

THE GENUS *CARLIA* (LACERTILIA, SCINCIDAE) IN WESTERN AUSTRALIA AND NORTHERN TERRITORY

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ABSTRACT

The eight species and subspecies of *Carlia* known from Western Australia and the Northern Territory are defined and keyed, viz. *C. fusca fusca* (Duméril & Bibron), *C. foliorum* (De Vis), *C. rufilatus* nov., *C. gracilis* nov., *C. triacantha* (Mitchell), *C. amax* nov., *C. johnstonei johnstonei* nov., and *C. johnstonei grandensis* nov.

INTRODUCTION

The morphological gap between species of *Carlia* is much smaller than usual in congeneric lizards. Long series are therefore needed for distinguishing individual from interspecific variation. Earlier workers, such as Macleay (1878) and De Vis (1885), underestimating individual variation, were liable to describe certain species several times, e.g. *C. fusca*. More recently Loveridge (1934) and Mitchell (1953) were inclined to make the opposite error and include several species under a single name, e.g. *C. pectoralis*.

Until the last few years the material for such a paper as this was grossly inadequate. As late as 1961, when he was revising the lizards of Western Australia, Glauert had only three specimens of *Carlia*. Since then many hundreds of specimens have been collected in the Kimberley Division by the Western Australian Museum. Our smaller Northern Territory collection has been augmented by generous loans from other institutions.

Specimens in the Western Australian Museum are cited without prefix. The registered numbers of borrowed specimens are prefixed with the initials of the collection: QM (Queensland Museum), AM (Australian Museum, Sydney), NMV (National Museum of Victoria), SAM (South Australian Museum), JSE (British Joint Services Expedition to Central Australia), NTM (Northern Territory Administration, Alice Springs), and NTR (CSIRO Division of Wildlife Research, Darwin). For the loan of these specimens I am indebted respectively to Miss J. Covacevich, Dr H.G. Cogger, Mr A.J. Coventry, Dr T.F. Houston, Lt Cdr A.Y. Norris, Mr D. Howe, and Mr J. Wombey. I am grateful to Mr Glen Ingram of Brisbane for the donation of Queensland material and for much information on Queensland species of *Carlia*, and to Messrs L.A. Smith and R.E. Johnstone for descriptions and photographs of live Kimberley specimens.

The characters used in this paper are snout-vent length, length of tail, keeling of nuchals and mid-dorsals, contact or separation of prefrontals, number of supraciliaries, relative size of palpebral disc, size and shape of ear aperture and ear lobules, number of midbody scale rows, number of lamellae under fourth toe, and coloration (including that of breeding male). 'Smooth' in this paper means without keels or striae.

Genus *Carlia*

Heteropus Duméril & Bibron, 1839, *Erpétologie générale* 5: 757. Based on *H. fuscus* and *H. peronii* Duméril & Bibron, not *Heteropus* Fitzinger.

Carlia Gray, 1845, *Catalogue of the specimens of lizards in the collection of the British Museum*, p. 271. Type-species (by monotypy): *C. melanopogon* Gray.

Myophila De Vis, 1885, *Proc. Roy. Soc. Qd* 1: 77. Type-species (by monotypy): *M. vivax* De Vis.

Lygisaurus De Vis, *ibid.* Type-species (by monotypy): *L. foliorum* De Vis.

Small terrestrial scincid lizards with digits 4 + 5; lower eyelid movable and bearing a transparent disc; dorsal and lateral scales keeled in most species; ear aperture usually margined with lobules; no supranasal or postnasal; prefrontals well developed but usually separated; supraoculars 4, first 2 in contact with frontal; supraciliaries low, usually 5-7; frontoparietals fused; interparietal small and free, except in *rhomboidalis* and some *fusca* (where fused to frontoparietals); usually one pair of nuchals; loreals 2, in horizontal series; labials normally 7, fifth subocular and much the largest; ventral scales and subdigital lamellae smooth.

Numerous species (many of them undescribed) in northern and eastern Australia, New Guinea, the Moluccas and Timor, with centre of abundance apparently in North Queensland.

