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A NEW SPECIES OF SALAMANDER FROM COLOMBIA AND THE STATUS OF *GEOTRITON ANDICOLA* POSADA ARANGO

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Emmett R. Dunn, in the addenda to his monograph of the family Plethodontidae (1926), briefly discussed six salamander specimens located in the British Museum (BM) that he assigned to *Oedipus platydactylus* (= *Bolitoglossa platydactyla*). Three of these, one from San Carlos, Costa Rica, and two from Medellín, Colombia, are of interest since the localities are far south of the known range of *B. platydactyla* (southern Mexico and northern Central America). Dunn stated that the San Carlos specimen "is certainly *platydactylus* rather than any other described form," but he also mentioned deviation in the color pattern from typical *platydactyla*. He discussed the coloration of the Medellín specimens and concluded that "These may represent an undescribed form, but as with the San Carlos specimen they are *platydactylus* rather than any other known species." We have recently examined the material discussed by Dunn in conjunction with our studies of the plethodontid salamanders. The Costa Rican specimen closely fits the description of *Bolitoglossa alvaradoi* described by Taylor (1954) and we assign it to that species. The Medellín specimens differ markedly from both *B. platydactyla* and *B. alvaradoi* and doubtless represent an undescribed species. In reference to the characteristic color pattern we propose that it be known as:

*Bolitoglossa phalarosoma*³, new species
Fig. 1

Oedipus platydactylus (part), Dunn, 1926: 440.

HOLOTYPE: BM 97.11.12.22; an adult female from Medellín, Depart-

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³From the Greek, *phalaros* (having a white patch) and *omos* (shoulder).



mento de Antioquia, Colombia, collected by a Mr. Pratt. The altitude of Medellín is 5,045 feet (1538 m.).

PARATYPE: BM 97.11.12.21; a male, same data as holotype.

DIAGNOSIS: A medium-sized species distinguished from all other South American salamanders by: flattened, fully webbed feet (Fig. 1); head narrower relative to body length than in other species; moderate numbers of maxillary teeth; and a characteristic color pattern consisting of a uniform dark ground color spotted along the sides of the head and over the shoulders by two series of large white patches (Fig. 1). The nearest relative is *B. alvaradoi* of Costa Rica, a larger species having a wider head, longer limbs and more maxillary teeth.

DESCRIPTION OF THE HOLOTYPE, adult female: snout moderately long, blunt tipped; nostril small, the labial protuberances moderate; canthus rostralis arched, poorly defined. Snout-vent length 8 times head width, 4.8 times snout-gular fold length; postorbital groove indistinct, extending posteriorly from eye as small depression for 3.6 mm., sharply proceeding ventrally and extending across gular area parallel to and 4.8 mm. anterior to gular fold. Vomerine teeth 12-11, extending to lateral border of internal nares. Maxillary teeth 20-23, extending posteriorly nearly to posterior border of eye. Two premaxillary teeth, not piercing lip. Tail missing. Post-iliac gland very poorly indicated. Limbs short, allowing four and one-half costal folds to remain uncovered when appressed to sides of trunk; snout-vent length 5.4 times right fore limb, 4.8 times right hind limb. Webbing of hand and foot (Fig. 1) complete; digits flattened, the tips of longer digits extending as small pointed tips from webbed pad. Fingers in order of decreasing length: 3,2,4,1; toes in order of decreasing length: 3,4,2,5,1.

Measurements in millimeters: Head width 7.3; snout-gular fold (head length) 12.2; head depth at posterior angle of jaw 3.6; eyelid length 3.3; eyelid width 1.6; anterior rim of orbit to snout 3.8; horizontal orbital diameter 2.2; interorbital distance 2.7; distance between vomerine teeth and parasphenoid tooth patch 0.6; snout to fore limb 15.8; distance separating internal nares 2.2; distance separating external nares 2.7; snout projection beyond mandible 1.2; snout to posterior angle of vent 58.2; snout to anterior angle of vent 55.0; axilla-groin length 34.2; fore limb length 10.8; hind limb length 12.2; width of right hand 3.8; width of right foot 4.6.

Coloration in alcohol: ground color of dorsum of head and trunk uniform blackish brown overlain by a single row of large white anastomosing patches on either side (Fig. 1), most conspicuous in neck region and over shoulder. White patches dorso-lateral in position, each larger than eyes, the first patch located immediately posterior to eye on either side, other patches extending to level of sixth costal fold on left, ninth on right side, one patch located immediately dorsal to insertion of right hind limb.

