Technical Memorandum 16

Diets and abundances of aquatic and semi-aquatic reptiles in the Alligator Rivers Region

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the Alligator Rivers Region

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TECHNICAL MEMORANDUM 16

DIETS AND ABUNDANCES OF AQUATIC AND SEMI-AQUATIC REPTILES IN THE ALLIGATOR RIVERS REGION

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Data were gathered on habit of food consumption, habitats, reproductive cycles, general biology, and utilisation by Aboriginal people, of five reptile species on the Magela Creek system: filesnakes (*Acrochordus arafurae*), sand goannas (*Varanus panoptes* and *V. gouldii*) and water goannas (*V. mertensi* and *V. mitchelli*).

Filesnakes are abundant in downstream billabongs, and eat a variety of fishes. Mating occurs during the Dry season, with parturition late in the Wet season. Radiotelemetry revealed extensive nocturnal movements, especially in shallowly inundated grassland during the Wet season.

Sand goannas have very diverse diets, including both vertebrate and invertebrate prey. The proportion of prey that is of aquatic origin is quite high (30% by weight) in *V. panoptes*, but negligible in *V. gouldii*. Water goannas are relatively uncommon in downstream areas. These lizards eat mainly fishes and terrestrial arthropods (*V. mitchelli*) and freshwater crabs (*V. mertensi*).

Aboriginal people eat sand goannas throughout the year and eat large numbers of filesnakes late in the Dry season. Water goannas are not important food items.

1 INTRODUCTION

The aquatic and riparian habitats of the Alligator Rivers Region support a diverse and abundant reptilian fauna which to date has attracted little scientific study. The mining and milling of uranium in the Region has raised the possibility that heavy metals and radionuclides might escape into the aquatic system and be accumulated by the reptilian fauna. Aquatic and semi-aquatic reptiles are regularly eaten by Aboriginal people of the region, and data on diets and reproduction of these species, as well as on their dispersion and abundance, are essential before the possibility that reptiles might act as pathways for these contaminants to Aboriginals can be assessed.

Thus the objectives of this study were:

1) To provide quantitative data on the diets of filesnakes (*Acrochordus arafurae*), sand goannas (*Varanus gouldii* and *V. panoptes*) and water goannas (*Varanus mertensi* and *V. mitchelli*);

2) to provide information on seasonal changes in abundance and distribution within the Magela Creek system of the species listed above; and

3) to describe the reproductive cycles of the species listed above.

1.1 Study area

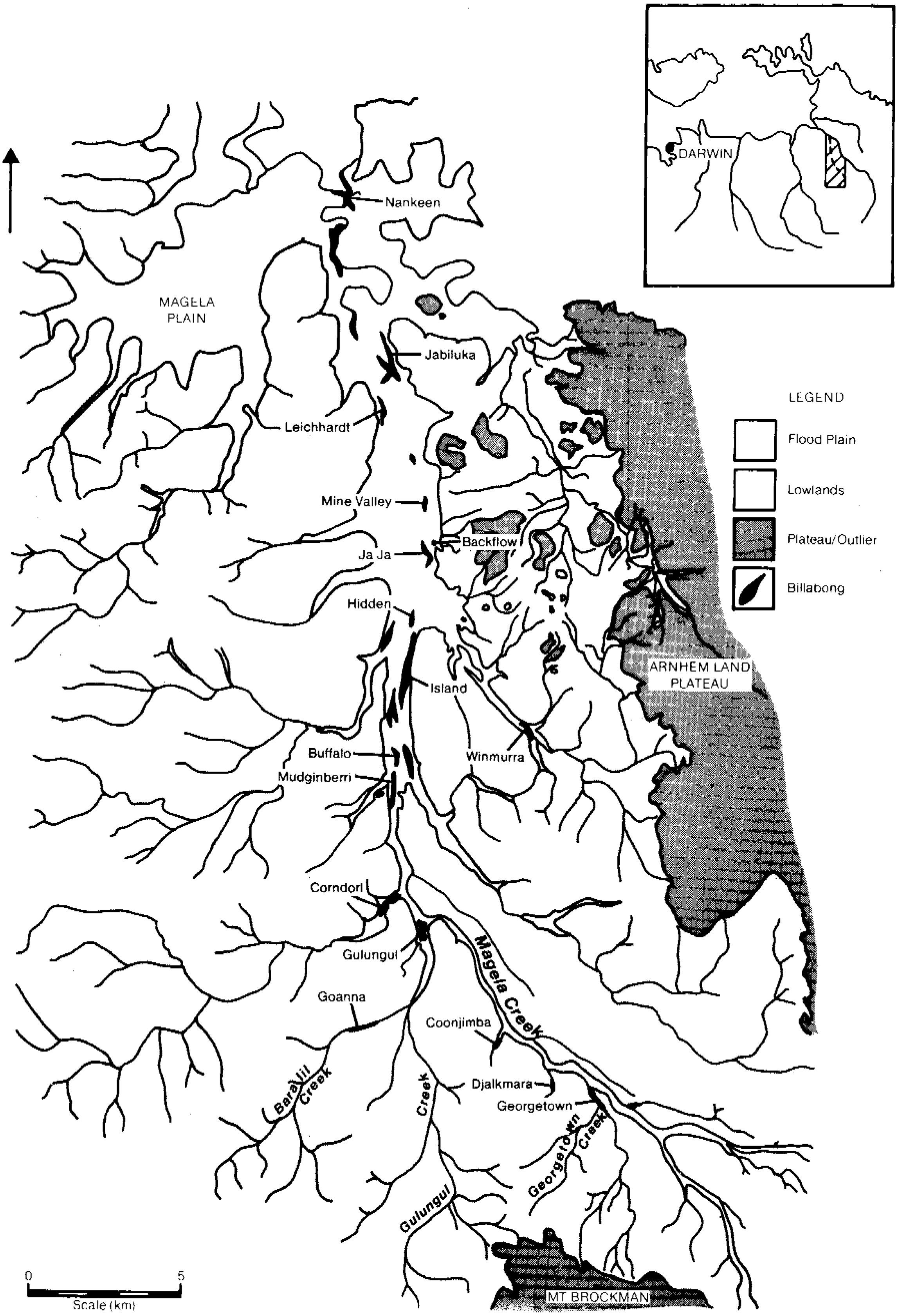
Magela Creek is a small watercourse, about 250 km east of Darwin, N.T., flowing from a sandstone plateau (the Arnhem Land escarpment) to the East Alligator River (Map 1). The creek consists of discrete billabongs during the Dry season (May-December), but torrential monsoonal rains during the Wet season (January-April) connect all the billabongs into a single watercourse. In the lower reaches of Magela Creek, an extensive flood plain (approximately 5 x 35 km) is inundated, often to a depth of 2 m, during the Wet season. Hence, the billabongs have extensive shallowly inundated fringes during this period.

Temperatures show some seasonal variation, with daily maxima averaging 30-34°C throughout the year. Night-time temperatures remain high (> 23°C) during the Wet, but reach lower minima (approx. 14°C) during the Dry season owing to the lack of cloud cover at this time. Preliminary data on water temperatures reveal extensive diurnal temperature fluctuations in shallow water, especially in the Dry season, with limited thermal stratification in the deeper billabongs (Hart & McGregor 1982).

Water clarity varies seasonally, with Secchi disc readings of 6 to 40 cm late in the Dry season and 1 to 2 m after the onset of the Wet (Hart & McGregor 1982).

Although preliminary data were gathered from the Mary River, most information comes from the Magela Creek system downstream of the Ranger mine. Major studies were conducted in the regions of:

1) Magela Crossing and the Buffalo-Crescent-Mudginberri-Boomerang billabong system, which are in the upper reaches of the creek. These billabongs are connected by small water channels which persist for most of the Dry season. Radiolocation and radiotelemetric work was centred on Buffalo Billabong, a medium-sized (600 x 100 m) main-channel waterbody fringed by large clumps of *Pandanus aquaticus, Barringtonia acutangula* and several other tree species. There were small areas (< 5% of the water surface) of floating grass mats (*Pseudoraphis*).



Map 1. Magela Creek system

2) Leichhardt and Hidden billabongs, which are in the main channel of the lower stream. Leichhardt Billabong is a long, narrow waterbody (approx. 2000 x 100 m) with extensive (> 10% of water surface) floating grass mats, and is fringed by trees. Hidden Billabong is smaller (800 x 100 m), with relatively little floating grass.

1.2 Species Studied

Four species of varanid lizards ('goannas') and one species of snake were studied.

Arafura filesnake *(Acrochordus arafurae)*. The three aquatic filesnake species which compose the family Acrochordidae appear to be only distantly related to any other living snakes (McDowell 1975, 1979). Both external and internal morphology make these one of the most bizarre groups of modern reptiles (McDowell 1975, 1979; Rieppel 1980). Their common name, 'elephant's trunk snake', is a good description: the skin is relatively 'baggy' and covered by small granular scales. Probably because of their aquatic habits and tropical Asian-Australian distribution, the ecology of filesnakes has attracted little scientific study, apart from recent work on the marine *Acrochordus granulatus* (Voris & Glodek 1980; Gorman et al. 1981) and earlier anecdotal reports on the freshwater *A. javanicus* and *A. arafurae* (Dowling 1960; Boo-Liat 1964; Worrell 1963). However, there have been several laboratory studies on acrochordid physiology (Glass & Johansen 1976; Heatwole & Seymour 1975; Seymour et al. 1981).

Sand goannas *(Varanus gouldii* and *V. panoptes)*. These large terrestrial lizards are commonly seen in riparian habitats in the Magela Creek system. Although the physiology of varanid lizards has been studied (e.g. Bartholomew & Tucker 1964), and the ecology of desert species has been investigated (e.g. King 1980; Green & King 1978; Green 1972; Pianka 1968, 1969, 1970, 1982), the tropical Australian species have attracted little scientific attention.

Identification of large goannas to species level is difficult unless the specimen can be approached very closely or collected. In the Magela Creek system, *V. panoptes* appears to be more common than *V. gouldii*, especially in riparian habitats. *Varanus panoptes* may be distinguished from *V. gouldii* by:

1) its larger size;

2) the tail tip, which is banded in *V. panoptes* whereas *V. gouldii* has a yellow tail tip (unfortunately, old specimens often lack tips to their tails); and

3) the dorsal colouration, which in *V. panoptes* consists of many small yellow spots, each surrounded by a black circle. In contrast, *V. gouldii* has fewer, larger, irregular yellow blotches that are not bordered by black.

Mertens' water goanna *(Varanus mertensi)*. This highly aquatic varanid displays several morphological adaptations to its habitat. For example, the tail is strongly laterally compressed for swimming, and the eyes and nostrils are positioned high on the head so that the animal can lie in the water with only those parts protruding above water-level. *Varanus mertensi* is rarely seen far from water, to which it invariably attempts to escape if pursued.

Mitchell's water goanna *(Varanus mitchelli)*. This small varanid is also highly riparian and spends much of its time in the water, but it lacks the extreme aquatic adaptations of *V. mertensi*. The species varies geographically in colouration; the specimens from Magela Creek are boldly marked with yellow and black splotches. Its colouration enables *V. mitchelli* to be readily distinguished from the sympatric *V. mertensi*, which is blue-grey dorsally, with yellow flecks.

2 METHODS

I collected samples in January–March 1982, July–August 1982, January–February 1983 and October–November 1983. In addition, samples were collected on my behalf in June and August 1983, and sporadically at other times. The number of specimens killed for dissection was kept to a minimum, and most dissection data came from road-killed specimens or preserved animals in the Northern Territory Museum.

2.1 Filesnakes

Collecting techniques. Depending upon water depth and time of year, we used one of the following five methods to collect filesnakes:

1) Collecting by hand in shallow (< 0.5 m) water at night with flash lights. This method is most effective in the Wet season, when extensive shallow areas are available and are utilised by the snakes.

2) Groping under logs and among roots of *Pandanus aquaticus* and *Barringtonia*. The snakes can be recognised by touch and are easily collected by hand. This technique works best when water levels are low, forcing snakes to concentrate in the few remaining areas of suitable habitat.

3) Diving or snorkelling along billabong fringes in 2 to 4 m of water. This technique provided few specimens and neither this nor method 2 is recommended for future studies because of the danger from the saltwater crocodile *Crocodylus porosus*.

4) 60 cm diameter drum nets with funnels at both ends, which were baited with freshly killed fish. The design was based on turtle traps (Legler 1960) but had smaller (10 cm) openings to prevent ingress of turtles and large fishes. These traps could be used in any depth of water: they were productive both in shallow (< 1 m deep) and deep (3 to 4 m) water. In the latter situation, snakes were rarely drowned if the nets were inspected every 2 hours: nets left overnight usually contained only dead snakes. Shallow-water drownings resulted only if snakes entangled their heads (often teeth) in the submerged mesh, as the upper portion of each net protruded from the water, allowing the snakes to breathe.

5) Unbaited fyke nets in shallow (< 1 m deep) water. Fyke nets were 3 m long conical traps, made of 4 cm mesh, with a maximum diameter of 60 cm at the entrance. Each trap was fitted with a leader 2 m to 4 m long and 30 cm high. Leaders and trap entrances were anchored to the substrate, with the trap lying on the bottom except for the one metre, furthest from the entrance, which curved upwards to the surface, allowing captured snakes to breathe. Capture success was greatest when nets were set with the long axis horizontally at right angles to the bank and the leaders extending from the water's edge to the trap entrance. The length of leader used was determined by the width of the shallow margin of the waterbody where the trap was placed, ensuring that the trap did not extend into deep water.

Handling. Filesnakes were never recorded to strike at people handling them, but occasional specimens thrashed around with an open mouth. The teeth are numerous, long and sharp, so contact with these was sufficient to draw blood. However, most snakes reacted sluggishly and could be handled with impunity. Even when thrown onto the bank, most specimens made no attempt to move back to the water.

Collection of data. Snout-vent length (SVL) was measured whilst holding the snake vertically, by the neck. Measurements were made after the snake had relaxed, but the flexible, contractile bodies of these snakes made repeatability of measurements difficult to obtain. This method gave better results than stretching snakes on a horizontal surface.

Tail length was measured as the distance from the posterior edge of the vent to the tail tip. Head length was measured with vernier calipers and was taken as the distance from the tip of the snout to the posterior edge of the articular.

Body weight was measured with spring balances (up to 1 kg, accuracy ± 10 g; above 1 kg, accuracy ± 20 g). Data for SVL and body weight are given in Appendix Table A1.

Sex was determined by dissection in a preliminary sample, and it was found that sex could be reliably determined by external morphological characteristics, especially tail shape and head size. Males have a slightly longer and appreciably thicker tail and have smaller heads relative to SVL.

The presence of food items in the stomach was determined by palpation and by forcing any items upwards, so that they were regurgitated by the snake. Food items were identified to species level if possible, and their length and weight recorded (Appendix Table A2). As an estimate of prey weight prior to digestion, reconstituted weights were calculated for most items, based on weight/length regressions for the common fish species of Magela Creek (Supervising Scientist for the ARR, unpublished).

Reproductive condition was assessed by palpation in females (gravid females were easily detected because they showed distended abdomens due to the presence of oviducal eggs), and by dissection in both sexes. Males were judged to be mature if they possessed enlarged turgid testes or thickened convoluted efferent ducts, or if they were found in mating aggregations. Females were judged to be mature if they possessed large ovarian follicles (> 5 mm) or thickened oviducts, or if they were gravid or were mating when collected.

Marking. All snakes captured were marked before release to provide data on population sizes. Early in the study, each snake was uniquely marked by branding the ventral surface of the body and tail with a 12-volt soldering iron (run from a car battery). These marks healed well and produced white scar tissue, which made the snakes immediately recognisable for at least 15 months after marking. Later in the study, we excised a small rectangle of skin (0.5 x 1.0 cm) from the snake's ventral surface with scissors. This allowed us to recognise the animals over a period of days or weeks, but the degree of permanency of these marks is unknown. Snakes were released at the site of capture as soon as possible after marking.

Telemetry. Miniature temperature-sensitive radio-transmitters were implanted in 17 filesnakes during the course of the study. All transmitters were 150-153 MHz, 50 mm long x 20 mm diameter and weighed 20 g, which averaged less than 4% of the weight of the snake carrying the transmitter and was assumed not to have affected the snake's behaviour - prey items are commonly much larger. Transmitters were encapsulated in a 3:1 mixture of paraffin and Elvax (R), and calibrated against temperature, in a thermally controlled water bath, over a range of 5° to 45°C (± 0.1°C).

Reliable reception range varied with topography (both under and above water) and the depth of the snake in the water, but averaged 200-500 m. Our initial study relied on surgical implantation of transmitters in the abdominal cavity, but healing of the incision was poor in two of five cases. These snakes are omitted from the analysis. Subsequently, the transmitters were placed in the snake's mouth and forced down into the stomach by external pressure. A small (30 x 20 x 20 mm) styrofoam float was attached to each transmitter by fishing line, so that the unit could be recovered when regurgitated by the snake. This had the additional benefit of revealing immediately when regurgitation occurred, because the transmitter floated close to the water surface where it was easily visible, and where its pulse rate was substantially quickened by the higher temperature of the water surface.

Filesnakes carrying transmitters were located at least once per day, and in most cases it was possible to locate the snake both early in the morning (approx. 0800 h) and late in the evening (approx. 1800 h). On five nights, we attempted to locate snakes every 2 h but this was generally unsuccessful owing to inclement weather, crocodiles and buffalo. Each location was noted on a map of the study area. Movements were measured as straight line distances between successive location points on the map, except where this would have required movement over dry land. In such cases, the minimum aquatic path was calculated.

