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COMMENTS ON SEVERAL SPECIES OF *ANOLIS* FROM
GUATEMALA, WITH DESCRIPTIONS OF
THREE NEW FORMS

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THE Guatemalan plateau anole with enlarged dorsal scales has customarily been known as *Anolis uniformis* Cope. I have recently had an opportunity to examine some of the cotypes of this species (United States National Museum No. 24859, Yucatán; Nos. 6774, 24734-48, and 24750, Guatemala) and find that they are not the highland anole nor even remotely related to it. *Anolis uniformis* represents, rather, a species which occurs abundantly on the Caribbean lowlands of northern Central America and to which the name *A. ruthveni*¹ has been applied. Another cotype of *A. uniformis* in the Museum of Comparative Zoology, Harvard University (No. 10933, *vide* Barbour²), I have not seen, but since it was originally one of the United States National Museum series from Guatemala, it probably is the same.

Further, I have examined four of the cotypes of *A. crassulus* Cope in the Academy of Natural Sciences of Philadelphia (Nos. 8023-27, Central Guatemala). These prove to be the

¹ L. C. Stuart, "A New *Anolis* From Northern Central America," *Occ. Papers Mus. Zool. Univ. Mich.*, 310 (1935): 1.

² T. Barbour, "The Anoles II. The Mainland Species from Mexico Southward," *Bull. Mus. Comp. Zool.*, 77, 4 (1934): 153.

highland form to which the name *A. uniformis* has heretofore been applied. Before me is a photograph of one of the two other cotypes of *A. crassulus* from Cobán, Guatemala, in the British Museum (Natural History), *vide* Barbour,³ which does not appear to be the same as the former series. However, I have collected in the Cobán region an anole which might easily be confused with *A. crassulus* and which is very much like the British Museum specimen. Since my extensive collecting in that area has failed to reveal true *A. crassulus*, it is suspected that the British Museum specimens are conspecific with mine.

The Academy of Natural Sciences of Philadelphia specimens are, therefore, herein designated lectocotypes, and the name *A. crassulus* is restricted to the Guatemalan plateau species. The proper synonymy of these species (citing only major references) should read

Anolis crassulus Cope

Anolis crassulus, Cope, *Proc. Acad. Nat. Sci. Phila.*, 1864, p. 173. Lectocotypes, Acad. Nat. Sci. Phila. Nos. 8023-27, Central Guatemala. Boulenger, *Cat. Lizards Br. Mus. (Nat. Hist.)*, 2 (1885): 81 (in part, specimen from "Plateau of Guatemala").

Anolis uniformis, Barbour, *Bull. Mus. Comp. Zool.*, 77, 4 (1934): 153.⁴

Anolis uniformis Cope

Anolis uniformis, Cope, *Proc. Amer. Phil. Soc.*, 22 (1885): 392. Types, U. S. Nat. Mus. No. 24859, Yucatán; Nos. 6774, 24734-48, 24750, Guatemala; Mus. Comp. Zool. No. 10933, Guatemala, *vide* Barbour. Boulenger, *Cat. Lizards Br. Mus. (Nat. Hist.)*, 2 (1885): 84 (no specimens).

Anolis humilis, Boulenger, *Cat. Lizards Br. Mus. (Nat. Hist.)*, 2 (1885): 82.

Anolis ruthveni, Stuart, *Occ. Papers Mus. Zool. Univ. Mich.*, 310 (1935): 1. Holotype, Univ. Mich. Mus. Zool., No. 76622. Many paratypes in the Museum of Zoology, Field Museum of Natural History, and the United States National Museum.

³ *Ibid.*, p. 129.

⁴ Barbour included *Anolis metallicus* Bocourt in his synonymy of *A. uniformis*. From the poor description (M.-F. Bocourt, *Ann. Sci. Nat., Zool. Ser.*, 5, 172 [1872]) and good figure of the head (M.-F. Bocourt, *Études sur les reptiles, Mission scientifique au Mexique* [Paris: Imprimerie Nationale, 1873], 3^e pte.: Pl. 17, bis, Fig. 1) I suggest that *A. metallicus* is synonymous with *A. tropidonotus* Peters.

Anolis haguei, new species

Anolis crassulus, Boulenger, *Cat. Lizards Br. Mus. (Nat. Hist.)*, 2 (1885): 81 (in part, specimen from "Coban, Guatemala").

