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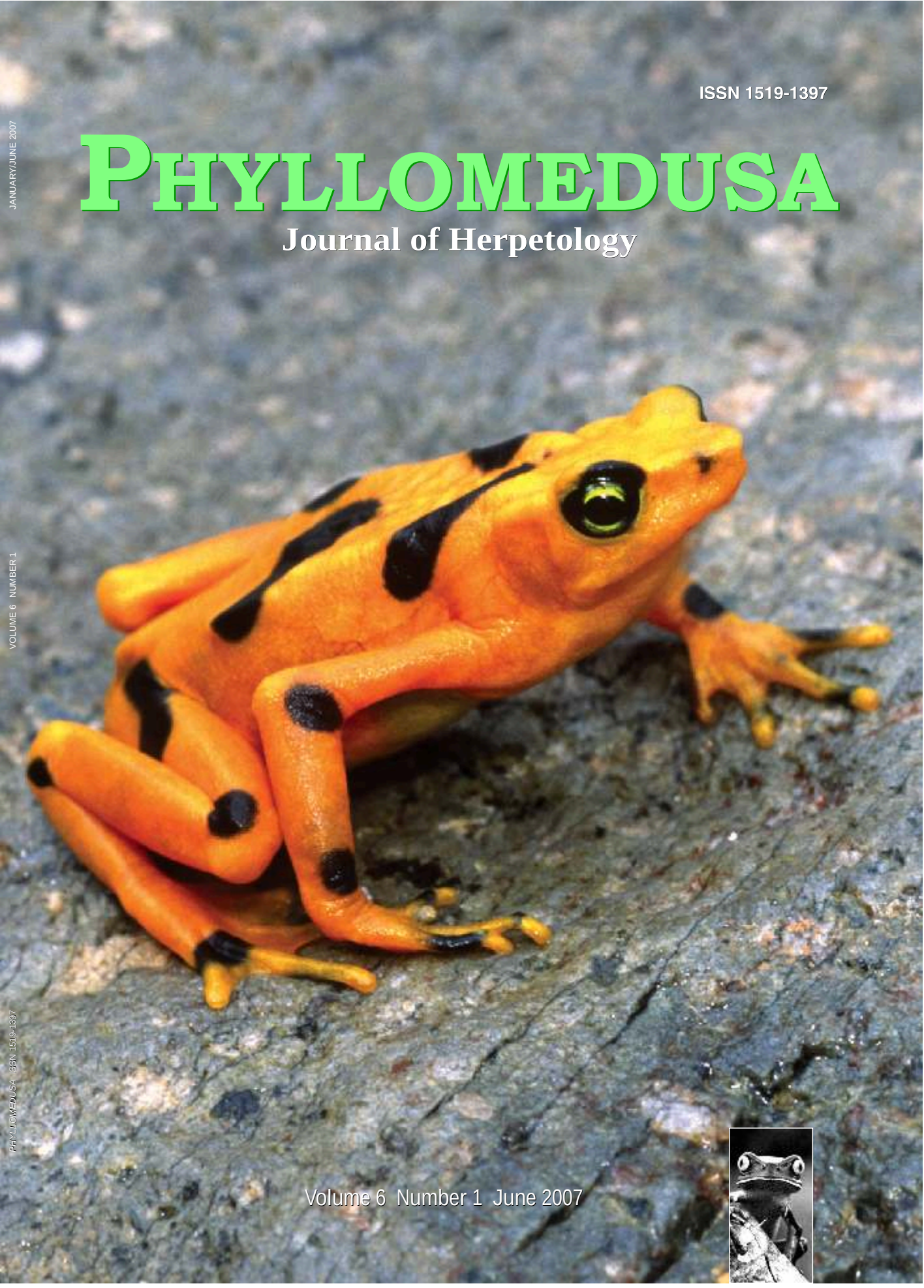

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Editorial

Phyllomedusa – Journal of Neotropical Herpetology celebrates the completion of 5 successful years of uninterrupted contributions to the field of Herpetology. During this period, the journal has attracted the attention of herpetologists from Latin America, as well as from North America, Europe, and Australia. A total of 170 authors from 16 countries have chosen PHYLLOMEDUSA for their scientific communications. Of the 14 new species were described in our pages, three were frogs, two amphisbaenians, three lizards, and six snakes.