Water temperatures were measured with a mercury thermometer held 20 cm under the water surface; these measurements were taken at the time the snakes were located, and as close as possible to the snake (usually within 2 m).

2.2 Varanids

Collecting techniques. Water goannas (*Varanus mertensi* and *V. mitchelli*) may be found on small creeks (e.g. Baralil, Gulungul and Corndorl) and, especially, at artificial pools beside road crossings. At the height of the Wet season, *V. mitchelli* may also be found among *Melaleuca argentea*, upstream of Mudginberri Billabong. These lizards are best approached from the water; if approached from the land, they usually take refuge in the water. They may be noosed with a long (6 m) fibreglass pole, to the end of which a small (8 cm diameter) nylon monofilament noose is attached. Baited metal live-traps are also effective.

Sand goannas (*Varanus gouldii* and *V. panoptes*) may be found throughout the woodland areas, but are most commonly sighted (especially *V. panoptes*) close to water. Cruising in a motor vehicle is usually more productive than walking through suitable habitat. The goannas are usually seen when they adopt a characteristic bipedal stance to investigate the vehicle's presence. They may be captured by a 20 cm monofilament noose on a 6 m pole.

Handling and data collection. All varanid species attempt to bite when captured, and use their sharp claws and muscular tails in their attempts to escape. Snout-vent length, weight, and sex (by probing and manual eversion of hemipenes) were recorded. Food items were removed by flushing water into and out of the stomach (Legler and Sullivan 1979). Large sand goannas (*V. panoptes*) had first to be immobilised: the varanid was allowed to seize a burlap-covered tube (60 cm long, 12 cm diameter) with its claws, and the lizard plus tube were then wrapped with masking tape. The lizards were marked by the removal of specific claws and released at the site of capture. Information on reproductive cycles of varanids was obtained by dissecting specimens in the collection of the Northern Territory Museum.

3 RESULTS

3.1 Filesnakes

Population estimates

Most of the collection methods were very successful, yielding a total of 759 *A. arafurae* over the course of the study. Another 87 specimens were collected on our behalf between our visits. These high numbers reflect the high population density of *A. arafurae* in the Region, and the ease with which they may be collected.

We performed two studies in which snakes were marked and recaptured to provide gross estimates of population sizes. The first group of filesnakes was marked in the upper section of Magela Creek early in the study (at Magela Crossing, February-March 1982; in Buffalo Billabong, February-March and July-August 1982). Based on experience of biologists who were diving for mussels in the Magela system (H. Allison and D. Walden, pers. comm.), the area comprising Magela Crossing, Mudginberri Billabong and Buffalo Billabong (including Crescent Billabong) has higher densities of filesnakes than most other upstream areas of Magela Creek. However, repeated collection by hand, fyke netting, baited drum nets and diving over three visits (Wet season 1982 and 1983, Dry season 1982) produced only 70 snakes in the region of Magela Crossing and Buffalo Billabong. Thirty-two snakes were captured, marked and released in this region during February-March 1982. Of the 18 snakes captured in the same area in January-February 1983, 5 (28%) were marked individuals. Although the sample size is small, these data suggest that (a) at least some filesnakes remain in, or return to, the same area year after year and (b) the total population in Buffalo Billabong/Magela Crossing is quite low - the estimate of total population size is $18/5 \times 32 = 115$.

The other mark-recapture study was performed on two lower mainstream billabongs, Leichhardt and Hidden, in November 1983. On the final night of trapping at Leichhardt Billabong, three of 26 adult female filesnakes collected had been previously marked (a total of 99 adult females had been previously marked). Similarly, two of 37 adult females collected at Hidden Billabong had been previously marked (a total of 42 adult females had been previously marked). A simple Lincoln Index suggests that there may be in the order of 1000 adult female filesnakes in each of these billabongs, but this estimate is highly uncertain and provisional. Nonetheless, it seems likely that numbers of filesnakes are many times higher in lower mainstream billabongs than in the upper reaches of the creek. This inference is supported by catch-per-unit-effort data which show that the numbers of snakes caught per 'net-night' was many times higher in Leichhardt and Hidden billabongs than in the Mudginberri-Buffalo billabong system. Using fyke nets, the number of snakes per net per night averaged 0.63 (20 in 32 'net-nights') in Buffalo Billabong, 3.93 (106 in 27) in Leichhardt Billabong and 10.33 (124 in 12) in Hidden Billabong. Similarly, data from drum nets show a much lower catch in Buffalo (0.03; 1 in 40) than in Leichhardt Billabong (2.78; 228 in 82). The differences in capture rates between upstream and downstream billabongs are clearly significant both for fyke-nets and drum-nets. Hand-collection (groping) results were consistent with this conclusion: for example, two people collecting in this way for 0.5 h in Jabiluka Billabong, in July-August 1982, captured 18 filesnakes, compared to 16 in over 20 hours of collection in Buffalo Billabong at the same time of year.

Sex ratio and body size

The majority of samples of *A. arafurae* contained more adult females (n = 331) than adult males (n = 217), but the ratio varied with locality and collection method (Table 1). The only sample collected by spotlighting (searching shallow water at night, with a torch, for active snakes) contained almost three times as many males as females, whereas the reverse was true in the sample obtained by groping under logs in a shallow backwater (Table 1). Two large samples taken at the same time (November 1983), by similar methods (nets), and in nearby billabongs (Hidden and Leichhardt) can be compared more directly: again, the ratios of males:females were very different (0.82 vs. 0.42; n = 65, 79; 52, 125; 2 x 2 table, χ^2 = 7.85, $P < 0.01$). Restricting the data from Leichhardt to snakes caught in fyke nets (the nets used at Hidden), the preponderance of females is even greater (n = 3 males, 13 females; sex ratio = 0.23; χ^2 = 6.14, $P < 0.02$).

There was a marked sex difference in both average and maximum body size - females average approximately 135 cm SVL and males 105 cm SVL (Table 1). For samples taken throughout the year, the range in SVL was similar in all localities (Table 1).

Morphology

Filesnakes are large and heavy-bodied, with small granular scales covering the entire body. The skin appears to be loose and baggy. Morphological data (Fig. 1) show that sexual dimorphism is extreme: not only do females grow much larger than males but, at any given SVL, females have heavier bodies, shorter tails and much larger heads than do males (Fig. 1).

The relationship between body length and mass in the two sexes was examined in detail because of the possibility that it could be influenced by seasonal variations in condition. The database was restricted to snakes less than 120 cm snout-vent length to ensure that males and females of equivalent SVLs were compared. All specimens used were from Leichhardt Billabong and comprised samples from both Wet season (53 males, 33 females) and Dry season (52 males, 34 females). Linear regression analysis (Zar 1974) was used to determine the most appropriate regression relationships between snake SVL and mass, taking into account the effects of sex and season. Four models, of different levels of complexity, were tested:

Model I: 1 slope, 1 intercept (a single regression including data for both sexes and both seasons);

Model II: 2 slopes, 2 intercepts (fitting data for males and females separately, but combining data from Wet and Dry seasons within each sex);

Table 1. Sample size, snout-vent length and adult sex ratio in samples of *Acrochordus arafurae*

All SVL measurements in cm. Unsexed juveniles are included with juvenile males.

Location	Buffalo Billabong	Mary River	Leichhardt Billabong	Leichhardt Billabong	Hidden Billabong	Hidden Billabong
Date	Feb 1982	Aug 1982	Feb 1983	Nov 1983	Nov 1983	Nov 1983
Capture method	Spot-lighting	Groping	Nets	Nets	Nets	Groping
Sample size	42	85	129	206	164	45
Females						
Juveniles						
n	7	15	25	27	16	5
SVL ($\bar{x}$ ± SD)	89.3 ± 13.7	80.6 ± 23.8	98.0 ± 12.4	99.4 ± 15.2	96.4 ± 18.9	104.6 ± 3.7
range	70-112	49-113	58-113	64-114	60-113	101-109
Adults						
n	8	36	51	125	79	32
SVL ($\bar{x}$ ± SD)	134.9 ± 13.0	130.3 ± 11.0	128.8 ± 7.7	132.1 ± 8.3	135.2 ± 10.8	137.2 ± 10.3
range	119-150	117-156	115-148	115-153	115-164	116-164
Males						
Juveniles						
n	5	16	1	2	4	0
SVL ($\bar{x}$ ± SD)	41.0 ± 8.0	58.3 ± 11.8	64.0	71.0	79.5 ± 1.3	-
range	35-55	44-79	-	69-73	78-81	-
Adults						
n	22	18	52	52	65	8
SVL ($\bar{x}$ ± SD)	102.1 ± 8.7	104.5 ± 6.8	105.4 ± 6.7	104.0 ± 5.9	106.5 ± 6.5	108.9 ± 5.9
range	90-120	91-114	88-118	89-118	88-120	101-116
Adult sex ratio (male/female)	2.75	0.50	1.02	0.42	0.82	0.25

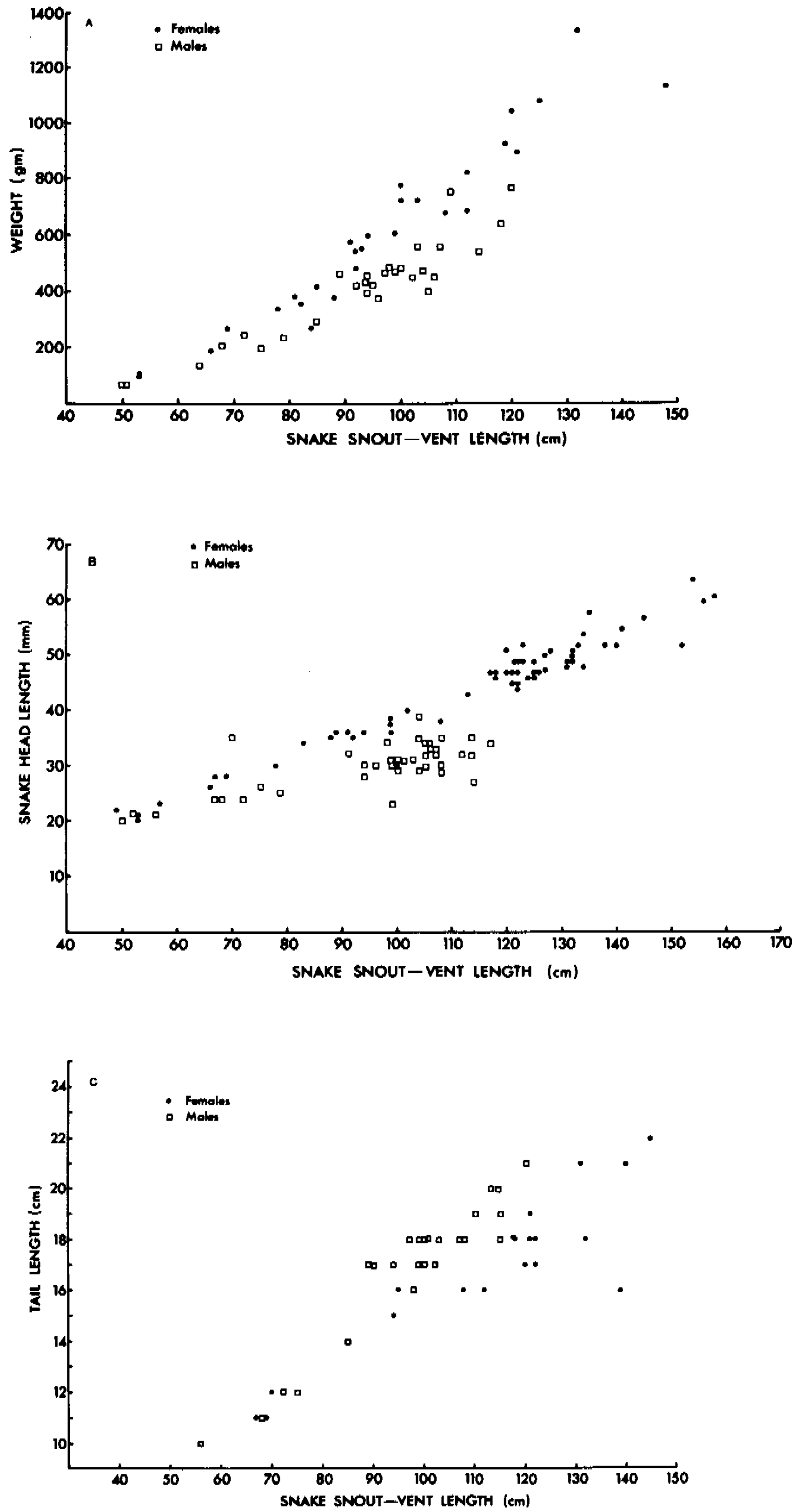


Figure 1. Morphological relationships in Acrochordus arafurae*: (A) body weight vs. snout-vent length; (B) head length (measured from the tip of the snout to the posterior edge of the articular; and (C) tail length vs. snout-vent length.*

Model III: 2 slopes, 4 intercepts (fitting all four data sets separately, but maintaining equal slopes for Wet and Dry season samples within each sex); and

Model IV: 4 slopes, 4 intercepts (fitting all four data sets separately).

Model II was found to be more appropriate than Model I ($F = 55.87$ on 2, 168 d.f., $P < 0.001$), indicating a significant difference between the sexes in the relationship between SVL and mass. However, allowing for seasonal differences within sexes (Model III) did not explain significantly more variance ($F = 1.43$ on 1, 166 d.f., n.s.). Neither was there a significant reduction in variance by using the most complex model (Model IV: $F = 1.39$ on 4, 164 d.f., n.s.). Hence, there are clear differences between sexes, but not between seasons, in the relationship between mass and body length.

Food habits

Acrochordus arafurae feed exclusively on fish and a wide variety of species and sizes are consumed (Table 2, Appendix Table A2). One medium-sized snake (113 cm SVL) was seen consuming a large (49 cm, 163 g) long tom (*Strongylura krefftii*) in shallow water (50 cm) at 0030 h in Leichhardt Billabong. Despite the enormous size of the prey relative to the size of the snake, the fish was quickly immobilised by constriction and swallowed in less than 2 minutes. In another case, a medium-sized filesnake was seen wrapped around a dead eel-tailed catfish on the surface of Leichhardt Billabong at 1830 h (P. Dostine, pers. comm.). The condition of the catfish suggested that it had been dead for some time prior to the attempted ingestion by the filesnake. The pectoral spines of the catfish (which protrude at right angles from the body after death) prevented the filesnake from swallowing the fish.

Dissection of *A. arafurae* from the Magela system suggested that catfish spines often cause significant wounds to the filesnakes. Two snakes were found to have abdominal abscesses containing catfish spines (which had clearly penetrated the stomach wall). Another snake was found with a catfish in its stomach, with the dorsal spine penetrating the lateral surface of the snake's body. At least 1 cm of spine protruded from the side of the filesnake. Filesnakes have been found with such injuries on several occasions (L. Baker, pers. comm).

Another filesnake was seen feeding on a fish which was apparently dead when found by the snake. The fish (a long tom) was being consumed by the filesnake when observations began, so that the initial strike was not seen. However, several other long toms of the same size were floating dead in the same area, having been discarded by a fisherman some time before. The willingness of filesnakes to feed on dead fish was also highlighted by our successful use of drum-nets baited with dead fish to catch these snakes. On nine occasions the filesnakes swallowed the bait. Captive filesnakes feed as readily on dead fish as on live prey, so it seems likely that *A. arafurae* acts as a scavenger, as well as a predator, in the Magela system.

Observations on captive *A. arafurae* showed that constriction is always used to immobilise prey, and that the fish are ingested very quickly. Although the snakes occasionally struck at fish swimming nearby, striking was usually not elicited until the fish actually touched some part of the snake's forebody. Chemical, as well as tactile, stimuli are important, because the snakes became active as soon as a fish was intro-

Table 2. Prey items recorded from stomachs of *Acrochordus arafurae*

See text for method of calculation of reconstituted prey mass.

Prey type	In adult male		In juvenile female		In adult female	
	No.	Mass (g)	No.	Mass (g)	No.	Mass (g)
Eel-tailed catfish *Neosilurus* sp.	5	4-10	5	7-10	1	446
Eel-tailed catfish *Neosilurus hyrtlii*	1	9	0	-	0	-
Mouth almighty *Glossamia aprion*	4	5-20	4	3-9	1	20
Silver barramundi *Lates calcarifer*	0	-	1	600	5	200-300
Sleepy cod *Oxyeleotris lineolatus*	1	100	2	40-270	8	25-882
Chequered rainbow-fish *Melanotaenia maculata*	2	4-5	1	4	1	4
Bony bream *Nematalosa* sp.	0	-	2	3-200	0	-
Tarpon *Megalops cyprinoides*	0	-	0	-	2	200-260
Forktailed catfish *Hexanematichthys leptaspis*	0	-	0	-	2	20-300
Banded grunter *Amniataba percoides*	0	-	2	41-50	0	-
Long tom *Strongylura krefftii*	1	163	0	-	2	100-130
Fish, sp. unknown	1	1	0	-	2	16
Catfish spines	3	-	0	-	1	-

duced to their tank. The snakes engaged in long bouts of tongue extrusion at this time.

Fish consumed by filesnakes cover a wide size range (Table 2), from several small species of less than 5 g to barramundi and sleepy cod of almost 1000 g. Sleepy cod (*Oxyeleotris*) comprised 19% of all prey items and over 50% of the total reconstituted weight of prey. Barramundi (*Lates*) were next in importance, comprising 10% of prey items and 18% of prey weight. The most abundant fish species in Magela Creek is the forktailed catfish, but these accounted for only 3% of the prey items. Larger snakes eat larger prey, and because female filesnakes are much larger than males in both body length and head size, diets of males and females differ in both prey species and prey size (Table 2). Analysis of prey items eaten shows that significant differences exist between the species of fishes eaten by adult male and adult female filesnakes (n = 14, 21; 2 x 9 contingency table, $X^2 = 21.6$, $p < 0.003$) and between juvenile and adult female filesnakes (n = 16, 21; 2 x 10 table, $X^2 = 20.6$, $p < 0.02$). However, diets of adult males and juvenile females are similar with respect to prey species (n = 14, 16; 2 x 9 table, $X^2 = 7.71$, $p = 0.46$).

