

Extending the Frontiers of Aerially Sown Pastures

Farrer Memorial Oration, 1989

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1989 FARRER MEMORIAL ORATION



Farrer Memorial Research Scholarship Fund

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Since the early 1950s, aerial techniques have made a large contribution to agriculture in Australia. The area topdressed with fertiliser and/or seeded, increased from 2000 ha in 1952 to peaks of 4.9 million ha in 1974 and 4.5m ha in 1988. The area sprayed, increased from 40,000 ha in 1956 to a peak of 3.6m ha in 1984. Violent fluctuations in activity, in response to landholder income, have plagued the aerial agricultural industry and almost brought about its downfall between 1982-86. It is also under threat from unreasonable demands by sections of the environmental lobby. These and other problems need to be solved to ensure its survival.

Pastures established using aerial techniques have made their major contribution through increased production on non-arable land. There remains large areas of such land in Australia and, as the technology is available, development can be promoted by economic assessment and increased extension activity.

The initial method of pasture improvement applied by aircraft in Australia was the distribution of fertiliser and/or legume seeds. This resulted in vastly increased animal production but, over time, the invasion of some 4 million ha of southern Australia by weeds. To control these it proved necessary to establish perennial grass dominant pastures. The advent of aerially applied herbicides and seed treatment to reduce ant theft made this possible.

Establishment of perennial grass dominant pastures by aerial techniques can reduce erosion (by providing more ground cover than native pastures), prevent desertification in Australia, cure some forms of desertification overseas and prevent or reduce acidification of hill country soils. Replacing native species with faster growing improved species and extending the area of the latter could increase carbon accumulation and contribute to environmental stability. The use of aerial techniques offers an alternative to cultivation and the ubiquitous loss of soil especially in weed control in pastures and crops on arable land.

Aerial techniques are available for the maintenance

of pastures on hill country through fertiliser distribution and weed and insect control. It has long been possible to selectively remove broadleaved weeds from hill pastures but now it is possible to remove some perennial grass weeds from perennial grass pastures.

Because of their speed and timeliness, aerial techniques have been used to establish perennial grasses on large areas of inland plains in Queensland. This technique has application in improving the degraded pastures in semi-arid inland regions of other states. Research is already under way in north western NSW to devise aerial techniques for establishing native and exotic perennial grasses in degraded pastures and abandoned crop lands. Research and development are also continuing in tropical and sub-tropical Australia into the use of aerial techniques for pasture improvement.

There are a number of frontiers that need to be breached to ensure the progress of aerially sown pastures. Amongst these is the development of pasture species specifically adapted for establishment on the soil surface. Herbicides are needed with wider weed control spectra, eg. in temperate Australia, glyphosate is ineffective on *Erodium*, *Geranium*, *Vulpia* and *Urtica* spp. Greatest loss of aerially sown species occurs during the first spring and summer after sowing, thus research into management to enhance survival during this critical period is necessary. Improvement in the aerial distribution of fertiliser, seed and herbicide is needed, particularly in the more rugged hill country of Australia. In the pasture improvement of non-arable land, the patterns of tree removal on forested country and tree replacement on non-forested country should be investigated so that sustainable systems, manageable by aerial techniques, are devised.

The breaching of these and other frontiers will contribute to more reliable pasture establishment by aerial techniques and the use of aircraft in new situations on arable and non-arable land, will swing the pendulum even further towards the replacement of tractor operations by aircraft operations.