KEY

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|--|-----|-----|-----|-----|-----|-----|-----|-----|--------------------|
| 1. Mid-dorsal scales smooth or tristriate | ... | ... | ... | ... | ... | ... | ... | ... | 2 |
| Mid-dorsal scales keeled | ... | ... | ... | ... | ... | ... | ... | ... | 3 |
| 2. Ear aperture not smaller than palpebral disc, vertically elongate with long acute lobules on anterior margin; dorsally and laterally dark brown without pattern | ... | ... | ... | ... | ... | ... | ... | ... | <i>fusca fusca</i> |
| Ear aperture much smaller than palpebral disc, horizontally elongate, with or without a short lobule on anterior margin; dorsally and laterally olive with a white line from under eye to top of ear aperture and backward from bottom of ear aperture | ... | ... | ... | ... | ... | ... | ... | ... | <i>foliorum</i> |

3. Mid-dorsal scales tricarinate 4
 Mid-dorsal scales bicarinate 8
4. Ear aperture not smaller than palpebral disc, vertically elongate with long acute lobules on anterior margin; mid-dorsal keels very weak *fusca fusca*
 Ear aperture smaller than palpebral disc, circular or horizontally elongate, with no long acute lobules; mid-dorsal keels very weak to strong 5
5. Ear aperture circular with a lobule on anterior margin and several shorter and sharper lobules around remainder of aperture; mid-dorsals tricuspidate, moderately to strongly keeled, not well aligned longitudinally; prefrontals usually forming a median suture; snout-vent length up to 52 mm *triacantha*
 Ear aperture horizontally elongate, with or without a very small lobule anteriorly and minute lobules elsewhere; mid-dorsals seldom tricuspidate, very weakly to moderately strongly keeled, moderately to very well aligned longitudinally; prefrontals rarely forming a median suture; snout-vent length up to 44 mm 6
6. Palpebral disc occupying not much more than half of eyelid; no white stripe from lores to ear aperture; nuchals usually striate or weakly keeled *gracilis*
 Palpebral disc occupying much more than half of eyelid; a white line or pale stripe from under eye to top of ear aperture and sometimes back for varying distances from bottom of ear aperture; nuchals smooth 7
7. Mid-dorsal keels very weak; white stripe on side of face and body narrow and well defined; supraciliaries usually 5 (except in North Kimberley, where usually 6 or 7) *foliorum*
 Mid-dorsal keels weak to moderately strong; pale stripe on side of head and body broad and often ill defined; supraciliaries usually 7 (except in Kimberley, where usually 6) *rufilatus*
8. Ear aperture not much smaller than palpebral disc, circular or vertically elongate, with a moderately large acute lobule on anterior margin and several small acute lobules around remainder of aperture; supraciliaries usually 7; midbody scale rows usually 34 or more *johnstonei johnstonei*

Ear aperture much smaller than palpebral disc, horizontally elongate, with a lobule on anterior margin and usually none on other margins (occasionally one or two minute lobules posteriorly in *amax*); supraciliaries usually 6; mid-body scale rows usually 32 or fewer 9

9. Side of body black flecked white; under surface greyish, chin and throat scales broadly edged with black *johnstonei grandensis*

Side of body brown; under surface whitish *amax*

Carlia fusca fusca

Heteropus fuscus Duméril & Bibron, 1839, *Erpétologie générale* 5: 759. Islands of Waigiou and Rawack (Quoy & Gaimard).

Diagnosis

A large *Carlia* with mid-dorsal scales tristriate or very weakly tricarinate; distinguishable from *C. foliorum* and *C. rufilatus* by its large, vertically elongate (rather than small, horizontally elongate) ear aperture, margined anteriorly with large acute (rather than small obtuse) lobules.

Distribution

Far north-east of Northern Territory (north-east Arnhem Land and Groote Eylandt). Extralimital in western New Guinea.

Description

Snout-vent length (mm): 39-57 (N=3). Tail (%SVL): 174-192 (N=2).

Prefrontals separated. Supraciliaries 7. Ear aperture as large as or slightly larger than palpebral disc, margined anteriorly with 3 long acute lobules and elsewhere with short acute lobules. Nuchals smooth. Midbody scale rows 32-36. Lamellae under fourth toe 27-29.