The journal's success seems to have resulted from (1) the high quality of its editorial board, which includes active members of scientific community from several different countries, such as Argentina, Austria, Brazil, Canada, Mexico, and USA; (2) the fact that PHYLLOMEDUSA papers can be retrieved from many important reference indexes and databases, such as Biological Abstracts, Zoological Record, CABI Publishing, Elsevier Science Bibliographic Databases, The Reptile Database, Bibliomania's Herpetological Contents, and Herpetological Literature Database; (3) the wide scope of the journal, which publishes papers in all fields of Herpetology; and (4) the availability of all papers at journal's website prior to the distribution of its printed version.

PHYLLOMEDUSA is broadening its geographical scope to reflect the globalization of its contributors and their interests. From now on, papers will be published on taxa from the Neotropics, as well as the rest of the world. Accordingly, the name of the journal is changing to **PHYLLOMEDUSA – Journal of Herpetology**, and the Editorial Board has incorporated new Associate Editors to represent scientific communities from other zoogeographic regions. There is a total of 20 internationally recognized herpetologists from 11 countries and three continents. The diversity of this group will enhance scientific communication among herpetologists around the world, and this should be the primary goal of any scientific periodical.

Many people greatly assisted the staff of PHYLLOMEDUSA during its first 5 years of publication, and we owe a debt of gratitude to each of them. I am especially indebted to two colleagues in particular. André Nemésio convinced me to create PHYLLOMEDUSA and published it for the first 3 years during difficult times. Pedro Rocha, applied his intelligence, discipline, and expertise to the process of manuscript evaluation, and immeasurably enhanced the quality of the published material. A first-class journal depends entirely on the quality of its authors, editorial board members, and *ad hoc* referees, and PHYLLOMEDUSA always counted on many of the best ones indeed. Associate editors who have served during these past 5 years have contributed greatly to the quality of the journal and made my life every so much easier. Finally, I wish to thank subscribers for their support and many libraries around the world that have included PHYLLOMEDUSA in their collections. Idmar Pedro is the designer responsible for the extraordinary graphic quality of the journal, and Fábio A. Bazanelli is gratefully acknowledged for his voluntary work as web designer and webmaster.

Financial support was provided by UFMG – Universidade Federal de Minas Gerais (2002–2004), USP – Universidade de São Paulo (since 2005), FEALQ – Fundação de Estudos Agrários Luiz de Queiroz (since 2005), CNPq – Conselho Nacional de Desenvolvimento Científico e Tecnológico (2003), FAPESB – Fundação de Amparo à Pesquisa do Estado da Bahia (2007) and some private institutions. Richard Vogt helped us obtain funds on several occasions. Breck Bartholomew deserves my most sincere acknowledgements for his continuous help accepting international subscriptions and divulging PHYLLOMEDUSA since 2003.

My last acknowledgements are extended to the new Associate Editors, who have accepted my invitation and have joined PHYLLOMEDUSA in its mission of serving as an international outlet for original herpetological research.

Jaime Bertoluci
Editor

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A striking new species of *Anolis* lizard (Squamata, Iguania) from Panama

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Abstract

A striking new species of *Anolis* lizard (Squamata, Iguania) from Panama. Here we describe a new *Anolis* lizard from Panama. The new form is most similar to South American *Anolis mirus* and *Anolis parilis* but differs in characters of color pattern and scalation. The new species appears to be a close relative of other large mainland Alpha *Anolis* (*latifrons* group; "*Dactyloa*").

Keywords: Squamata, Iguania, *Anolis kunayalae* sp. nov., systematics, Panama.

Resumen

Una especie nueva y llamativa de lagartija *Anolis* (Squamata, Iguania) de Panamá. Aquí describimos una especie nueva de lagartija *Anolis* de Panamá. Esta forma nueva es más similar a *Anolis mirus* y *A. parilis* de América del Sur, pero difiere en caracteres del patrón de color y de escamas. La especie nueva parece ser un pariente cercano de otras *Anolis* Alfa grandes de tierra firme (grupo *latifrons*; *Dactyloa*).

Palabras clave: Squamata, Iguania, *Anolis kunayalae* sp. nov., sistemática, Panamá.