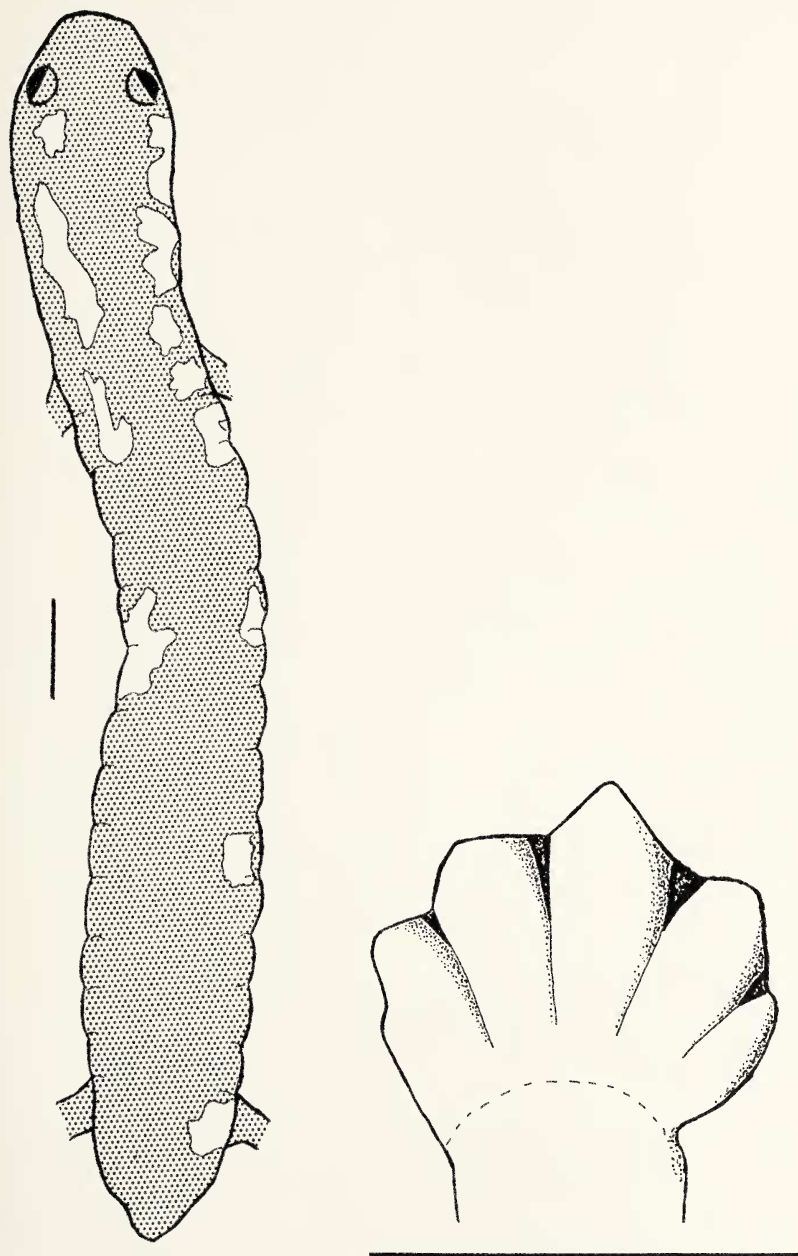


Fig. 1. Left: Color pattern of the holotype (BM 97.11.12.22) of *Bolitoglossa phalarosoma*; Right: Left foot of *B. phalarosoma* (MLaS 6). Lines equal 5 mm.

Markings absent on mid-dorsal line. Venter uniform dark brown, only slightly lighter than dorsum; gular region uniform brown, lighter than trunk venter. Limbs uniform dark brown. Post-iliac spots only faintly indicated.

VARIATION: Pertinent information concerning the male paratype follows: vomerine teeth 10-11; maxillary teeth 16-14; premaxillary teeth 3, piercing lip. Measurements in millimeters: head width 6.5; snout-gular fold (head length) 10.0; head depth at posterior angle of jaw 3.3; eyelid length 2.9; eyelid width 1.3; anterior rim of orbit to snout 2.9; horizontal orbital diameter 2.1; interorbital distance 2.6; distance between vomerine teeth and parasphenoid tooth patch 0.45; snout to forelimb 14.0; distance separating internal nares 1.7; distance separating external nares 2.1; snout projection beyond mandible 1.0; snout to posterior angle of vent 46.8; snout to anterior angle of vent 44.8; axilla-groin length 26.3; fore limb length 9.3; hind limb length 10.6; wide of right hand 2.8; width of right foot 5.1.

The paratype (in alcohol) is similar in color to the holotype but the ground colors are darker and the white patches less extensive. The first white patch on the right originates on the eyelid while the last right patch is anterior to the insertion of the fore limb. Only three large patches are present on the right side and two on the left. The most posterior patch is on the left and is located dorsal to the insertion of the fore limb.

