

## A New Species of Big Black *Bolitoglossa* (Amphibia: Caudata) from Central Panamá

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A new species of *Bolitoglossa* is described from the Cordillera Central of central Panamá. This is a large black species, which is likely related to the *B. (Eladinea) schizodactyla* group of Costa Rica and Panamá. The new species, known from a single specimen, differs from other large black *Bolitoglossa* in having white pigmentation on the lower face and on the ventral portions of the head and chest. It also has more interdigital webbing than most members of the *B. (E.) schizodactyla* group.

Se describe una especie nueva de *Bolitoglossa* de la Cordillera Central en el centro de Panamá. Esta especie es grande y negra, aparentemente relacionada con el grupo *B. (Eladinea) schizodactyla* de Costa Rica y Panamá. La nueva especie, conocida solamente a partir de un espécimen, difiere de los otros miembros del grupo por poseer pigmentación blanca en la parte inferior del rostro y en las porciones ventrales de la cabeza y del pecho. Esta especie también posee membranas interdigitales más desarrolladas que la mayoría de los miembros del grupo de *B. (E.) schizodactyla*.

IN much of Central America and south into Colombia one encounters large black salamanders of the genus *Bolitoglossa*. These species are confusingly similar, and while some of them may be close relatives, as a group they do not form a clade. They range geographically and structurally from slightly webbed species, such as *B. meliana* from Guatemala (which is so deeply differentiated genetically that it is almost certainly a multispecies complex; Wake and Lynch, 1982), to the extensively webbed *B. capitana* from Colombia (Brame and Wake, 1963). In between these extremes are a number of species showing intermediate amounts of webbing. The best known of these is *B. robusta*, of Costa Rica and Panamá, but there are several other species whose distinctiveness has been recognized only recently (Hanken et al., 2005). Now another species has made its appearance, farther east than any large black salamander previously known from Panamá. The new species may be a close relative of the recently described *B. anthracina*, from western Panamá (Brame et al., 2001), but it differs from *B. anthracina* in several important respects.

### MATERIALS AND METHODS

Measurements were made using digital or dial calipers or a dissecting microscope fitted with

an ocular micrometer; standard length (SL) was measured from the anterior tip of the snout to the posterior angle of the vent. Limb interval equals the number of costal interspaces between the tips of adpressed fore- and hind limbs, measured in one-half increments (e.g., 3, 4.5). Numbers of maxillary and vomerine teeth are provided separately for right and left sides. Institutional abbreviations: MVUP, Museo de Vertebrados, Universidad de Panamá; CH, Círculo Herpetológico de Panamá.

### *Bolitoglossa copia*, new species

El Copé Giant Salamander

Figure 1

*Holotype*.—MVUP 1766, adult male, Panamá, Provincia de Coclé, Parque Nacional General de División Omar Torrijos Herrera, from near the summit of Cerro Peña Blanca, approximate UTM coordinates 0541522 0957221, 1315 m elevation, field tag number CH 5419, P. Garcés and A. M. Jiménez, 22 May 2002.

*Paratypes*.—None.

*Diagnosis*.—This large (81.5 mm SL) species is distinguished from all other large black *Bolitoglossa* by having broader and more extensively

