Technical Memorandum 32

The terrestrial and semiaquatic reptiles (Lacertilia,Serpentes) of the Magela Creek region, Northern Territory

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the Alligator Rivers Region

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THE TERRESTRIAL AND SEMIAQUATIC REPTILES (LACERTILIA, SERPENTES) OF THE MAGELA CREEK REGION, NORTHERN TERRITORY

R.A. Sadlier

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and
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Major habitats in the Jabiluka and Ranger uranium mining project areas of the Magela Creek region were surveyed, primarily to obtain an account of the terrestrial snake and lizard species occurring in each area.

From these and later surveys in the region by other consultants, a total of 74 species of snakes and lizards are now known from the Magela Creek region, making this one of the most diverse regions in Australia. Of these species, 13% appear to be endemic to the Arnhem Land Plateau.

1 INTRODUCTION

There are two previous accounts of the herpetofauna of the Alligator Rivers Region, on the western edge of the Arnhem Land escarpment.

The first report was compiled by Francis J. Mitchell (1955) on the National Geographic Society - Commonwealth Government - Smithsonian Institution expedition to Arnhem Land, and included material from Oenpelli, Red Lily Lagoon and the East Alligator River. The area encompassed by these locations is not far removed in distance or similarity of habitats from the Magela Creek region. In Mitchell's report, a total of 21 terrestrial reptiles were recorded from western Arnhem Land.

The second and more extensive report arises from collections made by Dr H.G. Cogger (1973) for the Alligator Rivers Region Environmental Fact Finding Study which broadly encompassed the area lying between the East Alligator and South Alligator rivers. Cogger recorded a total of 69 snakes and lizards (of which 2 had been introduced) for the Alligator Rivers Region. The Mt Brockman-Nourlangie Rock area and Cannon Hill (both outliers of the main Arnhem Land escarpment located to the south and north-east of Magela Creek respectively) were among the collecting sites sampled by Cogger.

The data presented here are the combined results from two surveys undertaken in the Magela Creek region. The survey of the Jabiluka Project Area (August-September 1979) was concerned mainly with habitats associated with the Jabiluka outlier and with the middle reach billabongs and drainage channels flowing into Magela Creek. The survey of the Ranger Project Area (March-April and July 1981) was concerned mainly with lowland habitats associated with the upper reaches of Magela Creek.

2 STUDY DETAILS

2.1 Aims and methods of survey

The main objective of the surveys was to obtain an account of the terrestrial reptile species occurring in the various habitats encompassed by the two project areas (Fig. 1). Grid references for all sites sampled are given in section 2.3.

The Jabiluka Project Area sites were surveyed during the Dry season only. Ranger Project Area sites 18, 19 and 20 were established during the Wet season, on Magela Creek immediately downstream from the main plant operations, and on the edge of Gulungul Creek, a tributary of Magela Creek. All the Ranger sites were resurveyed during the Dry season, with additional sites (17, 21) being established further upstream on Gulungul Creek.

At both Project Areas, data were gathered by actively searching, morning and afternoon, in favourable areas, in conjunction with a pitfall fenceline trapping program at each site. At several sites on the Ranger Project Area a pitfall grid system was also established. The pitfall fenceline technique consisted of a fence line approximately 30 m in length and 20 cm in height running across ten sunken buckets, approximately 20 cm diameter by 20 cm deep. The pitfall grid system comprised 36 squares, each with a bucket centrally located, the distance between buckets being 5 m. Pitfall traps were usually checked in the early morning (0700-0800 hours), late morning (1100-1200 hours), and late afternoon (1700-1800 hours).

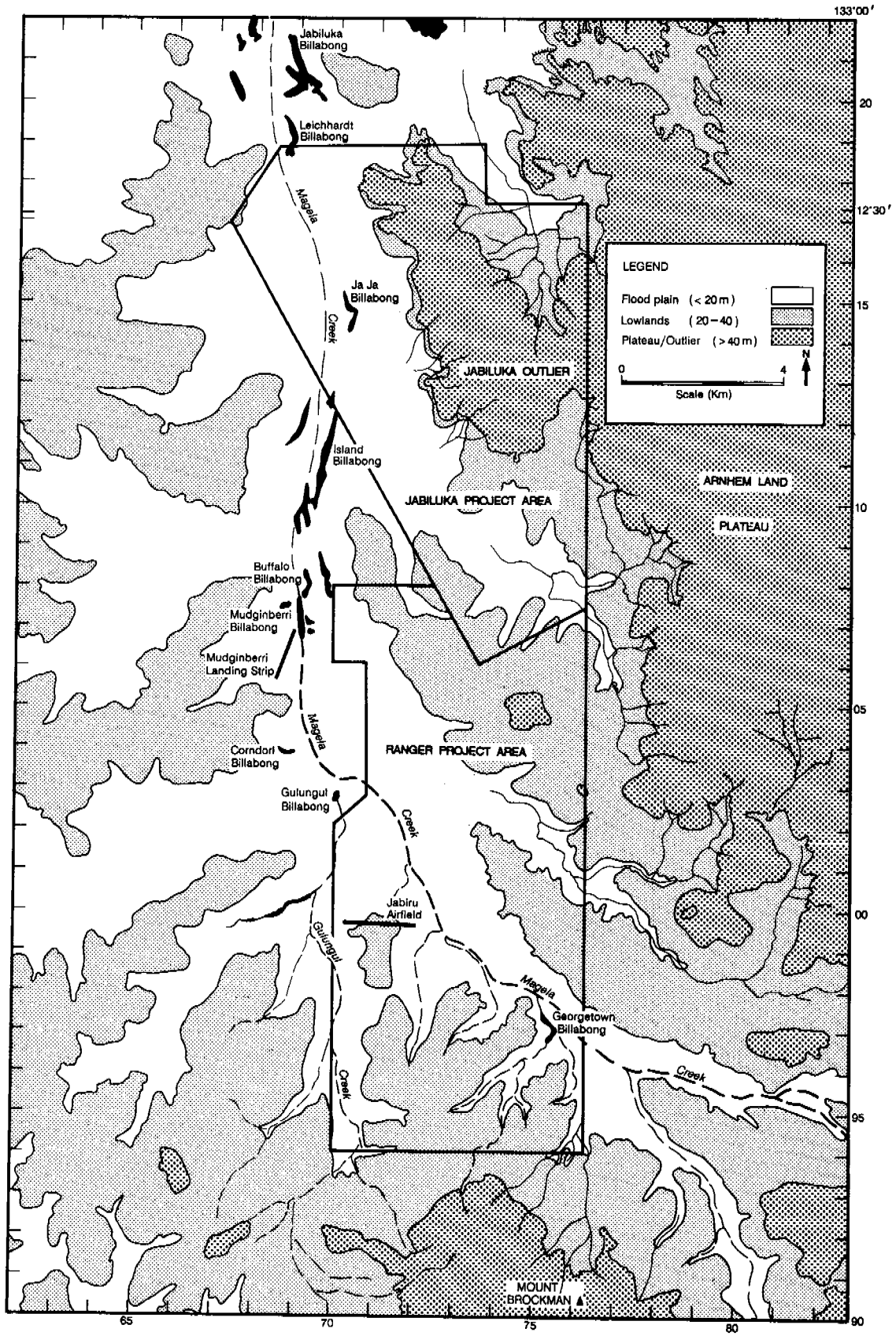


Figure 1. Map of the area of the Magela Creek region studied. Eastings and northings and grid references for sites examined are given in section 2.3.

Samples of animals collected were lodged in the Australian Museum for reference and comparative morphological studies. The taxonomic status of several species in the area is currently under revision. An asterisk (*) against a site in Section 3 (annotated list of species), denotes that the specimen records are held by Ranger Uranium Mines Ltd biologist at Jabiru East.

Classification follows Cogger et al. (1983, 1986). Keys for the families of snakes and lizards occurring in the Magela Creek region are given in Appendix 1.

2.2 Habitats

The term habitat includes topographic features, vegetative structure and floristics as these combine to influence the distribution of the reptile fauna in the area. The habitats were broadly divided into three catagories:

- Sandstone outcroppings and outliers of the Arnhem Land escarpment, i.e. Jabiluka outlier and Mt Brockman. The plateau of the sandstone outliers is an area of scattered rock outcroppings, with open sandstone woodland and, in areas of exposed soil, grass cover where unburnt (Fig. 2). The escarpment is an area of exposed, jumbled sandstone outcroppings with little exposed soil, sandstone woodland of scattered small to medium height trees, and where the soil surface is sufficient, some grass cover where unburnt. Sandstone rainforest occurs in broken terrain of the escarpment, here small springs, soaks or pools may be present.

- Lowland dryland habitats (Figs 3 & 4) are those encompassed by the drainage systems of Magela Creek tributaries (i.e. Gulungul Ck) and the upper reaches of Magela Creek. Woodland habitats include: tall mixed eucalypt woodland adjacent to the sandstone escarpment; myrtaceous woodland occuring on sandy alluvial flats adjacent to creeks at their mid-lower reaches, and at the mid-reaches of Magela Creek; dryland riparian woodland bordering seasonally dry creeks that pass through open mixed eucalypt woodland, the creek channel is usually well defined and the bed sandy; open mixed eucalypt woodland with an understory of speargrass on hard red lateritic soil. Along the upper reaches of the Magela Creek during the Wet season the adjacent woodland habitat is at some stage inundated and, when in flood, the flow is extremely swift and subject to rapid rise and fall.

- Lowland wetland habitats are those seasonally inundated habitats of the floodplain fringe associated with billabongs of the mid- and lower reaches of Magela Creek. At its mid-lower reaches, the Magela Creek and adjacent woodland and grassland habitats are inundated for long periods during the Wet season.

2.3 List and description of sites examined

The site numbers for this report have been assigned geographically from north to south for ease of reference[1] .

Grid references for collecting sites refer to sheet 5473 (Edition 2) Series R 621, 'East Alligator' for those references with the prefix KG, and sheet 5472 (Edition 1) National Map

[1]The data reported here were originally presented in two reports: the first, covering the Jabiluka Project Area was submitted to Pancontinental Mining Ltd in 1979; the second, covering the Ranger Project Area, was submitted to the Office of the Supervising Scientist in 1981. For any locality, a comparison between the site numbers given here and those assigned in the original reports can be made by reference to Appendix 2 [ed.]

Figure 2. Sandstone habitat of the plateau of the Jabiluka outlier (western side)

Figure 3. Lowland dryland habitat of myrtaceous woodland along the upper reaches of Gulungul Creek (site 21a)

Figure 4. Lowland dryland habitat of open mixed eucalypt woodland with speargrass ground cover (site 20a)

Series, 'Cahill' for those with prefix 5472. Site descriptions reflect the vegetation classification of Burgman & Thompson (1982).

Site *Location and description*

1 Magela Point - 1 site
12°27'S 132°51'E, grid reference (approx.) KG 665227
Lowland wetland habitat of mature mixed woodland with no grass cover but a heavy leaf litter cover and a number of logs over a loamy soil. Pitfall trapped, general collecting day and night.

2 Jabiluka Billabong - 2 sites
12°28'S 132°52'E, grid reference KG 691208

2a Lowland wetland habitat of tall paperbarks bordering the billabong, no grass but a cover of leaf litter over a moist dark silt substrate. Pitfall trapped, general collecting by day.

2b Lowland wetland habitat of floodplain fringe woodland with a medium to dense understorey, ground cover of leaf litter over a sandy substrate. Pitfall trapped, general collecting day and night.

3 Sandstone outcropping - 1 site
12°29'S 132°54'E, grid reference KG 712190
Sandstone habitat comprising a small isolated sandstone outcropping with sandstone woodland, separated from the Jabiluka outlier by open woodland. General collecting day and night.

4 Western edge of Jabiluka outlier - 1 site
12°30'S 132°54'E, grid reference (approx.) 5472 720177
Sandstone habitat of sandstone woodland on the western escarpment of Jabiluka outlier. Briefly collected by day.

5 Western edge of the Arnhem Land escarpment - 1 site
12°31'S 132°57'E, grid reference 5472 768156
Lowland dryland habitat of open mixed eucalypt woodland bordering sandstone escarpment, *Acacia* understory, little grass, groundcover mainly leaf litter over a sandy substrate. Pitfall trapped, general collecting day and night.

6 Ja Ja Billabong - 1 site
12°31'S 132°53'E, grid reference (approx.) 5472 707147
Lowland wetland habitat on the floodplain fringe of Ja Ja Billabong and adjacent woodland.

7 Eastern edge of the Jabiluka outlier - 2 sites
12°32'S 132°56'E

7a Grid reference 5472 750140
Lowland dryland habitat of tall open woodland, grass cover 70% on a sandy substrate. Pitfall trapped.

7b Grid reference 5472 74139
Sandstone habitat of open sandstone woodland amongst boulders of the escarpment, an open area with extensive soil surface and grass cover of *Sorghum* sp. 80-90% on grey sandy soil. Pitfall trapped, general collecting day and night.

8 Western edge of the Jabiluka outlier - 2 sites
12°32'S 132°54'E

8a Grid reference 5472 724135
Lowland dryland habitat of open woodland and mixed eucalypt woodland, grass cover patchy on a substrate of hard sand. Pitfall trapped, general collecting by day.

8b Grid reference 5472 720143
Dryland lowland habitat of mixed woodland and fringing community of mixed riparian woodland adjacent to a watercourse off the outlier, grass cover approximately 70-80% on a dark sandy substrate. Pitfall trapped.

9 Western edge of Jabiluka outlier - 1 site
12°32'S 132°55'E, grid reference 5472 725138
Sandstone habitat comprising a narrow band of closed woodland restricted to a gully on sandstone escarpment. A permanent soak occurs at the first rock outcropping midway on the escarpmment. General collecting by day and night.

10 Southern edge of Jabiluka outlier - 1 site
12°33'S 132°55'E, grid reference 5472 736121
Sandstone habitat on the sandstone plateau comprising small rock outcroppings and open areas of hard sand, with open sandstone woodland and a groundcover of isolated patches *Sorghum* sp. and small patches of *Triodia*. Pitfall trapped (Grid reference 5472 739120), general collecting day and night.

11 Southern edge of Jabiluka outlier - 1 site
12°33'S 132°55'E, grid reference 5472 731121 to 734124
Sandstone habitat of closed forest situated in a gully in the escarpment. Rock outcroppings and the gully walls dominate, and semi-permanent pools occur along the main stream bed to the plateau. General collecting by day and night.

12 Vicinity of southern edge of Jabiluka outlier - 3 sites
12°33'S 132°55'E, grid reference 5472 729118
12a Lowland dryland habitat of myrtaceous woodland, groundcover approximately 90% grass cover on a sandy substrate. Pitfall trapped.
12b Lowland dryland habitat of riparian woodland/scrub adjacent to watercourse, grass cover poor on a moist dark silt substrate. Pitfall trapped, general collecting day and night.
12c Lowland dryland habitat of tall paperbark stands on a soak area adjacent to a watercourse, groundcover of low tussock grass spread over a substrate of moist dark silt. Pitfall trapped general collecting day and night.

13 South-east corner of Jabiluka outlier - 2 sites
12°33'S 132°56'E
13a Grid reference 5472 741113
Sandstone habitat of small outcroppings at the base of the escarpment, with sandstone woodland and sparse scrub cover, recently burnt with no standing grass cover. Pitfall trapped, general collecting by day and night.
13b Grid reference 5472 741112
Lowland dryland habitat of tall mixed eucalypt woodland bordering the outlier. Recently burnt, no standing grass cover of significance, and a sparse leaf litter cover on dark sandy substrate. Pitfall trapped, general collecting by day and night.

14 Island Billabong - 1 site
12°34'S 132°53'E, grid reference 5472 698110
Lowland wetland habitat of tall grassland (90%) fringing the billabong. Pitfall trapped.

15 Sandstone outcropping 1.7 km south of the Jabiluka outlier - 5 sites
12°34'S 132°55'E
15a Grid reference 5472 732105
Lowland dryland habitat at the lower edge of the sandstone outlier where sandstone woodland of the escarpment grades into open woodland of the adjacent sandy alluvial flats, grass cover poor. Pitfall trapped, general collecting day and night.

15b Grid reference 5472 734102
Lowland dryland habitat of open myrtaceous woodland with a 90% grass cover on sandy substrate. Pitfall trapped.

15c Grid reference 5472 730102
Sandstone habitat situated on the plateau of the outlier, comprising scattered and infrequent boulder outcroppings with open sandstone woodland, patchy groundcover of *Sorghum* sp. (approximately 80-90% where present) on a hard sand substrate. Pitfall trapped, general collecting by day.

15d Grid reference 5472 734102
Sandstone habitat situated on the boulder slope of the escarpment approximately midway up the outlier, with low open sandstone woodland. Pitfall trapped, general collecting by day.

15e Grid reference 5472 733100
Sandstone habitat situated amongst large boulders on the lower slope of the escarpment, with sandstone woodland and a groundcover of *Sorghum* sp. (approximately 80-90%). Pitfall trapped, general collecting day and night.

16 Southern boundary of Jabiluka Project Area - 2 sites
12°35'S 132°57'E, grid reference 5472 763080

16a Lowland dryland habitat of riparian woodland bordering seasonally dry watercourse, grass cover approx. 80% or more on a sandy substrate. Pitfall trapped, general collecting day and night.

16b Lowland dryland habitat of open mixed eucalypt woodland, groundcover variably burnt leaving isolated patches of *Sorghum* sp. with leaf litter piles on the open areas between substrate of hard sand. Pitfall trapped, general collecting day and night.

17 Lower reaches of Gulungul Creek - 3 sites
12°39'S 132°53'E, grid reference 5472 7211012

17a Lowland dryland habitat of open myrtaceous woodland (*Melaleuca* sp. and occasional *Grevillea* sp.), with a groundcover of moderately thick low grass on course alluvial sand. Pitfall trapped and general collecting by day.

17b Lowland dryland habitat of mature paperbark stands and tall *Pandanus* thickets, groundcover of *Melaleuca* leaves and small tufty grass on dark silt substrate. Pitfall trapped and general collecting by day.

17c Lowland dryland habitat where open woodland with speargrass understory is adjacent to myrtaceous woodland of the alluvial flat. Pitfall trapped using fence line and grid system, general collecting by day.

18 Gauging station 8210009 (GS 009) on Magela Creek - 5 sites
12°39'S 132°54'E, grid reference 5472 720012

18a Lowland dryland habitat of open woodland with speargrass understory. Pitfall trapped and general collecting day and night.

18b Lowland dryland habitat (situated 25 m from main Magela Creek channel edge during Wet season) of open woodland with speargrass groundcover. Pitfall trapped and general collecting by day and night.

18c Lowland dryland habitat adjacent to main Magela Creek channel (inundated early in Wet season), comprising low paperbark saplings and a groundcover of low grass on dark silty soil substrate. Pitfall trapped and general collecting by day.

18d Lowland habitat adjacent to eastern bank of main Magela channel, comprising paperbark and *Pandanus* stands and a groundcover of thick grass (approximately 1 m in height) on a dark soil substrate. This site was inundated to a depth of approximately 1.5 m (indicated by flood debris at this height) during the wet. Pitfall trapped and general collecting by day.

18e Lowland dryland habitat of open mixed woodland with a medium to low grass/shrub cover on light silt substrate. Pitfall trapped, general collecting by day.

19 Gulungul Creek near the crossing of the Arnhem Highway - 4 sites
12°39'S 132°53'E, grid reference 5472 695996

19a Lowland dryland habitat situated on a sandy alluvial flat, with open myrtaceous woodland (*Melaleuca* sp. and occasional *Grevillea* sp. saplings), and a groundcover of moderately thick, tall grass. Pitfall trapped, general collecting by day.

19b Lowland dryland habitat (adjacent to the flooded Gulungul Creek channel during the Wet season) of eucalypt saplings (height 3 m), and a groundcover of thick low grass on a dark silt substrate. Pitfall trapped, general collecting by day.

19c Lowland dryland habitat situated on the low sandy levee bank, comprising mixed low eucalypt scrub and medium to sparse grass/shrub cover on a sand substrate. General collecting by day.

19d Lowland dryland habitat transitional between the open myrtaceous woodland and mixed woodland of the levee bank, situated adjacent to drainage channels peripheral to the main Gulungul Creek channel, seasonally dry but filled to 1 m of water in wet. Pitfall trapped, general collecting by day.

20 Georgetown Billabong (on Magela Creek) - 2 sites
12°41'S 132°56'E, grid reference 5472 755975

20a Lowland dryland habitat (50 m from the Magela Creek channel in the Wet season) of open mixed eucalypt woodland with a groundcover of speargrass on hard lateritic soil. Pitfall trapped, general collecting day and night.

20b Lowland dryland habitat (subject to inundation during the Wet season, approximately 40 m from the main channel during the dry) of open mixed woodland with a low grass/shrub understory on a sandy to lateritic soil substrate. Pitfall trapped during the wet and Dry seasons.

21 Upper reaches of Gulungul Creek - 3 sites
12°42'S 132°53'E

21a Grid reference 5472 707962
Lowland dryland habitat (approximately 0.75 km from the main Gulungul channel and adjacent to a natural drainage depression leading from the tailings pond) of open myrtaceous woodland with groundcover of grass on a light silt/sand substrate. Pitfall trapped.

21b Grid reference 5472 707962
Lowland dryland habitat of low woodland with a thick low canopy lying in a soak, groundcover of dense grass (to 0.6 m) on a dark silt substrate. Pitfall trapped and general collecting by day.

21c Grid reference 5472 701963
Lowland woodland habitat situated on a sandy levee bank adjacent to the main Gulungul Creek channel, with tall open woodland and a medium to sparse grass/shrub cover on sand substrate. Pitfall trapped, general collecting by day.

3 ANNOTATED LIST OF SPECIES

Family AGAMIDAE

Five species of agamid lizard occur in the Magela Creek region. Cogger (1973) records all these and the additional species *Lophognathus temporalis* and *Diporiphora magna* for the Alligator Rivers Region.

Only one species, *Ctenophorus caudicinctus macropus*, is restricted to a sandstone habitat; this species is also endemic to Arnhem Land.

3.1 *Ctenophorus caudicinctus macropus*

Habitat: *C. caudicinctus macropus* occurs in sandstone habitats of the escarpment where expansive rock shelves with large, flat sandstone exfoliations provide shelter.

Distribution: recorded from site 7b

Comments: This subspecies was only recently described by Storr (1967*b*).

3.2 *Chelosonia brunnea* (Plate 1)

Habitat: *C. brunnea* occurs in lowland dryland habitats of open eucalypt woodland and dryland riparian woodland.

Distribution: recorded from site 16a and the vicinity of Mt Brockman and Jabiru East

Field observations and comments: A gravid female shortly after capture (August 1979) laid approximately 5 shelled eggs. Similarly, museum specimen records show a gravid individual (collected August 1973 by F. Wohl) to have been caught digging an egg burrow by a rock. Juveniles from the Magela Creek region (AM R40445, AM R40810) are recorded as having hatched in late October 1973, with the egg of one of the hatched individuals (AM R40810) being laid in early September that same year.

3.3 *Chlamydosaurus kingii* (Plate 2)

Habitat: *C. kingii* occurs in lowland dryland habitats of open mixed eucalypt woodland usually with a speargrass understory.

Distribution: recorded from the vicinity of sites 18, 20 and Jabiru East

Field observations: Individuals were observed either active on the ground, at the roadside, or approximately 1.5-3 m above ground level on small to moderately-sized trees. This species is encountered frequently during the Wet season and infrequently during the Dry season. Males (245-265 mm SVL) are much larger than females (160-175 mm SVL) and have a distinct black patch ventrally between forelimbs and vent and a bright russet flush to the chest, gular and throat regions; adult females are more or less grey ventrally.

Plate 1. *Chelosonia brunnea* from vicinity of Jabiru East township (photo R. Lambeck)

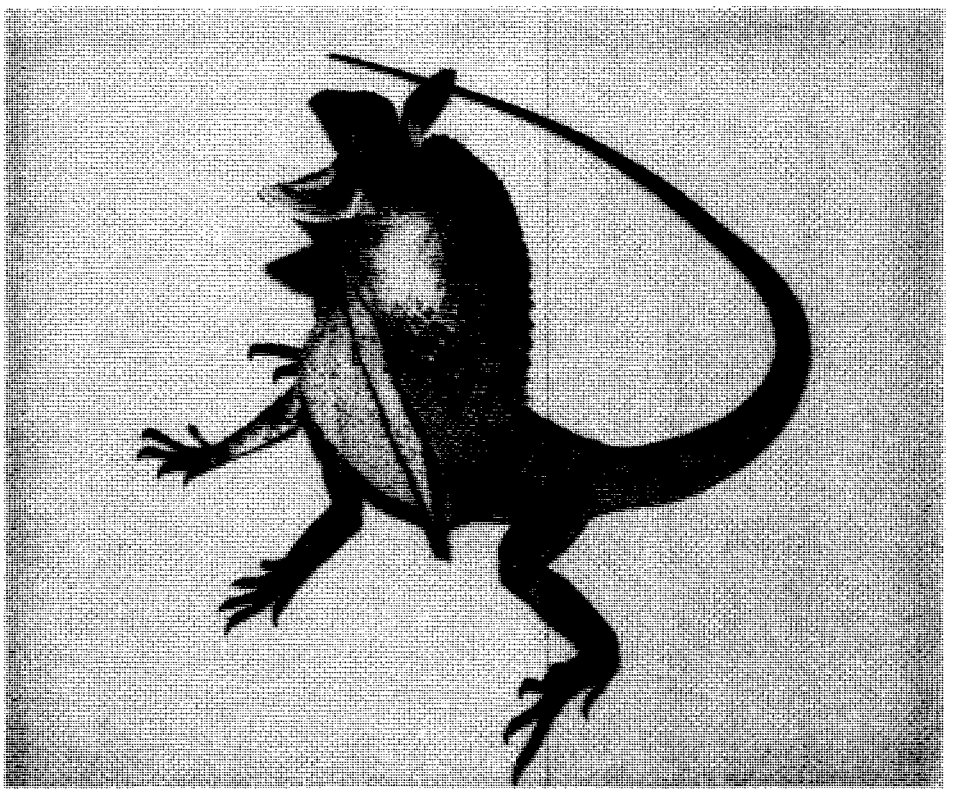


Plate 2. *Chlamydosaurus kingii* from the vicinity of Georgetown Billabong on Magela Creek. Colour and pattern differences between adult males, adult females and subadult males were noted as follows: dorsal and lateral surface mottled with grey in juveniles and subadult males and females, but with an overall russet tinge in adult males; ventral surface of adult females grey while adult males have a distinct black patch on chest and abdomen and a bright russet flush to remainder of chest and throat.

3.4 *Diporiphora bilineata* (Plate 3)

Habitat: *D. bilineata* occurs in lowland wetland and the following lowland dryland habitats: myrtaceous woodland on the sandy alluvial flats; riparian woodland on the levee banks of perennially dry creeks; and open eucalypt woodland bordering the sandstone escarpment.

Distribution: recorded from sites: 2b; 6; 7a; 8a, b; 10; 12a; 13b; 14; 15a, b; 16b; 17a, c; 18a, b, c; 19a, b, c; 20a; 21a, c

Field observations: During the Wet season fewer individuals were observed, comprising distinct adult (54-56 mm SVL with weights of 4-4.5 g) and juvenile (27-32 mm SVL with weights of 0.6-0.85 g) size classes, with adult males having a black patch posterior to the forelimb. During the Dry season far more individuals were encountered but were of a single size class (all individuals 30-51 mm SVL), with an absence of mature individuals > 54 mm SVL (except one male 58 mm SVL with testes reduced and clearly degenerative), and a black patch posterior to forelimb variably present in males 45-51 mm SVL).

Comments: Storr (1974*b*) recently re-described this species when reviewing members of the genus from Western Australia and the Northern Territory.

3.5 *Lophognathus gilberti* (Plate 4)

Habitat: *L. gilberti* occurs in lowland dryland and wetland habitats, most commonly in riparian woodland associated with watercourses, but also open eucalypt woodland away from watercourses.

Distribution: recorded from the vicinity of sites 1; 2; 12; 17b; 18a, b, c; 19c; 20a, b; 21b, c

Field observations: This species is largely aboreal in habit and when disturbed on the ground usually seeks refuge in the nearest tree. It appears equally abundant during both the Wet and Dry seasons.

Comments: Storr (1974*b*) recently re-described this species (as *Physignathus gilberti)* when reviewing members of the genus from Western Australia and the Northern Territory.

