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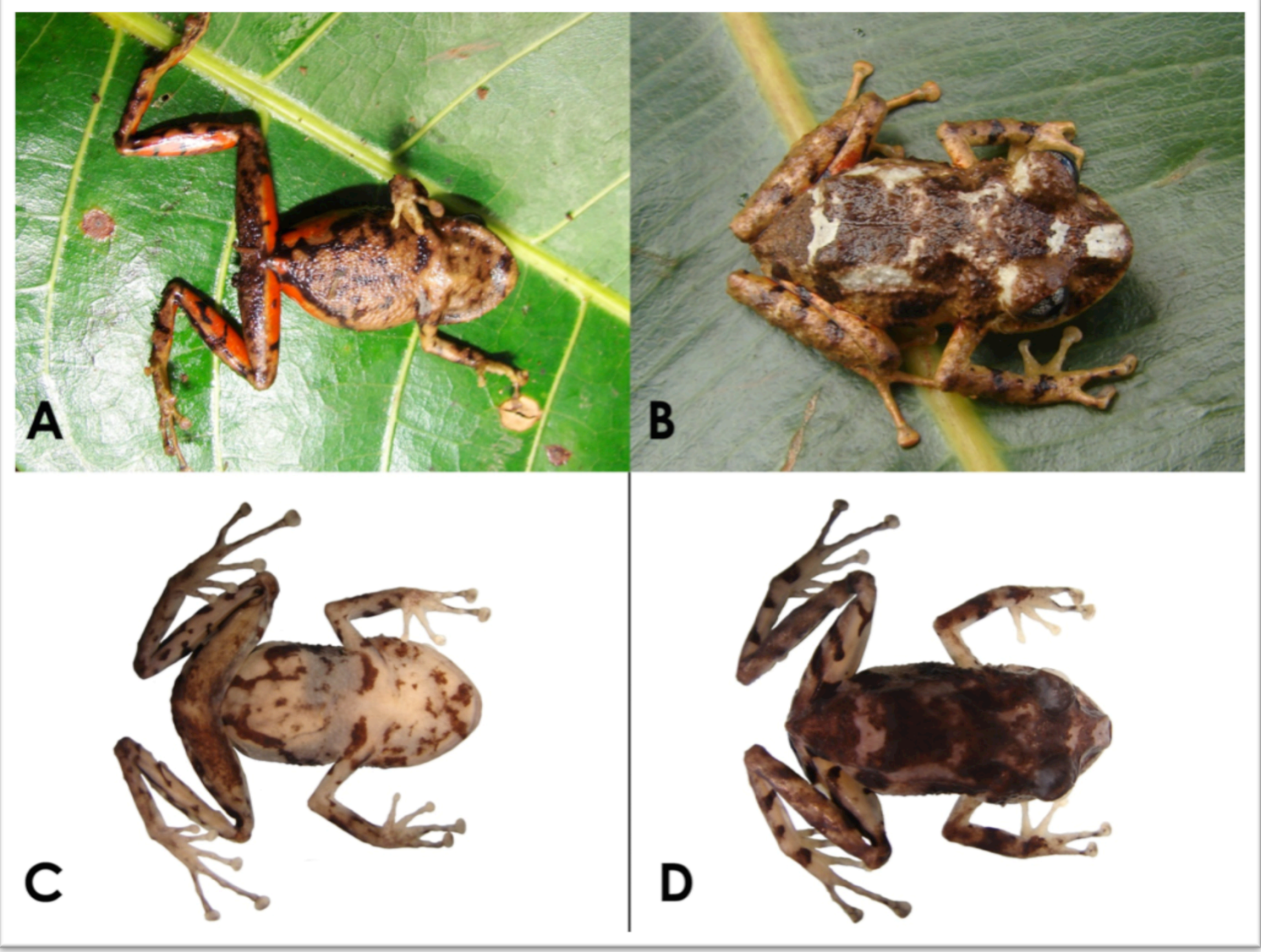
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# A new species of frog of the genus *Pristimantis* (Strabomantidae) from a cloud forest in southern Peru

