Catalogue of American Amphibians and Reptiles.

Fobes, T.M., J.S. Parmerlee, Jr., and R. Powell. 1993. *Anolis cybotes.*

Anolis cybotes Cope

Anolis (Anolis) cybotes Cope, 1862(1863):177. Type-locality, "western Hayti, from near Jeremie" [Département de la Grand 'Anse]. Syntypes, Academy of Natural Sciences, Philadelphia (ANSP) 7604-7605, both adult males (not examined by authors), and Museum of Comparative Zoology (MCZ) 14346-14347 (previously ANSP 7606-7607), adult male and female, respectively (not examined by authors). Cope (1862 [1863]) listed MCZ 1501 as the holotype, but no record of that specimen exists and the reason for the discrepancy is unknown. Barbour and Loveridge (1929) listed MCZ 3619 as a syntype, but that specimen had been misidentified and was discarded by Loveridge and Shreve in November 1939 (J. Rosado, pers. comm.). Specimens donated (and possibly collected) by Dr. Weinland were purchased in 1859 (J.E. Cadle, 8.IV.92, in litt.), actual dates of collection unknown.

Anolis riisei Reinhardt and Lütken, 1863:264. Type-locality, "Haiti." Syntypes, Universitetets Zoologiske Museum, København (UZM) R.3796-3797, Museum für Naturkunde, Humboldt-Universität, Berlin (ZMB) 4439, adults (one female), collected by Mr. Riise, date of collection unknown (not examined by authors).

Anolis citrinellus Cope, 1864:170. Type-locality, "Hayti," although Boulenger (1885) used "Santo Domingo." Holotype, British Museum of Natural History (BMNH) 1948.8.5.71, an adult female, collector and date of collection unknown (not examined by authors).

A(nolis) rūsei: Cope, 1869:164. *Lapsus.*

Anolis cybaotes: Hertz, 1980a:92. *Lapsus.*

Ctenonotus cybotes: Schwartz and Henderson, 1988:107.

• **Content.** Three subspecies are recognized: *cybotes, doris,* and *ravifaux,* but see Remarks.

• **Definition.** *Anolis cybotes* is a moderately sized (SVL of males to 77 mm, of females to 66 mm) (Schwartz and Henderson, 1991) anole with a "chunky" habitus and 4-11 rows of loreals, usually 0 scales between supraorbitals, 1-5 (mode 2) scales between interparietal and supraorbital semicircles, 3-7 postrostrals, 2-10 postmentals, and 0-1 row of scales between suboculars and supralabials. Dorsal and lateral scales granular and tuberculate, with a median row of enlarged scales continuing onto the tail; ventrals large, smooth (rarely keeled), imbricate, and cycloid; and subdigitals uni- or multicarinate. Tail short, compressed, and verticillate; scales in about 8 vertical rows and with 3 triangular median dorsal scales per verticil.

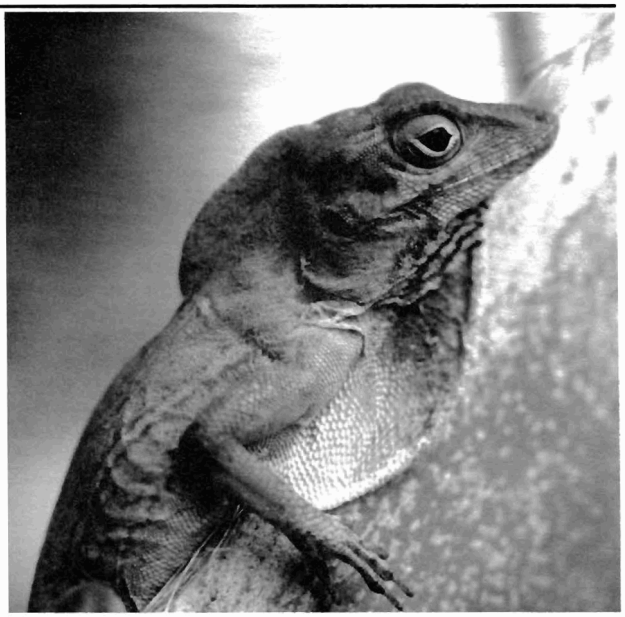


Figure 1. Adult male *Anolis cybotes cybotes* (Bobby Witcher Memorial Collection, BWMC 04607) from Barahona, Provincia de Barahona, República Dominicana.