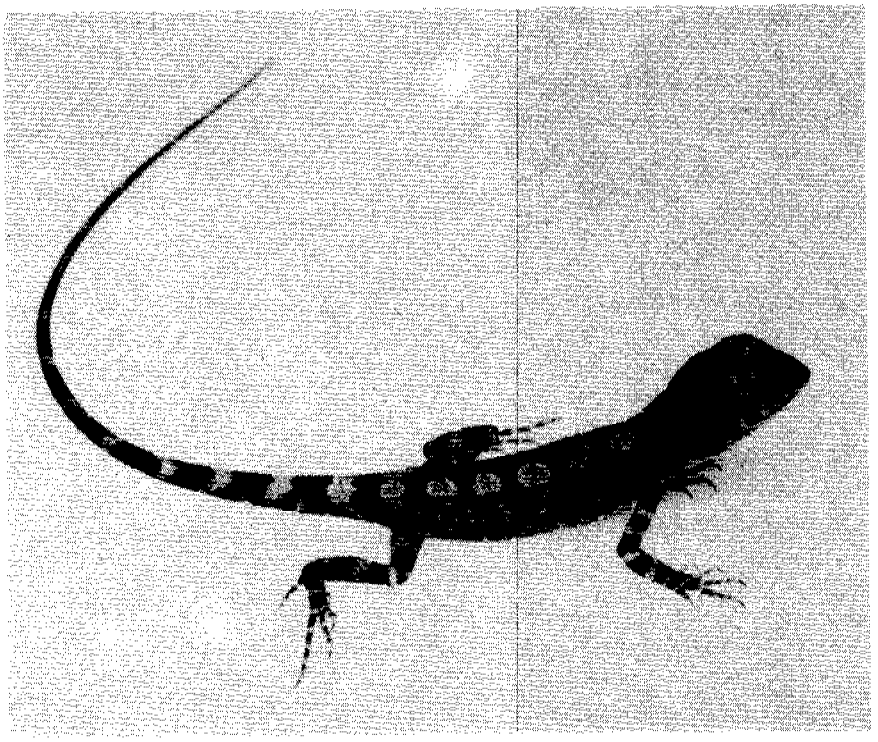


Plate 3. *Diporiphora bilineata* from Jabiru airstrip. Highly variable in colour and pattern. Body grey, light brown or russet, dorsal surface uniform or marked with a prominent to weak pale dorsolateral stripe and weak vertebral stripe. Either side of vertebral stripe a series of dark brown blotches may align to form broad, elliptical, transverse bars, or be offset to each other. Some individuals with weak pale dorsolateral stripes, and the dark vertebral blotches restricted to nape or absent. Lateral surface of adult males with a bold black patch posterior to the forelimb variably present.

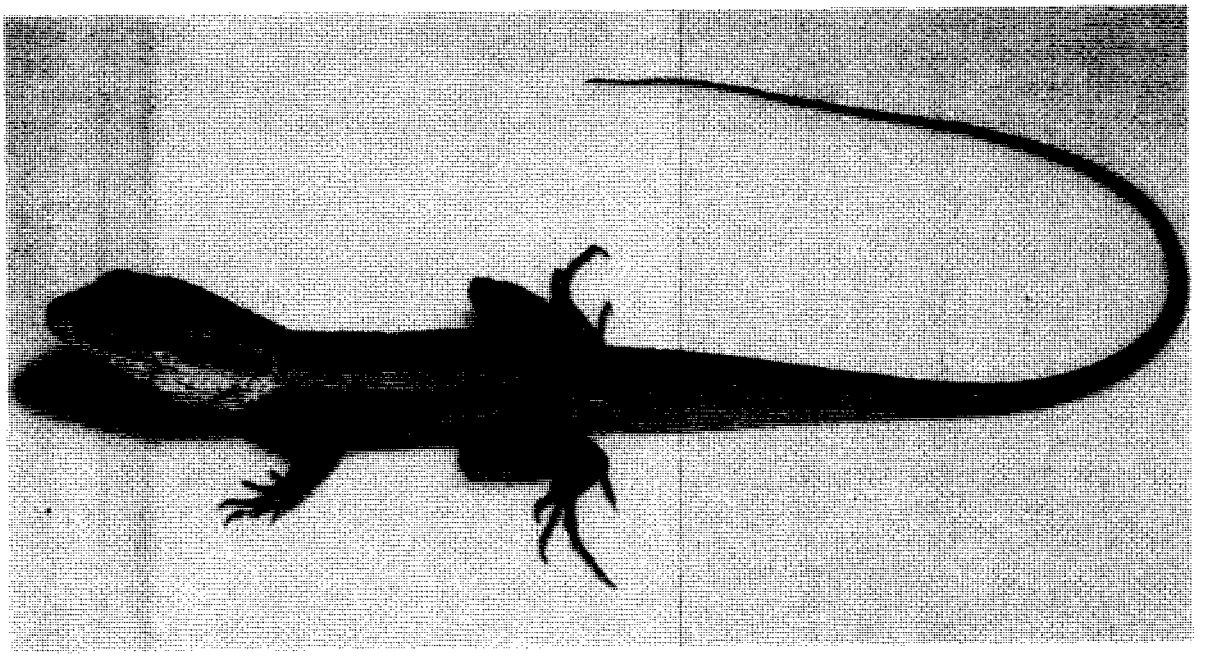


Plate 4. *Lophognathus gilberti* from Jabiru East township

Family GEKKONIDAE

Ten species of native gekkonid lizard occur in the Magela Creek region, plus two introduced species (*Gehyra* cf. *australis* and *Hemidactylus frenatus)* both associated with human habitation. Cogger (1973) records all of these species and the additional species *Diplodactylus stenodactylus* and *Diplodactylus taeniata* (as *Diplodactylus michealsoni)* for the Alligator Rivers Region. Five species, *Pseudothecadactylus lindneri, Oedura gemmata, Gehyra pamela, Gehyra nana* and *Nephrurus asper* are restricted or closely associated with a sandstone habitat; of these, the first three are endemic to Arnhem Land.

3.6 *Diplodactylus ciliaris* (Plate 5)

Habitat: *D. ciliaris* is recorded from a single individual from lowland dryland habitat of open mixed eucalypt woodland.

Distribution: recorded from site 18a

Field observations: The single individual was collected on the ground at night (2000 h) during the Dry season.

3.7 *Gehyra australis* (Plate 6)

Habitat: *G. australis* occurs in lowland dryland habitats of mature mixed woodland (site 1); mixed eucalypt woodland bordering the sandstone escarpment (site 12) and open mixed eucalypt woodland (sites 16b and 18a).

Distribution: recorded from sites: 1; 12; 16b; 18a

Field observations: *G. australis* is arboreal in habit. At the base of the sandstone outlier it occurs in mixed eucalypt woodland, and is paratopic with *Gehyra pamela* which occurs on rocks of the adjacent sandstone escarpment. *G. australis* was uncommon at several open woodland sites where the speargrass understory was regularly burnt, and common in mature woodland unburnt for 10 years (site 1). A single adult female collected July 1981 had 2 large shelled oviducal eggs. Two eggs located under debris in July 1981 measured 11.5 x 10 mm; the young that hatched both weighed 0.35 g for a SVL of 27.5 mm.

3.8 *Gehyra nana* (Plate 7)

Habitat: *G. nana* occurs on rock outcrops of the sandstone escarpment.

Distribution: recorded from sites 7b; 9; 10; 13a; 15c, d

Field observations: By night *G. nana* was observed active amongst the smaller rock outcroppings and was frequently pitfall trapped in areas of the escarpment between such outcroppings. By day individuals shelter beneath large, flat exfoliating rocks on rock platforms. Adult females collected in July contained a single enlarged yolked ovarian follicle or oviducal egg in the right ovary or oviduct respectively.

Comments: This species was only recently described by Storr (1978).

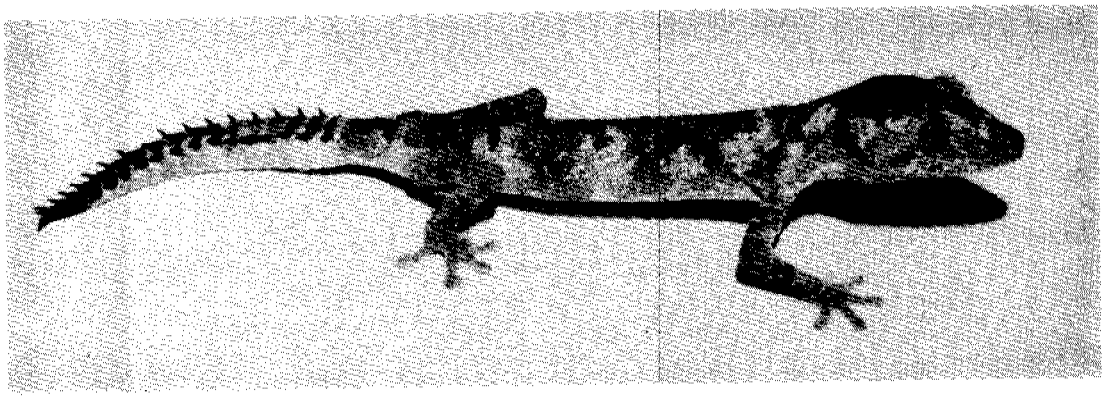


Plate 5. *Diplodactylus ciliaris* from the vicinity of GS009 on Magela Creek (site 18)

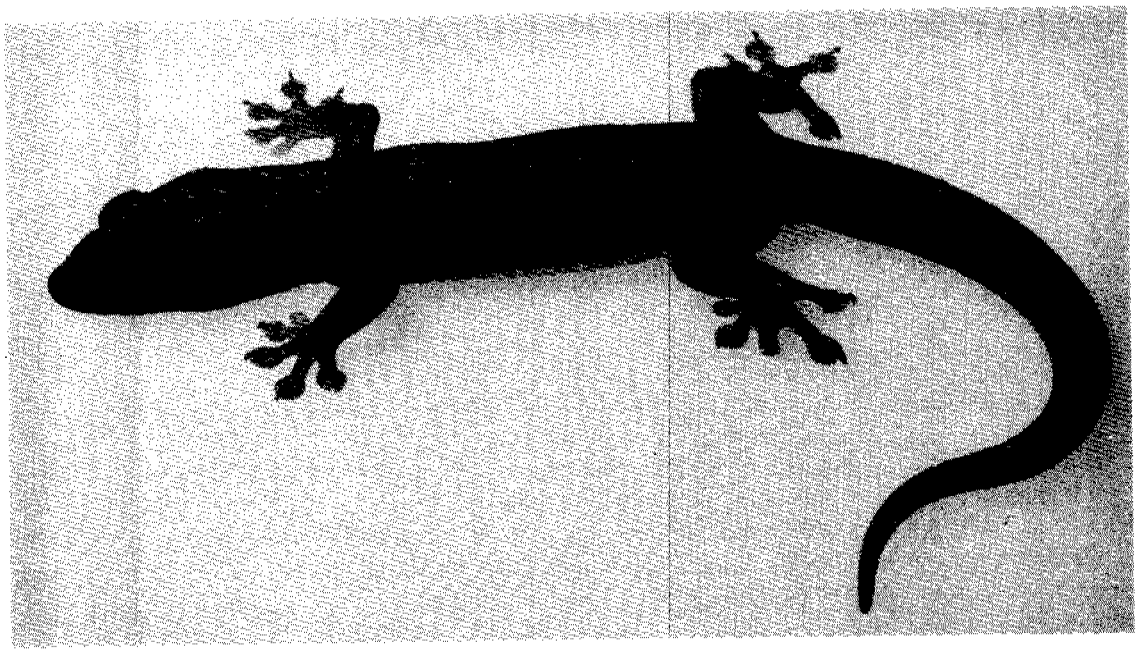


Plate 6. *Gehyra australis* from the Jabiluka Project Area (photo A.E. Greer)

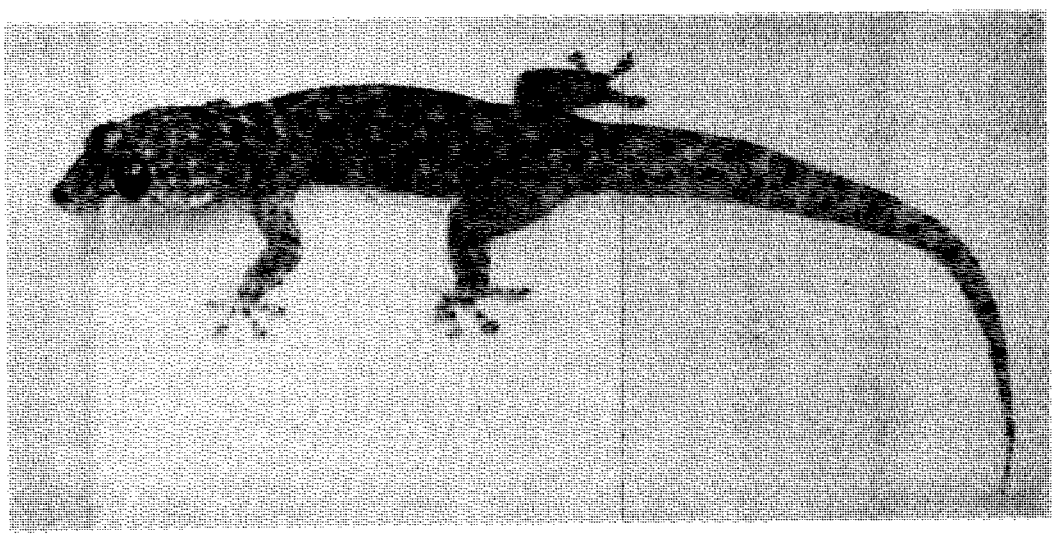


Plate 7. *Gehyra nana* from the western edge of the Jabiluka outlier (vicinity of site 9)

3.9 *Gehyra pamela* (Plate 8)

Habitat: *G. pamela* occurs on rock outcrops of the sandstone escarpment and plateau.

Distribution: recorded from sites 3; 7b; 10; 11; 13a; 15a, d

Field observations: By night *G. pamela* was observed active on large boulders of the escarpment and edge of the plateau, at the base of the escarpment it is paratopic with aboreal *G. australis* which occurs in adjacent mixed eucalypt woodland.

Comments: This species was only recently described by King (1982).

3.10 *Heteronotia binoei* (Plate 9)

Habitat: *H. binoei* occurs in most lowland woodland habitats. It was not recorded from sandstone habitats or lowland dryland habitats of myrtaceous woodland on the sandy alluvial flats.

Distribution: recorded from sites 1; 2b; 7a; 13a, b; 15a; 18; 19; 20a

Field observations: *H. binoei* was observed active at night amongst fallen leaf litter in woodland at Magela Point (site 1) and the east side of Jabiluka Billabong (site 2b), and was common at both sites. These areas were unburnt for a number a years and had a thick leaf and debris ground cover. By day individuals shelter beneath debris. Adult females are reproductively active during both the Wet and Dry seasons.

3.11 *Nephrurus asper* (Plate 10)

Habitat: *N. asper* occurs in sandstone habitat ranging over the upper, mid and lower reaches of the escarpment and adjacent mixed eucalypt woodland.

Distribution: recorded from sites 3; 5; 7; 15a, c, d

Field observations: This species is uncommon, isolated individuals were either pitfall trapped or spotted at night.

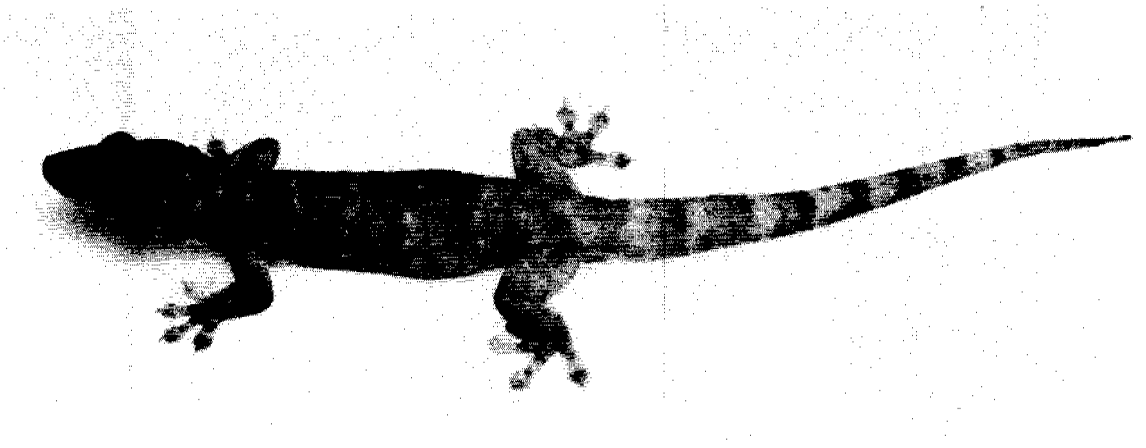


Plate 8. *Gehyra pamela* from the western edge of the Jabiluka outlier (vicinity of site 9)

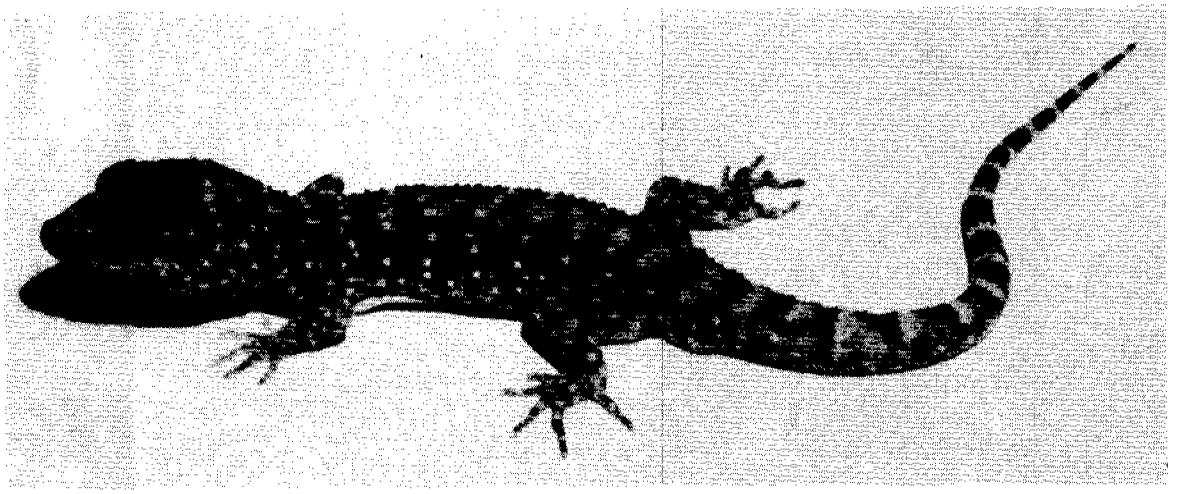


Plate 9. *Heteronotia binoei* from Jabiru East township

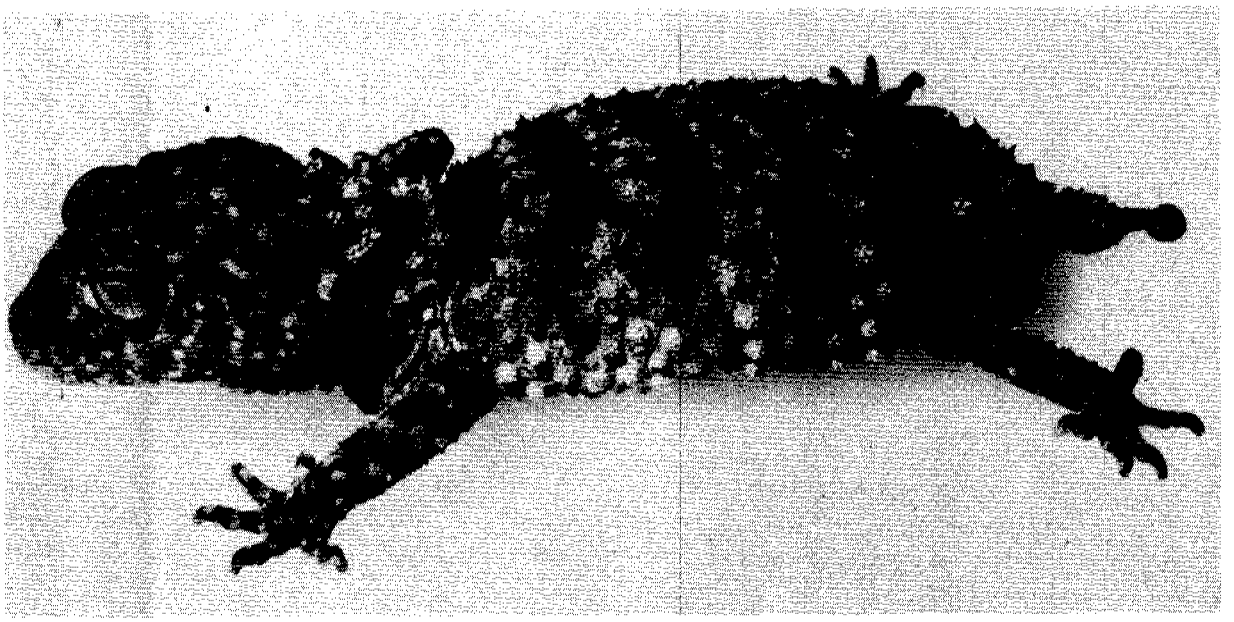


Plate 10. *Nephrurus asper* from the Jabiluka Project Area (photo A.E. Greer)

3.12 *Oedura gemmata* (Plate 11)

Habitat: *O. gemmata* occurs on rock outcrops of the sandstone escarpment.

Distribution: recorded from the vicinity of sites 5; 7b; 9; 10; 13a; 15

Field observations: By night *O. gemmata* was observed active on boulders and rock shelves, usually in the immediate vicinity of a deep, narrow, horizontal to diagonal crevice. Adult females (95 mm SVL) collected during the Dry season (August 1979) contained 2 enlarged yolked ovarian follicles or shelled oviducal eggs while adult females collected at the end of the Wet season (March 1973) showed no sign of reproductive activity.

Comments: This species was only recently described by King & Gow (1983).

3.13 *Oedura marmorata* (Plate 12)

Habitat: *O. marmorata* occurs in lowland dryland habitat of open eucalypt woodland.

Distribution: recorded from the vicinity of site 18a and Jabiru East*

Field observations: This species is uncommon. The single specimen collected from site 18a was found sheltering by day beneath exfoliating bark of a dead tree.

*Specimen records held by Ranger Uranium Mines Ltd

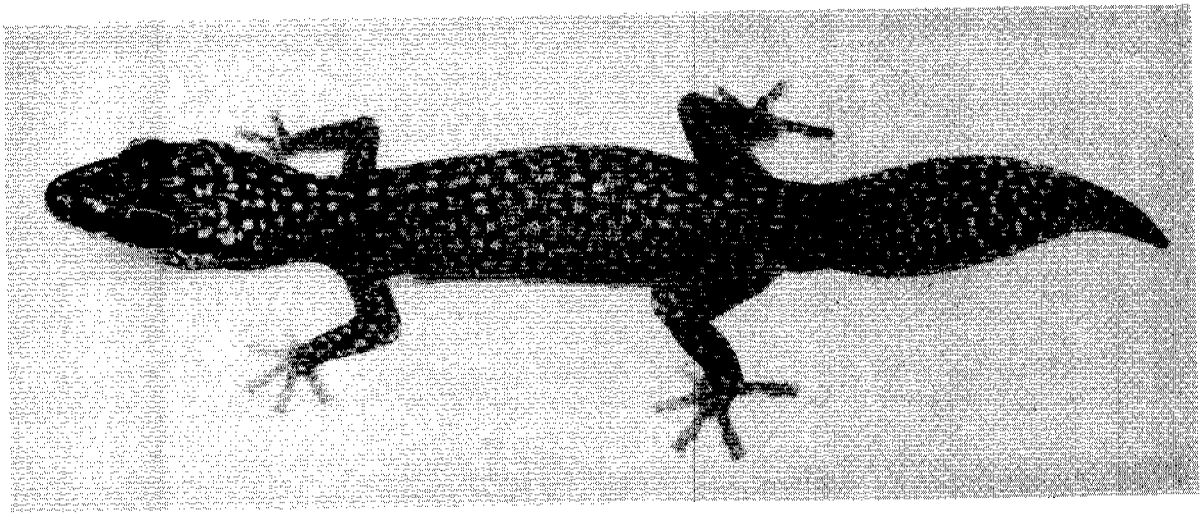


Plate 11. *Oedura gemmata* from the western edge of the Jabiluka outlier (vicinity of site 9)

Plate 12 *Oedura marmorata* from the vicinity of GS009 on Magela Creek (site 18)

3.14 *Oedura rhombifer* (Plate 13)

Habitat: *O. rhombifer* occurs in sandstone woodland of the escarpment and plateau; lowland wetland habitat of mature woodland at Magela Point; and lowland dryland habitat of open mixed eucalypt woodland.

Distribution: recorded from the vicinity of sites 1; 3; 10; 12; 13; 18

Field observations: This species is aboreal and by day shelters beneath exfoliating bark of dead trees or in hollows of dead limbs. An adult female (48 mm SVL) collected in the Dry season contained 2 large shelled oviducal eggs.

3.15 *Pseudothecadactylus lindneri* (Plate 14)

Habitat: *P. lindneri* occurs on rock outcrops of the sandstone escarpment and plateau.

Distribution: recorded from sites 9; 10; 11; 13a

Field observations: By night *P. lindneri* was observed active on large boulders and cliff faces of the plateau and escarpment and the gullies of the escarpment. In the gullies it was moderately common in areas where large boulders lined the creek bed. Individuals were often observed on small shrubs close to rock outcroppings, usually up to a metre above ground level, on thin upright branches and occasionally horizontal branches just above ground level. A single adult female (102 mm SVL) collected during the Dry season (August 1979) contained 2 large shelled oviducal eggs.

Comments: This species was only recently described by Cogger (1975).

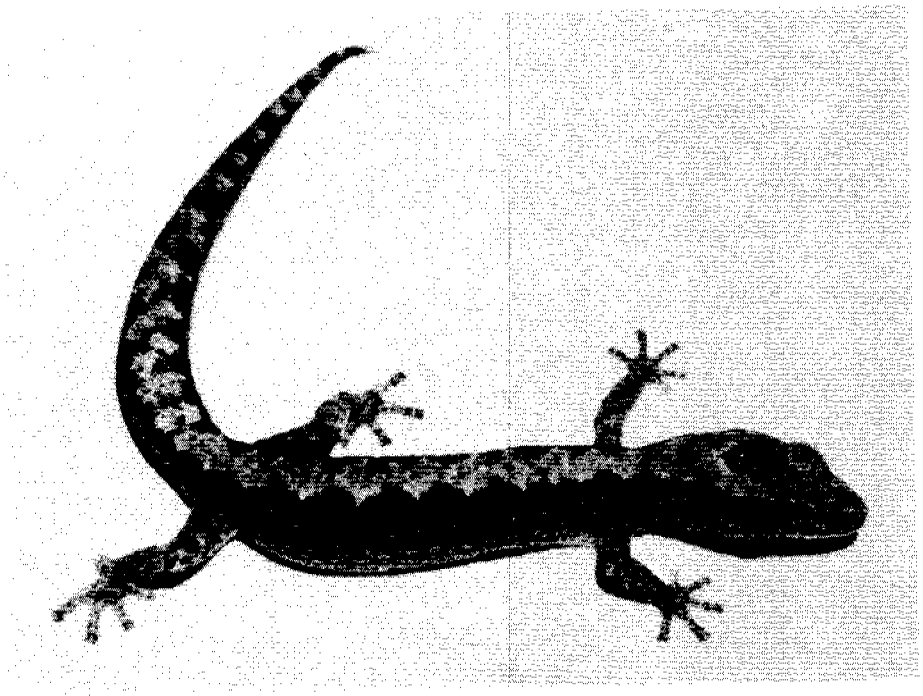


Plate 13. *Oedura rhombifer* from the vicinity of GS009 on Magela Creek (site 18)

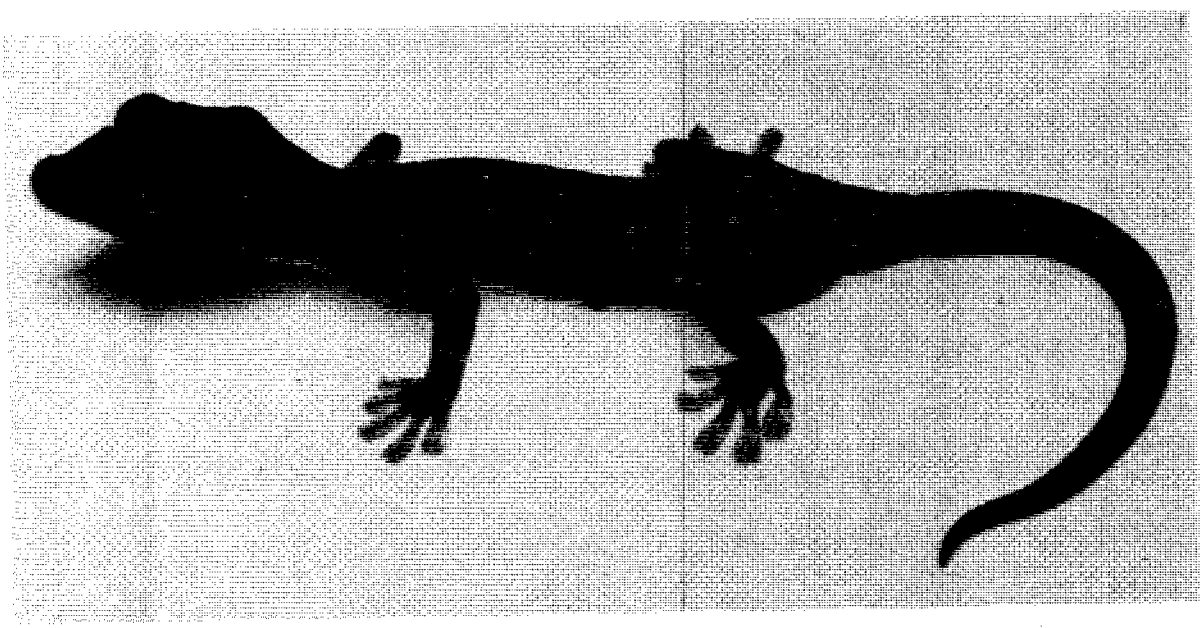


Plate 14. *Pseudothecadactylus lindneri* from the western edge of the Jabiluka outlier (vicinity of site 9)

Family PYGOPODIDAE

Two genera of pygopod lizards each represented by a single species occur in the Magela Creek region. Cogger (1973) records both these species and an additional undetermined species of *Delma* for the Alligator Rivers Region.