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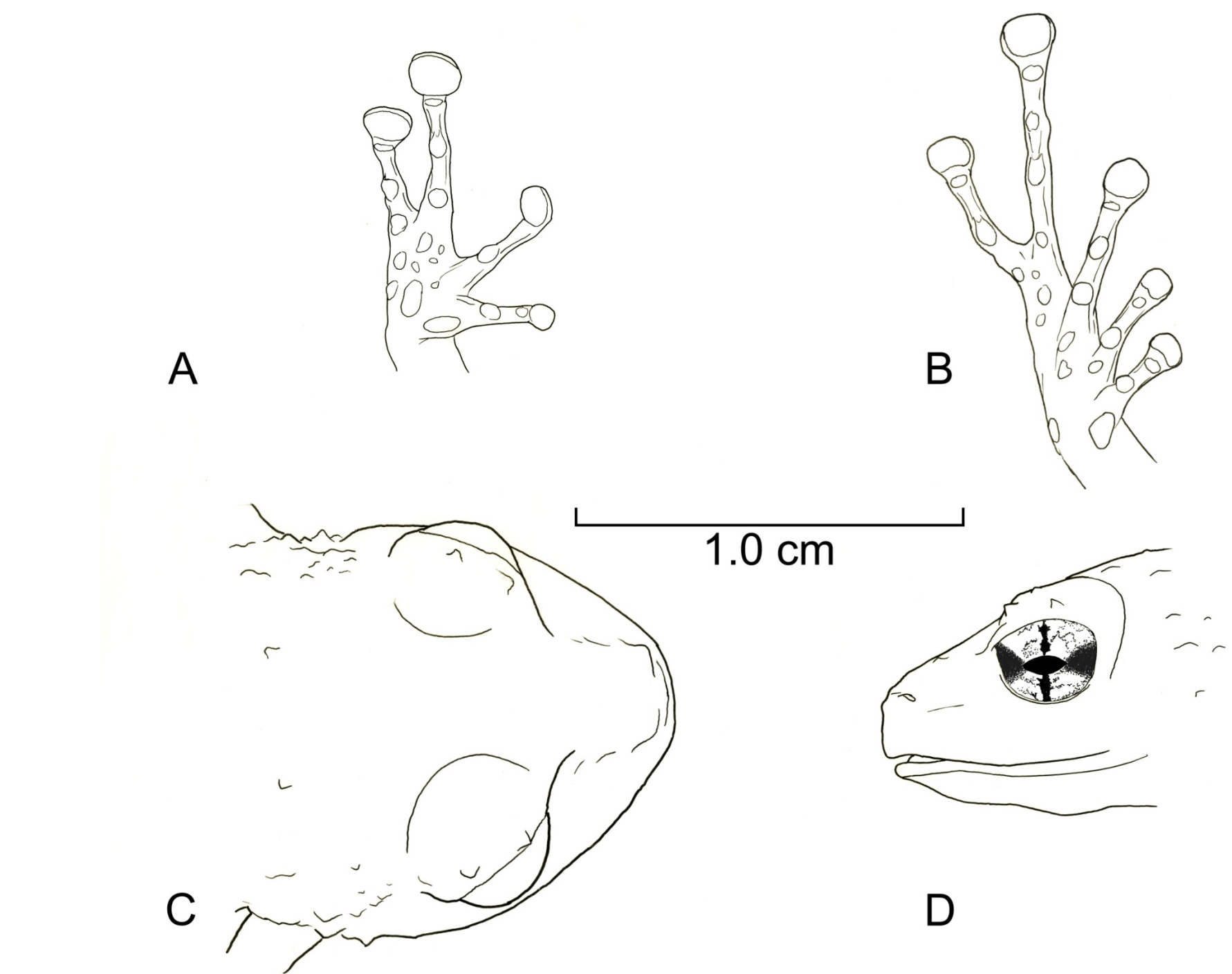
**Figure 1:** Photos of the new species A) ventral in life, B) dorsal in life, C) ventral preserved, D) dorsal preserved. Photos by C. Torres (A, B), photos by A. Baltuska (C, D).

