

A new species of skink lizard *Calyptotis* De Vis, 1886 from Queensland, Australia (Reptilia: Squamata: Scincidae).

LSIDURN:LSID:ZOOBANK.ORG:PUB:DA98AA88-FE53-44AF-BA21-257D40DB07B9

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Received 2 April 2022, Accepted 12 May 2022, Published 28 June 2022.

ABSTRACT

During a number of field trips to Queensland over a 30 year period, including when living there for a six month stint, morphologically divergent lizards previously identified as putative *Calyptotis lepidorostrum* Greer, 1983 from near Mackay in Queensland were inspected and appeared to be of a different species.

This population appears to have been separated from the main population of *C. lepidorostrum* to the south, by a coastal biogeographical break known as St. Lawrence Gap, just north of Rockhampton in Queensland. Species in the *Lampropholis delicata* (De Vis, 1888) species group were also split by this barrier and were found to be divergent by more than 2.5 MYA (Chapple *et al.* 2011), implying a similar break for the species *Calyptotis lepidorostrum*.

Combining reproductive isolation, ancient divergence and consistent morphological differences, this northern population is formally named *Calyptotis greerae* sp. nov. in recognition of wildlife conservation icon Germaine Greer.

A divergent form of *Calyptotis scutirostrum* (Peters, 1873) from the Bunya Mountains, Queensland, is also formally named as a new subspecies, *C. scutirostrum bunyaensis* subsp. nov..

Keywords: Taxonomy; nomenclature; Australia; Queensland; *Calyptotis*; *lepidorostrum*; Eungella; Crediton; new species; *greerae*; new subspecies; Bunya Mountains; *bunyaensis*.

INTRODUCTION

Commencing 1972 and ongoing, I have made numerous trips across most parts of Queensland and northern New South Wales (Australia) collecting and studying reptiles and frogs specifically, as well as various other wildlife.

Included in this has been a number of collections of sometimes locally common skinks in the genus *Calyptotis* De Vis, 1886 from Queensland and northern New South Wales.

Greer (1983) resurrected the genus *Calyptotis* De Vis, 1886 from the synonymy of *Sphenomorphus* Fitzinger, 1983 for the single species formally named as *Lygosoma scutirostrum* Peters, 1873 (later described by De Vis in 1886 as "*Calyptotis flaviventer*").

He then formally described four other species in the same genus, being, *Calyptotis lepidorostrum* Greer, 1983, *Calyptotis ruficauda* Greer, 1983, *Calyptotis temporalis* Greer, 1983 and *Calyptotis thornonensis* Greer, 1983.

All occur in wetter habitats north of the Hunter Valley in New South Wales, along the coast to the northern wet tropics in North Queensland.

Within this broad area, each species is parapatric to one another, or so it appears, and are distributed along a discrete section of coast and nearby ranges, with the five described forms as follows (from south to north) (taken from Greer 1983):

C. ruficauda Greer, 1983 is restricted to the lowlands of the

central north coast of New South Wales in the area between Brinerville and Moonee Beach in the north and Barrington Guest House and Bulahdelah in the south.

C. scutirostrum (Peters, 1873) is found from an area just northwest of Dorrigo, New South Wales in the south to an area just south of Gympie in south-eastern Queensland and inland to include the Bunya Mountains and the highlands south south-west of Stanthorpe in southern Queensland.

C. lepidorostrum Greer, 1983 is found from the Conondale and Blackall Ranges in south-east Queensland, north to the vicinity of Mackay and Eungella National Park. In the south, the range of this taxon abuts or interdigitates the range of *C. scutirostrum*, while in the north the range of this putative taxon appears to be surrounded by populations of *C. temporalis* Greer, 1983 (see below), which also appear to occupy a large area across the coastal biogeographical break known as St. Lawrence Gap, just north of Rockhampton in Queensland.

C. temporalis Greer, 1983 is found in various locations between Rockhampton in the South and Proserpine in the north, including east of Mackay, Queensland.

C. thornonensis Greer, 1983, still (as of 2022) is only known from Thornton Peak in the northern wet tropics of far north Queensland.

In both fieldwork and inspection of dead specimens after the fact,

I became aware of significant divergence between specimens of putative taxa in various locations, particularly with regard to the isolated northern population of *C. lepidorostrum*, a putative taxon with a type locality of Bulburin State Forest, in South East Queensland, being south of the St. Lawrence Gap.

