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ANOLIS CHOCORUM, A NEW PUNCTATUS-LIKE ANOLE FROM DARIÉN, PANAMÁ (SAURIA, IGUANIDAE)

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INTRODUCTION

In the course of a survey of the herpetofauna of Panamá, the junior author, accompanied by Charles W. Myers, Tomás Quintero, and Linda Trueb, travelled in a dugout canoe from Santa María de El Real, Darién, to the upper part of the Río Tuira Basin in July, 1965. Most of the month of July was spent working out of a base camp at the confluence of the Río Tuira and the smaller tributary, the Río Mono. Collections also were made at the mouth of Quebrada La Plata lower on the Río Tuira, and on Cerro Quia on the Panamanian-Colombian border. Six specimens of a previously undescribed species of anole are included in the collection; these plus one specimen obtained by G. B. Fairchild at Tacarcuna, Darién, and three specimens obtained more recently from the Serranía de Pirre, form the basis for the present description. A long previously collected specimen from Colombia in the American Museum of Natural History (AMNH) proves to belong to the same species.

The junior author is grateful to his field companions, whose combined efforts made the trip a great success. The survey of the herpetofauna of Panamá is being conducted in cooperation with the Gorgas Memorial Laboratory in Panamá and is supported by a grant (NIH GM-12020) from the National Institutes of Health. This paper is one of a series of studies of the genus *Anolis* prepared by the senior author with the support of National Science Foundation Grant GB-2444.

The material of the new species has been divided between the Museum of Natural History, Kansas University (KU) and

¹ Museum of Natural History, University of Kansas, Lawrence, Kansas.

the Museum of Comparative Zoology (MCZ). We name the new anole for the Chocó Indians of the region:

ANOLIS CHOCORUM new species

Type. KU 96934, adult ♂, Río Tuira at Quebrada La Plata, 100 m, Darién, Panamá, collected by a native for Charles W. Myers, 26 July 1965.

Paratypes. Panamá: *Darién*. KU 76027, young ♂, Tacarcuna Village on Río Tacarcuna, 550 m, G. B. Fairchild coll., 9 July 1963; KU 96931, Río Tuira at Río Mono, 130 m, William E. Duellman coll., 12 July 1965; MCZ 82546, same locality, William E. Duellman coll., 13 July 1965; MCZ 82547, same locality, Charles W. Myers coll., 13 July 1965; KU 96932, Cerro Quia, 740 m, Charles W. Myers coll., 9 July 1965; KU 96933, same locality, Charles W. Myers coll., 26 July 1965; KU 98520, north end, Serranía de Pirre, 320 m, C. W. Myers coll., 15 January 1966; KU 98521, south ridge, Cerro Cituro, Serranía de Pirre, 1100 m, C. W. Myers coll., 23 January 1966; KU 98522, same locality, C. W. Myers coll., 25 January 1966. Colombia: *Chocó*. AMNH 18235, Atrato Drainage, Quesada River, R. D. O. Johnson coll., 6 November 1920.

Diagnosis. An *Anolis* related to *A. punctatus* Daudin and *A. transversalis* A. Duméril but differing from the first in coloration, and in having a large dewlap in the female, and the snout *not* swollen in the male; it differs from the second in lacking sexual dichromatism in dorsal pattern, and in a higher number of loreal rows, and in coloration. It differs from both species in a lower number of lamellae under phalanges 2 and 3 of fourth toe. See also Tables 1 and 2.

Description. (Paratype variation in parentheses.) *Head.* Head scales moderate to small, smooth. Fourteen (11-14) scales across snout between second canthals. Weak frontal ridges outlining a shallow frontal depression. Scales in frontal depression equal to or distinctly smaller than surrounding scales. Seven (7-9) scales border rostral posteriorly. Nasal scale separated from rostral by one to two scales. Six (5-7) scales between supranasals.

Supraorbital semicircles separated by three (1-3) scales, separated partly or wholly from the weakly differentiated supraocular disks by one (1-2) row of scales. One (1-3) elongate supraciliary continued posteriorly by granules. Canthus distinct, nine (8-10) canthal scales, the anteriormost very small. Loreal rows eight (7-9), the uppermost abruptly larger.