## Introduction

Among the 123 species of *Pristimantis* known to occur in Peru, 14 have orange or red coloration in the groin and thighs. Claudia Torres, herpetologist at the Museo de Historia Natural Universidad Nacional Mayor de San Marcos (Lima, Peru) conducted a herpetological survey in April 2007 at 1790 m in a cloud forest in southern Peru. The collected specimens contained several unidentified species of *Pristimantis* that were given as a loan to E. Lehr. A new species of *Pristimantis* was identified which is represented by a single female specimen. The new species has bright orange-red coloring in the groin and thighs and a distinctive white iris with brown reticulations forming a cross pattern. The only other Peruvian species of *Pristimantis* to combine these characters is *Pristimantis cruciocularis*, a species found in the Andes of central Peru. Herein, we diagnose the new species and compare it with other similar species and show their distributions on a map.

## Materials and Methods

Diagnostic characters follow Duellman and Lehr (2009). The specimen was collected by C. Torres and stored at the Museo de Historia Natural Universidad Nacional Mayor de San Marcos (Lima, Peru). Specimens of *P. cruciocularis* for comparison were collected by E. Lehr and are currently housed at Illinois Wesleyan University. All specimens were stored in 70% ethanol. Measurements were taken using digital calipers under a stereomicroscope. Fingers and toes are numbered preaxially to postaxially from I–IV and I–V respectively. Photos of preserved specimens were taken using a level camera mount and drawings were made under a stereomicroscope using a drawing tube attachment. Coloration in life descriptions are based on photos taken by C. Torres. Photos of *P. cruciocularis* in life for comparison were taken by E Lehr. Descriptions and locations of comparative species are taken from Duellman and Lehr (2009).



**Figure 2:** Drawings of *Pristimantis* sp. nov. (MUSM). A) hand, B) foot, C) head in dorsal view and D) head in profile. Drawing by A. Baltuska.

## Abstract

Frogs of the genus *Pristimantis* are found throughout northern South America in various habitats ranging from lowland rainforest, cloud forest and up to 4000 m in the puna. Members of the family Strabomantidae breed terrestrially without a free swimming tadpole; instead froglets hatch from terrestrially deposited eggs. Of the 455 known species of *Pristimantis* 123 are known from Peru. Here we describe a new species from the Cordillera Central in the Andes of southern Peru. The new species is known from a single female specimen. It is readily distinguished from all other members of the genus by having a dark brown dorsum with large white blotches, absence of tympanic membrane and annulus, bright orange-red color in the groin and concealed surfaces of hind legs, and a distinct iris with intersecting vertical and horizontal streaks forming a cross. The new species is most similar with *Pristimantis cruciocularis* from the Andes of central Peru, but differs in several morphological characteristics such as size: Specimens of *P. cruciocularis* have a snout-vent length of 11.4–21.8 mm ( $n = 14$ ) compared to 23.5 mm ( $n = 1$ ) in the new species.

## Results

**Diagnosis:** A member of the *Pristimantis unistringatus* Group with the following characters: (1) Skin on dorsum shagreen with small scattered tubercles, short dorsolateral folds continuous in midsection; postocular folds present curved opening outward; skin of venter areolate, lacking discoidal fold; (2) tympanic membrane and tympanic annulus absent; (3) snout moderate, rounded in dorsal and lateral views; (4) upper eyelid width longer than IOD; upper eyelids with two enlarged tubercles, cranial crests absent; (5) dentigerous processes of vomers oblique and posterior to choanae; (6) male characters unknown; (7) Finger I shorter than Finger II, discs on outer fingers broadly expanded, rounded; (8) fingers with narrow lateral fringes; (9) ulnar tubercles present, outer surface of tarsus with a row of tubercles; (10) heel with single tubercle; inner tarsal fold absent; (11) inner metatarsal tubercle ovoid, three times as large as ovoid outer metatarsal tubercle, supernumerary tubercles present; (12) toes with narrow lateral fringes, webbing absent, Toe V longer than Toe III, toe discs broadly expanded, rounded, same size as discs on fingers; (13) in life dorsum brown with white blotches in sacral region, scapular area, posterior eyelids, interorbital area, and snout; groin, anterior surface of thighs, inner surface of shanks, and proximal outer surface of the foot are bright red-orange with dark brown blotches; throat and belly brown with scattered dark brown blotches and streaks; iris white with fine brown reticulations, dark brown horizontal and vertical streaks forming a single cross through pupil; (14) SVL in a single female specimen 23.5 mm