Introduction

The distinctive species *A. mirus* was described from a single specimen with the locality "Rio San Juan Colombia" by E. E. Williams (1963). Later Williams (1975) described *A. parilis*, a close relative of *A. mirus*, based on a single specimen from "Rio Baba, 2.4 km S Sto Domingo de los Colorados, Pichincha, Ecuador". These species share a unique morphology of the fourth toe, including few lamellae, indistinct toepad, and an especially large claw (see Figure 1 of Williams 1963). Recent fieldwork near El Copé, Panama has provided multiple specimens of a striking *Anolis* possessing this same toe morphology but differing from *A. mirus* and *A. parilis* in color pattern and other characteristics. Here we describe this form from moderate elevations in central Panama as a new species.

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Material and Methods

We consider species to be evolutionary lineages (Simpson 1961, Wiley 1978), and operationalize this concept by identifying species based on consistent differences between populations (Frost and Kluge 1994). That is, we hypothesize that populations that are diagnosable by major differences in the

frequencies of traits are distinct evolutionary lineages, or species (Wiens and Servedio 2000).

Measurements were made with digital calipers to the nearest 0.1 mm. Snout to vent length (SVL) was measured from tip of snout to anterior of cloaca. Head length was measured from tip of snout to anterior of ear. Head width was measured at the posteroventral corners of the jugal. Femoral length (FL) was measured from midline of body to knee. Ear height (EH) was measured vertically on the ear. Scale terminology follows Williams *et al*. (1995). Osteological terminology follows Etheridge (1959) and Poe (1998). We compared specimens of the new species to holotypes of probable close relatives (*Anolis mirus* – University of Illinois Museum of Natural History [UIMNH] 82901; *Anolis parilis* – British Museum of Natural History [BMNH] 1910.7.11.5).

Species Description

Anolis kunayalae sp. nov.
(Figures 1-4)

Holotype - Museum of Southwestern Biology (MSB) 72605 (adult male) collected along the trails of Parque Nacional General de División Omar Torrijos Herrera, 5 km north of El Copé, Coclé Province, Panama (8°40.315' N, 80°35.518' W), by Steven Poe, Erik Hulebak, and Heather MacInnes on August 5-8, 2004.

Paratypes - MSB 72603 (hatchling female) and MSB 72604 (sub-adult female), collected in same locality as holotype by Steven Poe on December 24-25, 2003; MSB 72606 (hatchling female), POE 1622 (juvenile female), MSB 72607 (adult male), MSB 72608 (adult female), collected in same locality as holotype by Steven Poe, Erik Hulebak, and Heather MacInnes on August 5-8, 2004; MSB 72609 (adult male, skeleton), same locality and collectors on August 10, 2004; MSB 72610 (sub-adult male), same locality and collectors on August 3, 2005; MSB 72611 (adult female), same locality, collected by Steven Poe on September 14, 2005; MSB 72612 (adult male), same locality and collector on September 14, 2005; MSB 72613 (adult male), same locality and collector on September 15, 2005; MCZ 185295, same locality and collector on September 16, 2005; MSB 72614 (hatchling female), same locality and collector on September 18, 2005; Círculo Herpetológico de Panamá (CHP) 4513 (adult male), collected in Cerro Bruja, Provincia de Colón (9°27'31" N, 79°34'28" W), by Iván Domínguez on January 27, 1997; CHP 5505 (adult male), same locality as MSB 72604, collected by Karen Lips on July 3, 2002; CHP 5880 (sub-adult male), same locality as holotype, collected by Karen Lips June 2, 2004; MVUP 1721 (adult female), collected at a stream northeast of the sawmill, north of El Copé, Coclé Province, Panama (8°40'05" N, 80°35'33" W) by César Jaramillo, Fidel Jaramillo, Roberto Ibáñez and Fernando Crastz on February 7, 1981; USNM 521924 (adult male) collected at Nusagandi, Comarca de San Blas or Kuna Yala, Panama, (9°20'28" N, 78°59'39" W), by Kyle Summers on September 1, 1991.

Etymology - The name *Anolis kunayalae* gives homage to the native Kuna Yala people of Panama and refers to the locality of one of the paratype specimens.

<u>*Diagnosis*</u> - *Anolis kunayalae*, *A. mirus* and *A. parilis* are the only *Anolis* with a unique fourth toe that includes: a narrow toe pad (*Norops* condition), reduced number of lamellae under phalanges ii and iii of the fourth toe relative to SVL (12-15; Williams 1963: Table 2), and distal phalanx (including claw) longer than phalanges ii and iii combined (see Figure 1 of Williams 1963). *Anolis kunayalae* differs from *A. mirus* and *A. parilis* in dorsolateral pattern of preserved males (*A. kunayalae*: dark brown with small white posteriorly directed diagonal stripes and ocelli; *A. mirus*: dark brown with indistinct oblique rows of small light dots on sides of body; *A. parilis*: red-brown with a narrow black middorsal line and black mottling tending to transverse banding on side of neck

Figure 1 - Male *Anolis kunayalae* sp. nov.