The size of prey items consumed shows similar trends to those given above for prey types. The size of prey eaten by adult males (n = 15, mean reconstituted weight = 24.0 g, SD = 45.4) is similar to that of juvenile females (n = 16, mean reconstituted weight = 79.6 g, SD = 158.7, F = 12.3, t = 1.39, $p < .05$). However the prey items eaten by adult females (n = 20, mean reconstituted weight = 290.7 g, SD = 265.5) are larger than those of either males (F = 35.7, t = 4.52, $p < .05$) or juvenile females (F = 2.83, t = 2.04, $p < .05$). This difference may result partly, or entirely from head-size differences between the sexes.

The proportion of filesnakes containing prey items was very low in all our samples (Table 3). Feeding was recorded in both the Wet and Dry seasons, but an average of less than 5% of snakes contained food. This proportion was lower in snakes caught in baited drum nets (which presumably attracted hungry snakes) than in snakes collected by other methods (Table 3; n = 759, $X^2 = 6.2$, $p < .05$). The proportion with prey was lower in males (8 of 251 or 0.03) than females (26 of 508 or 0.05), but the difference was not statistically significant (n = 759, $X^2 = 1.05$, ns).

Table 3. Proportion of filesnakes containing food at the time of collection

Presence of food was determined by palpation. Some records from fyke nets probably include fish consumed while the snake was in the net, as these nets often caught fish.

Collection method	Females		Males		Both sexes
	No.	Proportion with food	No.	Proportion with food	Proportion with food
Spotlighting	12	0	22	0.05	0.03
Groping	90	0.09	34	0	0.07
Fyke nets	186	0.07	130	0.05	0.06
Drum nets	220	0.02	65	0	0.02

Observations on captive filesnakes kept at 30°C show that a fish can be detected inside the snake's body, by palpation, for approximately four days after it is eaten. Even if fish were only detectable for a shorter period, the low proportion of snakes with food suggests that feeding must occur infrequently. For example, if prey are detectable for two days after ingestion and 5% of snakes contain detectable prey, the average proportion of snakes feeding on any given day is less then 3%. This is equivalent to a filesnake feeding, on average, once every 40 days. Because of the way this estimate is calculated, it is likely to overestimate feeding frequency.

Reproductive biology

Mating. Three instances of reproductive activity were observed in the field:

1) A copulating pair of *A. arafurae* was found among *Pandanus aquaticus* roots at Corroboree Camp, Mary River, on 8 August 1982. The water depth was approximately 1 m and the time 1400 h.

2) A large intertwined mass of eight males and one female was located among *Pandanus* roots at the north end of Jabiluka Billabong on 18 August 1982 at 1200 h; water depth was 1.5 m and one of the males was *in copula* with the female.

3) An intertwined mass of five males and one female (again, *in copula*) were collected among fallen branches in 3 m deep water in Crescent Billabong at 1700 h on 19 August 1982.

A fourth record of an apparent mating aggregation of one female and two males was noted on 21 July 1983 by D. Walden and K. Bishop (pers. comm.) in escarpment country just below Bowerbird Billabong. The snakes were coiled together, in open water in a fairly fast current, anchored to the substrate by the female's forebody. Water temperature was relatively low (21°C).

Size at sexual maturity. Snakes from the two areas examined (Magela Creek and Mary River) were remarkably similar in body sizes, with average and maximum SVLs differing between areas by less than 1 cm in both sexes. Hence, data from these localities were pooled for analysis.

Forty-nine males were dissected. All specimens over 90 cm SVL ($n = 39$) were reproductively mature, as were single specimens of 86 cm and 82 cm. Another 82 cm animal was immature, as were all specimens below this length ($n = 5$), and single animals at 86 cm and 89 cm SVL. I conclude that male *A. arafurae* mature at 82-90 cm SVL. The body lengths of males in mating aggregations may give an additional indication of size at sexual maturity. Three males actually *in copula* when collected measured 98, 104 and 105 cm SVL, whereas eleven other males in the same aggregations ranged from 94 to 108 cm SVL ($\bar{x} = 101.4$ cm, SD = 5.1).

The exact size of females at maturity is difficult to determine, because there is a very high proportion of non-reproductive females over the entire range of female body sizes. The four smallest reproductive females examined were 112.5 cm, 115.5 cm, 120 cm and 125 cm SVL, suggesting that sexual maturity is attained at approximately 115 cm SVL. However, the high proportion of non-reproductive females in this SVL range (> 0.90) means that some females may not mature until they attain much greater sizes. Surprisingly, a female *A. arafurae* from the eastern part of the species' Australian range (Archer River near Coen, Qld) was found to be gravid, with eleven offspring, at a much smaller body length (102 cm) than any of the Northern Territory specimens (Shine, unpub. data).

Seasonal reproductive cycle

There is a clear seasonal cycle in both testes and male efferent ducts. Testes attain maximum size (approximately 50 x 12 mm) and turgidity during the Dry season in June and July, and vasa efferentia are distended with spermatozoa at this time (n = 5 snakes dissected). Testes are slightly reduced in size by August and September, but the efferent ducts still contain abundant motile spermatozoa (n = 6 animals). Towards the end of the Dry season, October and November, testes become relatively flaccid and, as spermatozoa are lost, the efferent ducts lose their thickened opaque appearance (n = 9). By the beginning of the Wet season (January-February) the testes are very regressed (approximately 30 x 8 mm) and flaccid, and the efferent ducts are completely empty (n = 6). Recrudescence begins in March and April (the end of the Wet season), with increasing testicular turgidity (n = 5).

The low proportion of reproductive females meant that most of the mature females dissected did not provide useful data on seasonal cycles. However, one pre-ovulatory female with enlarged (9 mm diameter) ovarian follicles was collected in June. Gravid snakes are immediately recognisable by their distended posterior sections (due to the presence of developing embryos), and 23 such females were recorded. All were collected between October and February. Captive females, collected *in copula* in August 1982 and maintained in the laboratory at 30°C, gave birth on 14 March, 21 March and 15 April 1983. Gravid females collected in November 1983 gave birth on 16 February and 17 April 1984. Four recently born filesnakes (< 40 cm SVL) were collected in February and March, confirming that birth occurs early in the year.

Gestation, fecundity, Relative Clutch Mass and size at birth

Three gravid females collected in November contained small, unpigmented embryos. This observation suggests that ovulation in *A. arafurae* must occur in September-October, soon after mating. Hence the gestation period is approximately six months.

Dissection of gravid females revealed that the position of embryos in the body is different from that in most other viviparous reptile species I have examined. The embryos are carried in the anterior section of the oviducts, rather than occupying the entire length. For example, a gravid female *A. arafurae* (138 cm SVL) contained 14 embryos, all of which were held in a 26 cm length of the body with the most posterior embryo 28 cm from the vent. Similarly, a gravid specimen of 140 cm SVL had the most posterior embryo 37 cm from the vent. This placement was typical in all the gravid females dissected.

Fecundity of *A. arafurae* is high ($\bar{x}$ = 16.9, SD = 4.7, range = 11-25) and is highly correlated with female body size ($r = 0.83$, $p < .01$; Fig. 2). However, the number of young born is reduced by the high incidence of abortive ova. In the six gravid females dissected, a total of 93 developing and 21 abortive ova were seen, suggesting that almost 20% of the ovulated ova die before birth. In all cases the ova had been fertilised and embryonic development had commenced, but the embryo was dead and disintegrating by the time the snakes were dissected (less than halfway through gestation in each case).

Relative Clutch Mass (RCM), defined as weight loss at parturition divided by the female's post-parturition weight, ranged from 0.30 to 0.63

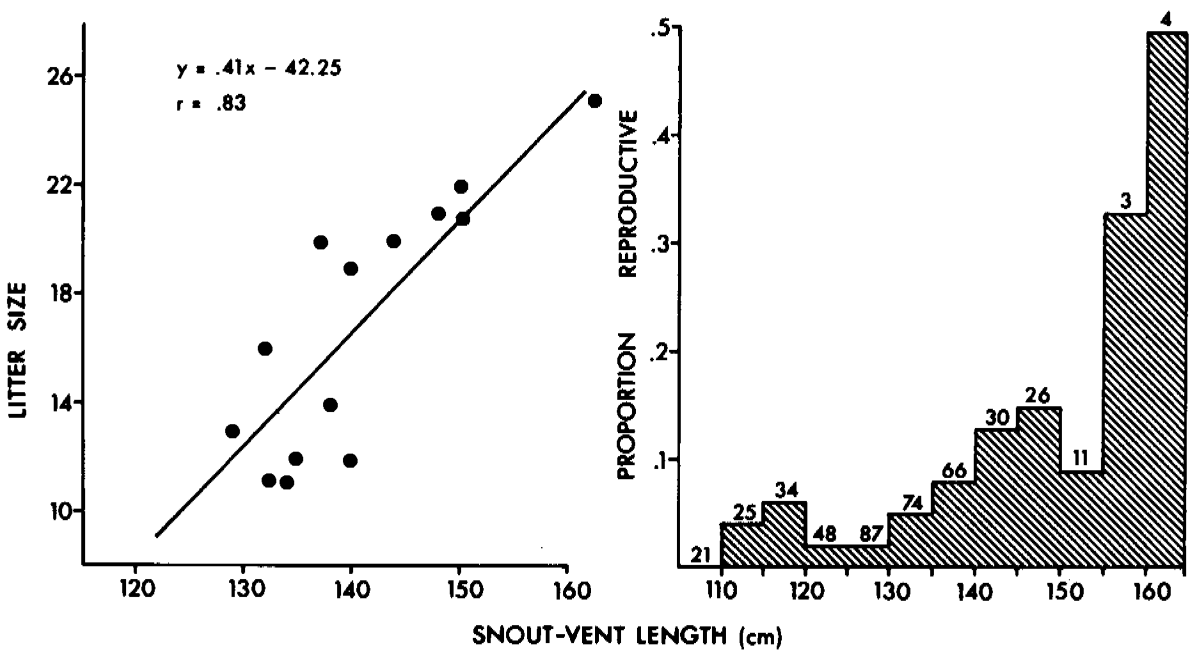


Figure 2. Fecundity and reproductive frequency in filesnakes

in five captive *A. arafurae* (Table 4). Dissection of four gravid females less than halfway through gestation showed RCMs, calculated in this case as total embryonic weight divided by the weight of the female after the embryos were removed, of 0.16 to 0.30 ($\bar{x}$ = 0.22). The lower RCM in early gestation reflects the lower weights of ova at this stage (mean ova weights in three females were 16.9 gm, 18.8 gm, 24.8 gm) compared to the weights of full-term offspring (means 27.1 to 32.7 g; Table 4).

Neonatal filesnakes are relatively large, and were similar in size in each of five litters born in captivity (Table 4). An additional record of offspring size comes from a dissected female containing a single full-term ectopic embryo of 308 mm SVL, similar to that of captive-born neonates.

Parturition

The birth of four of the young born in captivity on 21 March 1983 was observed. For at least half an hour prior to birth (1850 h) the female raised her head to the water surface to breathe at short intervals (2 to 5 minutes). Most breaths were brief (less than 10 seconds) but one lasted 57 seconds. Contraction of the posterior part of her body commenced 8 minutes before birth, and was followed by the sinuous movement of a body coil posteriorly down the body (similar to the body loop used by many snakes to push a food item down the oesophagus). As this coil approached the vent, the head of the young appeared. The neonate emerged within ten seconds, and was completely free of embryonic membranes except for torn remnants attached to the umbilicus. The latter remained inside the vent, and was torn off as the neonate emerged. At least one neonate sloughed, using vigorous body movements, before surfacing for its first breath; others took a breath first, then sloughed immediately. Neonates were extremely active after birth, and constantly attempted to escape from the aquarium.

Table 4. Relative Clutch Mass and size at birth in captive *Acrochordus arafurae*

Relative Clutch Mass = weight loss at parturition divided by maternal post-parturition weight

	Female No.				
	1	2	3	4	5
Date of birth	14.iii.1983	21.iii.1983	15.iv.1983	16.ii.1984	17.iv.1984
Maternal SVL (cm)	131	135	134	133	148
Relative Clutch Mass	0.53	0.55	0.30	0.63	0.62
Litter size	13	11	11	22	16
Offspring SVL (mm)					
range	320–325	355–370	368–383	325–373	350–378
$\bar{x} \pm SD$	342 ± 10	365 ± 6	371 ± 6	351 ± 14	362 ± 13
Offspring weight (gm)					
range	24.5–33.9	28.8–36.6	28.5–34.5	24.5–30.1	24.4–33.7
$\bar{x} \pm SD$	30.5 ± 3.7	32.7 ± 2.6	31.9 ± 2.1	27.1 ± 1.3	30.2 ± 2.4
Offspring head length (mm)					
range	12.5–18.9	15.8–19.5	16.4–18.1	15.3–17.5	16.6–18.3
$\bar{x} \pm SD$	17.2 ± 1.7	17.7 ± 1.1	17.2 ± 0.6	16.4 ± 0.6	17.5 ± 0.6

Frequency of reproduction

Judging by development of the testes and efferent ducts, all males over 90 cm SVL (n = 39) were reproductively active. In contrast, most of the females examined were non-reproductive. Because reproductive females could easily be recognised without dissection (ovarian follicles or oviducal embryos could be detected by palpation), it was possible to classify all adult females collected as reproductive or non-reproductive. Combining data from all localities and all trips, 25 of 383 adult-size females (> 115 cm SVL) were reproductive. This gives an overall proportion of reproductive females of 6.5%, but analysis shows that this proportion varies with SVL, being higher in larger females (categories of SVL in Fig. 2: $n = 12$, $r = 0.72$, $p < .01$). Nonetheless, the proportion remains low even in very large females: for example, only 4 (22%) of the 18 largest (> 150 cm SLV) snakes examined were reproductive.

The proportions of reproductive adult females in samples collected in different areas (Table 5) varied. For example, the proportion was higher in Hidden Billabong (17 of 112; 0.15) than in the nearby Leichhardt Billabong (3 of 213; 0.01) (2 x 2 table, d.f. = 1, $\chi^2 = 21.78$, $p < .001$). However, this comparison is confounded by collection method: samples collected by groping under logs and *Pandanus* roots contained a higher proportion of gravid snakes (0.22) than samples collected by trapping (0.04) (Table 5). A better comparison can be made between samples collected by net-trapping in November 1983: the proportion of reproductive animals remains higher in Hidden (8 of 76; 0.10) than in Leichhardt Billabong (1 of 133; 0.01) (2 x 2 table, $\chi^2 = 8.97$, $p < .003$). The best data to compare different collection methods come from Hidden Billabong in November 1983: Aboriginals collected a higher proportion of gravid animals by groping (9 of 36; 0.25) than we did by trapping (8 of 76; 0.10). Although in this case sample sizes are too low for significance ($\chi^2 = 2.93$, $p = 0.087$), it seems likely that both the locality and collection method affect estimates of reproductive frequency.

The proportion of reproductive females can also be assessed by examining gonads of dissected specimens for evidence of previous reproduction. Most adult-size females possessed extremely small, regressed gonads, comparable to those seen in immature females of other snake species. However, 8 of 59 (0.14) non-gravid females dissected possessed adult-size (i.e. enlarged, thickened) oviducts. In five of these eight cases, oviducal pockets from previous reproduction could be discerned. These were quite obvious in specimens collected in August, October and November, so it is likely that any females reproductive in the previous year would have been detected. Assuming that all females with enlarged oviducts had bred the previous season, 8 of 59 (0.14) of the females not gravid at the time of collection had been reproductive in the previous season.

Habitat utilisation

Whenever a 'radio-tagged' snake was located, its habitat was recorded and placed into one of nine categories (Fig. 3). During the Dry season (July 1983), snakes were necessarily restricted to the main billabongs. Most locations were under or among *Pandanus aquaticus* (41%) or floating grass mats (30%). This pattern changed dramatically in the Wet season, with most snakes in shallowly inundated grassland (32%) and under the boughs of freshwater mangrove (*Barringtonia acutangula*) (41%) which are flooded during this time. The seasonal shift in habitat utilisation is extreme (Fig. 3).

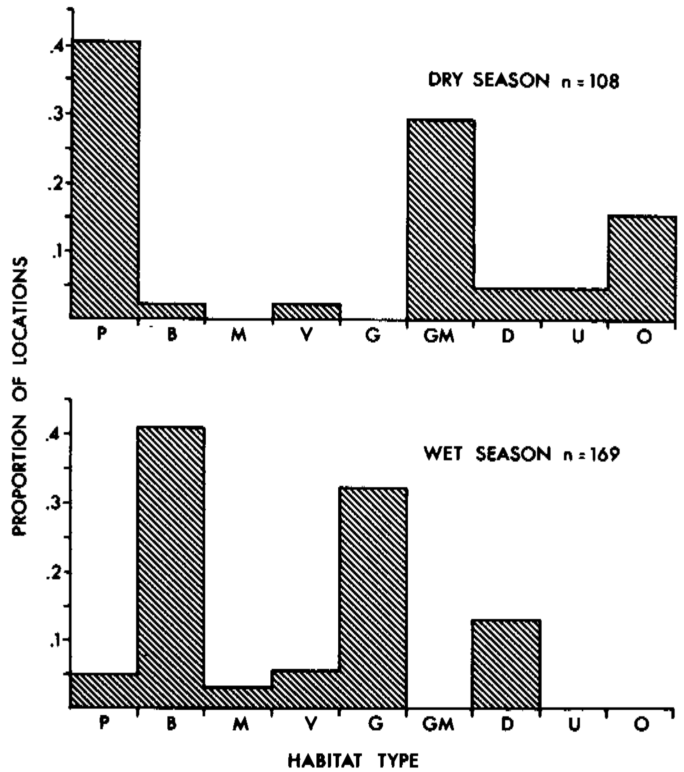
Table 5. The proportion of adult-size (> 115 cm SVL) female *Acrochordus arafurae* judged to be reproductive

(A) The proportion of females reproductive at the time of collection, as determined by palpation (i.e. gravid, or with enlarged ovarian follicles).

