

## A new species of *Mantidactylus* from northeastern Madagascar with resurrection of *Mantidactylus blanci* (Guibé, 1974)

(Amphibia, Anura, Ranidae)

Frank Glaw & Miguel Vences

Glaw, F. & M. Vences (2000): A new species of *Mantidactylus* from northeastern Madagascar with resurrection of *Mantidactylus blanci* (Guibé, 1974) (Amphibia, Anura, Ranidae). — *Spixiana* 23/1: 71-83

*Mantidactylus schilfi*, spec. nov. is described from the Marojezy massif in northeastern Madagascar. Males of the new frog species are characterized by a distinct colouration of the head sides (a white band along the upper lip which is bordered by a black band), very long hindlegs, and a small snout-vent length (males 27-29 mm). In addition, *M. schilfi* differs from all similar *Mantidactylus* species by advertisement calls. The new species is tentatively included in the subgenus *Gephyromantis*. *Gephyromantis blanci* Guibé, 1974 is resurrected (as *Mantidactylus blanci*) from the synonymy of *Mantidactylus decaryi* (Angel, 1930). Both species are redefined and advertisement calls of *M. decaryi* are described.

Frank Glaw, Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany.

Miguel Vences, Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, D-53113 Bonn, Germany.

### Introduction

Madagascar harbours an enormous diversity of amphibian species of which a large number still remains to be described. 182 valid species were scientifically named until the end of the 20th century, but a total of at least 224-250 species have already been discovered and identified (Glaw & Vences in press). The most speciose amphibian genus in Madagascar is *Mantidactylus* (Ranidae: Mantellinae), which is classified in 12 subgenera (Glaw & Vences 1994). Phylogenetic relationships between these subgenera are largely unknown. In the present paper we describe a new species of *Mantidactylus* from northeastern Madagascar and resurrect another one, which bears similarities to the new species in a number of characters.

### Material and methods

Vocalizations were recorded using portable tape recorders with an external microphone (Vivanco EM 238) and were analyzed with the MEDAV sound analyzing system Spekro 3.2. Sonagrams were edited with high frequency resolution (FFT 512). Morphological measurements were taken by the same person (FG) with a calliper to the nearest 0.1 millimeter. For definition of external and internal views of femoral glands, see Glaw et al. (in press). Webbing formula is given according to Blommers-Schlösser (1979). Institutional abbreviations are as follows: MNHN (Muséum national d'Histoire naturelle, Paris); UADBA (University of Antananarivo, Département de Biologie Animale); ZFMK (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn); ZSM (Zoologische Staatssammlung, München). SVL is used to abbreviate snout-vent length.



Fig. 1a. Holotype of *Mantidactylus schilfi*, spec. nov. (ZFMK 59885) from the Marujezy massif in dorsolateral view.