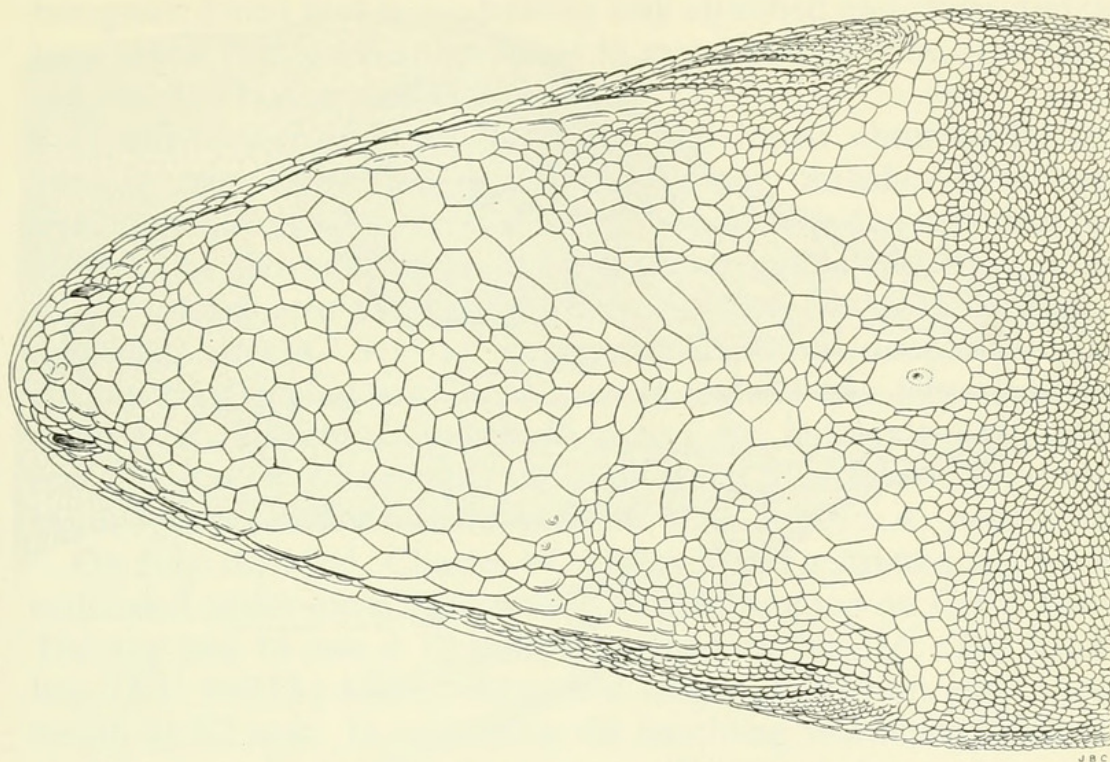


Fig. 1. *Anolis chocorum*, new species. Head scales of type, KU 96934. Actual snout-vent length 79 mm.

Temporal and supratemporal scales finely granular, several lines of weakly enlarged granules at the angle between temporal and supratemporal areas. Interparietal larger (or equal to, or smaller) than ear, separated from the supraorbital semicircles by four (2-4) somewhat enlarged scales. Laterally, slightly smaller scales grade into the supratemporal granules. Behind the interparietal the still smaller scales grade very quickly into granules as minute as those of the supratemporal area.

Three to four (2-4) suboculars in contact with the supralabials anteriorly, in contact with (or separated by 2-3 scales from) the canthus, posteriorly decreasing abruptly in size. Nine (8-9) supralabials to the center of the eye.

Limbs and digits: Hind foot scales multicarinate. Scales on anterior face of upper and lower arm, thigh and lower leg unicarinate, those at knee multicarinate. The larger scales of the hind limb as large or larger than the ventrals. About 20 (17-20) lamellae under phalanges 2 and 3 of fourth toe.

Tail: Tail slightly compressed. No dorsal crest, lateral and dorsal scales subequal. Two ventral rows larger, keeled. Verticils not evident. Postanal scales enlarged in male. Scales immediately behind vent smooth.

