

# ON A COLLECTION OF AMPHIBIANS FROM ANGOLA, INCLUDING A NEW SPECIES OF *BUFO* LAURENTI

J. C. POYNTON  
14 Mordern House, London

and

W. D. HAACKE  
Transvaal Museum, Pretoria

Poynton, J. C. and Haacke, W. D., 1993. On a collection of amphibians from Angola, including a new species of *Bufo* Laurenti. *Annals of the Transvaal Museum* 36(2): 9–16.

Two herpetological collecting trips to Angola during the 1970s produced 169 amphibian specimens representing 23 species. The material includes a new species of dwarf toad, *Bufo grandisonae*, which is described. It is most similar to *Bufo dombensis*, of which a redescription is given. A northern extension in the known range of *Phrynomerus annectens* is recorded.

Keywords: Angola, Taxonomy, Distribution, Amphibia, Bufonidae, *Bufo grandisonae* spec. nov.

## INTRODUCTION

As part of a herpetological survey of the Namib Desert, W.D.H., accompanied by H. D. Brown, visited southwestern Angola from 16 March to the end of April 1971. Various transects were sampled to document the faunal transitions from the coast inland and from the Kunene River mouth to as far north as Lobito. The rainy season was unusually good and extended late into April, creating extremely wet conditions and even reached the desert coast, to the extent that south of Namibé, (= Mossamedes), *Welwitschia* plants were found standing in rainwater pools, surrounded by green grass. As a result of these conditions there was still a fair amount of late-season amphibian activity, which was first noted in Ovambo in northern Namibia and in the southern Angolan border areas. Depressions (*oshanas*) were in flood, inundating the palm and mopani savannah. Large numbers of juvenile *Pyxicephalus* were encountered on the main road and on tracks. Although the focus was on reptiles, a number of amphibians were also collected.

A second expedition, from 25 April to 10 June 1974, was made in the company of G. G. A. Voigt to establish range limits for the rupicolous reptiles typical of northwestern Namibia and the northern Namib Desert. To avoid the rainy season, the expedition took place later in the year, which resulted in fewer amphibian records. Rock outcrops of the central highlands and parts of the escarpment zone were sampled as far north as the line

Malanje to Luanda. Political events in Angola prevented any further work, but it was decided to report on the available material, especially as it appeared that a new species of *Bufo* had been collected.

Uncertainties in the taxonomy of small species of *Bufo* delayed publication of this report. Recent work, notably by Grandison (1981) on African bufonids, and a review of dwarf toads in the Zambesiaca area and Namibia (Poynton and Broadley, 1988), have resolved some problems and identified others, to allow a taxonomic treatment of the *Bufo* species represented in the present collection. A species that resembles *Bufo dombensis* Bocage, and which is sympatric with it, is described here as a new species. Descriptions of both species are provided since *B. dombensis* is not well characterized in the literature. Poynton and Broadley (1988) found the relationships between *B. dombensis* and the Namibian *B. hoeschi* Ahl and *B. damaranus* Mertens to be in need of clarification. The description of *B. dombensis* is based primarily on two male syntypes in the Natural History Museum, London (BM 1942.2.21.3–4).

### *Bufo grandisonae* spec. nov., Figs 1–3, 4a

DIAGNOSIS. Showing the general features of the 'vertebralis group' (Grandison, 1981), and in particular resembling *Bufo dombensis*, but differing from this species (and all other members of the

'vertebralis group') by the large tympanum (horizontal diameter of tympanum greater than internarial distance in *grandisonae*, less than internarial distance in *dombensis*); differing also in the numerous dark-tipped spines, particularly on side of head (lacking in *dombensis*), large glandular mass posterior to tympanum (lacking in *dombensis*), fewer doubled digital subarticular tubercles, and more reduced webbing.

