Lupins in Western Australia. 6. Future prospects

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PREVIOUS articles in the series have discussed available lupin varieties, their cultivation, and the feed value of the seeds and crop residues. This final article for the series deals with future prospects for lupin varieties and markets, and how lupins might fit into Western Australian farming systems.

New varieties

Progress for the next few years will depend very much on the availability to farmers of new, improved cultivars.

The range of crop lupins now available in Western Australia is limited. Weiko III (released in W.A. in 1959) and Uniwhite (released 1967) are both late-maturing and confined to relatively high rainfall districts. Uniharvest, due for release in early 1971, has the advantage over Uniwhite of fully non-shattering pods, but is still late-maturing.

The first major advance of crop lupins into cereal districts could follow release of the cultivar Unicrop, which is identical with Uniharvest except that it flowers 2 to 4 weeks earlier. This should allow a substantial increase in the area where crop lupins can be grown reliably, particularly in northern agricultural districts where present cultivars of narrow-leafed lupins grow well but are definitely too late-maturing.

Unicrop may also widen the scope for lupins in existing areas by permitting slightly later seeding. Given reasonable conditions for further bulking of seed, it is hoped that release to commercial seed producers will be possible in early 1972.*

Preliminary observations now suggest that it may be possible to develop varieties of narrow-leafed lupin with still earlier maturity and more reliable seed setting, and this is a major aim in the recently started second phase of the lupin breeding programme. Given the time needed for production and testing, however, these varieties are unlikely to be available before about 1980 even if the programme is successful.

The mid-1970s could see the emergence of the first sweet, non-shattering cultivars of the sandplain or W.A. blue lupin. Early tests of crossbred lines on west coastal sandy soils have been promising. Frost susceptibility and a preference for mild growing conditions may prevent the general use of such cultivars in cooler parts of the wheatbelt, where narrow-leafed lupins will probably prove better adapted. A further limitation is that all sweet sandplain lupin lines are still hard-seeded, and suitable methods of artificial seed scarification will need to be devised.

The final possibility for the 1970s is that sweet, non-shattering cultivars of the white lupin (Lupinus albus) might become available. Although requiring somewhat higher soil fertility than other lupins, these have a high yield potential and their seeds have a high feed value (see Bulletin 3713). Two promising pure lines have been isolated and will undergo field testing.

Production costs

The cultivars now generally available have serious limitations in either yield potential or a tendency to pod shattering. Their late maturity also limits them to districts in which the economies of large-scale production are not fully available. Even with improved varieties, economic comparisons with other crops pose problems. Being legumes, lupins have their peculiar strengths and weaknesses,
which, until more is known about them, makes satisfactory cost comparisons difficult. Some favourable factors are:

- A beneficial effect on soil fertility, or at least a fertility-sparing action compared with non-leguminous crops.
- Higher quality residues for grazing by stock—perhaps offset in the case of lupins by a risk of lupinosis or the cost of management to avoid lupinosis.

Disadvantages are:

- A need for seed inoculation on many soils, at least at first, with attendant risk of nodulation failure. This cost and risk factor is likely to disappear following widespread introduction of lupins into a given district.
- Possible fungus or virus diseases. Present evidence suggests that fungus diseases are seldom serious on new lupin land, but once lupins are established in a rotation disease might rise to greater significance, particularly where successive lupin cropping is attempted.
- Spraying costs for insect control will be greater than for some non-leguminous crops but will vary for different circumstances. For instance, crop varieties of the narrow-leafed lupin may need no spraying at all in some seasons, whereas yellow lupins may have to be sprayed several times.

**Short-term prospects**

The current production of Weiko III and Uniwhite grain is being absorbed by the local stock-feeds market for about $1.60 a bushel (60 lb.) delivered to the factory. This use could increase if prices fall low enough to be competitive with cereal grains. A strong—though probably temporary—demand also exists in N.S.W. and elsewhere for seed purposes. Nevertheless any large-scale development of a lupin industry will have to be based on exports as stock feed.