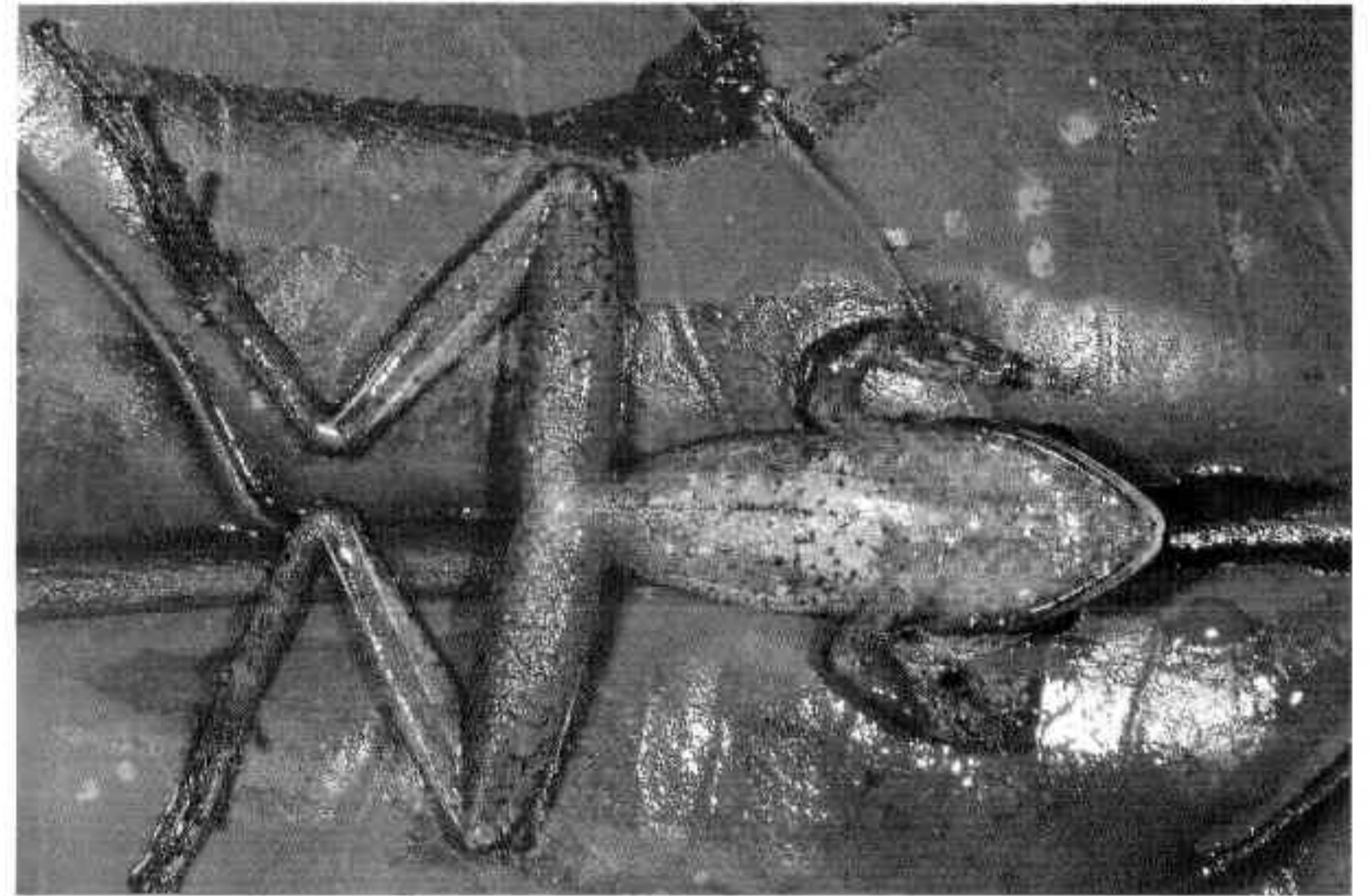


Fig. 2. Holotype of *Mantidactylus schilfi*, spec. nov. in ventral view.



Fig. 1b. Holotype of *Mantidactylus schilfi*, spec. nov. Drawing by R. Kübbandner (Photo: M. Müller).