Figure 3 - Female *Anolis kunayalae* sp. nov. (note enlarged claw on 4th toe).

Figure 2 - Dewlap of male *Anolis kunayalae* sp. nov.

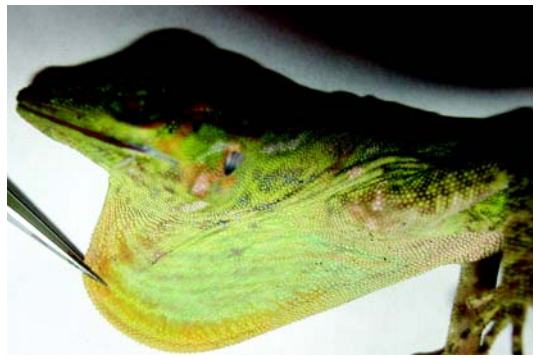

Figure 4 - Dewlap of female *A. kunayalae* sp. nov.

and lower flanks). *Anolis kunayalae* further differs from *A. mirus* in possessing smooth ventral scales (keeled in *A. mirus*) and scales around the interparietal gradually enlarged relative to temporals and dorsals (abruptly enlarged in *A. mirus*). *Anolis kunayalae* further differs from *A. parilis* in possessing two slightly projecting, enlarged, conical to triangular, keeled middorsal scale rows in males (middorsals smooth in *A. parilis*) and a distinct temporal line of scales (indistinct in *A. parilis*). *Anolis kunayalae* also may be distinguished by its extraordinarily prominent nuchal crest in some males (Figure 1). This trait is not present in preserved *A. mirus* and *A. parilis* but we cannot be certain that these species do not possess a distendable nuchal crest in life.

Description of Holotype (*paratype variation in parentheses, hatchlings not included*) - Snout to vent length 95.4 mm (81.0-109.3 mm); head length 25.1 mm (21.1-27.9 mm), width 15.1 mm (12.3-17.8 mm); ear height 1.9 (1.9-3.0 mm); femoral length 26. 6 mm (20.5-30.0 mm); tail length 221 mm (160-253 mm).

Overall appearance is stout, with robust limbs and broad body; large nuchal crest (present or absent); dorsal head scales mostly smooth but keeled anteriorly; weak frontal depression; 15 (12-17) scales across snout between second canthals; 4 (4-5) scales between supraorbital semicircles; 1 (0-1) slightly elongated supercilliary scales followed posteriorly by several small scales; 9 (6-9) loreal rows; circumnasal separated from rostral by one scale; interparietal length 1.2 mm (0.8-1.8); 4 (3-6) scales separating interparietal and supraorbital semicircles; 8 (8-10) supralabials to center of eye; 1 (0-1, majority contact) row of scales separate suboculars and supralabials; 7 (6-8) postmentals; 7 (6-9) postrostrals; scales in supraocular disc about equal in size; mental is

concave posteromedially, partially divided, even with rostral laterally (extending posterolaterally beyond rostral in most specimens); 2 (1-4) sublabials enlarged along infralabials; large dewlap reaches posterior to axillae in males, with 4-5 (4-6) rows of scales, each row of scales two to four scales wide (smaller in female paratypes); two slightly enlarged postcloacal scales (absent in females, present in males).

Dorsal scales granular and separated, with 2 middorsal scale rows slightly projecting, enlarged, triangular to conical, and unicariate, 9 scales (9-11) counted longitudinally in 5% of SVL; flank scales granular and separated or juxtaposed; ventral scales smooth and juxtaposed to subimbricate, 10 (8-13) scales in 5% of SVL, in transverse rows.

Dorsal limb scales distal from the knee and along the anterior of the femur are unicarinate and subimbricate, posterior scales smaller and granular along femur, supradigitals and heel multicarinate; narrow toepads, not distinct; 12 (11-15) lamellae under second and third phalanges of fourth toe, distal phalanx longer than phalanges ii and iii combined; fourth toe reaches beyond eye when hindleg pressed against body; tail with keeled scales and a double middorsal row grading into a single row posteriorly.