Collection method	Location	Date	No. of adult-size females	No. of reproductive females	Proportion reproductive	
Groping	Mary River	Aug 1982	35	5	0.14	
	Jabiluka Bb.	Aug 1982	2	1	0.50	0.22
	Hidden Bb.	Nov 1983	36	9	0.25	
Nets	Buffalo Bb.	Jan 1983	5	0	0	
	Leichhardt Bb.	Feb 1983	51	1	0.02	
	Leichhardt Bb.	Nov 1983	133	1	0.01	0.04
	Leichhardt Bb.	Oct 1982	29	1	0.03	
	Hidden Bb.	Nov 1983	76	8	0.10	
Total			364	26		

(B) The proportion of females possibly reproductive in the breeding season prior to the one at the time of collection, as determined by dissection (i.e. of all non-gravid, adult-size, females those showing enlarged oviducts or oviducal 'pockets' resulting from previous breeding).

Location	Date	No. of females dissected	No. with enlarged oviducts	Proportion reproductive in previous year
Leichhardt Bb.	Jun 1983	2	0	
	Aug 1983	12	2	
	Nov 1983	6	3	0.14
	Oct 1982	27	3	
Hidden Bb.	Nov 1983	12	0	
Total		59	8	



KEY TO HABITAT TYPES

P: among roots of *Pandanus aquaticus*
B: under *Barringtonia acutangula*
M: under *Melaleuca* spp.
V: among submerged vines
G: in inundated grassland
GM: under floating grass-mats
D: among submerged branches and debris
U: under banks
O: in open water

Figure 3. Habitat utilisation by telemetered filesnakes in the Buffalo Billabong area. Data for all snakes in each season are combined.

During the Wet season, there are no significant differences between diurnal and nocturnal habitats ($\chi^2 = 9.41$, 5 d.f., $p < 0.09$). During the Dry season, diurnal and nocturnal habitats differ ($\chi^2 = 17$, 6 d.f., $p < .01$). This difference is due primarily to the higher utilisation of 'open water' at night (31%) than during the day (6%) possibly because, during the Dry season, night-time temperatures of shallow waters are below those preferred by the snakes.

Data from trapping were also examined with respect to seasonal changes in habitat, and habitat differences between the sexes. The largest samples came from Leichhardt Billabong. In the Wet season sample (March 1983) there is a significant sex bias in habitat, with females found in deeper water than males (Table 6; n = 43, 29, 48, 7, 2 x 2 table, $\chi^2 = 10.3$, $p < .002$). Also, body lengths of females caught in deep water are significantly greater than of those caught in shallow water (Table 6; n = 29, 29, F = 2.73, t = 2.84, $p < .05$). This sex difference is not evident in the Dry season sample (November 1983): males and females are distributed randomly with respect to water depth (Table 6; n = 87, 63, 30, 24, $\chi^2 = 0.02$, n.s.), and body lengths of deep-water and shallow-water females are similar (Table 6; F = 1.26, t = 0.04, ns).

There was a significant difference in SVLs of females caught in shallow water in the Dry and Wet seasons. This difference was due to the presence of many small females in the Wet season shallow-water sample (Table 6). Male body sizes do not differ between any of the comparisons.

Table 6. Number, sex ratio and body length of filesnakes collected in Leichhardt Billabong

Mean SVL ± standard deviation is in cm

Date	Water depth	Females		Males		Overall	Sex ratio
		N	Mean SVL ± SD	N	Mean SVL ± SD	Mean SVL ± SD	(males/females)
Wet season (March 1983)	Shallow (< m)d	43	113.7 ± 19.0	48	104.5 ± 8.6	108.8 ± 15.1	1.12
	Deep (> 1 m)	29	126.3 ± 12.0	7	103.7 ± 9.7	121.9 ± 14.6	0.24
Dry season (Nov. 1983)	Shallow (< 1 m)	87	127.1 ± 12.9	30	101.8 ± 10.5	120.1 ± 17.3	0.34
	Deep (> 1 m)	63	127.0 ± 15.3	24	104.0 ± 5.1	120.7 ± 16.8	0.38

Differences between above means are statistically significant for:

(1) March, female SVL shallow *versus* deep

(2) March female SVL shallow *versus* November female SVL shallow

All other intra-sex comparisons not significant at $p < .05$

Movements and body temperatures. Regular monitoring of fifteen telemetered filesnakes (6 in the Dry season, 9 in the Wet season) revealed extensive day-to-day movements (Table 7). Average distances moved during the day were small ($n = 14$, $\bar{x} = 18.7$ m, $SD = 20.2$), but were large at night (based on displacement from the evening to the following morning: $n = 15$, $\bar{x} = 141.2$, $SD = 96.5$). This day/night difference is significant (Mann-Whitney $U = 15$, $n_1 = 15$, $n_2 = 15$, $p < .001$). Total displacement over 24-hour periods was also calculated, incorporating all available data on snake locations. For example, a given snake may have been located two or three times during a single night during our attempted two-hourly monitoring periods. If so, these locations were incorporated in the calculation of the animal's 24 h movements. The 24 h displacements averaged 166 m in the Wet season ($n = 9$, $SD = 55$) and 68 m in the Dry season ($n = 6$, $SD = 54$): a significant difference (Mann-Whitney $U = 4$, $n_1 = 9$, $n_2 = 6$, $p < .01$). Many of the movements in a single night were over half a kilometre, but in 20% of cases no displacement was recorded on successive days. The method used may underestimate the total distance travelled by snakes, because (i) displacement is measured as straight-line distances; and (ii) occasional overnight observations showed that some snakes would move extensively but then return to their previous daytime position. Such movements were recorded as zero displacements when recordings were only made at dusk and dawn. The preponderance of noctural movements was confirmed by trapping - traps never caught filesnakes during day.

The extensive noctural movements meant that telemetered snakes often left the billabong in which they were first captured. Even in the Dry season (July-August 1982), snakes caught and released in Buffalo Billabong moved into Boomerang, Crescent and Mudginberri billabongs.

The small movements recorded during daytime hours ($\bar{x} = 18.7$ m) were probably due to shade-seeking behaviour of the snakes: they tended to move so as to stay within the shadow of overhanging vegetation. This behaviour may make them less obvious to aerial predators (especially Sea Eagles).

Telemetric determinations of filesnake body temperature (Table 8) show that snake temperatures are very similar to water temperatures (mean difference < 1°C). Both snake and water temperatures are lower in the Dry season than the Wet season (Mann-Whitney $U = 0$, $n_1 = 3$, $n_2 = 8$, $p < .01$). This would be expected as air temperature is lower at this time of year.

Utilisation of filesnakes by Aboriginals

My information on this topic comes from conversations with local residents, especially Aboriginal people from Mudginberri community (see Acknowledgments). Filesnakes are collected and consumed by Aboriginal people throughout the year, but are harvested intensively only in the Late-dry season. The snakes are collected by groping under logs and among *Pandanus* roots, a method that is most effective when water levels are low. Several sites on the Magela are used, including Hidden, Ja Ja, Boomerang and Nankeen billabongs. These are all downstream billabongs where, our data suggest, filesnake densities are higher than in upstream areas.

Large numbers of filesnakes may be collected by Aboriginals: three women found 45 large snakes in approximately one hour at Hidden Billabong in November 1983. The hunting is done primarily by women, especially the older women. We were told that in some areas snakes are kept alive in 44-gallon drums of water until it is convenient to eat them. Apparently the largest, fattest snakes are the most highly prized, although snakes of all sizes are eaten. Gravid females are particularly relished.

Table 7. Daily movements of telemetered filesnakes

Diurnal movements are those between morning (0800 h) and evening (1800 h) locations. See text for method of calculation of 24 h means which are not the simple addition of diurnal and nocturnal means:

Season	Date	Snake		No. of days monitored	Mean distance moved (m)[a]		
		Sex	SVL (cm)		Per 24 h	Diurnal	Nocturnal
Wet season	Feb-Mar 1982	F	141	24	155 (30-432)	71 (0-174)	217 (0-522)
		F[b]	119	21	173 (0-260)	0 (0)	235 (0-930)
		M	125	21	150 (0-240)	24 (0-48)	110 (30-200)
	Feb 1983	F	139	9	110 (0-380)	44 (0-330)	46 (0-380)
		F	122	12	271 (0-556)	14 (0-100)	257 (0-503)
		F	127	11	233 (0-676)	12 (0-40)	201 (0-646)
		M	110	8	127 (15-305)	9 (0-35)	119 (5-305)
		M	101	11	103 (0-330)	0 (0)	40 (0-330)
		M	103	2	173 (15-330)	15 (15)	330 (330)
Dry season	July-Aug 1982	F	153	15	104 (14-184)	30 (30)	100 (15-184)
		F	150	7	12 (0-68)	-	-
		F	130	18	100 (0-419)	0 (0)	181 (29-419)
		F	100	21	46 (0-101)	10 (0-45)	45 (0-91)
		M	108	23	8 (0-165)	1 (0-4)	8 (0-165)
		M	106	7	138 (0-577)	31 (0-97)	88 (0-480)

[a] Range is given in brackets; [b] this snake was monitored in a small tributary (Corndorl Creek) rather than the main Magela channel.

Table 8. Body temperatures of filesnakes, measured telemetrically, and water temperatures measured at the same time as telemetric readings were taken

All data from Buffalo Billabong area.

	Snake no.	Sample size	Body temperature (°C)		Water temperature (°C)	
			Mean ± SD	Range	Mean ± SD	Range
Wet season (Feb-March)	1	15	30.5 ± 0.9	28.7-31.8	30.3 ± 1.3	28.3-31.4
	2	10	29.6 ± 2.2	27.8-35.0	29.8 ± 3.7	22.6-35.0
	3	11	30.5 ± 1.1	28.7-31.8	30.7 ± 2.4	29.0-33.5
	4	14	29.4 ± 0.9	27.9-30.6	29.1 ± 0.9	27.0-30.0
	5	18	28.9 ± 1.4	27.2-31.9	28.8 ± 1.1	26.0-31.0
	6	24	29.5 ± 0.6	28.4-30.6	28.9 ± 1.4	26.0-31.5
	7	21	29.4 ± 1.0	28.4-32.4	28.9 ± 1.4	26.0-31.5
	8	22	29.5 ± 1.2	27.2-31.5	29.1 ± 1.3	27.0-31.5
Dry season (July-August)	9	7	25.7 ± 0.4	25.2-26.2	24.2 ± 0.8	23.0-26.0
	10	7	26.7 ± 1.6	24.0-28.5	24.2 ± 1.1	23.0-27.0
	11	6	25.4 ± 0.7	24.5-26.2	24.2 ± 1.1	23.0-27.0

The only direct evidence on the types of filesnakes caught and eaten by Aboriginals comes from the sample collected by a group from the Mudginberri community in November 1983 (Hidden Billabong, Table 1). We provided transport for the hunters, but they chose the collecting site and method. These 45 snakes may be compared to 164 snakes caught in the same area by fyke nets over the next four days. The snakes caught by the Aboriginal hunters were mainly adult females (0.71 of total) rather than juvenile females (0.11) or males (0.18) (Table 1). In contrast, the sample collected by fyke nets contained relatively fewer adult females (0.48) and more adult males (0.40), the rest (0.12) being juveniles of both sexes. The difference between the two samples in proportion of each sex and reproductive class is significant (n = 45, 164; 2 x 4 table, 3 d.f., $\chi^2 = 9.5$, $p < .03$).

The low proportion of smaller snakes in the sample collected by the Aboriginals was due to the inevitably greater difficulty in locating by touch, and seizing, small snakes in turbid water.

All the snakes collected were kept by the hunters and were, presumably, shared around the camps and eaten. Some snakes were killed at the time of capture by dislocation of the cervical vertebrae, but many were kept alive.

3.2 Varanids

Information on varanids is much less extensive than on filesnakes, primarily because it is difficult to locate and capture specimens.

Morphology

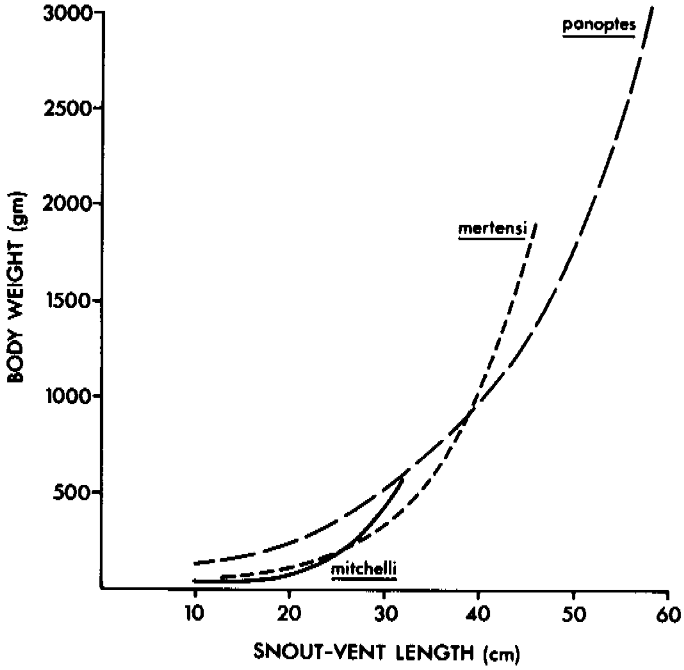
Data were gathered on 198 varanids, including both field-collected and museum specimens. Sample sizes and mean body sizes of each species are listed in Table 9. *Varanus panoptes* is by far the largest species, with some adult males attaining almost 70 cm SVL and approx. 4 kg mass. The other sand goanna, *V. gouldii*, is much smaller, the size of the adult being similar to the aquatic *V. mertensi* (approx. 37 cm SVL in males). The fourth species, *V. mitchelli*, is much smaller again ($\bar{x}$ = 26 cm). There is a strong sexual difference in body size in both 'sand goanna' species, with males being much larger than females. However, no such difference is apparent in the water goannas (Table 9). Weight-length relationships of three of the varanid species are fairly similar (Fig. 4).

Sex ratios of captured animals are male-biased in all four species, probably reflecting behavioural differences between the sexes, rather than a real sex ratio bias in the population.

Food habits

Information on dietary habits comes from stomach-flushing of live goannas and from dissection of preserved (museum) and road-killed specimens. A great diversity of prey is evident (Table 10, Fig. 5), with the two sand goanna species (*V. gouldii* and *V. panoptes*) being similar to each other but different from both of the water goannas. Raw data are given in Appendix Tables A3-A6.

Sand goannas. In terms of weight of food consumed, both species feed primarily on reptiles and mammals (Table 10, Appendix Tables A3-4; Fig. 5). Agamid and varanid lizards are particularly important prey, as are reptile eggs (in *V. gouldii*). Most of the mammalian prey eaten were small species



EQUATIONS
where: y = weight (gm)
x = SVL (cm)

V. mertensi:
y = 2.64 + 0.11x (n = 14)

V. mitchelli:
y = 1.18 + 0.16x (n = 22)

V. panoptes:
y = 4.32 + 0.06x (n = 29)

Figure 4. Relationship between snout-vent length and body mass in varanid lizards. Lines show the regressions calculated from data points.

Table 9. Sample size, snout-vent length and adult sex ratio of varanid lizards studied

Data from Jabiru collection and Northern Territory Museum specimens combined. Unsexed juveniles included with juvenile females. All species are in the genus *Varanus*. SVL = snout-vent length (cm).