3.16 *Delma borea* (Plate 15)

Habitat: *D. borea* occurs in lowland dryland habitat of open mixed eucalypt woodland, and sandstone habitat of open sandstone woodland with small rock outcroppings on the plateau.

Distribution: recorded from sites 10 and 18e

3.17 *Lialis burtonis* (Plate 16)

Habitat: *L. burtonis* occurs in a lowland dryland habitat of open myrtaceous woodland and also of eucalypt woodland, both with dense grass cover on a sandy substrate.

Distribution: recorded from the vicinity of sites 5 and 12.

Field observations: This species was observed active at night at both habitats during the Dry season. Dissection of one individual collected revealed one half digested and one recently swallowed specimen of the scincid lizard *Ctenotus essingtoni*.

Family SCINCIDAE

Twenty-five species of scincid lizard occur in the Magela Creek region, an additional eight species to that listed by Cogger (1973) for the Alligator Rivers Region. A number of species, *Ctenotus coggeri*, *Ctenotus inornatus*, *Egernia* cf. *frerei* and *Morethia ruficauda*, are restricted to sandstone habitats while others are most abundant in this habitat (*Carlia amax* and *Notoscincus wotjulum*). Of the species restricted to the sandstone escarpment *Ctenotus coggeri* and *Egernia* cf. *frerei* are endemic to Arnhem Land. A large number of skink species occur in open woodland habitat, and of these *Ctenotus arnhemensis* and *Menetia concinna*, two recently described species, are known only from the Magela Creek region. From Mt Brockman just to the south of Jabiru, Cogger records *Sphenomorphus douglasi*, which was not collected during the surveys of the Jabiru and Jabiluka project areas. From the South Alligator River region to the west (50 km) of Magela Creek are recorded the species *Ctenotus kurnbudj* and *Menetia mainii* which have not been recorded from the Magela Creek region. Of these *M. mainii* is known from remnant rainforest patches (Sadlier 1984) and could be expected to occur in similar habitat in the Magela Creek region.

3.18 *Carlia amax* (Plate 17)

Habitat: *C. amax* occurs in sandstone woodland and variably in lowland wetland habitat of mature woodland at Magela Point and dryland habitat of open mixed eucalypt woodland with a speargrass understory bordering the upper and mid reaches of Magela Creek.

Distribution: recorded from sites 1; 5; 7b; 8a, b; 10; 11; 13a; 15a, d, e; 18a, b; 20b

Field observations: *C. amax* was most abundant in sandstone habitats but was less common and more sporadic in distribution in lowland habitats.

Comments: James (1983) records shelled oviducal eggs from females collected in the Wet season. Storr (1974*c*) recently described this species in reviewing the genus *Carlia* in Western Australia and the Northern Territory.

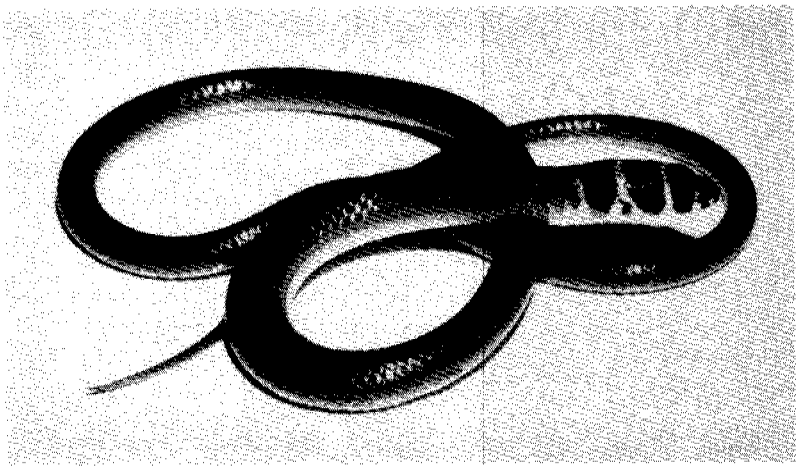


Plate 15. *Delma borea* from the vicinity of GS009 on Magela Creek (site 18)

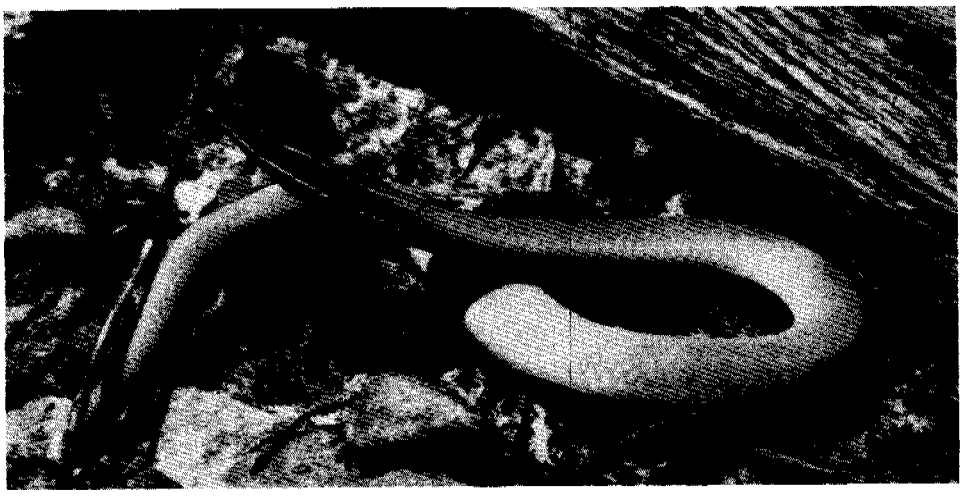


Plate 16. *Lialis burtonis* from Port Essington (photo H.G. Cogger)

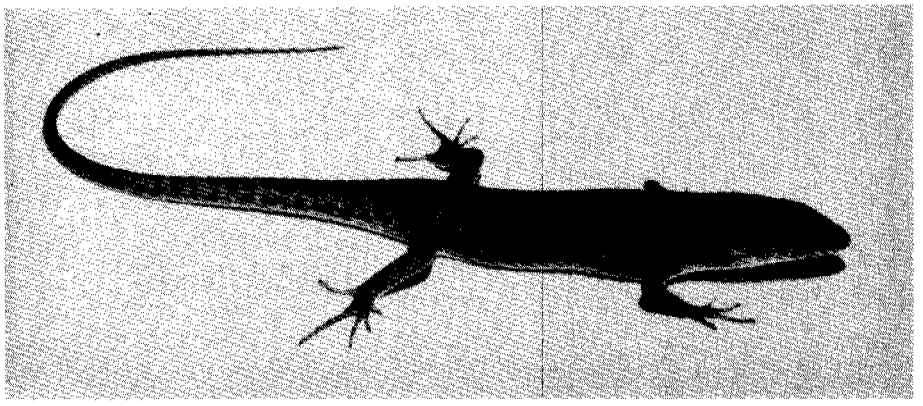


Plate 17. *Carlia amax* from the vicinity of GS009 on Magela Creek (site 18)

3.19 *Carlia munda* (Plate 18)

Habitat: *C. munda* occurs in lowland wetland and dryland woodland habitats.

Distribution: recorded from sites 1; 2b; 8a; 12b; 13b; 14; 15b; 16b; 18b, e; 19b, c; 20a

Field observations: During the Dry season *C. munda* is common and there is no obvious sexual dimorphism in colour in adults (28-37 mm SVL). During the Wet season fewer individuals are encountered and adult males and females (40-41 mm SVL) are noticeably sexually dimorphic in colour.

Comments: James (1983) records shelled oviducal eggs from females collected at the end of the Dry season through to the end of the Wet season (October-April) and egg laying at the end of the Wet season (March-April). Storr (1974*c*) recently re-described this species in reviewing the genus *Carlia* in Western Australia and the Northern Territory.

3.20 *Carlia gracilis* (Plate 19)

Habitat: *C. gracilis* occurs in riparian and paperbark woodland in the immediate vicinity of most lowland wetland and some lowland dryland watercourses.

Distribution: recorded from sites 2a; 6; 12b, c; 14; 16a; 17b, c; 18c; 19d; 20b; 21b

Field observations: *C. gracilis* was most abundant during the Dry season, and rarely observed away from the bank of the watercourse and fringing vegetation. *Carlia munda* often occupied adjacent woodland habitat but the two species did not overlap in their habitat preferences at this time of year. During the Wet season *C. gracilis* was less common and at this time of year the habitat normally occupied during the Dry season was either under water for considerable periods of time (billabong banks along the middle reaches), or frequently inundated by rapid rises for short periods accompanied by swift flow (upper reaches). Both *C. gracilis* and *C. munda* were found to coexist (in reduced numbers) in lowland dryland woodland habitat adjacent to the floodwater level at this time of year. Males attain a distinctive upper lateral colour pattern with maturity. Maturing males have a russet coloured upper lateral stripe and adult males a broad dark red upper lateral stripe. During the Wet season adult males have a metallic green sheen to the head (see Storr et al. 1981, p. 101, plate 1, fig. 3).

Comments: James (1983) records shelled oviducal eggs in the latter part of the Wet season (January-March). This species was only recently described by Storr (1974*c*).

3.21 *Carlia triacantha* (Plate 20)

Habitat: *C. triacantha* occurs mainly in open mixed eucalypt woodland with a speargrass understory. In this habitat *C. triacantha* was syntopic with *C. amax* and *C. munda*.

Distribution: recorded from sites 18a, b, c; 19b

Comments: Storr (1974*c*) in reviewing the genus *Carlia* in Western Australia and the Northern Territory re-described this species and included colour notes on breeding males; he also records a green colour to the head and face and red anteriorly on the lower flanks. Adult males (42-46 mm SVL) collected at the end of the Wet season (March 1981) showed marked sexual dimorphism in colouration, having a greenish tinge to the head and face, an orange flush laterally posterior of the forelimb, a light blue flush to the throat anterior of the forelimbs and an orange wash to the remainder of the venter posterior of the forelimbs. Adult females (SVL 46 mm) at this time of year (November-March) were gravid containing two shelled oviducal eggs.

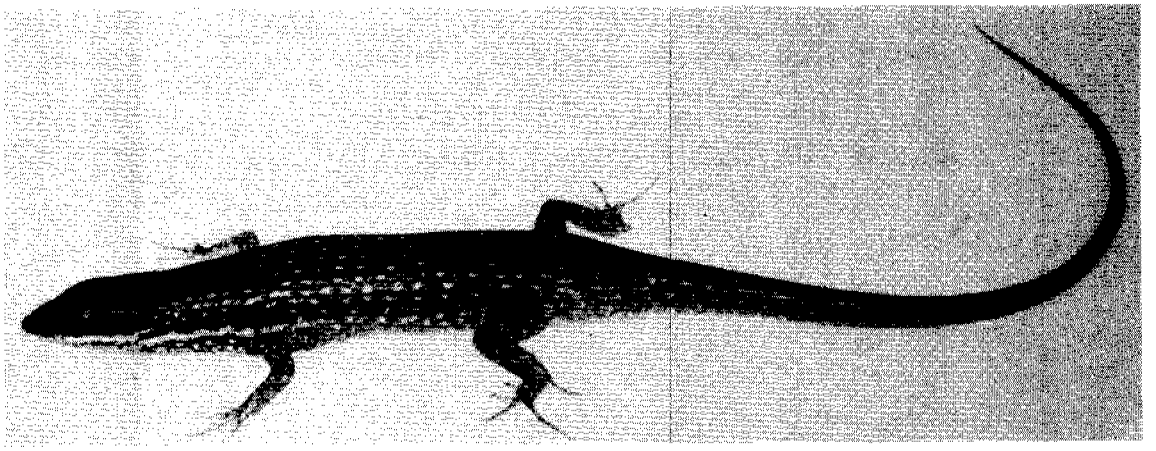


Plate 18. *Carlia munda* from the Georgetown Billabong on Magela Creek (site 20). The individual photographed was an adult male collected at the end of the Wet season (March 1981), and differed from adult females and subadult males in having the following colouration characteristics: a green tinge to the head; an orange flush laterally between the fore and hind limbs; a mottle of blue and black scallop-shaped flecks on the throat and neck.

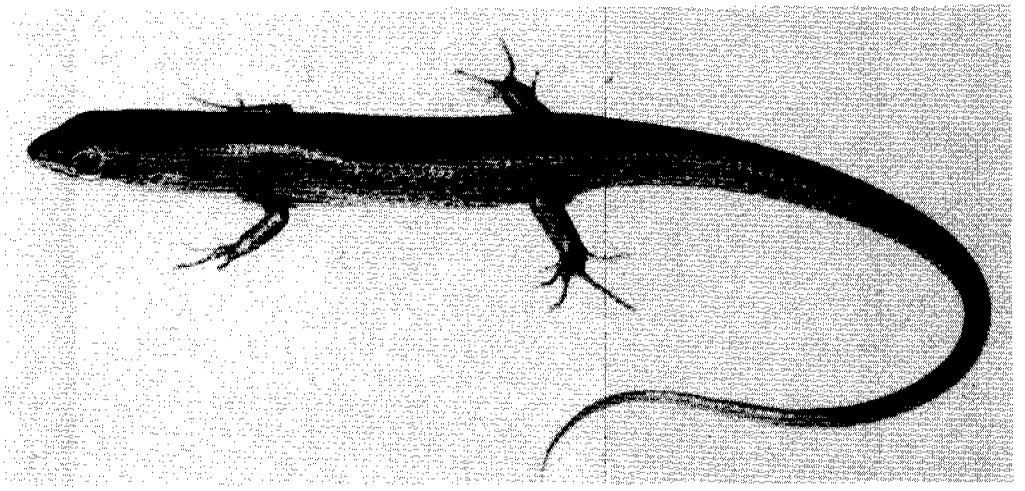


Plate 19. *Carlia gracilis* from Magela Creek in the vicinity of East Jabiru. On some individuals a fine, pale dorsolateral and midlateral stripe may also be present, and in maturing and mature males a russet to broad dark red upper lateral stripe occurs. Adult males collected at the end of the Wet season have a metallic green sheen to the head.

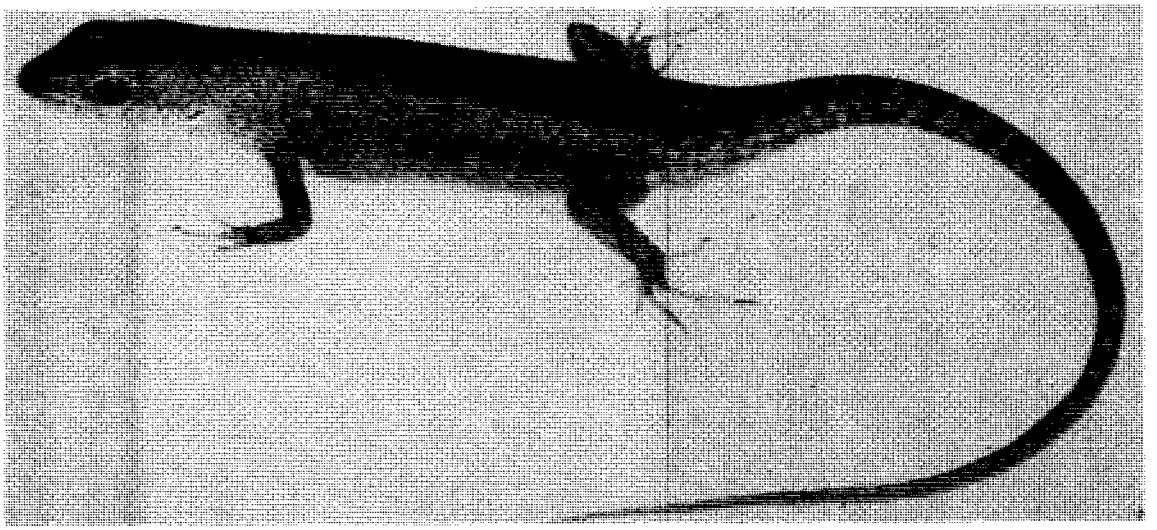


Plate 20. *Carlia triacantha* from the vicinity of GS009 on Magela Creek (site 18). The individual photographed was an adult male collected at the end of the Wet season (March 1981), and differed from adult females and subadult males in having the following colouration characteristics: a dark green tinge to the head; an orange flush laterally between the fore and hindlimbs; the throat and labials light blue; an orange wash to the chest and abdomen.

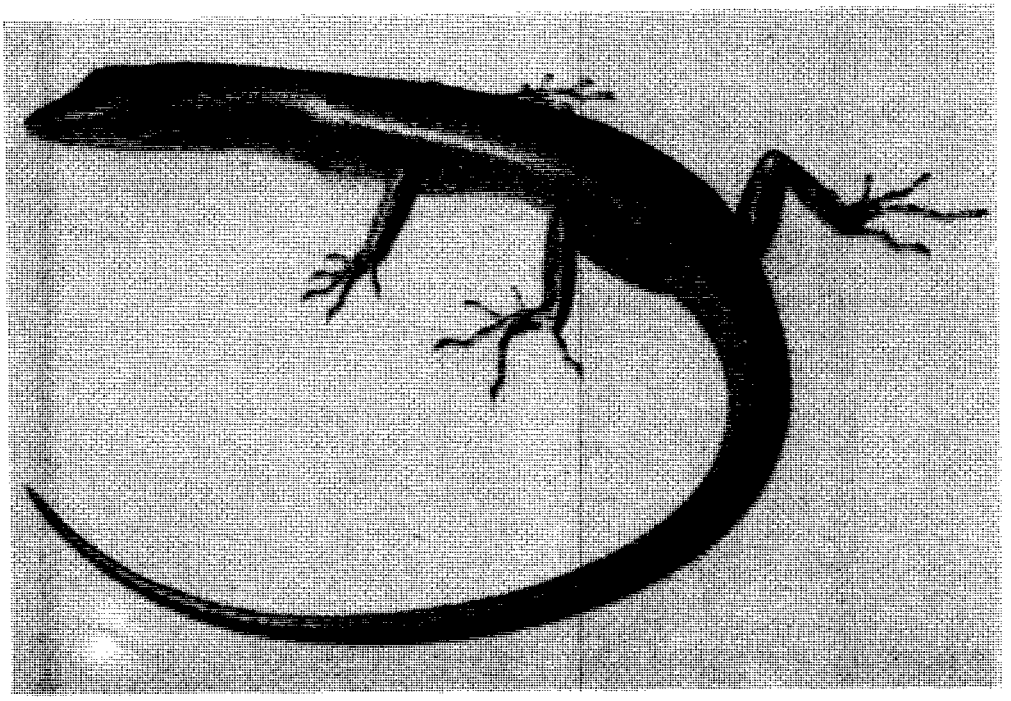
3.22 *Cryptoblepharus plagiocephalus* (Plate 21)

Habitat: *C. plagiocephalus* occurs in most woodland habitats with the exception of remnant rainforest in sheltered gulleys of the sandstone outliers.

Distribution: recorded from sites 1; 2a, b; 7b; 8a; 12b; 13a, b; 14; 15a, c, d; 16a, b; 17a, b, c; 18a, b, c, d, e; 19a, b, c, d; 20a, b; 21a, b, c

Field observations: *C. plagiocephalus* is an aboreal species. During the Wet season individuals were observed on trees in inundated water courses. Adult females collected during the Wet and Dry seasons contained 2 shelled oviducal eggs.

(a)



(b)

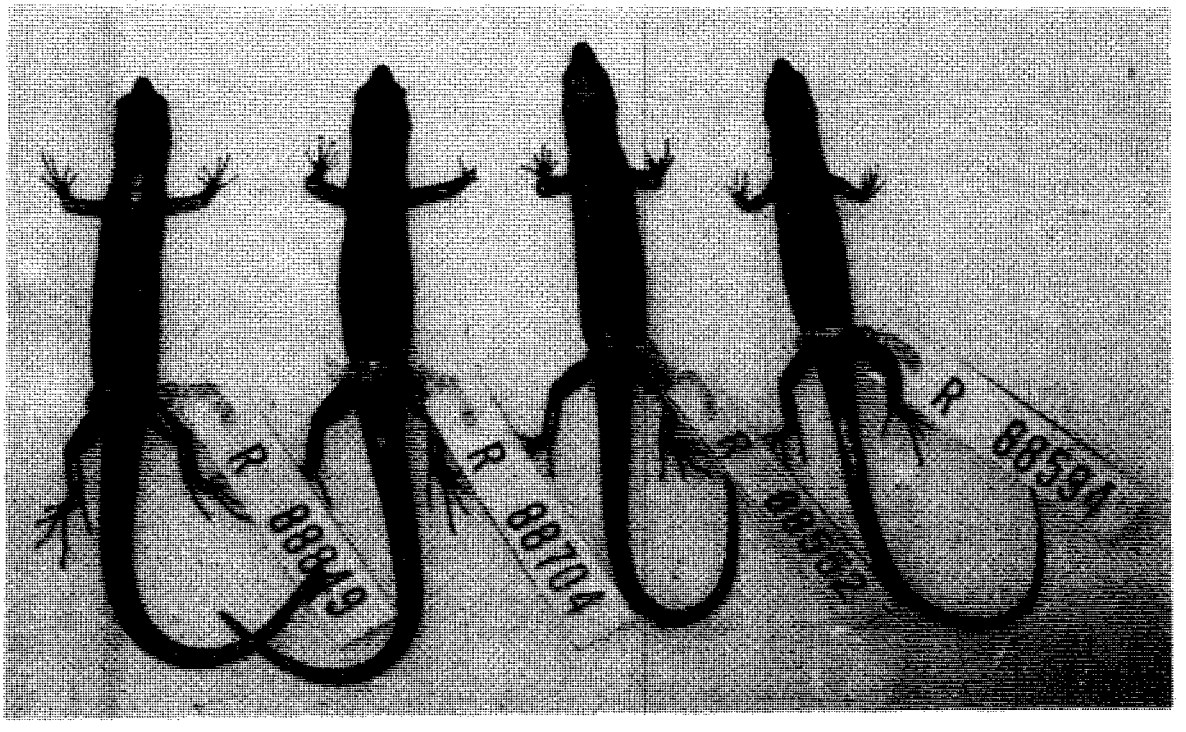


Plate 21. *Cryptoblepharus plagiocephalus* from the Jabiluka Project Area (photo A.E. Greer). There is considerable variation in the degree of dark patterning to the dorsal and lateral surface, the individual in (a) being of light colouration with little definition to the dorsal and lateral pattern. Other specimens (b) from this region showed the following colouration characteristics: a broad vertebral stripe variably defined by adjacent dark edging (present as a series of more or less continuous dark flecks and often only occurring anteriorly); a concentration of dark brown markings along the dorsolateral surface.

3.23 *Ctenotus arnhemensis* (Plate 22)

Habitat: *C. arnhemensis* occurs in lowland dryland habitat of open myrtaceous woodland with thick grass and sedge cover on the sandy alluvial flats, and lowland wetland habitat of grassland fringing Island Billabong.

Distribution: recorded from sites 12a; 14; 15b; 18e; 19a; 17a, c

Comments: This species was only recently described by Storr (1981).

3.24 *Ctenotus borealis* (Plate 23)

Habitat: *C. borealis* occurs in lowland dryland habitats of riparian woodland and open creekside vegetation at the upper reaches of Magela Creek and its tributaries, and mixed woodland adjacent to the floodplain at the mid reaches of Magela Creek.

Distribution: recorded from the vicinity of sites 6; 15b; 18; 20

Field observations: In life the ventral surface usually has a yellow flush posterior to the throat, most prominent on the abdomen and underside of the hindlimb, soles of the feet and tail. Individuals in which this yellow ventral flush is well developed also have a similarly coloured flush to the anterior section of the pale dorsolateral stripe.

Comments: James (1983) records shelled oviducal eggs in several individuals between February and May. This species was only recently described by Horner et al. (1985) where a full account of the species distribution can be found.

3.25 *Ctenotus coggeri* (Plate 24)

Habitat: *C. coggeri* occurs in sandstone habitat of the escarpment, plateau and outliers.

Distribution: recorded from sites 7b; 13a; 15e

Field observations: *C. coggeri* was collected mainly in small mammal and pitfall traps set overnight, and was occasionally observed in the early morning hours.

Comments: This species was only recently described by Sadlier (1985*a*) where a full account of the species distribution and habitats occupied can be found.