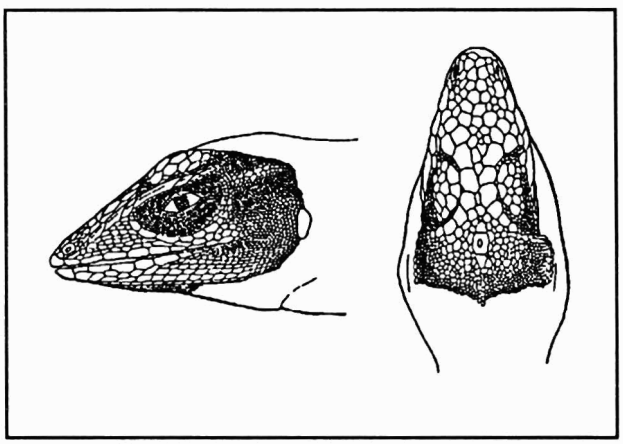
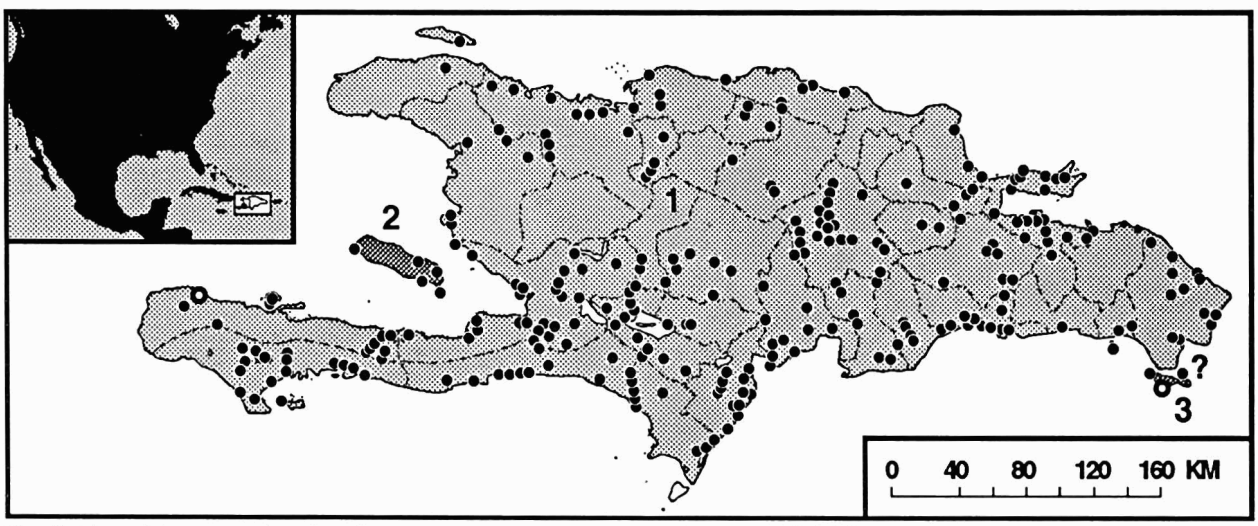


Figure 2. *Anolis cybotes doris* (USNM 69384), paratype from Gonâve Island, Haiti (from Cochran, 1941).



Map 1. Hispaniolan range of *Anolis cybotes* (modified from Schwartz and Henderson, 1991), but see Distribution. Large open circles mark type-localities, solid circles mark other records. The type-locality of *A. c. doris* is too imprecise to plot. The question mark indicates the uncertain subspecific status of the population from Isla Catalinita.

Dorsal ground color is tan and medium brown to reddish brown or gray. Males often possess a light flank stripe, females often with a middorsal pale stripe. Transverse dorsal dumbbells are present in both sexes of some populations. Distinct head markings are absent. The throat is white to gray, with or without darker markings. Dewlap color is variable, from pink or peach to pale yellow, yellow, yellow-orange, white, white with gray bars, or grayish.

