RARITY AND THREAT IN RELATION TO THE CONSERVATION OF ACACIA IN WESTERN AUSTRALIA

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Western Australia, particularly the south-west of the State, is recognised for its exceptionally high plant species diversity and endemism. The largest genus in the State, *Acacia*, is represented by 772 taxa of which 211 are recognised as rare and or threatened with two taxa presumed extinct. Currently 28 *Acacia* taxa are listed as threatened taxa (Declared Rare Flora) under the Wildlife Conservation Act and 12 of these are ranked as critically endangered. Another 183 Acacia taxa are considered to be rare and poorly known (Priority Flora) although their conservation status has yet to be accurately determined and many are likely to be under threat of extinction. Most of the rare and threatened taxa occur in the cereal growing areas (Wheatbelt) in the south-west of the State where there has been extensive land clearing and habitat degradation. Within this region threatened *Acacia* taxa are found on various land tenures although the highest numbers of populations occur on private property and Local Shire road reserves.

The list for Declared Rare and Priority Flora are based on rarity, usually defined with reference to distribution and abundance of the taxa, and threat to the populations. The threats identified for Acacia taxa include invasive flora and fauna, inappropriate fire regimes, habitat destruction associated with clearing activities, alteration of hydro ecology, and demographic and genetic effects associated with small declining populations. Understanding the ecological and genetic consequences of rarity in terms of low numbers of small, often fragmented populations can provide vital clues to the development of management actions and conservation strategies for rare and threatened species. It is also important to understand whether rarity in plant species is due to historical processes such as past climate change, to habitat specificity or to recent land clearing and habitat destruction. A particularly effective approach to understanding rarity and its implications for conservation is to carry out comparative reproductive, genetic and ecological studies on the rare species and closely related more common species. This approach has been used in studies a number of rare and critically endangered Acacia taxa focussing particularly on those factors that may constrain population persistence. The objectives were to determine whether the rare taxa have intrinsic biological characteristics that may account for their rarity and to rank constraints. These comparative studies revealed few differences in reproductive biology, seed predation and regeneration niche. However, they did show that genetic diversity levels were lower and inbreeding higher in the rare critically endangered taxa and that habitat specialisation may be important. Studies of factors constraining population growth in other Critically Endangered Acacia taxa have indicated that seed production in small populations is unlikely to limit population growth and that local abundance is perhaps most influenced by fire regimes and competitive interactions with introduced invasive annuals.