	V. gouldii	*V. panoptes*	*V. mertensi*	*V. mitchelli*
Total sample size	26	85	49	38
Males				
juveniles				
n	7	17	8	5
SVL range	25.0-36.3	20.5-37.0	18.5-32.0	13.7-20.0
adults				
n	11	43	19	14
SVL range	32.0-42.5	38.0-67.0	33.0-41.0	23.0-32.0
Mean SVL ± SD	37.0 ± 3.2	54.7 ± 9.0	36.4 ± 2.6	26.2 ± 2.5
Females				
juveniles				
n	3	15	8	8
SVL range	9.4-17.0	10.5-30.0	12.8-26.8	8.2-19.0
adults				
n	5	10	14	11
SVL range	27-33	31.0-43.0	31.0-46.0	21.0-29.0
Mean SVL ± SD	29.0 ± 2.3	38.6 ± 3.5	36.6 ± 4.2	23.6 ± 2.3
Adult sex ratio				
male/female	2.2	4.3	1.4	1.3

Table 10. Proportional composition of the diets of varanid lizards from the Alligator River Region

Based on data in Appendix Tables A3-A6

Prey item	*V. panoptes*		*V. gouldii*		*V. mertensi*		*V. mitchelli*	
Proportion of diet by:	Reconstituted Weight	No.	Weight	No.	Weight	No.	Weight	No.
Arachnida: Araneae	0.002	0.03	0.005	0.03	0.001	0.036	0.07	0.06
Malacostraca: Chilopoda	0.002	0.01	0.01	0.03	-	-	0.004	0.011
Gastropoda	-	-	-	-	-	-	-	0.011
Hexapoda: Blattodea	0.002	0.02	-	-	-	-	0.004	0.011
Orthoptera	0.05	0.46	0.05	0.14	0.003	0.036	0.18	0.29
Hemiptera	3×10^{-4}	0.01	9×10^{-4}	0.003	0.002	0.029	-	-
Coleoptera	0.009	0.05	0.017	0.12	0.01	0.18	0.006	0.03
Hymenoptera	2×10^{-4}	0.16	10^{-5}	0.014	10^{-4}	0.007	0.002	0.011
Larvae/pupae	0.008	0.09	0.03	0.49	-	-	-	-
Other insects	2×10^{-5}	0.01	0.002	0.008	4×10^{-4}	0.02	0.02	0.05
Crustacea	0.02	0.015	0.015	0.014	0.29	0.57	0.21	0.06
Vertebrata								
Fish	0.04	0.01	-	0.008	0.02	0.02	0.19	0.40
Anura	0.07	0.07	0.012	0.019	0.04	0.029	-	-
Reptilia: Skinks	6×10^{-3}	0.015	0.005	0.025	-	-	0.11	0.011
Varanids	0.08	0.005	0.30	0.003	-	-	-	0.011
Agamids	0.19	9.006	0.027	0.008	-	-	-	-
Snakes	0.16	0.003	-	0.003	0.04	0.007	-	-
Eggs	0.02	0.02	0.06	0.07	0.59	0.04	0	0.023
Birds	-	0.002	-	-	-	0.007	0	0.011
Mammals	0.34	0.012	0.52	0.008	0.003	0.007	0.20	0.011
TOTAL	3222.63	666	1983.90	353	709.69	138	49.21	87

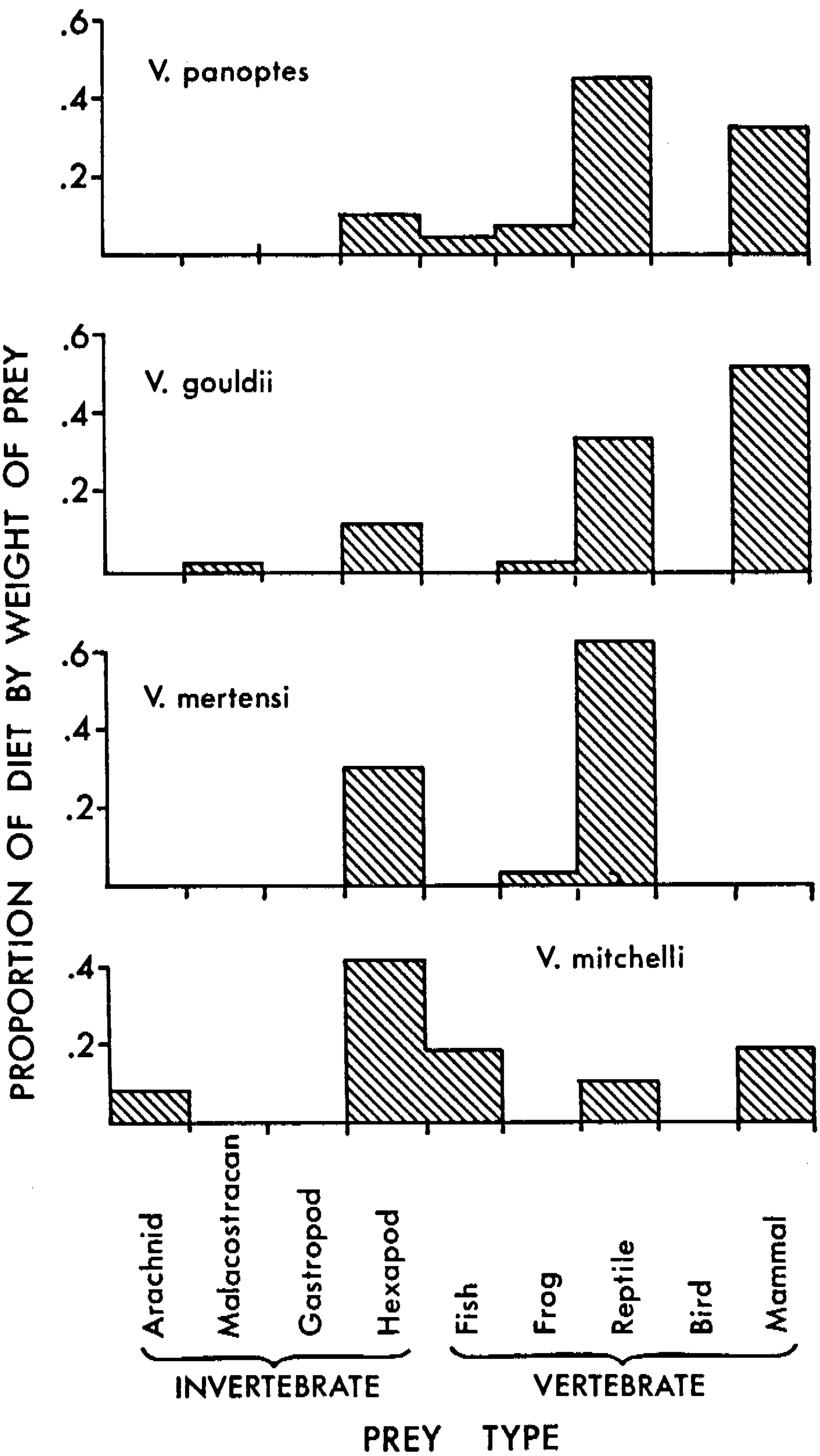


Figure 5. Histograms showing the total reconstituted weight of each prey type as a proportion of the total reconstituted weight of all prey items found in stomachs of that varanid species.

(determined by microscopic examination of fur) – *Mus*, *Rattus*, *Pseudomys*, *Sminthopsis*, *Isoodon* – and were probably killed by the varanids. The larger forms, macropods and echidna, were presumably taken as carrion. In terms of numbers (rather than weight) of prey there is a much greater contribution to the diet of the lizards by invertebrates than by reptiles and mammals. By far the most common prey item in *V. panoptes* was gryllids (46% of all prey), whereas insect larvae and pupae comprised 49% of all *V. gouldii* prey recorded.

Water goannas. *Varanus mertensi* has a less diverse diet than the other varanids, with a high proportion of its diet coming from freshwater crabs (29% by weight, 57% by numbers) and crocodile eggs (59% by weight, 4% by number, found in only one goanna). If the single specimen containing crocodile eggs is excluded from the analysis, the proportion of the diet consisting of crabs is 71% by weight and 59% by number. The importance of crabs in the *V. mertensi* diet is emphasised by their occurrence in 22 of the 31 lizards examined (Appendix Table A5); these crabs were rarely seen in the stomachs of the other varanid species. It seems likely that *V. mertensi* forages for the crabs in some specialised way: further studies would be useful.

Varanus mitchelli, although superficially similar to *V. mertensi*, has a very different diet (Table 10, Appendix Table A6, Fig. 5). The most common prey items are fish (40% by number, 20% by weight) and orthopterans (29% by number, 16% by mass), emphasising the ability of *V. mitchelli* to forage both on land and underwater. In this species, diet may be strongly dependent on habitat: the records of predation on fish came primarily from goannas caught in flooded *Melaleuca* above Mudginberri Billabong, whereas most of the invertebrate prey came from goannas caught in small creeks.

Proportion of aquatic prey in the diet. All four varanid species feed on both aquatic and terrestrial prey. As one might expect, the proportion of prey that is of aquatic origin is higher in the water goannas than in the sand goannas (Table 11). Approximately 40% of the biomass ingested by *V. mertensi* and *V. mitchelli* comes from the aquatic system: crabs, fish

Table 11. Percentage of prey eaten by varanids that is of aquatic origin

Weights in the table are percentages of the total reconstituted prey weight.

Species	Percentage	
	By weight	By number
V. panoptes		
Wet season	10.0	18.8
Dry season	38.0	5.4
Unknown dates	24.7	15.7
Total	29.2	12.7
V. gouldii	1.4	3.1
V. mertensi	39.7	81.0
V. mitchelli	44.1	36.8

and frogs are the most important components. In contrast, *V. gouldii* eats almost no aquatic prey (1.4% by weight). The more riparian *V. panoptes*, however, derives almost one-third of its food from the water (Table 11).

Reproductive biology

All four varanid species are oviparous (egg-laying), but the species differ substantially in body size at sexual maturity, and in clutch size.

Size at sexual maturity. Based on SVL of the smallest reproductive specimen (Table 9), the largest species (*V. panoptes*) matures at the largest body size: approximately 39 cm SVL for males, and 31 cm SVL for females. The related, but slightly smaller, *V. gouldii* attains maturity at 32 cm in males and 27 cm in females. The aquatic *V. mertensi* is similar to *V. gouldii* in this respect (32 cm in males, 30 cm in females), whereas the smallest species, *V. mitchelli*, attains maturity at smaller body sizes (22 cm in males, 21 cm in females).

Seasonal reproductive cycle. No definite mating activity was observed, but two pairs of *V. panoptes* were seen: one at Jabiluka Billabong on 27 July, and one at Leichhardt Billabong on 29 July. Both pairs consisted of one small and one large adult, with the latter (male?) actively pursuing the former (female?) whenever it moved away. It is likely that this is courtship behaviour.

Presence of oviducal eggs was determined by dissection of adult female varanids. Gravid female *V. gouldii* were recorded in January (1) and February (2), whereas gravid females of *V. mertensi* were recorded in April (2) and June (1). Gravid *V. mitchelli* were recorded in April (1) and June (1). No gravid *V. panoptes* were recorded. Although these data suggest that the sand goannas oviposit during the Wet season and the water goannas during the Dry, sample sizes are too low for any confidence in this conclusion. Additionally, a female *V. mertensi* with very large (38 mm diameter) ovarian follicles, presumably about to ovulate, was collected in mid-December. It is likely that oviposition occurs during several months of the year, at least in the water goannas.

Fecundity and size at birth. The following clutch sizes were recorded from oviducal eggs or enlarged ovarian follicles: 9, 11 and 13 in *V. panoptes*; 3, 4 and 11 in *V. gouldii*; 10, 11 and 12 in *V. mitchelli*; and 3 to 11 ($n = 10$, $\bar{x} = 6.9$, $SD = 2.6$) in *V. mertensi*. Clutch size was not clearly related to SVL in *V. mertensi* (9 d.f., $r = 0.54$, $p > .05$); sample sizes of the other species were too small for analysis.

Size at birth can be inferred from the body size of the smallest specimen collected, or from records of captive breeding. Two captive-born hatchling *V. panoptes* in the Northern Territory Museum measured 10.5 and 10.6 cm SVL; the smallest field-collected animal was 12.3 cm. Two captive-born *V. gouldii* measured 9.4 and 9.6 cm SVL. The smallest field-collected *V. mertensi* measured 12.8 cm SVL, considerably larger than the smallest field-collected *V. mitchelli* (8.2 and 8.3 cm SVL).

Habitat utilisation

Data from 127 sightings of varanid lizards in the Magela Creek system are summarized in Table 12. The only definite records obtained for *V. gouldii* were road-killed specimens in Jabiru and Jabiru East, suggesting a woodland habitat. The other three species show distinctive habitat preferences, with each species different from the others (in each comparison, 6 d.f., χ^2 table, $p < .001$). The data do not show any significant seasonal shifts in habitat utilisation by *V. panoptes* (4 d.f., $\chi^2 = 5.34$, $p = .25$). Our inability to locate *V. mitchelli* and *V. mertensi* during the Dry season, presumably because the lizards were inactive, precludes any seasonal comparison in these species.

The large sand goanna, *V. panoptes*, may be encountered almost anywhere on the Magela Creek system. However, the majority of sightings are in riparian habitats (Table 12). This is unlikely to be an artefact of sampling intensity, because vast areas of woodland were driven through during the study. My subjective impression was that *V. panoptes* were particularly common on the flood plain (54% of all sightings) but this may reflect the greater ease with which the lizards may be seen in these treeless areas. Hunting pressure by Aboriginal people may also be lower on the flood plain. Short-term aggregations of *V. panoptes* may occur following a fish kill: for example, four large sand goannas were seen in a small (0.5 hectare) area on the edge of Jabiluka Billabong on 13 February 1983. A large fishkill had just occurred, and one goanna was feeding at a barramundi carcass. Another was found to have fish scales in the stomach.

The aquatic *V. mertensi* were sighted almost exclusively on small creeks, generally around larger pools. With the notable exception of one specimen seen on the edge of the flood plain at Ja Ja Camp, *V. mertensi*

Table 12. Habitats from which varanid lizards were recorded

Habitat	*V. mitchelli*	*V. mertensi*	*V. panoptes*		*V. gouldii*
			Wet season	Dry season	
Billabong margins:					
mainstream	8	0	3	1	0
floodplain	1	1	15	14	0
Braided channels in Magela Creek	22	0	0	0	0
Pools in Magela Creek	0	4	0	0	1
Stream margins	8	13	5	0	0
Perennial woodland pools	0	2	0	0	0
Melaleuca-Barringtonia swamps	6	0	0	0	0
Floodplain grassland	0	0	1	1	0
Woodland	0	0	10	4	7
Total	45	20	34	20	8

were generally associated with small waterbodies. Most were seen basking on the ground at the water's edge, and they generally escaped into the water when disturbed. Then, they either hid on the bottom among tree roots and debris, or floated in the water with just the eyes and nostrils visible above water.

The small semi-aquatic *V. mitchelli* was often found sympatrically with *V. mertensi* on small creeks. However, *V. mitchelli* also utilised shallow areas of running water connecting billabongs on the main Magela channel. Seasonal shifts in habitat are probable. For example, at the height of the Wet season in January-February 1982, *V. mitchelli* were common in flooded *Melaleuca argentea* upstream of Mudginberri Billabong. A year later, because of the late arrival of the Wet season, these areas were not flooded and no *V. mitchelli* were seen there. However, several specimens were sighted up small creeks and in swamps.

Utilisation by Aboriginals

Varanid lizards are a highly favoured traditional food of Aboriginal people in the Alligator Rivers Region, partly owing to the large size of these lizards (Fig. 4) and the massive deposits of fat on healthy specimens. Goannas are generally hunted with packs of dogs but are obtained in several ways - for example, even freshly road-killed specimens are eaten (L. Hodgson, pers. comm.). The lizards are easier to see in the Dry season, when vegetation cover is lowest, but are nonetheless obtained throughout the year. Unlike filesnakes, which are collected in very large numbers but on rare occasions, goannas are gathered in small numbers more consistently throughout the year.

The water goannas (*V. mertensi* and *V. mitchelli*) are a relatively unimportant food source, because they are scarce, elusive, and too small. This is especially true of *V. mitchelli*. Large *V. mertensi* are potential Aboriginal food, but are rarely captured. The same is true of the small terrestrial and arboreal varanids of the Jabiru region (e.g. *V. scalaris*, *V. tristis*). However, small varanids (especially *V. mertensi*) are significant dietary items for Aboriginals in other geographic areas (e.g. the Kimberleys - M. Douglas, pers. comm.).

Both of the large sand goannas, *V. panoptes* and *V. gouldii* are eaten by Aboriginals. The woodland species (*V. gouldii*) may be harvested more than the generalised (woodland plus riparian) *V. panoptes*, simply because of higher encounter rates with Aboriginals. On the other hand, the larger size of *V. panoptes* means that adult specimens are particularly desirable prey items.

3.3 Other riparian reptiles

Apart from the filesnakes and varanids, the only other aquatic or semi-aquatic reptiles of real significance in Aboriginal diets are tortoises (*Chelodina*, *Emydura*, *Elseya*, *Carettochelys*). These are caught by fishing (with hooks baited with meat), by probing the muddy edges of billabongs with 'crowbars' (long metal poles), by groping among *Pandanus* roots, and by locating aestivating specimens in dried-out swampy areas. Apart from tortoises, Magela Creek also contains high densities of:

1) Estuarine and freshwater crocodiles (*Crocodylus porosus* and *C. johnstoni*), which were once harvested by traditional Aboriginal techniques, but this is now rare (B. Moore, pers. comm.).

2) Water pythons, *Bothrochilus fuscus* (*Liasis fuscus* or *L. mackloti* of many authors), which feed on a wide variety of reptiles, birds and mammals (Shine & Slip, unpub.), with water-birds and their eggs being very significant prey items. Water pythons may be eaten by Aboriginals occasionally.

3) Freshwater snakes, *Amphiesma mairii*, which feed mainly on frogs, are also common but are regarded as dangerous and hence avoided by most Aboriginal people. The same is true of the slaty-grey snake (*Stegonotus cucullatus*) and Macleay's water snake (*Enhydris polylepis*). A large *E. polylepis*, located by a group of Aboriginals while collecting filesnakes, caused a great deal of consternation among the group. None were prepared to approach the snake closely.

4) At least one highly venomous snake, the king brown (*Pseudechis australis*), is often found in floodplain habitats. This species, too, is regarded more as a danger than as a potential dinner.

4 SUMMARY

4.1 Relevant ecological characteristics of species studied

Filesnakes

1) Population densities are very high, in the order of thousands of adult snakes in downstream billabongs. Densities in upstream billabongs are much lower.

2) Filesnakes are entirely aquatic and piscivorous. Both live and dead fishes are eaten, with marked dietary differences between adult male and female snakes, and between adult and juvenile females. Very large fishes may be consumed, but feeding rates may be low.

