

DO PINE PLANTATIONS HAVE AN IMPACT ON THE DENSITY OF BRUSHTAIL POSSUMS IN KARST CAVES?

Rolan Eberhard¹ & Adrian Slee²

¹Resource Management & Conservation Division, Department of Primary Industries, Parks, Water and Environment, GPO Box 44, Hobart, Tasmania 7000; ²Forest Practices Authority, 30 Patrick Street, Hobart, Tasmania 7000; email: rolan.eberhard@dpipwe.tas.gov.au; adrian.slee@fpa.tas.gov.au

During a survey of karst features on a property near Mole Creek in northern Tasmania, we located and explored five karst caves. The caves included short walk-in type horizontal passages as well as steep-sided vertical shafts up to about 10 m deep. The latter required caving ladders to descend. None of the caves contained flowing water, other than minor seepage flows.

In all five caves we encountered living individuals or pairs of brushtail possums, *Trichosurus vulpecula* (Plate 1). Abundant fur, scats, leaf-lined roosting niches and a pervasive possum aroma suggested that the possums had been living in these caves for some time. They were clearly 'in occupation' and not just occasional cave visitors.



Plate 1. A not so innocent-looking cave-dwelling brushtail possum in a cave near Mole Creek. Photo: R. Eberhard.

While it is not unusual to encounter possums in karst caves, the density of cave-dwelling possums on this property is unprecedented in our experience. The

property was developed as a pine plantation approximately 30 years ago. We surmise that possums moving into the plantation from adjacent areas colonised the caves because young pine trees provide few if any opportunities for roosting in tree hollows. Forest remnants on adjacent slopes suggest that the original vegetation was dry grassy white gum.

A number of Tasmanian mammals are troglaxenes – habitual users of karst caves, but not dependent on caves to complete their life cycles (troglaphiles) or unable to survive outside caves (troglabites). In addition to brushtail possums, platypuses, wombats and Tasmanian devils are known to inhabit caves at Mole Creek and some other Tasmanian karst areas. Typically, however, possums appear to prefer roosting in tree hollows, which are likely to provide better protection from ground-based predators.

Mammals occupying caves can have significant effects on underground environments. Animals moving about and foraging or burrowing invariably disturb cave sediments, which may be compacted, mixed, displaced and otherwise altered. Wombats in particular can have quite intense effects due to their vigorous digging habits, which they engage in even when already underground inside a cave. Platypuses are known to use caves for nesting (Munks *et al.* 2004) and sometimes burrow extensively into the soft sediments of cave streamways. Mammals may displace other cave biota, such as invertebrates, or they may advantage them by bringing additional nutrients into otherwise nutrient poor cave environments. Under natural conditions, these are normal ecological processes.

We observed a range of impacts attributable to possums in the caves. In all cases there was abundant evidence of earthy sediments becoming hardened and compacted along well-developed ‘pads’ leading to entrances or nesting hollows (Plate 2); however, localised puddling and mixing had occurred where higher moisture content sediments were affected. A considerable amount of sediment had displaced to other parts of the cave, with stalagmites, flowstone and other substrates coated with dark greasy slicks over sizeable areas (Plate 2). The scale and intensity of muddying was reminiscent of the squalid conditions that can result in poorly managed caves subject to excessive recreational pressure. Possum faeces and urine were scattered throughout (Plate 3), as well as presumed nesting materials (sticks and leaves). Natural rates of change in caves are often very slow, implying limited or negligible capacity to recover from some of the impacts described above.

Broken stalagmites were also noted, although it is unclear whether possums were responsible for some or any of this damage. Possums are certainly capable of breaking off smaller stalactites. Elsewhere at Mole Creek, one of us had previously witnessed straw stalactites broken off when a cave-dwelling possum was startled by an approaching caver. This cave is located in sparse immature eucalypt

regrowth, which may also have provided limited opportunities for nesting in tree hollows.

If our interpretation that conversion of native forest to pine plantation has potential to increase the density of cave-dwelling possums is correct, then the impact of the change in land use includes the effect within the caves of increased levels of activity by possums. While our observations are of a preliminary nature, we suggest that they raise questions concerning the use of caves by mammals under different land use regimes and are worthy of further investigation.



Plate 2 (LHS). Greasy slick across flowstone caused by possums. Photo: R. Eberhard.

Plate 3 (RHS). Leaf litter, possum faeces and urine staining on cave floor. Photo: R. Eberhard.

REFERENCE

Munks, S.A., Eberhard, R. & Duhig, N. (2004). Nests of the platypus, *Ornithorynchus anatinus*, in a Tasmanian cave. *The Tasmanian Naturalist* 126: 55–58.

EDITORIAL NOTE

A version of this article first appeared in *Forest Practices News* (June 2009, Volume 9, No. 3, pp. 23–24): the Forest Practices Authority is thanked for permission to reproduce the article in *The Tasmanian Naturalist*.