Dorsally and laterally dark brown without pattern.

Remarks

I follow Mitchell (1953: 77) in allotting this population to the nominate subspecies of *C. fusca*. For a description of this subspecies based on adequate material, see Mitchell (*supra cit.*).

Material

Northern Territory: Yirkala (AM 12093); Groote Eylandt (AM 25782-3).

Carlia foliorum

Mocoo melanopogon Gray, 1845, Catalogue of the specimens of lizards in the collection of the British Museum, p.81. Port Essington, Northern Territory (John Gilbert). [Name rejected by Boulenger (1887: 288) as secondary homonym of *Lygosoma melanopogon* Duméril & Bibron.]

Lygisaurus foliorum De Vis, 1885, Proc. Roy. Soc. Qd 1: 77. Brisbane, Queensland (H. Tryon).

Heteropus mundus De Vis, 1885, Proc. Roy. Soc. Qd 1: 172. Warro, Port Curtis, Queensland (F.A. Blackman).

Diagnosis

A small *Carlia* with mid-dorsal scales smooth, tristriate or very weakly tricarinate, a white line from below eye to top of ear aperture and a white line for varying distances back from bottom of ear aperture. Further distinguishable from *C. fusca* by its much smaller ear aperture and lobules. Very similar to *C. rufilatus* but differing in its flatter head, smoother scales, narrower and better defined white line on side of head, neck and body, and in Northern Territory by fewer supraciliaries (usually 5 vs usually 7).

Distribution

Northern half of Western Australia south to the Cape Range, Hamersley Range and Mundiwindi; also Sir Graham Moore Island. Northern Territory south to lat. 21°S; also Bathurst and Melville Islands. Extralimital in Queensland.

Description

Snout-vent length (mm): 19-44 (N=130, mean 35.2). Tail (%SVL): 122-186 (N=34, mean 158).

Prefrontals usually separated, rarely forming a median suture. Supraciliaries 5-7 (N=125, mean 5.4), mostly 6 or 7 in North Kimberley, mostly 5 elsewhere. Ear aperture much smaller than palpebral disc, horizontally elongate, usually with a small lobule anteriorly and occasionally still smaller lobules elsewhere. Nuchals smooth. Midbody scale rows 27-34, mostly 30 (N=105, mean 30.1). Lamellae under fourth toe 19-30 (N=104, mean 25.3).

Dorsally and laterally olive, dotted with black and occasionally with white. White line extending from under eye to top of ear aperture margined above by black line, and white line from bottom of ear aperture back for varying distances (at one extreme failing to reach foreleg, at other extreme reaching nearly to hindleg). In breeding male top of head darkening and face, chin and throat becoming black (especially on edges of scales).

Remarks

Despite its ranging over half a continent, *C. foliorum* undergoes little geographic variation. Perhaps it has only recently spread into the Northern Territory and Western Australia and is now replacing the closely related *C. rufilatus*.

Material

Kimberley Division (W.A.): Sir Graham Moore Island (44013); Kalumburu

(43543-5, 44467-8, 44494, 44496-9, 44505); Crystal Creek (43100); Mitchell Plateau, including Surveyors Pool (43141, 43519-22, 44262); 8 km NE of Mitchell River HS (43248); Port George IV (NMV D2362); 18 km E of Kuri Bay (40427); Manning Creek (32306); Ninbing (27922); 6 km W of Kununurra (44523-4); Lake Argyle and vicinity (42766-9, 42771-2, 42777, 42797-9, 42812-6, 42906-8).

North-west Division (W.A.): Pilgagnoorra Well (SAM 3446a-b); Shothole Canyon, Cape Range (17000); Millstream (34745); 16 km N of Tambrey (45027-8, 45035); near Tom Price (31013); Weeli Wolli, Marillana (26715).