3) Mating occurs during the Dry season, with parturition late in the Wet season. Fecundity is high (11 to 25), and offspring are large at birth (36 cm SVL), but only about one-fifth of adult females reproduce each year.

4) Filesnakes move extensively at night, especially during the Wet season. Areas of shallowly inundated grassland are the favoured habitat at this time.

5) Aboriginal people collect and eat large numbers of filesnakes, especially late in the Dry season. Large snakes, especially gravid females, may be taken particularly frequently.

Sand goannas

1) Population densities are much lower than those of filesnakes.

2) Diets are diverse, typically consisting of a few large vertebrate prey and many small invertebrate prey.

3) The proportion of prey that is of aquatic origin is quite high (30% by weight) in *V. panoptes*, but negligible in *V. gouldii*.

4) Oviposition occurs in the Wet season, and possibly at other times as well. Fecundity is quite high (*V. panoptes*, 9 to 13 eggs; *V. gouldii*, 3 to 11 eggs), and hatchlings are large (10 cm SVL).

5) Although the data are not sufficient for statistical significance, there is an apparent trend for *V. gouldii* to occur in woodlands whereas *V. panoptes* is often seen in riparian habitats. However, *V. panoptes* may also be seen in woodlands.

6) These goannas are an esteemed food item for Aboriginal hunters, and are collected throughout the year with the help of dogs.

Water goannas

1) Both species are relatively rare in Magela Creek downstream of the Ranger mine.

2) Diets are diverse and apparently habitat-dependent in *V. mitchelli*, with a preponderance of fishes and terrestrial arthropods. In contrast, *V. mertensi* feeds heavily on freshwater crabs (*Holthuisana*), and occasionally on crocodile eggs.

3) Oviposition occurs in the Dry season and (occasionally?) in the Wet season as well. Fecundity is higher in the small *V. mitchelli* (10 to 12 eggs) than in the much large *V. mertensi* (3 to 11 eggs), but offspring are smaller in the former species.

4) Very few specimens were seen during the Dry season, suggesting that a high proportion of the population is inactive at this time.

5) Most water goannas were seen on small creeks (especially at road crossings) rather than on the main Magela channel. However, during January-February 1982, *V. mitchelli* were common in flooded *Melaleuca argentea* upstream of Mudginberri Billabong.

6) Apart from occasional adult *V. mertensi*, water goannas are rarely eaten by Aboriginal people in the Jabiru area.

4.2 Recommendations for further study

The results of the present study suggest that filesnakes have the potential to be important in contaminant pathways and further study on (i) the feeding ecology of the snakes; (ii) the population densities and dynamics of the snakes; (iii) the details of accumulation of radionuclides and heavy metals under laboratory conditions; (iv) the dispersion of filesnakes throughout the Magela Creek system; and (v) the age and sex classes of snakes taken by Aboriginal hunters would clarify the role of these reptiles in contaminant pathways in the Alligator Rivers Region.

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APPENDIX

The following Tables present the raw data collected during the study:

Table A1. Snout-vent length (SVL) (cm) and weight (Wt) (g) of filesnakes captured during the study

A) Males

Wet season

SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt
64	144	101	445	105	409	108	483	111	507
91	350	102	409	105	448	108	543	111	545
91	374	102	457	105	528	109	382	111	551
94	555	102	513	106	458	109	459	112	496
95	366	103	375	106	494	109	477	113	482
95	427	103	447	106	498	109	488	113	541
96	382	104	452	107	432	110	401	114	545
96	393	104	480	107	490	110	510	115	525
97	472	104	494	107	495	110	522	118	619
98	424	104	511	107	510	111	426	118	647
100	427	105	406	107	566				

Dry season

SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt
69	227	100	427	103	462	106	547	110	511
73	269	100	443	104	371	107	486	110	519
89	402	100	448	104	385	107	513	111	381
91	437	100	539	104	417	107	448	112	480
93	445	100	458	104	448	107	472	112	542
94	478	100	495	104	476	107	507	113	547
95	406	101	417	104	508	108	442	115	413
97	403	101	472	105	475	108	474	118	724
99	479	101	498	105	480	108	588		
99	536	101	528	105	498	109	439		
100	418	102	472	105	562	109	530		

Table A1 (ctd)

B) Females

Wet season

SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt
58	125	102	576	120	769	128	576	131	912
79	292	103	610	120	855	128	1156	133	1519
82	357	110	757	120	978	128	1242	133	1673
92	468	111	716	121	1067	128	1368	134	677
93	393	111	779	122	895	129	1045	134	1663
93	500	111	783	124	773	129	1072	135	1539
93	538	112	593	124	863	129	1108	136	1183
94	453	112	693	124	1029	129	1415	137	1020
95	480	113	556	124	1167	130	882	138	940
95	499	115	420	125	927	130	941	138	1198
97	485	115	848	125	1392	130	1057	138	1230
97	655	115	910	126	610	130	1145	141	1898
99	511	119	781	127	791	130	1158	146	2074
100	455	119	934	127	1091	130	1214	147	1171
102	560	120	693	127	1183	131	566	148	1146

Dry season

SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt	SVL	Wt
54	92	116	817	127	1200	131	906	137	1310
64	227	117	891	127	990	132	942	138	831
71	303	118	832	127	941	132	969	138	1110
82	377	119	954	127	1510	132	1000	140	1270
91	485	120	580	127	880	132	848	140	1380
100	631	120	711	128	1090	132	967	140	1410
100	618	120	1000	128	752	133	1460	140	1400
101	738	120	864	128	1200	133	1420	140	847
102	598	120	1090	128	1470	133	1590	141	1470
102	511	121	1170	128	1260	134	1000	143	1590
103	520	121	848	128	1200	135	1180	143	1490
103	679	121	1110	128	1050	135	1030	144	1260
106	779	122	1070	128	1300	135	1000	144	2700
106	787	123	745	129	1040	135	1290	146	1070
108	722	123	764	129	1340	135	1270	147	2000
108	644	124	804	129	1130	135	1760	149	1790
108	639	125	1000	130	1320	136	1190	150	1950
110	739	126	789	130	938	136	1370	150	1600
110	771	126	990	130	1040	136	1100	150	1920
110	566	126	1020	130	990	136	1670	150	1880
114	742	126	1200	130	1210	137	1000	152	2040
114	511	127	990	130	949	137	1900	153	2010
114	1000	127	1170	130	1440	137	1340		
115	775	127	1110	130	910	137	1680		
116	613	127	1100	131	1050	137	1570		

Table A2. Prey items from stomachs of *Acrochordus arafurae*

SVL = snout-vent length

Sex	SVL (cm)	Head length (mm)	Species	Reconstituted mass (g)	Date of collection
M	96	27.4	Eel-tailed catfish x 3	825	29.viii.83
M	111.5	30.7	Eel-tailed catfish x 2	10	29.viii.83
M	108.5	39.3	Eel-tailed catfish x 2	20	29.viii.83
M	144.0	50.7	*Glossamia aprion* x 1	20	29.viii.83
M	108.0	30.7	*Glossamia aprion* x 1	20	16.ii.83
M	113.0	31.3	*Neosilurus hyrtlii* x 1	9	9.vi.83
F	105.0	40.0	Fish sp. x 1	2.5	9.vi.83
F	130.0	49.5	*Lates calcarifer* x 1	?	9.vi.83
F	128.0	51.0	*Lates calcarifer* x 1	200	11.viii.83
F	138.0	52.0	Fish sp. x 1	?	11.viii.82
M	112.0	34.0	*Oxyeleotris lineolatus*	100	18.viii.82
M	109.0	?	Fish sp. x 1	1	12.ii.82
			Melanotaenia maculata x 1	5	
M	103.0	40.4	*Glossamia aprion* x 3	16	15.ii.82
			Melanotaenia maculata x 1	4	
			Nematolosa sp. x 1	3	
?	36.5	?	*Glossamia aprion* x 1	5	15.iii.82
M	148.0	57.1	Fish sp.	16	14.iii.82
M	102.0	33.0	Catfish spine	?	5.xi.83
F	137.0	45.9	Catfish spine	?	26.x.82
M	115.7	32.6	*Melanotaenia maculata* x 1	4	14.ii.83
F	104.5	50.0	*Lates calcarifer* x 1	600	18.viii.82
F	88.0	49.0	*Nematolosa* sp. x 1	200	14.xii.82
M	98.0	31.8	Catfish spine	?	13.ii.83
F	169.0	64.4	Eel-tailed catfish x 1	446	25.x.82
F	126.0	47.0	*Lates calcarifer* x 1	350	8.viii.82
F	1220.0	47.0	*Oxyeleotris lineolatus* x 1	850	8.viii.82
F	125.0	49.0	*Oxyeleotris lineolatus* x 1	200	8.viii.82
F	156.0	60.0	*Hexanematichthys leptaspis* x 1	300	8.viii.82
			Lates calcarifer (scales)	?	8.viii.82
F	122.0	44.0	*Hexanematichthys leptaspis* x 1	20	11.viii.82

Table A2 (ctd)

Sex	SVL (cm)	Head length (mm)	Species	Reconstituted mass (g)	Date of collection
F	104.0	39.0	Eel-tailed catfish x 1	7	18.viii.82
F	139.0	51.0	*Lates calcarifer* x 1	220	24.i.83
M	113.0	32.0	*Strongylura krefftii* x 1	163	13.ii.83
M	111.0	31.4	*Glossamia aprion* x 1	5	13.ii.83
M	106.0	32.7	*Glossamia aprion* x 1	5	13.ii.83
F	124.0	50.2	*Oxyeleotris lineolatus* x 1	800	13.ii.83
F	111.0	44.0	*Oxyeleotris lineolatus* x 1	270	15.ii.83
F	119.0	45.3	*Megalops cyprinoides* x 1	260	17.ii.83
F	138.0	54.6	*Oxyeleotris lineolatus* x 1	25	17.ii.83
M	108.0	31.7	Catfish spine	?	26.x.83
F	138.0	52.7	Fish sp. x 1	?	26.x.83
F	149.0	57.6	*Oxyeleotris lineolatus* x 1	243	5.xi.83
F	129.0	48.5	*Oxyeleotris lineolatus* x 1	303	5.xi.83
F	143.0	54.1	*Oxyeleotris lineolatus* x 1	882	5.xi.83
F	123.0	47.3	*Oxyeleotris lineolatus* x 1	248	5.xi.83
F	138.0	52.5	*Megalops cyprinoides* x 1	200	8.xi.83
M	105.5	?	*Glossamia aprion* x 1	10	9.xi.83
F	104.0	?	*Amniataba percoides* x 1	41	9.xi.83
F	121.0	?	*Strongylura krefftii* x 1	100	9.xi.83
F	137.0	?	*Strongylura krefftii* x 1	130	11.xi.83
F	92.0	34.2	Eel-tailed catfish x 1	10	29.viii.83
F	99.5	35.2	Eel-tailed catfish x 1	10	29.viii.83
			Oxyeleotris lineolatus	40	29.viii.83
F	99.0	30.0	*Amniataba percoides*	50	4.xi.82

Table A3. Prey items from stomachs and hindguts of *Varanus panoptes*

(1) WET SEASON

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
LF1LR1	62	Araneida: Lycosidae	0.44	0.44	0.33	0.19		15.ii.82
		Anura	0.05	1.0	0.04	0.44	v. digested	E. Bank
		Reptilia	-	-	-	-	vertebrae	Jabiluka
		Orthoptera: Gryllidae (x2)	0.71	0.73	0.54	0.32		Billabong
		Acrididae	0.005	-	0.004	-		
		Hymenoptera: Myrmicinae (x4)	0.01	0.01	0.008	0.09		
		Coleoptera: Scarabaeidae	0.005	-	0.004	-		
		Vegetable matter	0.10	0.10	0.08	0.04		
		Total	1.32	2.28				
LF1LR2	56	Araneida: Lycosidae (x2)	0.11	0.14	0.005	0.004		15.ii.82
		Blattodea (x2)						1 km W.
		Lepidoptera: larvae (x3)	1.09	1.09	0.05	0.03		Jabiluka
		Orthoptera: Gryllidae (x3)	0.59	0.75	0.03	0.02		Billabong
		Pyrgomorphidae (x3)	0.75	0.79	0.03	0.02		
		Coleoptera: larvae	1.03	1.03	0.05	0.03		
		Scarabaeidae (x3)	1.70	1.76	0.07	0.05		
		unidentified	0.05	0.12	0.002	0.003	head only	
		Anura: *Litoria dahli* (x9)	10.16	12.0	0.44	0.32		
		Scincidae	0.27	1.35	0.0	0.04		
		Unidentified (x15)	5.08	17	0.22	0.46		
		Insect fragments	1.01	-	0.04	-		
		Total	22.87	37.06				
14	56	Lepidoptera: larvae	-	0.15	-	0.15	mouth parts	8.ii.82
		Orthoptera	0.005	0.30	0.007	0.32	leg only	4-Gates
		Blattodea	0.01	0.50	0.01	0.53	fragments	Road, N.T.
		Insect fragments	0.25	-	0.35	-		
		Stones (x21)	0.44	-	0.62	-		
		Total	0.70	0.95				
18	61	Lepidoptera: larvae	0.22	0.4	0.23	0.08		11.ii.82
		Orthoptera: Caelifera (x2)	0.05	0.50	0.05	0.10	pieces only	Jabiluka
		Coleoptera: Scarabaeidae	0.01	-	0.01	-		Billabong
		Anura (x3)	0.38	3.8	0.40	0.79	v. digested	
		Assorted small insects	0.16	-	0.17	-		
		Unidentified fragments	0.02	-	0.02	-		
		Vegetable matter	0.11	0.11	0.12	0.02		
		Total	0.95	4.81				
		Faecal items: Blattodea	-	-	-	-		
17	55	Varanidae	5.81	100	1.00	1.00	*V. timorensis*	Corndorl Ck. crossing on
		Faecal items: Crustacea:						Arnhem Hwy.
		Holthuisana sp.	-	-	-	-		10.ii.82
69	24	Faecal items: Araneida	-	-	-	-	-	18.ii.82
		Coleoptera: adult	-	-	-	-	-	1 km E Sandy
		larvae	-	-	-	-	-	Crossing on Magela Creek
26	37	Faecal items: Orthoptera:						14.ii.82
		Gryllidae (x3)						Crescent
		Coleoptera: larvae						Billabong
304	43	Fish	0.08	-	1.00	-	Scales + bones	8.ii.82 Buffalo Bb.
305	40	Orthoptera: Gryllidae	0.03	0.80	1.00	1.00		9.ii.83 Buffalo Bb.
306	65	Lepidoptera: larvae (x2)	0.09	0.30	0.04	0.01		12.ii.83
		Orthoptera: Gryllidae (x3)	1.34	1.54	0.35	0.06		Nankeen
		Acrididae	0.02	0.50	0.01	0.02		Billabong
		Fish	0.01	-	0.01	-		
		Mammalia: Dasyuridae	0.80	25.0	0.35	0.91	*Sminthopsis* sp.?	
		Total	2.26	27.34				

Table A3 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
307	60	Orthoptera: Gryllidae	0.02	0.80	0.29	0.63		13.ii.83
		Colubridae: *Amphiesma mairii*	0.05	25.00	0.71	0.97	scales	Jabiluka Billabong
		Total	0.07	25.8				
Shine dis-section 204	39	Araneida: Lycosidae	0.70	0.70	0.007	0.004		3.xii.82
		Orthoptera: Gryllidae (x13)	8.97	15.00	0.92	0.95		2 km S. of
		Coleoptera: Scarabaeidae (x2)	0.10	0.10	0.01	0.01		Mudginberri on Oenpelli Rd
		Total	9.77	15.80				
Shine dis-section 206	30	Blattodea: Blattidae	0.28	0.3	0.19	0.11		30.i.83
		Orthoptera: Gryllidae	1.22	2.5	0.81	0.89		Baralil Ck.
		Total	1.50	2.8				
Shine dis-section 208	40	Araneida: Lycosidae	0.03	0.50	0.01	0.03		3.ii.83
		Lepidoptera: larvae (x4)	0.80	2.00	0.25	0.10		Oenpelli Rd
		Orthoptera: Gryllidae (x3)	0.41	5.00	0.12	0.26		7 km N.
		Muridae: *Mus musculus*	1.03	10.0	0.32	0.51	fur only	Arnhem Hwy
		Assorted fragments	0.97	2.00	0.30	0.10		
		Total	3.24	19.50				
Shine dis-section 339	32	Orthoptera: Acrididae (x2)	0.37	0.37	0.88	0.60		16.ii.83
		Gryllidae	0.05	0.25	0.12	0.40		Munmarlary turn-off on Arnhem Hwy.
		Total	0.42	0.62				
NTM R2301	25.8	Anura	0.28	1.80	0.85	0.37		14.iv.76
		Scincidae	0.05	3.00	0.15	0.63	jaw bone	Katherine
		Total	0.33	4.80				
NTM R2929	27.5	Araneida: Lycosidae	0.5	0.15	0.01	0.02		22.i.77
		Lepidoptera: larvae (x7)	1.96	2.80	0.41	0.38		Darwin
		Orthoptera: Acrididae (x2)	0.68	1.20	0.14	0.16		
		Gryllidae	0.26	0.50	0.05	0.07		
		Coleoptera: Scarabaeidae (x2)	0.32	0.60	0.07	0.08		
		pupae	0.14	0.14	0.03	0.02		
		Fragments	1.40	2.00	0.29	0.27		
		Total	4.81	7.39				
NTM R3300	14.6	Orthoptera: Gryllidae	0.42	0.50	0.68	0.50		1.i.77
		Pyrgomorphidae	0.20	0.50	0.32	0.50		Darwin
		Total	0.62	1.00				
NTM R6495	24.5	Orthoptera: Acrididae	0.08	0.50	0.03	0.11		28.iii.79
		Agamidae: *Diporiphora* sp.	2.51	4.00	0.97	0.89		Renner Springs
		Total	2.59	4.50				
NTM R6540	26.8	Orthoptera: Acrididae (x4)	1.26	3.20	1.00	1.00		11.ii.79 Fogg Dam
NTM R6696	28.5	Orthoptera: Gryllidae	0.01	0.50	0.01	0.20		14.iv.79
		Anura	0.38	2.00	0.36	0.80		Wyndham
		Vertebrate tissue	0.67	-	0.63	-		W.A.
		Total	1.06	2.50				
NTM R8103	28.8	Chilopoda (x1)	0.93	1.30	0.18	0.01		4.xii.79
		Araneida: Dipluridae	0.05	0.30	0.01	-		Humpty Doo
		Orthoptera: Gryllidae	0.12	0.80	0.02	0.01		
		Acrididae (x2)	0.47	2.00	0.09	0.02		
		Coleoptera: Scarabaeidae (x3)	0.63	1.80	0.13	0.01		
		Curculionidae larvae	0.62	1.20	0.12	0.01		
		Mammalia: *Rattus* sp.	0.50	110.0	0.10	0.92	Mandible	
		Total	5.07	119.40				