HOLOTYPE.—An adult male, University of Michigan Museum of Zoology No. 90226, collected by L. C. Stuart, May 21, 1940.

TYPE LOCALITY.—Cloud forest 2 km. south of Finca Chichén (about 9 km. [straight line] south of Cobán), Alta Verapaz, Guatemala. Altitude, about 1750 m.

PARATYPES.—University of Michigan Museum of Zoology Nos. 90227–31 (23), collected in the same general locality as the holotype.

DIAGNOSIS.—An anole very closely related to *Anolis crassulus* Cope, from which it is readily distinguished by its smaller dorsal scales.

DESCRIPTION OF HOLOTYPE.—Dorsal head scales irregular in size and shape, knobby in appearance, rugose or carinate. Supraorbital semicircles distinct, composed of scales which are broader than long; in contact medially. Three large and several somewhat smaller supraoculars, separated from the supraorbital semicircles and superciliaries by granular scales. Parietal distinct, slightly larger than ear openings, not in contact with supraorbital semicircles. Canthus sharp; five rows of loreal scales; six supralabials to below the center of the eye. About eleven rows of keeled, imbricate dorsal scales, those along the middorsal line largest; imbricate dorsals grading gradually into the granular, juxtaposed laterals which are much smaller than the dorsals. About fifty-seven dorsal scales between the levels of the axilla and groin. Ventral scales strongly keeled, much larger than the dorsals, numbering about thirty-five between the groin and axillary levels. Tail slightly compressed, and covered with sharply keeled, subequal scales. Male with enlarged postanal scutes. Dewlap large, extending posteriorly well beyond the level of the axilla.

Head length, snout to tympanum	14 mm.
Head width	9.5 mm.
Body length, snout to anus	50 mm.
Tail length	94 mm. (complete ?)

Tibia length	11 mm.
Groin to heel	22 mm.
Heel to tip of toe IV	15 mm.
Axilla to wrist	11.5 mm.

Ground color of dorsal surfaces brown. The posterior part of the head is mottled with black, and there is a black mid-dorsal stripe the lateral extent of which is irregular. Laterally, the snout is light brown, and the head behind the eye is mottled dark brown and black. The sides are very dark brown. A very fine dark streak extends from the tympanum posteriorly above the arm and on the sides. The legs are mottled with light and dark shades of brown above. The ventral surfaces are brownish white, the chin and throat heavily smudged with black. The tail is light brown with occasional dark spots. The dewlap is very pale red (bright red-orange in life).

VARIATION.—In the paratypic series no great variation is noted. The irregularity of the head scales produces many minor variations. Of these, the most frequent is the separation of the supraorbital semicircles by a single scale. The dorsal scutellation varies 41–57 (mean 48) in the males and 45–59 (mean 53) in the females, and the ventral scutes vary 31–35 (mean 33) in the males and 32–36 (mean 34) in the females. The dorsal head scales are more flattened in the females. The color of the paratypic series is largely like that of the holotype. In two females, however, the dark dorsal stripe is replaced by a very light dorsal stripe which extends from the nape onto the tail.

HABITS.—This species is strictly a ground anole of the cloud forest. It is most common in clearings in that zone between 1700–1800 m. Females taken during the middle and latter part of May contained several very large eggs.

RELATIONSHIPS.—There can be no question but that *A. haguei* represents nothing more than an eastern offshoot of *A. crasulius*. The two differ only in dorsal scutellation and slightly in pattern. The number of dorsals from the groin level to the axilla level in the two species is as follows (means in parentheses).

Species	Males	Females
<i>A. crassulus</i>	36-40 (38)	39-48 (44)
<i>A. haguei</i>	41-57 (48)	45-59 (53)

The pattern of *haguei* appears to consist of a dark middorsal stripe, whereas that of *crassulus* is more often a series of dark triangles (apex middorsally) on either side on a lighter background. When the eastern Sierra de los Cuchumatanes are better known, intergradation between the two will unquestionably be shown to exist. Specimens from the central part of that mountain mass are typically *crassulus*.

RANGE.—Known only from the type locality, but possibly occurring in the Cuchumatán—Alta Verapaz mountain complex both east and west of the type locality.

This species is dedicated to Henry Hague who, though an indefatigable collector of Guatemalan reptiles in the last century, seems to have been forgotten by describers of reptilian species.