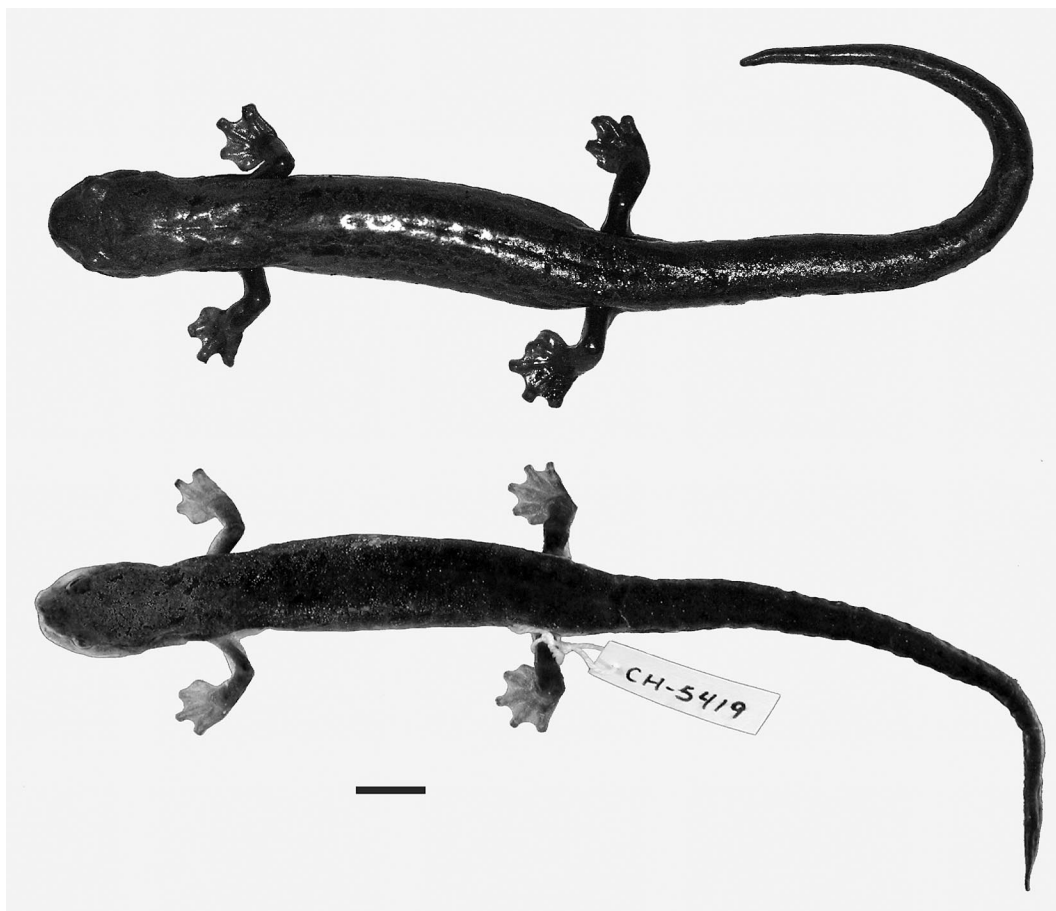


Fig. 1. Holotype of *Bolitoglossa copia*, MVUP 1766, from Cerro Peña Blanca, Provincia de Coclé, Panamá, in life (above) and preserved. Scale bar, 1 cm.

webbed hands and feet and in having white pigment surrounding the mouth and covering the entire gular and chest area. It is further distinguished externally from *B. robusta* by lacking a distinctive pale ring at the base of the tail. It has more maxillary and vomerine teeth (a total of 79 and 37 teeth in the single male, respectively) than *B. obscura* (35 and 19 in the female holotype), *B. magnifica* (means of 26 and 19 in two adult males), and *B. robusta* (means of 66 and 29 in ten adult males). It also has more maxillary teeth than *B. sombra* (mean of 34 in seven adult males) and *B. nigrescens* (mean of 54 and maximum of 73 in three adult females; females typically have more maxillary teeth than males in this genus). It has more maxillary teeth than male *B. anthracina* (66 teeth in one small adult) but fewer teeth than females (mean of 85 in two adults).

*Description.*—Known only from the holotype, an adult male. Body robust, head moderately short

and broad. Specimen was preserved with mouth open, which has left the head somewhat distorted. Snout broad, bluntly truncated. Nostrils and nasolabial protuberances small. Eyes small, not very protuberant. Discrete glandular opening in roof of mouth between internal nares. Premaxillary teeth long, slender, and unicuspid; they appear to protrude from the mouth when closed. Maxillary and vomerine teeth small. Limbs short and stout; limb interval 2.5. Hands and feet large and well developed, with stout and bluntly pointed digital tips. Digital webbing well developed; only portions of distal-most phalanges of longest digits free. Fingers, in order of decreasing length, 3–2–4–1; toes 3–4–2–5–1. Subterminal pads well developed on longer digits. Tail intact and relatively long, slightly exceeds SL; standard length divided by tail length 0.98. Postiliac gland pale and inconspicuous. Mental gland large and oval (5.3 mm wide, 4.8 mm long).