With this in mind and no known synonym names available for the northern population of *C. lepidorostrum* it was decided to audit the entire genus as conceived by Greer, 1983 and all other publishing authors since, to see if the northern population of *C. lepidorostrum* or any other within the genus warranted taxonomic recognition and at what level.

MATERIALS AND METHODS

Specimens from across the ranges of all relevant putative taxa were inspected.

This included live specimens, dead specimens (mainly those in the Qld Museum inspected during a visit in 2002) and photos with good locality data.

A review of the literature relevant to these species and others affected by the same biogeographical features, including any relevant molecular studies was also conducted, as was a review of past climate and vegetation in the relevant part of Australia.

Literature relevant to the five putative species being audited and the taxonomic conclusions ultimately made, included Chapple *et al.* (2011), Cogger (2014), Cogger *et al.* (1983), Daly and Hoyer (2016), De Vis (1886), Greer (1979, 1983), Hoser (2009), Hutchinson *et al.* (2021), Longman (1916), Müller (1880), O'Shaughnessy (1874), Peters (1874), Pyron *et al.* (2013), Reeder (2003), Ride *et al.* (1999), Singhal *et al.* (2018), Skinner *et al.* (2013), Wells (2002, 2010), Wells and Wellington (1984, 1985) and sources cited therein.

RESULTS

Putative *C. lepidorostrum* from the Eungella and Crediton areas west of Mackay in Queensland were morphologically divergent from those found south of the gap in distribution that coincided with the coastal biogeographical break known as the St. Lawrence Gap, just north of Rockhampton in Queensland.

Within the gap of distribution for putative *C. lepidorostrum* were populations of *C. temporalis* implying that species played a role in separating the two populations of putative *C. lepidorostrum*, which in turn implied that the formation of the St. Lawrence Gap barrier also had something to do with the split and its dating.

In the absence of molecular data on the two populations of putative *C. lepidorostrum*, I looked for alternative evidence to date the split between the two populations.

In their study of putative *Lampropholis delicata* (De Vis, 1888), Chapple *et al.* (2011) found that populations in this species group were also split by the St. Lawrence Gap barrier more than 2.5 MYA.

With *L. delicata sensu lato* being less habitat specific than species within *Calyptotis*, one can only conclude that 2.5 MYA is a minimum divergence time the two populations of putative *C. lepidorostrum*.

Combining reproductive isolation, ancient divergence and consistent morphological differences, this northern population is formally named according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999, as amended online since) as *Calyptotis greerae* sp. nov. in recognition of Australian wildlife conservation icon Germaine Greer.

Putative *Calyptotis scutirostrum* (Peters, 1873) from the Bunya Mountains, Queensland were also identified by Greer as being divergent, including with regards to greater average size of adult females.

This population appears to be physically isolated from others of the same taxon nearer the coast, but in the absence of any dated divergence or means to date the barrier between extant populations, I am loathe to formally name the new taxon at the species level.

Therefore it is formally named herein as new subspecies, being,

C. scutirostrum bunyaensis subsp. nov. with reference to where it occurs.

Referring also to the species "*Lampropholis colossus* Ingram, 1991" endemic to the Bunya Mountains, Queensland, treated herein as properly placed in the genus *Allengreer* Hoser, 2009, it appears to be a divergent form of putative *A. delicata* (De Vis, 1888), which happened to be in an unnamed species-level clade of the taxon, based on the phylogeny of Chapple *et al.* (2011). 4 groups within that unnamed clade all appeared to diverge from one another about 2 MYA and in turn from other named clades at least 3.5 MYA.

The claim of by Wilson (2015) of *A. colossus* that it is "*Status uncertain; possibly outlying pop. of L. delicata*" while more-or-less correct at the time, can be amended to read that it is a valid species, allied to *A. delicata*, but divergent by some millions of years.

Based on the above, *C. scutirostrum bunyaensis* subsp. nov. may be too conservative a placement and formal species-level recognition may be appropriate at a future date.

NOTES IN TERMS OF THE FOLLOWING FORMAL DESCRIPTIONS

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as are relevant staff at museums who made specimens and records available in line with international obligations (in this case Jeanette Covacevich and Patrick Couper, for the Queensland Museum, Brisbane, Australia, Ken Aplin at the Australian National Wildlife Collection in Canberra, ACT, Australia as well as Allen Greer and Ross Sadlier for the Australian Museum, Sydney, Australia).