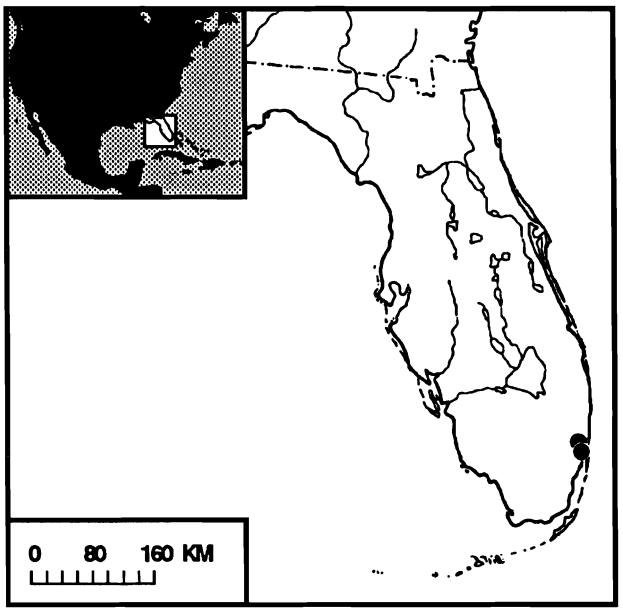
• **Descriptions.** In addition to the original description by Cope (1862 [1863]) and other references cited in the synonymies, descriptions may be found in Boulenger (1885), Meerwarth (1901), Mertens (1939a, b), Cochran (1941), Conant and Collins (1991), and Schwartz and Henderson (1991).

• **Illustrations.** Line drawings are in Boulenger (1885), Cochran (1941), Williams (1963), Behler and King (1979) and Conant and Collins (1991). Smith and Brodie (1982) and Conant and Collins (1991) provided color drawings. Black and white photographs are in Noble (1923), Klingel (1929), Mertens (1939a, b, 1940), Wilson and Porras (1983), and Henderson and Schwartz (1984). Mertens (1938, 1939b) included a black and white drawing (as *A. cybotes saxatilis*) along with photographs of dorsal and ventral scales. Williams (1975, 1977b, d) provided drawings of dorsal scales and caudal vertebrae, respectively. Case and Williams (1987) included line drawings of mid-thoracic and caudal vertebrae and of the clavicle. They also provided a scanning electron micrograph of head scales. Schleich and Kästle (1985) included scanning electron micrographs of subdigital scales. Noble (1923) illustrated display behavior, Jenssen (1983) head bobbing. Gorman and Atkins (1966) and Gorman (1973) figured the karyotype (2n = 36, 12V + 24m).

• **Distribution.** An Hispaniolan endemic and ecological generalist, the species is found islandwide and on a number of satellite islands. *Anolis cybotes* is absent from higher elevations of several mountain ranges where it is replaced by various species of cybotoid anoles, and also is excluded from exceedingly xeric habitats at low elevation where it often is replaced by *A. whitemani*. *Anolis cybotes* has been introduced to and established in southeastern Florida (Ober, 1973; Schwartz and Thomas, 1975; Williams, 1977a; Wilson and Porras, 1983; Schwartz and Henderson, 1988, 1991). The Hispaniolan range is illustrated in Schwartz (1989) and Schwartz and Henderson (1991), the total range in Conant and Collins (1991).

• **Fossil Record.** Etheridge (1965), unable to distinguish skeletons of various cybotoid anoles, tentatively referred fossils from late Pleistocene cave deposits found in the Cerro de San Francisco to *A. cybotes*.