Table A3 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
NTM R8104	28.3	Araneida	0.04	0.05	0.01	-		4.xii.79 Humpty Doo
		Coleoptera: Carabidae	0.20	0.20	0.04	-		
		Scarabaeidae	0.28	0.40	0.05	0.01		
		Staphylinidae	0.01	0.02	0.0001	-		
		Scincidae: *Carlia foliorum* (x2)	2.72	3.00	0.54	0.02		
		eggs (x2)	0.18	0.18	0.04	-		
		Varanidae	1.65	150.00	0.32	0.97		
		Total	5.08	153.85				
NTM R8261	26	Orthoptera: Acrididae (x14)	4.39	15.0	0.98	-		2.xii.79 Humpty Doo
		Vertebrate bone	0.08	-	0.02	-		
		Total	4.47	15.0				
NTM R8262	24.6	Blattodea: Blattidae	0.15	0.30	0.03	0.04		2.xii.79 Humpty Doo
		Orthoptera: Acrididae	0.83	0.83	0.16	0.11		
		Hemiptera	0.04	0.04	0.01	0.01		
		Anura: Hylidae (x2)	4.06	6.40	0.80	0.84		
		Total	5.08	7.57				
NTM R3127	30.8	Chilopoda	-				(fragments	13.ii.77 Ban-Ban Springs
		Araneida: Lycosidae	-				(only from	
		Lepidoptera: larvae	-				(hindgut	
		Orthoptera: Gryllidae	-				(	
NTM R3320	22	Orthoptera: Acrididae	-		1.00	1.00	legs only	21.iii.77 Noonamah
NTM R207049	23	Lepidoptera: larvae	<0.01	0.05	-	0.03	head capsules	4.i.78 Georgetown Billabong
		Orthoptera: Acrididae	0.07	0.04	0.13	0.25	head capsules	
		Hemiptera (x2)	<0.01	0.4	-	0.25		
		Coleoptera	0.48	0.77	0.87	0.48		
		Total	0.55	1.62				
NTM R202490	54	Orthoptera: Gryllidae	2.02	2.10	1.00	1.00		28.iv.77 Jabiru
Shine dis-section 16B	63.0	Crustacea: *Holthuisana* sp. (x4)	21.78	26.0	0.68	0.72		29.iii.82 Whistle Duck Dreaming on Jim Jim Rd.
		Coleoptera: Carabidae (x2)	10.13	10.13	0.32	0.28		
		Total	31.91	36.13				
(2) <u>DRY SEASON</u>								
203	63	Orthoptera: Gryllidae	0.54	2.5	0.08	0.22		29.vii.82 Leichhardt Billabong
		Hemiptera	0.06	0.10	0.01	0.01		
		Coleoptera: larvae	0.48	0.48	0.07	0.04		
		Anura (x2)	2.4	5.0	0.36	0.45		
		Vegetable matter	3.11	3.11	0.47	0.28		
		Total	6.59	11.19				
206	67	Turtle eggs (*Emydura australis*) (x12)	28.10	54.2	1.00	1.00		16.viii.82 Jabiluka Billabong
207	63	Orthoptera: Gryllidae	0.08	0.3	0.001	-		18.viii.82 Jabiluka Billabong
		Anura	0.17	2.0	0.02	0.004		
		Acrochordidae: *Acrochordus arafurae*	4.70	5.00	0.56	0.99		
		Vegetable matter	3.39	3.39	0.41	0.006		
		Total	8.34	505.69				
202	53	Araneida	0.05	0.2	0.01	0.01		27.vii.82 Edge of floodplain near Ja Ja
		Orthoptera: Gryllidae (x52)	15.12	18.0	0.99	0.99		
		Total	15.17	18.2				
		Faecal items: Orthoptera: Gryllidae (x70) Coleoptera (x2)						

Table A3 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
204	62	Orthoptera: Gryllidae (x13)	3.2	4.5	0.03	0.03		29.vii.82 Leichhardt Billabong
		Strongylura krefftii (long tom) (x4)	112.60	135.0	0.95	0.95		
		Anuran	0.4	2.5	0.003	0.02		
		Bird (wading bird)	2.06	-	0.02	-	remnants	
		Total	18.26	142.00				
		Faecal items: Orthoptera: Gryllidae (x42); *S. krefftii* (long tom); Bird feather and claw						
201	44	Faecal items: Araneida	-	-	-	-		25.vii.82 Fogg Dam
		Coleoptera: Dytiscidae	-	-	-	-		
			-	-	-	-		
		Varanidae						
51		Orthoptera	-	0.8	-	0.19	mandibles only	6.vi.83 30 km W. Jabiru
		Hymenoptera: Formicidae	-	-	-	-		
		Coleoptera (x2)	0.07	1.3	0.09	0.32	*C. essingtoni*?	
		Scincidae: *Ctenotus* sp.	0.75	2.0	0.91	0.49	tail only	
		Total	0.82	4.1				
52		Orthoptera: Gryllidae (x2)	2.7	2.7	0.36	0.36		25.x.83 on Arnhem Hwy 800 m W. Jim Jim turnoff
		Agamidae: *Diporiphora bilineata*	4.85	4.85	0.64	0.64		
		Total	7.55	7.55				
53		*Tachyglossus aculeatus* (Echidna)	48	-	-	-	remnants	x.83 Jabiluka
54		Orthoptera: Acrididae	0.45	0.45	0.01	0.003		19.vii.83 D.O.R. Baralil Ck crossing
		Lepidoptera: larvae	1.10	1.4	0.03	0.01		
		Hemiptera	-	-	-	-	fragments	
		Coleoptera	-	-	-	-	elytra only	
		Mammalia: *Pseudomys* sp.	37.0	150.0	0.95	0.98		
		Total	38.8	152.1				
NTM R2388	39.7	Scincidae	0.30	0.70	0.27	0.19		21.vi.76 Near Jabiru on Hwy
		Agamidae	0.80	3.00	0.73	0.81		
		Total	1.10	3.70				
NTM R6497	205	Orthoptera: Acrididae (x8)	7.65	10.20	1.00	1.00		1.v.79 Fogg Dam
NTM R7161	22	Araneida: Lycosidae (x4)	0.61	0.66	0.05	0.05		14.vi.79 Gray Rd W.A.
		Blattodea: Blattidae (x4)	2.24	2.24	0.20	0.18		
		Lepidoptera: larvae (x20)	5.11	6.00	0.46	0.48		
		Orthoptera: Gryllidae (x3)	1.02	1.02	0.09	0.08		
		Acrididae (x3)	2.24	2.62	0.20	0.21		
		Total	11.22	12.54				
NTM R7657	40.8	Chilopoda (x2)	2.60	2.60	0.69	0.53		12.x.79 Cape Hotham
		Araneida: Lycosidae (x3)	0.97	1.80	0.26	0.37		
		Orthoptera: Acrididae	0.20	0.50	0.05	0.10		
		Total	3.77	4.90				
NTM R3478	57.5	Hemiptera (x2)	-	-	-	-	head capsules	26.vi.77 Darwin R. N.T.
		Coleoptera	-	-	-	-	fragments	
		Mammalia: Macropod claw	-	-	-	-		
		Bandicoot (*Isoodon* sp.)	1.10	8.00	-	-	lower jaw	
NTM R3440	50.5	Lepidoptera: larvae (x2)	1.08	3.0	1.00	1.00		14.v.77 31.5 km E. East Alligator R. on Arnhem Hwy.
NTM R201621	36.5	Coleoptera: Scarabaeidae (x3)	3.26	7.29	1.00	1.00		

Table A3 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
NTM	59	Orthoptera: Acrididae (x2)	0.25	2.30	0.26	0.19	head capsules	
No number		Hymenoptera: Formicidae (x2)	0.04	0.06	0.04	0.005		
(#3)		Coleoptera: Carabidae	0.58	4.60	0.61	0.37		
		Anura (x3)	0.08	5.40	0.08	0.44	bones only	
		Total	0.95	12.36				
NTM	37.5	Araneida: Sparassidae	0.30	0.65	0.16	0.10		
R202493		Trichoptera (adult)	0.02	0.06	0.01	0.01		
		Acrididae	0.25	0.4	0.13	0.06		
		Hymenoptera: Formicidae (x2)	-	-	-	-		
		Anura (x2)	1.29	2.6	0.69	0.42		
		Scincidae	-	2.50	-	0.40	tail only	
		Total	1.86	6.21				
NTM	31	Orthoptera: Acrididae	1.05	1.25	1.00	1.00		
No number (#6)								
NTM	36.5	Orthoptera: Acrididae (x2)	0.80	1.00	0.58	0.28		
R8008		Hemiptera	-	0.4	-	0.11		
		Hymenoptera: Formicidae (x9)	-	-	-	-		
		Anura	0.59	2.2	0.42	0.61		
		Unidentified insect	-	-	-	-		
		Total	1.39	3.60				
NTM	29	Lepidoptera: larvae	0.90	4.0	0.80	0.89		
No number		Orthoptera: Acrididae	0.22	0.05	0.20	0.11		
(#4)		Total	1.12	4.5				
NTM		Chilopoda	1.07	1.07	0.46	0.16		
RR2039?3		Crustacea: *Holthuisana* sp.	0.92	3.4	0.39	0.51		
		Orthoptera: Gryllidae (x7)	0.35	2.20	0.15	0.33	heads only	
		Coleoptera: Curculionidae	-	-	-	-	very small	
		Total	2.34	6.67				
NTM	26	Anura: *Limnodynastes convexiusculus* (x4)	11.95	12.75	0.82	0.64		
R202503(3)		*Ranidella bilingua*	0.21	0.40	0.01	0.02		
		Litoria sp. (x2)	1.65	1.80	0.11	0.09		
		Litoria dahli	0.83	5.0	0.06	0.25		
		Total	14.64	19.95				
NTM	63	Fish: vertebrae (may be barramundi)	2.5	-	1.00	-	probably scavenged	
No number (#1)								
NTM	49	Crustacea: *Holthuisana* sp. (x4)	5.76	24.1	0.84	0.96		
No number		Lepidoptera: larvae	1.08	1.10	0.16	0.04		
(#501)		Total	6.84	25.2				
NTM	37	Blattodea: Blattidae	-	-	-	-		
R201418		Lepidoptera: larvae (x2)	0.38	0.42	0.02	0.02		
		Orthoptera: Gryllidae (x2)	-	0.02	-	-	very small	
		Hymenoptera: Formicidae (x91)	0.62	0.62	0.04	0.02		
		unidentified	-	-	-	-	fragments	
		Coleoptera	0.4	1.0	0.03	0.04		
		Anura: unidentified (x2)	14.45	22.0	0.86	0.88	maybe *Limnodynastes*	
		Uperoleia inundata	0.88	0.90	0.05	0.04		
		Mammalia: *Isoodon*	-	-	-	-	hair only	
		Total	6.69	24.96				
NTM	42.5	Blattodea: Blattidae	0.50	0.60	0.03	0.04		
R201622		Orthoptera: Gryllidae (x8)	13.92	14.0	0.97	0.96		
		Total	14.42	14.60				
NTM	38	Crustacea: *Holthuisana* sp.	6.17	13.0	0.98	0.95		
R202437		Orthoptera	-	0.5	-	0.04	fragments	
		Coleoptera: Dytiscidae larvae	0.15	0.15	0.02	0.01		
		Total	6.32	13.65				

Table A3 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
NTM	38	Chilopoda	0.80	0.80	0.14	0.13		
No number		Orthoptera	–	–	–	–	fragments	
(#2)		Scincidae: *Ctenotus essingtoni*	3.55	3.60	0.18	0.56		
		Sphenomorphus isolepis	1.30	2.0	0.23	0.31		
		Total	5.65	5.40				
NTM	28.5	Blattodea	–	–	–	–		
R201522		Orthoptera: Gryllidae (x7)	11.35	11.8	0.85	0.66		
		Anura	2.08	6.0	0.15	0.34		
		Total	13.43	17.8				
NTM	61	Orthoptera: Acrididae (x3)	6.95	10.0	0.06	0.08		
R202502		Hymenoptera: Formicidae	–	–				
		Coleoptera	–	–	–	–	fragments	
		Anura: *Cyclorana australis* (x3)	96.50	119.50	0.92	0.90		
		Limnodynastes convexiusculus	1.71	2.50	0.02	0.02		
		Total	105.16	132.0				
NTM R205363	54	Agamidae: *Chlamydosaurus kingii*	130.30	6.00	1.00	1.00		

Table A4. Prey items from stomach and hindgut of *Varanus gouldii*

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
302	65.0	Lepidoptera: pupae	1.23	1.23	0.47	0.73		30.i.83
		larvae (x2)	0.41	0.80	-	-		Jabiluka
		Orthoptera: Gryllidae	0.52	0.75	0.15	0.27		Billabong
		Fish	1.30	-	0.38	-	Scales, bones, flesh	
		Total	3.46	2.78				
301	66.0	Orthoptera: Gryllidae (x3)	1.45	1.85	0.39	0.12		27.i.83
		Acrididae (x2)	0.35	1.20	0.09	0.08		Leichhardt
		Anurans (x5)	1.65	12.5	0.45	0.79		Billabong
		Vegetable matter	0.22	0.22	0.06	0.01		
		Total	3.67	15.77				
Shine dissection 331	27.8	Coleoptera	0.02	-	0.07	-	legs only	15.ii.83
		Lizard	0.28	-	0.93	-	vertebrae only	Jabiru East
		Total	0.30	-				
Shine dissection 205	34.8	Orthoptera: Gryllidae	0.02	0.06	0.06	0.02		7.xi.82
		Dasyuridae: *Sminthopsis* sp.	0.30	25.0	0.94	0.98		Gulungul Ck
		Total	0.32	25.6				
Shine dissection 207	33.2	Orthoptera: Gryllidae (x5)	0.45	4.0	0.08	0.01		27.i.83
		Coleoptera	0.01	0.30	-	-		Jabiru East
		Varanidae (*V. gouldii*)	2.87	600	0.50	0.98		
		Unidentified fragments	2.45	3.00	0.42	0.01		
		Total	5.78	607.3				
NTM R0102	30.0	Fish	0.60	-	1.00	1.00	Scales	5.x.73 Katherine
NTM R2229	25.0	Lepidoptera: pupae	0.81	1.00	0.99	0.77		28.iv.76
		larvae	0.58	1.00				Katherine
		Orthoptera	0.01	0.60	0.01	0.23		
NTM R2830	28.0	Orthoptera: Gryllidae	0.02	0.60	0.06	0.05		8.i.77
		Coleoptera: Scarabaeidae	0.32	1.50	0.85	0.12		Noonamah
		Fish scales	0.01	-	0.03	-		
		Snake scales (?)	0.01	-	0.03	-		
		Muridae: *Mus musculus*	0.01	10.0	0.03	0.83		
		Total	0.38	12.10				
NTM RR3334	26.5	Araneida: Mygalomorphae	0.17	0.20	0.04	0.02		9.iv.77
		Araneomorphae	0.01	0.06	0.002	0.01		Barroloola
		Lepidoptera: larvae (x2)	0.22	1.20	0.05	0.13		N.T.
		Coleoptera: Curculionidae	0.15	0.15				
		Curculionidae	0.10	0.15	0.17	0.11		
		Curculionidae (x6)	0.53	0.80				
		Anuran: Hylidae	3.29	5.00	0.72	0.52		
		Scincidae: *Ctenotus* sp.	0.10	2.00	0.02	0.21		
		Total	4.57	9.56				
NTM R5168	9.6	Chilopoda: (x2)	1.65	1.70	0.13	0.09		5.xi.78
		Araneida: Araneomorphae (x2)	0.02	0.50	0.01	0.03		N.T.
		Lepidoptera: larvae (x2)	2.34	2.70	0.20	0.14		
		Orthoptera: Gryllidae (x5)	6.66	10.20	0.58	0.52		
		Gekkonidae	0.57	2.00	0.05	0.10		
		Lizard eggs (x6)	0.30	2.40	0.03	0.12	13 x 6 mm	
		Total	11.54	19.50				
NTM R8592	40.5	Lizard eggs (x7)	0.20	3.60	0.86	0.98		18.x.72
		Unidentified insect fragments	0.08	0.08	0.14	0.02		Marchinba
		Total	0.58	3.58				
NTM R8940	28.8	Chilopoda	0.65	0.65	0.15	0.09		20.x.72
		Araneida:	0.03	0.50	0.01	0.07		Jensen's
		Orthoptera: Gryllidae	0.32	1.50	0.08	0.21		Lagoon
		Scincidae: *Carlia foliorum*	1.45	1.60	0.35	0.23		
		Lerista karlschmidtii	0.72	0.80	0.17	0.11		
		Squamate eggs (x10)	1.00	2.00	0.24	0.29	11 x 6 mm	
		Total	4.17	7.05				

