

An unexpected case of cannibalism involving two skinks in the genus *Liopholis* Fitzinger, 1843 and the formal description of a new subspecies in the *L. whitii* Lacépède, 1804 species complex.

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.

Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: snakeman (at) snakeman.com.au

Received 29 March 2017, Accepted 15 July 2017, Published 10 August 2018.

ABSTRACT

Australian skinks of the genus *Liopholis* Fitzinger, 1843 are well known to most Australian herpetologists, because they are widespread, large and common.

In Eastern Australia, most are referred to the species *L. whitii* Lacépède, 1804, although numerous regional forms have been formally described and named. Unfortunately the various papers naming these forms have failed to either provide appropriate synonym lists for relevant taxa, suitable diagnostic features that separate the putative taxa or both. The result being that no texts including the most recent treatises of the group (Cogger 2014, or Wilson and Swan 2017) have properly defined or separated the various similar forms, in that diagnostic characters purported to separate the various purported taxa simply do not. They invariably rely on claims of colour variations which simply are not consistent or hold true, even within a single location. Notwithstanding the preceding, molecular evidence (e.g. Chapple *et al.* 2008, Pyron *et al.* 2013) confirms that several morphologically similar, yet valid species and subspecies are being confused with one another. One of the more divergent forms within the complex from Tasmania remains undescribed and so it is formally named as a subspecies of *E. whitii* according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) herein.

Hoser (1989) reported that *L. whitii* Lacépède, 1804 often lives in groups consisting of 2-3 individuals, sometimes sharing the same rock as a retreat. Contrary to this observation, this paper reports on an unexpected case of cannibalism between two *L. whitii* complex skinks from near Kinglake in Victoria.

Keywords: Skink; *Liopholis*; *whitii*; *montana*; Victoria; Tasmania; Kinglake; Whittlesea; Humevale; Australia; cannibalism; new subspecies; *dannygoodwini*.

INTRODUCTION

Australian skinks of the genus *Liopholis* Fitzinger, 1843 are well known to most Australian herpetologists, because they are widespread, large and common.

In Eastern Australia, most are referred to the species *L. whitii* Lacépède, 1804, as done by Hoser (1989), although numerous regional forms have been formally described and named (see Cogger *et al.* 1983, Wells and Wellington 1985 and Donnellan *et al.* 2002). Unfortunately the various papers naming these forms have failed to either provide appropriate synonym lists for relevant taxa, suitable diagnostic features that separate the putative taxa or both. The result being that no texts including the most recent treatises of the group (Cogger 2014, or Wilson and Swan 2017) have properly defined or separated the various similar forms, in that diagnostic characters purported to separate the various purported taxa simply do not. They invariably rely on claims of colour variations which simply are not consistent or hold true even within a single location.

Notwithstanding the preceding, molecular evidence (e.g. Chapple *et al.* 2008, Pyron *et al.* 2013) confirms that several morphologically similar, yet valid species are being confused with one another.

Hoser (1989) reported that *L. whitii* Lacépède, 1804 is often

found in groups of 2 or 3 individuals of different ages, sometimes sharing the same rock as a retreat. The statement was based on observations involving specimens at Cowan, New South Wales in Kurringai Chase National Park (east of the north-south railway line, near Jerusalem Bay) and also at Heathcote National Park, at Waterfall, New South Wales, west of the north-south railway line, to the west of Lake Toolooma.

In both locations skinks of ages ranging from juvenile to adult were found on several occasions sharing a single large rock as a refuge, or fleeing into a single rock crevice.

No observations of antagonistic behaviour between specimens occurred.

One widely divergent form within the *L. whitii* species group is also formally named within this paper as a new subspecies.

MATERIALS AND METHODS

As a licensed snake controller in Victoria, I attend locations to remove venomous snakes perceived to be a risk to people or pets. Opportunistic observations of wildlife are made and exceptional cases recorded. This paper refers to one such incident.

In the process of seeking to identify the relevant species involved, it emerged that a divergent subspecies within the *L.*

whitii species complex from Tasmania remained unnamed and so it is formally described according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) within this paper.

RESULTS

Contrary to the earlier observations of group social interaction within the *L. whitii* species complex by myself, this paper reports on an unexpected case of cannibalism between two *L. whitii* complex skinks from near Kinglake in Victoria.

In September 2015, I was called to attend a site 250 metres east of 655 Whittlesea-Kinglake Road, Humevale, on the northern outskirts of Melbourne, Victoria, Australia. People working for the phone company Telstra had seen a large unidentified snake, most likely a Copperhead *Austrelaps superbus* (Günther, 1858), in the area they were working in and had called me to come and remove it.

The site was within a roadside reservation between the main bitumen road and fenced farm paddocks to the north. A search for the snake failed to locate it, which was not surprising as it turned out that the workmen had seen it some days prior.

The delay in myself attending the site was due to a delay in the Telstra line of communication and not through any delays at my end. In fact I attended the site immediately when called to on the basis I was told that the snake was present, not moving and waiting to be caught! However as part of the checking process a number of small to medium sized rocks were lifted to see if any snakes were hiding under them.