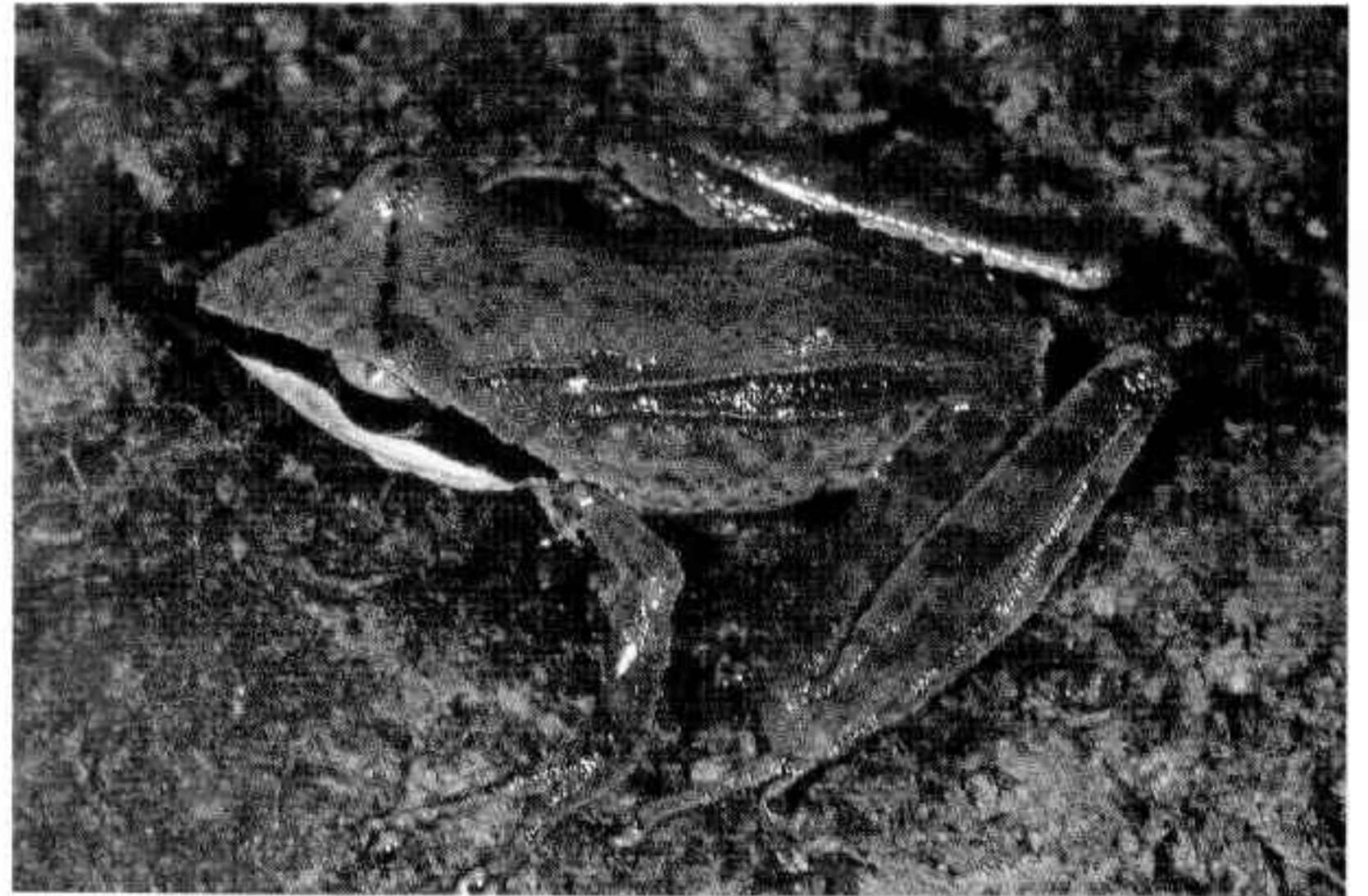


Fig. 3. Paratype of *Mantidactylus schilfi*, spec. nov. (ZSM 587/1999) in dorsolateral view.

## Results and Discussion

### *Mantidactylus schilfi*, spec. nov.

Figs 1-5

**Types.** Holotype: ZFMK 59885, adult male, collected in the "Réserve Naturelle Intégrale Marojezy", Camp 4 (ca. 1250 m above sea level), northeastern Madagascar, on 28 February 1995 by F. Glaw & O. Ramiison. – Paratypes: 2 males: ZSM 587/1999 (originally ZFMK 59886) and IADBA (number unknown), both with same locality, date and collectors as holotype; 1 female: MNHN 1973.931 (with very small oocytes as ascertained by dissection) from Marojezy, 1300 m above sea level, collected by C. P. Blanc on 2 July 1972.