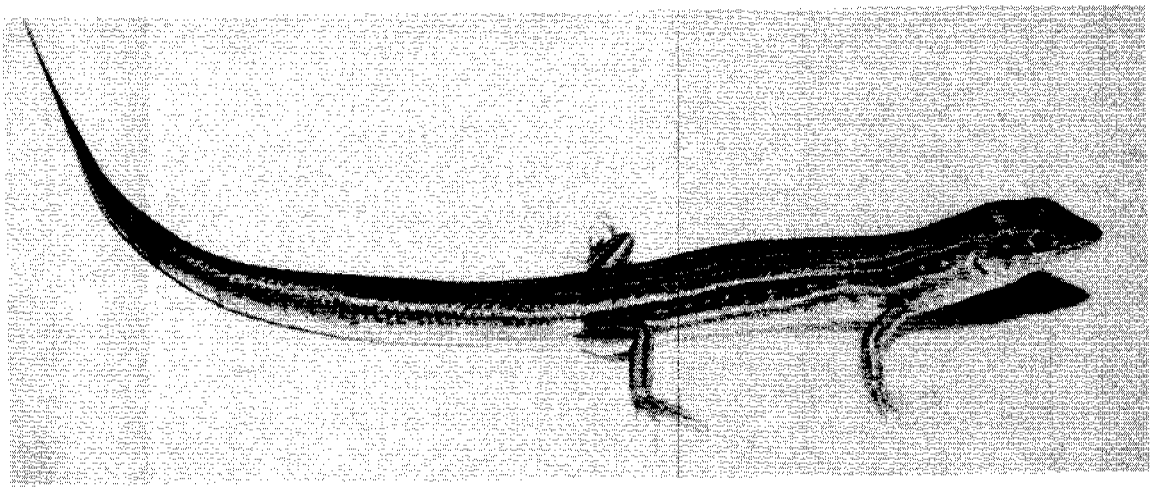


Plate 22. *Ctenotus arnhemensis* from the vicinity of GS009 on Magela Creek (site 18)

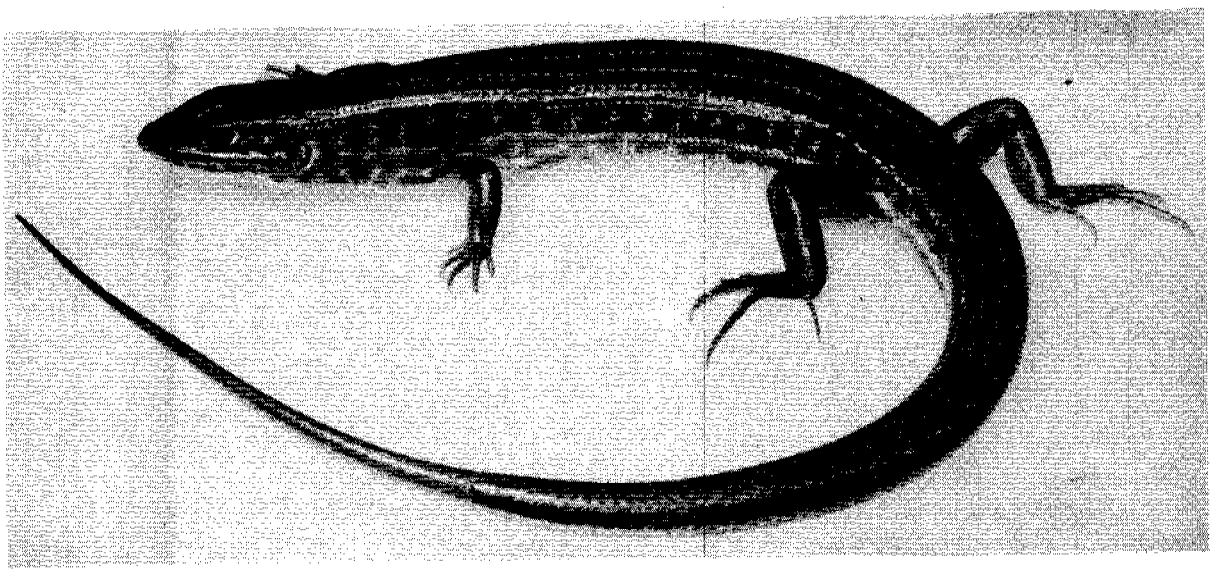


Plate 23. *Ctenotus borealis* from the vicinity of Ja Ja Camp on Magela Creek (photo A.E. Greer)

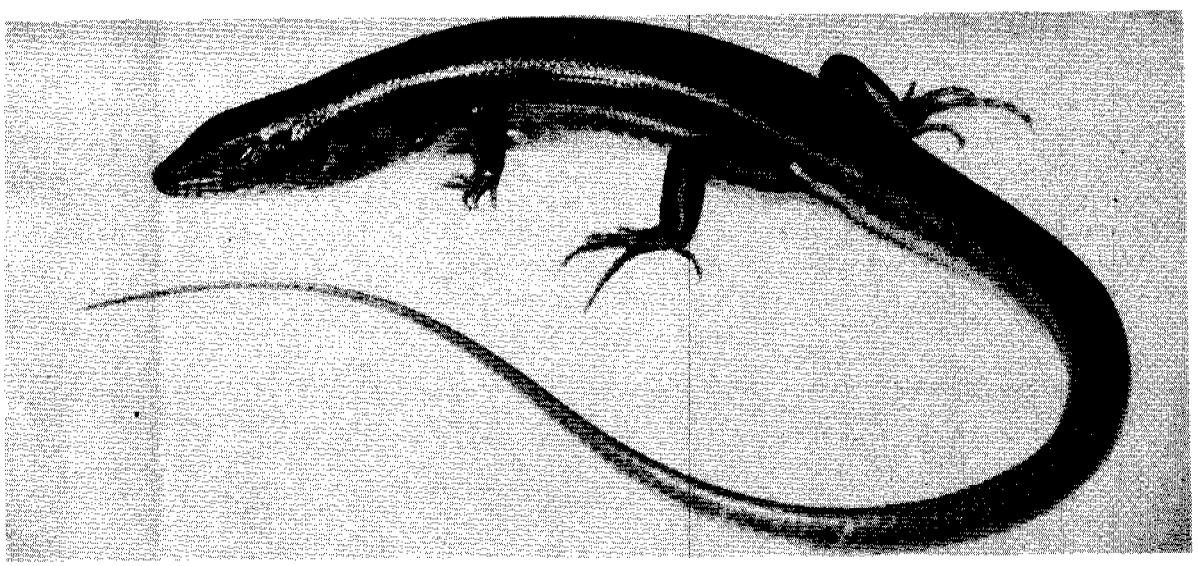


Plate 24. *Ctenotus coggeri* from the Jabiluka Project Area (photo A.E. Greer)

3.26 *Ctenotus essingtoni* (Plate 25)

Habitat: *C. essingtoni* occurs in wetland riparian woodland and most lowland dryland habitats including: tall mixed eucalypt woodland bordering the sandstone outlier; dryland riparian woodland; myrtaceous woodland of the sandy alluvial flats; and grassland of the upper flood plain fringe and creek edges.

Distribution: recorded from sites: 2b; 5; 7a; 8a, b; 12a, b; 13a, b; 14; 15a, b; 16a, b; 17a, b, c; 18b; 19a, b, c, d; 20a; 21a, c

Field observations: During the Dry season (August-November), adult females contained 2-4 enlarged yolked ovarian follicles. From the end of the Wet season through the first months of the Dry season both adult males and females show no sign of reproductive activity.

Comments: James (1983) recorded egg laying occurring over a similar period. Storr (1969) redescribed this species when reviewing the genus *Ctenotus* in Western Australia and the Northern Territory.

3.27 *Ctenotus gagadju* (Plate 26)

Habitat: *C. gagadju* occurs in lowland dryland habitat of open mixed eucalypt woodland with speargrass understory.

Distribution: recorded from sites 16b; 18a, b; 20a

Field observations: *C. gagadju* was the only *Ctenotus* species to occur in this (above) woodland habitat. An adult female (54 mm SVL) collected at the end of the Wet season contained three enlarged yolked ovarian follicles; adult females collected during the Dry season showed no sign of reproductive activity.

Comments: This species was only recently described by Sadlier (1985*b*) where a full account of the species distribution and habitats occupied can be found.

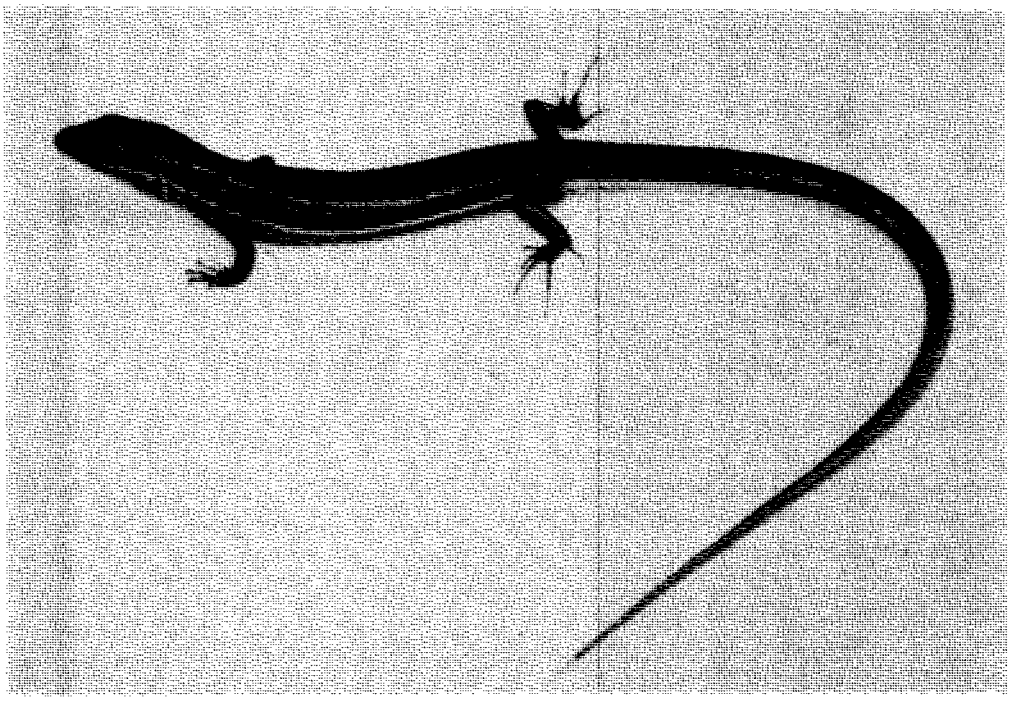


Plate 25. *Ctenotus essingtoni* **from Georgetown Billabong on Magela Creek (site 20)**

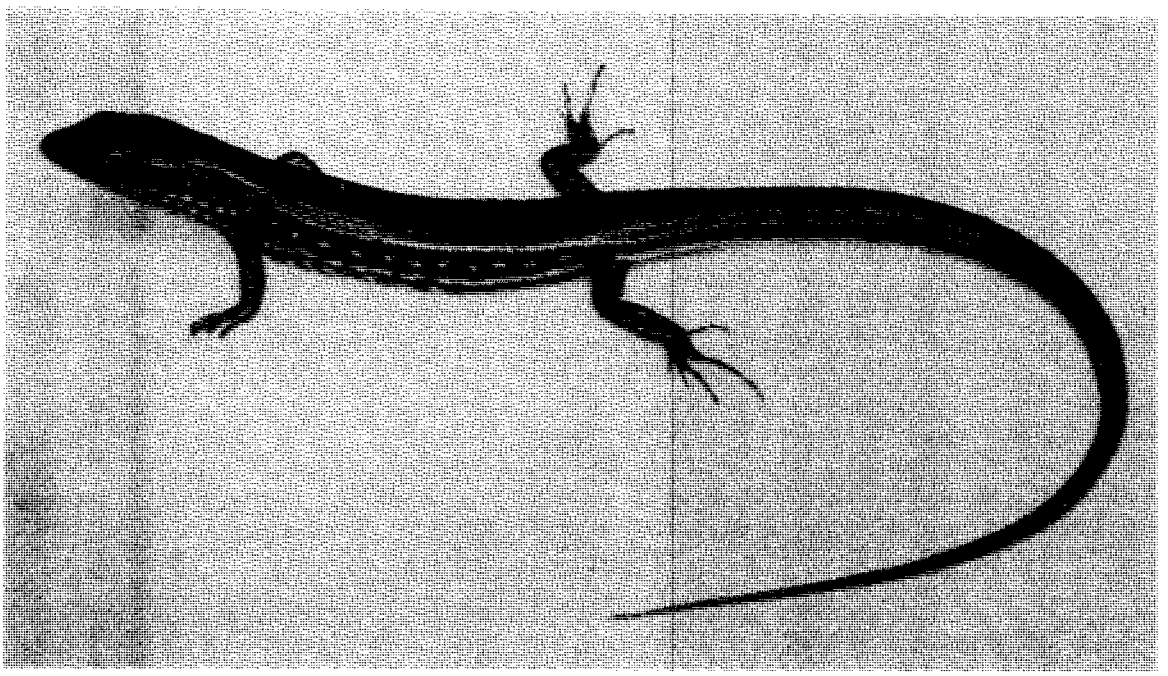


Plate 26. *Ctenotus gagadju* **from Georgetown Billabong on Magela Creek (site 20). The dark vertebral stripe may be absent from some individuals**

3.28 *Ctenotus inornatus* (Plate 27)

Habitat: *C. inornatus* occurs in sandstone habitat of the plateau of the sandstone outliers.

Distribution: recorded from sites 7b; 15c

Field observations: *C. inornatus* is uncommon. Individuals were observed active in the mid-late morning and late afternoon hours. In life there is a pink flush to the facial region and yellow flush ventrally posterior of the forelimbs.

Comments: Sadlier (1985*a*) in describing *C. coggeri* from the Alligator Rivers region discusses the status of *C. inornatus* (particularly the Arnhem Land specimens) across northern Australia. James (1983) records shelled oviducal eggs for a single individual in late October.

3.29 *Ctenotus storri* (Plate 28)

Habitat: *C. storri* occurs in dryland lowland habitats of open myrtaceous woodland with dense sedge and grass cover on sandy alluvial flats, and open woodland and mixed eucalypt woodland adjacent to the sandstone escarpment.

Distribution: recorded from site 8a; 15a, b; 19a, b

Comments: This species was only recently described by Rankin (1978) where a full account of its distribution and habitat preferences in other regions can be found.

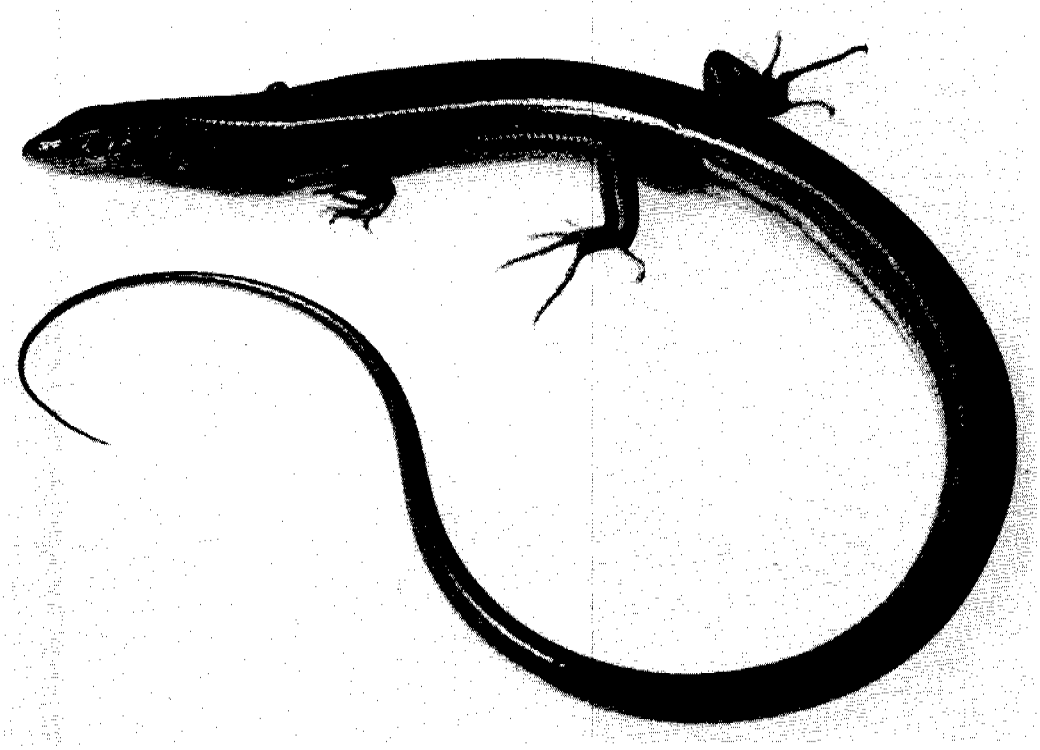


Plate 27. *Ctenotus inornatus* from the eastern edge of the Jabiluka outlier (site 7b) (photo A.E. Greer)

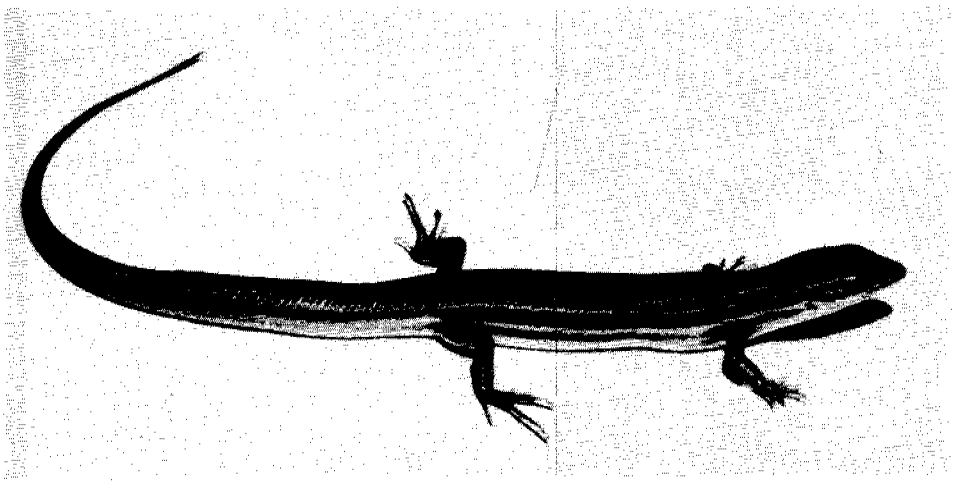


Plate 28. *Ctenotus storri* from the mid-reaches of Gulungul Creek (site 19)

3.30 *Ctenotus vertebralis* (Plate 29)

Habitat: *C. vertebralis* occurs in sandstone woodland habitat of the sandstone plateau, and lowland dryland habitat of tall mixed eucalypt woodland bordering the sandstone escarpment.

Distribution: recorded from sites 5; 7b; 10; 13b

Field observations: On the sandstone plateau *C. vertebralis* was observed in areas of exposed soil with grass cover. It was not recorded from among the sandstone peaks or outcroppings of the escarpment.

Comments: Rankin and Gillam (1979) record shelled oviducal eggs from an individuals collected July 1973 but were unable to determine clutch size. Another individual (52 mm SVL) collected in April 1979 contained three moderately enlarged yolked ovarian follicles. *C. vertebralis* is known from three localities along the western and southern borders of Arnhem Land, where it occurs in open woodland on lateritic to sandy soils in close association with rock outcroppings. This species was only recently described by Rankin & Gillam (1979).

3.31 *Egernia* cf. *frerei* (Plate 30)

Habitat: *E.* cf. *frerei* occurs in closed forest and rocky habitats associated with the sandstone escarpment.

Distribution: recorded from southeast corner of Jabiluka outlier

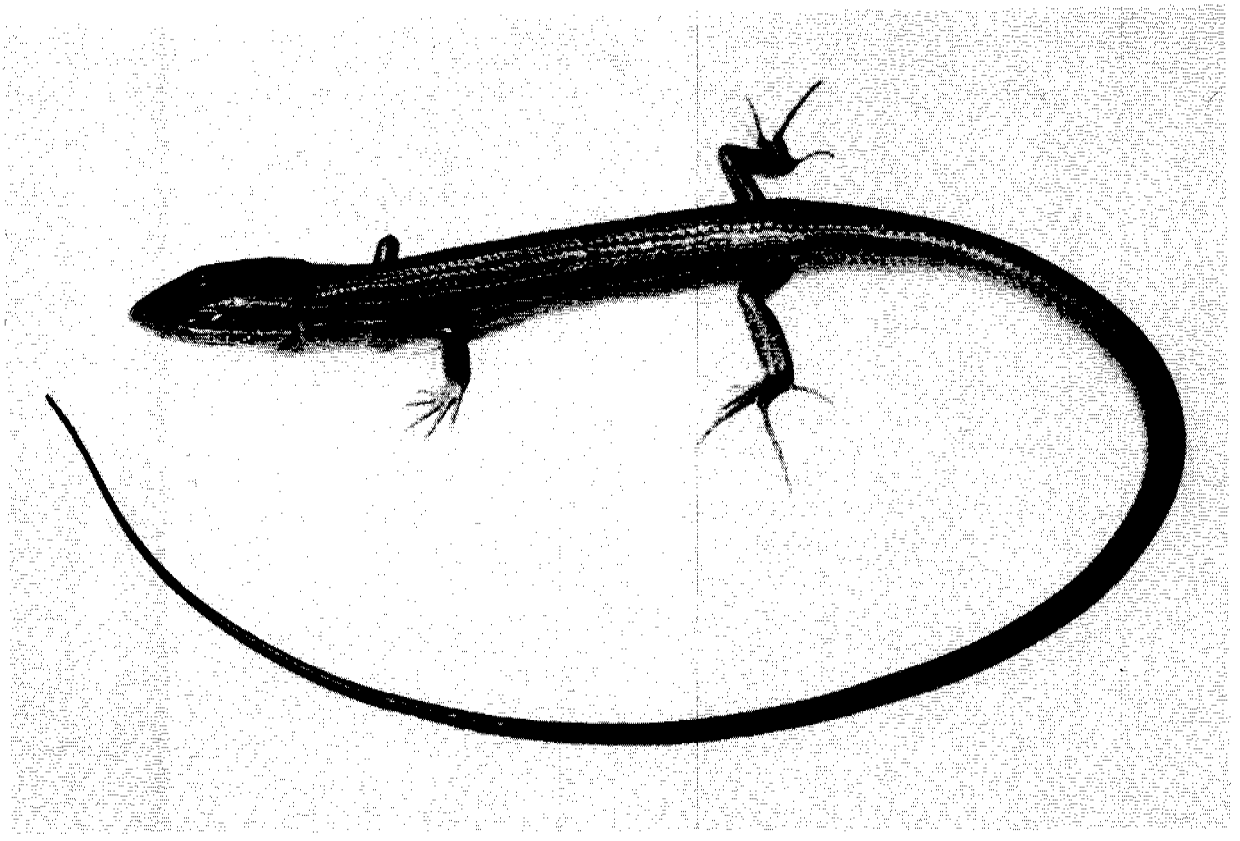


Plate 29. *Ctenotus vertebralis* from the plateau of the Jabiluka outlier (site 10) (photo A.E. Greer). Colour and pattern is variable, the individual photographed is boldly marked, but the pattern can fade in intensity to the point where the dark vertebral stripe and upper lateral stripe are obscure or absent.

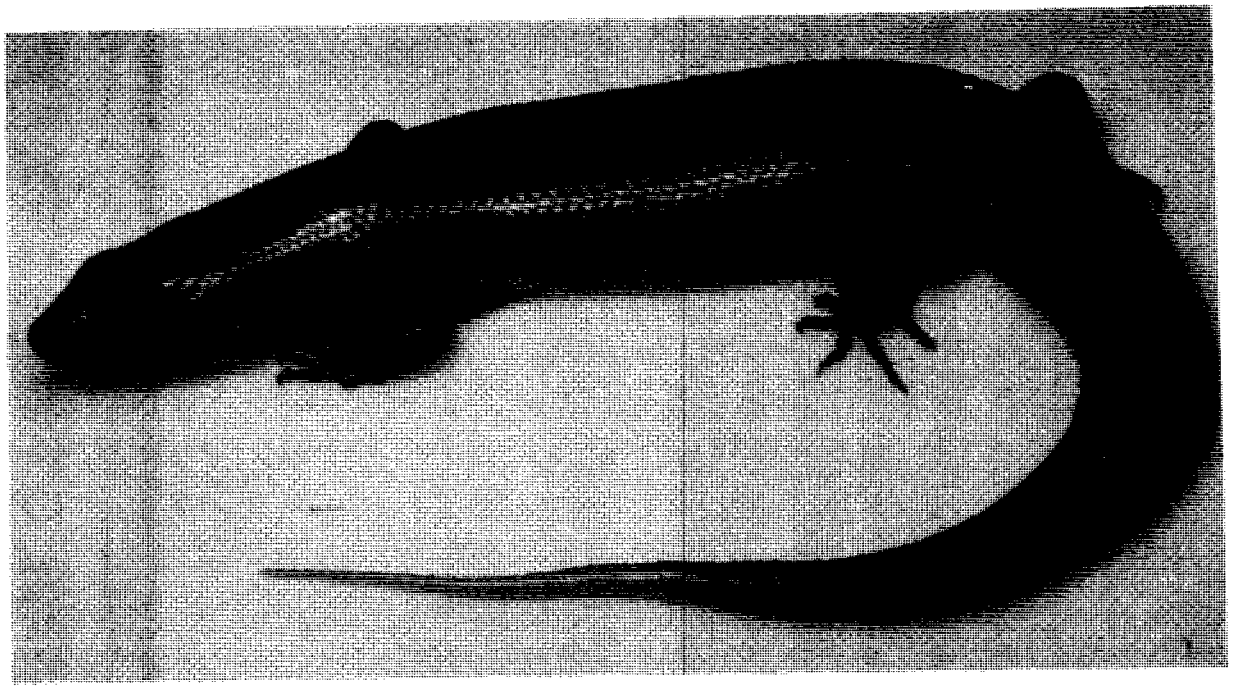


Plate 30. *Egernia* cf. *frerei* from the south-east corner of the Jabiluka outlier (photo A.E. Greer)

3.32 *Lerista karlschmidti* (Plate 31)

Habitat: *L. karlschmidti* occurs in lowland dryland habitats adjacent to the sandstone escarpment (tall mixed eucalypt woodland), upper reaches of Magela Creek (riparian woodland), and seasonally inundated wetland habitat (mature woodland) bordering the mid-reaches of Magela Creek. Ground cover in dryland woodland habitats was leaf litter on sandy substrate and in wetland, woodland leaf litter on a dark silt substrate.

Distribution: recorded from sites 1; 5; 12b; 15a; 19b

Field observations: In riparian woodland, individuals of *L. karlschmidti* were collected beneath logs embedded in soil. In mixed eucalypt woodland adjacent to the sandstone escarpment individuals were collected within the superficial layer of fine ash and sand beneath leaf litter at the base of boulders.

3.33 *Menetia alanae* (Plate 32)

Habitat: *M. alanae* occurs in lowland dryland habitats of mixed woodland associated with sandy levee banks on tributaries on the upper reaches of Magela Creek.

Distribution: recorded from sites 19b, c; 21c

Field observations: *M. alanae* was observed active amongst piles of leaf litter at the base of trees and shrubs. Adults had a yellow flush to the venter from forelimbs to tail. The dorsal surface of the juveniles is a very light grey and sharply in contrast with the dark grey lateral surface.

Comments: This species was only recently described by Rankin (1979).

3.34 *Menetia concinna* (Plate 33)

Habitat: *M. concinna* occurs in lowland wetland habitats of floodplain fringe woodland, and lowland dryland habitats of mixed eucalypt and riparian woodland, both with a moderately thick understory on a sandy substrate.

Distribution: recorded from sites 2b; 5; 10; 12b

Field observations: Individuals of *M. concinna* were collected beneath leaf litter in the layer of fine debris covering the ground surface.

Comments: This species was only recently described by Sadlier (1984).

3.35 *Menetia greyi* (Plate 34)

Habitat: *M. greyi* occurs in lowland dryland habitats of open mixed eucalypt woodland with speargrass understory.

Distribution: recorded from sites 18a; 20a

Field observations: All recorded specimens were pitfall trapped. A single adult female (27 mm SVL) collected during the Dry season contained 2 large shelled oviducal eggs.

Comments: This species was recently redescribed by Rankin (1979) in reviewing *Menetia* in the Northern Territory.

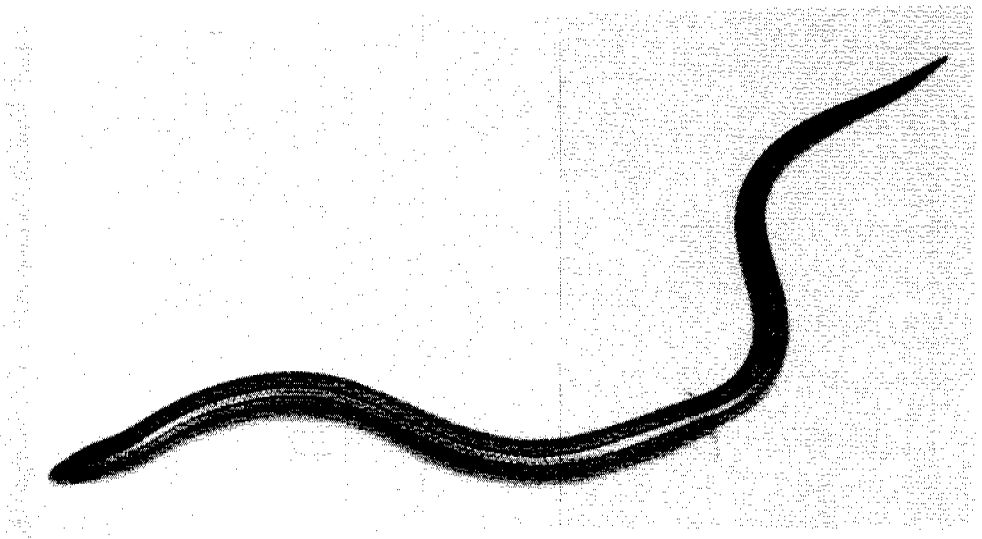


Plate 31. *Lerista karlschmidti* from the mid-reaches of Gulungul Creek (site 19).

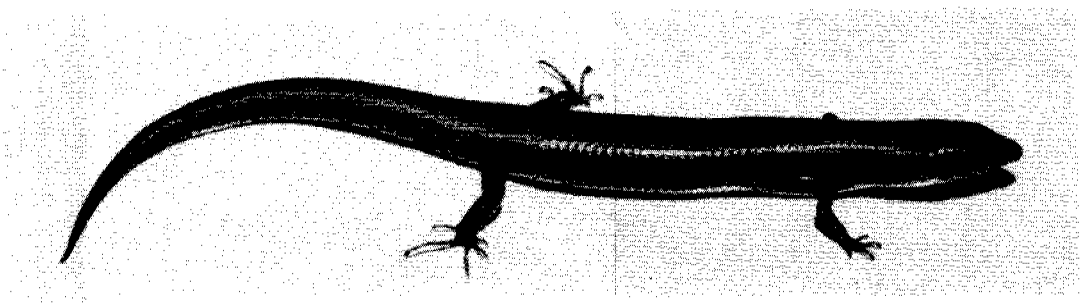


Plate 32. *Menetia alanae* from the mid-reaches of Gulungul Creek (site 19)

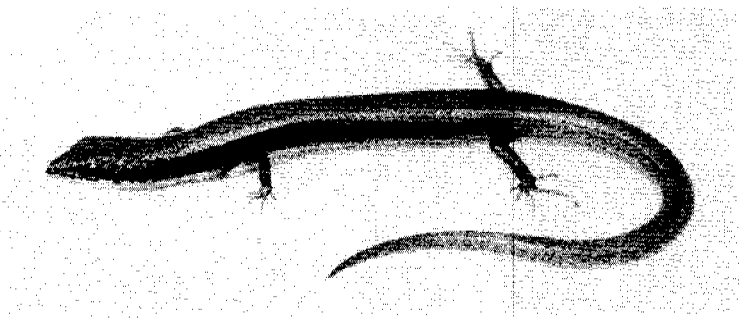


Plate 33. *Menetia concinna* from the western edge of the Arnhem Land escarpment (site 5) (photo A.E. Greer)

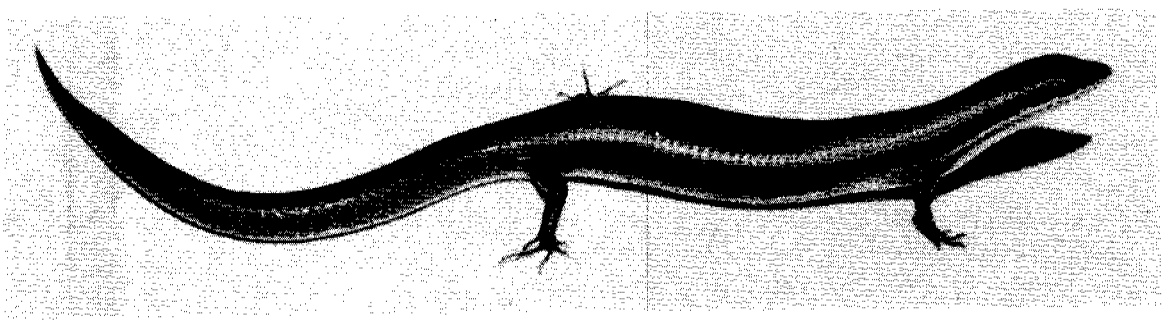


Plate 34. *Menetia greyi* from the vicinity of GS009 on Magela Creek (site 18)

3.36 *Morethia ruficauda* (Plate 35)

Habitat: *M. ruficauda* occurs in sandstone habitat on the Jabiluka outlier escarpment and on sandstone outliers.