**DESCRIPTION.** Small-sized toads, three known adult females with snout-urostyle length from 33,6–38,1 mm, single male with length of 32,9 mm. Tympanum large and very conspicuous, with a prominent tympanic ring, rounded in shape (horizontal diameter 92 % – 94 % of vertical diameter) and in adults exceeding internarial distance in both horizontal diameter (by 110 % – 123 %) and vertical diameter (by 103 % – 113 %). Dense patch of minute asperities present on the tympanum. Columella well developed. Tympanum also rounded and conspicuous in five juveniles (snout-urostyle length 22–26 mm); in four specimens, with a snout-urostyle length of 24–26 mm, the tympanum diameters are 100 % – 105 % internarial distance, but only 98 % in a 22 mm specimen. Allometric growth in tympanum diameter is indicated. In adults, internarial distance equal to 45 % – 57 % of distance from snout tip to eye, 97 % – 107 % of distance from nostril to eye, 79 % – 90 % of horizontal diameter of eye, 88 % – 93 % of horizontal diameter of tympanum.

No discrete parotid glands visible; glandular thickening in parotid area less than 0,5 mm in section. In adults, a conspicuous glandular mass abuts posterior edge of tympanum, extending somewhat beyond position of ventrally-directed bulge of parotid gland in *Bufo fenoulheti*, *B. beirani* and *B. dombensis* (Poynton and Broadley, 1988). Usually two glandular patches situated ventrally to tympanum. Juveniles lack glands



Fig. 1

Holotype of *Bufo grandisonae* spec. nov. TM 40150 on natural substrate at the type locality.

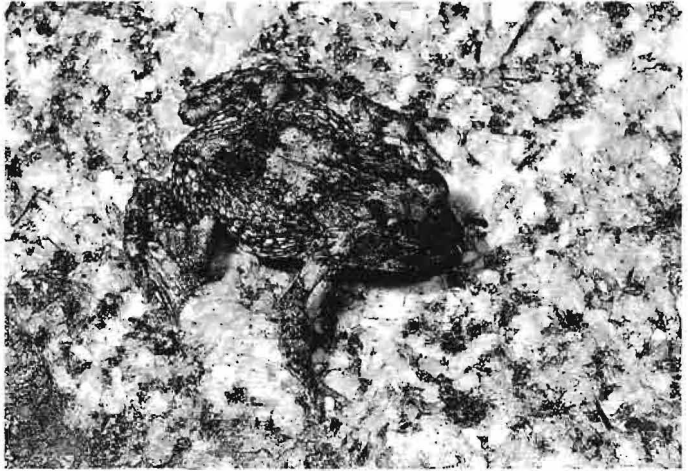


Fig. 2

Paratype of *Bufo grandisonae* spec. nov. TM 40156 (now BM 1988.745) on natural substrate at the type locality.

posterior to tympanum.

No tarsal fold. Subarticular tubercles of fingers single except distal tubercle of third finger, which is bilobed or double. No clear doubling of larger subarticular tubercles of toes. Two enlarged palmar tubercles present, inner smaller, but nevertheless substantially larger than other palmar tubercles. Length of outer metatarsal tubercle nearly equal to length of inner metatarsal tubercle, to 70 % shorter. Toes without a margin of web;

