

## REPTILIA: SQUAMATA: GEKKONIDAE

## PHYLLODACTYLUS WIRSHINGI

## Catalogue of American Amphibians and Reptiles.

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***Phyllodactylus wirshingi* Kerster and Smith**  
Wirshing's Leaf-toed Gecko, Salamanca Barreada

*Phyllodactylus tuberculosus*: Grant and Roosevelt 1932:47 (*nec* Wiegmann 1834).

*Phyllodactylus pulcher*: Grant 1932a:335 (*nec* Gray 1828).

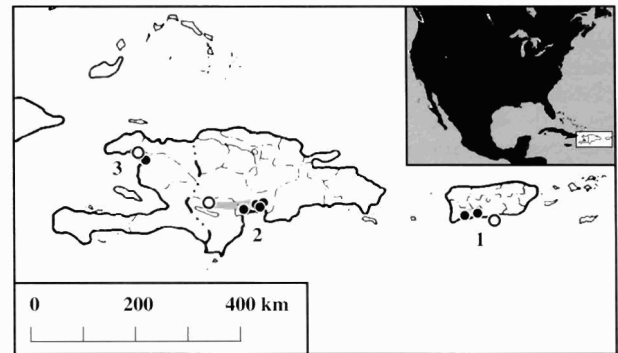
*Phyllodactylus martini*: Barbour 1935:99 (part, *nec* van Lidth de Jeude 1887)..

*Phyllodactylus wirshingi* Kerster and Smith 1955:229. Type locality, "Caja de Muertos, Puerto Rico." Holotype, University of Illinois Museum of Natural History (UIMNH) 37740, an adult male, collected by Juan A. Wirshing, 10 March 1953 (not examined by authors).

• **CONTENT.** Three subspecies are recognized (Kluge 1991, 1993, 2001; Rösler 2000): *P. w. wirshingi* Kerster and Smith 1955, *P. w. hispaniolae* Schwartz 1979, and *P. w. sommeri* Schwartz 1979 (incorrectly listed as Schwartz 1970 by Rösler 2000).

• **DEFINITION.** *Phyllodactylus wirshingi* is a medium-sized member of the genus; males attain 62 mm SVL and females 66 mm (Schwartz 1979). The body is depressed and robust. The head is large, approximately 30% SVL; 1.4 times as long as wide, depressed, 1.7 times wider than deep. The snout is rounded and the frontal and interorbital region bears a shallow depression. The rostral is rectangular, deeper than adjacent labials, narrower than the mental, 2.0 times as broad as high, with a short median cleft extending from the posterior border, and bordered posteriorly by two supranasals. The nostril is bordered by the rostral, first supralabial, two postnasals, and a supranasal. Supralabials number 5–6 (usually 6) to a point below the middle of the eye, and are followed posteriorly by 3–5 much smaller supralabials that angle upward along the posteroventral margin of the orbit. The ear opening is oblique, the long axis subvertical and greater than one half of orbital diameter. The tympanum is clearly visible. Numerous subequally-sized conical or subtriangular tubercles occur on the occipital and temporal regions and are separated from each other by small granules. Scales of the snout are elongate, heterogeneous, flattened to fairly robustly keeled, and subequal to slightly smaller than occipital tubercles. The canthal region is weakly inflated. The posteriormost supraciliary scales bear very small spines. The eye is large, the pupil vertical with posterior margin crenellated. The distance between snout and eye is 1.5 times eye diameter. The mental is large, triangular to pentagonal, bordered by an anterior postmental series of 2–5 large scales (varies by subspecies, see below) that is not interrupted by the apex of the mental and is in contact with the first supralabials laterally. A second series of 4–10 postmentals varies by subspecies (see below). Gulars are minute and subimbricate to imbricate. Five infralabials reach a point below the middle of the eye and are followed posteriorly by 2–3 much smaller scales.

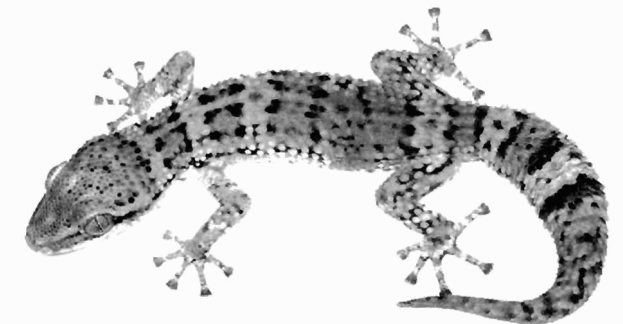
The dorsum bears 15–22 rows of enlarged, carinate, trihedral, subequal tubercles of moderate height, each separated by 1–2 rows of small, flat granules. One to five granules separate tubercles in each longitudinal series. Tubercles number 31–42 in each series from head to the tail base and 15–26 from axilla to groin. The neck, venter, and lower surfaces of legs are clad in smooth, imbricate, cycloid scales. Scale rows across the venter at midbody number 15–24 and 42–55 ventrals extend from the



