

# An illustrated key to the frogs of Namibia

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## ABSTRACT

A simple-to-use identification key is provided to 50 species of frogs, of which 7 have not yet been recorded in Namibia, although they are believed to occur there.

## INTRODUCTION

This key is designed for use by non-specialists, who require accurate identifications of frogs. The identification of Namibian frogs is not easy. This is partly due to the scattered literature and uneven geographic coverage of available reports, and partly to the lack of fieldwork required to elucidate the taxonomic status of many species. This key is intended as a simple-to-use, up to date means of identifying all the frogs known to occur in Namibia. In addition, I have included some species not yet recorded from Namibia, but which are known from neighbouring areas, and which further collecting will probably bring to light. This paper is a companion to an annotated checklist of the frogs of Namibia (Channing & Griffin, in prep.). That source should be consulted for detailed distributions and life history notes. This key is based partly on the works of Poynton (1964, 1970), Poynton and Broadley (1985a, b, 1987, 1988), and Channing and Van Dijk (1976).

### How to use this key

Each numbered couplet represents two choices. Starting at number 1, read through both choices (a) and (b), comparing the descriptions with the frog you are identifying. Using the illustrations, select one of the choices as best describing your frog. If you selected choice 1(b), for example, you would be directed to go to couplet 4. Each successive choice leads either to a new couplet, or to the name of the frog.

Experienced users may jump directly to the part of the key concerned. All species within a genus have been placed together, so that, for example, all *Bufo* species may be identified starting at step 14 (bufonids from step 13), and all *Ptychadena*

species start at step 30. The genera have been placed together under the appropriate family name.

Users of this key are reminded that species which have not been included in the key, but which may be present in the area, will be misidentified. However, the extralimital species which are included in this key should help to avoid such misidentifications. Animals showing extreme variations in colour pattern or morphology may be misidentified. Users of this key are urged to identify more than one specimen from each population for confirmation, as the variation between animals may be quite pronounced. Finally, each species of frog has a unique male call, which may be quite easily learned. Many of these calls are available on record, e.g. the record accompanying Passmore & Carruthers' (1979) field guide. Specimen identifications should be checked with a museum or other authority, and unusual specimens should be referred to a museum for expert opinion.

Some species are particularly difficult to identify: the species of *Tomopterna*, for which calls are essential for confirmation; many *Ptychadena* are superficially alike and careful reading of the key is called for; and the taxonomy of the smaller *Bufo* species (*B. dombensis*, *B. hoeschi*, *B. kavangensis* and *B. fenoulheti*) is not yet stable. Field work is required to determine the status of these taxa.

A summary statement of known distribution is included before the identification of each species. These are only guides, as extensive collecting may extend the known distributions.

A short glossary of terms used is presented after the key.

## KEY TO THE ADULT FROGS

1. a) Tongue absent, three claws on each foot (Fig. 1) ..... 2  
b) Tongue present ..... 4

### PIPIDAE

2. a) Subocular tentacle at least half eye diameter (Fig. 2)  
(Northern areas) *Xenopus muelleri*  
b) Subocular tentacle less than half eye diameter ..... 3

3. a) Underside white or pale without markings  
(Throughout) *Xenopus l. laevis*  
b) Underside with clear dark markings (Fig. 3)  
(Northern areas) *Xenopus l. petersi*

### RHACOPHORIDAE

4. a) Fingers arranged in opposing pairs (Fig. 4)  
(North eastern areas) *Chiromantis xerampelina*



Fig. 1

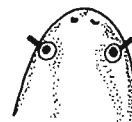
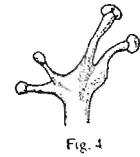


Fig. 2



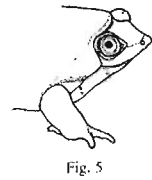
Fig. 3

- b) Fingers arranged in one plane ..... 5
- 5. a) Upper jaw with minute or large teeth ..... 21
- b) Upper jaw without teeth ..... 6