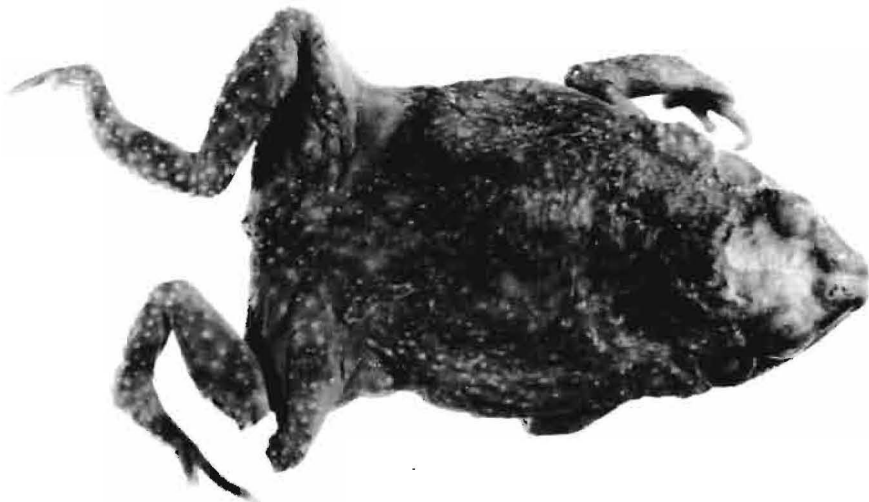


Fig. 3

Dorsal view of holotype of *Bufo grandisonae* spec. nov. TM 40150. Twice natural size.

webbing between toes vestigial, edge not serrated.

Ventral skin of females smooth, slightly creased in gular region in male. Skin of back of females and male with scattered warts surmounted by dark-tipped spines; top of head smooth. Upper eyelids lacking spines to possessing up to nine, mostly along outer edge. Dark-tipped spines scattered over side of head and lined over tympanic annulus. Limbs with numerous warts surmounted by dark-tipped spines. Larger juveniles (over 24 mm snout-urostyle) with a scattering of dark-tipped spines over back and hind limbs, developing later (26 mm stage) on forelimbs.

No ventral markings. Clearest dorsal markings consist of a light, irregular patch over head and occipital region, and a pair of light sacral patches, which might fuse mid-dorsally. Light markings in male very extensive. No clear interorbital dark bars present in the available material.

*Sexual dimorphism:* male distinguished by slightly rugose gular skin, with a dark vocal sac showing beneath, and by a dense covering of minute dark asperities on upper and inner surfaces of first finger, and to a lesser extent on the upper medial surface of second finger and inner metacarpal tubercle.

**MATERIAL EXAMINED.** HOLOTYPE: a mature but non-gravid female TM 40150 collected by W. D.

Haacke 5 km E of Assunção, Mossamedes District, Angola, on 25 March 1971. PARATYPES: a mature non-gravid female, TM 40151, same data as holotype; a mature, non-gravid female, TM 40155, collected from Assunção but otherwise same data as holotype; and a male, TM 40227, with developed secondary sexual characters collected by W. D. Haacke from Caraculo, Mossamedes District, Angola, on 26 March 1971. OTHER MATERIAL. Three juveniles, TM 40978–80, collected by W. D. Haacke at the Saiona River, 2 km N of Cainde, Mossamedes District, Angola, 16 April 1971; 2 juveniles, TM 41016–7, collected by W. D. Haacke 20 km W of Virei, Mossamedes District, 16 April 1971. Types in the Transvaal Museum, except TM 40151, which is deposited in the Natural History Museum, London (BM 1988.745).

**REMARKS.** TM 40150 was collected under a slab on top of a huge granite boulder, while TM 40151 was collected in the crack of a small boulder half-buried in soil. TM 40155 was collected on a rock slab at night together with a specimen of *Bufo dombensis* (TM 40156). TM 40227 was collected at night while it was trying to climb up a granite boulder.

All the material examined was compared with BM syntypes of *Bufo dombensis* (1942.2.21.3–4). While the tympanum of this species is relatively

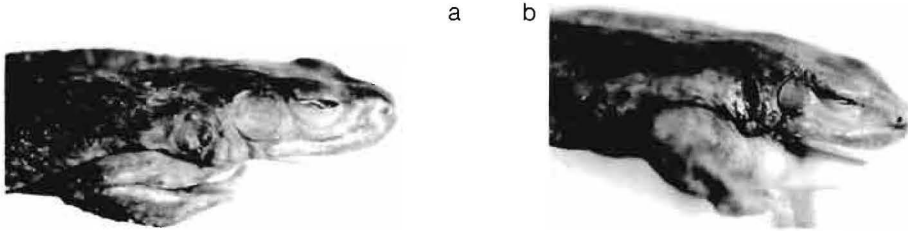


Fig. 4

a) Lateral aspect of holotype of *Bufo grandisonae* spec. nov. to show size of tympanum. Twice natural size.

