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New Brazilian Forms of Hyla

by

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New Brazilian Forms of *Hyla*

BERTHA LUTZ*

ABSTRACT

The author describes three new species and three new subspecies of *Hyla*, found during her work toward a monograph of the species of *Hyla* which occur in Brazil. The new species are: *Hyla adenoderma* from Rondonia territory; *H. longilinea* from the high mountains at Poços de Caldas, Minas Gerais; and *H. egleri* from Belem do Para. The last-named is a northern representative of the forms belonging to the group of *H. catharinae* from the southern and southeastern serras. The new subspecies are: *H. duartei caldarum* from Poços de Caldas; *H. raddiana joaquinii* from the highest and most southern part of the state of Santa Catarina; and *H. rubra orientalis* from the Atlantic coastal area of Brazil.

*Hyla adenoderma* n. sp.

An unusual and interesting large-sized Hylid was received by the author from the Swiss ethnographic explorer, F. Casper, who collected it while on a trek along the Rio Branco in the former Territory of Guapore, now Rondonia. This territory lies in the southwestern corner of the Brazilian sector of the Amazonian Hylaea; mesetas occur in its southern part.

*Diagnostic Characters.* Skin extremely coriaceous, entirely glandular and mammillate on the dorsal surface and sides of the body, adorned by a net composed of wide meshes surrounding large patches on the back; a short rounded head; large size, extensive webs.

*Type and Type Locality.* The holotype and unique, perhaps slightly immature specimen was received Sept. 1, 1959, and is now No. 4054 of the Amphibian Collection of the MNR.** It was taken by F. Casper from the banks of the Rio Branco, a sub-tributary of the Rio Madeira in Rondonia, Brazil. The Rio Branco flows northward from the meseta called Chapada dos Parecis. Rondonia lies approximately between 8° to 14°S. and from less than 60° to slightly more than 66°W. The locality is between 10° to 12°S. and 62° to 63° 30’ W.; climate hot and humid (*Am. Koppen*) with ill defined dry season and large-leafed rain forest in the lowlands.

*Description.* Size large; holotype approximately 64 mm. from snout to vent, difficult to measure accurately because of the bent head and slightly curved body. Robust build, massive head, wider than long. Body as wide at the head

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* Museu Nacional, Rio de Janeiro, Brazil.
** Museu Nacional, Rio de Janeiro.
as at the shoulders, tapering somewhat beyond the sacrum. Hind limb impossible to adpress, the tibiotarsal articulation probably not reaching beyond the eye. Snout short, rounded, not projecting above the mouth. Canthus rostralis short, blunt, truncate at nostrils which are lateral, subcanthal, and slightly tumefied; loreal region high, slightly concave. Eye of preserved specimen oblique, longer than the distance from its anterior corner to the nostril. Tympanum distinct, partly covered by a thick ridge, about half the diameter of the eye. Interorbital space slightly wider than internarial space. Tongue rounded, short, wide, entire, partly free behind. Vomerine teeth in two short, well separated, transverse groups between and to the posterior border of the choanae. Fore limb thick, hand large, with robust fingers and large, rounded disks, the first slightly smaller than the others, the third almost as large as the tympanum. An oblique narrow web between the first and second fingers; web to below the disk on the outer side of the second and on fourth, to penultimate tubercle on both sides of the third, hence fringed. Tibia slightly shorter than femur, both moderately stout; foot long. Web oblique between first and third toes, wide to below the disk on the outer side of first, second, third and fifth, to the penultimate joint on both sides of fourth toe. Disks slightly smaller than on fingers. Subarticular tubercles average. An elongate callosity under the first finger and the first toe, a rather flat one below the outer fingers. Skin unusually coriaceous, mammillate over the entire dorsal surface and the sides, with regular raised rows of glandules; a glandular ridge and larger glandules in the peritympanic region. Ventral surfaces granular, especially the gula, belly, and mid-ventral part of
thigh. Limbs smooth, above and beneath. A fold of skin forms a tiny bib at the base of the throat and folds on the sides below the mouth.