HEMISOTIDAE

- 6. a) Snout sharp and hardened for digging, transverse fold behind eyes (Fig. 5) (Northern areas)  
     *Hemisis marmoratus* ..... 7
- b) Snout rounded or flattened, no transverse fold behind eyes ..... 7
- 7. a) Transverse folds on palate, skin smooth or granular ..... 8
- b) No transverse folds on palate, skin very warty ..... 12
- 8. a) Squat short burrowing frogs, inner metatarsal tubercle large, brown or cream backs with markings (Fig. 6) ..... 11
- b) Walking frogs, inner metatarsal tubercle not enlarged and spade-like, backs usually black with red or orange markings ..... 9



MICROHYLIDAE

- 9. a) Tips of fingers not expanded into distinct discs, back with orange spots or flecks (Ovamboland to Waterberg)  
     *Phrynomantis affinis* ..... 10
- b) Tips of fingers expanded into discs (Fig. 7) ..... 10
- 10. a) Two broad orange bands running from the eyes to the hind legs, also an orange patch on a raised glandular area over the vent, up to 70 mm SVL (Northern areas)  
     *Phrynomantis bifasciatus* ..... 10
- b) Red or yellow spots on a brown or black back, up to 40 mm SVL (Dry western, central and southern areas)  
     *Phrynomantis annectens* ..... 10

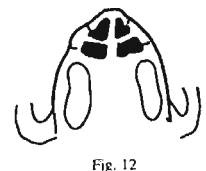
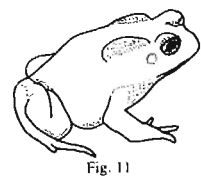


- 11. a) Hands smooth, with fleshy webbing between the fingers (Fig. 8). No dark stripe from eye to armpit (Southern coastal areas)  
     *Breviceps macrops* ..... 13
- b) Tubercles present on the hand (Fig. 9), no fleshy webbing between the fingers, and a dark stripe from eye to armpit (Throughout area)  
     *Breviceps adspersus* ..... 13
- 12. a) Tarsal fold present (Fig. 10) ..... 13
- b) Tarsal fold absent ..... 18



BUFONIDAE

- 13. a) Parotid glands present (Fig. 11) ..... 14
- b) Parotid glands absent, a pair of dark spots present in sacral region (Northern areas)  
     *Schismaderma carens* ..... 14
- 14. a) Parotid glands continue posteriorly as a glandular ridge running to the sacral region (Not yet recorded, expected from north eastern areas)  
     *Bufo lemairii* ..... 15
- b) Parotid glands not continuing posteriorly beyond the scapular region ..... 15
- 15. a) Throat not as granular as lower abdomen (Along Orange river) *Bufo garioepensis* ..... 16
- b) Throat as granular as lower abdomen ..... 16
- 16. a) A light cross present on head, formed between darker markings (Fig. 12)(variable) ..... 17

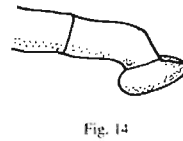


- b) No light cross on top of head  
(Throughout area) *Bufo poweri*
- 17. a) Parotid glands prominent with distinct lateral margins (Northern areas) *Bufo gutturalis*
- b) Parotid glands flattened, without distinct margins (Northern areas) *Bufo maculatus*
- 18. a) Skin of snout smooth, with small warts ..... 19
- b) Skin of snout granular, warts distinct ..... 20



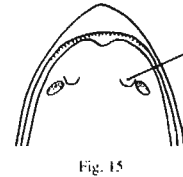
- 19. a) Tympanum present (Fig. 13) (North western areas) *Bufo dombensis*
- b) Tympanum absent (Central areas) *Bufo hoeschi*
- 20 a) Outer margin of parotoids straight, distinct (Not yet recorded, expected from north eastern areas) *Bufo kavangensis*
- b) Outer margin of parotoids indistinct, curved (North eastern areas) *Bufo fenoulheti*

- 21. a) Last phalanx of fingers displaced downwards by an intercalary cartilage (Fig. 14), discs often present ..... 22
- b) Last phalanx of fingers not out of alignment ..... 26



HYPEROLIIDAE

- 22. a) Discs on fingers and toes absent, dorsal markings dark bands on lighter brown background (Throughout area) *Kassina senegalensis*
- b) Discs present on fingers and toes ..... 23
- 23. a) Vomerine teeth present (Fig. 15) ..... 24
- b) Vomerine teeth absent ..... 25