b) Lateral aspect of *Bufo dombensis* (TM 40156) to show size of tympanum. Twice natural size.

larger than the tympanum of any other member of the 'vertebralis group,' it does not exceed the relative size of tympani in some other species of African *Bufo*, notably *B. dodsoni* Boulenger, *B. kisoensis* Loveridge, *B. lemairii* Boulenger and *B. reesi* Poynton. There appears to be no strong correlation between tympanum size and species habitat; the habitats occupied by the four species listed above range from semi-desert (*B. dodsoni*) to montane forest (*B. kisoensis*).

**ETYMOLOGY.** The species is named after Alice G. C. Grandison, in recognition of her contribution to our knowledge of dwarf African bufonids.

#### *Bufo dombensis* Bocage

**DESCRIPTION.** Small-sized toads, females reaching length of 40 mm, males reaching length of 36 mm. Tympanum distinct, horizontal diameter up to 74 % internarial distance, vertical diameter up to 81 % internarial distance. Internarial distance 53 % – 64 % of distance from snout tip to eye in adults.

Parotid glands very flattened, margins not clearly defined, separated from eyelids by a narrow gap. Slightly swollen outer margin follows edge of tympanum to about half-way around its posterior border. A row of glands extends below tympanum from upper jaw almost to arm insertion.

No tarsal fold. Subarticular tubercles of fingers usually double; in BM syntypes, tubercle at base of third finger single, but double in about half the other specimens examined, e.g., TM 40156; single on one hand and double on the other in SAM 15957. At least the more distal subarticular tubercles of toes 3 and 4 double. Two enlarged palmar tubercles present, inner smaller, but substantially larger than other palmar tubercles.

Outer metatarsal tubercle subequal to length of inner, to about two-thirds its length. Toes without

webbing margin to a very narrow margin of webbing. Two phalanges of toes 3 and 5 free of web, edge of web not to slightly serrated; web between toes 3 and 4 just extending beyond base of proximal phalanx of fourth toe.

Abdominal skin of males and females a pavement of very flattened warts, surmounted by minute spines in females; gular skin of males more rugose. Dorsal surface smooth; no spines on dorsal surface of head, including upper eyelids. A scattering of minute, lightly pigmented spines over side of head, and surmounting flattened warts on sides and limbs.

No ventral markings. Clearest dorsal markings are a light occipital patch, and a pair of light sacral patches, which may fuse medially. A dark interocular bar may be present (as in one BM syntype), or reduced to area over upper eyelid (other syntype) or lacking altogether. In the latter case, the occipital patch becomes continuous with a light patch on the snout area. A light mid-dorsal line may be present over urostyle or along length of back.

**Sexual dimorphism:** males in breeding condition have a relatively loose, rugose gular skin with a dark vocal sac. A dense covering of minute, dark asperities present on inner and upper surfaces of first and second fingers and on inner metacarpal tubercle.

**REMARKS.** A single male, TM 40156, was collected at night on sand between granite boulders at Assunção. A female *B. grandisonae* (TM 40155) was found on a rock slab nearby. The *B. dombensis* male shows the features of full breeding condition. The specimen was compared with the BM syntypes, with which it corresponds in detail, apart from having more subarticular tubercles doubled.

Poynton (1964) considered *B. dombensis* as a subspecies of *B. vertebralis* Smith, a treatment that has not been supported by subsequent

developments (Poynton and Broadley, 1988). It still remains an open question as to whether Mertens (1971) was justified in listing his *damaranus* as *B. dombensis damaranus* (Poynton and Broadley, 1988). It may, however, be noted that *damaranus* tends to have a concealed tympanum, which places it further from *B. grandisonae* than from *dombensis*. Head measurements of *dombensis* overlap with those of *grandisonae*, apart from the diameter of the tympanum.