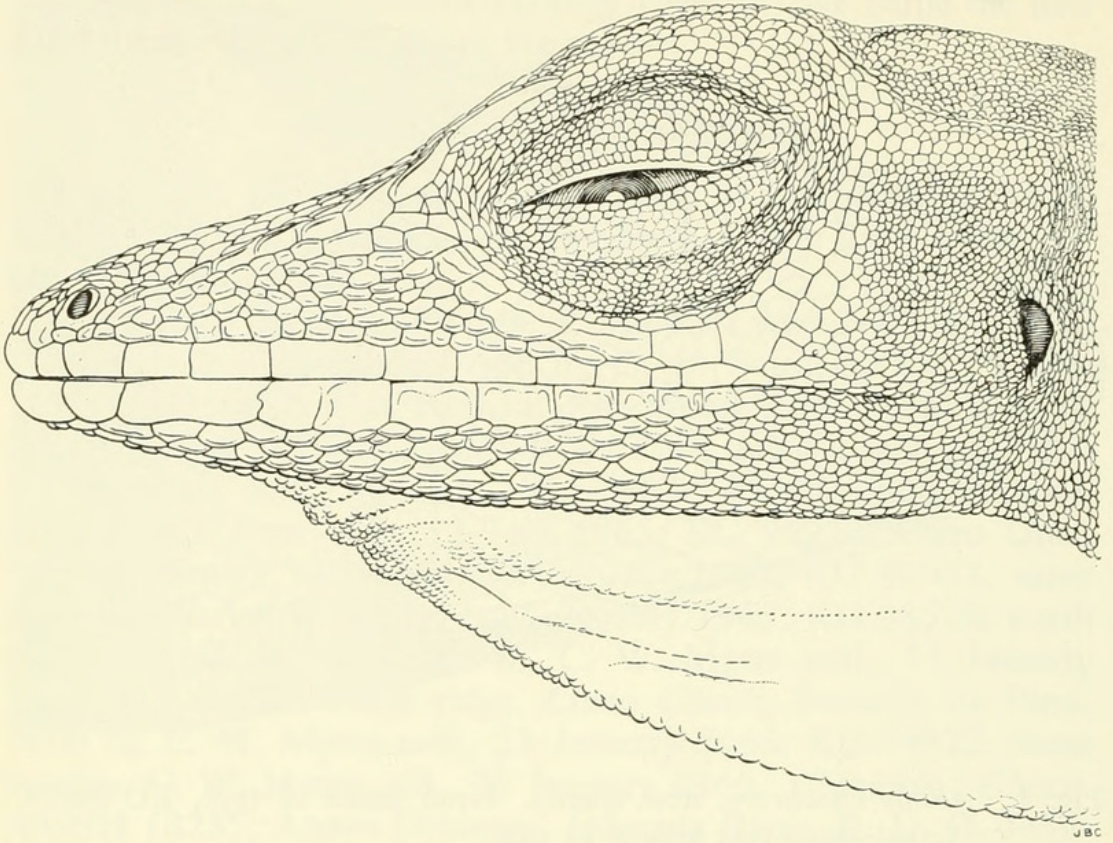


Fig. 2. *Anolis chocorum*, new species. Side view of head of type, KU 96934. Actual snout-vent length 79 mm.

Size (snout/vent length): ♂ (Type) 79 mm; longest ♀ 73 mm.

Color. Color in life is summarized in Table 3. The blue gray belly spotted with white is quite distinctive and differentiates this species immediately from any previously known.

As indicated in Table 3, the sexes differ most prominently in the color of the dewlap; it is in fact uncertain whether any other sex-correlated color differences exist. Both sexes vary somewhat in color; the occurrence in both of uniform and patterned dorsa is especially conspicuous. It is possible, however, that the pattern when present is feebler in females than in males; it is true in the specimens as preserved. Whether it was true in life is not recorded. Whether also some peculiar color variants (the light middle of the belly in some males and the gray tongue of one female) imply a range of variation in one sex not found in the other is unknown.