**Measurements** (mm.). Head and body measured separately on account of the bent head: \(20 + 44 = 64\). Head length to width 20:24. Eye 8, tympanum 4, eye-nostril 6, interorbital space 7, internarial space 5. Hind limb 114: femur 35, tibia 34, tarsus 19, foot 26, hand 22.

**Color and Pattern.** The preserved specimen is tan, its irregular pattern brown, with broad meshes, some of them open, delimiting large intervals; regular bars on the permanently visible dorsal aspects of the limbs, very distinct on thigh, leg and outer edge of tarsus and foot; otherwise unmarked; pustules lighter than the network. Snout in front of the eye devoid of network, lighter than the rest. Concealed upper aspects of limbs and ventral aspect of body unmarked.

Unfortunately, no data were provided with the specimen. It differs by the texture of the skin from all other species of *Hyla* known to me. It may come near to the rare *H. coriacen* Peters from Surinam. The skin however, is mamillate, not pitted, as described by Peters, the pattern is quite different and some of the other morphological characters disagree. The localities of these two are in the Hylaean Region but at its most divergent extremes. The shape of the head and especially its bent position suggest a certain degree of phragmosis; the build is reminiscent of *Trachycephalus* but the skin of the head is not concrescent with the bone, nor is there a skull cap or a perceptible occipital ridge. In the absence of adult male characters one cannot be certain of paired vocal sacs.

**Hyla longilinea n. sp.**

A unique specimen of a relatively large *Hyla* of streamlined *Eleutherodactylus*-like build was obtained during field work in the naturally radioactive area around Poços de Caldas, by the Institute of Biophysics of the Federal University of Rio de Janeiro, the National Museum, and the U. S. Atomic Energy Commission.

**Diagnostic Characters.** Relatively large size, long-lined build, with elongate head and snout and long hind limbs; permanently visible parts of the dorsal aspect are pustular. Morphological details similar to those of *H. acuminata* Cope (*phrynoderma* Boulenger) of the *H. rubra*-*H. x-signata* complex. It differs from *H. acuminata* by the larger size, long-lined build, thinner and longer hind limbs, longer, less acuminate snout, and still rougher dorsal surface; it differs from *H. fuscovaria* by having a different appearance, texture of skin, and pattern.

**Type and Type Locality.** Holotype 9, now MNR No. 4060, collected by Heber Nobrega da Cunha, Dec. 17, 1963, at the water reservoir of Morro de São Domingos, Poços de Caldas, Minas Gerais, 21° 50' S., 46° 53' W., 1,200–1,300 meters elevation.
Description. Female, 48 mm. long (Fig. 3), somewhat bent. Long-lined build, somewhat spindle-shaped, attenuated in front from the tympanic region to the tip of the snout, tapering more sharply behind from sacrum to anal region. Hind limb relatively long, the adpressed tibiotarsal articulation reaching the nostril. Head massive, longer than wide, with a slight depression between the eyes. Body robust, almost as wide as head at the shoulders. Snout very long, oval in outline from above, sloping slightly to mouth opening in profile. Canthus rostralis fairly distinct; loreal region grooved behind the nostril. Nostril subcanthal, small, not terminal but much farther from the eye than from tip of the snout. Eye moderate in preserved type; very slightly longer in diameter than the distance to the nostril, shorter than the distance to the tip of the snout. Tympanum slightly oblique, its transverse diameter about one third the diameter of the eye. Interorbital space wider than interocular space. Tongue very large, fleshy, rounded but distinctly notched and partly free behind. Vomerine teeth in two small groups between the choanae, as usual in the H. rubra-H. x-signata complex. A bare trace of web between the fingers. A callosity at the edge of the first, a flat, bifid tubercle under the third and fourth fingers. Disks wide, short, rounded in front, constricted behind, that of first finger relatively smaller than the others. Toes fully webbed; a narrow fringe on the inner side of first and on the outer side of fifth; web wide to below the disk on the outer side of second, third, and on fifth, to the penultimate articulation on the inner side of second and third
and on both sides of fourth toe. Disks slightly smaller than those of fingers. A small inner and a minute outer metatarsal tubercle. Faint ridges on tarsus and forearm; glandules, but no real appendix on heel. Skin of dorsal surface rough on all parts of body and limbs visible in repose, but not on the thigh, seeming rougher to the touch than that of *H. acuminata*. A very marked supratympanic ridge from eye to shoulder; glandular ridges in lieu of the apparently much fragmented dorsolateral stripes and sacral spot. Disseminated pustules all over the head, upper eyelid, back, sides of the body and limb segments visible in repose. No distinct fold across the chest. Skin of gula, chest, belly and midventral strip of the thigh granular, as if paved.


