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TWO NEW SPECIES OF THE GENUS *PLATYMANTIS*
(AMPHIBIA: RANIDAE) FROM LUZON ISLAND, PHILIPPINES

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Two new species of frogs, *Platymantis pygmaeus* and *P. naomii*, are described from Luzon Island, Philippines. The species are different from other Philippine species of the *dorsalis* Group in their male advertisement calls and other characteristics given in the diagnoses.

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The two species, *Platymantis pygmaeus* and *P. naomii*, described here are in the *Platymantis dorsalis* Group. They were first identified in the field by their distinct advertisement calls. The *dorsalis* Group, as presently diagnosed, is differentiated from other Philippine Groups (*hazela* Group and *guentheri* Group) on the basis of: (1) digits about as deep as broad, (2) relatively undilated, rather than broadly dilated finger and toe disks, and (3) blunt or pointed terminal phalanges, rather than T-shaped terminal phalanges (Brown, Brown and Alcala 1997).

MATERIALS AND METHODS

Materials examined include holotypes of *Platymantis dorsalis*, *meyeri*, and *mimulus* of the *dorsalis* Group of *Platymantis* from the Philippines and paratypes of *Platymantis parkeri* from Bougainville Island in the Solomons.

Morphometric characters: Snout-vent length (SVL), head length (HL), head width (HW), snout length (SnL), diameter of eye (ED), diameter of tympanum (TD), tibia length (TiL), and third finger length (3FL) from proximal edge of basal tubercle, were measured to the nearest 0.1 mm using a Helios dial caliper. Other non-metric, morphological characters include webbing of

fingers and toes, skin ornamentation, shape of snout, shape of terminal phalanges, color pattern, vomerine teeth, and tubercles on various parts of the body. Advertisement calls were recorded and analyzed using a Kay Electrics SonaGraph (Model #550) with a wide-band filter and SIGNAL Sound Analysis System software.

SYSTEMATIC SECTION

Platymantis pygmaeus, new species

Holotype. — NMPH 6255, an adult male, collected in disturbed Dipterocarp Forest at 55–65 m in the Northern Sierra Madre Natural Park in Sitio Natapdukan, Barangay Didian, Municipality of Palanan, Isabela Province (16°57.93'N, 122°24.23'E), Luzon Island, by A. C. Diesmos, 24 March 1997.

Paratypes. — CAS 204762–64 at the type locality; CAS 204765–66, NMPH 6456–60, at Blos, Barangay Reina Mercedes, Maconacon, Isabela Province, within 50 km of type locality, collected by A. C. Diesmos, March–April, 1997.

Description of Holotype. — A mature male (measurements in mm): SVL 15.2, HL 5.5, HW 6.0, SnL 2.4, ED 2.1, TD 1.5, TiL 7.5, 3FL 1.7; dorsum brown, with darker blotch in middle; an oblong darker spot surrounding anal opening; dorsum and venter smooth; a white oblique line composed of about three tubercles at the postero-ventral margin of tympanum; a black, irregular dark spot in the proximal antero-ventral part of upper arm and adjacent part of chest; a small area of areolation on side of body posterior to forelimb.

DIAGNOSIS. — This species differs from other small-disked species of Philippine *Platymantis* in the following combination of characters: very small size, 14.1–15.7 mm SVL for 11 mature specimens (10 males and one female; Table 1); finger disks narrower than those of toes, about the same width as digits proximal to disks; terminal disks bluntly rounded to pointed; dorsum smooth, and the advertisement call.