Ecology. The Darién localities from which *A. chocorum* is known are in a broad expanse of relatively undisturbed tropical

evergreen forest that is moderately well stratified and characterized by a lower story of slender palms in many places. The area has a definite, but not severe, dry season.

Anolis chocorum is arboreal. All individuals observed by day were in trees. One was obtained from the branches of a large tree immediately after it was felled. Another individual dropped from a tree during a storm at night. Two individuals were sleeping on bushes at night, one in a large fern on the steep bank of a mountain stream. Several species of *Anolis* are associated with *A. chocorum* in eastern Darién; these include two large arboreal species (*A. biporcatus* and *A. frenatus*), the moderate-sized arboreal *A. capito*, the smaller bush-dwelling *A. chloris*, *limifrons*, *tropidogaster*, and *vittigerus*, and the semi-aquatic *A. poecilopus*.

On July 10, 1965, Charles W. Myers found a striated egg partly concealed under loose bark on top of a rotting log on Cerro Quia. The egg was 16 mm x 12 mm; it hatched on July 26. The hatchling (KU 96933) had a snout-vent length of 30 mm and a total length of 92 mm. In coloration the hatchling resembled adults of *A. chocorum* by being green above with lateral diagonal rows of blackish brown spots. The tail was green with indistinct grayish brown crossbands. The venter was white with a faint bluish cast to the belly and a pale dull yellow cast to the median part of the dewlap.

Relationships. The series to which *A. chocorum* belongs is clearly an endemic South American one (see discussion of the alpha and beta series of Etheridge, 1960, in Williams, 1965). Its discovery in series in Darién is probably only an accident of activity and attention: similarly thorough and careful collecting has not been done in the adjacent areas of Colombia. However, a single specimen (AMNH 18235) records its presence there. This is a distribution resembling that of a number of other anoles. *A. chloris*, for example, associated in Darién with *A. chocorum*, is likewise a South American autochthon, well known in Chocóan, Colombia (there known under the names *A. palmeri* and *A. gorgonae*), and in trans-Andean Ecuador. The distribution of *A. chocorum* may well be more like that of *A. chloris* than we now know and extend into western Ecuador. However, the range of *A. chocorum*, as at present known, is only eastern Darién Province in Panamá, where it occurs at elevations of from 100-1100 m, in the upper Río Tuira Basin and on the Pacific slopes of Cerro Quia and the Serranía del Darién, and in the Colombian Chocó.

Of the endemic South American group, *Anolis chocorum* is very clearly most similar to *Anolis punctatus* Daudin of Brazil, the

Guianas, Peru and Ecuador. The most immediately striking differences are in the coloration of the belly (blue gray with white spots) and in the lack of any snout swelling in the male. The presence of a much lower lamellar count and a large dewlap in the female are soon discovered as further differences.

A. punctatus is a species of the Amazonian-Guianan forests and the closest approach to the Darién-Chocó form thus far known is