- 24. a) Disc width less or equal to toe width, adults usually found on ground (Northern areas) *Leptopelis bocagii*
- b) Disc width greater than toe width (Not yet recorded, expected from northern areas) *Leptopelis cynnamomeus*

- 25. a) Small, maximum 25 mm body length, greenish reed-frogs (Northern areas) *Hyperolius nasutus*
- b) Moderate (up to 35 mm body length) reed frogs, browns, reds, and creams are the dominant colours in various patterns (Northern areas) *Hyperolius angolensis*

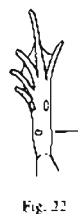
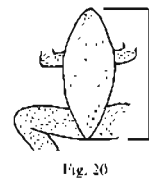
- 26. a) Vomerine teeth present ..... 27
- b) Vomerine teeth absent ..... 42
- 27. a) Inner metatarsal tubercle spade-like ..... 30
- b) Inner metatarsal tubercle not spade-like ..... 29

RANIDAE

- 28. a) Throat white or yellowish, no bands ..... 46
- b) Throat with clear dark longitudinal bands (Fig. 16) (Waterberg, northwards) *Hildebrandtia ornata*
- 29. a) Vomerine teeth separated from the internal nostrils ..... 38
- b) Vomerine teeth bordering the internal nostrils (Fig. 15) ..... 30



30. a) Two or more dark bands lying beneath vent from knee to knee (Northern areas)  
*Ptychadena subpunctata*  
b) One or no bands below vent running from knee to knee ..... 31
31. a) A light triangular patch on snout (Fig. 17) ..... 32  
b) No light triangle, or a broad light band continuing backwards from snout ..... 33
32. a) Posterior face of thigh mottled, snout strongly projecting (Fig. 18) (Northern areas)  
*Ptychadena oxyrhynchus*  
b) Posterior face of thigh with light and dark longitudinal stripes (Northern areas)  
*Ptychadena anchietae*
33. a) Two phalanges of fourth toe free of web (Fig. 19) (Northern areas)  
*Ptychadena mascareniensis*  
b) 2 1/3 or more phalanges of fourth toe free of web ..... 34
34. a) Length of foot not more than half body length ..... 35 (Fig. 20)  
b) Length of foot more than half body length ..... 36
35. a) Continuous pair of skin folds alongside dorsal mid-line from head to sacrum (Northern areas)  
*Ptychadena mossambica*  
b) Skin folds not continuous from head to lower back (Northern areas)  
*Ptychadena schillukorum*
36. a) Posterior face of thigh with continuous light and dark bands ..... 37  
b) Posterior face of thigh spotted or mottled (Northern areas)  
*Ptychadena porosissima*
37. a) Distinct dark band continuous from knee to knee below vent (Northern areas)  
*Ptychadena taenioscelis*  
b) Dark band, if present, not continuous from knee to knee below vent (Northern areas)  
*Ptychadena upembae*
38. a) Foot length equal to or longer than distance from tympanum to vent (Fig. 21) ..... 39  
b) Foot length less than distance from tympanum to vent ..... 40
39. a) Foot length less than twice head width (Not yet recorded, expected from the extreme south)  
*Strongylopus springbokensis*  
b) Foot length more than twice head width (Not yet recorded, expected in the south)  
*Strongylopus grayii*
40. a) A broad golden band running over snout backwards to vent (Northern areas)  
*Rana darlingi*  
b) No broad golden band ..... 41
41. a) Less than one phalanx of fourth toe free of web (Nauklufi, Fish river) *Rana fuscigula*  
b) More than one phalanx of fourth toe free of web (Not yet recorded, expected in the extreme north)  
*Rana angolensis*
42. a) A white tubercle present about midway along tarsus (Fig. 22) ..... 43