• **Pertinent Literature.** Schwartz (1989) presented a systematic review. General relationships were discussed by Etheridge (1960). Williams (1976) placed *A. cybotes* in the Alpha section, *cristatellus* series, *cybotes* subseries, *cybotes* species group, and *cybotes* superspecies. Difficulties in establishing the relationship of *A. cybotes* among anoles were discussed by Gorman (1974), Shochat and Dessauer (1977, 1981), Williams (1974, 1977c, d, 1989), Wyles and Gorman (1980), and Guyer and Savage (1986). Webster (1975) made an electrophoretic comparison with *A. marcanoi*, and Zani et al. (1993) a similar comparison with Hispaniolan and Puerto Rican *A. cristatellus*. Burnell and Hedges (1990) and Hedges and Burnell (1990) included *A. cybotes* in their electrophoretic study of relationships among West Indian anoles. Williams (1960) provided a chart comparing certain characters of Hispaniolan anoles, and Case and Williams (1987) compared character states of cybotoid anoles. Schwartz (1971, 1980) characterized this species as an islandwide form. SEA/DVS (1990) provided an index to habitats in the Dominican Republic. Schoener (1988) used *A. cybotes* in his study of models testing non-randomness in sizes and habitats of West Indian lizards. Pregill (1986) compared body sizes of extant and fossil specimens. Mertens (1939a), Rand (1962), Rand and Williams (1969), Williams and Rand (1969), Moermond (1974, 1979a, 1983, 1986), Peterson (1974), Schoener (1977), Schwartz (1979), Williams (1983), Jenssen et al. (1988), Fitch et al. (1989), and Fobes et al. (1992) described ecological relationships. Hillman and Gorman (1977), Hertz (1977a, b, 1978, 1980a, b), and Hertz and Huey (1981) discussed aspects of ecological physiology. Mating behavior was observed by Noble and Bradley (1933). Reproduction was addressed by Licht and Gorman (1970) and Fitch (1982). Moermond (1979b) described foraging behavior, Jenssen (1983) and Losos (1985b) display behavior, Losos (1985a) aggressive male behavior, and Powell (1990) aggressive behavior between *A. cybotes* and *A. porcatus*. Henderson et al. (1987a, b) noted predation by *Epicrates striatus* and *Uromacer* ssp., respectively. Moermond (1978) described color changes. Schwartz and Henderson (1991) summarized information on natural history. Fobes et al. (1992) described the natural history of a population in altered habitat and noted a parasitic infection by a nematode, *Skrjabinoptera leiocephalorum*. Malarial infections were reported by Telford (1975) and Ayala (1977, 1978). Williams (1975, in a footnote attributed to W. Hall, pers. comm.) and Gorman (1973) described the karyotype. Gorman and Atkins (1966) noted the absence of heteromorphism in male chromosomes. Wever (1978) described aspects of ear morphology, Schleich and Kästle (1985) discussed ultrastructure of subdigital scales, and Bolton and Beuchat (1991) found ciliated cells only in the tubular stalk that connects the bladder to the cloaca. Information on captive husbandry was presented by Nietzke (1980).



Map 2. Range of *Anolis cybotes* in the United States. The solid circle marks the known locality.

The species is included in additional reports, checklists, keys, and guides by Cope (1869), Boulenger (1885), Garman (1887 [1888]), Fischer (1888), Müller (1892), Barbour (1914, 1930a, b, 1935, 1937), Schmidt (1921), Cochran (1924, 1928), Barbour and Loveridge (1929), Böker (1939), Grant (1956), Schwartz and Thomas (1975), Schwartz et al. (1978), Behler and King (1979), Smith and Brodie (1982), Henderson and Schwartz (1984), Henderson et al. (1984), Schwartz and Henderson (1985, 1988), Banks et al. (1987), Ashton and Ashton (1991), Conant and Collins (1991), and SEA/DVS (1992a, b, c).

• **Etymology.** The name *cybotes* probably is from the Greek *kubos* (= cube or solid square), presumably a reference to the "blocky" head (A. Schwartz, in litt., 17.II.92); *doris* honors Doris M. Cochran (1898-1968), long associated with the U.S. National Museum and author of "The Herpetology of Hispaniola"; and *ravifaux* is from the Latin *ravus* (= gray) and *faux* (= throat), an allusion to dewlap color.

• **Remarks.** Schwartz (1989) detailed uncertainties regarding the status of populations from the tip of the Tiburon Peninsula and noted the probable presence of additional subspecies. Burns et al. (1992) addressed additional uncertainties concerning relationships among cybotoid anoles in the northwestern República Dominicana.

The common name "Largehead Anole" was suggested in Collins (1990) and used by Conant and Collins (1991). Variations of that name have appeared repeatedly in the literature. Some questions (H. Dundee, pers. comm.) regarding grammatically correct usage have been raised and previously-used names, e.g., Large-headed Anole (Banks et al., 1987), have been suggested as better alternatives. However, because many anoles (including a number of related Hispaniolan forms) are large-headed, an additional question arises as to whether the name is even appropriate.

Powell (in press) included *Anolis cybotes doris* and *A. c. ravifaux* in a list of diagnosable and allopatric Hispaniolan taxa that may represent species misrepresented as subspecies.

1. *Anolis cybotes cybotes* Cope

Anolis (Anolis) cybotes Cope, 1862(1863):177. See species synonymy.
Anolis riisei Reinhardt and Lütken, 1863:264. See species synonymy.
Anolis citrinellus Cope, 1864:170. See species synonymy.
A(nolis) rüsei: Cope, 1869:164. *Lapsus.*
Anolis cybotes cybotes: Cochran, 1934:168. First use of trinomial.
Anolis cybotes saxatilis Mertens, 1938:334. Type-locality, "südlich von Fondo Negro, Gebiet des unteren Rio Yaque del Sur, Südwest-Santo Domingo" (south of Fondo Negro, near the lower Río Yaque del Sur, southwestern Santo Domingo = Barahona Province, República Dominicana). Holotype, Natur-Museum Senckenberg, Frankfurt am Main (SMF) 25032, an adult male collected by H. Böker on 10 August 1937 (not examined by authors).
Ctenonotus cybotes cybotes: Schwartz and Henderson, 1988:107.

