *Crop. Selection:* Carefully match crop to paddock, soil type, pH and drainage requirements (see table 1).

- *Variety Selection:* Select the best available variety, particularly for disease tolerance. Varieties are gradually improving and some significant gains have been made. However, some crops such as chickpeas and faba beans need to have fungicidal programs implemented to control diseases such as ascochyta (chickpeas) and chocolate spot (faba beans). Ideally we will eventually have varieties resistant to these diseases.

Sowing Time: Optimum sowing times are critical for maximum yield potential and need to be adapted to localised areas. Too early (frost and disease) or too late (low yields) a planting can result in disappointing results. For example, in the upper central west, sowing of Albus lupins from very late April to mid May appears to be the best compromise to avoid severe flower and stem frosting. Likewise, similar sowing times with narrow-leaf lupins and faba beans gives the best chance of maintaining yields and, at the same time, avoiding late autumn aphid flights which carry virus diseases such as cucumber mosaic virus (narrow-leaf lupins) and luteo virus (faba beans). With fieldpeas, late May to early June sowings are necessary to avoid pod frosting and reduce disease.

Row Spacing: Most pulse crops are adapted to wider row spacings:

Lupins	18 - 50cm
Chickpeas	18 - 75cm
Faba beans	18 - 75cm

Wider rows can reduce foliar fungal disease incidence (increasing airflow) and allow better stubble clearance by sowing machinery. However, good weed control is essential with wider rows.

- *No-Till:* Pulse crops are ideally adapted for no-tilling into cereal stubbles. This allows maximum nitrogen fixation by the legume. By retaining stubbles, this tends to reduce the spread of fungal disease (brown leaf spot in lupins) and virus diseases (reduces aphid activity).

- *Hard Pans:* These should be identified and eliminated in paddocks intended for pulse crops. Hard pans can severely reduce root development and cause waterlogging problems. "Sudden Death" disease in lupins can be a direct result.

- *Sulphonylurea Residues:* Observe the plant back periods with herbicides such as Glean and Logran particularly on heavy alkaline soils. Most pulse crops require 22 months on alkaline soils (pH greater than 6.5) but only 12 months on the loam soils where soil pH is less than 6.5.

- *Insects:* Heliothis management and control is a must with all pulse crops during flowering and pod fill to preserve yield and quality. Thrips also need monitoring and can be very damaging, particularly in lupins during the early growth stages up to budding. They can be particularly severe on narrow-leaf lupins. Paddocks with root lesion nematode should not be sown to chickpeas but fieldpeas, faba beans and lupins are resistant to this pest.

- *Weed Control:* Good weed control is essential with all pulse crops. There is now a good range of herbicides registered for use in all crops. Pulse crops offer an opportunity to control grass weeds efficiently and economically. See NSW Agriculture's "Weed Control in Winter Crops" booklet for more details.