**Diagnosis.** *M. schilfi* is characterized as a member of the genus *Mantidactylus* by the lack of nuptial pads in males and by its general similarities to other species of the genus. Males differ from all other *Mantidactylus* by a combination of the following characters: (1) Colouration of the head sides (a distinct white band along the upper lip which is bordered by a black band from the snout tip to the insertion of hindlimbs, Fig 1); (2) very long hindlegs (when limbs are adpressed to the body, tibiotarsal articulation reaches far beyond the tip of snout); (3) small snout-vent length (males 27-29 mm); (4) virtually not recognizable femoral glands in calling males; (5) largely, but not completely connected lateral metatarsalia; (6) advertisement calls (see below). It differs from *M. granulatus* (which can have very similarly coloured head sides) by (1) largely connected metatarsalia, (2) less webbing between toes, (3) smaller SVL (males up to 29 mm in *M. schilfi* versus up to 42 mm in *M. granulatus*), (4) lack of black vocal sac folds along the lower jaw in males, (5) advertisement calls, and (6) by the calling habitat (along brooks in *M. granulatus* versus independent from water bodies in *M. schilfi*).

### Description

Holotype (Figs 1-2). SVL 29.0 mm. Body slender; head longer than wide, slightly wider than body; snout pointed in dorsal and lateral views; nostrils directed laterally, slightly protuberant, nearer to snout tip than to eye; canthus rostralis distinct, slightly concave; loreal region weakly concave; tympanum distinct, rounded, horizontal tympanum diameter (1.9 mm) is 50% of eye diameter (3.8 mm); supratympanic fold recognizable (appears distinct by the strong colour border), rather straight; tongue ovoid, distinctly bifid posteriorly; vomerine teeth small but distinct, positioned posterolateral to choanae; choanae rounded. Arms slender; subarticular tubercles single; outer metacarpal tubercle not recognizable, inner metacarpal tubercle indistinct; fingers without webbing; relative length of fingers: 1 < 2 < 4 < 3; finger disks distinctly enlarged; nuptial pads absent. Hindlimbs slender; tibiotarsal articulation reaches far beyond snout tip; lateral metatarsalia largely, but not completely connected; inner metatarsal tubercle small but distinct; outer metatarsal tubercle rudimentary and indistinct; webbing formula between toes: 1(1), 2i(1.5), 2e(1), 3i(2.25), 3e(1.5), 4i(3), 4e(2.5), 5(1); relative length of toes: 1 < 2 < 3 < 5 < 4. Skin on the upper surface smooth, back with rather indistinct dorsolateral folds; ventral side largely smooth, slightly granular on the venter. No distinct tubercles in the anal region. Femoral glands (in life and in preservative) very poorly delimited and very indistinct from both external and internal view (not referable to the gland types defined in Glaw et al. in press). After more than four years in alcohol, dorsum grey-brown, more beige posteriorly. A brown band between eyes, bordering a more or less triangular beige patch which covers the head surface. Arms light brown without distinct dark crossbands. Hindlimbs light brown with indistinct dark crossbands. Head colouration very characteristic: a highly distinct white band along the upper lip from snout tip to the insertion of arms, sharply bordered by a black band from snout tip to the insertion of arms which is interrupted by the eye. Venter beige to yellowish, with small dark spots on the venter and a more reticulated pattern on the shanks. Brown mottling on the throat, with a thin blackish band along the lower jaw. Colouration in life (Figs 1-2) generally similar to that in preservative. However, the dorsal surface is more colourful in life, being more orange-brown. The ventral surface is more yellowish than in alcohol.

Paratypes. ZSM 587/1999 is morphologically very similar to the holotype. SVL 27.1 mm. Tympanum diameter (2.0 mm) is 51% of eye diameter (3.9 mm). The dorsolateral folds are more distinct than in the holotype. Femoral glands very poorly delimited and very indistinct from both external and internal view. Webbing formula is identical to the holotype. The paratype from UADBA was not available for morphological comparison. The life colouration of the two male paratypes is shown in Figs 3-5. Morphology and colouration of MNHN 1973.931 is largely similar to ZFMK 59885 and ZSM