An additional specimen from the Museo de La Salle, Bogotá, Colombia (MLaS 6) is assigned to *B. phalarosoma*. The only information concerning collecting locality is that the specimen is from "Antioquia," the name of both a Colombian city and Departamento. The individual differs from the type specimens in having a slightly wider head in proportion to body length and in lacking any white spots on the body. Pertinent information on the adult male follows: vomerine teeth not countable (inside of mouth damaged); maxillary teeth 26-25; premaxillary teeth 0. Measurements in millimeters: head width 7.5; snout-gular fold (head length) 12.0; snout to posterior angle of vent 55.8; axilla-groin length 31.5; fore limb length 10.9; hind limb length 11.8; width of right foot 5.1. In alcohol the dorsal surfaces are uniform blackish brown. The ventral surfaces of the head and trunk are a lighter grayish brown, although the ventral surface of the tail is darker.

RELATIONSHIPS

Bolitoglossa phalarosoma differs from all other South American members of the genus in its striking color pattern. In addition, it is easily distinguished from the *B. palmata* group by its longer snout and flat, fully-webbed hands and feet. The fully-webbed hands and feet also separate it from *B. adspersa*. It differs from *B. borburata* in having differently shaped hands and feet, fewer maxillary teeth, and a narrower head. The fully-webbed salamanders of the Amazon drainage, tentatively

assigned to *B. altamazonica*, are smaller and have shorter snouts. Several undescribed South American forms differ strikingly from *B. phalarosoma* in characters associated with webbing and coloration. There appears to be no close relationship between *B. phalarosoma* and any other South American species.

Several species of *Bolitoglossa* are known from southern Central America. *B. phalarosoma* differs from the large *B. lignicolor* in size, color pattern, and in having a much narrower head; from *B. striatula* in color and in having a narrower head; from *B. colonnea* in color, in having maxillary teeth, and in lacking the dermal interorbital ridge; from *B. arborescandens* in color, in smaller size, and proportions; from *B. flaviventris* in color, particularly ventral color, in smaller size, in proportions, in having fewer vomerine teeth, and in characters of the webbing of hands and feet. The specimens from Medellín were called *Oedipus platydactylus* (= *B. platydactyla*) by Dunn (1926), but there are numerous differences between *B. phalarosoma* and *B. platydactyla*, including size and proportional differences, and differences associated with the webbing of the hands and feet. *B. platydactyla* is a larger species that has a proportionally wider head. The web is fuller in *B. phalarosoma*, the foot flatter, and the digits are less demarcated. *B. platydactyla* has a dark ground color and a solid dorsal band of orange to orange-brown with a few irregular spots of ground color showing through. No band is present in *B. phalarosoma*, and the whitish color that is present is spotted on the dark ground color. Little evidence can be seen of relationship of *B. phalarosoma* to any of the above species.

Some evidence is seen of a relationship between *B. phalarosoma* and *B. alvaradoi*, a species known only from San Carlos, Provincia de Alajuela, and Moravia de Chirripó, Provincia de Limón, Costa Rica. The species are similar in basic color pattern, although *B. alvaradoi* has larger patches of color which are more extensive and less regularly placed than in *B. phalarosoma* (see Taylor, 1954, fig. 2). The extent of webbing and shape of the hands and feet are similar in the two species. Several differences between the species indicate that the relationship is not close. *B. alvaradoi* is a larger species with a wider head, longer limbs, and more maxillary teeth (proportional to snout-vent length). Five specimens of *B. alvaradoi* ranging in size from 46 to 77 mm. in snout-vent length have a total of from 59 to 89 maxillary teeth (versus 30 to 51 in *B. phalarosoma* at from 46.8 to 58.2 mm. snout-vent length). In two animals of comparable size the head is wider in *B. alvaradoi* (7.2 mm. at 46 mm. snout-vent length) than in *B. phalarosoma* (6.5 mm. at 46.8 mm. snout-vent length). Color serves as an indicator of relationships in other genera of salamanders (*Desmognathus* and *Plethodon*). On the basis of similarity of color and shape of hands and feet we believe *B. phalarosoma* is closer to *B. alvaradoi* than to any other species.