Distribution: recorded from sites 13a; 15a, c, d, e

Field observations: All recorded specimens were pitfall trapped.

Comments: Greer (1980) reviewed the status and biology of this species, providing notes on colour in life of *M. ruficauda* from individuals collected in the Magela Creek region.

3.37 *Morethia storri* (Plate 36)

Habitat: *M. storri* occurs in lowland dryland habitats of open mixed eucalypt woodland with speargrass understory, and myrtaceous woodland on sandy alluvial flats. Both habitats generally had a thick grass cover.

Distribution: recorded from sites 12a; 15b; 16b; 17a, c; 18a, b, c; 19b, c; 20a; 21a, c

Field observations: All recorded specimens were pitfall trapped. Females collected during the dry and late Wet season contained 2-3 enlarged yolked ovarian follicles, and one individual (Dry season) shelled oviducal eggs.

Comments: This species was only recently described by Greer (1980) where a full account of the species distribution and biology is provided.

3.38 *Notoscincus wotjulum* (Plate 37)

Habitat: *N. wotjulum* occurs in sandstone woodland on the sandstone escarpment, and adjacent lowland dryland habitat of mixed eucalypt woodland.

Distribution: recorded from sites 7a, b; 8a; 10; 13a, b; 15a, d

Field observations: Individuals were usually observed active in leaf litter piles, and when pursued burrowed into fine litter beneath the leaves.

Comments: The status of this species in the Northern Territory was recently reviewed (as *Notoscincus ornatus wotjulum*) by Storr (1974*a*).

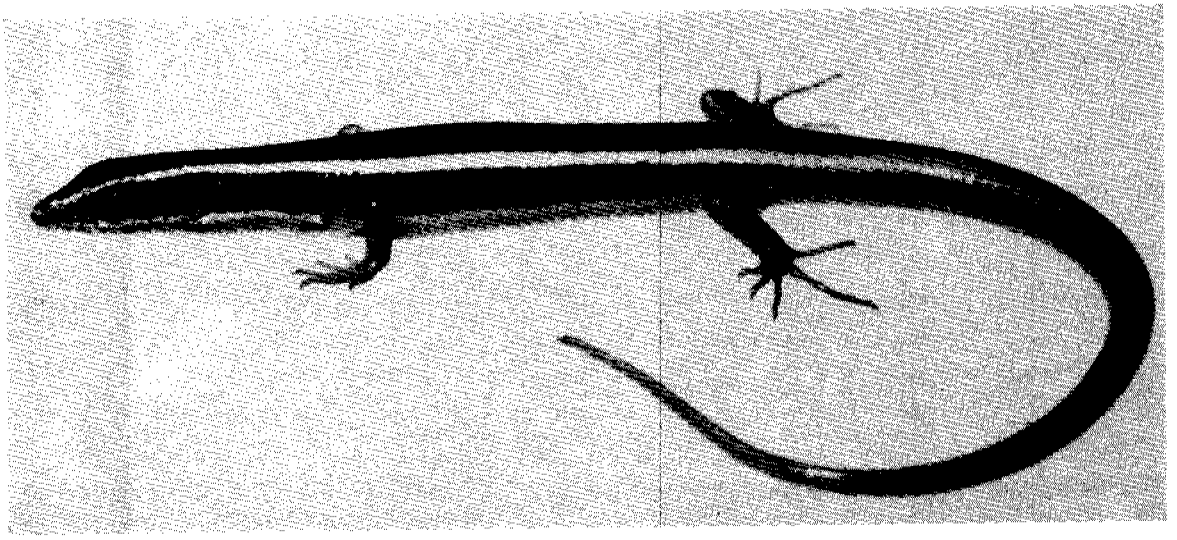


Plate 35. *Morethia ruficauda* from sandstone outcropping on Jabiluka Project Area (site 15) (photo A.E. Greer)

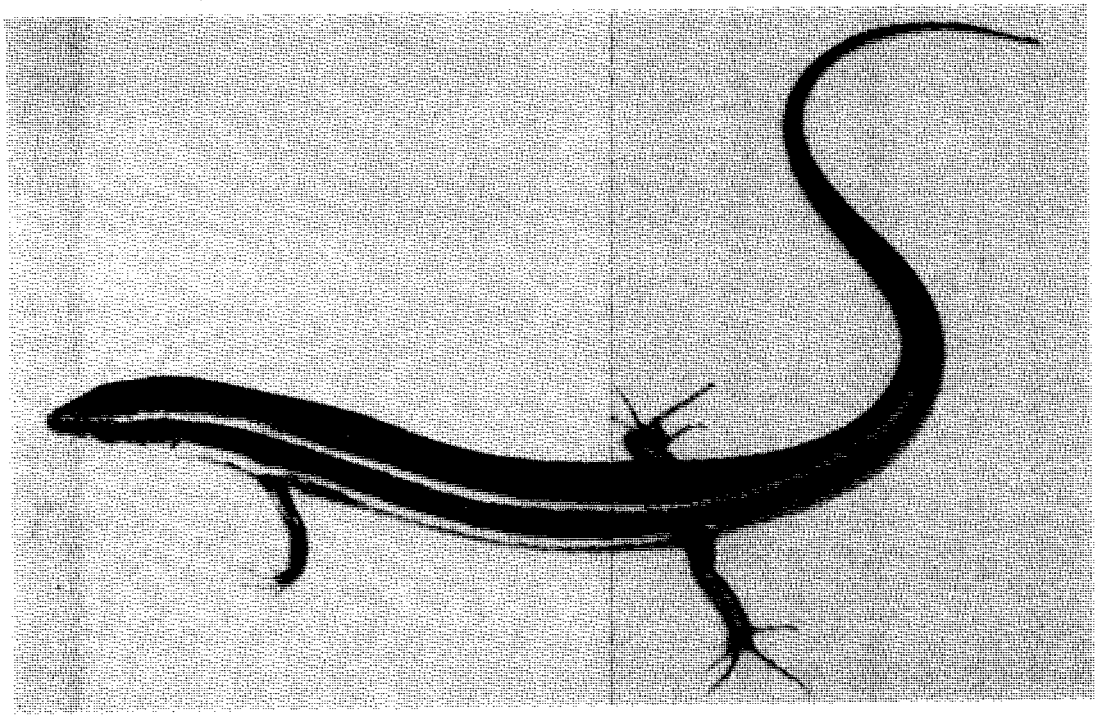


Plate 36. *Morethia storri* from Georgetown Billabong on Magela Creek (site 20)

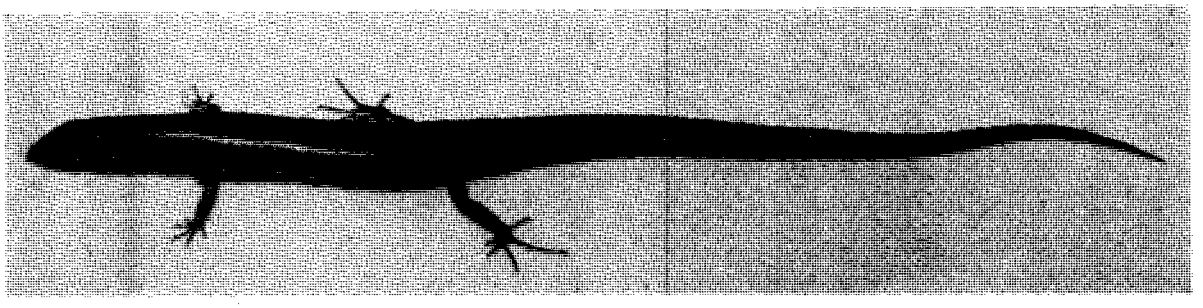


Plate 37. *Notoscincus wotjulum* from sandstone outcropping on Jabiluka Project Area (site 15) (photo A.E. Greer)

3.39 *Proablepharus tenuis* (Plate 38)

Habitat: *P. tenuis* occurs in sandstone woodland on the sandstone plateau and escarpment of the Jabiluka outlier, and in lowland wetland habitat of floodplain fringe woodland bordering Jabiluka Billabong.

Distribution: recorded from sites 2b; 15a, d

Field observations: Individuals were collected from finer debris and ash substrate beneath leaf overburden piled against smaller rock outcroppings. Colouration of the adult male in life features an orange flush to the facial and anterior dorsal head shields (rostral, nasal, frontonasal, prefrontal and frontal scales) most pronounced anteriorly, with the throat a paler orange.

3.40 *Sphenomorphus darwiniensis* (Plate 39)

Habitat: *S. darwiniensis* occurs in lowland dryland habitats of riparian woodland and paperbark woodland, and lowland wetland habitat of flood plain fringe vegetation. In both wetland and dryland habitats the substrate was moist during the Dry season.

Distribution: recorded from sites 2a; 12b, c

Field observations: Individuals were collected either sheltering beneath logs and debris by day, or overnight in pitfall traps.

Comments: This species was only recently described (as *Sphenomorphus crassicaudus darwiniensis*) by Storr (1967*a*).

3.41 *Sphenomorphus isolepis* (Plate 40)

Habitat: *S. isolepis* occurs in lowland dryland habitat of myrtaceous woodland on sandy alluvial flats and riparian woodland, and lowland wetland habitat of floodplain fringe vegetation.

Distribution: recorded from sites 2; 6; 12a; 13; 19c; 20b

Field observations: Individuals of *S. isolepis* were rarely observed by day and were usually collected sheltering beneath logs and debris, often in areas that would be inundated during the Wet season.

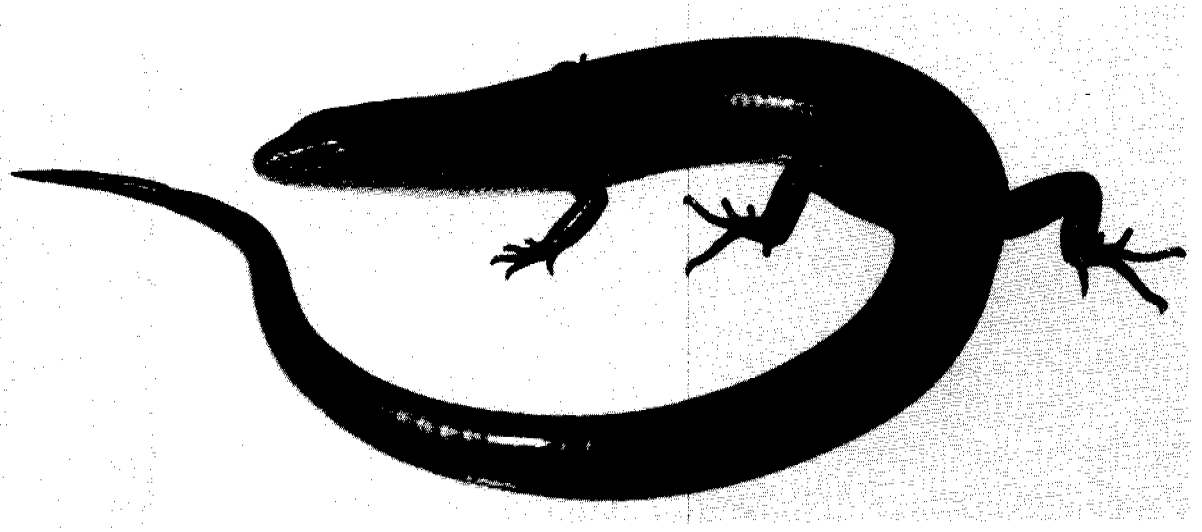


Plate 38. *Proablepharus tenuis* from sandstone outcropping on Jabiluka Project Area (site 15) (photo A.E. Greer)

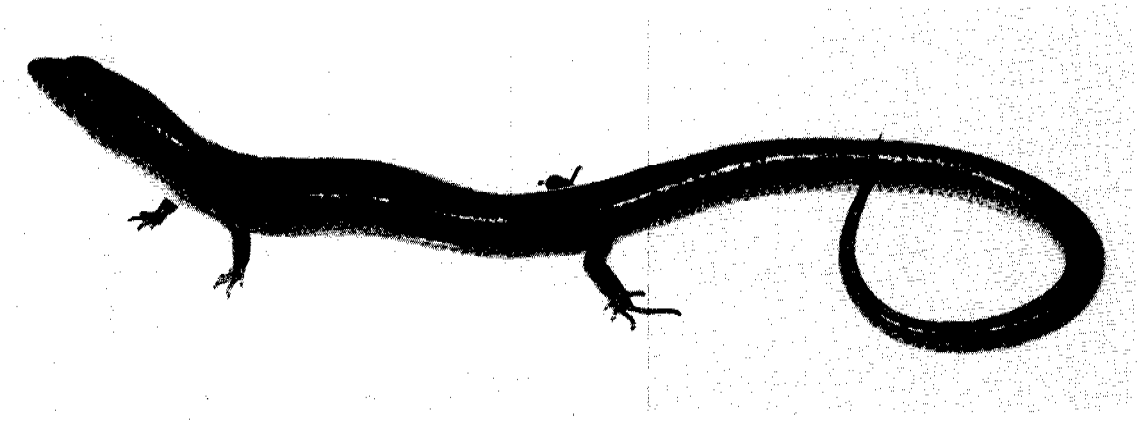


Plate 39. *Sphenomorphus darwiniensis* from Cannon Hill (photo H.G. Cogger)

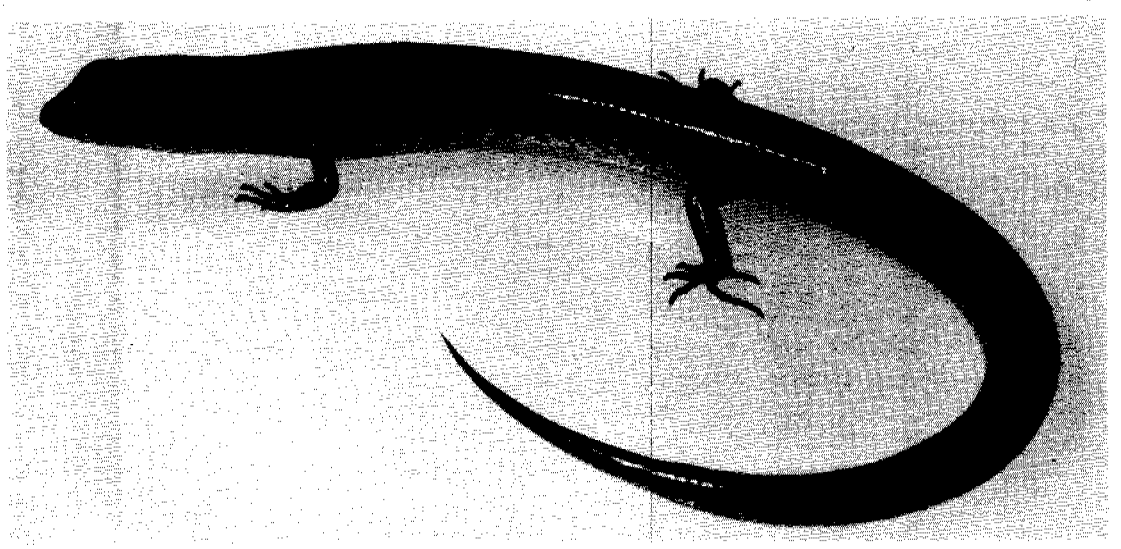


Plate 40. *Sphenomorphus isolepis* from Ja Ja Camp on Magela Creek (photo A.E. Greer)

3.42 *Tiliqua scincoides intermedia* (Plate 41)

Habitat: *T. scincoides intermedia* was recorded from lowland dryland habitats of open mixed eucalypt woodland, and lowland wetland habitats of mature woodland.

Distribution: recorded from sites 1; 2b and Jabiru East

Field observations: *T. scincoides intermedia* is sporadic in distribution and infrequently encountered.

Family VARANIDAE

Eight species of varanid lizard occur in the Magela Creek region. Cogger (1973) records these same species from the Alligator Rivers Region (but did not distinguish *Varanus panoptes* from *V. gouldii),* and Rankin et al. (1987) the additional species *V. glauerti. Varanus baritji* and *V. glebopalma* are restricted to sandstone habitats of the sandstone escarpment. *Varanus mertensi* and *V. mitchelli* are restricted to habitats associated with watercourses and *V. gouldii*, *V. panoptes*, *V. timorensis* and *V. tristis* occur in lowland woodland habitats.

3.43 *Varanus baritji* (Plate 42)

Habitat: *V. baritji* occurs in sandstone habitat of the escarpment and outliers.

Distribution: specimen records from the vicinity of sites 15 and 7; sight record only from site 11

Comments: This species was recently described by King & Horner (1987), where a full account of the species distribution can be found.

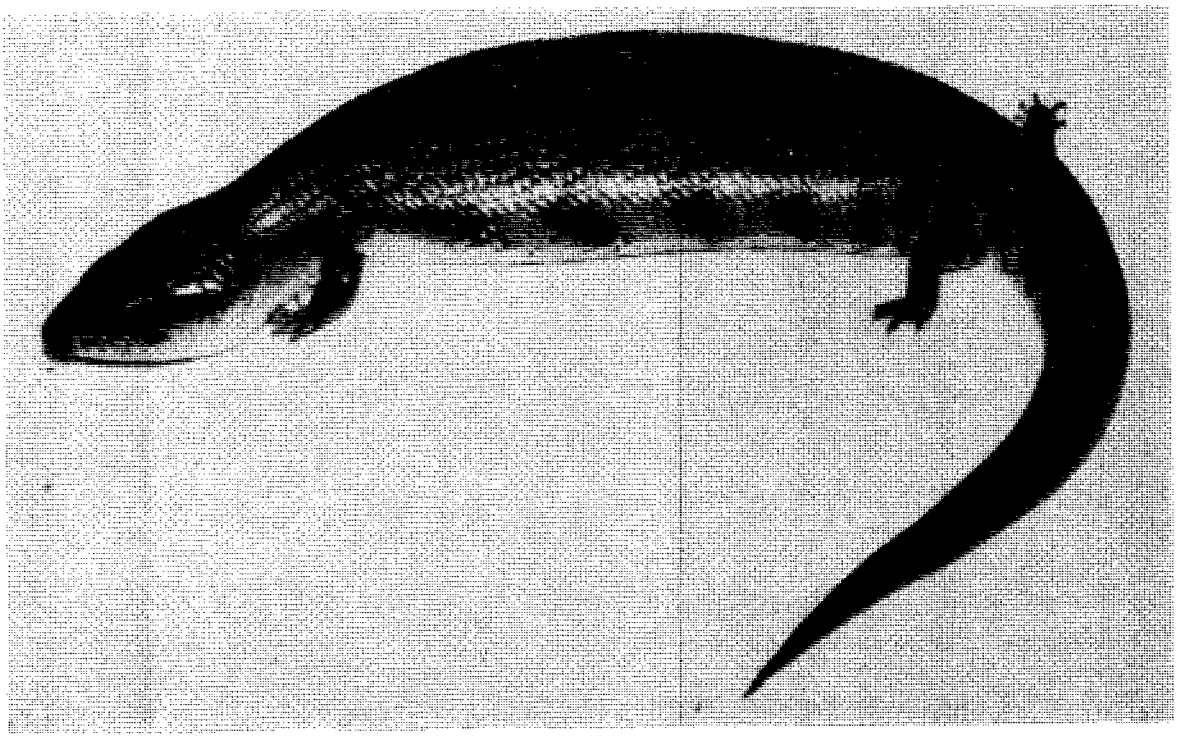


Plate 41. *Tiliqua scincoides intermedia* from Jabiru East township

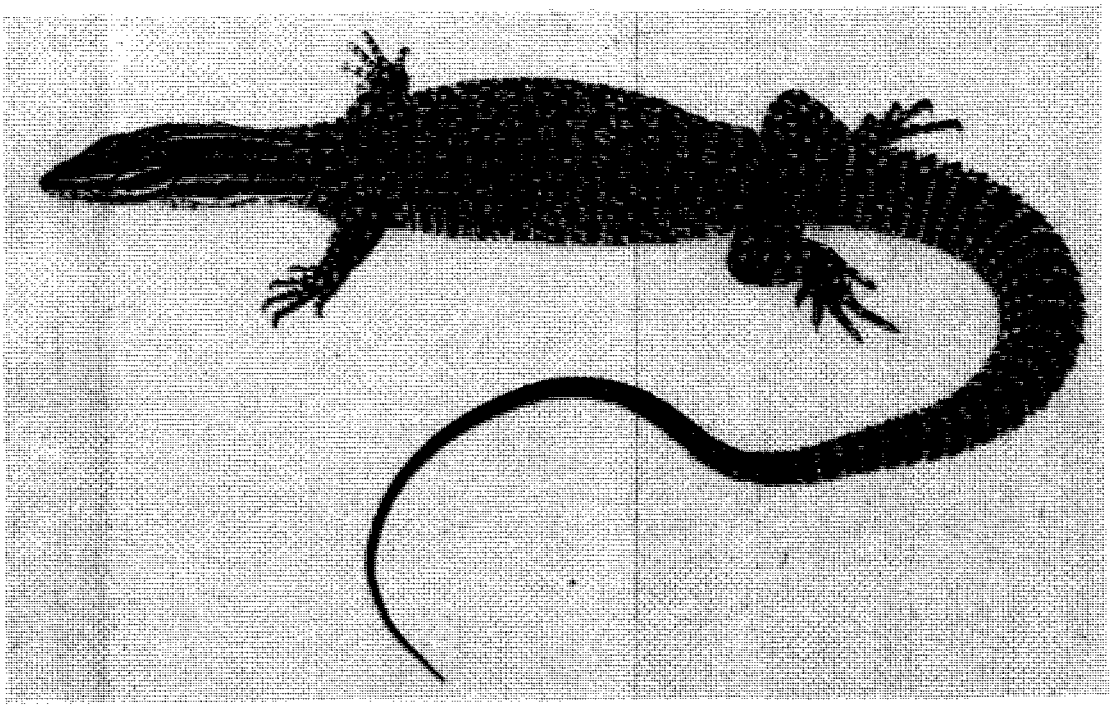


Plate 42. *Varanus baritji* from Mt Brockman (photo H.G. Cogger)

3.44 *Varanus gouldii*

Habitat and distribution: Shine (1986*a*) records this species from the vicinity of Jabiluka Billabong, Leichhardt Billabong, Gulungul Creek, Jabiru and Jabiru East, and comments that these distributions suggest *V. gouldii* occurs largely in woodland habitats.

3.45 *Varanus glebopalma* (Plate 43)

Habitat: *V. glebopalma* occurs on rock outcrops of the sandstone escarpment and plateau.

Distribution: observation records only from sites 3; 4; 7b; 11; 13a; 15

Field observations: *V. glebopalma* was commonly encountered active during the early morning and late afternoon hours.

3.46 *Varanus mertensi* (Plate 44)

Habitat: *V. mertensi* was recorded by Shine (1986*a*; 1986*b*) as occurring primarily at larger pools of the small creeks (rather than the main Magela channel) during the Wet season.

Distribution: (from Shine 1986*a* records); vicinity of Jabiru and East Jabiru; Corndorl Creek crossing; Ja Ja; Baralil Creek

Field observations and comments: During the Wet season (March) a gravid individual (360 mm SVL) collected dead on the road contained shelled oviducal eggs. Shine (1986*a*; 1986*b*) records that individuals were mostly observed basking on the ground at the waters edge, retreating into the water when disturbed. Shine (1986*a*; 1986*b*) comments on the biology of this species, providing data on activity times, food habits and reproductive biology, largely from field data gathered on the Magela Creek.

3.47 *Varanus mitchelli* (Plate 45)

Habitat and distribution: *V. mitchelli* was recorded by Shine (1986*a*; 1986*b*) as occurring along the main Magela Creek channel upstream of Magela crossing, with a strong association to *Melaleuca argentia* on the sandy islands and creek bed between billabongs, and tributaries of Magela Creek at its upper reaches. Shine (1986*a*) records the distribution as follows: Magela crossing; SW bank Mudginberri Billabong; 500 m, 600 m, 700 m, and 800 m upstream from Mudginberri Billabong; 30 m and 300 m downstream from Mudginberri Billabong; Gulungul Creek crossing of Arnhem Highway; Corndorl Creek crossing of Arnhem Highway.

Comments: Individuals were recorded by Shine (1986*a*; 1986*b*) as basking on trees close to water, and when disturbed tending to run further up the tree rather than retreating to the water. In a Dry season survey Shine recorded only 4 individuals (v. 30 from their Wet season survey) from near Mudginberri and Buffalo billabongs. Shine (1986*a*; 1986*b*) comments on the biology of this species.