Skeletal description (based on MSB 72609 and MSB 72611) - Parietal roof flat, V-shaped, without casque, lacking crenulation on edges, anterolateral corners reach posterolateral corners of frontal; pineal foramen at parietal-frontal suture; slightly rugose on dorsal of skull bones; postfrontal present; frontal sutures anteriorly with nasals; slight longitudinal crests on nasals; external nares bordered posteriorly by nasals; dorsal aspect of jugal terminates on lateral surface of postorbital; no jugal-squamosal contact; posteroventral corner of jugal is anterior to posterior edge of jugal; epipterygoid contacts parietal; pterygoid and palatine teeth absent; lateral edge of vomer is smooth; maxilla extends posteriorly beyond ectopterygoid; no basipterygoid crest; no lateral shelf of quadrate; black pigment present around pineal foramen but not on majority of dorsal surfaces; nasals flush with premaxilla, not overlapping; posterior dorsal surface of skull flat, not angled inferiorly; mandibular toothline extends posterior to anterior mylohyoid foramen; angular process of articular present, large; posterior suture of dentary pronged; anteriormost aspect of posterior border of dentary even with mandibular fossa on one side, anterior to fossa on other; splenial present; ventral aspect of anteromedial process of coronoid extends anteriorly; external opening of surangular foramen entirely within surangular; labial process of coronoid present; coronoid does not extend posterolaterally beyond surangular foramen; no jaw sculpturing; no angular.

Five postxiphisternal ribs, all attached to dorsal ribs (5:0 rib formula), three sternal and two xiphisternal ribs (see Etheridge 1959: Figure 4d); caudal vertebrae with posterolaterally directed transverse processes anteriorly, gradually lost posteriorly (Alpha condition); interclavicle in contact with medial 80% of clavicle, free at distal end ("arrow shaped"); 23 presacral vertebrae; 3 lumbar vertebrae; autotomy septa not evident on caudal vertebrae.

Color in life of male (from field notes and photos in life) - Dorsum green; flanks and sides of neck aqua blue with thin broken yellow-green or white lines within; reddish brown on dorsum of head; reddish brown spot posterior to eye; iris reddish-brown; eyelid blue-green; throat black with tan tongue and white along edges of mouth; chin, upper and lower lips pale greenish-yellow, dewlap skin white with green tint proximal and orange along anterior border, with multiple rows of yellow-green or blue scales; midventer greenish-white; ventral surface of hindlegs greenish-white; tail green with brown-black bands; alternating tones of green-yellow and dark green bands visible on anterior of limbs and digits; yellow-green under skin folds at front shoulder; alternating tones of dark green and green-yellow along middorsal.

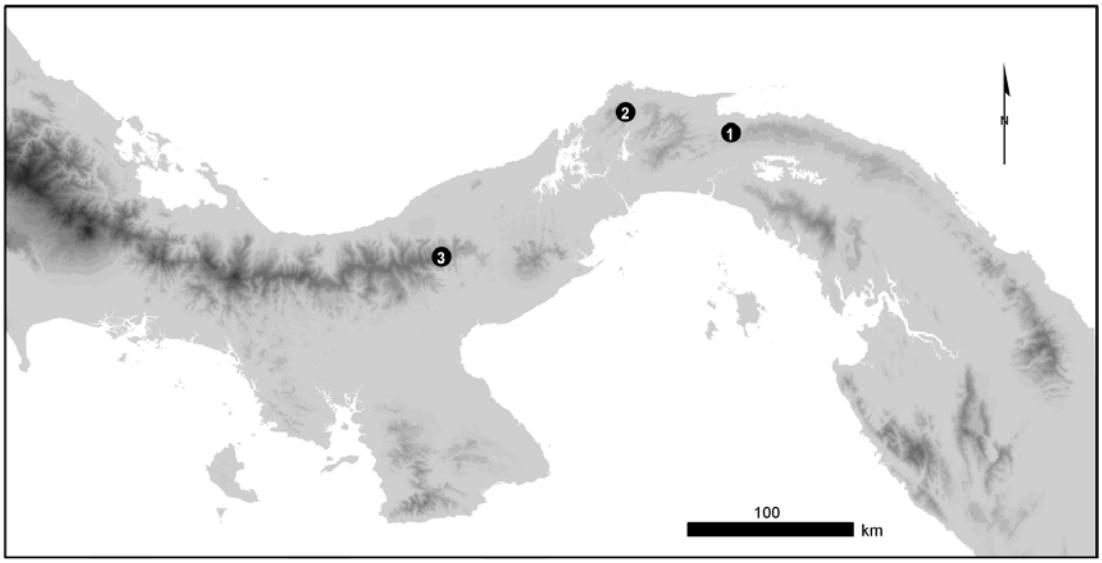

Figure 5 - Distribution of *Anolis kunayalae* sp. nov.: (1) Nusagandi, (2) Cerro Bruja, and (3) north of El Copé, Parque Nacional General de División Omar Torrijos Herrera.