Table A4. (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
NTM R8941	32.0	Chilopoda	0.77	0.80	0.35	0.17		20.x.72 Jensen's Lagoon
		Coleoptera	0.08	0.30	0.04	0.06		
		Squamate eggs (x3)	1.31	3.60	0.61	0.77	18 x 11 mm	
		Total	2.16	4.70				
NTM R9624	32.5	Crustacea: *Holthuisana* sp.	0.08	3.00	0.02	0.24		N.T.
		Araneida: Dipluridae	0.01	0.02	-	-		
		Hemiptera: Cicadidae	0.36	1.80	0.07	0.14		
		Hymenoptera: Formicidae (x4)	0.03	0.03	0.01	0.01		
		Coleoptera: Curculionidae (x3)	0.07	0.15	0.08	0.06		
		unidentified (x4)	0.31	0.65				
		Anura: Leptodactylidae	4.00	7.00	0.82	0.55		
		Total	4.86	12.65				
NTM R8002	32.7	Chilopoda: (x4)	3.92	4.2	0.43	0.39		
		Lepidoptera: larvae	1.23	1.5	0.14	0.14		
		Coleoptera: Scarabaeidae (x2)	1.07	1.25	0.12	0.12		
		Scincidae: *Sphenomorphus isolepis*	0.66	0.70	0.07	0.07	juvenile	
		Sphenomorphus isolepis	1.77	3.0	0.19	0.28	adult	
		Unidentified insect fragment	0.40	-	-	-		
		Total	9.05	10.65				
NTM R2852	39.5	Chilopoda	3.64	3.84	1.00	1.00		12.i.77 11.5 km N. Noonamah
NTM R203901	33.5	Orthoptera: Gryllidae (x5)	21.90	23.00	0.92	0.92		
		Coleoptera: Scarabaeidae	2.00	2.00	0.08	0.08		
		Total	23.90	25.00				
NTM No number (#1)	36.5	Araneida: Dipluridae (x3)	1.86	7.80	0.02	0.008		
		Lepidoptera: larvae	0.07	0.07	-	-		
		Orthoptera: Gryllidae (x2)	-	-			head capsule	
		Coleoptera: Scarabaeidae (x4)	2.67	2.90	0.03	0.003		
		Scincidae	0.20	0.80	0.002	-	jaw and foot	
		Mammalia: *Isoodon* sp.	87.0	1000	0.95	0.99		
		Total	91.80	1011.6				
NTM No number (#2)	37.5	Chilopoda	1.05	1.05	0.04	0.03		xii.77
		Araneida: Lycosidae	0.50	0.90	0.02	0.03		
		Orthoptera: Gryllidae (x10)	27.30	29.0	0.95	0.94		
		Total	28.85	30.95				
NTM R200920	37.0	Lepidoptera: larvae (x30)	5.05	5.10	0.53	0.44	all similar size	
		pupae (x27)	4.38	4.50	0.46	0.39		
		Agamidae: *Diporiphora bilineata*	0.08	2.0	0.008	0.17	two feet only	
		Total	9.51	11.60				
NTM R201336	40.0	Chilopoda	2.32	8.0	0.04	0.13	head only	
		Lepidoptera: larvae (x105)	30.11	30.1	0.54	0.48	all similar size	
		Orthoptera: Gryllidae (x11)	23.82	24.0	0.42	0.39		
		Total	56.25	62.10				
NTM CT2	36.3	Coleoptera: Scarabaeidae (x12)	4.20	13.0	1.00	1.00		
Shine dissection 16	41.0	Lepidoptera: larvae	0.15	0.15	0.003	0.003		26.iv.82 1 km E. Jabiru East on Arnhem Hwy (D.O.R.)
		Orthoptera: Acrididae	0.07	0.07	0.01	0.01		
		Hymenoptera	-	-			fragments	
		Coleoptera	0.21	0.30	0.004	0.006		
		Agamidae: *Lophognathus gilberti*	50.90	50.9	0.98	0.98		
		Total	51.96	52.05				
Shine dissection 16A	42.5	Araneida: Dipluridae	0.53	0.53	0.43	0.38		21.iv.83 Jabiru East
		Agamidae: *Diporiphora bilineata*	0.69	0.85	0.57	0.62		
		Total	1.22	1.38				

Table A5. Prey items from stomach and hindgut of *Varanus mertensi*

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
3	21.0	Odonata: Corduliidae	0.3	0.3	1.00	1.00		1 km NW Jabiru
21	21.0	Crustacea: *Holthuisana* sp.	0.38	2.0	1.00	1.00		Corndorl Ck. crossing of Oenpelli Rd
31	24.2	Crustacea: *Holthuisana* sp. (x3)	2.61	13.0	0.90	0.98		Arnhem Hwy 150 m E. Jabiru East turnoff
		Orthoptera: Gryllidae	0.30	0.30	0.10	0.02		
		Total	2.91	13.30				
32	21.7	Crustacea: *Holthuisana* sp.	0.23	3.00	0.12	0.82		Corndorl Ck crossing of Oenpelli Rd
		Orthoptera: Ensifera	0.16	0.64	0.08	0.18		
		Invertebrate fragments	1.5	-	0.79	-		
		Total	1.89	3.64				
47	24.5	Crustacea: *Holthuisana* sp.	0.10	2.0	0.47	0.95		Corndorl Ck crossing of Oenpelli Rd
		Araneida: Lycosidae	0.10	0.11	0.47	0.05		
		Vegetable matter	0.001	-	0.05	-		
		Total	0.21	2.11				
52	26.8	Crustacea: *Holthuisana* sp. (x3)	1.09	10.5	0.27	0.24		iii.82 Ja Ja
		Orthoptera	-	-			wing only	
		Hymenoptera: Formicidae (Green ants)	0.08	0.08	0.02	0.002		
		Fish (x2)	1.12	1.40	0.28	0.03		
		Anuran	0.55	0.73	0.14	0.02		
		Anuran	0.09	1.0	0.02	0.02	Ilium, femur and tibia	
		Acrochordus (juvenile)	1.00	30.0	0.25	0.69	Skin and flesh	
		Varanid scales					sloughed?	
		Vegetable matter	0.05	-	0.01	-		
		Insect fragments	0.08	-	0.02	-		
		Total	4.06	43.71				
65	18.5	Crustacea: *Holthuisana* sp.	0.29	4.0	0.61	0.97		Arnhem Hwy 1 km from East Jabiru
		Araneida	0.02	0.13	0.06	0.03		
		Vegetable matter	0.01	-	0.03	-		
		Total	0.32	4.13				
68	35.0	Crustacea: *Holthuisana* sp.	-	-	-	-	from faeces	8.ii.83 Arnhem Hwy Condorl Ck
69	19.0	Araneida: Lycosidae	0.07	0.10	1.00	1.00		13.ii.83 East Jabiru
NTM R0107	37.0	Crustacea: *Holthuisana* sp.	1.65	5.00	0.22	0.69		11.x.73 U.D.P. Falls
		Fish	0.01	-	0.01	-		
		Bird (sylvid: rufous songlark?)	3.69	-	0.48	-		
		Cotton wool	1.33	1.33	0.17	0.18		
		Vegetable matter	0.90	0.90	0.12	0.12		
		Total	7.58	7.23				
NTM R3479	30.5	Fish	0.02	-	1.00	1.00	Scales only	20.vii.77 Katherine
NTM R3726	28.5	Crustacea: *Holthuisana* sp. (x7)	8.92	12.00	1.00	1.00		Katherine
NTM R3728	40.5	Crustacea: *Holthuisana* sp.	0.34	4.00	1.00	1.00		Katherine
NTM R6718	24.8	Araneida: Lycosidae	0.18	0.19	1.00	1.00		15.iv.79 Ord River W.A.
NTM R6309	34.0	Crustacea: *Holthuisana* sp. (x2)	2.60	5.00	1.00	1.00		16.i.79 Katherine
NTM R8335	32.0	Crustacea: *Holthuisana* sp.	2.70	2.70	1.00	1.00		13.xi.79 190 km S Darwin

Table A5 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
NTM R8606	33.0	Crustacea: *Holthuisana* sp. (X3)	8.68	9.00	0.94	0.84		11.iii.80 Adelaide R.
		Araneida: Araneomorphae	0.01	0.20	0.005	0.02		
		Orthoptera: Gryllotalpidae	0.01	0.50	0.005	0.05		
		Anuran	0.50	1.00	0.05	0.09		
		Total	9.20					
NTM R8936	35.0	Crustacea: Shrimps (x10)	4.70	5.07	1.00	1.00		2.x.72 SE lagoon
NTM R9273	19.0	Mammal	0.50	1.80	1.00	1.00	Unfurred juvenile	16.iv.70 Kunnunurra W.A.
	38.2	Crustacea: *Holthuisana* sp. (x2)	6.85	8.5	1.00	1.00		7.iv.83 Baralil Ck
	35.5	Orthoptera	-	-	-	-	fragments	30.i.83 Magela Ck
		Hemiptera	-	-	-	-	fragments	
NTM R202021	39.5	Crustacea: *Holthuisana* sp. (x6)	9.76	16.7	1.00	1.00		
NTM R202027	35.0	Crustacea: *Holthuisana* sp. (x7)	7.30	10.3	1.00	1.00		
NTM R202488	38.5	Crustacea: *Holthuisana* sp. (x1)	2.20	4.20	1.00	1.00		
NTM R5240	36.0	Crustacea: *Holthuisana* sp. (x1)	3.32	13.0	1.00	1.00		10.iv.78
NTM R202489	32.5	Crustacea: *Holthuisana* sp. (x3)	5.8	15.0	1.00	1.00		
NTM R202022	33.5	Crustacea: *Holthuisana* sp.	-	-	-	-	fragments only	
		Crustacea: *Holthuisana* sp. (x2)	3.65	13.0	0.25	0.49	legs & claws	8.iii.83 20 km W. of Jabiru
		Hemiptera: Nepidae (x3)	1.42	1.55	0.10	0.06	aquatic bugs	
		Coleoptera: Dytiscidae (x24)	9.05	9.05	0.61	0.34	predacious water beetles	
		Coleoptera: Carabidae (x1)	-	-			fragments	
		Anuran: *Litoria* sp.	0.75	3	0.05	0.11	skeletal pieces	
		Total	14.87	26.60				
NTM 17x	53.0	Reptile eggs: probably *Crocodylus johnstoni* (x6)	160.5	420	1.00	1.00		
NTM R1008 or 8001	35.0	Anuran	11.75	25	1.00	1.00	unidentifiable	
NTM 202495	33.0	Crustacea: *Holthuisana* sp. (x6)	12.40	19.2	1.00	1.00		28.iv.77 Jabiru
NTM R202491	39.0	Crustacea: *Holthuisana* sp. (x14)	30.38	33.5	1.00	1.00		28.iv.77 Jabiru

Table A6. Prey items from stomachs and hindguts of *Varanus mitchelli*

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
16	22.5	Araneida	0.01	0.20	0.01	0.09	legs only	10.ii.82
		Odonata: Corduliidae	0.10	0.30	0.09	0.13		30 m down-
		Orthoptera: Gryllidae (x3)	0.90	1.80	0.89	0.78		stream Magela
		Vegetable matter	0.01	0.01	0.01	0.004		crossing
		Total	1.02	2.31				
8	27.0	Orthoptera: Gryllidae	0.29	0.58	0.14	0.23		7.ii.82
		Hymenoptera: Formicidae	0.09	0.09	0.04	0.04		10 km NE
		Fish: *Melanotaenia maculata*						Jabiru East
		(chequered rainbow-fish)	0.51	0.64	0.24	0.25		
		Vegetable matter	1.20	1.20	0.57	0.23		
		Total	2.09	2.51				
29	14.5	Araneida	0.27	0.90	1.00	1.00		20.ii.82
								Mudginberri
30	26.3	Fish (x3)	0.73	1.22	0.97	0.98		20.ii.82
		Vegetable matter	0.02	0.02	0.03	0.02		700 m
								upstream
								Mudginberri
		Total	0.75	1.24				Billabong
40	24.0	Coleoptera	0.08	0.08	0.03			2.iii.82
		Squamata eggs (x2)	0.84	-	0.33	-		800 m upstream
		Scincidae: *Ctenotus* sp.	1.61	5.37	0.64		may be	of Mudginberri
							C. robustus	Billabong
		Total	2.53					
46	23.5	Araneida: Lycosidae (x2)	0.93	1.33	1.00	1.00		6.iii.82
57	13.7	Orthoptera: Gryllidae	0.15	0.17	0.94			15.iii.82
		Unidentified insect	0.01	-	0.06			500 m
								upstream
		Total	0.16					Mudginberri
		Faecal item: Orthoptera						
		Araneida						
58	24.5	Fish (x 11):						
		Melanotaenia maculata	0.15	0.16				15.iii.82
			0.11	0.17				600 m upstream
			0.35	0.44				Mudginberri
			0.46	0.71				Billabong
			0.40	0.57				
			0.73	0.91	1.00	1.00		
			0.62	0.83				
			0.44	0.59				
			0.41	0.51				
			0.73	0.77				
			0.51	0.73				
		Assorted fish tissue	1.78	-				
		Total	6.69	6.39				
70	24.5	Fish tissue: unidentifiable	0.25	0.83				17.iii.82
								Gulungul Ck
73	27.0	Gastropoda	-	-	-	-	Secondary	17.iii.82
		Orthoptera: Gryllidae	0.07	0.25	0.27		ingestion	SW bank
		Fish scales	-	-	-	-		Mudginberri
		Bird feather	-	-	-	-		Billabong
		Vertebrate tissue	0.10	-	0.38			
		Vegetable matter	0.09	-	0.35			
		Total	0.26					
41	13.7	Orthoptera: Gryllidae (x2)	-	-				1.iii.82
		Faeces: Acrididae	-	-				500 m upstream
		Araneida	-	-				Mudginberri
16	22.5	Orthoptera: Ensifera (x3)	-	-				10.ii.82
								300 m down-
								stream Magela
								crossing

Table A6 (ctd)

Marking code	SVL (cm)	Prey item	wt (g)	Recon. wt (g)	Propn. of tot. prey wt	Propn. of tot. recon. prey wt	Comments	Capture
66	25.5	Crustacea: *Holthuisana* sp.		2.5				16.iii.82 Gulungul Ck crossing of Arnhem Hwy
		Araneida						
		Chlamydosaurus scales	–	–				
74		Chilopoda	0.06	0.20	0.14	0.11		31.i.83 Baralil Ck on Arnhem Hwy
		Araneida: Lycosidae	0.30	0.35	0.68	0.20		
		Orthoptera: Acrididae (x2)	0.06	0.60	0.14	0.34		
		Gryllidae	0.01	0.30	0.02	0.17		
		Gryllotalpidae	0.01	0.30	0.02	0.17		
75	20.0	Crustacea: *Holthuisana* sp.	0.20	1.5	0.95	0.79		1.ii.83 Corndorl Ck crossing Arnhem Hwy
		Orthoptera: Gryllidae	0.01	0.40	0.05	0.21		
		Total	0.21	1.90				
76	28.5	Crustacea: *Holthuisana* sp.	0.16	1.50	0.09	0.29		7.ii.83 Corndorl Ck crossing Arnhem Hwy
		Araneida: Lycosidae (x2)	0.04	0.60	0.03	0.11		
		Clubionidae	0.02	0.20	0.01	0.04		
		Lepidoptera: Papilionoidea	0.02	0.20	0.01	0.04		
		Orthoptera: Gryllidae (x4)	0.95	1.80	0.55	0.35		
		Acrididae	0.05	0.40	0.03	0.08		
		Unidentified fragments	0.48	0.50	0.28	0.09		
		Total	1.72	4.20				
77	19.0	Orthoptera: Acrididae	0.23	0.50	1.00	1.00		13.ii.83 Oenpelli Rd Corndorl Ck
NTM R0787	21.6	Blattodea: Blattidae	0.19	0.20	1.00	1.00		18.v.75 Oenpelli
NTM R2299	22.6	Crustacea: crabs (x2)	2.00	5.00	1.00	1.00		17.iv.76 Darwin
NTM R3065	25.5	Orthoptera: Caelifera	0.25	0.60	0.58	0.25		19.xii.76 E. Alligator on Oenpelli
		Anuran	0.18	2.00	0.42	0.77		
		Total	0.43	2.60				
NTM R3394	21.7	Orthoptera: Gryllidae	0.62	1.00	1.00	1.00		iv.76 Batchelor N.T.
NTM R8614	31.5	Muridae: *Mus musculus*	1.8	10.0	1.00	1.00	Fur and bones	20.i.80 Annaburroo
NTM R9797	15.5	Coleoptera (x2)	0.02	0.20	1.00	1.00		29.x.80 Keep River

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RESEARCH PUBLICATIONS

Alligator Rivers Region Research Institute Research Report 1983-84

Alligator Rivers Region Research Institute Annual Research Summary 1984-85

Research Reports (RR) and Technical Memoranda (TM)

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RR 2	Water quality characteristics of eight billabongs in the Magela Creek catchment. December 1982 (pb, mf - 60 pp)	Hart, B.T. & McGregor, R.J.
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	A limnological survey of the Alligator Rivers Reion. II. Freshwater algae, exclusive of diatoms. 1986 (pb - 176 pp)	Ling, H.U. & Tyler, P.A.
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