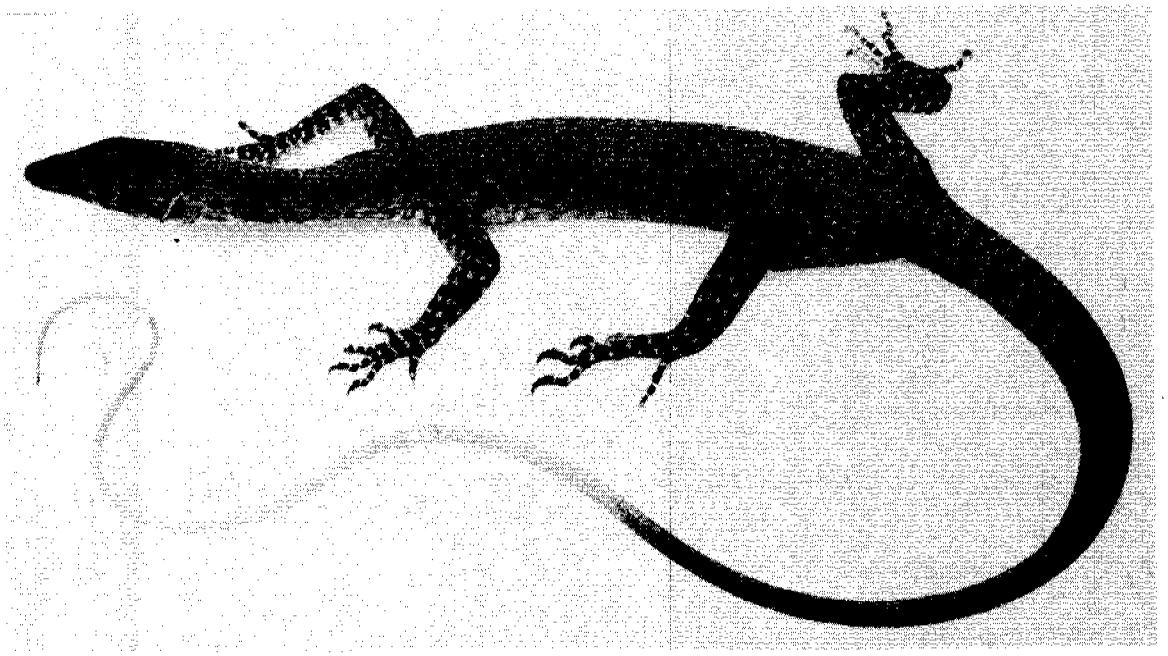


Plate 43. *Varanus glebopalma* from Mt Brockman (photo H.G. Cogger)

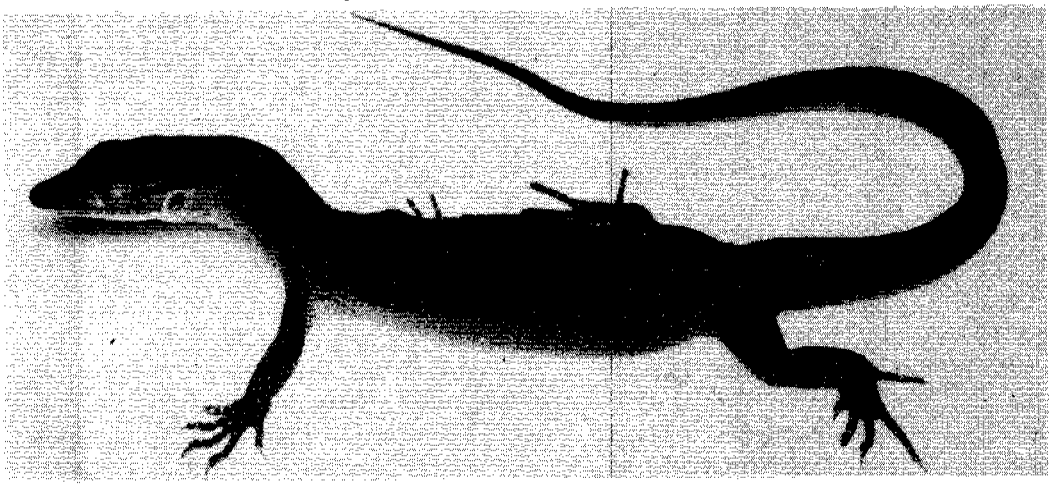


Plate 44. *Varanus mertensi* from Magela Creek

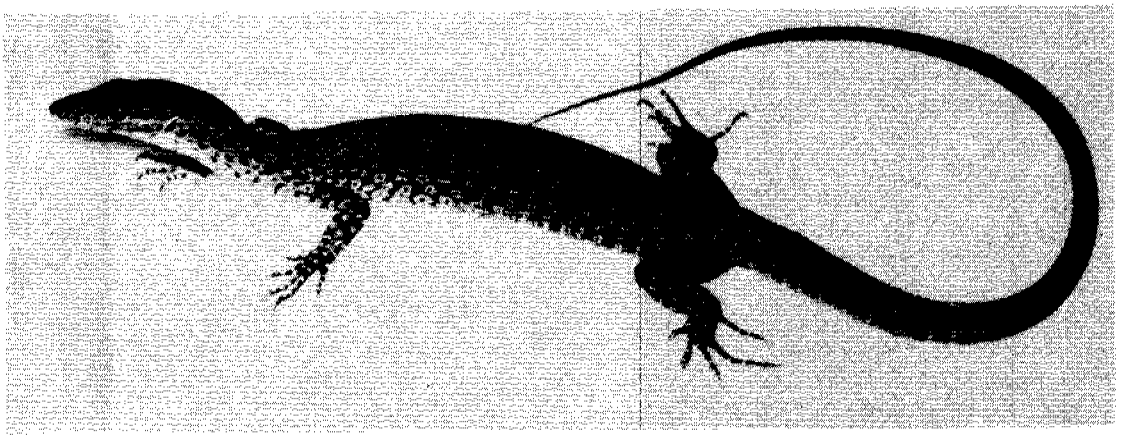


Plate 45. *Varanus mitchelli* from Magela Creek

3.48 *Varanus panoptes* (Plate 46)

Habitat: *V. panoptes* generally occurs in lowland dryland woodland habitats adjacent to water courses.

Distribution: recorded from the vicinity of sites 17b; 18a; 20b; 21b; and the following sites recorded by Shine (1986*a*) vicinity of Jabiluka Billabong; Crescent Billabong; Buffalo Billabong; Nankeen Billabong; Leichhardt Billabong; Baralil Creek; vicinity of Jabiru; vicinity of Ja Ja; Corndorl Creek crossing of Arnhem Highway; 2 km south of Mudginberri on Oenpelli Road; 7 km north of the Arnhem Highway on the Oenpelli Road; Munmallary turnoff on Arnhem Highway

Comments: Sight records taken on the Jabiluka Project Area in 1979 could have been either *V. panoptes* or *V. gouldii* but were at the time not distinguished (the description of *V. panoptes* post dating the Jabiluka survey) and voucher specimens were not taken. Shine (1986*b*) comments that the majority of sightings are from riparian habitats. This species was only recently described by Storr (1980). Shine (1986*a*; 1986*b*) comments on the biology of this species.

3.49 *Varanus timorensis* (Plate 47)

Habitat: *V. timorensis* occurs in lowland dryland habitat of open eucalypt woodland with a speargrass understory, and woodland habitats along the channels of Magela Creek.

Distribution: recorded from vicinity of sites 2b; 18; 20 and Jabiru East

Field observations: *V. timorensis* was most commonly encountered during the Wet season. Fewer individuals were observed during the Dry season and none of these near the creek channels. Individuals were usually observed on a tree in the vicinity of a hollow, only occasionally being disturbed on the ground.

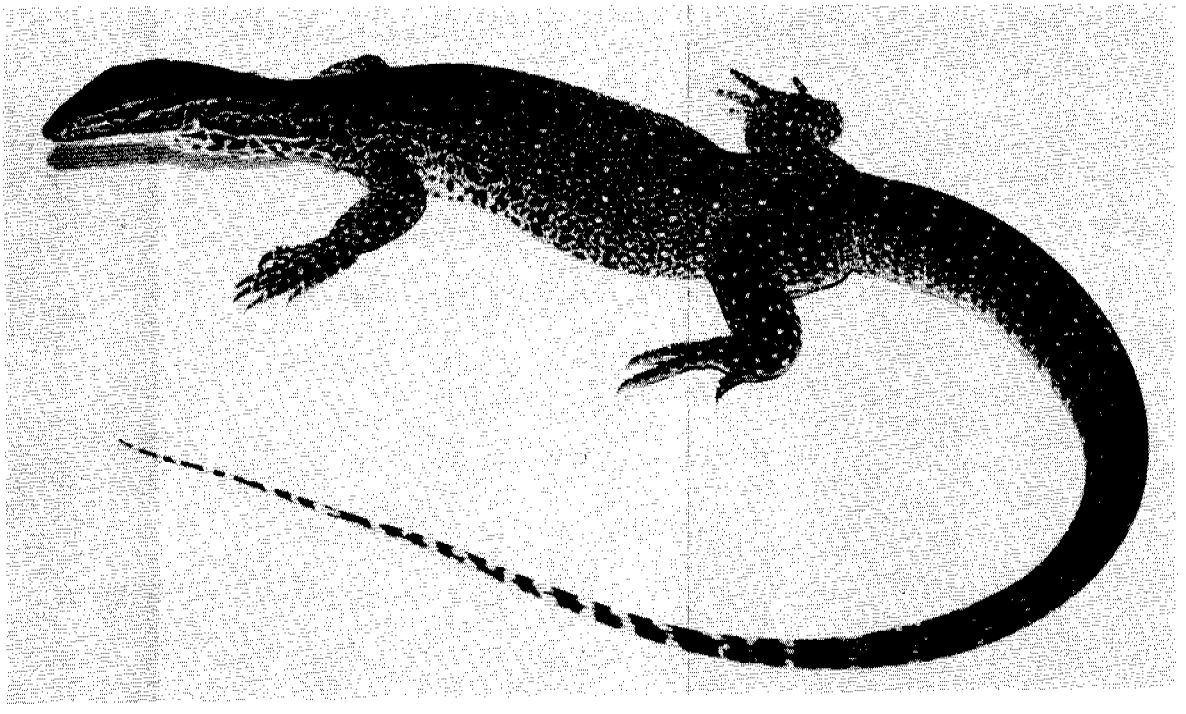


Plate 46. *Varanus panoptes* from lower reaches of Gulungul Creek (vicinity of site 17)

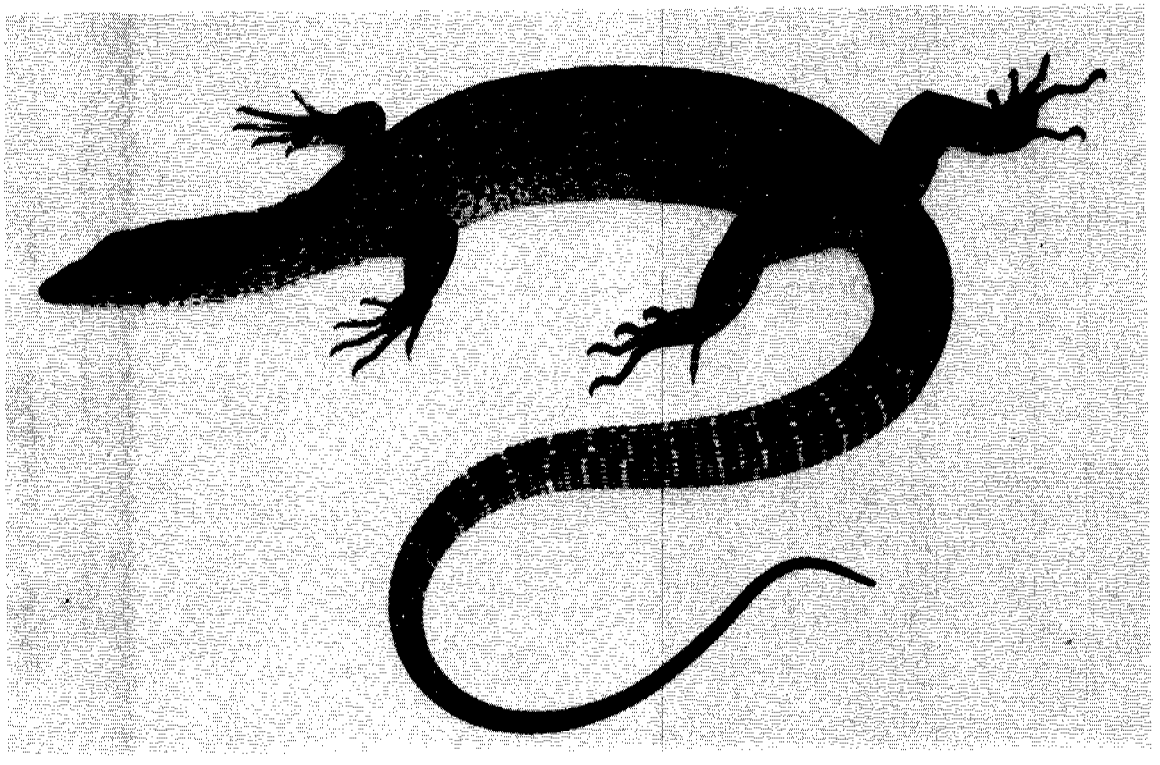


Plate 47. *Varanus timorensis* from Jabiru East township

3.50 *Varanus tristis* (Plate 48)

Habitat: *V. tristis* is recorded from two individuals taken on the road in open eucalypt woodland.

Distribution: recorded from Jabiru East; in the vicinity of Leichhardt Billabong

Family ACROCHORDIDAE

3.51 *Acrochordus arafurae* (Plate 49)

Distribution: *A. arafurae* occurs in freshwater billabongs and pools on Magela Creek. This species was the subject of an extensive study by Shine (1986*a*).

Family BOIDAE

Five species of boid snakes occur in the Magela Creek region. Cogger (1973) records these species and the additional species *Aspidites melanocephalus* from the Alligator Rivers Region. Two species, *Morelia oenpelliensis* and *Bothrochilus olivaceus* show a close association with the sandstone escarpment. *M. oenpelliensis* is endemic to Arnhem Land.

3.52 *Bothrochilus childreni* (Plate 50)

Habitat: *B. childreni* occurs in lowland open woodland with a speargrass understory.

Distribution: recorded from vicinity of sites 6, 2 and Coonjimba Billabong*

Field observations: Two individuals were collected active on roads at night during the Wet season.

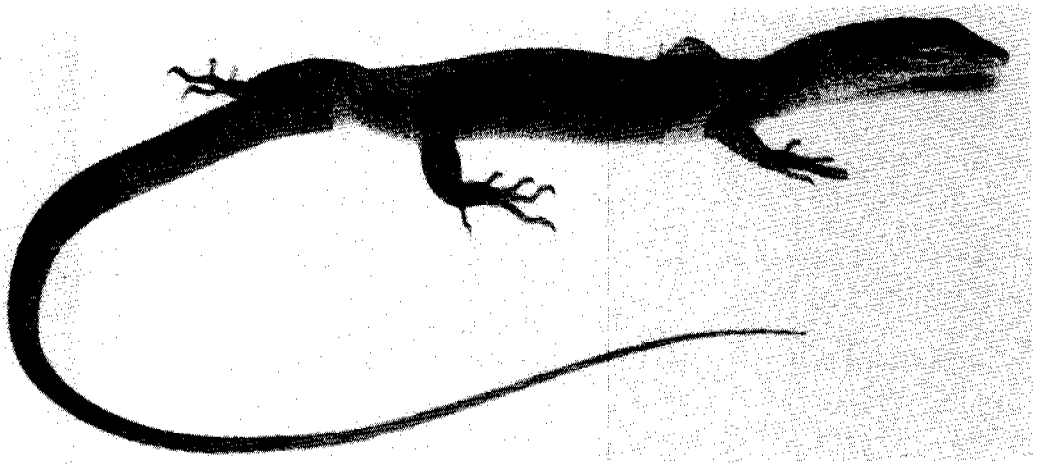


Plate 48. *Varanus tristis* from vicinity of Jabiru East

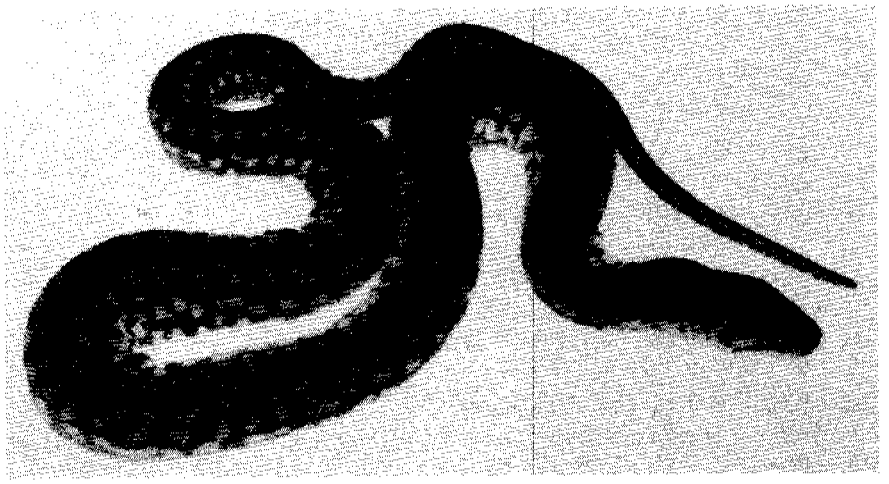


Plate 49. *Acrochordus arafurae* from Magela Creek near crossing of the Oenpelli road

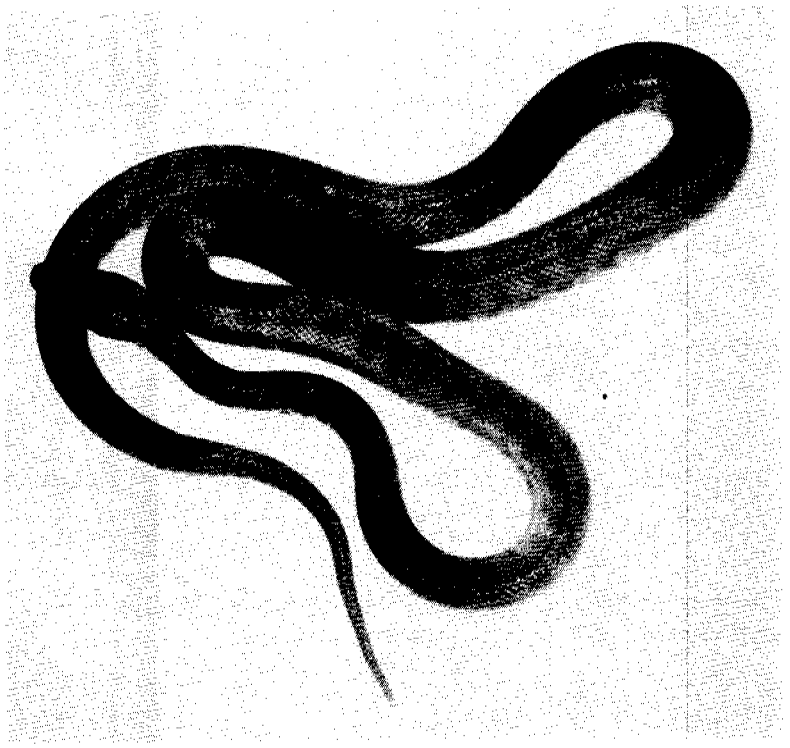


Plate 50. *Bothrochilus childreni* from the vicinity of GS009 on Magela Creek

3.53 *Bothrochilus fuscus* (Plate 51)

Habitat: *B. fuscus* occurs in lowland wetland habitat in the vicinity of waterbodies.

Distribution: recorded from vicinity of sites 6 and Retention Pond No. 2 at Ranger Mine

Field observations: A large individual (1.9 m) collected active at night during the Wet season was completely submerged in approximately 0.5 m of still water amongst weed growth lining the bank.

3.54 *Bothrochilus olivaceus* (Plate 52)

Habitat: *B. olivaceus* is recorded from a gully on the sandstone escarpment.

Distribution: recorded from the vicinity of site 11

Field observations: At each of two localities in the same gully an individual of *B. olivaceus* was observed with only the head protruding from the water of a small pool and with most of the body concealed beneath a rock overhang. On sandy inclines adjacent to these pools were the tracks of small mammals and birds.

3.55 *Morelia oenpelliensis* (Plate 53)

Habitat: *M. oenpelliensis* is recorded from the sandstone escarpment of the Jabiluka outlier.

Distribution: recorded from site 7b

Field observations: The single specimen collected during the Dry season was observed active at night stretched full length on the upper branches of a medium height tree (approx. 5 m) next to a cliff face.

Comments: This species was only recently described by Gow (1977).

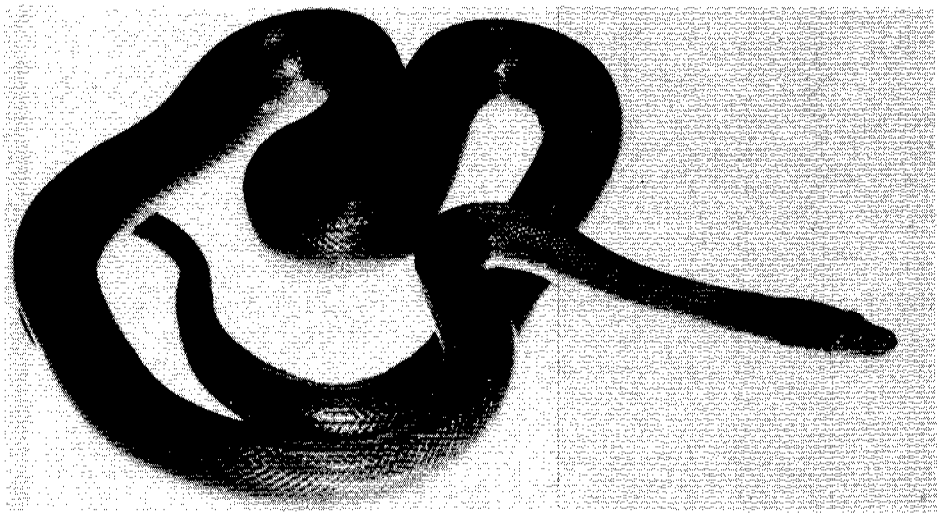


Plate 51. *Bothrochilus fuscus* from Magela Creek

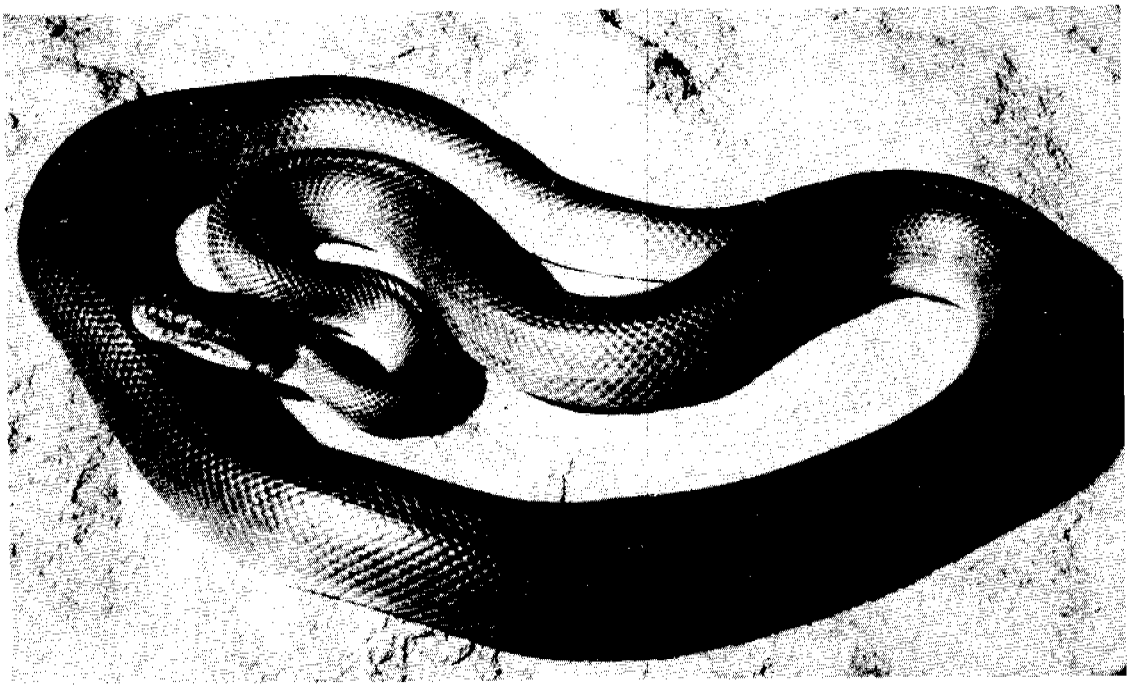


Plate 52. *Bothrochilus olivaceus* from a gully at the southern end of the Jabiluka outlier (photo A. Kerle)

Plate 53. *Morelia oenpelliensis* from the eastern edge of the Jabiluka outlier (photo A. Kerle)

3.56 *Morelia spilota* (Plate 54)

Distribution: Recorded from a single specimen collected on Arnhem Highway between South Alligator River crossing and Jabiru.

Family COLUBRIDAE

Five species of colubrid snakes occur in the Magela Creek region. Cogger (1973) records these same species for the Alligator Rivers Region.

3.57 *Boiga irregularis* (Plate 55)

Habitat: *B. irregularis* occurs in broken terrain of the sandstone escarpment, and from adjacent lowland woodland habitat.

Distribution: recorded from vicinity of sites 5; 8; 11, Jabiru East*

Field observations: *B. irregularis* was collected by day sheltering in crevices of sandstone outcroppings on the escarpment. At night one individual was observed active in the low scrub of the escarpment gully (site 11).

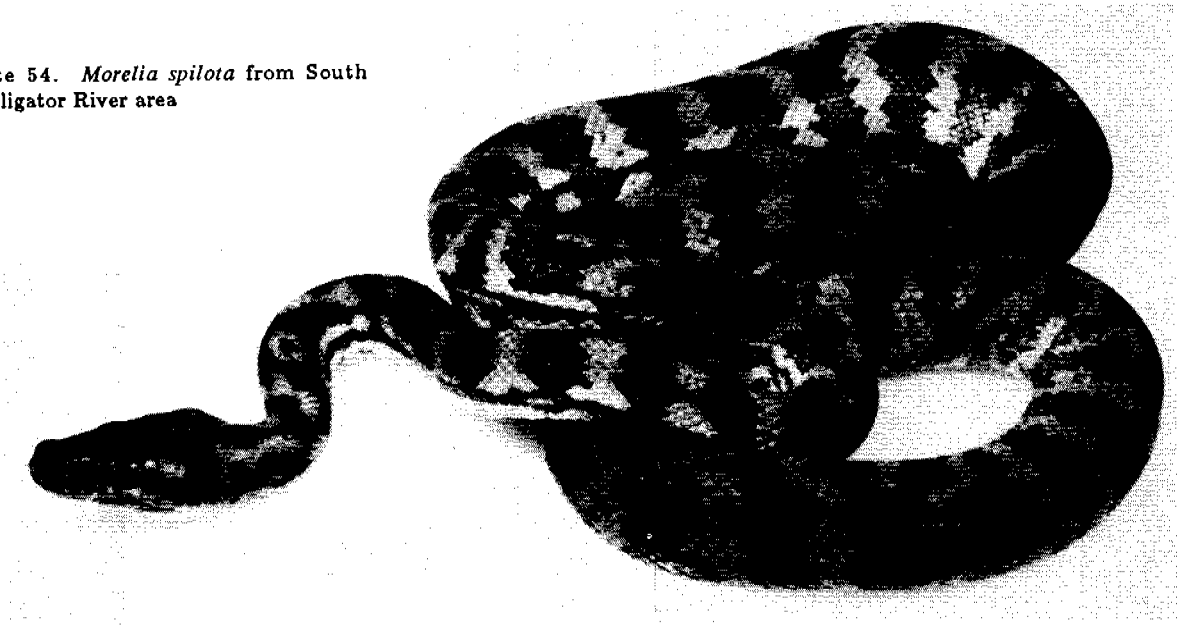
3.58 *Dendrelaphis punctulatus* (Plate 56)

Habitat: *D. punctulatus* occurs in lowland wetland habitats of the floodplain fringe and riparian woodland, and a broken terrain of the escarpment gully (site 9).

Distribution: recorded from sites 2b; 9; and from the vicinity of Jabiru East and Magela Creek near Jabiru East

Field observations: The sandstone escarpment site (9) contained a permanent soak during the Dry season.