DESCRIPTION. — SVL 24.1–15.7 mm for ten mature males and 15.0 mm for one mature female; HL 36–40% of SVL; HW 39–44% of SVL; snout rounded; upper jaw slightly protruding; SnL 14–18% of SVL; ED 12–15% of SVL; TD 6–10% of SVL; tympanum exposed; usually a series of three whitish tubercles arranged diagonally

behind tympanum; lores moderately oblique, concave; vomerine teeth only slightly protruding, widely separated; fingers not webbed, with small, shallow-grooved disks; first, second, and fourth fingers about equal in length and shorter than third; 3FL 10–13% of SVL; subarticular tubercles prominent but not pointed; one row of supernumerary tubercles; inner and middle metacarpal tubercles large, oval; outer tubercle small, oval; hind limb moderately long, TiL 46–53% of SVL; toes with minute webs at base; disks of toes distinctly larger than those of fingers; subarticular tubercles of toes more prominent than those of fingers; inner metatarsal tubercle larger than outer, elongate; outer round, strongly protruding; plantar area smooth; dorsum, head, snout, eyelids, and limbs generally smooth, with few tubercles on dorsum and eyelids in occasional specimens; throat, belly, and thighs smooth.

COLOR. — In preservative, dorsal ground color dirty white to light brown with some dark blotches; head and snout generally darker than posterior part; tympanum with dark figure; dark crossbars on forelimbs and hind limbs; dark, irregular spot on proximal antero-ventral part of upper arm and adjacent part of chest; in lighter-colored specimens, a dark brown oval ring surrounds the anal opening. Side of body posterior to forelimb with areolation in most specimens. Belly and ventral parts of limbs dirty white to light brown. Throat and breast usually grayish.

The color in life was noted by the collector (ACD) as gray-brown above.

REPRODUCTION. — The only female specimen in the collection has medium-sized eggs and coiled oviduct. Unfortunately, only one egg is measurable (ca. 1 mm in diameter). The eggs are yellow without pigment. It is probable that the species undergoes direct development as is known for other species of the genus, i.e., *P. hazelae* and *P. guentheri* (Brown and Alcalá 1982).

ADVERTISEMENT CALL. — The call of this species sounds like “tet-tet,” a chirping sound. The first part of each note is between 3800 and 5500 Hz. The second shorter part is between 4500 and 5500 Hz. The duration of each note is between 0.01 and 0.02 of a second. The interval between notes is 0.30 to 0.80 or more seconds (Fig. 1C).

TABLE 1. A comparison of the snout-vent length (SVL in mm) of four Philippine species of *Platymantis* (N = number of specimens).

Species	N	SVL (Adults)	
		Range	Mean
<i>Platymantis dorsalis</i>			
Females	10	30.8–42.9	34.5
Males	16	26.7–35.0	29.4
<i>Platymantis mimulus</i>			
Females	18	21.0–28.1	24.2
Males	32	18.4–25.8	21.9
<i>Platymantis naomii</i>			
Females	14	21.6–28.0	24.3
Males	18	20.3–23.9	21.6
<i>Platymantis pygmaeus</i>			
Females	1	15.0	—
Males	10	14.1–15.7	15.1

ETYMOLOGY. — The name *pygmaeus* (from the Greek word *pygmaios*) refers to this species as the smallest of the Philippine *Platymantis*.

ECOLOGICAL NOTE. — The species inhabits the litter on the forest floor at low altitude (50–400 m). The Dipterocarp forest had been logged, but apparently still contained suitable microhabitats for this species. The specimens were found on and under dead leaves and rotting vegetation at night. Many of the males were heard vocalizing at the time of collection in March–April, 1997. At the rate the forest is being cut, it is probable that this species is unlikely to survive in lowland forest in the near future.

COMPARISONS. — Previous to the discovery of this species, Brown, Alcala and Diesmos (1997) described *Platymantis mimulus* as a very small species among the small-disked Philippine species. The smaller size of *pygmaeus* (SVL 14.1–15.7), compared to *mimulus* (SVL 18.4–28.1) readily differentiates the two (Table 1). The Solomon Island species, *P. parkeri parkeri* (Brown 1965), is most similar in size (SVL 14.9–18.5 mm for four males and 11 females). These two species are widely separated geographically, and only phylogenetic studies can determine their relationship.

RANGE. — Known only from the type locality in the northern Sierra Madre Mountains, Luzon Island.

