Development of a lightweight, portable trap for capturing free-ranging Koalas *Phascolarctos cinereus*

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Introduction

Koalas *Phascolarctos cinereus* are specialised arboreal folivores that inhabit woodland and forest communities of eastern Australia (Martin and Lee 1984). The species is also Australia's largest arboreal mammal, the weights of adult males in southeastern Australia reaching approximately 13kgs (Lee and Martin 1988). Much of the knowledge on various aspects of koala ecology has come from studies of captured animals (e.g. Gall 1976; Martin 1981; Lee *et al*. 1990; Mitchell 1990; Melzer and Lamb 1996; Pieters and Woodhall 1996; Kavanagh *et al*. 2007).

Traditionally, the capture of koalas for research and/or management purposes involves various procedures, most of which employ a combination of telescopic poles, flags and/or nooses, usually in conjunction with a variable (but by no means commensurate) measure of arboreality on the part of researchers and/or their assistants. However, koala capture procedures in some areas of Australia have drawn criticism from some quarters (Phillips 1997). In New South Wales, concerns about some captures led to instigation of a formal review of procedures by the south-east forests Koala Research Committee. This review (Bali and Delaney 1996) recognised the potential for stressful captures to contribute to koala mortality and amongst other things, resulted in the development of draft capture protocols for researchers. The protocols (subsequently amended by the former NSW Koala Research Committee) have been adopted by the (now) NSW Department of Environment, Climate Change and Water and are distributed to Animal Ethics Committees in NSW for their guidance.

Whilst various capture methods were reviewed by Bali and Delaney (1996), the concept of actually trapping koalas was not discussed in any detail and is therefore not one of the preferred methods recognised by the protocols. The purpose of this paper is to describe a trapping device that has proven effective in the capture of free-ranging koalas. Trap specifications and the results from a pilot study are presented herein with a view to broader acceptance of the technique as an acceptable method of koala capture that offers a number of advantages when compared to more traditional techniques.

Trap Structure

The structure comprises a flexible barrier (the trap-wall) that has a single opening through which a trap is inserted. The trap-wall comprises a series of nine Corflute® panels 1200mm x 900mm x 5mm joined end to end (allowing a 10mm gap between panels) by 50mm industrial duct tape, thereby allowing them to be folded onto each other in concertina fashion for storage and/or transport purposes (Fig. 1), each panel (optionally) reinforced on the upper edge by 6mm plastic poster framing. The trap component is a 38cm x 38cm x 76cm[1] collapsible platform, treadle-based fox trap (Mascot Wire Works), the end (trap closed) outline of which is cut from one of the more centrally located panels in order to provide the single opening referred to above. Use of a collapsible platform trap is recommended because it offers the dual advantage of being collapsible for transport purposes while also able to be opened at either end in order to affect release of a captured animal (see below).

The approximate weight of individual trap components can be broken down as follows:

Trap wall (9 panels):	~9.0 kgs
Collapsible platform trap:	~5.5 kgs
Hessian Bag:	~1.0 kg
Total weight :	**~15.5 kgs**

In the field, the trap-wall is extended out around the base of the selected capture tree with the two ends overlapping and joined by fasteners. Once the trap wall is erected, the cage trap is inserted through the opening (Fig. 2) and a hessian bag placed over it to cover the top and sides, but otherwise leaving the distal end uncovered (Fig. 3).

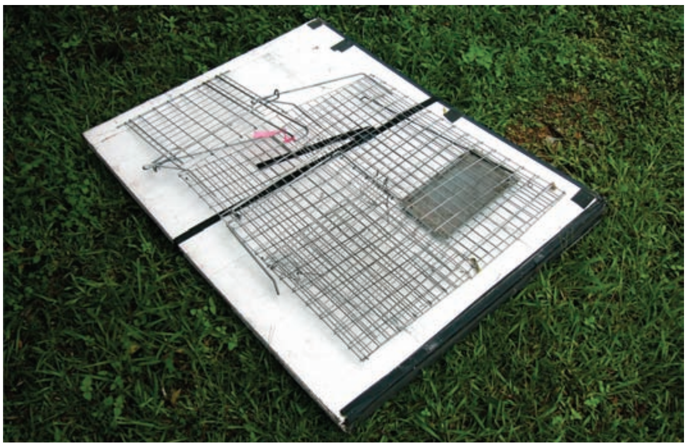

Figure 1. Koala trap dismantled and ready for storage and/or transport; the total weight of all components is approximately 15kgs.

[1] Larger trap dimensions can be utilised.

Figure 2. The cage trap is inserted through the opening in the trap wall, being careful to ensure that gate closure will not be obstructed.

Figure 3. The same trap in Fig.1 erected around a large Forest Red Gum *E. tereticornis*. Note placement of the hessian bag such that the distal end of the cage trap is left uncovered.

Field trials

The abovementioned structure was deployed on 31 occasions during the course of a pilot study undertaken by the author and was successful in 23 instances (including recaptures) to provide an overall trap success of 74%. The weights of captured animals ranged from 4.5 – 10.5 kg. Factors that contributed to trap "failure" included canopy overlap (i.e. branches from adjoining trees extending into the canopy of the capture tree) and the proximity of adjoining tree boles which offered alternative routes for a koala descending to the ground. In practice, this latter factor can be minimised by the insertion of additional panels to increase the trap-wall radius, or by deployment of another trap around trees of concern.