*Color and Pattern.* Dorsal surface medium brown, pattern and pustules much darker. Interocular spot prolonged backward, bluntly triangular, bifid with a faint light halo in front and a central pustule in the middle of the anterior border. The usual curved, inverted parentheses-like, dorsolateral stripes and the sacral spot much fragmented, the segments distributed over the back with bilateral symmetry; glandular, beset with large-based pustules. Subcanthal stripe and supratympanic ridge similar; faint, alternating light and dark oblique areas from eye to edge of mouth. Tympanum light brown, as usual in the whole group. Thigh smooth, without dark bars (present in *H. acuminata*) but with a minute marbling in blending tones of brown, the lighter spots slightly larger and more horizontally disposed in the posterior portion, concealed in repose. Edges of pattern on limbs not very marked when viewed from beneath.

Unfortunately, no ecological or other notes were sent with the specimen, which was not seen alive by me. The collector is no longer on the staff of the institution.

*Affinities.* This solitary specimen is streamlined in appearance. The name, suggested by Prof. G. A. Lutz, was derived from terminology of the Italian typologists, who divide humans into long-lined and short-lined types. This is exactly the impression gained when *H. longilinea* is compared to females of *H. acuminata* which are nearest to it in skin surface and pattern. Despite the acuminate snout of the latter, they are shorter (40–44 mm.) and more squat, with the plump legs so often seen in the *H. rubra-H. x-signata* complex; their tibiotarsal articulation fails to reach the nostril and often does not go much beyond the anterior corner of the eye. The difference in build of *H. longilinea* is impressive. It contrasts with all but the largest specimens of *H. fuscovaria* in size, but is smoother, more rounded, and less flattened in shape. In Brazilian forms of *Hyla*, the morphological details seem to be group characters rather than specific ones. Though very different in appearance, *H. longilinea* conforms to morphological characters of the *H. rubra-H. x-
signata complex, in the shape and position of the vomerine teeth, and in the shape of the tongue and disks.

The locality where it was found is very different from the area inhabited by H. acuminata, which belongs to the fauna of the Chaco, i.e., of the Continental Depression. H. fuscovaria has a great range which includes part of the coastal mountains up to a certain elevation, but apparently does not include forested terrain. H. longilinea was taken at a distance from the sea, at an elevation between 1,200 and 1,300 meters in the vicinity of a reservoir where the forest has been maintained.

_Hyla egleri_ n. sp.

This species of _Hyla_, found in the coastal lowlands of northern Brazil, is similar in dorsal pattern to the group species _H. catharinae_, but has a more elongate snout. The skin is glandular as in the whole _H. catharinae_ group. We have a number of specimens of it from Belem do Para.

**Diagnostic Characters.** Long snout, with raised, not quite terminal nostrils, give it a crocodilian profile; small choanae; concealed surfaces dull green-gray to slate color; iris has dark horizontal pseudocolobom and two median vertical, bar-like spots, producing an incomplete dark cross. Hind limb apparently longer than in the group of _H. catharinae_, though this character is variable in Brazilian species of _Hyla_.

**Types and Type Localities.** The holotype ♂ and allotype ♀ (Figs. 4, 5) on which this description is based were collected in Belem by A. L. Carvalho; paratypes were collected from the “pirarucu” pond of the Museu Goeldi in Belem do Para by the author and Misses Alba Maranhao and Inah Silveira. Additional paratypes were sent, in December, 1959, by the late Director of the Museum, Dr. Walter Egler, for whom the species is named. Holotype ♂ MNR 4055, Allotype ♀ MNR 4056.