### ***Xenopus laevis petersii* Bocage**

TM 40912–3: Lagoa Nuntechite, 15 April 1971, in flooded grassland.

The transverse lateral line bar count in both specimens is 18–19, which is well within the range of *X. l. petersii* (Poynton and Broadley, 1985a).

### ***Phrynomerus annectens* Neiden**

TM 40228: Caraculo, 26 March 1971, at night on a granite boulder feeding on termites.

TM 41108–10: Mutiambo River, 17 April 1971, at night on granite boulders.

TM 46523: 8 km NE of Novo Redondo – Gabela, 26 May 1974, during the day under dead aloe on top of calcrete cliff. This locality represents a range extension and the northernmost record for the species.

### ***Bufo gutturalis* Power**

TM 23978: Humpata, June 1954, collected by C. Koch.

TM 40332–8: Saco do Giraul, 28 March 1971, calling at night in flooded marshy river-bed.

TM 40415–26: Coroca River Mouth, 30 March 1971, at night among reeds on marshy ground.

TM 41237: Cima, 20 April 1971, at night in dry river-bed.

TM 45505: Dondo, 19 May 1974, during day on bank of Quanza river.

### ***Bufo maculatus* Hallowell**

TM 40967: Caine, 16 April 1971, during afternoon in dry wash, killed by neuropteran larva which had attached itself to the toad's throat.

TM 45293–5: Monguavalo Farm, 7 May 1974, at night on lawn.

TM 45470–2, 45476: Duque de Bragança Falls, 16 May 1974, at night on road, in gravel pit and in forest.

TM 45380: 16 km W of Vila Nova, 11 May 1974, at night; climbed up side of rock when disturbed.

TM 46608: 31 km NE of Sousa Lara – Chila, 28 May 1974, at night, on granite slab amongst grass in sisal plantation.

One 66.5 mm female from Duque de Bragança Falls (TM 45471) exceeds the 65 mm maximum given for *maculatus* in the Zambesiaca area (Poynton and Broadley, 1988). It shows the diagnostic features of *maculatus*, however, as do a male and two juveniles from this locality.

### ***Bufo kavangensis* Poynton & Broadley**

TM 40075: 23 km NW of Pereira de Eça – Roçadas, 21 March 1971, during the day in flooded grass among mopani trees.

### ***Pyxicephalus adspersus edulis* Peters**

TM 40070: Pereira de Eça, 21 March 1971, during the day, in flooded mopani veld.

TM 40071–2: 23 km NW of Pereira de Eça – Roçadas, 21 March 1971, during the day, in flooded grass among mopani trees.

The material, identified by Parry (1982), was subsequently lost in the post.

### ***Tomopterna cryptotis* (Boulenger)**

TM 22894–6: Miranda, May 1954, collected by C. Koch.

TM 40077–84: 2 km NW of Calequero – Cahama, 21 March 1971, at night, in wet mopani veld.

TM 41024: 25 km W of Virei, 17 April 1971.

The tubercles on the first finger of the NW Calequero series are variable, being double on one hand of one specimen and both hands in another, which is a feature of *krugerensis*.

### ***Tomopterna tuberculosa* (Boulenger)**

TM 40852: Christo Rei, 12 April 1971, collected by H. D. Brown in the afternoon.

TM 40930: 7 km SE of Jau, 15 April 1971, in the afternoon, overcast, in thick bush among rocks.

TM 45221–8: 7 km N of Cutenda, 5 May 1974, late afternoon, overcast, thunderstorm in distance, next to puddles among granite outcrops.

TM 45229, 45233: 13 km N of Cutenda, 5 May 1974, collected by G. Voigt, at night on track.

TM 46747: Bottom of Leba Pass, 2 June 1974, collected by G. Voigt, in the morning on bank of small stream.