Plate 54. *Morelia spilota* from South Alligator River area



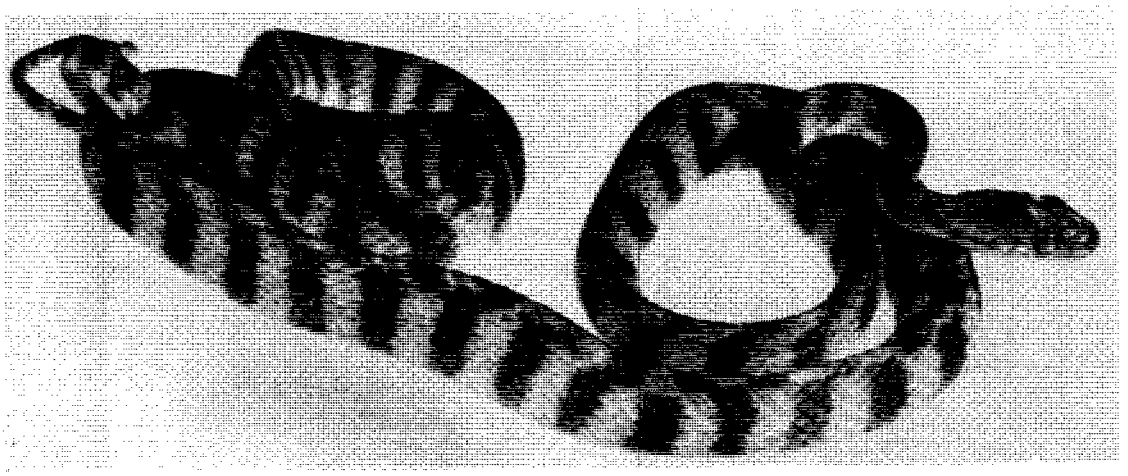


Plate 55. *Boiga irregularis* from Port Essington (photo H.G. Cogger)

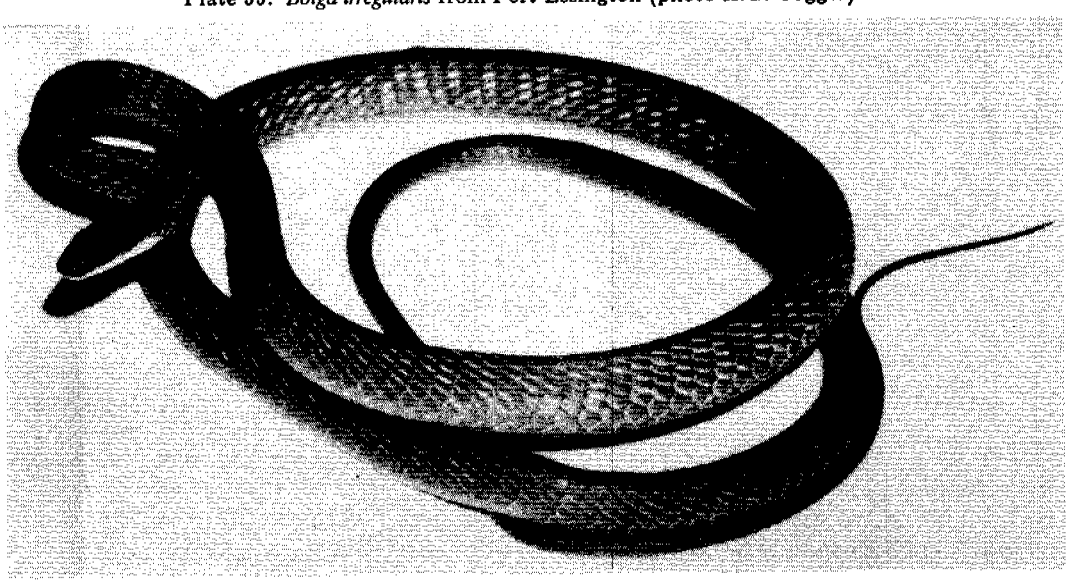


Plate 56. *Dendrelaphis punctulatus* from Magela Creek in the vicinity of Jabiru East township

3.59 *Enhydris polylepis* (Plate 57)

Distribution: recorded from Buffalo Billabong

3.60 *Stegonotus cucullatus* (Plate 58)

Habitat and distribution: recorded from lowland wetland habitats in the vicinity of Magela Creek near Jabiru East township, and Coonjimba Billabong*

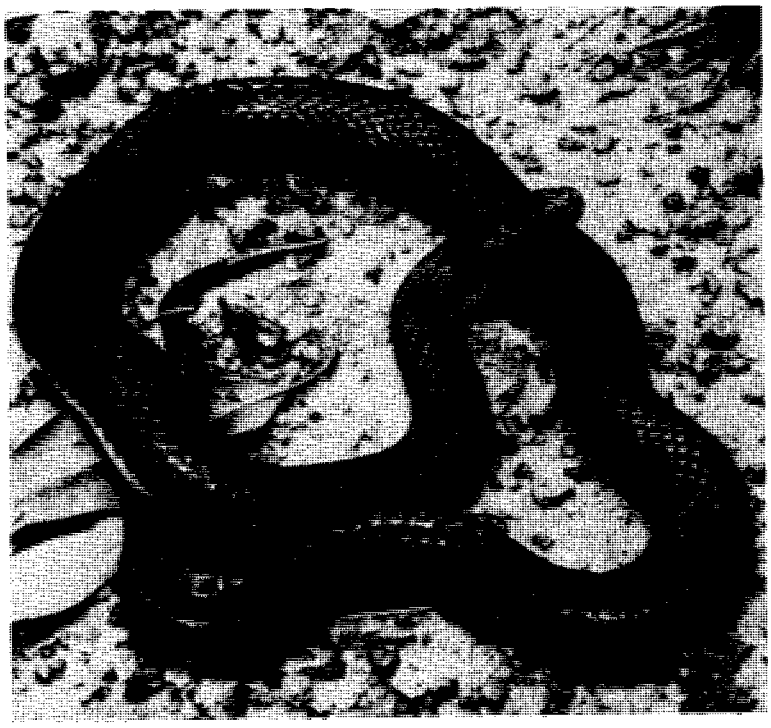


Plate 57. *Enhydris polylepis* from Buffalo Billabong on Magela Creek (photo R. Lambeck)

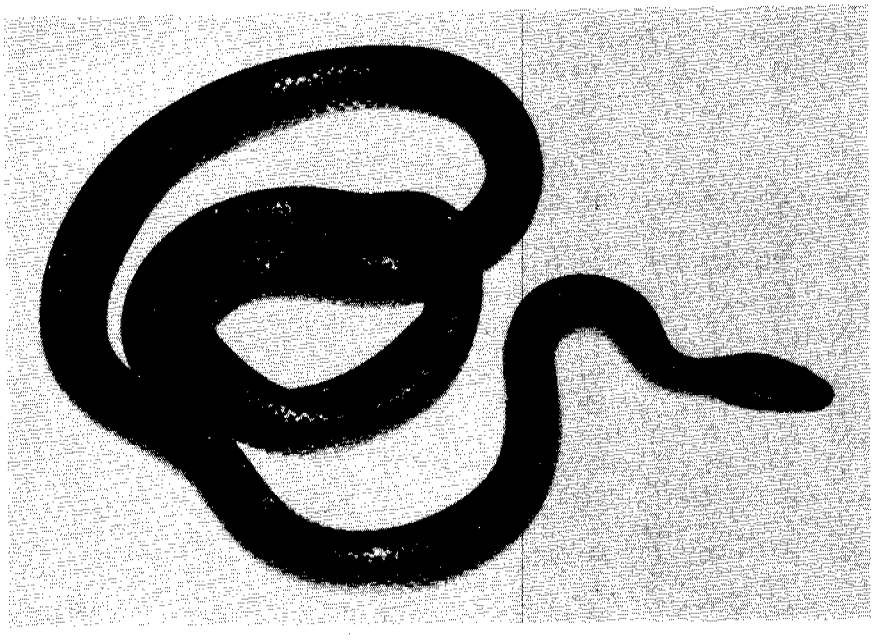


Plate 58. *Stegonotus cucullatus* from Fogg Dam

3.61 *Tropidonophis mairii* (Plate 59)

Habitat: *T. mairii* occurs in lowland wetland habitats in the vicinity of permanent water-bodies.

Distribution: recorded from the vicinity of sites 6; 18; 19; Retention Pond No. 2 (Ranger mine site); Coonjimba Billabong*

Field observations: Individuals were encountered on roadways at night during the Wet season. During the Dry season this species appears to be less common, individuals usually being located beneath debris.

Family ELAPIDAE

Nine species of elapid snakes occur in the Magela Creek region. Cogger (1973) records these same species and the additional species *Oxyuranus scutellatus* from the Alligator Rivers Region. Records are opportunistic and it is difficult to assess the status of species in the region.

3.62 *Acanthophis praelongus* (Plate 60)

Distribution: *A. praelongus* is recorded from the Pancontinental mining camp bordering Ja Ja Billabong (site 6), and Jabiru East township.

3.63 *Cryptophis pallidiceps* (Plate 61)

Distribution: *C. pallidiceps* is recorded from a single specimen collected at Jabiru East township.

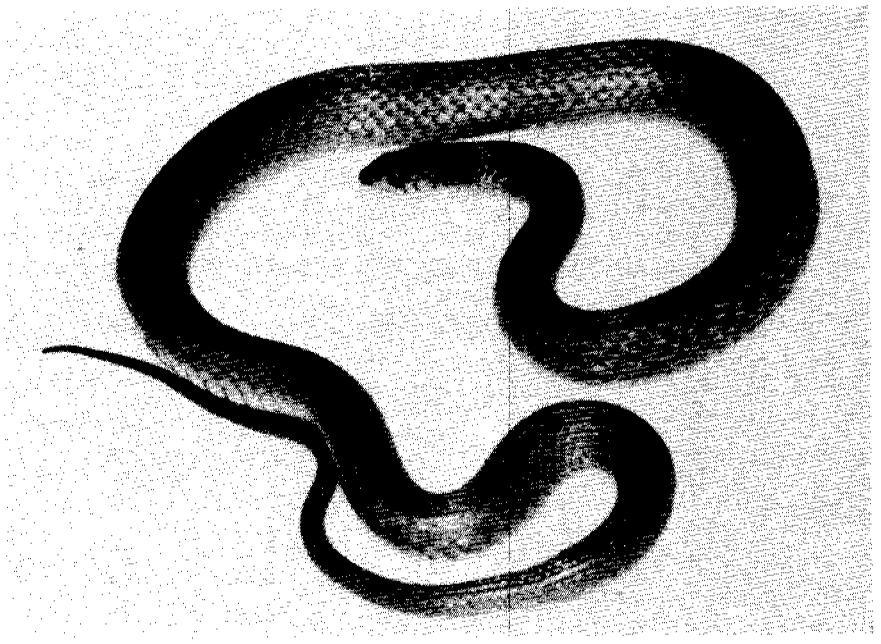


Plate 59. *Tropidonophis mairii* from Magela Creek

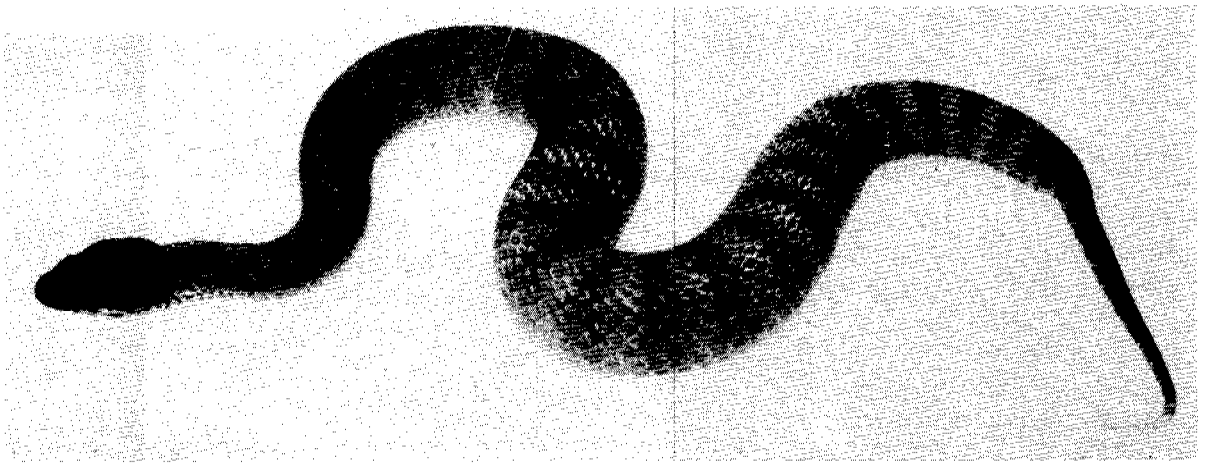


Plate 60. *Acanthophis praelongus* from Jabiru East

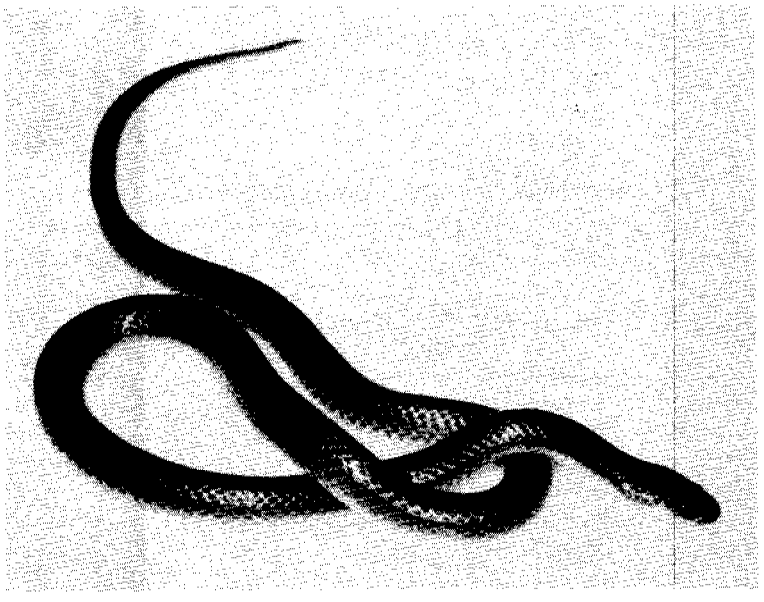


Plate 61. *Cryptophis pallidiceps* from East Alligator River area

3.64 *Demansia atra* (Plate 62)

Habitat: *D. atra* occurs in lowland dryland habitat of open eucalypt woodland and open myrtaceous woodland.

Distribution: recorded from sites 12b; 15b and vicinity of Jabiru East*

3.65 *Demansia olivacea* (Plate 63)

Habitat and distribution: *D. olivacea* is recorded from a single specimen collected in lowland dryland habitat of riparian woodland fringing a dry cheek channel (site 16a), and from the vicinity of Jabiru East*.

3.66 *Denisonia punctata* (Plate 64)

Habitat and distribution: *D. punctata* is recorded from a single specimen collected in a lowland dryland habitat of open mixed eucalypt woodland adjacent to riparian woodland bordering the upper reaches of Magela Creek (site 20).

Field observations: The single specimen collected was concealed beneath a small piece of wood.

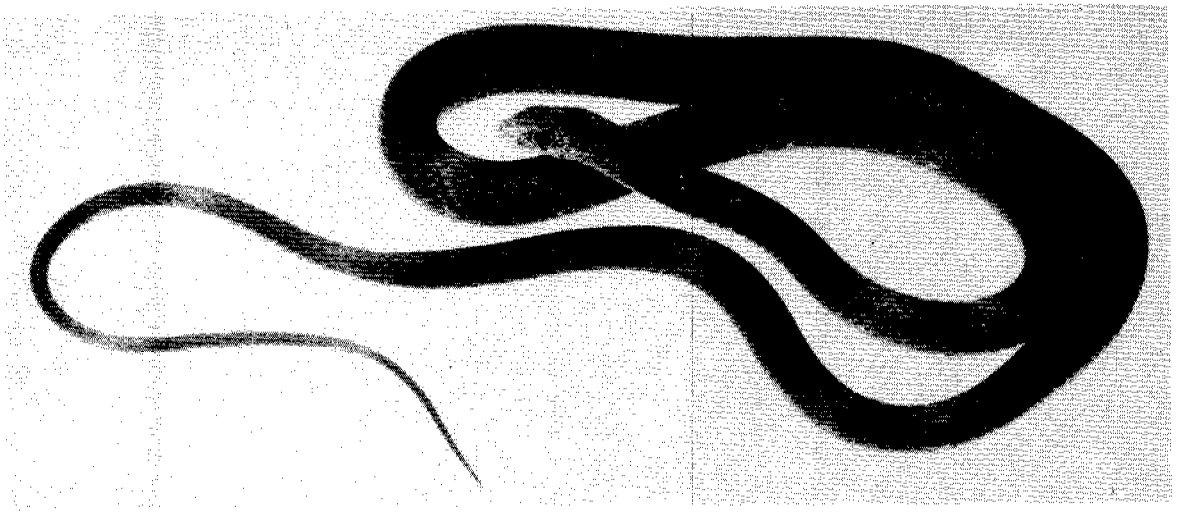


Plate 62. *Demansia atra* from Katherine (photo H.G. Cogger)

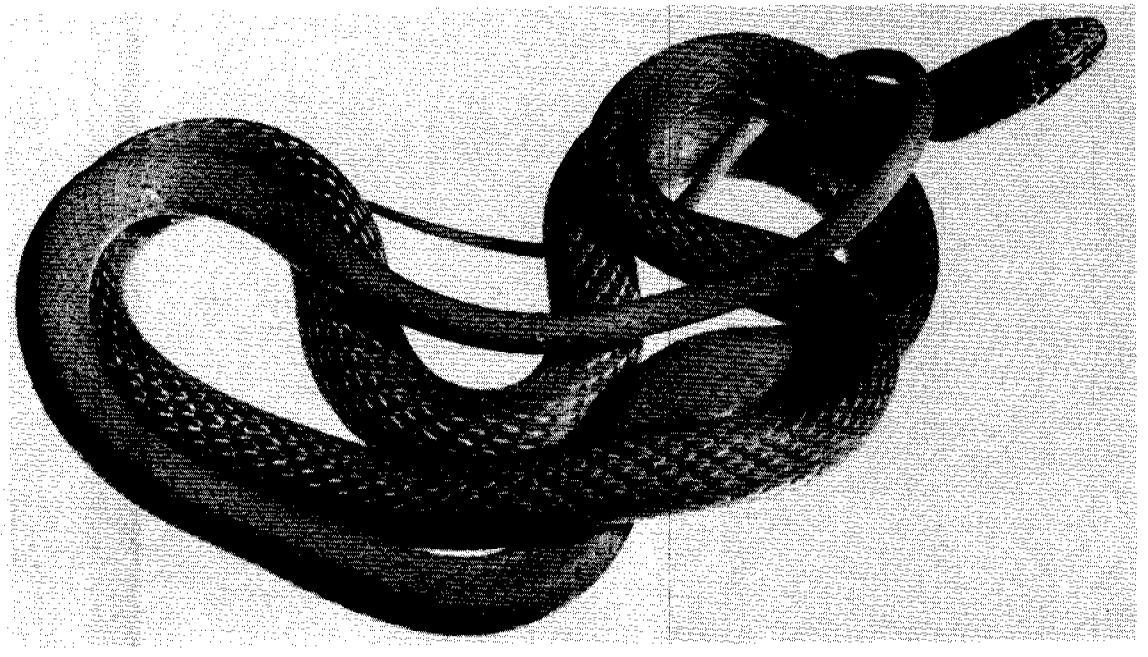


Plate 63. *Demansia olivacea* from Port Essington (photo H.G. Cogger)

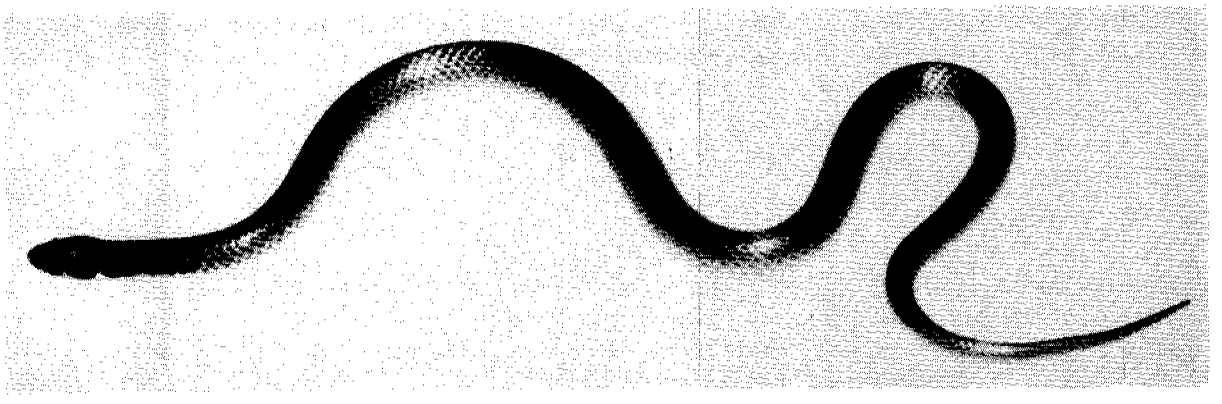


Plate 64. *Denisonia punctata* from the vicinity of Georgetown Billabong on Magela Creek

3.67 *Furina ornata* (Plate 65)

Habitat and distribution: *F. ornata* is recorded from a single specimen collected in lowland dryland habitat of open eucalypt woodland (site 18a), and from the vicinity of Jabiru East*.

Field observations: The individual from site 18a was collected inside a rotting and disused termite mound approximately 10 cm below ground level.

3.68 *Pseudechis australis* (Plate 66)

Habitat: *P. australis* occurs in broken terrain on the sandstone escarpment of the Jabiluka outlier, and riparian woodland adjacent to the escarpment.

Distribution: recorded from sites 4; 11; vicinity of 12

Field observations: Three individuals were observed, all active at mid-morning as follows: amongst epiphytic ferns on a large boulder (site 4); amongst large rocks in a dry creek bed (site 11); at the base of a *Pandanus* clump near a small pool in woodland adjacent the escarpment (site 12). All sightings were in close proximity to either a pool or soak.

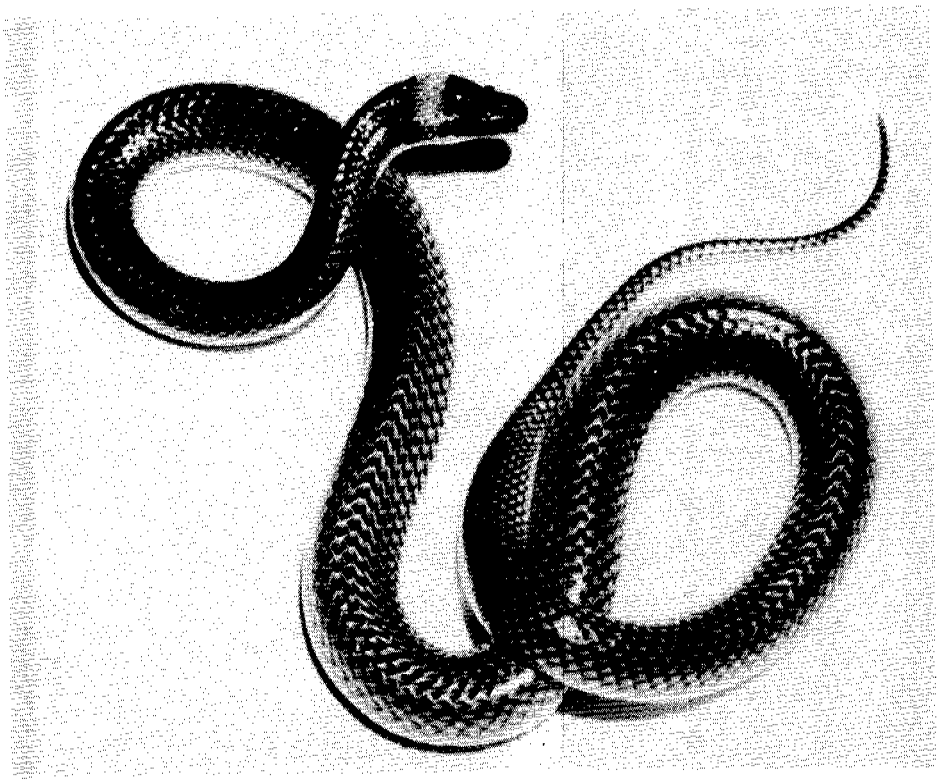


Plate 65. *Furina ornata* from the vicinity of GS009 on Magela Creek (site 18)

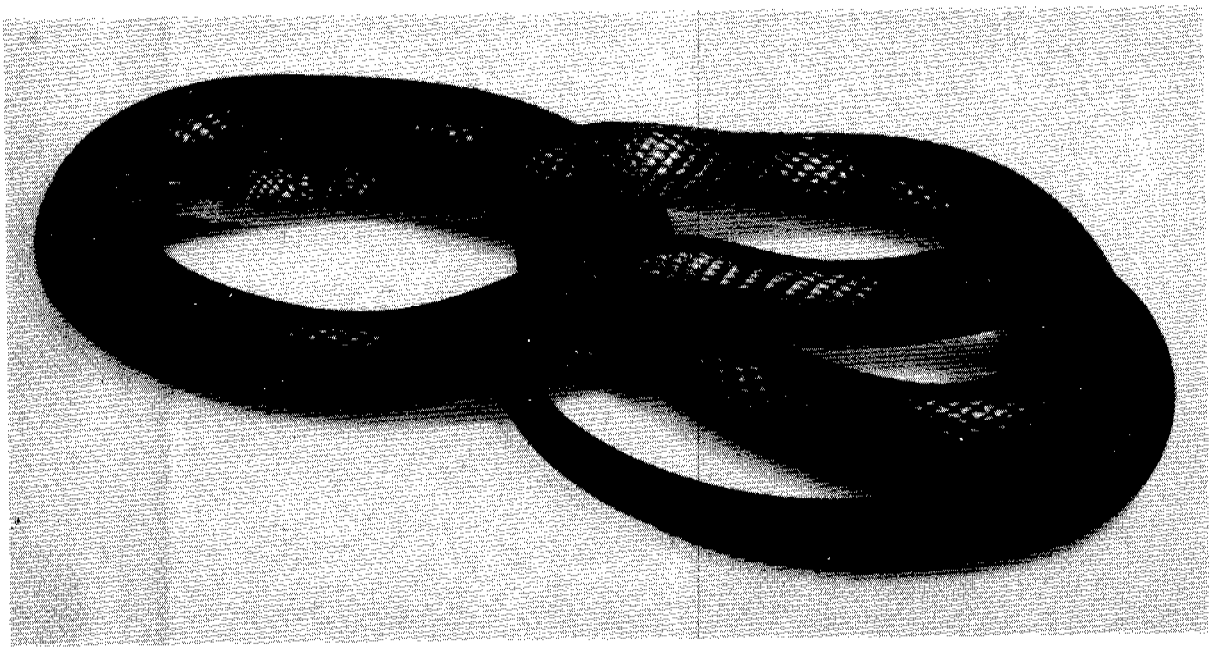


Plate 66. *Pseudechis australis* from the Oenpelli road

3.69 *Pseudonaja nuchalis*

Habitat: *P. nuchalis* occurs in lowland dryland habitats of open woodland.

Distribution: recorded from the vicinity of Jabiru East township and Ja Ja Camp

Field observations: In the Magela Creek region two distinct colour morphs are present; one grey brown overall with lighter spaces dorsally between the eyes and with darker flecking on the nape, the other tan with broad dark bands on the posterior half of the body.

3.70 *Simoselaps semifasciatus* (Plate 67)

Distribution: *S. semifasciatus* is recorded from two specimens collected in Jabiru East township.

3.71 *Vermicella multifasciata* (Plate 68)

Distribution: *V. multifasciata* is recorded from several preserved specimens collected at East Jabiru*.

Comments: Storr (1967*c*) recently reviewed the taxonomy and distribution of the species.

Family TYPHLOPIDAE

Three species of typhlopid snake occur in the Magela Creek region. Cogger (1973) records five different but undetermined species.

3.72 *Ramphotyphlops grypus* (Plate 69)

Distribution: *R. grypus* is recorded from a specimen collected from a pitfall trap at site 6 and a specimen from Jabiru East*.

3.73 *Ramphotyplops polygrammica*

Distribution: *R. polygrammica* is recorded from a single specimen collected from a pitfall trap at site 18c.

3.74 *Ramphotyphlops unguirostris*

Distribution: *R. unguirostris* is recorded from a specimen collected in a pitfall trap at site 15b and from a specimen from Jabiru East*.