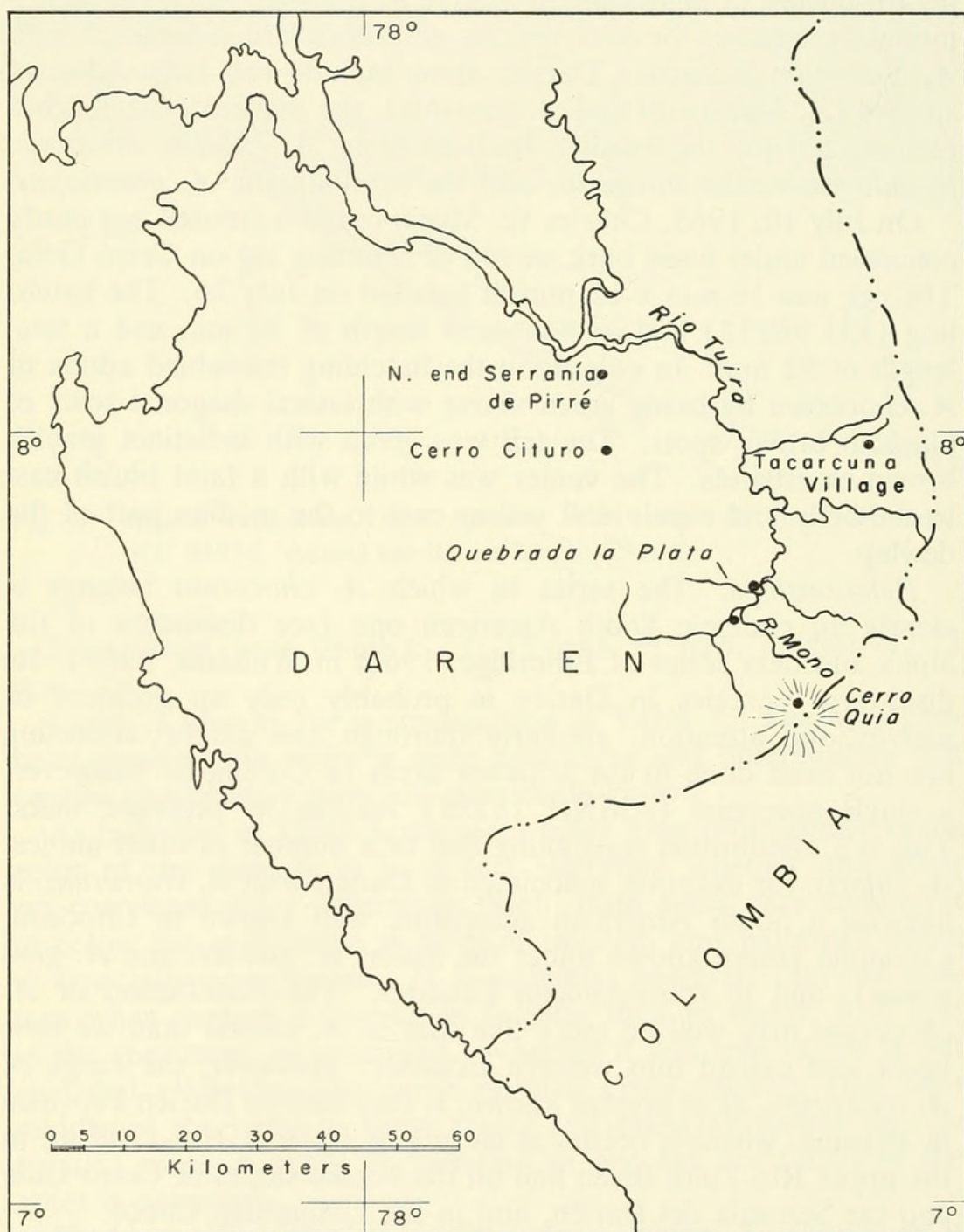


Fig. 3. Map of the distribution of *Anolis chocorum*, new species.

represented by a specimen from the Río Apaporis in eastern Colombia. Over most of its enormous range *A. punctatus* has smooth ventrals like *A. chocorum*. Some of the Peruvian, all the Ecuadorian, and the Colombian (Apaporis) populations have keeled ventrals. For these the subspecific name *boulengeri* is available.

Overlapping a substantial part of the western range of *A. punctatus*, all of *boulengeri*, and part of Peruvian typical *punctatus* is *A. transversalis*. Structurally, this differs from *A. chocorum* in lower loreal and toe lamellar counts and in the peculiar mental-postmental scale pattern. The very striking throat pattern of the female is very different from the condition of either sex in *A. chocorum* and the bold crossbanding of the dorsal surface of the female *transversalis* is also very different. The dorsal pattern of the male *transversalis* (originally described as a distinct species, *buckleyi*), however, does somewhat resemble the irregular spotted condition mentioned above as seen in some *A. chocorum*.

A. transversalis, so far as known, gets geographically no closer to *A. chocorum* than does *A. punctatus*. There is the very substantial gap in Andean Colombia.

The similarity in many scale characters of the three species is seen in Table 1 and is reinforced by the general similarity in habitus and size. *A. chocorum*, as shown in Tables 1 and 2, in many ways connects *A. punctatus* with *A. transversalis*.