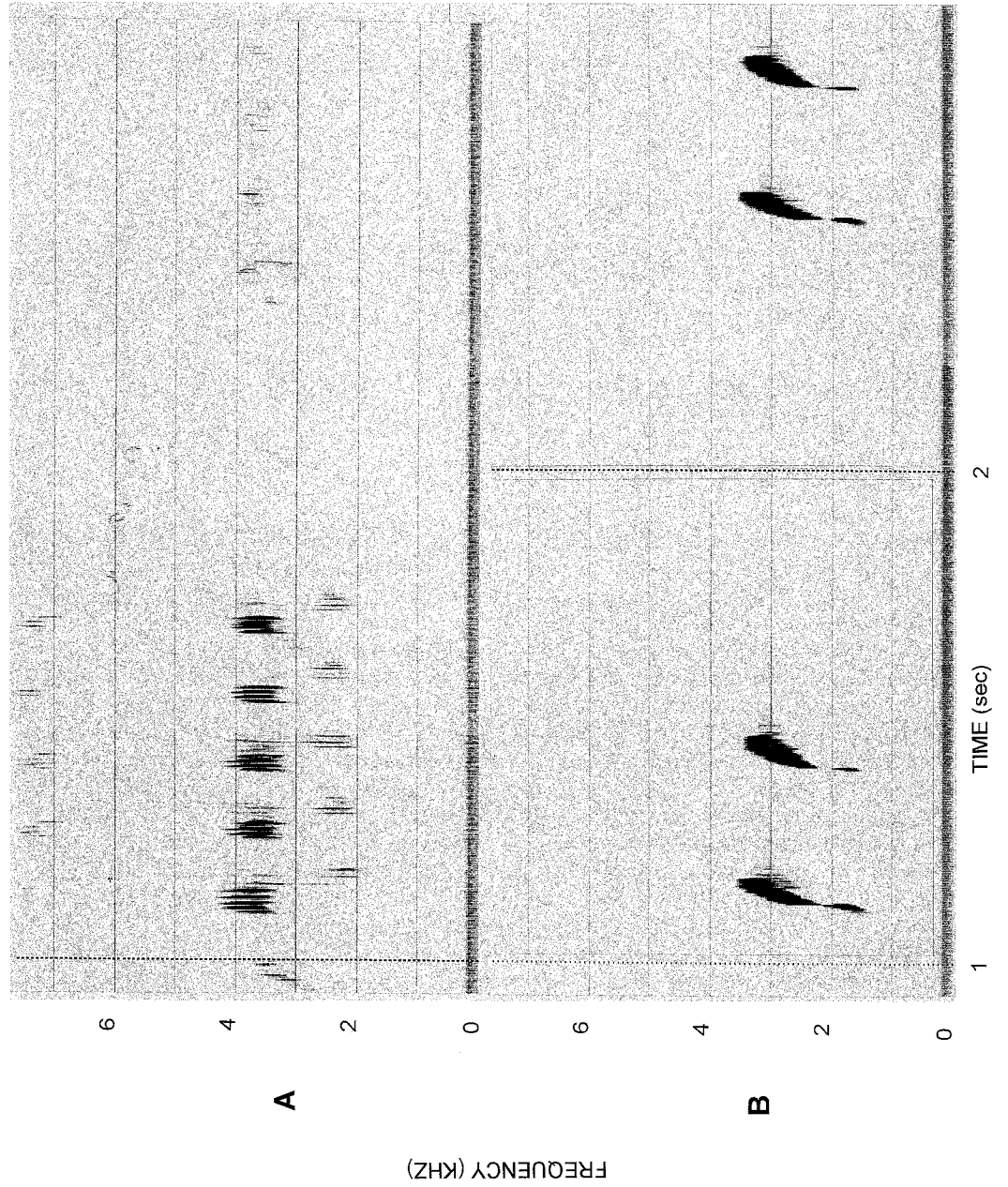
Platymantis naomii, new species

Holotype. — CAS 204746, an adult female collected in the montane forest on southeast slope of Mt. Banahao (Tayabas side), Luzon Island at about 1400 m, by A. C. Diesmos on 23 April 1995.