**Description.** Males with vocal sac, 24–29 mm. snout to vent; female 35–40 mm. long, robust; specimens without marked sex characters 22–23 mm. snout to vent. Body elongate, narrowed between the sacrum and the groin. Hind limb variable in length, the tibiotarsal articulation reaching beyond the nostril, to the tip of the snout (juveniles) or only between the nostril and the eye. Head slightly longer than wide. Snout elongate, slightly acuminate in front, truncate in profile; nostrils tumefied, not quite terminal; canthus rostralis moderate, loreal region slightly concave under the eye. Outline of mouth ogival. Eye moderately large, its horizontal diameter about equal to the distance from its anterior corner to the nostril. Tympanum distinct, vertical, small, its horizontal diameter between one-fourth and two-fifths the diameter of the eye. Interorbital space slightly wider than the internarial space. Tongue oval, distinctly notched, slightly free behind. Vomerine teeth in two small, transverse, curved groups, close together, between the choanae, which are not large. Disks short and wide on the fingers, except on the first, slightly
smaller on the toes. Outer fingers free. Toes more than half webbed; a narrow fringe of web on inner side of second toe, in some specimens an even narrower fringe outside the first. Web oblique between second, third, fourth, and fifth toes, wide to the penultimate subarticular tubercle on fourth, reaching below the disk on the outer side of second, third, and fifth toes. Skin of dorsal surface with many scattered glandules, especially on the head, upper eyelids, edges of the limbs and sometimes on the outline of the spots. Glandules on eyelids very distinct as they are on the heel, a distinct point sometimes present on heel, but not forming a conical appendage. Dorsal pattern occasionally outlined, and dorsolateral spots occasionally covered by glandules. There is a supra-tympanic ridge, and slight fold across the chest. Skin of thigh, belly, and entire ventral surface of the body, granular. The males have large median vocal sacs for their size.

Variation. The usual variation as to the relative length of the hind limb, which may reach the snout or beyond it. The small specimens are almost all very long-legged, the tibiotarsal articulation reaching the snout or even beyond it.

Color in Life. Several color slides made by G. A. Lutz of specimens sent by Egler from Belem fail to show much dorsal pattern; slightly roseate tones of brown on the dorsal aspect with indistinct pattern, especially so in the
lightly pigmented specimens. Alternate dark bars relatively light, more
distinct on limbs than the pattern on the body, reaching the outer
digits. Ventral surfaces light, the belly white, the gula with indistinct dark dotting;
ventral parts of limbs grayish, the thighs and legs with a greenish tint.

**Pattern.** The basic components of the dorsal pattern are the same as those
of the group of *Hyla catharinae*, i.e., interocular and sacral spots plus dark
dorsolateral curved stripe areas, similar to inverted parentheses. Interocular
spot elongate, somewhat narrowed posteriorly, forming a blunt, truncate
triangle generally devoid of its apex; in one there are two blunt points
behind. Sacral spot more or less rectilinear; in the Belem specimens either
elongately quadrilateral or trapezoid prolonged backward and sometimes
downward at the posterior edges. Outline of the dorsal spots often more
distinct and darker than the area enclosed. There may be a prolongation
from the interocular spot backward or from the sacral spot forward, a spot
between them or a few small spots behind the sacral one. Two of the speci-
mens have an additional light margin around the interocular spot; in one it is
reddish. The dorsolateral dark areas begin at the eyes and are narrow over the
tympana, thence wider and deflected onto the sides of the body, stopping at
the elbows or just beyond them. They are indistinct in some specimens but
these have a complex of large black peritympanic glandules. Oblique bars on
the permanently visible dorsal aspect of the limbs present in all of the speci-
mens, generally reaching the outer digits. Pattern on the concealed upper
part of the thighs consisting of dark bars on light ground, their edges visible
from beneath as spots in many, but not in all, specimens. The female allotype
has unusually light areas on the sides of the back.

The parentheses-like dorsolateral spots are very dark in a number of
specimens.

**Range.** We have seen short series of similar specimens, having a more
marked cross on the iris, from two northeastern localities: Mamanguape in
Paraiba and Rio Largo in Alagoas, both lots belonging to the Department of
Zoology of the state of São Paulo. These specimens, though probably con-
specific, were not seen alive by us and are not included in the description.