From underneath two separate rocks in fairly close proximity were recovered two *L. whitii* complex skinks of similar appearance, one clearly being young born the previous summer and the other an unsexed adult.

They were presumably one or other of *L. whitii*, *L. coplandi* Wells and Wellington, 1985, *L. montana* (Donnellan, Hutchinson, Dempsey and Osborne, 2002) or potentially even an undescribed species, based on capture location.

Both were placed in a large plastic tub immediately after capture for the purpose of being photographed and released. Within a few minutes I opened the container to throw in a centipede to be retained and fed to frogs we use in Australia's only hands on reptile shows and at the same time saw the end of the tail of the younger lizard protruding from the mouth of the adult lizard as it continued to eat it.

I grabbed the larger lizard and it regurgitated the smaller one.

A photo of the larger lizard appears on the cover of this issue (issue 38) of *Australasian Journal of Herpetology*.

DISCUSSION

While it could be speculated that the presence of two lizards in the confined space of a plastic container was the sole cause of the cannibalistic behaviour by the larger lizard, I doubt this to be the case. The only obvious variable I could see would be that there was a greater chance of the young lizard being caught and eaten in the confines of a plastic tub, as opposed to in the wild outside of the tub.

That the two lizards occupied separate rocks in close proximity when found, also leads one to assume that for the smaller lizard at least, it had chosen to hide away from a larger lizard likely to eat it.

Noting that the placing of a wild lizard into a plastic tub is stressful for it, it is slightly surprising that in the face of this stress, it still chose to eat the smaller lizard. Again this implies that the attack was normal for the individual of the species and not an aberrant act of cannibalism.

Because multiple individuals of varying age of this species group have been found in proximity without apparent incident around Sydney, New South Wales, cannibalism may not be common practice in the *L. whitii* complex in some areas and yet occurring elsewhere.

Based on molecular evidence, the central Victorian populations of *E. whitii* are also believed to be a divergent clade to those

from Sydney, New South Wales and so this may in part also explain the seemingly different behaviour observed.

If a herpetologist could access sufficient numbers of specimens from various locations and get ethics approvals from wildlife authorities, it would be an interesting study indeed to see what causes acts of cannibalism in *L. whitii* complex species and if this behaviour is the same between populations and clades.

Furthermore, while there have been a number of taxonomic studies and summaries of the *L. whitii* complex species including Cogger *et al.* (1983), Chapple and Scott Keogh (2004), Chapple *et al.* (2005, 2008), Donnellan *et al.* (2002), Gardner *et al.* (2008), Storr (1968) and Wells and Wellington (1984, 1985) the taxonomy of the complex is far from resolved and certain due to a lack of sampling from nay localities relevant species occur. Due to the relative abundance of the species involved, a revisiting of the taxonomy of the group, based on both molecular and morphological evidence should be a priority.

Notwithstanding the preceding comments, the Tasmanian population of *L. whitii* is significantly divergent from the typical form from kangaroo Island, South Australia, or those described and named from New South Wales, including forms in Victoria related to the nominate types from South Australia or New South Wales.

It is therefore formally described herein as a new subspecies, *L. dannygoodwini* sp. nov.

LIOPHOLIS DANNYGOODWINI SUBSP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.88446 collected 11.3 km East of Campbell Town, via Road, Tasmania, Australia, Latitude -41.95 S., Longitude 147.62 E. The Australian Museum in Sydney allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.66604, collected at Freycinet Peninsula, Tasmania, Australia, Latitude -42.20 S., Longitude 148.316 E.

Diagnosis: *Liopholis dannygoodwini* subsp. nov. is similar in most respects to the described species *L. whitii* (Lacépède, 1804), *L. compressicaudus* (Quoy and Giamard, 1824), *L. coplandi* Wells and Wellington, 1985, *L. montana* Donnellan *et al.* (2002), *L. messeli* Wells and Wellington, 1985 and *L. multiscutatus* (Mitchell and Behrndt, 1949), some of the preceding of which may be conspecific.

L. dannygoodwini subsp. nov. is however readily separated from all the above species by the presence of ivory white labials under the eye and posterior to it, with thick black etching around each white blotch, usually numbering three large irregular-shaped white blotches, combined with significant reddening towards the end of the original tail, as well as a dorsal pattern including a series of longitudinal markings incorporating brown and grey dorsolateral stripes, black zones and numerous whitish or cream spots arranged in a linear manner on the dorsum and upper flanks. There are no specimens or morphs of this species that have the so-called plain back, being a uniform brown or grey in colour as seen in the other species.

While the other species commonly have white upper labials, the distinctive thick dark black etching of the rear ones is not seen as in *L. dannygoodwini* subsp. nov..

The Tasmanian subspecies *L. dannygoodwini* subsp. nov. reaches a snout-vent length in adults of 85 mm, versus 95 mm in most of the other species.

Distribution: Most of Tasmania, except for the far south, including immediately adjacent offshore islands to the north and east and invariably found in or near rocky situations, although like most other reptiles will happily seek out and live in human rubbish such as sheets of tin.