The taxonomic status of the anoles from Mexico and northern Central America with smooth ventrals is, at present, confused. I feel certain that much of this confusion is caused by the fact that in some species the ventrals are actually feebly keeled, but in poorly preserved material examined beneath less efficient lenses and under such poor lighting conditions as may have existed during the nineteenth century, these scales might well have appeared smooth. Such an instance may be represented by specimens from Cobán, Alta Verapaz, which Bocourt⁵ assigned to *Anolis schiedii* Wiegmann.

In the Cobán area I secured in 1938 and 1940 a series which answers the description of Bocourt's specimens except that the ventrals are feebly but distinctly keeled. It may be argued that Wiegmann, too, might have overlooked feebly-keeled scales on the type of *schiedii*. Nevertheless, upon comparing my Cobán specimens with an excellent photograph of the type of *schiedii*, I find several conspicuous differences. I am of the opinion, therefore, that Bocourt's "*schiedii*" is conspecific

⁵ M. Bocourt, *op. cit.*, p. 64, Pl. 14, Fig. 19.

with my material and that the Cobán specimens represent the following species:

Anolis cobanensis, new species

Anolis schiedii, Bocourt, *Mission scientifique au Mexique*, 1873, p. 64, Pl. 14, Fig. 19 (Cobán, Alta Verapaz).

HOLOTYPE.—An adult male, University of Michigan Museum of Zoology No. 90232, collected by L. C. Stuart, April 19, 1938.

TYPE LOCALITY.—Wet pine and broadleaf forest 3 km. south of Finca Samac (6 km. [straight line] due west of Cobán), Alta Verapaz, Guatemala. Altitude, about 1350 m.

PARATYPES.—University of Michigan Museum of Zoology Nos. 90233–38 (9), cloud forest above Finca Chichén, Alta Verapaz, Guatemala. Altitude, about 1750 m. See preceding species.

DIAGNOSIS.—An anole very close to *A. schiedii* Wiegmann. It has small, keeled dorsal scutes, feebly keeled ventrals, carinate head scutes, and the males lack enlarged postanals. From *schiedii* it is readily distinguished by its small ventrals and its carinate, rather than rugose, head scales, and, possibly, by its keeled ventral scales.

DESCRIPTION OF HOLOTYPE.—Dorsal head scales roughly subequal, rugose posteriorly, carinate anteriorly. Supraorbital semicircles distinct, separated by three rows of scales medially. About a dozen enlarged, carinate scutes forming a supraorbital plate which is separated from supraciliaries and supraorbital semicircles by smaller, granular scales. Parietal no larger than surrounding scales, much smaller than the moderately large ear opening. Canthus sharp; seven rows of loreal scales; seven supralabials to below center of eye. Dorsal scales juxtaposed, sharply keeled, those of the middorsal region about twice the size of the granular laterals, numbering about seventy-five from the level of the axilla to the groin. Ventrals very feebly keeled, imbricate; about fifty-five between levels of axilla and groin. Tail covered with subequal, imbricate, sharply keeled scales. Tail vertically oval; strongly compressed and slightly expanded at tip. No enlarged postanals in male. Dewlap large.

Head length, snout to tympanum	13 mm.
Head width	8.5 mm.
Body length, snout to anus	47 mm.
Tail length	79 mm.
Tibia length	13 mm.
Groin to heel	24 mm.
Heel to tip of toe IV	20 mm.
Axilla to wrist	12 mm.

Dorsally, the ground color of the head and body is brown without marking except for slightly darker patches on the body. The legs are lighter brown above with no pattern. The dorsal ground color grades gradually into the brownish white of the ventrum. The chin and throat are white. The undersides of the legs are white, mottled with light brown. The dewlap is pinkish (brilliant purple in life).

VARIATION.—The paratypic series is essentially like the holotype. The majority of the specimens have the scales of the supraorbital plate in contact with the supraorbital semicircles, and frequently there are but two scales between the latter. In several females there is a narrow, distinct, dark, middorsal stripe. The females have larger ventral scutes than do the males.

HABITS.—This species is strictly a cloud forest anole associated with *A. haguei*. It prefers heavier forest than the latter and does not invade open areas to the extent that *A. haguei* does. It is more of a climbing type, generally resting on the lower parts of tree trunks or on bushes along trails. The holotype was not taken in the cloud forest proper. It was found, rather, in the pine zone, where a marshy area produced local conditions similar to those of a cloud forest. A female taken as late as May 24 contained several fully formed eggs.