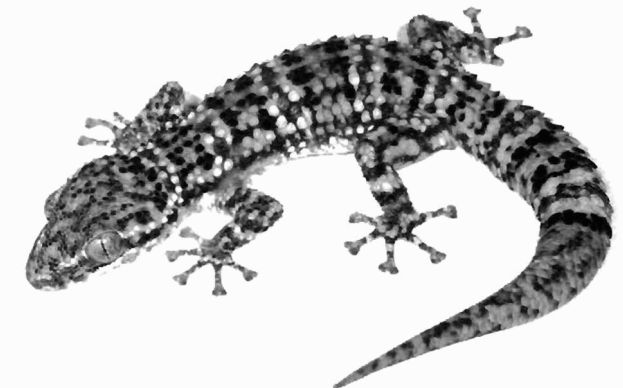
**MAP.** Distribution of *Phyllodactylus wirshingi* based on museum records. Open circles indicate type localities, dots demarcate other records (some symbols denote two or more proximate localities).



**FIGURE 1.** Adult *Phyllodactylus w. wirshingi* from Guánica, Puerto Rico, near sea level (photograph by L. Lee Grismer).



**FIGURE 2.** Adult *Phyllodactylus w. hispaniolae* from 5.1 km northwest of La Descubierta, Independencia Province, Dominican Republic, elev. 273 m (photograph by S. Blair Hedges).



**FIGURE 3.** Adult *Phyllodactylus w. sommeri* from 10.4 km northwest of Ça Soleil, Département de l'Artibonite, Haiti, elev. 130 m (photograph by S. Blair Hedges).

axilla to the vent. No enlarged preanal plate and no preanal or femoral pores are present.

Forelimbs are approximately 30% of SVL, hindlimbs approximately 40%. Scattered conical tubercles are on the anterior aspects of the humeri and forearms. Dorsal and posterior aspects of the thighs are more strongly tuberculate. Scattered tubercles are on the dorsal surfaces of the metatarsal regions of the pes. The posterior aspect of the thighs and edges of the cloacal rim bear small, granular scales. Digits are expanded distally into a pair of subrectangular apical lamellae on either side of a small claw. The width of the distal dilation is about twice the width of more proximal portions of the digits. Fingers and toes bear ventral series of transverse lamellae, some of those under the penultimate phalanx are cleft or divided. Lamellae under digit IV of the pes number 8–14.

The tail is cylindrical, approximately equal in length to SVL. Unregenerated portions are covered dorsally and laterally with large imbricate, smooth or uncarinate scales irregularly interspersed with smaller but similar scales. Basally, enlarged scales are arranged in whorls, with 15–20 scales per whorl at the level of the addressed knee. Rows of tubercles at the base of the tail number 6–8. Ventral caudals are smooth and disposed in a single, transversely-widened series.

Dark stripes extend from the eyes to the insertions of forelimbs or slightly beyond. The dorsum is pinkish grey, light grey, tan, or grey-brown with five dark brown bars across the back between the nape and the tail base. A narrower band extends across the occiput. Bands fade into the background color laterally, may appear double, and have darker anterior and posterior edges fading to a lighter center (varies with age and subspecies, see below). Bands are brown with darker edges, or dark grey to grey-tan with black edges, or mottled darker brown and lighter buff to cream with only a faint pattern of darker crossbands. The head is uniformly straw-colored or mottled with light brown and bears dark brown reticulations. Markings on mottled snout are variably developed between different subspecies (see subspecies diagnoses). Limbs and digits have mottled light and dark patches with no definitive pattern. Original tails bear light brown and buff crossbands edged with black or are banded black and white. Regenerated tails are buff with longitudinal dark streaks. The venter is pinkish grey, pinkish, or white. Juveniles have the most boldly defined color patterns. In all populations, dark juvenile body bands become more diffuse with age, yielding similar adult patterns. The iris is golden brown, greenish gold, or silvery.