**Affinities.** This form is either a species or a subspecies of the northern forms
akin to *H. catharinae*, a name used by me for the mostly montane forms from
southeastern Brazil, which are without yellow or orange flash colors on the
concealed surfaces.

The northern forms seem to be longer-headed. There probably will be at-
ttempts to lump *H. egleri* together with others, such as *H. boulengeri*, or the
frogs from Venezuela put in *Hyla palpebrogranulata* by Lutz and called *Hyla
lutzi* by Melin. The color of the concealed surfaces is a very important point
and those with orange or yellow must not be grouped with others that range
from dull gray or violet, like *H. egleri*, to glaucous tones of green or blue.
The frogs collected by Dr. Johann Becker and his assistants during a survey of naturally radioactive areas at Poços de Caldas, in the state of Minas Gerais, include a very small new form of the *Hyla rubra*-*H. x-signata* complex. I have called it *Hyla duartei caldarum* after the type locality, whose name is derived from the thermal springs found there.

**Diagnostic Characters.** The small size, elongate, fairly slender build, long snout and robust hind limbs, are allied to a variant of the *H. rubra* pattern. This comprises an interocular spot, a pair of longitudinal stripes and light ocelli, chrome-colored in life, on the concealed areas of thighs and flanks.


**Description.** Size small, male type 25 mm. snout to vent (Fig. 6). Build elongate, postcapular region almost as wide as head. Hind limb robust, fairly long, the tibiotarsal articulation reaching between nostril and eye when leg is adpressed. Head slightly longer than wide; snout long, triangular, depressed beyond nostrils, blunt at the tip, projecting obliquely over the mouth opening in profile. Canthus rostralis not marked. Loreal region rather high, concave between nostril and eye. Nostril superolateral, not terminal, very slightly tumefied. Eye average, approximately as long as its distance from nostril, considerably shorter than its distance from tip of snout. Interorbital space wider than internarial space. Tympanum very distinct, about one-half the diameter of the eye. Tongue wide, oval, slightly notched and free behind. Vomerine teeth in two short, transverse, almost contiguous groups, between the choanae. Fingers long, lateral ones with a trace of web at the base. Disks short, rounded. An elongate callosity on the edge of first finger, an indistinct, bifid tubercle below third and fourth fingers. Foot half-webbed, wide part of webs rather straight. An inner and a small outer metatarsal tubercle. A slight ridge of glandules on the inner edge and a slighter one on the outer edge of tarsus; similar, less distinct ones on the edge of forearm, the outer continued onto the hand. Disseminated glandules on the dorsal surface and limbs, especially on the upper eyelid and vertex. Venter granular, with minute dots on the vocal sac. A fold across the chest concealed by the vocal sac, a peritympanic ridge, a series of glandules below the tympanum.

**Female Allotype.** Larger, 28 mm. snout to vent. Build more robust. Hind limb slightly shorter. Snout less blunt. Throat and chest minutely granular. Fold across the chest and short axillary folds more marked.
Fig. 6. (a) *Hyla duartei caldarum* n. subsp., male type, natural size 25 mm. (b) Male paratype. (c) Characteristic profile.

Secondary Sex Characters. Not striking. Males small, slender, vocal sac very large, callosity at the edge of first finger rather marked. Female larger, more robust, belly distended by eggs.

Variation. Fifteen of the male paratypes are like the holotype, especially those collected together with it. There is not more than one millimeter of difference between them in snout-vent length. Hind limb variable, as usual in Brazilian species of *Hyla*, the adpressed tibiotarsal attaining some point between eye and nostril, nearer to the latter in some, to the former in a few. The other differences are minute and regard the width of the tongue, the degree of approximation of the groups of vomerine teeth and the distinctness of the glandular ridges and pustules. Two males from Rio das Antas differ more: they are very slightly larger (27 and 26 mm. snout to vent), more
robust and more elongate in build, with long, pointed snout and shorter hind limb, the tibiotarsal articulation reaching in front of the eye in one, to its anterior part in the other. The third is average in size and aspect.

*Color.* Seventeen of the males are grayish drab above with a somewhat darker pattern; the smaller one from Rio das Antas is slightly darker than the others. The two large aberrant ones are quite dark, olive to clove brown.