The oblique rows of dark blotches on the dorsum of some specimens (well shown in the type, Fig. 1) resemble the dorsal pattern of the giant anoles, *A. frenatus*, *A. princeps*, *A. squamulatus*, *A. latifrons*. All of these have considerably higher scale counts in all respects than *A. chocorum*, and differ also in their much larger size (over 100 mm snout-vent length rather than 70-80 mm). They are, however, quite clearly closely related, and in mental shape, for example, are more like *A. chocorum* than are either *A. punctatus* or *A. transversalis*.

These apparent affinities of *A. chocorum* in several directions seem to effectively subvert the recent attempt of the senior author to define a *punctatus* group from which *A. transversalis* was expressly excluded as a "fringe species" and from which the giant anoles were considered still more remote. This newly discovered anole clearly and firmly connects the so-called "fringe species" (and the giant anoles as well) with the *punctatus* group. Thus we seem to be faced with a single series of species which, however, exhibit striking and peculiar trends in several adaptive lines. The presence of still surviving intermediates helps to connect up and to indicate the affinities of the more peculiar species.

TABLE 1
Scale Counts
Anolis chocorum and Relatives

	<i>punctatus</i> (including <i>boulengeri</i>)	<i>chocorum</i>	<i>transversalis</i>
Scales across snout			
between second canthals	8-14	10-14	4-8
Scales between semicircles	0-2	1-3	0-1
Scales between interparietal and semicircles	0-4	2-4	0-3
Loreals	4-7	6-8	3-6
Labials to center of eye	6-10	8-10	6-9
Lamellae, 4th toe	23-30	17-20	22-27

TABLE 2
Qualitative Characters
Anolis chocorum and Relatives

	<i>punctatus</i> (including <i>boulengeri</i>)	<i>chocorum</i>	<i>transversalis</i>
Snout	Swollen in ♂	Not swollen in either sex	Not swollen in either sex
Ventrals	Smooth (<i>punc-</i> <i>tatus</i>) or keeled (<i>boulengeri</i>)	Smooth	Smooth
Mental	At least as deep as wide	Wider than deep	Deeper than wide
Sublabials	+	—	+ (large)
Dewlap (♂)	Moderate (lateral scales large, elon- gate, in close- packed rows)	Large (lateral scales small, weak, in multiple rows widely sep- arated by naked skin)	Large (lateral scales small, weak, in multiple rows widely sep- arated by naked skin)
Dewlap (♀)	Absent	Large as in male but differently colored	Large as in male but differently colored
Dorsal pattern	Not sexually dichromatic	Not sexually dichromatic	Strong sexual dichromatism

TABLE 3
Color in life of *A. chocorum*

	♂	♀
DEWLAP		
	<i>Edge</i> anteriorly white, posteriorly orange	<i>Edge</i> white
	<i>Sides</i> pale orange with several faint bluish white or green lines	<i>Sides</i> green with white lines or pale green
	<i>Base</i> pale green	<i>Base</i> pale yellow or gray
DORSUM		
	Green, uniform or with oblique rows of dark green blotches on flanks	As in ♂
VENTER		
	Green of dorsum continued on edge of belly. Center of belly light or blue gray. Both blue and green areas heavily spotted with white	As in ♂, but center of belly not light in any specimen
EYELIDS		
	Edges yellow	As in ♂
IRIS		
	Pale brown (coppery) with- out dark markings	As in ♂, or reddish brown with gray periphery
TONGUE		
	Yellow orange, sometimes with tip dark gray	As in ♂, or pale flesh gray or pale greenish yellow or pale yellow
LINING OF THROAT		
	Black	As in ♂

REFERENCE CITED

- WILLIAMS, ERNEST E.
1965. South American *Anolis* (Sauria, Iguanidae): Two new species
of the *punctatus* group. *Breviora*, No. 233:1-15.

(Received 5 April, 1966.)



Fig. 4. *Anolis chocorum*, new species. Lateral view of type, KU 96934. Actual snout-vent length 79 mm.

