

(e.g. rocks, shrub, ground) both in places close and away from bodies of water (lakes, streams). During hikes alongside streams, we observed an individual of *P. cristinae* (Fig. 2a) calling from shrubby vegetation. Calls of this type were heard, especially on cloudy days, both during the day and night periods, leading to estimates of 10-20 individuals per day. Also, during the diurnal hikes frogs of the species *P. ruthveni* (Fig. 2b) were observed jumping and hiding around rocks in a stream. The identification of these species was based on descriptions, illustrations, the determination key published by LYNCH & RUIZ-CARRANZA (1985) and confirmed by J. D. LYNCH (pers. comm.).

Our records at about 3500 m elevation increase the known altitudinal distribution of *P. cristinae* (1530-2600 m) and *P. ruthveni* (1880-2600 m) by 900 m (ACOSTA-GALVIS 2000; FROST 2009), which is important in order to establish conservation strategies for endemic endangered species like *P. cristinae* (RAMÍREZ-PINILLA et al. 2004). In addition, our records document the presence of *P. cristinae* and *P. ruthveni* in páramo, a habitat where these species have not been previously recorded (LYNCH & RUIZ-CARRANZA 1985; FROST 2009).

ACKNOWLEDGMENTS: We are grateful to the Unidad Administrativa Especial de Parques Nacionales Naturales of Colombia (UAESPNN), to Conservation International-Colombia, and to the Conservation Leadership Programme for financial and logistic support necessary for field work. Thanks to the indigenous community of Sierra Nevada of Santa Marta for allowing us to conduct research in their territories. Also thanks to the community of the locality of San Pedro de La Sierra for their friendship and guidance in the study area. Biologists Giovanni CHÁVEZ, León PÉREZ CARMONA, León Andrés PÉREZ, Jeiner CASTELLANOS, Neis MARTÍNEZ and Rosana LONDOÑO helped in fieldtrips. Thanks to J. D. LYNCH for confirming the identification of the species.

REFERENCES: ACOSTA-GALVIS, A. R. (2000): Ranas, salamandras y caecilianos (Tetrapoda: Amphibia) de Colombia.- Biota Colombiana, Santafé de Bogotá; 1(3): 289-319. ESPINAL, T. S. & MONTENEGRO, E. (1963): Formaciones vegetales de Colombia: Memoria explicativa sobre el mapa de Colombia. Bogotá (Instituto Geográfico Agustín Codazzi [IGAC], Departamento Agrológico), 201 pp. FROST, D. R. (2009): Amphibian species of the world: Version 5.1. Electronic database accessible at < <http://research.amnh.org/vz/herpetology/amphibia/> >, American Museum of Natural History, New York, USA. [accessed on 26 February 2010]. LYNCH, J. D. & RUIZ-CARRANZA, P. M. (1985): A synopsis of the frogs of the genus *Eleutherodactylus* from the Sierra Nevada de Santa Marta, Colombia.-

Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor; 711: 1-59. LYNCH, J. & RUIZ-CARRANZA, P. M. & ARDILA-ROBAYO, M. C. (1997): Biogeographic patterns of Colombian frogs and toads.- Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Bogotá; 21 (80): 237-248. RAMÍREZ-PINILLA, M. P. & OSORNO-MUÑOZ, M. & RUEDA, J. V. & AMÉZQUITA, A. & ARDILA-ROBAYO, M. C. (2004): *Pristimantis cristinae*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. < www.iucnredlist.org > [accessed on 26 February 2010]. RUIZ-CARRANZA, P. M. & ARDILA-ROBAYO, M. C. & LYNCH, J. D. (1996): Lista actualizada de la fauna de amphibia de Colombia.- Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Bogotá; 20 (77): 365-415.