*Pattern.* The pattern is essentially that of the *H. rubra* group. The type specimen shows a discrete dark, subcanthal line; a light brown tympanum with the area around it slightly darker than the background. The interocular spot is a trapezoid with the longer part in front; it is not prolonged posteriorly but has small median, anterior and posterior notches plus minute anterior and posterior lateral prongs. The pair of dark dorsal stripes is entire and touches the interocular spot on the left side. The stripes curve inward toward each other between shoulder and forearm, diverge again, become more or less straight on the sacrum and fade out. Both interocular spot and dorsal stripes are surrounded by a white halo, perhaps yellow in life. Bar-like oblique spots on the permanently visible aspect of the limbs, especially tibia and forearm, present but not distinct. A pattern of small, rather irregular, light ocelli on the part of the flank and on the posterior dorsal part of the thigh that are concealed in repose. Ventral aspect clear.

Except for the two large specimens from Rio das Antas, the male paratypes are very similar in pattern to the type. The two large dark specimens from Rio das Antas show more pattern than would be expected, because there is a halo of large, discrete, brilliant, white spots along the edges of the dorsal stripes and interocular spot and also along the edges of the bars on the limbs. The thighs show a very distinct pattern of dark bars and light areas. The female allotype shows no pattern at all except for the ocelli.

*Habits and Ecology.* Unfortunately, I have not yet seen living individuals of this little frog from the montane marshes of its elevated and formerly volcanic type locality. Dr. Becker informs me that it is quite common and lives in the rosettes of an Umbellifera (*Eryngium* sp.), and of large Eriocaulaceae with similar appearance.

*H. duartei caldarum* is evidently a member of the *H. rubra*-H. *x-signata* complex. Initially, I considered it as a distinct species with rather polymorphic trends. After examination of more abundant material, I now consider it as a subspecies of *H. duartei*, adapted to a very special biotope.

Three very small specimens of a *Hyla* from Inobra, Oxford, near São Bento do Sul, N. Santa Catarina, are very similar to *H. d. caldarum* and also to *H. fuscomarginata*; they are much smaller than *caldarum* and have ocelli, albeit small and indistinct ones.

*Hyla raddiana joaquinii* n. subsp.

This very beautiful tree frog was collected in the highest and most southern
part of the state of Santa Catarina, at an elevation of almost 1,400 meters. It is dedicated to the co-finder, my late assistant and collaborator, Joaquim Venancio, whose name is the same as that of the patron saint of the type locality.

**Diagnostic Characters.** Very similar to *H. raddiana*, especially to those specimens having a uniform green dorsal mantle with light dorsolateral margins. Differing from others by the ornamentation of the postsacral region and the absence of dark stripes on the concealed surfaces of thighs and flanks; also by the very short snout, truncate between the nostrils, the better developed pollex rudiment and by the range, on the Serra Geral of southern Brazil and perhaps its spur into Argentina.

The type (MNR 4033; Fig. 2) and a paratype (MNR 4034), both males, were caught on December 30, 1949, by Joaquim Venancio and the author outside São Joaquim in the state of Santa Catarina (28° 17' 19" S., 49° 55' 56" W.) at about 1,350 meters altitude, in open, montane meadow formation; São Joaquim is one of the highest and coldest inhabited places in Brazil. The type was found sitting on a stone in a clear mountain stream. The paratype was gotten from a tree in the vicinity.

**Description.** *Type* ♂: 51.5 mm. snout to vent. Build robust. Body elongate, narrowed only between the sacrum and the groin. Leg fairly long, the adpressed tibiotarsal articulation reaching in front of the eye. Head almost square. Snout very short, truncate between the almost terminal nostrils, abbreviated and very slightly convex in profile. Canthus rostralis short, distinct. Loreal region high, vertical, grooved between nostril and eye. Crown slightly concave between eyes. Interorbital space wider than the internarial, not much wider than the upper eyelid. Eye large, its horizontal diameter not quite double the distance to the nostril. Tympanum less than one-half the diameter of the eye. Vomerine teeth in two short, robust, well-separated groups, at the

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Fig. 7. *Hyla raddiana joaunini*, male type. Natural size, 51.5 mm.
level of the posterior edge of the choanae. Tongue short, very wide, entire, slightly free behind. A short web between the three lateral fingers to the first subarticular tubercle, thence narrowed to a fringe. A very marked pollex rudiment ending in a sharp point. Web between first and second toes oblique, reaching the first subarticular tubercles; on the outer three, webs longer, wide to the second tubercle. A modest inner and no outer metatarsal tubercle. Skin smooth above, slightly granular on the chest; gula and midventral aspect of thigh with small but distinct, regular granulations; abdomen granular.