Northern Territory: Bathurst Island (NMV D1653, 1655-7, 1659-64); Melville Island (NMV D5240, 5243, 5245, 5259); Port Essington (31179); King River (NMV D1646-7); Darwin (NMV D5686-7, 8216-8); Oenpelli (32256-9); Woolwonga Reserve (AM 38840); Koongarra, Mt Brockman Range (AM 38814, 38828); Murrakai (NTM 4598); Batchelor (37126); El Sherana (SAM 6223-5); 27 km S of Pine Creek (23196-8); Katherine (19896-9, 21582-5, 21924-8); Timber Creek (NMV D10779); Roper River (SAM 1131); Groote Eylandt (SAM 1116; AM 9719a-d, 9720a-e); Bing Bong (SAM 13540); Borroloola (NMV D5091, 5093, 5106-11, 5113, 5194); Newcastle Waters (NTM 5367); 6 km E of Tennant Creek (SAM 13537); 42 km SW of Wauchope (24324); 'Northern Territory' (NMV D2212, 4558); Dryfield Creek (NMV D5133).



Fig. 1. Map of Western Australia and Northern Territory showing location of specimens of *Carlia foliorum*.

Carlia rufilatus sp. nov.

Holotype

R23271 in Western Australian Museum, collected by G.M. Storr and A.M. Douglas on 14 September 1964 at Tumbling Waters, Northern Territory, in 12°46'S, 130°57'E.

Diagnosis

A small *Carlia* with mid-dorsal scales weakly to moderately tricarinate and moderately regular in alignment; distinguishable from *C. foliorum* by stronger dorsal keels and broader, fainter, less extensive white stripe on side of head and body; and distinguishable from *C. gracilis* by larger palpebral disc and broader, more depressed, less cylindrical body. Further distinguishable in Northern Territory from *C. foliorum* and *C. gracilis* by more numerous supraciliaries (usually 7 vs usually 5).

Distribution

Wet north-west corner of Northern Territory in vicinity of Darwin. Far north of Western Australia (East and West Kimberley).

Description

Snout-vent length (mm): 28-42 (N=39, mean 36.3). Tail (% SVL): 120-184 (N=18, mean 159).

Prefrontals usually separated (forming a median suture in one specimen). Supraciliaries in Northern Territory usually 7, occasionally 6 (N=25, mean 6.9); in Western Australia 5-7, mostly 6 (N=10, mean 6.2). Palpebral disc large. Ear aperture much smaller than palpebral disc, longer axis horizontal, with or without a very small lobule anteriorly. Nuchals smooth. Midbody scale rows 28-32 (N=27, mean 30.1). Lamellae under fourth toe: in Northern Territory 24-31 (N=23, mean 26.8); in Western Australia 21-27 (N=10, mean 23.3).

Dorsally and laterally dark olive or dark brown, back dotted with black. Whitish stripe from under eye to top of ear aperture, and occasionally from bottom of ear aperture to foreleg, but stripes often faint or reduced to a remnant in vicinity of ear. In breeding male a red midlateral stripe.

Geographic variation

The isolated Kimberley populations, as described above, differ from the Northern Territory population in having fewer supraciliaries and subdigital lamellae.

Remarks

This seems to be a dying species, surviving only where the widespread *C. foliorum* is scarce or absent.

Paratypes

Northern Territory: Gunn Point (NTR, 10 unnumbered specimens); Darwin, including Rapid Creek and Berrimah (23312, 23315, 23512-6, 32234-5; NTR 249; QM J2619-20, 7789); Tapa Bay, Cox Peninsula (NTR 216-7); 'Northern Territory' (SAM 5367a-c, 5367e).

Western Australia: Cockatoo Springs, 37 km SE of Kununurra (23115-24); Derby (45025-6).

Carlia gracilis sp. nov.

Holotype

R43219 in Western Australian Museum, collected on 14 January 1973 by Messrs L.A. Smith and R.E. Johnstone at Mitchell Plateau, Western Australia, in 14°52'S, 125°50'E.

Diagnosis

A small slender *Carlia* with mid-dorsal scales tricarinate and very regular in longitudinal alignment; distinguishable from *C. rufilatus* by its smaller palpebral disc, absence of white stripe from lores to ear aperture, nuchals usually striate or weakly keeled (rather than smooth), stronger dorsal keels, and fewer supraciliaries (usually 5 rather than usually 7).