Monitoring

For the purposes of the pilot study, monitoring of traps was undertaken by inspection on an hourly basis. Interestingly, no captures occurred during daylight hours or before about 2100hrs (EST). Moreover, capture data suggests the possibility of two peak periods of nocturnal movement by Koalas, the first between 2100hrs and 2300hrs, the second immediately preceding sunrise or shortly thereafter (Fig. 4). However, the extent to which these observations reflect normal koala movement patterns must remain speculative simply because the extent to which the physical presence of the trap may have been influencing koala activity remains unknown.

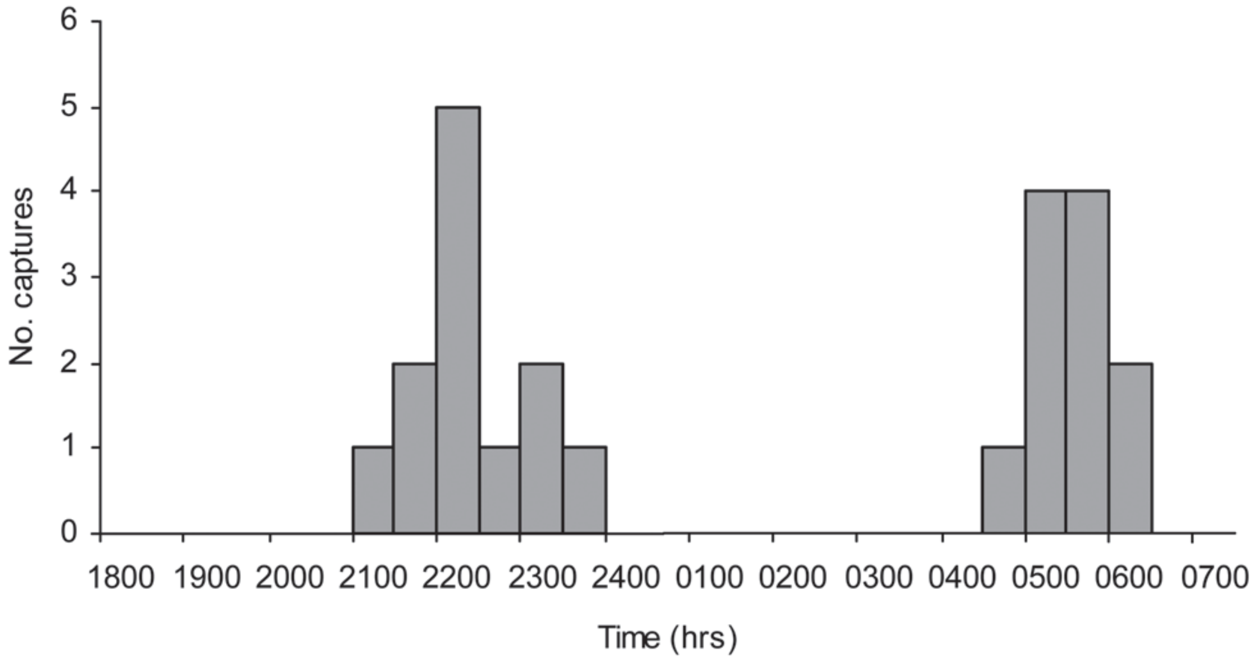

Figure 4. Capture times for 23 Koalas collected and released from the koala trap during field trials whereby traps were monitored on an hourly basis from sunset through to sunrise. Traps were set at various times throughout daylight hours.

No adverse behavioral reactions by koalas to being 'trapped' were observed. To the contrary, passive observations from a distance indicated that captured animals (including female koalas with pouch or back young) tended to sit calmly in the cage trap until closely approached and/or released, the hessian bag offering both cover and protection from the elements. Release is simply effected by opening one end of the trap and allowing the animal to walk out where it can then be restrained by experienced handlers.

Discussion

The koala trap offers a number of advantages. Most importantly, by allowing a koala to descend the tree of its own volition and at a time of its own choosing, it enables captures to be effected with a minimum of stress. That consideration aside, the trap offers the potential to work as an adjunct to traditional capture methods and so increase the efficiency of field work that requires the capture of wild koalas (see Lassau *et al*. 2008). Indeed, the technique is particularly suited to tall forest communities where both climbing and capture by other means presents risks for both researchers and koalas. Traps can also be monitored using a radio-receiver or scanner in association with a beacon transmitter (Titley Electronics) that becomes activated upon closure of the trap door, thus allowing several traps to be monitored remotely and concurrently.

The use of a fence-based technique to capture koalas was first described by Hasegawa and Carrick (1995) who utilized a galvanized corrugated steel swimming pool surround in conjunction with a steel tree collar. The structure described herein differs from that described by Hasegawa and Carrick (1995) in a number of significant ways, not the least of which is that it is lightweight and portable, readily adaptable to a wide variety of capture situations, and very easy to transport, erect and dismantle. The use of a cage trap is also a novel addition which, when used in conjunction with radio-telemetry, diminishes the need for constant monitoring while enabling a rapid response by researchers to further minimize potential capture and/or or confinement stress.

Acknowledgements

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