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Lupin prospects for wheatbelt rotations

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An upsurge of interest in lupins and a rapid expansion in the area sown in the wheatbelt indicates that farmers there see an important place for this crop. Apart from the grain yield it offers, a number of factors have encouraged this interest in lupin cropping.

The most important are:

- A preference for legume nitrogen rather than expensive fertiliser nitrogen for following cereal crops. The difficulties wheatbelt farmers have experienced in growing legume pastures in the poorer sandy soils under today’s intensive cropping system have helped shift the legume emphasis to lupins.
- The fact that lupins can be sown early or dry means that extra area can be cropped without extra machinery.
- The potential of lupin stubbles for improving ewe nutrition at joining, and for growing young sheep during summer.
- The local production of a high quality protein source as a substitute for meatmeal in the pig industry.

Wheatbelt farmers first saw the potential of lupins being demonstrated in the northern wheatbelt and west coastal areas in the early 1970s and many decided to try them. In general their efforts resulted in failures, which in retrospect were highly predictable.

Management

We have learnt that to grow lupins successfully in the wheatbelt a number of important management practices must be undertaken:

- Grow an early maturing variety such as Yandee, Ilyarrrie or Unicrop.
- Sow early . . . before June.
- Sow a higher seeding rate than wheat . . . 80 to 90 kg/ha.
- Obtain good weed control. It is nearly always necessary to use herbicides, except on new land.
- Watch constantly for insects and spray when they are severe. (See ‘Insects and lupins’).

In the early 1970s most wheatbelt sowings were of the varieties Uniwhite or Uniharvest, which are relatively late maturing. Often they were sown after the cereal programme in mid to late June. Because seed supplies were expensive, farmers used low seeding rates, often in the range 30 to 50 kg/ha. Weed control was by cultivation only . . . simazine was not registered for use in lupins at that stage. Native bud worm attacks were rarely sprayed. We know now that this ‘formula for disaster’ led to a loss of confidence in lupins.

Much of the Department of Agriculture’s experimental work suffered the same problems.

A study of lupin yields from all experiments conducted between 1969 and 1981 reveals a strong relationship between time of sowing and yield. Yields between 1.0 and 2.0 tonnes per hectare were common for sowings before June. Two failures recorded from early sowings resulted from the drift of 2,4-D ester onto plot areas in one case, and an extremely heavy ryegrass burden in the second case, accentuated by damage from vermin. The yield potential for June or later sowings decreased markedly. Total failures were common.

It has become clear that lupins cannot be grown successfully in the wheatbelt as a low-input crop. Adequate levels of seed, fertiliser and herbicides are required. These need to be managed with care and attention to detail. Crop management practices developed for cereal growing are not totally transferable to lupin growing.

Yield potential

Little data is available for conclusive yield comparisons to be made between cereals and lupins. Lake Grace experimental data show that many lupin crops have been sown with too little attention to management compared to wheat. This applies more to the traditionally non lupin growing areas where farmers have little lupin management experience.

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Today it seems that lupin yields of 50 to 100 per cent of wheat yields can be achieved. It is possible to identify situations which will favour lupins relative to wheat. The most important of these are:

- **Soil type.** Lupins have performed better than wheat on sandy soils.

- **Place in rotation.** The best results usually have been achieved after a cereal crop or crops. This could be a result of in-crop weed control resulting in a lower weed challenge to the lupin crop. Cereal stubble also is important on sandy soils to protect the susceptible lupin seedlings from wind blast.

- **Land development.** Lupin yields generally have been best on paddocks that have not previously had a legume pasture. Fewer weeds and less root disease are probably the main reasons for this.

Most wheatbelt farms have considerable areas of sandy soils which no longer have or have never had legume pastures. Today the cereal cropping intensity in the wheatbelt is such that large areas with these specifications will be available each year, following cereal crops, to provide the conditions which favour lupins relative to wheat.

**Rotation systems**
The poorer sandy soils which favour lupins relative to wheat correspond with those on which sub-clovers have often failed in the wheatbelt.

It seems likely that a lupin/wheat rotation without a pasture phase will give the best results. A further advantage of this system is that the weed control efforts in both the cereal and lupin crops are helpful to whichever crop follows. In time, weed densities may be reduced.

Research is being directed at determining the optimum number of cereal crops between lupin crops. Disease carry-over from one lupin crop to the next will have a big influence on what is possible. Farm-to-farm differences in soil type distribution also will be important.

**New land development**
Lupins should have an important place in new land development in the wheatbelt. Cereal yields decline with progressive cropping on new land.

The third cereal crop is often extremely poor unless adequate nitrogen fertiliser is used. In the wheatbelt, pastures sown at this stage often fail. Also, heavy investment in fencing and water supply is required to establish a legume pasture.

However lupins offer the opportunity to continue cropping and maintain a cash flow while delaying heavy capital expenditure.

**Sheep nutrition vs harvesting efficiency**
Much of the reputation of lupin stubbles as valuable sheep feed is related to the quantity of grain left in the paddock after harvest. Sampling of farmers’ paddocks in 1981 showed that 200 kg/ha of residual seed was common. This is a big, high-quality feed resource. The non-seed component of the stubble is of higher value than cereal stubble but not dramatically so. Many wheatbelt farms have more than enough stubble for the sheep they carry. We can expect improved technology and techniques to reduce the amount of seed left after harvest.

**Herbicide damage**
Another issue which has emerged in traditional lupin growing areas and now worries potential producers in the wheatbelt is the damage caused to lupin crops by drifting herbicides, particularly 2, 4-D ester. Though its use is declining this herbicide is still common. It can damage lupins grown at a considerable distance from the spraying site.

The problem can be minimised by:

- greater care in assessing wind direction and intensity before spraying 2, 4-D ester.
- substitution of non-volatile sources of hormone spray for volatile forms.
- using early post-emergent herbicides instead of later applied hormone-type herbicides.

**Conclusion**
There is a place for lupin growing in the wheatbelt. Lupins are complementary in many ways to the other components of the wheatbelt farming system... cereal growing and sheep production. The extent to which wheatbelt farmers will use lupins is still difficult to forecast. The crop has not been grown there long enough to provide the technical and economic data to make such a prediction.

However, our understanding of lupin management systems for the wheatbelt and their successful implementation on farms make us optimistic about the prospects for the crop to the extent that lupin sowings have risen in most wheatbelt areas by five to 10 times in each of the last two years. Results from the 1982 crop will have an important bearing on the rate of future expansion.