THE STATUS OF *Geotriton andicola* POSADA ARANGO

In 1909 Posada Arango described a new species of salamander, *Geotriton andicola*, from Colombia. The description contained no designation of a type or a type locality, although the paper was addressed from Medellín, Colombia. None of the material examined by Posada Arango is extant, and there is no record of anyone examining the material subsequent to publication of the description. Posada Arango described adult (66 mm. snout-vent length) *andicola* as being an intense and uniform black dorsally with some whitish spots on the venter; the young were bronze dorsally, black on the sides, and reddish on the throat. The species was compared only with *Geotriton fuscus* (= *Hydromantes italicus*) from Italy and the comparison dealt only in generalities, although the foot of *andicola* was said to resemble closely that of the Italian species. Apparently Posada Arango was unaware of the earlier description by Peters (1863) of *Spelerpes (Oedipus) adpersus* (= *Bolitoglossa adpersa*) from Bogotá, Departamento de Cundinamarca, Colombia, because he made no mention of it.

Since several species of *Bolitoglossa* occur in Colombia, we have attempted to assign the two available names, *adpersa* and *andicola*, to the appropriate populations. The syntypic series of *B. adpersa* was examined by Brame at the Berlin Museum, and the salamanders from the immediate vicinity of Bogotá are all assignable to that species. Dunn (1926) considered *andicola* to be a synonym of *adpersa*, but in 1944 he referred certain salamanders from the Bogotá area to *andicola* and presented a key for distinguishing the two species. The *andicola* of Dunn (1944) was said to be a larger form (males to 70 mm., snout-vent length), with a uniform dark dorsal color pattern or a broad, light dorsal band, and two costal interspaces between appressed limbs. According to Dunn, *adpersa* was smaller (male to 53 mm., snout-vent length, female to 70 mm.) with a color pattern consisting of light dashes or streaks on a dark background, and four to five costal interspaces between appressed limbs.

We have examined the salamander material in the collections of the Instituto de Ciencias Naturales and the Instituto de La Salle, both of Bogotá, including material seen by Dunn, and are unable to recognize more than one species in the Bogotá area. Large specimens of *adpersa* occasionally lack the characteristic streaked color pattern and appear uniformly dark dorsally. Posada Arango made no mention of a broad, light dorsal band, nor have we seen any specimens from the Bogotá area with such coloration. The number of costal interspaces between appressed limbs is highly variable in *adpersa* and is related to both age and sex, ranging from two to five in a given population. Large adult males tend to have longer legs than females of the same size, and males and females from the same locality may have two and four costal interspaces between appressed limbs, respectively. Adult size in *adpersa* varies from region

to region. The *adpersa* from San Miguel and Tequendema Falls near Bogotá (called *andicola* by Dunn) are very large, (63 to 69.1 mm. snout-vent length in four specimens) but large *adpersa* also occur in the Monserrate-Arrayán region and are similar to smaller *adpersa* in all characters except size. Uniform dark dorsal coloration is rare in both large and small *adpersa*, although uniformity of color pattern (black) is seen in most specimens from Páramo de Palacio, near Bogotá. The salamanders from the Bogotá area assigned by Dunn to *andicola* are, in our opinion, large individuals of *B. adpersa*.

Several species other than *adpersa* occur in Colombia. Of these, only one attains a size as large as that attributed to the species described by Posada Arango. Nicéforo María (1958) presented a photograph of a specimen assigned by him to *B. andicola*. We have examined his material and find it represents an unknown species to be described by the authors at a later date. Members of this species are large (exceeding the size given by Posada Arango for *andicola*), are uniformly black with no whitish markings, and have fully webbed feet.

B. adpersa occasionally exceeds the size of the specimens measured by Posada Arango. Posada Arango's color description fits some large *adpersa*, although *adpersa* is usually dark brownish black with extensive streaks or stripes of bronze. A small number of individuals are uniformly black. There is no sign of reddish color on the throat or other ventral surfaces in young specimens. Whitish spots are occasionally found but they are lateral in position and are not common ventrally. The foot of *andicola* was said to resemble that of *Hydromantes italicus*. The foot of *adpersa* is not fully webbed and approaches the condition seen in *H. italicus*.

None of the several smaller species that occur in Colombia fit Posada's color description of *andicola*. *B. phalarosoma*, in addition to being smaller and having a different color pattern, also has a different foot shape. Examination of all extant Colombian salamander material leads us to consider *Geotriton andicola* Posada Arango as a synonym of *Bolitoglossa adpersa* Peters, on the basis of coloration in some larger specimens of *Bolitoglossa adpersa* (especially from San Miguel) with similar maximum size, and similar foot shape.

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SUMMARY

A new Colombian species of plethodontid salamander, *Bolitoglossa phalarosoma*, is described from material long confused with *B. platydactyla*. The new species is apparently related neither to *B. platydactyla* and its relatives of Mexico and northern Central America nor to any South American members of the genus. The closest relative of *B. phalarosoma* appears to be *B. alvaradoi* of Costa Rica.

The status of *Geotriton andicola* from Colombia is discussed, and the name is placed in the synonymy of *B. adspersa*.

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