Color in life of female (from field notes and photos in life) - Coloration of females is very different from males (Figure 2), which may initially lead one to believe these lizards are not the same species. Female dorsum overall lighter green than male, solid or broken white bands traverse flanks and neck along with black or black with green-centered ocelli, creating alternating patterns of black, green, and white along middorsal rows, smaller blue and blue-white ocelli are also present; anterior dorsum of head reddish-brown; iris red; eyelid white, blue, and green; throat black with tan tongue and white along edges of mouth; chin, upper and lower lips pale green to greenish-yellow; female dewlap yellow-orange border with multiple scale rows of similar color and white skin with a blue-green tint (Figure 4); midventer greenish-white; alternating tones of green-yellow and dark green bands present on anterior of limbs and digits; tail green with dark brown-black bands. Hatchling females are identical in color pattern to female adults, including dewlap color.

Habitat and distribution - The new species is known from three moderate elevation sites in central Panama: Nasagundi (at 370 m elevation) in Kuna Yala, Cerro Bruja (at 800 m elevation) in Colón Province, and Parque Nacional General de División Omar Torrijos Herrera (at 744 m elevation) in Coclé Province (Figure 5).

Most *A. kunayalae* were collected in primary and secondary wet forest sleeping on twigs or leaves at night 1-3 m high.

Discussion

Anolis kunayalae is unlikely to be confused with any other Central American lizard due to its unique color pattern (Figures 1-4). The blue anterior wash and dewlap color pattern of males are especially distinctive. *Anolis mirus* and *A. parilis* are the only species that are morphologically similar to *A. kunayalae*, and these species are amply distinct from *A. kunayalae* (see diagnosis) and found over 600 km southeast of its easternmost known locality

(see Figure 6 of Williams 1975).

The character states of *A. kunayalae* of high inscriptional rib formula (5:0), lack of caudal autotomy, alpha-type caudal vertebrae, presence of splenial, large size, rows of multiple scales on the dewlap, and presence of a double row of dorsal caudal scales are shared by members of a basal clade of large South American Alpha *Anolis* (Poe 2004) that is informally called the *latifrons* group sensu stricto (Williams 1976). This group is part of Etheridge's (1959) larger *latifrons* group, called *Dactyloa* by Guyer and Savage (1986). Nicholson *et al.* (2005) included *A. kunayalae* (CHP 5505, their "New Species 1"; Nicholson, pers. comm.) in phylogenetic analysis of mitochondrial DNA sequences and found it to nest within this group.

The unique morphology of the fourth toe and other shared character states such as extensive lateral skin folds on the neck, large number of scale rows between supraorbital semicircles, and large number of supralabial scales (see Table 1 of Williams 1975) suggest that the closest relatives of *A. kunayalae* are likely to be *A. mirus* and *A. parilis*, which have not yet been included in phylogenetic analysis. We are analyzing these three species in ongoing phylogenetic analyses of *Anolis*.

Acknowledgements

We acknowledge the effort of the Republic of Panama for protecting habitat that maintains populations of *Anolis* that continue to be discovered. Thanks to Caleb Hickman, Heather MacInnes, César Jaramillo, Fidel Jaramillo, Kyle Summers, Karen Lips, Iván Domínguez, and Fernando Crastz for collecting lizards and providing information for use in this manuscript. Thank you to Eric Schaad for review and comments on the manuscript. Thanks to the Smithsonian Tropical Research Institute and the Autoridad Nacional del Ambiente for collecting and export permits (No. SE/A-70-03, No. SE/A-73-05).