The type and paratype are both males with thickened forearms as well as sharp pollex rudiments. Vocal sac not conspicuous. Females not yet seen.

**Measurements.** Type (mm.) 51.1 from snout to vent. Hind limb 99. Head length to width 15:1. Femur 29, tibia 28, tarsus 17, foot 24. Paratype 40.1 snout to vent; head length to width 15:2; femur 20, tibia 20, tarsus 13, foot 17.

In life, head and body covered by a beautiful green mantle with luminous white, dorsolateral margins, from behind the eyes to the sacrum; similar, slightly more sinuous white margins, outlined in dark, on the sides of the head. A bronze suffusion on the forepart of the head and the upper eyelids. A similar slightly browner longitudinal area on the median post sacral part of the back. A longitudinal series of olive-green spots, very small in front, growing larger and becoming elongate caudal, on each side of the body, just inside the light margin; the last one forms an inlet in the color of the sides, so that the margin ends in a prong. Forelimb and tibia similar to the body in color, but lighter. Thighs quite different; three brilliant white spots on the left one and some large scallops on the right one, limited in front by the vinaceous color of the anterior part of the thigh and behind by the olive green tone of the posterior upper part, both concealed in repose. Tarsus and foot less distinctly ornamented with longitudinal, light, scalloped areas and dark spots. Sides of body olive green. Ventral aspect light, clear.

Several specimens of a *Hyla* collected at an elevation of 800 meters at San Pedro, Misiones, by Ceí, Roig and Valerio, on the spur of the Serra Geral which enters Argentina, are rather similar.

In *Frogs of Southeastern Brazil* (1955), Cochran (Doris M., 1955, Bull. U. S. Nat. Mus., 206, pp. I–XVI, 1–423) publishes a photograph (No. 11) of *Hyla raddiana*, USNM 12493 from “South America” which is similar to *H. r. joaquini*. The new subspecies differs from the other races of *H. raddiana* by the diagnostic characters mentioned above.

*Hyla rubra orientalis* B. Lutz, n. subsp.

This is an eastern form of *H. rubra* from the Atlantic area of Brazil. We know of its occurrence from Pernambuco to Santa Catarina. The subspecific name is derived from the range along the seaboard of Brazil. For a long time the specimens of *H. rubra orientalis* (Fig. 8) collected near Rio de Janeiro were loosely put under *H. fuscomarginata* Lutz, 1925, but that is a dwarf-form, first found in Minas Gerais.

[ 15 ]
Diagnostic Characters. Similar to *H. rubra rubra* and *H. rubra duartei* in size, but differing from both by the more robust build, rougher skin and the absence of ocelli or bright flash-colors on the parts of the flanks and limbs concealed in repose. Smaller than *H. rubra huebnerii*. Range different from that of the other forms.

Types and Type Locality. Fifteen specimens from Crubixa, county of Santa Leopoldina, state of Espirito Santo, were collected by Elio Gouvea on March 16, 1960. MNR No. 4030 was selected as male type and MNR No. 4031 as female allotype; the others, MNR No. 4032, serve as paratypes (Fig. 8).