## Discussion

The new species is readily distinguished by its lack of tympanic membrane and annulus, bright red-orange coloration on the groin and legs, and cruciform marking on the eye. Of all species of *Pristimantis* found in Peru lacking a tympanic membrane and annulus, four (*P. altamazonicus*, *P. coronatus*, *P. croceinguinis*, and *P. cruciocularis*) have orange or red color in the groin and thighs. Among these, *P. altamazonicus* and *P. croceinguinis* are found in the lowland Amazon forests of northeastern Peru. *Pristimantis altamazonicus* differs from the new species by lacking dorsolateral folds, having a prominent discoidal fold, and having an eye width narrower than interorbital distance. *Pristimantis croceinguinis* also lacks dorsolateral folds as well as upper eyelid tubercles, both present in the new species. *Pristimantis coronatus* is known



**Figure 3:** Ventral views of the new species (left, photo by C. Torres) and *P. cruciocularis* (right, photo by E. Lehr). Note dark belly blotches on the new species absent on *P. cruciocularis*



**Figure 4:** Cross-shaped eye pattern in the new species (left, photo by C. Torres) and *P. cruciocularis* (right, photo by E. Lehr). Note the white iris and white skin blotches in the new species.

from only one specimen from the far northern Cordillera de Huancabamba in northern Peru in cloud forest at 2850m. It differs from the new species by lacking dorsolateral folds, having a prominent discoidal fold, and an eye width narrower than its interorbital distance. *Pristimantis coronatus* is also much darker in dorsal coloration and is smaller (SVL 15.3 mm in single female). The new species is most similar to *P. cruciocularis* notably due to the two being the only known members of *Pristimantis* in Peru to have a cruciform streak through the iris. *Pristimantis cruciocularis* differs from the new species in the following characteristics (traits of the new species in parentheses): maximum SVL in females 21.8 mm (23.5 mm), dorsolateral folds absent (short folds present), eye

width narrower than interorbital distance (broader), fingers and toes lacking lateral fringes (narrow fringes on both fingers and toes), upper eyelid tubercles low (prominent), dorsum pale brown with small red spots (brown with large white blotches), and venter dark gray with pale cream spots (brown with scattered dark brown blotches), iris bronze (iris white).

The new species of *Pristimantis* and 14 others in Peru have orange or red spots in the groin and/or thighs (**Figure 5**). These species are found from the Amazon lowlands up to 3000 m. Only four of these species (*P. cosnipatae*, *P. cruciocularis*, *P. ornatus*, and *P. sagittulus*) plus the new species are found in the Andes of central or southern Peru. The remainders of such species are known from the Andes of northern Peru or the Amazon lowlands (*P. altamazonicus* and *P. croceinguinis*).

## Conclusions

- New species from *Pristimantis unistringatus* Group with orange-red blotches in groin, thighs, and shanks, cruciform reticulations on white iris, and dorsolateral folds.
- Wide distribution of orange and red coloration among species of *Pristimantis*, with possible concentration in northern Peru.

