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Lupins in the Geraldton region

By P. Nelson and J. Hamblin, Geraldton District Office.

Introduction
About 70 per cent of Geraldton’s hinterland is light land, much of it ideally suited to lupins. However, these soils are prone to wind erosion, have a poor water-holding capacity and lack nutrients . particularly nitrogen and phosphorus. Fortunately most of the coastal and Eradu sands are in areas of relatively reliable winter rainfall.

The Geraldton region has a long association with lupins which started when the sandplain lupin *Lupinus cosentinii*. L. was introduced there more than 100 years ago. Between 1900 and 1910 large scale plantings of this self regenerating wild species were made for summer sheep feed, and to improve the soil in the better, early-settled areas. The next phase of lupin expansion was in the early 1950s when the late Sir Eric Smart and Mr E. C. Newton used the W.A. sandplain blue lupin at Mingenew to open up light land in that region. The most recent phase of lupin production in the Geraldton region followed the release by Dr J. S. Gladstones of narrow-leaved lupin varieties (*L. angustifolius*) in 1967. These were true crop plants, being non-shattering, soft-seeded, sweet and white-flowered.

In recent years, sheep numbers have fallen in the region because of drought-caused stock feed shortages and deterioration of conventional clover and medics pastures. High sheep prices and the economic aftermath of the droughts have deterred farmers from restocking and resowing pastures. This has accelerated the trend towards multiple cropping.

However, the sandplain soils are very fragile. Multiple cropping and conventional cultivation has led to wind-erosion. This, together with the need for more nitrogen fertiliser, can make continuous cereal cropping uneconomic, whereas lupins fit well into sandplain farming systems as a crop in their own right.

Lupins entered the statistical records of the Geraldton region in 1970.

The area sown to lupins built up rapidly during the early 1970s and looked to be stabilising at about 100,000 ha, when in 1976 the ‘break of the season’ was late and the rainfall was considerably below average. Lupin yields were very low... less than 0.1 of a tonne/ha... and the area sown fell dramatically in 1977 to about 57,000 ha and remained low until 1980.

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Geraldton’s lupin area is expanding rapidly.
However, the weather was not the only cause of this loss of interest in lupins. During the early 1970s, herbicides were not recommended for use in lupin cropping north of the Great Eastern Highway. Cropping after lupins rapidly became difficult because of weeds such as brome grass, radish and turnip. Also, farmers did not appreciate the significance of seed rate and seed quality. Low plant density and poor weed control often caused crops of the early flowering, short, high yielding lupin variety Unicrop to fail or to make them low yielding and difficult to harvest. Because of this, farmers in the Geraldton hinterland preferred the more vigorous, taller, later flowering varieties UniHarvest and Marri though these are inherently lower-yielding. By 1979 65 per cent of the area was sown to Marri. Also, Marri was resistant to grey leaf spot, a serious post-flowering lupin disease in the early 70s.

If we examine the wheat and lupin yields of the Mingenew Shire for the period 1970 to 1980, we find that the average yield of wheat over this time was 1.08 t/ha whilst that of lupins was 0.54 t/ha. This poor lupin performance resulted in large sums of money being lost, and gave lupins a reputation as a high risk crop.

However by the late 1970s most of the technical, agronomic problems of lupin growing had been solved. This allowed the Department to develop a lupin production package, based mainly on the work of G. H. Walton and H. M. Fisher, which has been strongly promoted by the Geraldton District Office since 1979. At the same time J. S. Gladstones developed the new variety Ilyarrie, which was early flowering, high yielding, well adapted to the Geraldton region, and resistant to grey leaf spot. This variety has had a major influence in reversing the low plantings of the late 1970s. In 1981, many light land farmers reported that lupins performed better than wheat, and on occasions yielded three times as much as wheat. This year the area sown to lupins in the region is estimated to be about 150,000 ha.

Because of their capital investment in equipment and financial commitments from drought years, farmers are committed to cropping to maintain cash flow. Lupins fit in well as a legume cash crop and, in part, as a substitute for a pasture phase.

Today’s evidence suggests that on sandy soils in the Geraldton area, providing that the season opens in May, and the ‘package’ approach to management is adopted, lupin yields will approach those of wheat.

In the Geraldton region lupins yield best on deep well-drained fertile acid to neutral soils, and on the yellow earthy sands. They do not grow well on the coastal alkaline grey-black wattle soils, deep white Banksia sands, waterlogged soils or shallow soils over sheet laterite. On acid ‘Wodgil’ soils, which lack native rhizobial bacteria, lupins being planted for the first time need inoculation with the Group G culture.

As lupin breeders produce new varieties these are tested for their suitability to the region. For example we expect the midseason variety Chitick released in 1982 to replace Marri in the wetter districts of Allanooka and South Dongara. Ilyarrie is the recommended variety for the rest of the region, with Unicrop as an alternative for the drier eastern districts.

As in other sandy soil regions, lupins are prone to serious damage from sand blasting. A trash-farming system, that is, sowing into cereal stubbles, offers the best protection. The plant can be severely retarded or killed if sandblasting damages its growing point in its early growth stages.

Successful crops of lupins have been grown in the drier parts of the region by seeding before the winter rains. The herbicide simazine is sprayed onto standing cereal stubble, then the lupins are dry-sown with a ‘cultitrash’ drill or air seeder. Experience indicates that this system can fail if the land has a high weed density as simazine is less effective if a considerable delay occurs between seeding and germination.

In these circumstances it is better to delay planting until after weeds germinate.

The lupin’s susceptibility to hormone-type weedicides has caused problems in the region. Farmers are now being discouraged from using high-volatile 2-4D ester, particularly through misters or aircraft, because of the potential damage to lupins. This practice could seriously limit the expansion of lupin production in the region and would deprive many farmers of income. It may also involve others in compensation claims.

As in other areas, lupinosis poses problems in the Geraldton region. There are indications that all sheep grazing sweet lupins are subject to a degree of chronic lupinosis, which may not cause any external symptoms, but can contribute to rapid deaths from acute lupinosis.

**Future of lupins in the Geraldton Region**

Today the future for lupins in the Geraldton region looks bright. They fit well into sandplain farming systems as a legume crop in their own right, as well as supplying nitrogen to a succeeding cereal crop and providing summer feed for sheep.

The prospects for increased areas and tighter rotations will be influenced by plant diseases. A major disease epidemic could be a serious threat to the industry, but progress in breeding for disease resistance and plant pathology studies should enable us to avoid this. Continuing studies on Phomopsis and breeding for resistance to this disease could have a big influence on the future of lupin cropping as this may reduce the risk of lupinosis occurring in sheep grazing lupin stubbles over summer.

We also can expect better-adapted, higher yielding varieties to emerge from the breeding programme. As information on the relative effectiveness of lupin varieties to ‘fix’ nitrogen for following cereal crops becomes available this could influence a farmer’s choice of variety. It may be more profitable to accept a slightly lower lupin yield, compensated for by an increase in the residual nitrogen for the succeeding wheat crop.

New herbicides will give us better control of grass weeds in lupins, particularly reyegrass, which is not controlled well by simazine.