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature (ICZN), (see Article 32.5.1 of the *International Code of Zoological Nomenclature*, Ride *et al.* 1999). This includes if Latinisation is wrong, apparent spelling mistakes and so on.

Any online citations within this paper, including copied emails and the like, are not as a rule cited in the references part of this paper and have the same most recent viewing and checking date of 6 May 2022 (at which time they were still online as cited).

Unless otherwise stated explicitly, colour and other descriptions apply to living adult specimens of generally good health, as seen by day and not under any form of stress by means such as excessive cool, heat, dehydration, excessive ageing, abnormal skin or reaction to chemical or other input

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant genera, subgenera, species or subspecies has already been spelt out and/or is done so within each formal description and does not rely on material within publications not explicitly cited herein.

CALYPTOTIS GREERAE SP. NOV.

LSIDurn:lsid:zoobank.org:act:5A2F942E-BCF2-4EE3-A4EA-FEA580491EBC

Holotype: A preserved adult specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number J32735 collected from Crediton, Queensland, Australia, Latitude -21.216667 S., Longitude 148.566667 E.

This government-owned facility allows access to its holdings.

Paratypes: The following 21 specimens in the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers J 32653-32655, 32671, 32673, 32707-32716, 32721-32722, 32734, 32736-32738 all collected from Crediton, Queensland, Australia, Latitude -21.216667 S., Longitude 148.566667 E, and a preserved specimen at the Australian Museum, Sydney, New

South Wales, Australia, specimen number R 59244, collected from the Eungella Area, Queensland, Australia.

Diagnosis: Until now, *Calyptotis greerae* sp. nov. has been treated as a northern population of *C. lepidorostrum* Greer, 1983, which it would otherwise key as using the key in Greer (1983).

Live adult specimens of *Calyptotis greerae* sp. nov. are readily separated from *C. lepidorostrum* by the following suite of characters:

1/ Black on the anterior tips of some of the scales are expanded to form three continuous and unbroken jagged edged lines running down the back, versus black on scale tips not expanded, thereby forming three lines of dots running down the back (in *C. lepidorostrum*);

2/ There are no obvious white flecks on the flanks, or if present, only on the upper part of the anterior flank, versus obvious white flecks on the flanks, or rarely an excess of white marbling on the flanks (in *C. lepidorostrum*);

3/ Half or most of the upper surfaces of the anterior limbs are dark or with mainly dark mottling, versus mainly light and with scattered dark flecks (in *C. lepidorostrum*).

Both *Calyptotis greerae* sp. nov. and *C. lepidorostrum* are separated from the other five species in the genus by the following unique suite of characters:

External ear indicated by a shallow auditory meatus (meaning in this case a conical depression) and a scaleless tympanum; head and body relatively deep; postorbital bone present; prefrontals present (from Greer, 1983).

Calyptotis De Vis, 1886 are separated from all other Australian skinks by the following suite of characters: palatal rami of pterygoids roughly triangular in shape (narrow anteriorly and broad posteriorly) and separated to varying degrees by posteriorly extending processes from posteromedial corners; phalanges in fourth toe of manus four; postmental in contact with only one infralabial; loreal single; and fourth supralabial subocular; small adult size (maximum SVL 59 mm or less); low number

of longitudinal scale rows at midbody (19-24); and bright coral pink to red colour on the ventral surfaces of the posterior part of the body and the tail (modified from Greer, 1983).

Calyptotis lepidorostrum, with a type locality of Bulburin State Forest, in South East Queensland, being south of the St. Lawrence Gap, is herein confined to the region south of this biogeographical barrier (being situated just north of Rockhampton, Queensland).

C. greerae sp. nov. is found north of here, currently only known from the vicinity of the where the type and paratype specimens come from, being the hills west of Mackay, Queensland.