*Measurements of holotype (in millimeters).*—Head width 13.1; snout to gular fold (head length) 19.5; head depth at posterior angle of jaw 7.1 (perhaps abnormally large because of the open mouth); eyelid width 2.2; eyelid length 4.6; anterior rim of orbit to tip of snout 4.7; horizontal orbit diameter 2.9; interorbital distance between angle of eyes 6.6; interorbital distance between eyelids 4.6; distance between nuchal groove and gular fold 6.1; snout to forelimb 25.4; distance separating external nares 4.0; snout to posterior angle of vent (SL) 81.5; snout to anterior angle of vent 75.0; axilla to groin 45.8; limb interval (distance separating adpressed limbs) 2.5; tail length 83.2; tail width at base 7.9; tail depth at base 7.9; forelimb length (to tip of longest toe) 17.4; hind limb length 19.1; hand width 7.7; foot width 10.1; length of third toe 2.0; length of fifth toe 1.2. Numbers of teeth: premaxillary 5; maxillary 39–40; vomerine 18–19.

*Coloration of holotype (in alcohol).*—Dorsal and ventral coloration nearly uniformly black (Fig. 1). Superficial suffusion of obscure yellowish green (from metallic chromatophores) over head, from snout onto neck. Suffusion becomes increasingly diffuse posteriorly, fading into two ill-defined points on either dorsolateral flank behind forelimb. Face white below canthus rostralis and eye, including lower eyelid and entire region of upper and lower jaws. Few irregular and ill-defined pale whitish marks along body, laterally and dorsolaterally, give impression of obscure stripe on either side. Venter dark gray, paler anteriorly, generally paler than dorsum. Entire gular and anterior chest regions whitish (with fine punctate melanophores), and regions of anterior limb insertions pale. White pigmentation particularly evident on otherwise black animal. Abdomen gradually becomes gray, then gray-black, and finally, on tail, nearly as black as dorsum. Limbs, while dark, are lightly pigmented in the joints. Hands and feet have black digits, but more lightly pigmented interdigital webbing.

*Habitat and range.*—*Bolitoglossa copia* is known only from the type locality in the Cordillera Central of central Panamá, near the continental divide (Fig. 2). The single specimen was found inside an earthen mound in forest near the summit of Cerro Peña Blanca, the highest mountain in the region, at an elevation of approximately 1315 m.

*Remarks.*—*Bolitoglossa copia* is known only from the holotype, yet the specimen is sexually ma-

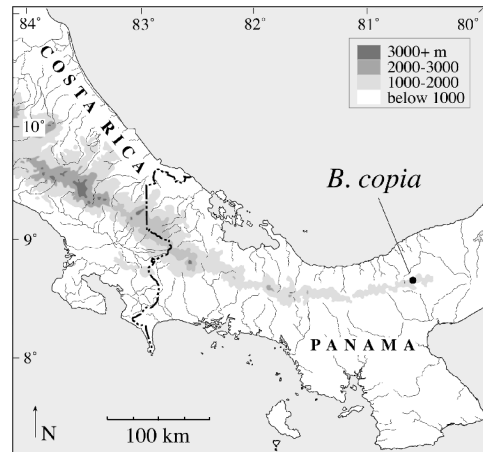


Fig. 2. Map of southeastern Costa Rica and western Panamá, showing the type locality of *Bolitoglossa copia* from Cerro Peña Blanca, Provincia de Coclé.

ture and displays adult characteristics that are unique. Nasolabial protuberances are relatively small for a male. The species is just one member of a moderately species-rich complex of large black *Bolitoglossa* in Costa Rica and Panamá, which is dealt with in detail in a companion paper (Hanken et al., 2005). Pending derivation of additional data that provide insight into its phylogenetic relationships, we assign *B. copia* to the *B. (Eladinea) schizodactyla* species group, which contains other members of the complex (Parra-Olea et al., 2004; Hanken et al., 2005). We were surprised by the recent discovery of yet one more new species of large black salamander just as we had completed a prolonged study of these animals. *Bolitoglossa copia* has the easternmost distribution of these species. Another large black salamander occurs even further east, in north central Colombia (*B. capitana*; Brame and Wake, 1963), but it is assigned to a different species group (Parra-Olea et al., 2004).

*Etymology.*—The species name is a Spanish word with several meanings, including copy or counterpart, and copiousness, in reference to the many similar species of large black salamanders with which *B. copia* might be confused. The name is also reminiscent of the nearby town of El Copé. Finally, the name is an indirect tribute to the pioneer student of plethodontid salamanders and describer of the first-named big black *Bolitoglossa* (*B. robusta*), Edward Drinker Cope, for whom this journal is named.

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