Distribution

Far north of Western Australia (North Kimberley south to Mitchell Plateau and east nearly to Wyndham). Far north of Northern Territory south to the Roper River; also Melville Island.

Description

Snout-vent length (mm): 18-41 (N=143, mean 34.0). Tail (%SVL): 123-195 (N=41, mean 161).

Prefrontals usually separated (just touching in one specimen, forming a median suture in two specimens). Supraciliaries usually 5 (90% of specimens), occasionally 6, rarely 7 (N=140, mean 5.1). Palpebral disc small (occupying not much more than half of lower eyelid). Ear aperture usually smaller than palpebral disc, longer axis usually horizontal, with 0-3 (usually one) very small lobule anteriorly. Midbody scale rows 24-32, mostly 28-30 (N=129, mean 28.3), mid-dorsally with three moderately strong keels, each triad of keels widely separated from those of laterally adjacent scales (as depicted for *C. pectoralis* by Mitchell, 1953: 87, fig. 3b). Lamellae under fourth toe 19-27 (N=122, mean 23.2).

In Kimberley dorsally and laterally brown or grey, becoming blackish brown on head, face and temples and anterior third of dorsal scales; in breeding male foreleg and anterior half of flanks coppery. In Northern Territory ground colour more coppery and lateral pattern better developed — usually a small streak of white on upper margin of ear aperture occasionally extending forward as a faint subocular line, and less commonly a faint whitish midlateral stripe.

Paratypes

Kimberley Division (W.A.): Kalumburu (13911, 31257, 40477-8, 44469, 44471-4, 44478-9, 44482, 44486-9, 44492, 44500-4); Surveyors Pool, Mitchell Plateau (43133); King River, 14 km S of Wyndham (34596-8).

Northern Territory: Melville Island (NMV D5257); King River (NMV D6142-4); Yirrkala (AM 12715a-h); Gunn Point (NTR 2-5); Charles Point (NMV D4327); Darwin, including East Point, Rapid Creek and Casuarina Beach (23434-40, 23482-99, 23529-30, 40299-301; NTR 2224-6); Fogg Dam, Humpty Doo (NTR 198); Beatrice Hill (NTM 1603-5); Tortilla Flats, ca 100 km SSE of Darwin (AM 38685); Marrakai (NTM 4599-4604, 5477);

Woolwonga Reserve (AM 38833-7, 38839); Boroalba Creek (AM 40009-10, 40138); Nourlangie Rock (AM 39993); Koongarra (AM 38822-3, 38830, 38832); Cannon Hill (AM 39881); Oenpelli (32255); Coomalie Creek (23759); 11 km N of Adelaide River (24002); 13 km S of Adelaide River (NTR 341); 26 km NE of Pine Creek (23204); Red Lily Lagoon, Daly River (34612-26); upper Roper River (NMV D5137-9, 5141 6); Dryfield Creek (NMV D5130-2, 5134-5), 'Northern Territory' (SAM 5367d).

Carlia triacantha

Leiopisma triacantha Mitchell, 1953, Rec. South Aust. Mus. 11: 88.
Adelaide River, Northern Territory (R.V. Southcott).

Diagnosis

A moderately large and robust *Carlia* with prefrontals usually forming a median suture and mid-dorsal scales irregular in alignment, usually tricarinate, and tending to be tricuspitate; further distinguishable from *C. gracilis* by its larger palpebral disc, larger and more circular ear aperture, and sharper and more numerous ear lobules.

Distribution

Western Australia north of lat. 23°S; including many continental islands from Sir Graham Moore south-west to Barrow. Greater part of the Northern Territory.



Fig. 2. Map of Western Australia and Northern Territory showing location of specimens of *Carlia triacantha*.

Description

Snout-vent length (mm): 21-52 (N=139, mean 39.4). Tail (%SVL): 121-244 (N=66, mean 181).