The series from north of Cutenda shows a range in colouration from typical *tuberculosa* markings to a uniform brown. This is a condition found

apparently only in Angolan and Namibian material (Poynton and Broadley, 1985*b*), and it deserves further study.

***Rana angolensis* Bocage**

TM 23973–7: Humpata, June 1954, collected by C. Koch.

TM 45296: Monguavalo Farm, 7 May 1974, at night in swimming pool.

***Hildebrandtia ornata ornata* (Peters)**

TM 40073–4: 23 km NW of Pereira de Eça – Roçadas, 21 March 1971, in the afternoon, overcast, flooded grass in mopani veld.

TM 40076: 2 km NW of Calequero, 21 March 1971, at night, next to pond.

TM 40811: Dongue, 10 April 1971, in the afternoon, in rain pool next to road.

These specimens are all short-limbed, the length of the tibia being less than half the body length, not more than in *ornata ornatissima* (Bocage) from Bihé. Characteristic of western material, however, the markings of the paravertebral chain are smaller and more disrupted than in the eastern part of the range, a condition which approaches that of *ornatissima*.

***Ptychadena anchietae* (Bocage)**

TM 45506–8: Dondo, 19 May 1974, during the morning on banks of Cuanza River.

***Ptychadena grandisonae* Laurent**

TM 40914–5: Lagoa Nuntechite, 15 April 1971, during the day, in flooded grassland.

TM 45287–8: 5 km W of Calucembe, 7 May 1974.

These are newly metamorphosed specimens; identification of Calucembe material cannot be made with complete confidence.

***Ptychadena uzungwensis* (Loveridge)**

TM 45445: 20 km NW of Quimbango, 15 May 1974, in water-logged grassland, a typical situation.

***Ptychadena taenioscelis* Laurent**

TM 45446: 20 km NW of Quimbango, 15 May 1974, collected in water-logged grassland.

***Phrynobatrachus natalensis* (Smith)**

TM 40693: Foz de Cunene, 6 April 1971, during the morning, in river near edge.

TM 45448: 16 km SE of Quissol – Garibo 916Da, 15 May 1974, at night on track.

TM 45474: Duque de Bragança Falls, 16 May 1974, at night in gravel pit.

***Phrynobatrachus mababiensis* FitzSimons**

TM 40911: Lagoa Nuntechite, 15 April 1971, during the day, in flooded grassland. A newly metamorphosed specimen; some doubt exists as to its identification.

***Phrynobatrachus* sp.**

TM 45477: Duque de Bragança Falls 916Aa, 16 April 1974, in gravel pit.

This specimen, with a snout-urostyle length of 18 mm, has well-developed digital discs with circum-marginal grooves. Comparison with material in the Natural History Museum, London, shows the webbing to be intermediate between that of *P. rungwensis* Loveridge and *P. guttuosus* Chabanaud (as defined by Poynton and Broadley, 1985*b*). Webbing does not reach the distal tubercle of the third toe, but it does just reach the distal tubercle of the fifth toe, and a narrow margin just reaches the middle tubercle of the fourth toe. The specimen appears to be a male out of breeding condition, and possibly not fully grown. Oval femoral glands are discernible as flattened yellow patches. The gular area is darkened, with longitudinal but no transverse folds, not matching any of the *Phrynobatrachus* species from the Upemba Park, southern Zaire, figured by Schmidt and Inger (1959).

***Kassina senegalensis* (Duméril and Bibron)**

TM 45113–4: 5 km W of Pereira de Eça, 1 May 1974, found at the bottom of an unused drying hole for clay pots.

TM 45163: Viriambundo, 3 May 1974, found during the day sheltering on the ground under a stone.

The Pereira de Eça specimens have an interrupted dorsal stripe, typical of the western 'Form 4' of Schiøtz (Poynton and Broadley, 1987). The Viriambundo specimen, a juvenile, has very irregular markings, lacking the lateral paravertebral line of marks, while the remaining marks are unusually broad and rounded. In other respects the

specimen shows *senegalensis* characters, not those of *K. kuvangensis* (Monard, 1938).