• **DIAGNOSIS.** *Phyllodactylus wirshingi* differs from all other congeners (*sensu* Bauer et al. 1997) in the following combination of characters: moderately-sized (maximum SVL 66 mm), rostral scale twice as wide as high; first postmental scales contact first infralabials only; dorsal tubercles carinate and trihedral, arranged in 15–22 rows, each separated by 1–2 rows of small, flat granules, 31–42 tubercles in each longitudinal row from head to tail base; 15–24 scales across venter at midbody; tubercles present on forearm, thigh and tibia; no preanal or femoral pores; no enlarged preanal plate; 6–8 rows of tubercles at base of tail; width of apical lamellae of fourth toe twice that of basal part of digit; 8–14 lamellae under fourth toe of pes; dorsal color pattern of six variegated dark transverse bands on a lighter background, occipital band narrower than those on nape and trunk; tail banded; color pattern and banding more pronounced in juveniles than adults. Among the Antillean *Phyllodactylus*, this species may be distinguished from *P. pulcher*, *P. rutteni*, and *P. julieni* by a lower number of tubercles in the median longitudinal row from head to tail base (42 or fewer versus 45 or more) and from *P. martini* by the presence of tubercles on the forelimbs.

• **DESCRIPTIONS.** In addition to the type description, Grant (1932a) provided a detailed description of a specimen from Parguera (as *Phyllodactylus pulcher*). Dixon (1962) provided a tabular summary of scalation features and a species account noting coloration and pholidosis. Subspecies descriptions were given by Schwartz (1979) and Schwartz and Henderson (1988) presented a description applicable to all three forms.

• **ILLUSTRATIONS.** Grant (1932a) presented a black and white photo of a juvenile from Caja de Muertos, Puerto Rico. Kerster and Smith (1955) provided a black and white photograph of the holotype and a line drawing of the cloacal region, showing the position of the cloacal bones and cloacal sac apertures. A color photograph of a juvenile was published by Rivero (1978, 1998), and Rivero (1998) also published a color photo of an adult in a slightly oblique lateral view.

• **DISTRIBUTION.** The nominate subspecies is restricted to the arid regions of extreme southwestern Puerto Rico from Parguera to 9 km SE Guánica and on Isla Caja de Muertos. *Phyllodactylus w. hispaniolae* occurs in the Valle de Neiba, Independencia Province, near Canoa, Barahona Province, and Monte Río and SE of Azua, Azua Province of the Dominican Republic (Schwartz 1980, Schwartz and Henderson 1988, Hedges and Thomas 1989), and *P. w. somneri* is restricted to the region of Ça Soleil, Département de l'Artibonite, Haiti (Schwartz and Henderson 1988). Distribution maps were provided by Dixon (1962) and Schwartz and Henderson (1991).

• **FOSSIL RECORD.** No fossil material exists for *Phyllodactylus wirshingi* (Pregill and Olson 1981).

• **PERTINENT LITERATURE.** Kerster and Smith (1955) and Thomas and Joglar (1996) reviewed the circumstances of the discovery and description of *Phyllodactylus w. wirshingi*, and Powell et al. (1999) reviewed the discovery of the Hispaniolan forms. Kerster and Smith (1955) suggested close affinities with *P. martini*, but presented a number of characters that differentiated the two taxa. Hummelinck (1940) noted the probably affinities of the Puerto Rican *Phyllodactylus* with those of Venezuela and the Netherlands Antilles. Dixon (1960b) referred *P. wirshingi* to the *P. tuberculosus* group and later (Dixon 1962) noted its probable affinities to *P. martini*, providing diagnostic features to separate the two. Dixon and Huey (1970) remarked on the similarity of *P. wirshingi* to *P. sentosus*, *P. kofordi*, *P. darwini*, and especially *P. martini*. Bauer et al. (1997) compared allozyme data from *P. wirshingi* to that from other Leaf-toed Geckos and found no close affinities either to Old World taxa (now removed from *Phyllodactylus*) or to *P. xanti*, the other New World species they examined.

Schwartz (1979) proposed that a Hispaniolan ancestor invaded Puerto Rico. Hedges (1996) proposed that the species arose by dispersal from South America in the Cenozoic and suggested that the Hispaniolan forms were derived from Puerto Rico. Crother (1999) reviewed previous views on the affinities of *P. wirshingi* and its diversification in the Greater Antilles.

Kerster and Smith (1955) discussed cloacal anatomy. Dixon (1960a) examined scalation of specimens of this species but did not comment on them explicitly. Kluge (1983) examined *P. wirshingi* for certain osteological characters, but did not comment on the species specifically. Schwartz (1979, 1980), Rivero (1978, 1998), Schwartz and Henderson (1988), and Powell et al. (1996) provided information about habitat. The species is xerophilic and typically associated with limestone crevices and boulders, but may make use of road cuts, rock piles, or accumulations of plant or artificial debris. Distribution was discussed by Williams (1999) and Thomas (1999).