Paratypes. — CAS 201197–99 and 204754 Mt. San Cristobal; CAS 201009–011, 201184, 204747–54, 204755–61 Mt. Banahao, Quezon Province, Luzon Island.

Description of holotype. — An adult female (measurements in mm): SVL 24.5, HL 9.5, HW 10.1, SnL 4.1, ED 3.0, TD 2.2, TiL 13.4, 3FL 3.5; dorsum, eyelids, anterior head and limbs with numerous tubercles; few low, irregularly-shaped ridges on anterior dorsum. Venter granular, throat smooth. Color of dorsum dark brown, with a light mid-dorsal line. Toe webs reach level of basal tubercles except on fourth toes.

DIAGNOSIS. — This species differs from other Philippine species of the *dorsalis* Group (in which the disks on the fingers and toes are scarcely wider than the subtending digits) in the



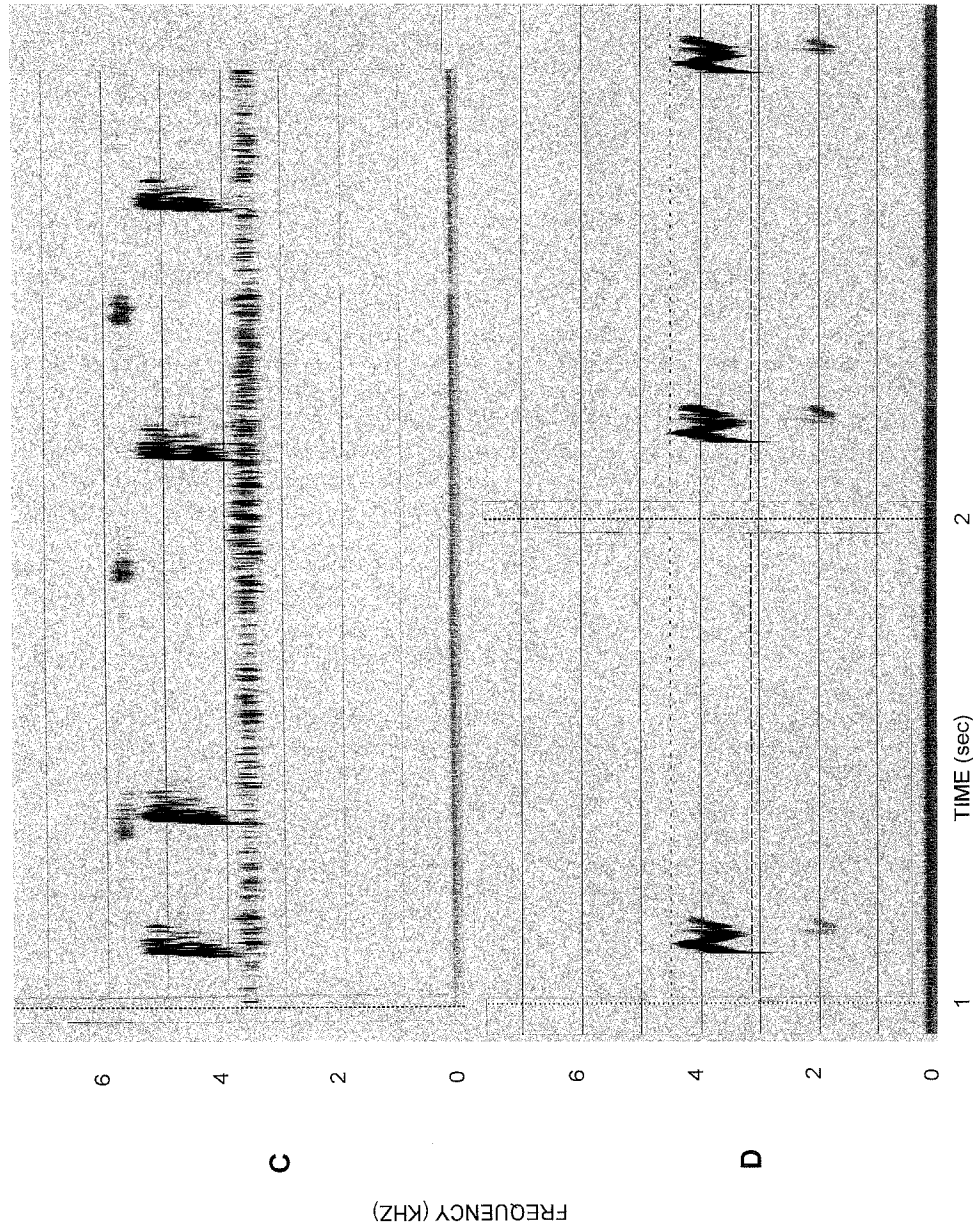


FIGURE 1. Audio spectrograms of (A) *Platymantis mimulus* (CAS 201191), (B) *P. dorsalis* (CAS 201561), (C) *P. pygmaeus* (NMPH 6255), and (D) *P. naomii* (CAS 204247). Temperature data were not recorded.

advertisement call of males. It is further differentiated from *dorsalis* by its shorter SVL and fewer dorsal ridges and from *pygmaeus* by its greater SVL (Table 1). In this character, it is in closer agreement with *mimulus*. However, it differs from *mimulus* in the (1) advertisement call, (2) more reduced webbing on second and third toes, and (3) the presence of numerous tubercles and short low ridges on the snout, head, eyelids, dorsum, and hind limbs.

DESCRIPTION. — SVL 20.3–23.9 mm for 18 mature males and 21.6–28.0 mm for 14 mature females; HL 38–44% of SVL; HW 39–46% of SVL; snout rounded; upper jaw slightly protruding; SnL 15–19% of SVL; ED 12–14% of SVL; tympanum exposed, TD 7–11% of SVL; canthus rostralis rounded; lores moderately oblique, concave; vomerine teeth strongly protruding, patches widely separated; fingers not webbed; fingers with small grooved disks; first, second, and fourth fingers about equal in length, third longer, 3FL 13–17% SVL; subarticular tubercles oval, large but not pointed; one row of supernumerary tubercles well developed; inner and middle metacarpal tubercles large, oval; outer metacarpal tubercle