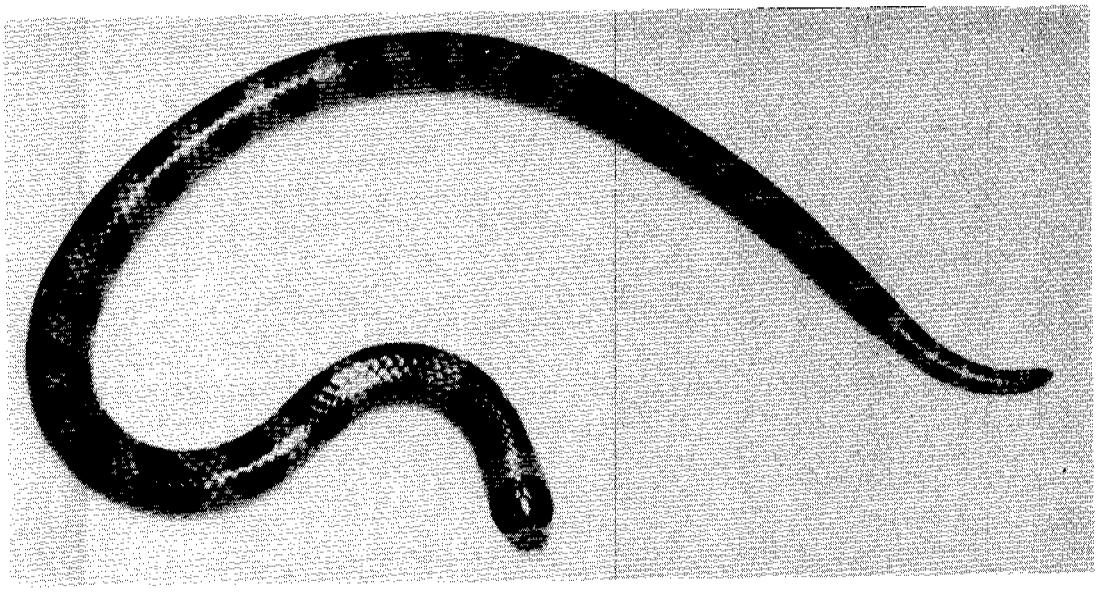


Plate 67. *Simoselaps semifasciatus* from Jabiru East

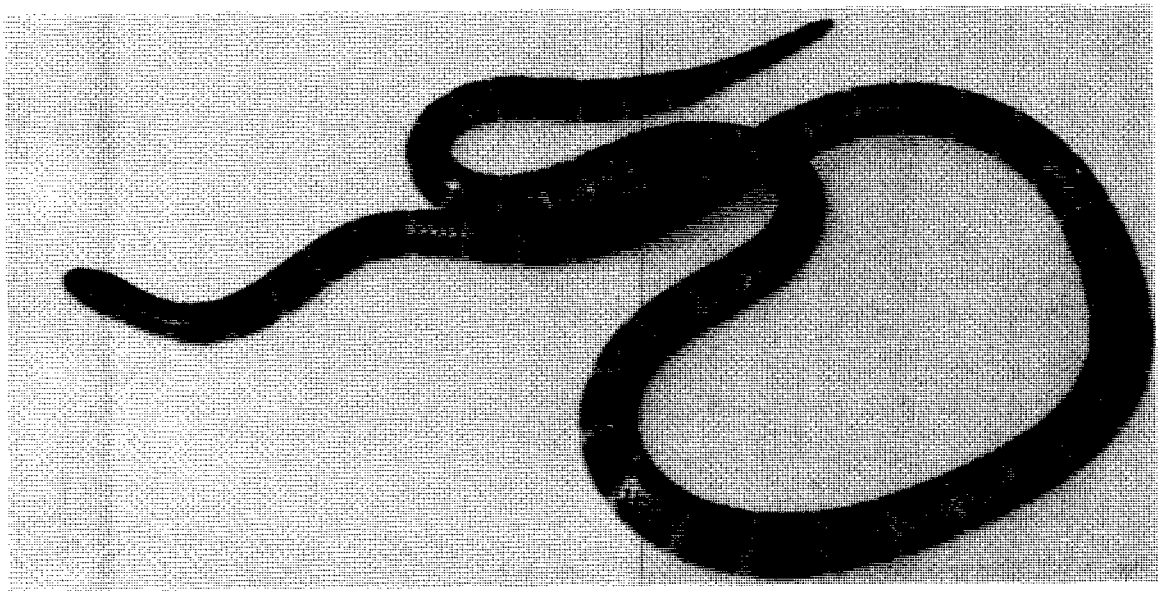


Plate 68. *Vermicella multifasciata* from Humpty Doo (photo H.G. Cogger)

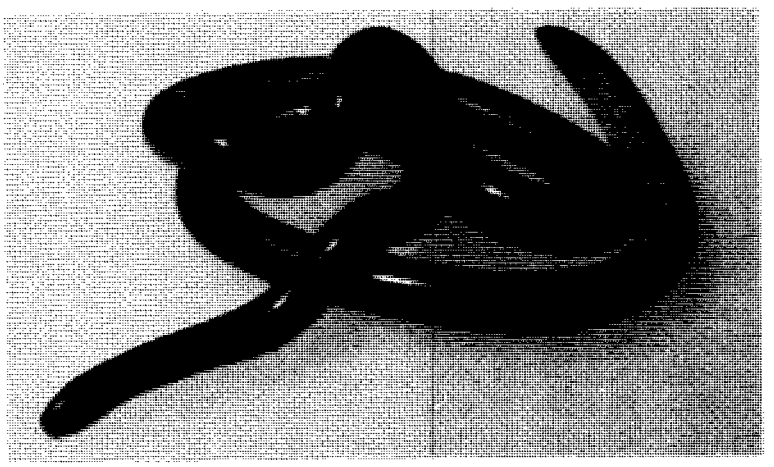


Plate 69. *Ramphotyphlops grypus* from Ja Ja Camp on Magela Creek (photo A.E. Greer)

4 CONCLUSIONS

The herpetofauna of the Magela Creek region

The western edge of Arnhem Land contains a very diverse herpetofauna (99 species of marine, freshwater and terrestrial reptiles including those recorded by Cogger 1981). Most of these species occur in the Magela Creek region. The sandstone escarpment and many of the species endemic to this habitat also occur further to the east in the Arnhem Land Aborginal Reserve, but the occurrence of lowland flood plain and sandstone escarpment in the same area is probably unique to the East Alligator River region of western Arnhem Land. Several endemic lowland species (*Ctenotus arnhemensis*, *Ctenotus gagadju* and *Menetia concinna*) are at present known only from the Alligator Rivers Region. Further survey work to the east along the northern boundary of Arnhem Land, particularly in lowland and escarpment ecotones, is required to further determine the distribution of these species.

A comparison of the Jabiluka and Ranger Project Areas

Though in close proximity, these two areas vary in the range of habitats, a feature reflected in the composition of the herpetofauna recorded from each area. The most obvious difference is the absence of remnants of the sandstone escarpment from the Ranger lease. On the Jabiluka lease 17 species of reptiles (*Ctenophorus caudicinctus macropus*, *Gehyra nana*, *Gehyra pamela*, *Nephrurus asper*, *Oedura gemmata*, *Pseudothecadactylus lindneri*, *Carlia amax*, *Ctenotus inornatus*, *Ctenotus coggeri*, *Ctenotus vertebralis*, *Egernia* cf. *frerei*, *Morethia ruficauda*, *Notoscincus wotjulum*, *Varanus baritji*, *Varanus glebopalma*, *Morelia oenpelliensis*, *Bothrochilus olivaceous*) are either restricted to or occur in greatest abundance in sandstone habitats. Most of these species are known from similar habitats in the Alligator Rivers Region outside the Jabiluka lease (pers. obs.).

The species component of lowland dryland habitats, i.e. myrtaceous woodland of the sandy alluvial flats and mixed eucalypt woodland on red lateritic soils, is similar on both leases.

Reptile activity patterns in the Wet and Dry seasons

Larger reptiles were more numerous during the Wet season and some (*Chlamydosaurus kingii*, *Varanus mitchelli*, *Varanus timorensis*) were quite common at this time in contrast with the greatly reduced in numbers observed during the Dry season.

Reproductive data on small reptile species collected during the surveys by Sadlier, and by James (1983) indicate seasonal rather than year-round patterns for most species.

Reptile movement in response to shifting water levels was noted during Wet and Dry season visits to Georgetown Billabong, GS009, Gulungul Creek at Arnhem Highway crossing and Island Billabong. Ground dwelling species (*Carlia gracilis* and *Sphenomorphus isolepis*), normally largely restricted to riparian habitats along the mid- to lower reaches of Magela Creek during the Dry season, were collected in adjacent woodland when billabong and creek verge habitats were inundated. In the upper reaches of Magela Creek these same species were uncommon during both the Wet and Dry season surveys. In this section of Magela Creek frequent inundation during the Wet season accompanied by rapid fluctuation in water level and swift flow may make riparian habitat marginal for these ground dwelling species.

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APPENDIX 1

1.1 Key to the species of agamid lizards occurring in the Magela Creek region

1. Large, loose frill of skin around the neck ..... *Chlamydosaurus kingii*

   No large, loose frill of skin around the neck 2

2. Preanal and/or femoral pores absent; tail up to twice the body length and with a blunt tip ..... *Chelosonia brunnea*

   Preanal and/or femoral pores present; tail more than twice as long as body and tapering to a fine tip 3

3. Femoral pores absent, preanal pores present; gular fold absent..... *Diporiphora bilineata*

   Femoral and preanal pores present; gular fold present 4

4. Scales of dorsal surface of body with a distinct keel..... *Lophognathus gilberti*

   Scales of dorsal surface of body round and granular, more or less uniform in size..... ..... *Ctenophorus caudicinctus macropus*

1.2 Key to the species of gekkonid lizards of the Magela Creek region

1. Body with conical protrusions consisting of a large pointed tubercule surrounded by 5-6 smaller pointed scales, most pronounced on lateral surface; underside of digits without enlarged subdigital tubercules or lamellae; tail short and ending in a moderately enlarged knob..... *Nephrurus asper*

   Scales of body more or less subequal in size; underside of digits with enlarged subdigital tubercules and or lamellae at least distally; tail tapering to a distinct tip.... 2

2. Digits with a continous series of moderately enlarged lamellae of which only the distal most is divided; dorsal surface of body consisting of enlarged tubercules arranged in irregular longitudinal rows..... *Heteronotia binoei*

   Digits with some distal lamellae enlarged; dorsal surface of body with small, homogenous flat scales..... 3

3. Pair of noticeably enlarged distal plates distinct from other lamellae 4

   Enlarged subdigital lamellae in a continous series 7

4. Distal lamellae excluding the apical pair single; tail and upper eyelid with some scales modified to enlarged spines..... *Diplodactylus ciliaris*

Distal lamellae excluding apical pair divided; palpebral and caudal scales more or less homogenous 5

5. Dorsal scales minute and granular; body with a colour pattern featuring a broad zig-zag vertebral band ..... *Oedura rhombifer*

Dorsal scales flat and rounded; body without a colour pattern featuring longitudinally aligned bands 6

6. Tail more or less rounded; body with a colour pattern featuring pale transverse bars dorsally on a dark background ..... *Oedura marmorata*

Tail dorsoventrally flattened; body with a colour pattern featuring numerous randomly scattered pale blotches ..... *Oedura gemmata*

7. Claws of digits arising from edge of distal expansion; tip of tail with fine setae; preanal pores of males arranged in several rows ..... *Pseudothecadactylus lindneri*

Claws of digits arising from upper surface of distal expansion; tail tip without fine setae; preanal pores of males arranged in a single row 8

8. Lamellae beneath expanded distal portion of digit (excluding distal most) paired; body with a colour pattern featuring numerous small pale and dark spots ..... *Gehyra nana*

Lamellae beneath expanded distal portion of digit undivided; body colour pattern light with, transversely elongate blotches 9

9. Postmental scale small, the snout to vent length equal to more than 22 × the length of the postmental; preanal pores in males 12-17 ..... *Gehyra australis*

Postmental scale large, the snout to vent length equal to less than 22 × the length of the postmental; preanal pores in males 19-23 ..... *Gehyra pamela*

1.3 Key to the species of pygopod lizards occurring in the Magela Creek region

1. Head narrow and pointed, covered in small irregular scales ..... *Lialis burtonis*

Head blunt and rounded, covered with large symetrical head shields ..... *Delma borea*

1.4 Key to the species of scincid lizards occurring in the Magela Creek region

1. Each parietal shield bordered along its posterolateral edge by two or more temporal scales and a nuchal scale 2

Each parietal shield bordered along its posterolateral edge by a single temporal scale and single nuchal scale 16

2. Parietal shields failing to contact medially being separated by the interparietal scale contacting the nuchal 3

Parietal shields in contact medially behind the interparietal 4

3. Posterior to parietal scales a series of longitudinally elongate occipital scales; head much wider than neck; and hind limbs more or less subequal in length ..... *Tiliqua scincoides intermedia*

Posterior to parietal scales a series of transversely elongate nuchal scales; neck more or less as wide as head; hind limbs longer than fore limbs ..... *Egernia* cf. *frerei*

4. Lower eyelid scaly and moveable 5

Lower eyelid with a transparent disc, movable or immoveably fixed to form a permanent spectacle 15

5. Ear aperture with a series of enlarged lobules anteriorly 6

Ear aperture without enlarged lobules anteriorly 13

6. Dorsal and lateral surface with a colour pattern wholly of regularly spaced, alternating dark and pale longitudinal stripes ..... *Ctenotus storri*

Dorsal and lateral surfaces often contrasting in colour pattern, consisting of a combination of longitudinally aligned spots and stripes 7

7. Lamellae beneath toes broad with a moderately wide dark callus 8

Lamellae beneath toes moderately compressed with a narrow dark 11

8. Dorsal surface uniform in colour; lateral surface uniform in colour or with several obscure pale spots anteriorly ..... *Ctenotus coggeri*

Dorsal surface with a strong dark vertebral stripe usually pale edged; lateral surface usually with a series of pale spots sometimes obscure 9

9. Prefrontal scales narrowly to moderately separated; upper labials 7 ..... *Ctenotus arnhemensis*

Prefrontal scales in moderate contact; upper labials 8 10

10. Pale mid lateral stripe commencing at nape, passing under eye, through ear opening and over hindlimbs; paravertebral scales 64-73 ..... *Ctenotus borealis*

Pale midlateral stripe commencing just past ear opening and passing over hindlimb along tail; paravertebral scales 57-60 ..... *Ctenotus inornatus*

11. Upper lateral surface with a single series of pale spots along its length; lower lateral surface and face russet with a reddish flush in life ..... *Ctenotus gagadju*

Upper lateral surface without a series of pale spots along its length, or if present restricted to anterior part of body; lower lateral surface and face brown-grey with an olive tinge in life 12

12. Body with a colour pattern relatively uniform and distinct, light dorsal and dark lateral surfaces well defined; upper labials usually 7, rarely 8 ..... *Ctenotus essingtoni*

Body with a colour pattern that is variable and often ill defined, dorsal and lateral surfaces may or may not be well defined; upper labials usually 8, rarely 7 or 9 ..... *Ctenotus vertebralis*

13. Small (maximum SVL 47mm) elongate skink with short limbs which fail to contact when adpressed to the body; postmental scale contacts first and second upper labials ..... *Sphenomorphus darwiniensis*

Moderately large (maximum SVL 64 mm) skinks with moderately well developed limbs, nearly touching or overlapping when adpressed to the body; postmental scale contacts first upper labial only 14

14. Body with a colour pattern featuring a concentration of dark flecks dorsolaterally so as to form a distinct broad band at least anteriorly; upper labials 6, rarely 7 ..... *Sphenomorphus douglasi*

Body with a more or less uniform lateral colour with some concentration of dark flecks on upper lateral surface; 7 upper labials ..... *Sphenomorphus isolepis*

15. Elongate slender skink with limbs markedly reduced, forelimbs absent, hindlimbs monodactyl with a small claw distally ..... *Lerista karlshmidti*

Small moderately elongate skink with limbs well developed and pentadactyl ..... *Notoscincus wotjulum*

16. Digits on the front limbs 4 17

Digits on the front limbs 5 23

17. Small (maximum SVL 37-45 mm) stout skinks; lower eyelid moveable with a transparent disc; supraocular scales 4, each transversely orientated 20

Very small (maximum SVL 35 mm) elongate skinks; lower eyelid a transparent disc completely covering the eye; supraoculars 2, obliquely orientated 18

18. Body with a colour pattern in which the dorsal surface is poorly defined from the lateral surface ..... *Menetia alanae*

Body with a colour pattern in which the dorsal surface is clearly defined from the lateral surface 19

19. Anterior subocular scale present ..... *Menetia concinna*

Anterior subocular scale absent ..... *Menetia greyi*

20. Dorsal scales of body smooth to faintly striate ..... *Carlia munda*

Dorsal scales of body keeled 21

21. Dorsal scales of body bicarinate ..... *Carlia amax*

Dorsal scales of body tricarinate 22

22. Prefrontal scales in broad contact; supraciliary scales 6-7; maximum SVL 45.5 mm ..... *Carlia triacantha*

Prefrontal scales narrowly to moderately separated; supraciliary scales 5; maximum SVL 37 mm ..... *Carlia gracilis*

23. Supraoculars 3; frontoparietals divided and distinct from interparietal ..... *Proablepharus tenuis*

Supraoculars 4; frontoparietals and interparietal fused to form a distinct shield 24

24. Supraciliary scales forming a straight line suture with supraoculars; clear lower eyelid with 3 enlarged palpebral scales uppermost ..... *Cryptoblepharus plagiocephalus*

Supraciliary scales angular and interdigitating with supraoculars; clear lower eyelid surrounded by more or less uniform granular scales 25

25. 2nd, 3rd and 4th supraciliaries only, angular and interdigitate between 1st and 2nd, 2nd and 3rd, 3rd and 4th supraoculars respectively; dorsal surface brown, lateral surface black ..... *Morethia storri*

2nd and 3rd supraciliaries only, angular and interdigitate between 1st and 2nd, 2nd and 3rd supraoculars respectively; dorsal and lateral surface black ..... *Morethia ruficauda*

1.5 Key to the species of varanid lizards occurring in the Magela Creek region

1. Tail strongly laterally compressed over entire length 2

Tail more or less rounded or only slightly laterally compressed basally to moderately compressed distally 3

2. Nostril positioned in upper part of snout and directed upwards; body with a colour pattern featuring numerous randomly scattered pale spots ..... *Varanus mertensi*

Nostril positioned laterally; body with a colour pattern featuring moderately large, pale, dark centered ocelli transversely aligned, or merging to form broad blotches or bars 3

3. Scales round middle of body more than 200; end of tail with dark bands for entire length ..... *Varanus panoptes*

Scales round middle of body generally fewer than 200; end of tail pale and lacking in dark bands ..... *Varanus gouldii*

4. Caudal scales of dorsal and lateral surface with an enlarged spinose keel .....

..... *Varanus baritji*

Caudal scales of dorsal and lateral surface with low relatively blunt keels 4

5. Scales round middle of the body more than 140; underside of throat and chest with a pattern of dark reticulations ..... *Varanus glebopalma*

Scales round middle of the body fewer than 140; venter occasionally with randomly scattered dark flecks 5

6. Nostril positioned in upper part of snout and directed outwards; tail slightly laterally compressed basally, to moderately compressed distally ..... *Varanus mitchelli*

Nostril positioned laterally; tail more or less rounded 6

7. Scales round middle of body fewer than 120; keels of caudal scales blunt posteriorly ....

..... *Varanus timorensis*

Scales round middle of body more than 120; keels of caudal scales with a fine mucronate posterior edge ..... *Varanus tristis*

1.6 Key to the bold snakes occurring in the Magela Creek region

1. Head shields small, mostly irregular and asymetrical ..... *Morelia spilota*

Head shields usually large and regular with at least a distinct frontal shield 2

2. Ventral scale rows 400 or more; subcaudal scale rows 100 or more .....

..... *Morelia oenpelliensis*

Ventral scale rows fewer than 400; subcaudal scale rows fewer than 100 3

3. Loreals two or more ; body with a colour pattern featuring irregular dark blotches .....

..... *Bothrochilus childreni*

Loreal single; body uniform in colour on the dorsal and lateral surfaces 4

4. Midbody scale rows more than 60; ventral scale rows more than 300 ..... *Bothrochilus olivaceus*

Midbody scale rows fewer than 60; ventral scale rows fewer than 300 ..... *Bothrochilus fuscus*

1.7 Key to the species of colubrid snakes occurring in the Magela Greek region

1. Scales of dorsal and lateral surface of body markedly keeled ..... *Tropidonophis mairii*

Scales of dorsal and lateral surface of body smooth or feebly keeled 2

2. Anal scale single 3

Anal scale divided 4

3. Two or more enlarged temporal scales between parietals and upper labials; body with colour pattern of alternate light brown and dark brown bands ..... *Boiga irregularis*

Single enlarged temporal between parietals and upper labials; body with colour pattern of uniform grey ..... *Stegonotus cucullatus*

4. Midbody scale rows 13 ..... *Dendrelaphis punctulatus*

Midbody scale rows 21-23 ..... *Enhydris polylepis*

1.8 Key to the species of elapid snakes occurring in the Magela Creek region

1. Below the eye a complete row of subocular scales; anterior part of body with keeled scales ..... *Acanthophis praelongus*

No subocular scales below the eye; scales of body smooth 2

2. Single enlarged temporal scale between parietals and upper labials 3

Two enlarged temporal scales between parietals and upper labials 5

3. Subcaudal scales more than 35 ..... *Pseudonaja nuchalis*

Subcaudal scales less than 35 4

4. Snout blunt and rounded; body with a colour pattern of alternate broad dark and narrow pale bands completely around body ..... *Vermicella multifasciata*

Snout acutely wedge shaped; body with a colour pattern of alternate broad dark and narrow pale bands on dorsal and lateral surfaces only ..... *Simoselaps semifasciatus*

5. Nasal scale widely separated from preocular scale ..... *Furina ornata*

Nasal scale in point to moderate contact with preocular scale 6

6. Anal scale divided 7

Anal scale single 8

7. Midbody scales in 15 rows; subcaudal scales divided over entire length of tail 8

Midbody scales in 17 rows; subcaudal scales variably divided, the anterior ones usually single ..... *Pseudechis australis*

8. Front of snout with a narrow black bar between nostrils ..... *Demansia olivacea*

Front of snout without a black bar between nostrils ..... *Demansia atra*

9. Dorsal surface of head brown with a bold dark streak anteriorly followed by a dark blotch on the nape, lateral surface of head with several bold dark blotches ..... *Denisonia punctata*

Dorsal and lateral surface of head overall grey black, a shade lighter on supraocular region ..... *Cryptophis pallidiceps*

APPENDIX 2

Table of site numbers used in this report (Sadlier 1990) and those used in the reports originally submitted to Pancontinental Mining Limited on the Jabiluka Project Area (1979) and to the Supervising Scientist for the Alligator Rivers Region on the Ranger Project Area (1981).

Composite Report (1990)	Jabiluka Report (1979)	Ranger Report (1981)
1	10	-
2a	5a	-
2b	5b	-
3	'Lonely Rocks'	-
4	'Mill Valley'	-
5	9	-
6	'Ja Ja Camp'	-
7a	11a	-
7b	11b	-
8a	6a	-
8b	6b	-
9	-	-
10	8	-
11	4	-
12a	3a	-
12b	3b	-
12c	3c	-
13a	2b	-
13b	2a	-
14	12	-
15a	1a	-
15b	1b	-
15c	1e	-
15d	1c	-
15e	1d	-
16a	7a	-
16b	7b	-
17a	-	4a
17b	-	4b & 4c
17c	-	4d
18a	-	2e
18b	-	2a
18c	-	2b
18d	-	2c
18e	-	2d
19a	-	description of site omitted = 3a
19b	-	3b incorrectly labelled 3a

Composite Report (1990)	Jabiluka Report (1979)	Ranger Report (1981)
19c	-	3c
19d	-	3d
20a	-	1a
20b	-	1b
21a	-	5a
21b	-	5b
21c	-	5c

SUPERVISING SCIENTIST FOR THE ALLIGATOR RIVERS REGION

RESEARCH PUBLICATIONS

Alligator Rivers Region Research Institute Research Report 1983-84
Alligator Rivers Region Research Institute Annual Research Summary 1984-85
Alligator Rivers Region Research Institute Annual Research Summary 1985-86
Alligator Rivers Region Research Institute Annual Research Summary 1986-87
Alligator Rivers Region Research Institute Annual Research Summary 1987-88
Alligator Rivers Region Research Institute Annual Research Summary 1988-89 (in press)

Research Reports (RR) and Technical Memoranda (TM)

RR 1	The macroinvertebrates of Magela Creek, Northern Territory. April 1982 (pb, mf - 46 pp.)	R. Marchant
RR 2	Water quality characteristics of eight billabongs in the Magela Creek catchment. December 1982 (pb, mf - 60 pp.)	B.T. Hart & R.J. McGregor
RR 3	A limnological survey of the Alligator Rivers Region. I. Diatoms (Bacillariophyceae) of the Region. August 1983 (pb, mf - 160 pp.)	D.P. Thomas
	*A limnological survey of the Alligator Rivers Region. II. Freshwater algae, exclusive of diatoms. 1986 (pb, mf - 176 pp.)	H.U. Ling & P.A. Tyler
RR 4	*Ecological studies on the freshwater fishes of the Alligator Rivers Region, Northern Territory. Volume I. Outline of the study, summary, conclusions and recommendations. 1986 (pb, mf - 63 pp.)	K.A. Bishop, S.A. Allen, D.A. Pollard & M.G. Cook
	Ecological studies on the freshwater fishes of the Alligator Rivers Region, Northern Territory. Volume II. Synecology. 1990	K.A. Bishop, S.A. Allen, D.A. Pollard & M.G. Cook
	Ecological studies on the freshwater fishes of the Alligator Rivers Region, Northern Territory. Volume III. Autecology (in press)	K.A. Bishop, S.A. Allen, D.A. Pollard & M.G. Cook
RR 5	Macrophyte vegetation of the Magela Creek flood plain, Alligator Rivers Region, Northern Territory. March 1989 (pb - 41 pp.)	C.M. Finlayson, B.J. Bailey & I.D. Cowie
TM 1	Transport of trace metals in the Magela Creek system, Northern Territory. I. Concentrations and loads of iron, manganese, cadmium, copper, lead and zinc during flood periods in the 1978-1979 Wet season. December 1981 (pb, mf - 27 pp.)	B.T. Hart, S.H.R. Davies & P.A. Thomas
TM 2	Transport of trace metals in the Magela Creek system, Northern Territory. II. Trace metals in the Magela Creek billabongs at the end of the 1978 Dry season. December 1981 (pb, mf - 23 pp.)	S.H.R. Davies & B.T. Hart
TM 3	Transport of trace metals in the Magela Creek system, Northern Territory. III. Billabong sediments. December 1981 (pb, mf - 24 pp.)	P.A. Thomas, S.H.R. Davies & B.T. Hart
TM 4	The foraging behaviour of herons and egrets on the Magela Creek flood plain, Northern Territory. March 1982 (pb, mf - 20 pp.)	H.R. Recher & R.T. Holmes
TM 5	Flocculation of retention pond water. May 1982 (pb, mf - 8 pp.)	B.T. Hart & R.J. McGregor
TM 6	Dietary pathways through lizards of the Alligator Rivers Region Northern Territory. July 1984 (pb, mf - 15 pp.)	C.D. James, S.R. Morton, R.W. Braithwaite & J.C. Wombey
TM 7	Capacity of waters in the Magela Creek system, Northern Territory, to complex copper and cadmium. August 1984 (pb, mf - 42 pp.)	B.T. Hart & S.H.R. Davies

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TM 8	Acute toxicity of copper and zinc to three fish species from the Alligator Rivers Region. August 1984 (pb, mf - 31 pp.)	L. Baker & D. Walden
TM 9	Textural characteristics and heavy metal concentrations in billabong sediments from the Magela Creek system, northern Australia. October 1984 (pb, mf - 39 pp.)	P.A. Thomas & B.T. Hart
TM 10	Oxidation of manganese(II) in Island Billabong water. October 1984 (pb, mf - 11 pp.)	B.T. Hart & M.J. Jones
TM 11	*In situ* experiments to determine the uptake of copper by the aquatic macrophyte *Najas tenuifolia* R.Br. December 1984 (pb, mf - 13 pp.)	B.T. Hart, M.J. Jones & P. Breen
TM 12	Use of plastic enclosures in determining the effects of heavy metals added to Gulungul Billabong. January 1985 (pb, mf - 25 pp.)	B.T. Hart, M.J. Jones & P. Bek
TM 13	Fate, of heavy metals in the Magela Creek system, northern Australia. I. Experiments with plastic enclosures placed in Island Billabong during the 1980 Dry Season: heavy metals. May 1985 (pb, mf - 46 pp.)	B.T. Hart, M.J. Jones & P. Bek
TM 14	Fate of heavy metals in the Magela Creek system, northern Australia. II. Experiments with plastic enclosures placed in Island Billabong during the 1980 Dry season: limnology and phytoplankton. May 1985 (pb, mf - 32 pp.)	B.T. Hart, M.J. Jones, P. Bek & J. Kessell
TM 15	Use of fluorometric dye tracing to simulate dispersion of discharge from a mine site. A study of the Magela Creek system, March 1978. January 1986 (pb, mf - 51 pp.)	D.I. Smith, P.C. Young & R.J. Goldberg
TM 16	Diets and abundances of aquatic and semi-aquatic reptiles in the Alligator Rivers Region. July 1986 (pb, mf - 57 pp.)	R. Shine
TM 17	Plants of the Alligator Rivers Region, Northern Territory. August 1986 (pb, mf - 54 pp.)	I.E. Cowie & C.M. Finlayson
TM 18	The taxonomy and seasonal population dynamics of some Magela Creek flood plain microcrustaceans (Cladocera and Copepoda) September 1986 (pb, mf - 80 pp.)	M.E. Julli
TM 19	Frogs of the Magela Creek system. January 1987 (pb, mf - 46 pp.)	M.J. Tyler & G.A. Crook
TM 20	Radiation exposure of members of the public resulting from operation of the Ranger Uranium Mine. December 1987 (pb, mf - 22 pp.)	A. Johnston
TM 21	Interlaboratory comparison of the measurement of uranium in urine. June 1988 (pb - 24 pp.)	T. Anttonen, B.N. Noller & D.A. Woods
TM 22	Biology and early development of eight fish species from the Alligator Rivers Region. June 1988 (pb - 68 pp.)	W. Ivantsoff, L.E.L.M. Crowley, E. Howe & G. Semple
TM 23	Alien plants in the Alligator Rivers Region, Northern Territory, Australia. September 1988 (pb - 34 pp.)	I.D. Cowie, C.M. Finlayson & B.J. Bailey
TM 24	The determination of zinc in Magela Creek water April 1989 (pb - 26 pp.)	C.A.A. LeGras & B.N. Noller
TM 25	Element concentrations in the freshwater mussel, *Velesunio angasi*, in the Alligator Rivers Region June 1989 (pb - 262 pp.)	H.E. Allison & R.D. Simpson
TM26	A simple computer model for terrestrial and solar radiation transfer August 1989 (pb - 60 pp.)	I.M. Vardavas & L.M. Cannon
TM27	Annual rainfall statistics for stations in the Top End of Australia: normal and log-normal distribution analysis (In press)	I.M. Vardavas
TM28	A study of the reproducibility of water conditions between small enclosures and a tropical waterbody November 1989	B.N. Noller, T.P. McBride, C.W. Hunt & B.T. Hart

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TM29	Concentration of radon and radon daughters during semi-dry tailings deposition by QML at Nabarlek (1985-88) December 1989	D.A. Woods
TM30	The development of a regulatory mechanism for the control of water release from Ranger Uranium Mine June 1990	M.W. Carter
TM31	Investigation of the erosional stability of waste rock dumps under simulated rainfall: a proposal (In press)	S.J. Riley & T.J. East

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