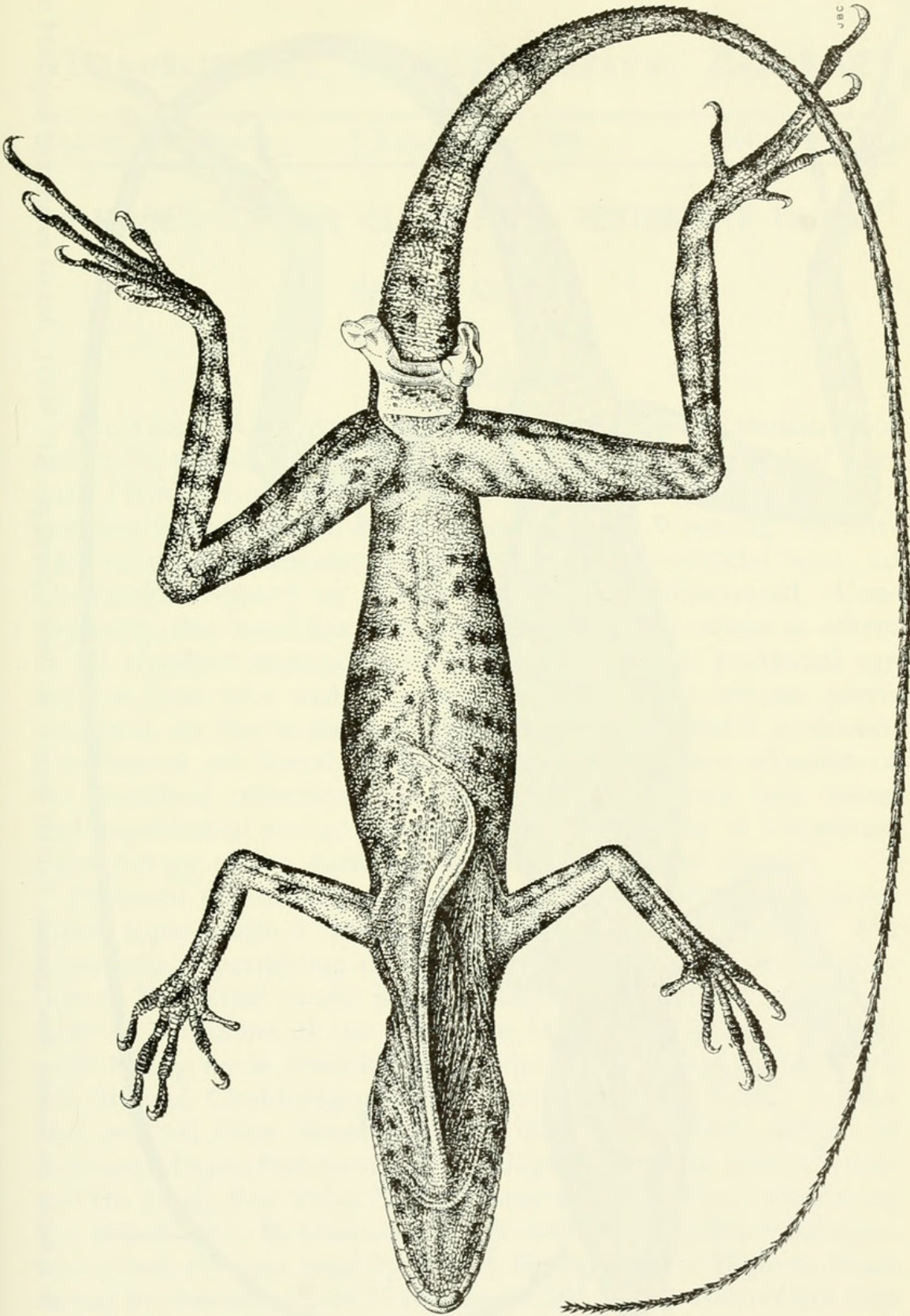


Fig. 5. *Anolis chocorum*, new species. Ventral pattern of male type, KU 96934. Actual snout-vent length 79 mm.