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Call for Symposium Proposals

On behalf of the 6th World Congress of Herpetology Organizing Committee, we would like to invite colleagues to organize and propose symposia. Proposals should state clearly that the symposium organizer is ready to assume the organization of the symposium. Proposal submissions will be open until 30 September 2007 and should include the following items:

1) A symposium title; 2) The full name of the organizer or chair of the proposed symposium; 3) Institutional affiliation of the organizer and contacts (full address, e-mail, phone and FAX numbers; 4) A brief text (200 words) explaining the goal of the symposium; 5) A list of potential speakers and their topics.

Presentations should be of 20 minute duration for each participant (this time should include time for questions and discussions). If the Symposium organizer has compelling reasons for other time allotments, the symposium organizer must make his/her case with the Organizing Committee for an alternate scheme of time allotments that would allow for time coordination with the other symposia being held simultaneously.

Organizers should indicate the participants to prepare their presentations in Power Point for PC. Below are the names and contact of the members the Symposium Committee of the 6th World Congress of Herpetology - please send your proposal to one of the members:

Dr. Carlos Frederico D. Rocha (Head of Symposium Committee) (Rio de Janeiro, Brazil) – cfdrocha@uerj.br

Dr. Claudia Keller (Manaus, Brazil) – keller@inpa.gov.br

Dr. Jean-Marc Hero (Queensland, Australia) - m.hero@griffith.edu.au

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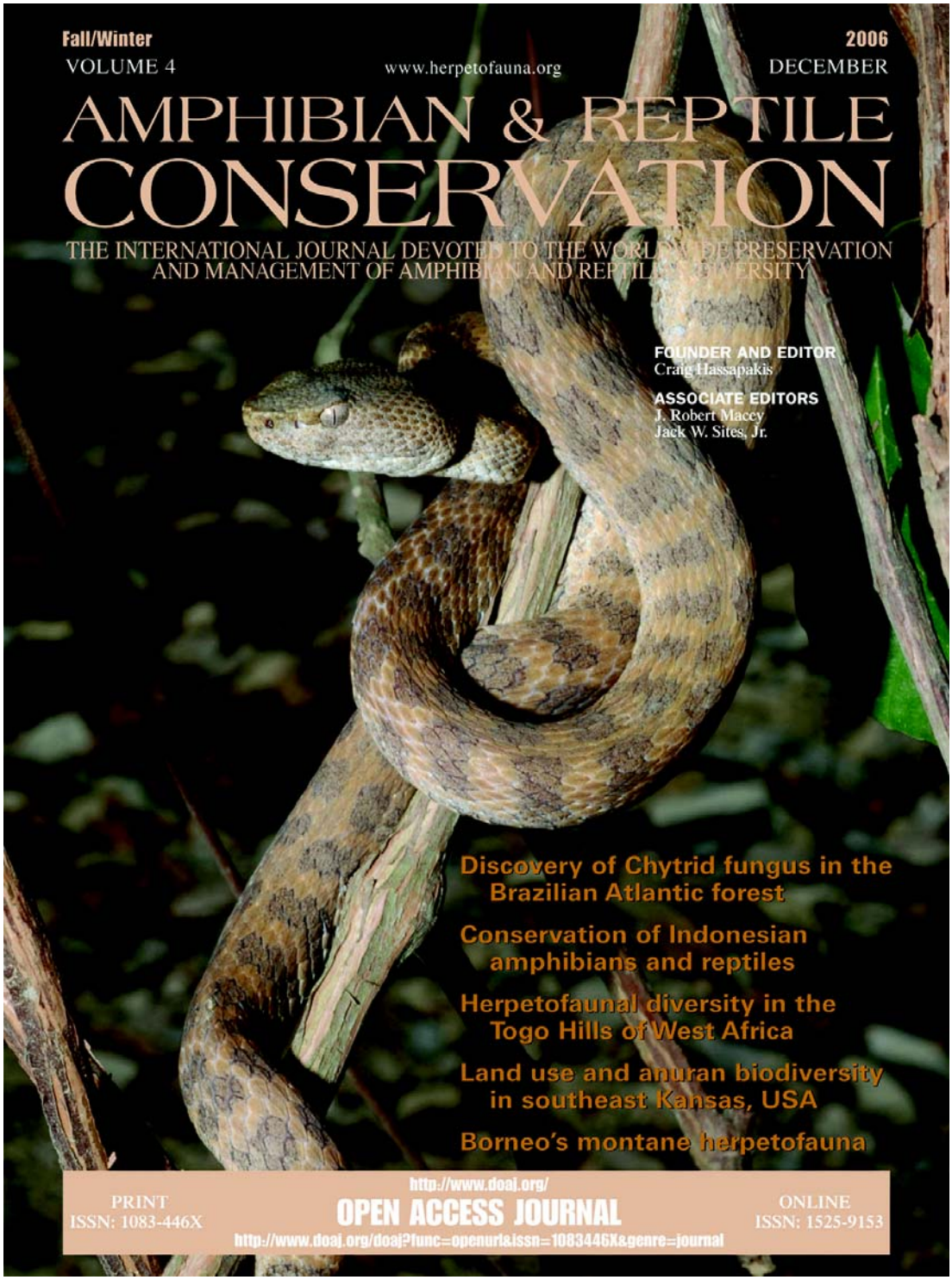
Dr. Richard Griffiths (Kent, England) - R.A.Griffiths@kent.ac.uk