small, oval to elongate; hind limbs long, TiL 52–61% of SVL; toes webbed at base: first, second, and third to base of subarticular tubercle, to distal edge of fifth, and short of basal tubercle on fourth; disks of toes generally larger than those of fingers; subarticular tubercles as for fingers; metatarsal tubercles protruding; inner elongate, outer round or elongate; plantar area smooth; tubercle on heel present; dorsum, head, eyelids, and limbs with few to numerous tubercles; few to several short, low, irregularly-shaped ridges on posterior head and anterior dorsum (Fig. 2); throat and chin smooth; belly smooth to granular.

COLOR. — In preservative, the dorsal background color is light brown to tannish brown, dark blotches in the head region and occasionally on sides of body; interorbital area and middle of back lighter in some individuals; a middorsal light line in many individuals; dark cross bars on limbs; throat and chest gray or mottled brown, belly and hind limbs dirty white, sometimes with brown mottling.

In life the background color is light brown above with dark blotches on anterior body, head, and eyelids.

REPRODUCTION. — Gravid females were collected in April, May and June, 1995 and 1996. Five females had 10–20 (mean 14) large, yellow unpigmented eggs, ranging in size from 1.0 to 2.2 mm in diameter. Like other species of *Platymantis*, this species probably undergoes direct development (within the egg capsule) from egg to froglet. Mt. Banahao had high rainfall (150–500+ mm) during the months of January and May through December, although it received rain during the other months of the period 1983–1992 (A. C. Diesmos, unpublished ms.). An egg-laying period for this species beginning in April or May is therefore a reasonable assumption. This is strengthened by our observations on other *Platymantis* species in the Mt. Banahao area. Eggs of an arboreal species, probably *P. luzonensis*, were collected on April 20, 1996 and September 20, 1997. Two of the seven unpigmented, whitish oviductal eggs measuring 3.5 mm in diameter were accidentally squeezed out of the oviduct of a female *P. mimulus* on June 22, 1996.