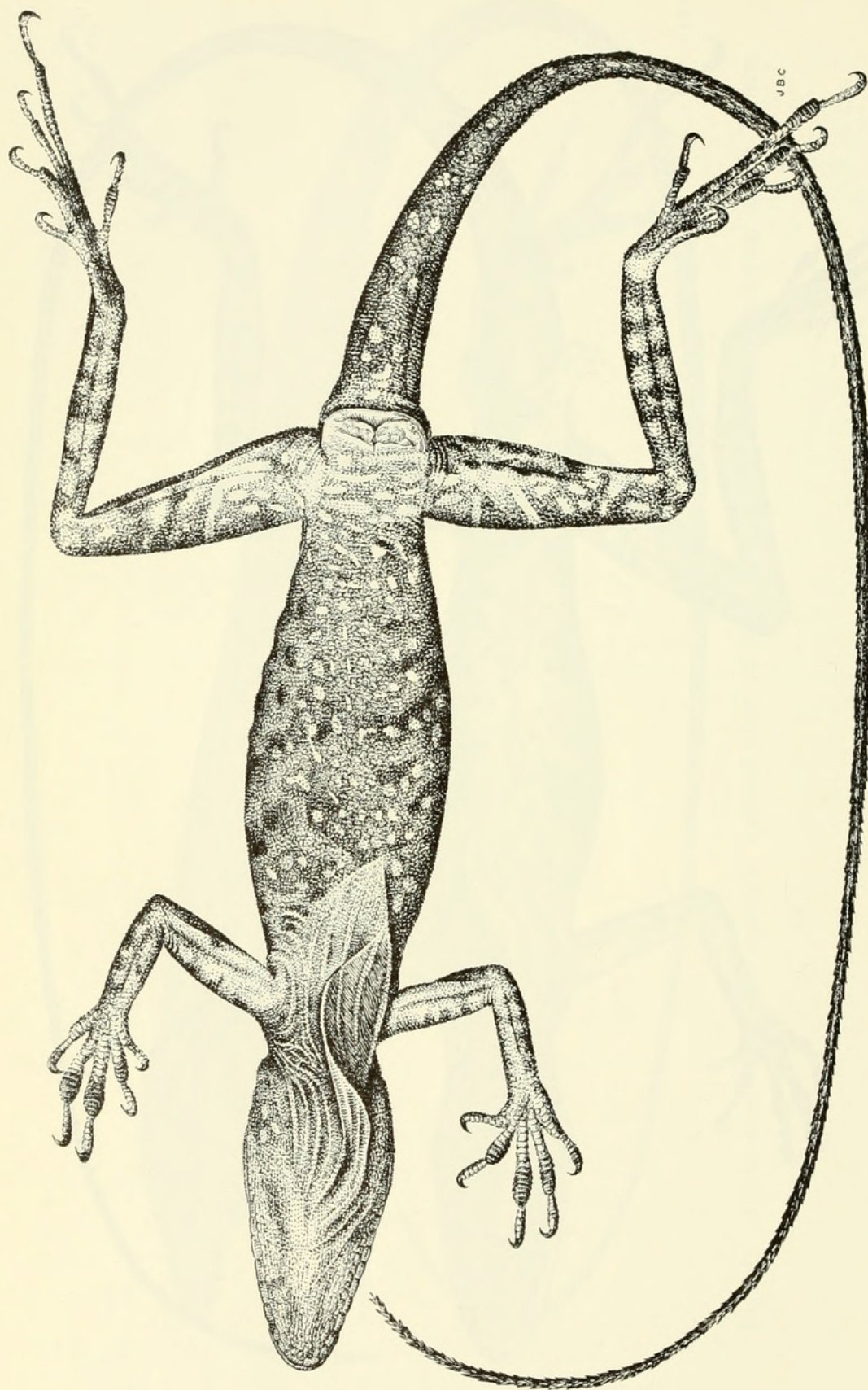


Fig. 6. *Anolis chocorum*, new species. Ventral pattern of female paratype, KU 96931. Actual snout-vent length 78 mm.



Williams, Ernest E. and Duellman, William E. 1967. "Anolis chocorum, a new Punctatus-like anole from Darien, Panama (Sauria, Iguanidae)." *Breviora* 256, 1–12.

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