Prefrontals forming a median suture (90% of specimens), just touching (1%) or narrowly separated (9%). Supraciliaries 4-7, mostly 6 (N=120, mean 5.8). Ear aperture smaller than palpebral disc, usually circular, a lobule on anterior margin and several (up to 8) smaller, more acute lobules around remainder of aperture. Nuchals striate or weakly keeled, occasionally smooth. Midbody scale rows 28-36, mostly 32 (N=108, mean 32.3). Lamellae under fourth toe 21-30 (N=119, mean 25.0).

Head brown; back and tail greyish brown, thickly dotted with greyish black, dots more prominent on tail and tending to align. In breeding male head and face shining coppery green, back bluish grey, lower flanks anteriorly red.

Material

Kimberley Division (W.A.): Sir Graham Moore Island (44014, 44058-60); Kalumburu (27926-34, 40504, 43546, 44470, 44475-6, 44480-1, 44483-5, 44490-1, 44493); King Edward River (28197-202, 28207, 28225-7); South-west Osborne Island (44115, 44118); South-east Osborne Island (44119); Crystal Creek (43082-99); Mitchell Plateau (43240-3, 44270); Boongaree Island (44099); Bigge Island (41448, 41454); Coronation Islands (41417-8); St Andrew Island (44145); Augustus Island (41503); Heywood Islands (40454, 41375-6, 41378, 41381-4); Champagny Island (41436); 18 km E of Kuri Bay (40428); Uwins Island (44128-30); Koolan Island (27921, 45012-4); 11 km SE of Wyndham (23093); Parry Creek (44056); 37 km ESE of Wyndham (23100-2); Lake Argyle (42770, 42775-6, 42817-8, 42828-9, 44507-12, 44514-6, 44520-2); Inglis Gap (27925); Frazier Downs (27917, 27919).

North-west Division (W.A.): Barrow Island (45413, 45731); Hooley 34729).

Eastern Division (W.A.): Pollock Hills (45178).

Northern Territory: Gunn Point (NTR, 2 specimens); Darwin (32336-8; NMV D4680; NTR 288; QM J13690-1); 48 km S of Darwin (37149); Stapleton (NMV D1217); 33 km S of Adelaide River (23778, 37115); 5 km NW of Pine Creek (23219, 23783); Eva Valley (NTR 125); 20 km E of Katherine (NMV D10760); Balbirini (16° 41'S, 135° 30'E) (NTM 5621-2); Kintore Range (23° 21'S, 129° 23'E) (JSE 243, 256a-b); Mt Olga (JSE 83a-b).

Carlia amax sp. nov.

Holotype

R43350 in Western Australian Museum, collected on 22 February 1973 by Messrs L.A. Smith and R.E. Johnstone at Mitchell Plateau, Western Australia, in 14° 52'S, 125° 50'E.

Diagnosis

A small *Carlia* with mid-dorsal scales bicarinate, distinguishable from *C.j. johnstonei* by its much smaller ear aperture with fewer lobules, fewer rows of midbody scales (mostly 30-32 rather than mostly 34-38) and fewer supraciliaries (usually 6 rather than usually 7), and from *C.j. grandensis* by its much paler coloration.

Distribution

Far north of Western Australia south to lat. 16°30'S; also Heywood, Wood and Koolan Islands. Far north and north-east of the Northern Territory south to the watershed between the Gulf of Carpentaria and the Barkly Tableland; also Groote Eylandt, Maria Island and the Sir Edward Pellew Group.



Fig. 3. Map of part of Western Australia and Northern Territory showing location of specimens of *Carlia amax*.

Description

Snout-vent length (mm): 17-40 (N=111, mean 32.5). Length of tail (% SVL): 111-187 (N=47, mean 147).

Prefrontals narrowly separated or forming a median suture. Supraciliaries 6 (occasionally 5 or 7, rarely 8). Upper ciliaries partly hidden under brow. Ear aperture much smaller than palpebral disc, longer axis horizontal, usually a very small lobule on anterior margin, occasionally one or two minute lobules on other margins. Nuchals striate or weakly keeled. Mid-body scale rows 26-35, mostly 30-32 (N=83, mean 30.9), mid-dorsally bicuspidate with two strong mucronate keels, keels not well aligned longitudinally. Lamellae under fourth toe 19-28 (N=91, mean 22.7).