ADVERTISEMENT CALL. — The male advertisement call of *Platymantis naomii* sounds like “psik” repeated at intervals of about 0.6 to 1.1 seconds for one male (Fig. 1D) The frequency is strongly modulated. The duration of each note ranges from about 0.043 to 0.056 seconds. The frequency for each note is about 3160 to 4520 Hz. The dominant frequency is in the first half of the notes.

ETYMOLOGY. — Named after the wife (Naomi) of the first author (ACA) in recognition of her support for our herpetological studies.

COMPARISONS. — This species is about the same size as *mimulus*, but is much smaller than *dorsalis* and larger than *pygmaeus*. The foot structure resembles *mimulus* except for slightly reduced toe webs. The dorsum has a pattern of more numerous tubercles (Fig. 2).

ECOLOGICAL NOTE. — This species occurs on the forest floor in the montane forest at elevations of 900–2150 m. Its altitudinal distribution does not overlap with that of *mimulus*, which does not occur above 600 m on the Banahao massif. It is the most abundant, ground-dwelling *Platymantis* on Mt. Banahao at 1000 m and above.

RANGE. — Found only on Mt. Banahao and Mt. San Cristobal, Luzon Island.



FIGURE 2. *Platymantis naomii* showing color pattern and dorsal skin ornamentation in life.

DISCUSSION

The distinct advertisement calls helped in identification of populations of these two species in the field, as was the case for *Platymantis mimulus* (Brown, Alcala and Diesmos 1997) and *P. banahao* and *P. luzonensis* (Brown, Alcala, Diesmos and Alcala 1997). To the human ear the call of *Platymantis dorsalis* sounds like "whet-whet" (produced by whistling); *P. mimulus* "osec-sec-sec"; *P. pygmaeus* "tet-tet" (a chirp); *P. naomii* "psik." Frequency modulation is greatest for *P. naomii* and least for *P. dorsalis*.

Both of these new species belong to the *dorsalis* Group as delineated by Brown, Brown and Alcala (1997b). Based on our current information these species appear to have very restricted ranges. *Platymantis naomii* is known only from Mt. Banahao, southern Luzon Island and *P. pygmaeus* only from the northern end of the Sierra Madre mountains in northeastern Luzon.

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LITERATURE CITED

- BROWN, W. C. 1965. New frogs of the genus *Cornufer* (Ranidae) from the Solomon Islands. *Breviora* 1965 (218):1-16.
- BROWN, W. C. AND A. C. ALCALA. 1982. Modes of reproduction of Philippine anurans. Pp. 416-428 in *Advances in Herpetology and Evolutionary Biology*, R. G. J. and K. Miyata, eds. Mus. Comp. Zool., Harvard University.
- BROWN, W. C., A. C. ALCALA, AND A. C. DIESMOS. 1997. A new species of the genus *Platymantis* (Amphibia: Ranidae) from Luzon Island, Philippines. *Proceedings of the Biological Society of Washington* 110(1):18-23.
- BROWN, W. C., A. C. ALCALA, A. C. DIESMOS, AND E. ALCALA. 1997. Species of the *guentheri* Group of *Platymantis* (Amphibia: Ranidae) from the Philippines, with descriptions of four new species. *Proceedings of the California Academy of Sciences* 50(1):1-20.

- BROWN, W. C., R. M. BROWN, AND A. C. ALCALA. 1997. Species of the *hazela* Group of *Platymantis* (Amphibia: Ranidae) from the Philippines, with descriptions of two new species. *Proceedings of the California Academy of Sciences* 49(11):405-421.
- DIESMOS, A. C. 1998. The Amphibian Faunas of Mount Banahao, Mount San Cristobal, and Mount Maquiling, Luzon Island, Philippines. Unpublished MS. Thesis, University of the Philippines, Los Baños, Laguna.