RELATIONSHIPS.—Beyond its similarity to *schiedii*, I cannot make any further suggestions regarding the relationships of this new species. E. R. Dunn, of Haverford College, believes that it may eventually be shown to connect with *A. cupreus*, and it certainly resembles that species in many characteristics.

The relative size of the ventral scales in *cobanensis* and *schiedii* is brought out in the following tabulation (ventral

scales contained in the distance between the tip of the snout and the ear opening).

Type	<i>schiedii</i> ♂	<i>cobanensis</i> ♂ ♂	<i>cobanensis</i> ♀ ♀
	34	36-41 (40)	32-34 (33)

It is with some hesitancy that I describe a third species also from the Alta Verapaz. Nevertheless, it is so distinct and so utterly unlike any known form that I prefer to describe it rather than to attempt to force it into some species which it only partly resembles. Unfortunately, it is known from but a single male, collected in the coffee zone on the northern slopes of the Polochic Valley. To the memory of Hernán Cortez, who, in his almost unbelievable overland journey from Mexico to Honduras, was the first European to explore this valley, I dedicate

Anolis cortezi, new species

HOLOTYPE.—An apparently adult male, University of Michigan Museum of Zoology No. 90542, collected by L. C. Stuart, February 10, 1940.

TYPE LOCALITY.—Between the hacienda and Barranca Las Palmas on Finca Los Alpes, Alta Verapaz, Guatemala (about 35 km. [straight line] east and slightly south of Cobán). Altitude, about 1015 m.

DIAGNOSIS.—A small anole with keeled juxtaposed dorsal scales, keeled imbricate ventrals, almost smooth upper head scales, and very short limbs. Its relationships are obscure.

DESCRIPTION OF HOLOTYPE.—Head moderately slender and relatively low, much longer than tibia. Dorsal head scales moderate in size, flattened, smooth to very slightly rugose. Supraorbital semicircles distinct, separated by a single row of scales except posteriorly, where the corners of two scales come into contact. Two very large and several smaller but well differentiated supraoculars, separated from supraorbital semicircles by a row of granules and from the superciliaries by several rows. Parietal much larger than ear opening, separated from the supraorbital semicircles. Canthus sharp, five rows of

loreal scales, seven supralabials to below the center of the eye. Dorsals somewhat hexagonal in shape, keeled, juxtaposed; two middorsal rows slightly larger than other dorsals which grade gradually into the granular laterals; about seventy scales between the levels of the axilla and groin along the middorsal line. Ventrals strongly keeled, larger than dorsals, imbricate, about fifty-five between the axilla and groin levels. Tail slightly vertically oval, covered with subequal, keeled scales. Digital dilations broadly expanded; limbs very short. Several slightly enlarged postanal scales. Dewlap extending well posterior to the axilla level.

Head length, snout to tympanum	11.5 mm.
Head width	7.5 mm.
Body length, snout to anus	39 mm.
Tail length	55 mm. (+ tip)
Tibia length	7.5 mm.
Groin to heel	14.5 mm.
Heel to tip of toe IV	9.5 mm.
Axilla to wrist	9 mm.

In spirits the dorsal ground color is very dark brown. A light brown band extends across the head from eye to eye. An indication of a diffused light brown stripe laterally from the eye to the base of the tail, very distinct above leg insertions. Chin and throat white faintly specked with brown; chest and belly almost solid brown. Upper surfaces of legs and anus mottled with light and dark brown. Dewlap white and unmarked.

RELATIONSHIPS.—I know of no species in Central America which even approaches this new form. The short legs, its most distinctive feature, remind one of *petersii*, its head scutellation of *A. ustus*, and its dorsal and ventral scales of *A. biporcatus*; yet, *in toto*, it is so very different from all three in its remaining characters that it cannot be associated with any one of them.

A search of the literature has revealed but a single described species to which it may possibly be related, *A. salvini* Boulenger. This latter is known from but a single male from

“Guatemala.” From this species it differs in possessing a very large occipital, quite different supraoculars, and in lacking enlarged vertebral scales on the tail. It is entirely possible that *salvini* and *cortezi* may form a natural group restricted to so-called “nuclear Central America,” a region well-known for its endemism. If such is the case it is indicated that *cortezi* may be the Caribbean form, whereas *salvini* is the Pacific form. This conclusion is based on the fact that Godman’s and Salvin’s material from the east was well labeled, generally bearing such data as “Coban,” “Vera Paz,” “Vera Paz, low forest,” whereas much of their Pacific material, collected at an early date, often merely bears the label “Guatemala.”