Description. Size small, but not minute, up to 32 mm. snout to vent. Build robust. Body almost uniform in width from eye to sacrum. Hind limb short, tibiotarsal articulation reaching the eye when adpressed. Snout triangular, wide at the base, narrow in front, sometimes appearing pointed beyond and below the nostrils. Canthus rostralis straight to the nostril, moderately distinct. Loreal region slightly concave. Nostrils subcanthal, small, slightly swollen. Eye prominent, slightly longer than the distance to nostril. Tympanum small, not more than one-third horizontal diameter of eye, very dis-
tinct. Tongue subcircular, slightly emarginate and free behind. Vomerine teeth in two short, subcontiguous groups between the small choanae. Disks short but well developed, especially on hand, rounded in front. Fingers free. Webs on toes more or less straight, reaching to below the disk on the outer side of second, third, and fifth toes, reaching to the penultimate tubercle on both sides of fourth toe. A tubercle below the first finger; palm well padded, especially below third and fourth fingers. An elongate inner, and a very small outer, metatarsal tubercle. Skin pustular on the back and sides; belly and midventral aspect of thigh granular. A glandular supratympanic ridge; distinct folds of skin below the gula and across the chest.

*Measurements.* Females 25–32 mm. snout to vent; males 23–30, average 29 mm.

The specimens from Espírito Santo and those from Santa Catarina are mostly large and robust. The latter may be evolving into a separate race.

Secondary sex characters are not marked except for the yellow gula of the male and the distension of the body by egg masses in the female. Some females attain larger size than males.

Dorsal coloring in life (Rio de Janeiro population) dull, olivaceous brown or drab, variable in depth and intensity at different times in the same individual. Pattern darker. Tympanum a lighter brown. Upper part of iris iridescent; lower half is same color as sides of the head. Sometimes the entire body has a metallic glint. In males, the ventral surfaces of the body are whitish, and the gula is dull yellow. In females, the ventral surfaces of limbs are grayish, as is the gula.

The pattern consists of two pairs of longitudinal dark stripes, or bands, separated by a lighter interval, plus an interocular spot and sometimes a vertebral line. Inner dorsal stripe more uniform and manifest; wider and longer than outer, dorsolateral one. In some individuals dark blotches behind the outer spot. Interval either the same color as the dorsal background or lighter, very conspicuous in juveniles. Interocular spot often absent or indistinct, variable in shape, sometimes reminiscent of a phrygean bonnet. Details and intensity of pattern very variable. One ornate juvenile reminiscent of northern races of the species.

Some specimens from the lowlands of the state of Rio de Janeiro have the inner dorsal stripe fragmented into a fore and a hind part and/or slightly curved inwards, as if they tended toward the pattern of the forms belonging to the *H. x-signata* sector of the group. In most specimens from Rio de Janeiro, the pattern is, however, inclined to simplification, with a conspicuous inner dorsal band, a very dark but short, narrow outer band and the rest of the pattern indistinct. The specimens from Espírito Santo have a more marked pattern on the back, often with a light halo around the dark bands which are variable in shape; these specimens also have a white area along the upper jaw. Most of the specimens from Santa Catarina have a marked dorsolateral pattern. A number of them show a light area at the edge of flank and thigh,
obscure mottling on the concealed posterior part of the latter, and oblique spots or bands on the permanently visible dorsal aspect of the limbs.

**Voice.** The call of *H. rubra orientalis* heard in Río and in southern Bahia, agrees with the usual croak of the whole *rubra x-signata complex*. It sounds something like “créé, créé, ccréé…”

**Habits and Ecology.** This form, like others of the complex observed alive, calls from vegetation above ponds and other sheets of standing water in which it breeds. At Sernambetiba outside Río it often sits on small banana trees at the edge of a canal. In southern Bahia it was found during daylight hours, sheltering in epiphytic bromeliads, some of which were growing on trees in swampy ground while others were clinging to dead trees or telephone poles in full sunlight. The microclimate inside the bromeliads probably remains moist and cool except during long periods of drought.

**Range.** There is a hiatus in the known distribution of *H. rubra “sensu lato”* along the coast, between Cap Orange and Pernambuco in Brazil. Our large samples of *H. rubra orientalis* are from the states of Bahia, Espírito Santo, Río de Janeiro, Guanabara and Santa Catarina, plus a few from São Paulo and one from Tapera in Pernambuco. It is possible that some very small specimens from Río Grande do Sul collected by Milstead at Porto Alegre belong here though they have no vestige of livery. They are already within the range of *H. eringiophila*, but this belongs to the *H. x-signata* sector of the complex.

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