The immediate outlook for grain lupins on the world market is bound up with that of other feed protein sources.

World consumption of feed grains generally is growing rapidly. Firstly in response to rising living standards (and hence meat consumption) in most developed and semi-developed countries, and secondly because increases in meat production depend almost entirely on intensive methods which demand a plentiful supply of concentrated feeds. An important factor is that importing countries usually, for economic and political reasons, prefer to import feed for domestic livestock industries rather than importing the finished livestock products.

In this context, high protein feedstuffs must be considered separately from cereal grains. Apart from a few very high population density areas, such as Japan, most consuming regions produce their own cereal stockfeeds and many have surpluses, e.g., Western Europe. With rising cereal and other yields resulting from more intensive irrigation, fertiliser usage and improved crop varieties, this situation seems likely to continue for the time being, unless there is a change in current protectionist trade policies. By contrast, high protein feeds are imported into Japan and Europe in large quantities, as a matter of necessity. Attempts to produce them there have met with little success. There is nothing to suggest that this situation will change greatly in the near future.

At present the international vegetable protein market is dominated by soya beans, of which annual production in the U.S.A. exceeds 2,000 million bushels. Given that there is probably still considerable scope for increase in soya bean production in the U.S.A. and elsewhere, entry of sweet lupins into the market will depend on its price being competitive with soya bean meal. The comparison is not quite direct, as account must be taken of the slightly lower feeding value of lupins for some classes of stock, with consequent adjustments necessary in feed mixture formulation.

Future prices in this market cannot be predicted accurately, but if sweet lupins can be produced in suitable districts of Western Australia at costs similar to those for wheat, they should have little difficulty in finding markets overseas. This could well be an attainable goal with the varieties now in prospect.
**Long-term prospects**

The long-term outlook depends on technical and economic conditions which at present can hardly be foreseen, but what little is known suggests that high protein feed stuffs will remain in short supply for some time, relative to other agricultural products.

A longer-term factor that will undoubtedly influence the demand for feed grains is the development of "synthetic" meats and meat substitutes, made directly from vegetable or other proteins and bypassing the animal. Such a development is inevitable and indeed essential if a growing world population is to be adequately fed, and will occur not only in less developed countries (where it already applies anyway), but for economic reasons also in the industrialised countries. The important factor here is that this will affect the cereal feed grains rather than high protein crops, which will still be needed as a direct basis for the synthetic meats or meat substitutes.

**Crop lupins in the farming system**

Given that reasonably adapted crop lupin varieties become available over the next few years, how might they fit into existing or foreseeable farming systems in the wetter parts of the W.A.'s agricultural areas? The answers to this question seem encouraging.

- Lupins fit logically into a pasture-crop rotation following cereals or other non-leguminous crops, or on light soils where nitrogen does not build up greatly, perhaps as the sole crop in the rotation.
- Existing machinery can be used for all operations. Peculiar features of lupin cultivation, e.g., early sowing and, in the case of early-maturing varieties, early harvesting, might in some rotations improve overall efficiency by allowing more extensive use of existing plant.
- Crop lupins are flexible in their uses, e.g., for silage, harvesting as a cash crop, harvesting and feeding back (in both cases with grazing of the stubble), or grazing as a standing crop. The decision as to final use does not have to be made until the time comes, which allows flexibility in planning.
- There are no known barriers to bulk handling, storage and transport of the seed.

**Summary and conclusions**

This series of articles has described lupin growing in W.A., and the progress being made in developing new cultivars suitable for use as crop plants. These are now starting to become available to farmers, and by the middle to late 1970s there should be a full range of cultivars, adapted to a fair proportion of medium and light textured soils in the wetter half of the wheatbelt and higher rainfall areas. Improved yields and reliability, and possibly an extension into dry parts of the wheatbelt may be achieved by further breeding.

It is suggested that a sound and growing world market exists for high protein feedstuffs. Production of sweet lupin grain at a cost enabling it to compete successfully in that market should be possible and should allow lupins to become, in time, a valuable major crop in W.A.