Etymology: Named in honour of Danny Goodwin of Inverloch, Victoria, Australia, formerly of Tasmania, Australia and Worri Yallock, Victoria, Australia in recognition of his services to herpetology over some decades.

LITERATURE CITED

Chapple, D. G. and Scott Keogh, J. 2004. Parallel adaptive radiations in arid and temperate Australia: molecular phylogeography and systematics of the *Egernia whitii* (Lacertilia: Scincidae) species group. *Biological Journal of the Linnean Society* 83:157-173

Chapple, D. G., Scott Keogh, J. and Hutchinson, M. N. 2005. Substantial genetic substructuring in southeastern and alpine Australia revealed by molecular phylogeography of the *Egernia whitii* (Lacertilia: Scincidae) species group. *Molecular Ecology* 14:1279-1292.

Chapple, D. G., Hutchinson, M. N., Maryan, B., Plivelich, M., Moore, J. A. and Keogh, J.S. 2008. Evolution and maintenance of colour pattern polymorphism in *Liopholis* (Squamata : Scincidae). *Australian Journal of Zoology* 56:103-115.

Cogger, H. G. 2014. *Reptiles and Amphibians of Australia* (Seventh edition), CSIRO. Sydney, Australia:1064 pp.

Cogger, H. G., Cameron, E. E. and Cogger, H. M. 1983. *Zoological Catalogue of Australia, Volume 1: Amphibia and Reptilia*. Australian Government Publishing Service, Canberra, ACT:313 pp.

Donnellan, S. C., Hutchinson, M. N., Dempsey, P. and Osborne, W. S. 2002. Systematics of the *Egernia whitii* species group (Lacertilia: Scincidae) in south-eastern Australia. *Australian Journal of Zoology* 50:439-459.

Fitzinger, L. 1843. *Systema Reptilium, fasciculus primus, Amblyglossae*. Braumüller et Seidel, Wien:106 pp.

Gardner, M. G., Hugall, A. F., Donnellan, S. C., Hutchinson, M. N. and Foster, R. 2008. Molecular systematics of social skinks: phylogeny and taxonomy of the *Egernia* group (Reptilia: Scincidae). *Zoological Journal of the Linn. Soc.*, 154(4):781-794.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, 2088, Australia:238 pp.

Lacépède, B. G. E. L. 1804. Mémoire sur plusieurs animaux de la Nouvelle- Hollande dont la description n'a pas encore été publiée. *Annales du Mus. Nat. d'Histoire Nat.*, Paris, 4:184-211.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: <http://www.biomedcentral.com/1471-2148/13/93>.

Storr, G. M. 1968. Revision of the *Egernia whitei* species-group (Lacertilia: Scincidae). *J. R. Soc. West. Aust.* 51:51-62.

Wells, R. W. and Wellington, C. R. 1984. A synopsis of the class Reptilia in Australia. *Australian Jour. of Herp.* 1(3-4):73-129.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology Supplementary Series* 1:1-61.

Wilson, S. and Swan, G. 2017. *A complete guide to reptiles of Australia*. (3rd ed.). New Holland, NSW, Australia:647 pp.

CONFLICT OF INTEREST
There are no conflicts of interest in terms of this paper.

Hoser 2018 - Australasian Journal of Herpetology 38:3-5.

TAX INVOICE
Kwik Kopy Printing Box Hill
3/1031 Whitehorse Road
Box Hill VIC 3128
t: 039 899 0833 | f: 039 899 0536
ABN: 65 740 679 782


 Corporate Design
 & Print Solutions
No.26151

CONTACT
Australasian Journal of Herpetology

INVOICE DETAILS
Issue Date: 23/05/2018
Ship Via:

QUANTITY.	DESCRIPTION	VALUE	Ex. GST
50	Australasian Journal of Herpetology Issue 37 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	\$272.27	
50	Australasian Journal of Herpetology Issue 38 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	\$272.27	

RECEIVED BY: _____ **DATE:** _____

Terms: **Please refer to terms & conditions of trade** You can deposit directly into our bank account. E. & O.E All claims and returned goods are to be accompanied by this invoice, and made within 7 days of receipt of goods

SUBTOTAL \$544.54
GST \$54.45
TOTAL \$598.99
AMOUNT DUE \$598.99

CUSTOMER: Australasian Journal of Herp
 INVOICE No.: 26151
 INVOICE Tot.: \$598.99

Something for everyone.

GRAPHIC DESIGN
SCREEN PRINTING
LABEL DESIGN
EMERGENCY SERVICES
DIRECT MAIL
WEBPRINT

REMITTANCE ADVICE: RETURN WITH PAYMENT
 Suechess Pty Ltd | Bank: Westpac | BSB: 033 172 | Acc: 334 219

Method: **VISA MASTERCARD CASH CHEQUE OTHER***

Amount: \$ _____ Date: _____
 Card No.: _____
 Name: _____ Expires: _____ CCV: _____

*see terms of trading for conditions of payment by other methods