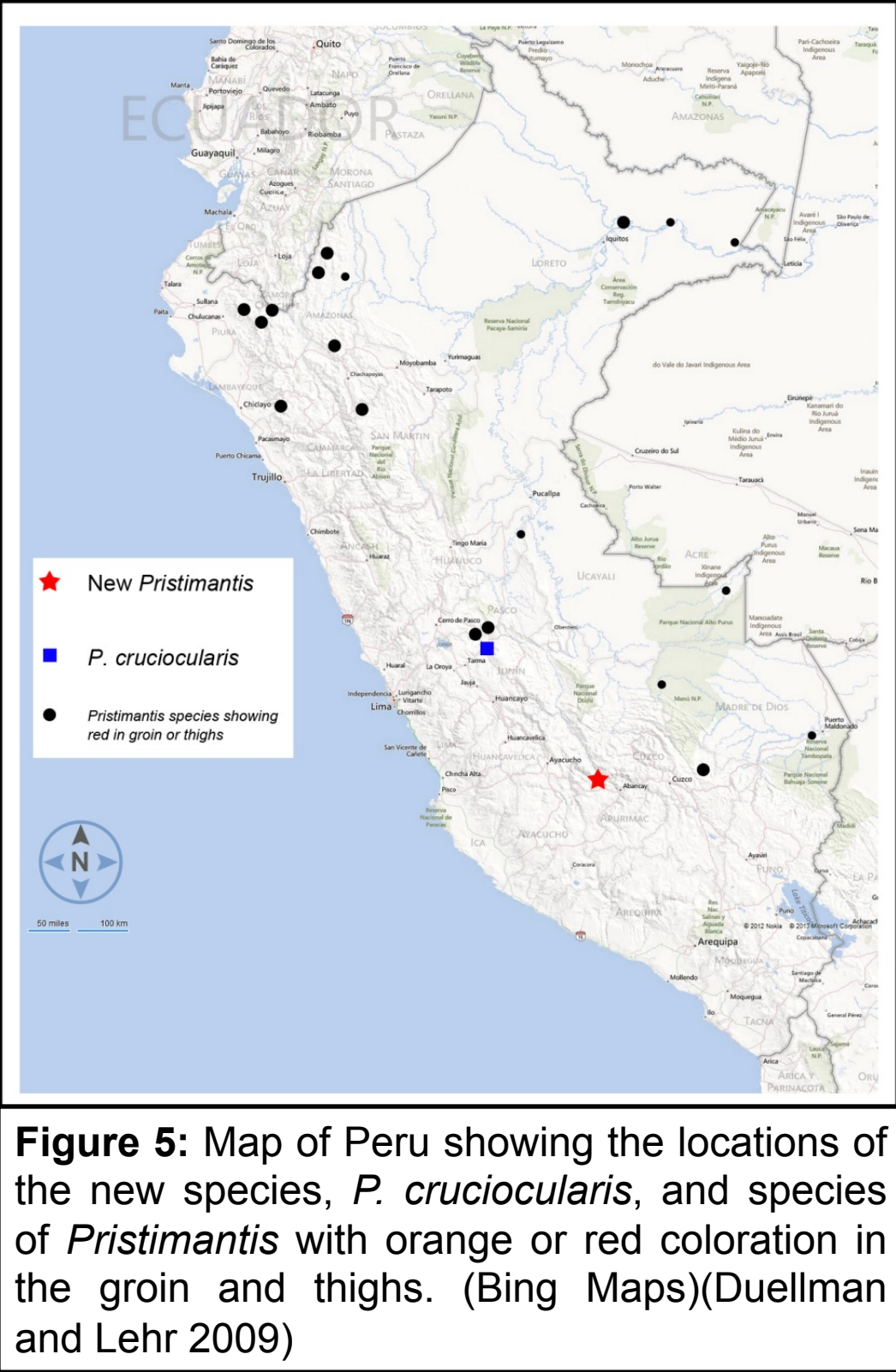
## Acknowledgements

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## References

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**Figure 5:** Map of Peru showing the locations of the new species, *P. cruciocularis*, and species of *Pristimantis* with orange or red coloration in the groin and thighs. (Bing Maps)(Duellman and Lehr 2009)