KEY WORDS: Amphibia, Anura, Strabomantidae, *Pristimantis cristinae*, *Pristimantis ruthveni*, Sierra Nevada de Santa Marta, Páramo, endangered species, high altitude record

SUBMITTED: March 11, 2010

AUTHORS: Luís Alberto RUEDA-SOLANO, Fernando VARGAS-SALINAS, Laboratorio 305, Bloque J, Departamento Ciencias Biológicas, Universidad de Los Andes, Carrera 1 Este No. 18A-70, Bogotá D.C., Colombia, < biologoluisrueda@gmail.com > < f.vargas216@uniandes.edu.co >

Hemidactylus mabouia MOREAU DE JONNÈS, 1818 and *H. frenatus* SCHLEGEL, 1836 in western Ecuador: new records reveal range extension

The name *Hemidactylus* (GRAY, 1845) specifies a group of nocturnal geckos occurring naturally through much of tropical Asia and Africa (CARRANZA & ARNOLD 2006). This genus comprises more than 80 species, eight of which are known as successful invasive species, *H. mabouia* (MOREAU DE JONNÈS, 1818), *H. frenatus* SCHLEGEL in DUMÉRIL & BIBRON, 1836, *H. turcicus* (LINNAEUS, 1758), *H. brookii* GRAY, 1845, *H. garnotii* DUMÉRIL & BIBRON, 1836, *H. persicus* ANDERSON, 1872, *H. flaviviridis* RÜPPELL, 1835, and *H. bowringii* (GRAY, 1845) (CARRANZA & ARNOLD 2006). These species are frequently found in human settlements, therefore their invasive range could well be the result of human introduction, along with some natural transmarine journeys (CARRANZA & ARNOLD 2006). Displacement of native species by invasive *Hemidactylus* has been suggested (BALDO et al. 2008), and there are some cases, in which the introduction of *H. mabouia* and *H. frenatus* has

affected natural populations of lizards, irrespective of their ecology and biology (PETREN et al. 1993; CASE et al. 1994; MESHAKA 2000).

Hemidactylus mabouia has its natural range in central and eastern Africa (CARRANZA & ARNOLD 2006) and has colonized western Africa, the Caribbean, South America and Florida (RÖDDE et al. 2008). There are two hypotheses to explain its dispersal from Africa to the American continent, transport by man (slavery ships), or other floating objects (CACCIALI & MOTTE 2009). In South America, *H. mabouia* is widespread throughout the Amazon basin, where it arrived possibly with human settlers (ÁVILA-PIRES 1995) and subsequently dispersed through river systems (CARRANZA & ARNOLD 2006; ANJOS & ROCHA 2008). This colonization is known to include Ecuador east of the Andes. However, we report here the first records of *H. mabouia* west of the Andes in northern Ecuador, province of Esmeraldas: three specimens (QCAZ 5998-6000) collected in Quinindé (0°19'48"N, 79°28'48"W), and one (QCAZ 6098) from Esmeraldas (0°57' 0"N, 79°40'0"W). How *H. mabouia* arrived west of the Andes in Ecuador is unknown, but its current distribution seems to be related to human settlements.

Hemidactylus frenatus has its natural range in tropical Asia and the Indo-Pacific Archipelago (CASE et al. 1994), and has been introduced in many tropical and subtropical regions worldwide (BAUER & HENLE 1994). Its introduction in South America has been reported recently for western Venezuela (RIVAS FUENMAYOR et al. 2005) and western Ecuador, provinces of Esmeraldas and Manabí (JADIN et al. 2009). Here we report new records from western Ecuador, province of Guayas: one specimen (QCAZ 8472) from Ingenio San Carlos, cantón Marcelino Maridueñas (2°11'30"S, 79°31'41"W), and another specimen (QCAZ 9111) from Bosque Protector Cerro Blanco (2°07'0"S, 80°05'0"W). The former specimen was found under a log in a crop of cacao, banana, cassava and corn. The new records lie approximately 145-160 km south of the southernmost known locality (JADIN et al. 2009), which suggests that *H. frenatus* is widespread in western Ecuador.

ACKNOWLEDGMENTS: This research was funded by Secretaría Nacional de Ciencia y Tecnología del Ecuador (SENACYT), project PIC-08-0000470.