### *Hyperolius nasutus* Günther

TM 40878–910: Lagoa Nuntechite, 15 April 1971, during the day, on grass and on track in flooded grassland.

TM 40916–9: Lagoa Nuntechite, 15 April 1971, during the day, on grass and on track in flooded grassland.

TM 45497: 3 km W of Salazar, 19 May 1974, during the day, on weeds in coffee plantation.

TM 46636: Namba, 29 May 1974, during the day, on aloe.

One of the four Lagoa Nuntechite specimens shows a mid-dorsal line of melanophores typical of *nasutus* (Poynton and Broadley, 1987); the remaining three show a scattering of dark spots. Twenty-six juveniles from 12–13 mm from this locality show marked variation:

1. distinct mid-dorsal line only: 1 specimen.
2. distinct mid-dorsal line plus faint light paravertebral bands: 3 specimens.
3. no mid-dorsal line, faint light paravertebral bands: 13 specimens.
4. no mid-dorsal line, distinct light paravertebral bands: 19 specimens.

The latter pattern is characteristic of *benguellensis* (Poynton and Broadley, 1987), and the intergrading from *nasutus* to *benguellensis* patterning in this series further serves to reduce confidence in the distinctness of the two taxa as currently defined.

### ACKNOWLEDGEMENTS

A critical reading of a draft of this paper by Miss A. G. C. Grandison is warmly acknowledged.

We are indebted to Dr João Crawford-Cabral, formerly of the Instituto de Investigação de Científica de Angola, and Dr Brian Huntley, formerly State Ecologist of Angola, for their assistance towards obtaining permission to collect, providing local information, guidance and introductions, and for their hospitality. Many local residents, too many to mention individually, provided assistance and hospitality. In particular, W. D. Haacke wishes to thank

A half-grown specimen from Namba shows a mid-dorsal line; this line is evident in only the anterior half of the 25 mm female from 3 km W of Salazar.

### *Hyperolius steindachneri* Bocage

TM 45473: Duque de Bragança Falls, 16 May 1974, at night, on tarred road.

### *Hyperolius marmoratus huillensis* Bocage

TM 40873–7: Lagoa Nuntechite, 15 April 1971, during the day, in flooded grassland.

? TM 45410–29: 12 km W of Bela Vista, 12 May 1974, during the day, in rock crevices.

Although showing a wide range of variation from fine light spots to irregular light blotches with dark margins, the Lagoa Nuntechite specimens can be distinguished from the range of patterning in *H. m. angolensis* Steindachner, as described by Schiøtz (1971). The Bela Vista series, collected in cracks of granite boulders in grassveld, consists of juveniles, males and females with undeveloped ovaries. The specimens show a *marmoratus* type of juvenile patterning with rounded sacral patches, and, in most specimens, a more or less complete hourglass pattern. One specimen has an irregular light and brown vermiculation. The material agrees with *pliciferus* Bocage (*cf.* Perret, 1976), and may be presumed to show the juvenile or perhaps the hibernating pattern of *huillensis*, if this form is taken to cover the southern uplands of Angola.

### REFERENCES

- GRANDISON, A. G. C., 1981. Morphology and phylogenetic position of the West African *Didynamis sjoestedti* Anderson, 1903 (Anura Bufonidae). *Monitore zoologico italiano* N.S. Supplemento 15: 187–215.
- MERTENS, R., 1971. Die Herpetofauna Südwest-Afrikas. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* 529: 1–110.
- MONARD, A., 1938. Contribution à la Batrachologie d'Angola. *Arquivos do Museu Bocage* 9.
- PARRY, C. R., 1982. A revision of southern African *Pyxicephalus* Tschudi (Anura: Ranidae). *Annals of the Natal Museum* 25: 281–292.
- PERRET, J.-L., 1976. Revision des amphibiens africains et principalement des types, conservés au Musée Bocage de

travelling companions and friends Dick Brown and Geoffrey Voigt for their good company and assistance. Technical assistance at the Transvaal Museum was provided by Sheila Nel, Gerry Newlands and Lomi Brown. All photographs were taken by W. D. Haacke.

