Abstract

The marbled gecko (*Christinus marmoratus*) and wall skink (*Cryptoblepharus plagiocephalus*) are two arboreal lizards known to use dead stags in the jarrah forest of south-western Australia. Both these species are abundant in un-mined jarrah forest. However, the marbled gecko and to a lesser extent the wall skink are failing to return to areas rehabilitated following mining by Alcoa World Alumina Australia. The reason for this is thought to be the absence of dead stags, as dead stags can provide an important habitat component to arboreal lizards as a foraging substrate to hunt insect prey and also a place in which to shelter (cracks and hollows).

The present study examined the microhabitat available to arboreal lizards in rehabilitated mine-pits at Alcoa’s Huntly mine-pit (≈100km SE of Perth) and in adjacent un-mined jarrah forest, as well as determining the size and senescence of trees used by the two study species. It was found that in un-mined jarrah forest live trees regardless of size (small or large) had significantly less bark than dead trees and that large dead trees had significantly more cracks compared with live trees (small and large) and small dead trees. In rehabilitated areas, trees had similar characteristics to trees of comparable size in the jarrah forest. It was concluded that the absence of large dead trees (the biggest source of cracks) in rehabilitated mine-pits could be preventing the return of the marbled gecko and wall skink to these areas.

A trap was designed to specifically target the two study species, so it could be determined what size and senescence of jarrah tree in un-mined forest was most preferred by the wall skink and marbled gecko. Three experiments were conducted. The first experiment was an olfactory experiment wherein wall
skinks significantly tongue-flicked towards crickets more than the other four baits tested (fruit flies, mealworms, cockroaches and peanut butter). No significant response was given for any of the five baits by the marbled gecko. As a result crickets were used as the bait. The second experiment examined the attractiveness of different visual and acoustic cues (live crickets, live mealworms, live fruit flies, live cockroaches, peanut butter, a flashing LED light and darkness/cover) using a Y-maze. The wall skink had a significant aversion to darkness/cover. The marbled gecko did not show a significant aversion or attraction to any of the seven stimuli tested. As a result the trap was made from aluminium fly-wire which allowed light through. The final experiment looked at what material was best to use for the drift-fence. It was found that damp-proof flashing with cooking oil applied was the best material to use as it was difficult to climb for both the marbled gecko and wall skink. Consequently flashing was used as the drift-fence material; however, oil was not applied as it became sticky when left in the sun.

Because of low capture rates of the marbled gecko and wall skink, microhabitat requirements can only be inferred from apparent general trends. Arboreal lizards apparently preferred dead jarrah trees over live jarrah trees, as all reptile captures were on dead trees. However, no significant preference was shown for the size (small or large) of jarrah tree. Trees on which reptiles were caught were associated with high numbers of cracks (which can be used as shelter sites) low canopy cover (which increases insolation through the canopy for basking), and a greater number and volume of logs in close proximity (which can be used as foraging and basking sites). These findings suggest that these habitat components may be determining factors in the presence/absence of arboreal reptiles (including the wall skink and marbled gecko) in the jarrah forest.
The present study also examined whether marbled geckos and wall skinks will re-colonised rehabilitated mine-pits where habitat has been provided by thinning using two different techniques, notching with herbicide injections (to produce dead standing stags) and cutting trees with a chainsaw (to produce small logs). The provision of habitat in the form of dead stags and logs apparently did not facilitate the re-colonisation of the two target species, since no reptiles were observed in any of the rehabilitated mine-pits. Reasons for this may be the lack of both dead stags and logs in the one rehabilitated site as arboreal reptiles were found using a combination of logs as well as dead stags in un-mined forest. Also the absence of larger dead stags and logs could also be limiting factors, since large, dead stags were the biggest source of cracks in the native jarrah forest and large logs found to be used by the wall skink for foraging sites.

From the findings of this study it is recommended that large logs as well as large dead stags are transported into rehabilitated mine-pits. In addition, notching of trees is recommended to occur in stages over a period of time to produce dead stags of many sizes. These recommendations are likely to encourage the re-colonisation of the wall skink and marbled gecko. However, more research is required on the longevity of dead stags and the importance of logs to the two study species.