587/1999, except for its distinctly larger size (SVL 34.5 mm) and the fact that the head is as wide as the body (which may be due to a different mode of fixation). The skin in the femoral gland region of the shanks is similar to the male paratypes. Vomerine teeth present; tympanum diameter (2.3 mm) is 58% of eye diameter (4.0 mm); dorsolateral folds distinct; tibiotarsal articulation reaches much beyond snout tip, webbing formula of the foot: 1(1), 2i(1.75), 2e(1), 3i(2.5), 3e(1.75), 4i(3), 4e(2.5), 5(1); lateral metatarsalia partially connected. Dorsal colouration light brown with black head sides and distinct white lips. Two very small black dots between the eyes. Ventral colouration whitish with vermiculated markings. The stomach contained one beetle of about 3 mm length. The dorsal colouration of MNHN 1973.931 closely resembles that of *Mantidactylus granulatus* and it was considered as such in Vences et al. (1999). However, a careful re-examination of this specimen revealed that it has much less webbing between the toes and partially connected lateral metatarsalia and therefore can not be a subadult *M. granulatus*. It is very probably a female of *M. schilfi* because of its general similarities in colouration and external morphology with the other type specimens and the fact that it was collected in the same area at virtually the same altitude as the other *schilfi* types. It must be emphasized, however, that the available *schilfi* males are distinctly smaller than MNHN 1973.931 (79-84% of the female SVL) and that such distinct sexual size dimorphism is unusual in both the *M. granulatus* group and the *M. boulengeri* group (see "Relationships" below).

**Distribution.** *Mantidactylus schilfi* is only known from 1250-1300 m altitude of the Marojezy Reserve in northeastern Madagascar. Numerous amphibian and reptile species appear to be endemic to this massif, and the same may be true for the new species. Except for MNHN 1973.931, no additional voucher specimens of *M. schilfi* were found in the MNHN collection which harbours a large collection from the Marojezy mountains. This may indicate that *M. schilfi* is a rare species. However, it appears more likely that it is simply difficult to discover by opportunistic searching, since all recently collected specimens were found only by locating calling males.

**Habitat.** Calling males were sitting at mid-day in bushes ca. 1-1.5 m above the bottom. No water body was recognized in the vicinity of the calling males. Therefore, it appears likely that *M. schilfi* has a reproductive mode which is independent from water bodies. It probably has direct development (without free swimming tadpoles) as is known for several species of the subgenus *Gephyromantis* (Blommers-Schlösser 1979, Glaw & Vences 1994).

**Advertisement calls** (Fig. 10). Vocalizations were recorded at the type locality in the Marojezy Reserve on 28 February 1995, 11:30 h, at 22.5 °C air temperature. Notes are unharmonious, distinctly pulsed and (generally) emitted in regular series. One completely analyzed note series consisted of 21 notes and had a duration of about 40 seconds. Temporal parameters (given as range, followed by mean ± standard deviation and number of measurements) are as follows: Note duration is 326-428 ms (404 ± 27 ms, n=22), interval duration 974-3607 ms (1625 ± 743 ms, n=21). Intervals between the first notes of a note series are the longest and become successively shorter until they reach a constant value (about 1000-1500 ms). Notes consist of 48-61 pulses (56 ± 4, n=8), the pulse rate is 136-155/s (142 ± 7/s, n=7). Frequency range is 2400-3900 Hz (dominant frequency 2800-3300 Hz).

**Etymology.** *Mantidactylus schilfi*, spec. nov. is dedicated from Mrs. Margot Schilf (Augsburg) to her son Prof. Dr. Wolfgang Schilf on the occasion of his 50th birthday.

**Relationships.** The relationships of *M. schilfi* are of special interest, because it shows a mosaic of characters which are typical either for the *Mantidactylus granulatus* group of the subgenus *Phyllacomantis* or for the *Mantidactylus boulengeri* group of the subgenus *Gephyromantis*. Other characters are intermediate between both groups. *M. schilfi* therefore seems to represent a connecting link between both species groups that may indicate close phylogenetic relationships between them.

- The contrasting colouration of the head sides with a distinct white band along the upper lip and a black band from the snout tip to the insertion of arms is very typical for *Mantidactylus* (*Phyllacomantis*) *granulatus*. However, most species of the *Mantidactylus boulengeri* group (subgenus *Gephyromantis*) can also have a blackish temporal region and a light band along the upper lip, although this band is less distinct and often disrupted by small dark spots.
- The lateral metatarsalia are largely or completely connected in all species of the *Mantidactylus boulengeri* group and partially or completely separated in the species of *Phyllacomantis*.

