

# Native Forest Changes Affecting Apiculture and Crop Pollination

Don Keith AM

*loricekeith@bigpond.com*

**Keywords:** native forest, apiculture, crop pollination



Beehives on stands on the flood plains west of Goondiwindi, 1979.

## Relevance

Governments have cited an aim of doubling agricultural production. The most feasible route to achieving this outcome is by increasing production of high-value horticultural crops, most of which depend on or benefit from insect pollination. Controlled pollination is dependent on the apiculture industry, which in turn is dependent on native flora for its continuity and production of apiary products.

## Analysis

During my involvement with the apiary industry since 1950, and as a full time commercial migratory beekeeper from 1955 to 2008, changes in land use have caused a large change and some decline in the industry.

The industry has been further challenged by the incursion of a major exotic pest – the small

hive beetle – in 2000; two major bee diseases – European foulbrood and chalkbrood – since 1980; and the apparent effect of warming temperatures on vegetation. Industry decline, pests and diseases have reduced the availability of honeybees for crop pollination.

## Accessing Ever-decreasing Resources

Coastal tea tree (*Melaleuca quinquinervia*) in wetlands was utilised by most commercial beekeepers in the 1950s and 1960s, including many from the Darling Downs. By 1970, exotic pine plantations had replaced much of this species. As well, increasing urbanisation caused the loss of large areas of productive forest. Because of the loss of forest resources, we moved our beekeeping headquarters from south-west Brisbane to the southern Darling Downs in 1969. At that time the adjacent Traprock and Granite Belt

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International Licence. Individual articles may be copied or downloaded for private, scholarly and not-for-profit use. Quotations may be extracted provided that the author and The Royal Society of Queensland are acknowledged. Queries regarding republication of papers, or parts of papers such as figures and photographs, should be addressed to the Secretary of The Royal Society of Queensland (rsocqld@gmail.com).

areas supported the most productive forests for the apiary industry. Yellow box (*Eucalyptus melliodora*), which produced large crops of highest-quality honey, grew here as well as a number of other productive species.

Yellow box had been given protection at a few trees per acre on Crown land in the 1950s. However, from the 1960s most of the Traprock lands were freeholded, transferring ownership of the trees to the landholder. Large bulldozers and the herbicides Tordon and Velpar became available in the 1970s, and an estimated 90% of this resource was cleared during the era of the Wool Reserve Price Scheme. The downturn in the wool industry following the failure of the Wool Reserve Price Scheme resulted in property amalgamations and the loss of a large percentage of the region's population. The clearing caused a parallel loss of apiarists and apiary production. We continued to produce by reducing stocking rates to utilise the remaining trees, many of which were on stock routes and public reserves. However, in 1988 we experienced the first failure to produce a crop from a reasonable flowering.

### Apparent Warming Effect

When we moved to the Inglewood district in 1969, long-time residents had expectations of the first frost around the time of Anzac Day. We had occasions when all our water pipes were frozen. As time went by, this occurred less and less often – and never after 1990. First frosts came later and last frosts earlier.

Yellow box used to finish flowering around 10 December, and most production occurred from 1 November. The modest warming that was occurring caused the trees to commence flowering earlier, reducing honey production as much of the flowering occurred during the shorter, cooler days of earlier months.

While the level of warming that occurred seemed small, the *Eucalyptus* genus contains over 700 species, most of which have a limited range in which they prosper. I suspect the modest

change has had a major effect on species growing in specific locations.

It was instructive that on a trip to the Traprock lands in early November 2016, the last few flowers were on the yellow box, a month earlier than in the 1970s. Research reported by Phillips et al. (2018) (cited by Montaut, 2018) notes that flowers reduce their nectar production in drier or drought conditions, confirming beekeepers' field observations. The impact on all pollinators of the predicted increase in drought conditions expected to accompany climate change was particularly noted. Meanwhile, ClimateWatch, a collaborative program of the Earthwatch Institute in Australia, the Bureau of Meteorology and The University of Melbourne, reported that peak nectar flow occurred nearly four weeks earlier than in the 1970s. ClimateWatch researchers work with NASA and a network of beekeepers across the US and Australia. They attribute the shift in timing to climate change and, specifically, "the warming effect of urbanisation".

In my last 20 years of active beekeeping, we produced just four yellow box crops compared to crops at two- or three-year intervals previously. The Traprock region, which had supported many apiarists, had been cleared 'up hill and down dale', destroying a valuable resource and reducing biodiversity.

The woodlands of the Macintyre River flood plains west of Goondiwindi were a valued apicultural resource until cotton production commenced in the 1980s. While there were significant remaining native vegetation resources, cotton is highly attractive to bees, and insecticide losses made these areas unviable. We migrated further west to the Narran River catchment until cotton again presented the same challenge. From 1989 we had to travel much longer distances to access resources, as modern commercial apiarists continue to do.

### Crop Pollination

Controlled pollination is dependent on the apiculture industry, which in turn is dependent on

native flora for its continuity. “Where are the bees?” has been a common question. Pests and diseases and pesticides have devastated the feral (wild) honeybee population, a previously helpful pollinator. Maintenance of a viable apiary industry is essential to ensure crop pollination for growth of the agricultural sector.

Prior to 1970 the Traprock region was the major area supporting the Queensland apiary industry. The extensive destruction of the region’s forests and woodlands has had a large impact on the apiary industry, now the major source of crop

pollination for expanding intensive agriculture and horticulture.

The region is the catchment for the Glenlyon and Coolmunda Dams. Rainfall in the catchment has declined, preventing farmers’ allocations downstream from being met. Allowing the Traprock forests and woodlands to regenerate as carbon stores, stabilising the catchment and its rainfall, protecting biodiversity and providing precious resources for the apiculture industry so critical for future crop production, may be a future for the region.

### Conclusion

Queensland’s forest resource for apiculture continues to decline, and hives available for pollination of expanding insect-pollinated crops will not be available unless action is taken to increase forest resources and access to those resources. To the long-understood damage caused by clearing native vegetation, use of insecticides and lax biosecurity must now be added relentless climate change. There is no single cause and no single remedy, so coordinated policy action is required on many fronts.

Many parts of Queensland have been drought declared for much of the two decades of the 21st century. Biodiversity is in steep decline, and species once common are threatened. Many rural producers are financially stressed, and the Darling River catchment is struggling. Have we debilitated the land nurtured for 60,000 years by the first Australians by over-clearing and unrealistic expectations on the use of water?

### Literature Cited

- Montaut, M. (2018). Bees and Climate Change. *The Australasian Beekeeper*, 121(1), 22–23. <https://www.theabk.com.au>
- Phillips, B. B., Shaw, R. F., Holland, M. J., Fry, E. L., Bardgett, R. D., Bullock, J. M., & Osborne, J. L. (2018). Drought Reduces Floral Resources for Pollinators. *Journal of Global Change Biology*, 24(7), 3226–3235.

### Author Profile

Now retired, Don Keith was a commercial apiarist for 53 years. He is a past Chairman of the Queensland Beekeepers’ Association, the Federal Council of Australian Apiarists’ Associations and the Board of Capilano Honey Limited.



Yellow box (*E. mellidora*) is a premium honey producing species which has been extensively cleared across the Traprock country. The restoration of this endangered box-ironbark ecosystem would provide multiple benefits including honey production, carbon capture and biodiversity.

(Photo: Bindi Vanzella)