REFERENCES: ANJOS, L. A. & ROCHA, C. F. D. (2008): Reproductive ecology of the invader species gekkonid lizard *Hemidactylus mabouia* in an area of southeastern Brazil.- Iheringia, Porto Alegre; (Série zoologia) 98 (2): 205–209. ÁVILA-PIRES, T. C. S. (1995): Lizards of Brazilian Amazonia (Reptilia: Squamata).- Zoologische Verhandelingen, Leiden; 299: 1-706. BALDO, D. & BORTEIRO, C. & BRUSQUETTI, D. & GARCÍA, J. D. & PRIGIONI, C. (2008): Reptilia, Gekkonidae, *Hemidactylus mabouia*, *Tarentola mauritanica*: distribution extension and anthropogenic dispersal.- Check List, São Paulo; 4 (4): 434–438. BAUER, A. M. & HENLE, K. (1994): Familia Gekkonidae (Reptilia, Sauria). Part I Australia and Oceania; XIII, 306 pp. In: WERMUTH, H. & FISCHER, M. (eds.): Das Tierreich. Eine Zusammenstellung und Kennzeichnung der rezenten Tierformen. The Animal Kingdom. A compilation and characterization of the recent animal groups. part 109, Berlin, New York (W. De Gruyter). CACCIALI, P. & MOTTE, M. (2009): Nuevos registros de *Hemidactylus mabouia* (Sauria: Gekkonidae) en Paraguay.- Cuadernos de Herpetología, San Miguel de Tucumán; 23 (1): 41–44. CARRANZA, S. & ARNOLD, E. N. (2006): Systematics, biogeography, and evolution of *Hemidactylus* geckos (Reptilia: Gekkonidae) elucidated using mitochondrial DNA sequences.- Molecular Phylogenetics and Evolution, San Diego; 38: 531–545. CASE, T. J. & BOLGER, D. T. & PETREN, K. (1994): Invasions and competitive displacement among house geckos in the tropical pacific.- Ecology, New York; 75: 464–477. FRENKEL, C. (2006): *Hemidactylus frenatus* (Squamata: Gekkonidae): call frequency, movement and condition of tail in Costa Rica.- Revista de Biología Tropical, San José; 54 (4): 1125–1130. JADIN, R. C. & ALTAMIRANO, M. A. & YÁNEZ-MUÑOZ, M. H. & SMITH, E. N. (2009): First record of the common house gecko (*Hemidactylus frenatus*) in Ecuador.- Applied Herpetology, Leiden; 6: 193–195. MESHAKA, W. E., Jr. (2000): Colonization dynamics of two exotic geckos (*Hemidactylus garnottii* and *H. mabouia*) in Everglades National Park.- Journal of Herpetology, Houston; 34: 163–168. PETREN, K. & BOLGER, D. T. & CASE, T. J. (1993): Mechanisms in the competitive success of an invading gecko over an asexual native.- Science, Washington; 159: 354–357. RIVAS FUENMAYOR, G. & UGUETO, G. & RIVERO, R. & MIRALLES, A. (2005): The herpetofauna of Isla de Margarita, Venezuela: new records and comments.- Caribbean Journal of Science, Mayagüez; 41 (2): 346–351. RÖDDE, D. & SOLÉ, M. & BÖHME, W. (2008): Predicting the potential distributions of two alien invasive house-geckos (Gekkonidae: *Hemidactylus frenatus*, *Hemidactylus mabouia*).- North-Western Journal of Zoology, Oradea; 2 (4): 236–246.

KEY WORDS: Reptilia: Squamata: Sauria Gekkonidae, *Hemidactylus mabouia*, *Hemidactylus frenatus*, invasive species, range extension, distribution, ecology, Ecuador, South America

SUBMITTED: September 9, 2009

AUTHORS: Amaranta CARVAJAL-CAMPOS (corresponding author) <a.carvajalc campos@gmail.com>; Omar TORRES-CARVAJAL, Escuela de Biología, Pontificia Universidad Católica del Ecuador, Avenida 12 de Octubre y Roca, Apartado 17-01-2184, Quito, Ecuador