Calyptotis lepidorostrum is depicted in life in Cogger (2014) on page 422 at bottom and Wilson (2015), page 96 bottom and online at:

<https://www.wesreadphotography.com/calyptotis/lepidorostrum>

and <https://www.inaturalist.org/observations/105389941>

and <https://www.inaturalist.org/observations/66688232>

C. greerae sp. nov. is depicted online at:

<https://arod.com.au/arod/reptilia/Squamata/Scincidae/Calyptotis/lepidorostrum>

and <https://cqclandcarenetwork.org.au/wildlife/cone-eared-calyptotis/>

and <https://www.flickr.com/photos/smacdonald/6409493009>

Distribution: *C. greerae* sp. nov. is found north of the St. Lawrence Gap, biogeographical barrier (being situated just north of Rockhampton, Queensland), but currently is only definitively known from the Eungella/Crediton hills, west of Mackay, Queensland.

Specimens from Mount Abbott, west of Bowen, Queensland

(north of the type localities) are also referred to this newly named species.

Calyptotis lepidorostrum, with a type locality of Bulburin State Forest, in South East Queensland, being south of the St. Lawrence Gap, is herein confined to the region south of this biogeographical barrier (being situated just north of Rockhampton, Queensland). It is found from Rockhampton, south to the Gold Coast hinterland hills.

Etymology: *C. greerae* sp. nov. is named in honour of Germaine Greer, born in Melbourne, Australia on 29 January 1939, in recognition of her contribution to wildlife conservation. This is best known in terms of when she correctly pointed out that the death of the late Steve Irwin was a direct consequence of his non-stop acts of animal abuse and cruelty for television audiences in his taxpayer funded mocked-up "reality TV" shows (Greer 2006).

Greer correctly pointed out that it was inevitable that Steve Irwin's non-stop assault of innocuous animals would eventually lead to one or more of them fighting back and with potentially fatal consequences.

Steve Irwin was a police-protected criminal and law-breaker who made millions of dollars for his family business, including via hand outs from governments for sham charities he operated, government funded TV appearances and the like.

His widow, Teri Irwin has publicly admitted that their zoo business only survived as a result of government largesse.

Steve Irwin aggressively campaigned against wildlife conservation groups for many years in return for cash hand outs from governments, government departments and businesses involved in habitat destruction.

This included his active support for the construction of the \$2 billion Traveston dam across the Mary River, that if built may well have caused the extinction of the Mary River Turtle *Elusor macrurus* Cann and Legler, 1994, being a species endemic to this drainage.

In return for this support for the project, Irwin and/or his business got yet more massive government hand-outs and gifts hidden in the form of highly paid government advertising contracts and non-prosecution for a number of serious criminal, wildlife and animal cruelty offences.

CALYPTOTIS SCUTIROSTRUM BUNYAENSIS SUBSP. NOV.
LSIDurn:lsid:zoobank.org:act:17B83265-C3C3-4215-B9DC-EE9C8A8E23B8

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number QM J12188 collected from Marlaybrook, Bunya Mountains National Park, Queensland, Australia, Latitude -26.883333 S., Longitude 151.616667 E.

This government-owned facility allows access to its holdings.

Paratypes: 1/ Eight preserved specimens at the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R 17702-17707, 21279 and 26148 all collected from Marlaybrook, Bunya Mountains National Park, Queensland, Australia, Latitude -26.883333 S., Longitude 151.616667 E.

2/ Two preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers J12189 and J23932 both collected from Marlaybrook, Bunya Mountains National Park, Queensland, Australia, Latitude -26.883333 S., Longitude 151.616667 E.

Diagnosis: The subspecies *Calyptotis scutirostrum bunyaensis* subsp. nov. is confined to the Bunya Mountains and the immediate surrounds. Nominate *Calyptotis scutirostrum scutirostrum* (Peters, 1873) occupies the rest of the range of this species throughout its known distribution in south-east Queensland and nearby north-east New South Wales.

In more detail, *C. scutirostrum* (Peters, 1873) is found from an area just northwest of Dorrigo, New South Wales to an area just south of Gympie in south-eastern Queensland and inland to include the Bunya Mountains and the highlands south south-west

of Stanthorpe in southern Queensland.

Nominate *C. scutirostrum* and *C. scutirostrum bunyaensis* subsp. nov. are separated as follows:

C. scutirostrum have distinctive white or yellowish barring on the upper labials. In *C. scutirostrum bunyaensis* subsp. nov. this barring is reduced to become tiny white spots only.

C. scutirostrum have distinctive rows of white spots or marbling along the upper flanks, whereas in *C. scutirostrum bunyaensis* subsp. nov. only the top row is distinctive, with all lower areas having the spotting being diffuse to the point of being like peppering instead.

