Lupin yields are not what they should be: viewpoint

M Ferguson
S. Trevenan

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Lupin yields are not what they should be

Mike Ferguson has been in charge of the Three Springs office of the Department of Agriculture since 1977. Before that, he was an adviser at Moora for one year and at the Lake Grace office for five years. Based on trials he has done, and others he has seen, he believes farmers can greatly increase their yields of lupins.

In the North Midlands area, lupin yields are about half the yield of wheat, according to census figures. But in our experiments, lupins have yielded 98 per cent of wheat in the ‘Northern’ zone (north of a line through Eneabba, Carnamah and Caron) and 81 per cent of wheat in the ‘north central’ zone (an area centred on Moora). These trials are an average over good years and bad, and on sites which we have chosen as being representative of the district. I think they clearly show the potential for lupins with good management.

What do you mean by good management?

Farmers sometimes think that the way we manage our trials is not practical on a farm basis, but all that is required is a bit of care in the right direction. We do spend a lot of time on our trials, but so would you if you were planting hundreds of plots. In any case it is the comparison with wheat yields that indicates the potential for lupins, rather than the actual yields.

The main difference between farmers’ crops and our trials is that farmers mainly try to grow lupins on poorer-sandy paddocks. Lupins like good soils too. You also must watch for weed control, take some special care with seeding, and later in the season, watch for insects.

Firstly then, which paddocks do lupins prefer?

In our trials, lupins have yielded up to a third more after a cereal crop than after a pasture. The difference is especially noticeable if the cereal crop has been relatively free of weeds, or the cereal stubble has been burnt. We think this is because clover and lupins suffer the same root rot diseases. So lupins can follow non clover pasture with some success, provided grasses are controlled either by heavy grazing to stop seed set, or by herbicides.

There is little point in growing lupins immediately after a clover dominant pasture because the nitrogen already produced by the pasture is wasted on the lupins which can produce their own nitrogen. The nitrogen would only encourage weeds in the lupin crop. Also because of disease, growing lupins after another lupin crop should be especially avoided. The dead lupin trash carries disease over the summer, allowing it to build up quickly in a following crop. A cleaning cereal crop the year before lupins is the answer.

The best soils for lupins are sandy loams, but they also grow well on the red sands and sands over clay. Deep white sands are deficient in nutrients, particularly potash and manganese which are expensive to apply. Pale yellow sands are suitable, provided manganese is applied.

Soils must be well drained for lupins, and slightly acidic. Heavy clay loams and soils affected by salinity do not grow good crops of lupins.

Mike Ferguson examining an emerging crop of lupins
Because lupins are deep rooted and can grow on sandy soils, farmers often grow them only on the poorer sandy paddocks. But when you consider the extra costs of the potash and manganese required on these soils, it is hardly worthwhile. You also have to consider that with lupins at about $140 a tonne and producing almost the same yield as wheat, you can afford to give them the better soils.

What is the ‘special care’ needed with seeding?
I suspect the main reasons for yields of lupins not being what they should be, are late seeding and thinly sown crops. Lupins really respond to the warmer weather, and to give them a good start the best time to sow is early to mid-May. Potential yields will fall if planting is delayed, especially if it is delayed beyond mid-June. In fact, if lupins are not in the ground by mid-June, it is probably best to wait until next year and plant wheat in the meantime.

To get the lupins in early, you would have to plough after the first major germination and seed immediately. If a clean cereal crop has been grown the previous year, lupins can be seeded directly into the stubble using a culti-trash seeder. Herbicides can be used for further weed control if necessary. We always use a high rate of seed, and I think farmers should too — 80 to 90 kg/ha assuming the seed has an 80 per cent germination.

A germination test is a good idea as the seed can be damaged at harvest or be affected by the split seed problem. We can do the germination test; it takes about two weeks to get results back from the laboratories. One sample we tested had only 50 per cent germination. If you have any doubts about the quality, the seed rate should be increased.

Some farmers get away with seeding at 40 kg/ha but you need good control of weeds and early seeding. To bulk up seed of a new variety such as Illyarrie, the rate can be reduced to 40 kg/ha provided extra attention is given to weed control. Seed should be planted shallow (2 to 4 cm deep) preferably into a moist seedbed, and this helps the crop to emerge quickly. However, depth should be increased to 4 to 5 cm if either of the pre-emergent herbicides simazine or diuron are used, if the soil is dry or drying, or if inoculated seed is used. Seeding any deeper than 5 to 6 cm will reduce nodulation and emergence. Although it may be quite a chore, inoculation is generally advisable on land that has not carried lupins or serradella within the last four or five years, especially on poorer sandy soils. Many crops on yellow sands seem to manage to nodulate without inoculation.