- b) No tubercle midway along tarsus .....44
- 43. a) Webbing between toes not passing proximal subarticular tubercle of fourth toe (Fig. 23) (Northern areas) *Phrynobatrachus mababiensis*
- b) Broad web passes proximal tubercle of fourth toe at least on one side (Central and northern areas) *Phrynobatrachus natalensis*
- 44. a) A delicate skin ridge running along dorsal midline ..... 50
- b) No fine skin ridge along dorsal midline ..... 45
- 45. a) Inner metatarsal tubercle shorter than first phalanx of inner toe, rounded (Fig. 24) (Throughout area) *Cacosternum boettgeri*
- b) Inner metatarsal tubercle longer than first phalanx of inner toe, pointed and narrow (South) *Cacosternum namaquense*
- 46. a) Lower jaw with three cusps (Fig. 25) (Central and northern areas) *Pyxicephalus adspersus*
- b) Lower jaw without cusps .....47
- 47. a) Inner metatarsal tubercle less than 1,2 x length of second toe (Fig. 26) (Northern areas) *Tomopterna tuberculosa*
- b) Inner metatarsal tubercle longer than 1,4 x length of second toe .....48
- 48. a) Webbing reaching middle subarticular tubercle of fourth toe and distal tubercle of fifth toe (Fig. 27) (Northern areas) *Tomopterna marmorata*
- b) Webbing not as extensive as above ..... 49
- 49. a) Proximal subarticular tubercle of first finger single (Throughout area) *Tomopterna crytotis*
- b) Proximal subarticular tubercle of first finger double (Fig 28.) (Waterberg northwards) *Tomopterna krugerensis*



Fig. 23



Fig. 24



Fig. 25



Fig. 26



Fig. 27



Fig. 28

ARTHROLEPTIDAE

- 50. (Not yet recorded, but expected from the north eastern areas) *Arthroleptis stenodactylus*

GLOSSARY OF TERMS USED IN THE KEY

- Cusps.** Tooth-like projections on the lower jaw of bullfrogs.
- Discs.** (Fig. 7) Enlarged, flattened tips of the fingers and toes,
- Distal.** "Away from the midline of the body", opposite to proximal.
- Intercalary cartilage.** A piece of cartilage between the last two phalanges of the fingers, which causes the distal phalanx to be out of line with the rest of the finger.
- Internal nostrils.** (Fig. 15) The openings in the roof of the mouth connecting to the external nostrils.
- Metatarsus.** (Fig. 24) The region of the hind foot between the toes and the ankle of climbing frogs.
- Palate.** The roof of the mouth.
- Parotid glands.** (Fig. 11) Large skin glands situated behind the eyes in many bufonids.
- Phalanx.** (plural: **Phalanges**) The bones of the fingers or toes.
- Proximal.** "Toward the midline of the body", opposite to distal.

- Sacrum.** The region of the backbone that articulates with the top of the hip in frogs.
- Scapular.** The region of the back where the shoulder girdle articulates with the backbone.
- Subarticular.** "Beneath the joint", usually referring to the position of tubercles of the finger or toe.
- Subocular tentacle.** (Fig. 2) A small tentacle originating below the eye in *Xenopus*.
- Tarsal fold.** (Fig. 10) A fold of skin along the inside edge of the tarsus.
- Tarsus.** The ankle of frogs.
- Tubercles.** (Fig. 9) Small raised areas of skin on the walking surfaces of the hands and feet in frogs (protuberance, swelling, projection).
- Tympanum.** (Fig. 13) The external ear drum.
- Vent.** The posterior opening of the gut.
- Vomerine teeth.** (Fig. 15) Small tooth-like projections on the roof of the mouth near the internal nostrils.

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## REFERENCES

- CHANNING, A. & VAN DIJK, D.E. 1976. A guide to the frogs of South West Africa. *Univ. Durban-Westville Monoqr. Ser* 2: 1-49.
- PASSMORE, N.I. & CARRUTHERS, V.C. 1979. South African Frogs. Johannesburg: Witwatersrand University Press.
- POYNTON, J.C. & BROADLEY, D.G. 1985a. Amphibia Zambesiaca 1. Scolecomorphidae, Pipidae, Microhylidae, Hemisidae, Arthroleptidae. *Ann. Natal Mus.* 26: 503-553.
- POYNTON, J.C. & BROADLEY, D.G. 1985b. Amphibia Zambesiaca 2. Ranidae. *Ann. Natal Mus.* 27: 115-181.
- POYNTON, J.C. & BROADLEY, D.G. 1987. Amphibia Zambesiaca 3. Rhacophoridae and Hyperoliidae. *Ann. Natal Mus.* 28: 161-229.
- POYNTON, J.C. & BROADLEY, D.G. 1988. Amphibia Zambesiaca 4. Bufonidae. *Ann. Natal Mus.* 29: 447-490.