• **Diagnosis.** This subspecies is defined by the following combination of characters (N = 1356): large size (SVL of males to 77 mm, of females to 66 mm), 4-11 ($\bar{x}$ = 6.8) (modally 7) snout scales at 2nd canthal, 4-11 ($\bar{x}$ = 6.7) loreal rows, 0-5 (modally 2/2) scales between semicircles and interparietal, 31-64 ($\bar{x}$ = 42.9) median dorsals in head length, 19-46 ($\bar{x}$ = 32.1) ventrals in head length, 0-2 (modally 1/1) scales between suboculars and supralabials, 5-23 ($\bar{x}$ = 12.5) scales in supraocular disc, 2-10 ($\bar{x}$ = 4.2) postmentals, 3-7 ($\bar{x}$ = 4.4) (modally 5) postrostrals, 2-5 (modally 3/3) canthals, 14-23 ($\bar{x}$ = 18.0) 4th toe lamellae, 7-18 ($\bar{x}$ = 11.4) scales around interparietal, and femur/SVL 22.0-39.4 ($\bar{x}$ = 28.9).

2. *Anolis cybotes doris* Barbour

Anolis doris Barbour, 1925:101. Type-locality, "Gonave or Gonaive Island, off the west coast of Haiti." Holotype, Museum of Comparative Zoology (MCZ) 13739, an adult male collected by G.M. Allen in August 1919 (not examined by authors).
Anolis cybotes doris: Cochran, 1934:168. First use of trinomial.
Ctenonotus cybotes doris: Schwartz and Henderson, 1988:107.

• **Diagnosis.** This subspecies is defined by the following combination of characters (N = 34): moderate size (SVL of males to 69 mm, of females to 52 mm), 4-7 ($\bar{x}$ = 6.3) (modally 6) snout scales at 2nd canthal, 4-8 ($\bar{x}$ = 6.3) loreal rows, 1-4 (modally 2/2) scales between semicircles and interparietal, 35-47 ($\bar{x}$ = 40.2) median dorsals in head length, 16-46 ($\bar{x}$ = 30.0) ventrals in head length, 0-1 (modally 1/1) scales between suboculars and supralabials, 8-20 ($\bar{x}$ = 12.8) scales in supraocular disc, 2-6 ($\bar{x}$ = 4.1) postmentals, 2-5 ($\bar{x}$ = 4.6) (modally 5) postrostrals, 3-4 (modally 3/3) canthals, 15-21 ($\bar{x}$ = 18.1) 4th toe lamellae, 7-13 ($\bar{x}$ = 10.3) scales around interparietal, and femur/SVL 25.6-34.7 ($\bar{x}$ = 29.8).

3. *Anolis cybotes ravifaux* Schwartz and Henderson

Anolis cybotes ravifaux Schwartz and Henderson, 1982:3. Type-locality, "environs of Mano Juan, Isla Saona, República Dominicana." Holotype, Museum of Comparative Zoology (MCZ) 156221, an adult male, collected by Richard Thomas on 19 July 1964 (not examined by authors).
Ctenonotus cybotes ravifaux: Schwartz and Henderson, 1988:107.

• **Diagnosis.** This subspecies is defined by the following combination of characters (N = 24): small size (SVL of males to 59 mm, of females to 44 mm), 4-7 ($\bar{x}$ = 5.5) (modally 5) snout scales at 2nd canthal, 5-7 ($\bar{x}$ = 5.8) loreal rows, 1-3 (modally 2/2) scales between semicircles and interparietal, 35-54 ($\bar{x}$ = 44.9) median dorsals in head length, 27-51 ($\bar{x}$ = 36.5) ventrals in head length, 0-1 (modally 0/0) scales between suboculars and supralabials, 6-12 ($\bar{x}$ = 8.9) scales in supraocular disc, 4-8 ($\bar{x}$ = 4.8) postmentals, 3-5 ($\bar{x}$ = 3.7) (modally 4) postrostrals, 3/3 canthals, 12-20 ($\bar{x}$ = 17.5) 4th toe lamellae, 10-18 ($\bar{x}$ = 13.8) scales around interparietal, and femur/SVL 28.3-34.0 ($\bar{x}$ = 31.2).

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