Dorsally and laterally dark brown, without pattern, except occasionally

for a fine greenish white line under eye and white edging to ear aperture. In breeding male head becoming coppery and back greyish.

Geographic variation

Kimberley specimens differ from Northern Territory specimens in the higher frequency of contiguous prefrontals (55 vs 16% of individuals) and in having fewer subdigital lamellae (mean 21.3 vs 23.0).

Remarks

This species is named after the Amax (Bauxite) Corporation, whose hospitality enabled my colleagues Lawrence A. Smith and Ronald E. Johnstone to spend six weeks on the Mitchell Plateau during the wet season of 1972-3.

Mitchell (1953: 85) included this species in *C. vivax* of Queensland. However, *C. vivax* differs from *C. amax* in having:

- (1) a ridged back (i.e. body tending to be triangular in section);
- (2) a tendency to form pale dorsolateral and midlateral stripes;
- (3) fewer supraciliaries (usually 5);
- (4) prefrontals more widely separated;
- (5) anterior ear lobule very large and obtuse;
- (6) more numerous lamellae under fourth toe (23-29, mean of 10 specimens 25.8).

Paratypes

Kimberley Division (W.A.): Kalumburu (44477); Port Warrender (45024); Mitchell Plateau (40472-4, 42523-5, 43194, 43196-7, 43348-9, 43351); Heywood Islands (40457); Kunmunya (40716); Wood Islands (44174-5); Koolan Island (45015); Wyndham (32359); Ninbing (27923-4); Ord Dam, Lake Argyle (44513).

Northern Territory: Mt Borradaile (NTM 4550-2); Oenpelli (37154-63); Cannon Hill (AM 39683-4, 39882); Koongarra (AM 38815-6, 38818-20, 38824, 38826-7, 38829, 38831, 39994-5); Muirella Park (NTM 5013); Deaf Adder Creek (AM 40253-4; NTM 5011, 5045); Darwin, including Stuart Park and Berrimah (23313-4, 23466-8; NTR 219; NMV D632, 1670, 2539, 2719, 5161; QM J2246); 27 km SE of Darwin (23696); Howard Springs (23625-6); Batchelor (37121-5); Coomalie Creek (23526-7, 23758); 13 km S of Adelaide River (NTR 336-7); 26 km NE of Pine Creek (23202-3); Pine Creek (23199-200); Katherine (19900, 21923, 21929, 23154-60); 32 km N of Larrimah (23799); Gorrie (AM 12837); Larrimah (24140-1, 24147); Maria Island (NTM 5738, 5742, 5747); Craggy Island, Sir Edward Pellew Group (40310); Bing Bong (SAM 13531a-b, 13536); Borroloola (NMV D5105, 5112); Nicholson River (17° 49'S, 137° 13'E) (NTM 3891); Springvale (NTM 3892).

Carlia johnstonei johnstonei subsp. nov.

Holotype

R43170 in Western Australian Museum, collected by Messrs L.A. Smith

and R.E. Johnstone on 28 January 1973 at Mitchell Plateau, Western Australia, in 14° 52'S, 125° 50'E.

Diagnosis

A small dark *Carlia* with mid-dorsal scales bicarinate, distinguishable from *C. amax* by its more numerous midbody scale rows (mostly 34-38 vs 30-32), more numerous supraciliaries (usually 7 vs 6), larger and more circular ear aperture margined with longer and more numerous lobules, and weaker but more regularly aligned dorsal keels.

Distribution

Sub-humid north-west coast of the Kimberley Division and adjacent plateaux; also several continental islands.



Fig. 4. Map of part of Western Australia and Northern Territory showing location of specimens of *Carlia rufilatus*, *Carlia gracilis*, *Carlia johnstonei johnstonei* and *Carlia johnstonei grandensis*.

Description

Snout-vent length (mm): 19-43 (N=100, mean 35.0). Tail (% SVL): 103-173 (N=36, mean 137).