The assistance of Dr B. T. Clarke at the Natural History Museum, London, is gratefully acknowledged. J. C. Poynton acknowledges funding for travel from the Foundation for Research Development, Pretoria, and the University of Natal.

- Lisbonne. *Arquivos do Museu Bocage 2A Série 6*: 15–34.
- POYNTON, J. C., 1964. The Amphibia of southern Africa: a faunal study. *Annals of the Natal Museum 17*: 1–334.
- POYNTON, J. C. and BROADLEY, D. G., 1985a. Amphibia Zambesiaca 1. Scolecomorphidae, Pipidae, Microhylidae, Hemisidae, Arthroleptidae. *Annals of the Natal Museum 26*: 503–553.
- POYNTON, J. C. and BROADLEY, D. G., 1985b. Amphibia Zambesiaca 2. Ranidae. *Annals of the Natal Museum 27*: 115–181.
- POYNTON, J. C. and BROADLEY, D. G., 1987. Amphibia Zambesiaca 3. Rhacophoridae and Hyperoliidae. *Annals of the Natal Museum 28*: 161–229.
- POYNTON, J. C. and BROADLEY, D. G., 1988. Amphibia Zambesiaca 4. *Annals of the Natal Museum 29*: 447–490.
- SCHIÖTZ, A., 1971. The superspecies *Hyperolius viridiflavus* (Anura). *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 134*: 21–76.
- SCHMIDT, K. P. and INGER, R. F., 1959. Amphibians. *Exploration du Parc National d'Upemba 5*: 1–264.

Postal addresses: J. C. Poynton  
14 Morden House  
Harewood Avenue  
London NW1 6N  
United Kingdom

W. D. Haacke  
Department of Herpetology  
Transvaal Museum  
P. O. Box 413  
Pretoria  
0001 South Africa

## GAZETTEER

Assuncão	1413 Cc	Miranda	1614 Dd
Assuncão, 5 km E of	1413 Cc	Monguavalo Farm	1314 Bc
Bela Vista, 12 km W of	1216 Ca	Mutiambo River	1412 Cd
Cainde	1513 Ad	Namba	1114 Dd
Calequero, 2 km NW of	1614 Db	Novo Redondo (= N'Gunza), 8 km NE of	1113 Bb
Candumbo Rocks	1219 Db	Pereira D'Eça (= N'Giva)	1715 Ba
Capaia, 30 km NW of	1413 Bc	Pereira D'Eça (= N'Giva), 5 km W of	1715 Ba
Caraculo	1512 Ba	Pereira D'Eça (= N'Giva), 23 km NW of	1615 Dc
Christo Rei	1413 Da	Quimbango, 20 km NW of	1017 Dc
Cima (= Giraúl de Cima)	1512 Aa	Quissol, 16 km SE of	0916 Da
Cutenda, 7 km N of	1415 Ac	Saco do Giraul	1512 Aa
Curoca River Mouth	1511 Db	Saiona River	1513 Ad
Dondo	0914 Cb	Salazar, 3 km W of	0914 Bd
Dongue	1514 Ac	Sousa Lara (= Bocoio), 31 km NE of	1214 Ab
Duque de Bragança Falls	0916 Aa	Vila Nova, 16 km W of	1216 Ca
Foz de Cunene	1711 Bd	Virei, 20 km W of	1512 Db
Humpata	1513 Ab	Virei, 23 km W of	1512 Da
Jau, 7 km SE of	1513 Bc	Viriambundo	1514 Ca
Lagoa Nuntechite	1513 Ab		
Leba Pass	1513 Aa		