What herbicides are useful in lupin crops?
Simazine is probably the most useful general purpose herbicide as it controls grasses and broadleafed weeds, and this gives substantial increases in yield. It is more effective when applied to moist soils, and may be used post-emergence, but results are generally better as a pre-emergent. Simazine is almost essential for growing lupins, as it would pay for itself with a yield increase of a little over 100 kg/ha. In 1977/78 trials, the average response to simazine was a 50 per cent increase in yield. Also, Robin Randall the Manager of the Department of Agriculture research station at Badgingara has been getting yields of 1 to 1½ tonne/ha since using simazine, compared to 0.7 to 0.8 t/ha before. Diuron is a cheaper alternative for radish, doublegees and turnip, and cheaper still is trifluralin which is effective against ryegrass and wild oats. Both diuron and trifluralin are applied as pre-emergents. Hoegrass can be used for ryegrass control post emergence, and is very effective. But I think simazine is the one for most situations. If you use simazine as a routine, you can probably seed earlier, and that is the big advantage.

I know it may be hard to accept, but if you plough after the first germination of weeds, seed and then use simazine, you will probably get good weed control. Resist the temptation to wait for another cultivation before seeding, as this delays the planting date sometimes considerably, with consequent loss of yield.

What fertiliser do you recommend?
The main fertiliser to remember with lupins is manganese. A deficiency of manganese causes the "split seed" problem in lupins. It reduces yield and produces poor quality seed.

If you are sowing lupins on the poorer white sands or pale yellow sands, I would suggest 30 kg/ha of manganese sulphate drilled with the seed. On white gravelly sands or slightly better soils, use 15 kg/ha of manganese sulphate. Manganese is available already mixed in manganese super, or you can buy manganese sulphate and mix it with your own super.

Manganese super at 200 kg/ha contains the equivalent of 30 kg/ha of manganese sulphate. Manganese has good residual effect on these soils, and will build up by about 50 per cent with each application. For super, use the same rates as for wheat on old land with a good super build up, and on new land, use one and a half times the rate for wheat.

Potash is also needed on deep pale sandy soils, or where large amounts of potash have been removed in hay. The best way to confirm this is with a soil test. However, if the soil is a deep pale sand of the type that needs potash, it probably is not worth growing lupins there.

Copper, zinc and molybdenum requirements are probably similar to requirements of cereals. Lupins do need less copper than wheat, but you have to apply it anyway for following cereal crops and pasture.

What are the common insect problems?
Insect problems are so seasonal that it is hard to predict the risk. The main ones are red-legged earth mite on young plants, and later in the season, aphids and native budworm. The main thing is to inspect the crop regularly. If you see aphids, it is difficult to decide whether spraying is
worthwhile. They may disappear overnight, but if they don’t, they can be controlled with a spray. Spring is the main danger time, and my rule of thumb last season was that if 10 per cent of the plants were badly affected, the crop may be worth spraying. Native budworm can also ruin a crop. Watch the crop for the white speck-sized eggs just as the pods start ripening. Certainly you have to watch a lupin crop more than a comparable wheat crop, but then the profits we are talking about are greater too. I have made the mistake — leaving a trial for three weeks, and when you get back to see it, the lupins are a mess.

Are there any special difficulties with harvesting? I suspect harvesting has been a problem with lupin growing in the past. So often you hear that yields of the first lupin crop are good, but fall off with the next crop. One likely explanation is manganese deficiency which limits proper seed development and the seed germinates poorly. But also, I think some of the trouble is due to damage at harvest. At least for seed which is to be saved, the drum speed should be reduced to a minimum to avoid harming the seed.

Is lupinosis a big problem for farmers who grow lupins? Lupinosis has been a problem from time to time, but the feed value of lupins would far outweigh the risk of lupinosis. In general, farmers are becoming more careful about lupinosis, and as a result, it has not been such a problem. The risk of lupinosis can be greatly reduced by watching stock regularly. Sheep should be moved around the paddock to pick up any stragglers. This is an early sign of lupinosis, and if you see it, the flock should be removed to good quality pasture, or fed hay or cereal grain in another pasture. This stimulates their appetite and helps them to throw off the effects. You can probably do a lot to prevent “lupinosis” by a selenium drench. Particularly weaners are likely to need selenium when grazing lupin stubbles, So far you have been talking about present possibilities for lupins. What about the future? Overseas markets for lupins now seem quite secure. The West German market will take 300 000 tonnes this year at about $130 a tonne, so there is plenty of room for expansion of the industry in that direction. The new variety, Illyarrie should boost yields even more than in the ways I have been talking about. Also there are even better varieties in the pipeline, and in the next few years the Department should make these available. So, it certainly looks as though lupins have an assured future in Western Australia.

Copper for lupins A statement in the March issue of the Journal incorrectly implied that the trace element copper should not be applied to lupin crops, as it could aggravate the lupinosis problem. However, the initial application of copper recommended for crops and pastures, is also recommended for lupins (Farmnote 23/77). Repeated use of copper fertiliser is not only a waste of money, but greatly increases the incidence of stock deaths due to copper toxicity of animals with livers damaged by lupinosis.