Prefrontals separated (95% of specimens) or just touching (3%) or forming a median suture (2%). Supraciliaries usually 7, occasionally 6, rarely 8 (N=91, mean 6.9). Ear aperture usually a little smaller than palpebral disc, circular or vertically elliptical with one moderately large acute lobule anteriorly and 6-12 smaller acute lobules on other margins. Nuchals smooth or striate, occasionally weakly keeled. Midbody scale rows 32-40, mostly 34-38 (N=59, mean 35.4), mid-dorsally with moderately strong well-aligned keels. Lamellae under fourth toe 20-26 (N=75, mean 23.0).

Dorsally and laterally blackish brown; back and sides occasionally flecked

with pale brown and greyish white. Ventrally bluish grey; many scales of chin and throat edged with blackish brown or dark grey. Legs brown flecked with black. In breeding male head, neck and foreback black flecked with white; remainder of back dark chocolate brown flecked with white.

Remarks

This species is named after my assistant Ronald E. Johnstone, who collected much of the type series and many other *Carlia* in the Kimberley Division.

Paratypes

Kimberley Division (W.A.): Middle Osborne Island (40713-5, 41491-2); South-west Osborne Island (41500-2, 44112, 44116-7, 44124-5); South-east Osborne Island (44123); Surveyors Pool, Mitchell Plateau (43136); Amax Camp, Mitchell Plateau (43171, 43174, 43179, 43181, 43195, 43207, 43214-8, 43387, 43488, 44268-9); King Edward River (28224); Katers Island (41477-9); East Montalivet Island (41462); Bigge Island (41449-53); Boongaree Island (44098, 44100-2); Careening Bay (44005-6); Coronation Island (41414-6); Uwins Island (44131-2); Augustus Island (40439, 40445, 40481-2, 41273-8, 41305-16); Heywood Islands (40455-6, 41379-80, 41399-401); 18 km E of Kuri Bay (40418).

Carlia johnstonei grandensis subsp. nov.

Holotype

R13464a in Australian Museum, Sydney, collected on Groote Eylandt, Northern Territory.

Diagnosis

A small dark bicarinate *Carlia*; distinguishable from *C. j. johnstonei* by its fewer midbody scale rows, supraciliaries and ear lobules; and from *C. amax* by its much darker coloration, especially of throat and flanks.

Distribution

Groote Eylandt, off east coast of Northern Territory.

Description (based on holotype and single paratype)

Snout-vent length (mm): 39-42.

Prefrontals separated. Supraciliaries 6. Ear aperture considerably smaller than palpebral disc, longer axis horizontal, with a moderately large, very obtuse lobule on anterior margin. Nuchals striate. Midbody scale rows 30-32, mid-dorsally with two moderately strong keels, not well aligned longitudinally. Lamellae under fourth toe 23-25.

Dorsally dark olive flecked with black. Sides black flecked with greyish white. Scales of lips, chin and throat broadly edged with black; remaining ventral scales greyish white narrowly edged with pale brownish grey.

Remarks

In most respects other than coloration, *C. j. grandensis* is more like *C. amax* than *C. j. johnstonei*. In size and shape of ear aperture and lobule,

C. j. grandensis is most like *C. vivax* of Queensland.

The strange distribution of *C. johnstonei* (disjunct between North Kimberley and Groote Eylandt) is paralleled in the agamid lizard *Diporiphora bilineata margaretae*.

Paratype

Northern Territory: Groote Eylandt (AM 13464b).

REFERENCES

- DE VIS, C.W. (1885). A conspect of the genus *Heteropus*. *Proc. Roy. Soc. Queensland* 1: 166-173.
- GLAUERT, L. (1961). *A handbook of the lizards of Western Australia*. Perth.
- LOVERIDGE, A. (1934). Australian reptiles in the Museum of Comparative Zoology, Cambridge, Massachusetts. *Bull. Mus. Comp. Zool.* 77(6): 243-383.
- MACLEAY, W. (1878). Lizards of the 'Chevert' Expedition. *Proc. Linn. Soc. New South Wales* 2:60-69.
- MITCHELL, F.J. (1953). A brief revision of the four-fingered members of the genus *Leiopisma* (Lacertilia). *Rec. South Aust. Mus.* 11: 75-90.