Dr. W. Ronald Heyer (Washington, D.C., U.S.A.) - HEYERR@si.edu

More information and details about the meeting may be found on the WCH web page: http://www.worldcongressofherpetology.org/index.php?section=11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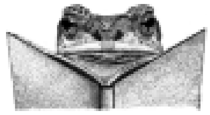

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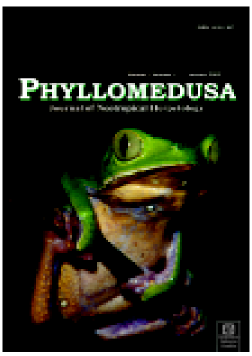

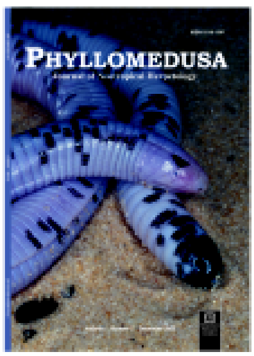

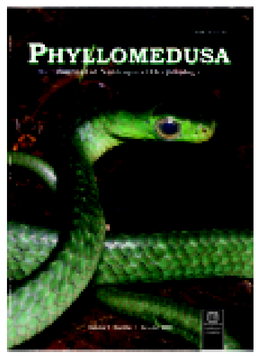

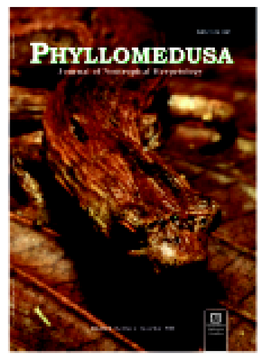

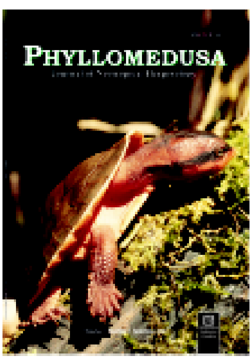

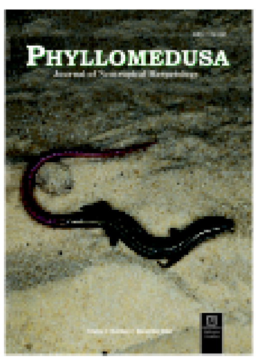

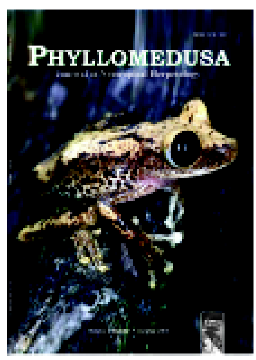

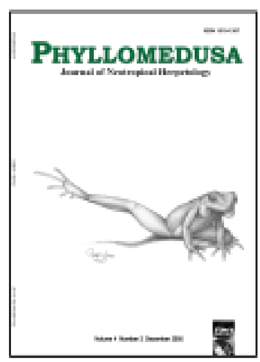

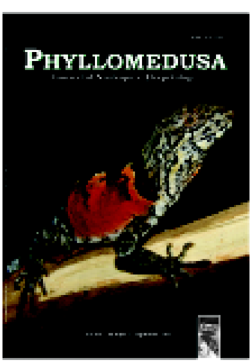

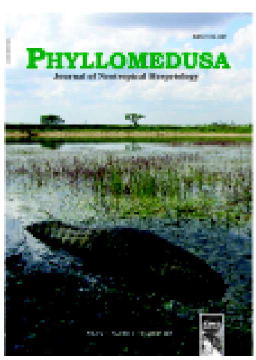

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