Greer (1983) also noted:

"In addition to the sexual dimorphism in size, there is also some geographic variation that is interesting. The animals in the Bunya Mountains, for example, seem to reach a larger size than animals from elsewhere. This is evidenced by the fact that out of 261 specimens from throughout the range of *C. scutirostrum* exclusive of the Bunya Mountains, only one (AM R 57553 from Wilson's Peak, SE Queensland) attained a SVL of 54 mm, whereas seven of the 17 specimens from the Bunya Mountains measured 54-59 mm SVL."

Both *C. scutirostrum scutirostrum* (Peters, 1873) and the subspecies *C. scutirostrum bunyaensis* subsp. nov. can be separated from all other members of the genus *Calyptotis* De Vis, 1886 are separated from the other six species in the genus (including *Calyptotis greerae* sp. nov. as formally described in this paper) by the following unique suite of characters:

External ear indicated by a shallow auditory meatus (meaning in this case a conical depression) and a scaleless tympanum; head and body relatively deep; postorbital bone present; prefrontals present (from Greer, 1983).

Calyptotis De Vis, 1886 are separated from all other Australian skinks by the following suite of characters: palatal rami of pterygoids roughly triangular in shape (narrow anteriorly and broad posteriorly) and separated to varying degrees by posteriorly extending processes from posteromedial corners; phalanges in fourth toe of manus four; postmental in contact with only one infralabial; loreal single; and fourth supralabial subocular; small adult size (maximum SVL 59 mm or less); low number

of longitudinal scale rows at midbody (19-24); and bright coral pink to red colour on the ventral surfaces of the posterior part of the body and the tail (modified from Greer, 1983).

Photos of *C. scutirostrum bunyaensis* subsp. nov. in life can be found online at:

<https://www.inaturalist.org/observations/106904031>

and

<https://www.inaturalist.org/observations/84192936>

and

<https://www.inaturalist.org/observations/49299330>

Photos of *C. scutirostrum scutirostrum* (Peters, 1873) in life can be seen in Cogger (2014) on page 424 bottom and Wilson (2015) on page 96 bottom right and online at:

<https://www.inaturalist.org/observations/34903190>

Chapple *et al.* (2011) found a divergence of about 2 MYA for putative "*Lampropholis delicata*" from Bunya Mountains in terms of their nearest relatives from the Conondale National Park, Queensland, being about 120 km straight line distance away. While there are populations of the same putative species from intermediate ranges, these appear morphologically most similar to those from further east, indicating the Bunya Ranges as a zone of isolation for both putative "*Lampropholis delicata*" and *C. scutirostrum*.

While 2 MYA and breeding isolation is normally deemed species-level divergence, I have taken the conservative step here and formally described this new taxon as a subspecies.

Elevation to full species may be appropriate following a wide sampling of the genetics of the relevant taxa.

Distribution: *C. scutirostrum bunyaensis* subsp. nov. is believed to be endemic to the Bunya Mountains in south-east Queensland, Australia and immediately adjacent foothills, being restricted here by drier areas away from the hills, either by way of habitat constraints or competing species.

Etymology: *C. scutirostrum bunyaensis* subsp. nov. is named in reflection of where it occurs and the type locality, being in the area of the Bunya Mountains, South-east Queensland, Australia.

Conservation: *C. scutirostrum bunyaensis* subsp. nov. is not believed to be under any existential threat, however the relevant comments of Hoser (1989, 1991, 1993, 1996, 2007, 2019a, 2019b apply).

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CONFLICT OF INTEREST

None.

Cite this paper as:

Hoser, R. T. 2022. A new species of skink lizard *Calyptotis De Vis*, 1886 from Queensland, Australia (Reptilia: Squamata: Scincidae). *Australasian Journal of Herpetology* 58:16-20.

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50	Australasian Journal of Herpetology Issue 57 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	\$302.27
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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.

SUB-TOTAL	\$604.54
G.S.T	\$60.45
TOTAL	\$664.99
AMOUNT DUE	\$664.99

REMITTANCE ADVICE: RETURN WITH PAYMENT
Suechess Pty Ltd | Bank: Westpac | BSB: 933 172 | Acc: 334 219

Method: VISA MASTERCARD CASH CHEQUE OTHER*
Amount: \$ _____ Date: _____
Card No.: _____
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Expires: _____ CCV: _____

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