*Phyllodactylus wirshingi* was included in species lists for Puerto Rico by Grant (1932b; as *P. pulcher*), Barbour (1935, 1937; as *P. martini*), Philobosian and Yntema (1977), and Schwartz and Henderson (1985), and in a list of vertebrates of U.S. possessions by Banks et al. (1987). The Hispaniolan forms were listed by MacLean et al. (1977), Schwartz (1980), Henderson and Schwartz (1984), Henderson et al. (1984), and Powell et al. (1999), and all three forms were listed by Schwartz and Henderson (1988). Dixon and Huey (1970) included it in a list of New World *Phyllodactylus* names. The species was noted in the checklists and synonymies of Wermuth (1965), Kluge (1991, 1993, 2001), Powell et al. (1996), Thomas and Joglar (1996), and Rösler (2000), and listed in keys to Puerto Rican lizards by Rivero (1978, 1998). Dixon (1962, 1964) provided keys to distinguish it from other congeners in northern South America and the Caribbean, and Schwartz and Henderson (1988) provided a key to distinguish this species from *P. pulcher* of Barbados.

• **REMARKS.** The species was first noted from Caja de Muertos, Puerto Rico by Grant and Roosevelt (1932), who referred it to *Phyllodactylus tuberculatus*. Grant (1932a) referred both this specimen and another from Parguera to *P. pulcher* and noted the biogeographic significance of the occurrence of a Leaf-toed Gecko in the Greater Antilles. Parker (1935) regarded these Puerto Rican specimens as only minimally differentiated from *Phyllodactylus martini* from the Dutch West Indies, and Grant and Beatty (1944) explicitly referred Puerto Rican specimens to this species. The type material was cited by Smith et al. (1964). The date of publication of the description of the Hispaniolan subspecies was miscited as 1980 by Schwartz and Henderson (1988). Williams (1999) incorrectly stated that Schwartz (1979) had initially described *P. w. hispaniolae* and *P. w. sommeri* as full species. Powell et al. (1996) provided a color photograph purporting to be *P. w. wirshingi* from Bosque Guánica, but the specimen illustrated is a *Hemidactylus* not a *Phyllodactylus*.

• **ETYMOLOGY.** The epithet *wirshingi* is a patronym in honor of Juan A. (Tito) Wirshing, a friend of Chapman Grant, who collected the holotype and three of the paratypes. The subspecific epithet *hispaniolae* refers to the occurrence of this form on the island of Hispaniola. The subspecific epithet *sommeri* is a patronym in honor of William W. Sommer, collector of the holotype of this Haitian taxon.

### 1. *Phyllodactylus wirshingi wirshingi* Kerster and Smith Puerto Rican Leaf-toed Gecko

*Phyllodactylus wirshingi* Kerster and Smith 1955:229, fig. 1, pl. 323, pl. 1. See species synonymy.

*Phyllodactylus wirshingi wirshingi* Schwartz 1979:421. First use of trinomial.

• **DIAGNOSIS.** This subspecies of *Phyllodactylus wirshingi* differs from both *P. w. hispaniolae* and *P. w. sommeri* in that it bears distinctive dark markings on the snout that usually form a preocular bar and/or a U or V shape. It differs from *P. w. hispaniolae* in having a lower number of postmental scales (first row:  $\bar{x}$  = 2.0 versus 2.8, mode 2 versus 3; second row:  $\bar{x}$  = 5.4 versus 6.8), larger size (66 mm versus 61 mm maximum SVL), and larger number of ventral scales at midbody ( $\bar{x}$  = 21.5 versus 19.1) (data from Schwartz 1979). It differs from *P. w. sommeri* in having higher mean (5.4 versus 4.3) and modal (6 versus 4) counts for the second series of postmental scales, and in the color of body bands in the juvenile (brown or mottled with blackish edges in the nominate form versus uniformly black in *P. w. sommeri*).

• **REMARKS.** Although the three subspecies of *Phyllodactylus wirshingi* are allopatric lineages currently evolving independently of one another, they are very weakly differentiated and features claimed to be diagnostic (Schwartz 1979) overlap considerably between the forms. Further evidence, perhaps molecular, that might corroborate or refute the recognition of the subspecies is desirable.

### 2. *Phyllodactylus wirshingi hispaniolae* Schwartz Dominican Leaf-toed Gecko

*Phyllodactylus wirshingi hispaniolae* Schwartz 1979:422. Type locality, "2.0 km E La Descubierta, Independencia Province, República Dominicana." Holotype, Texas Cooperative Wildlife Collection (TCWC) 51046 (an adult female, original number James R. Dixon [JRD] 21493), collected by James R. Dixon, 20 November 1975 (not examined by authors).

• **DIAGNOSIS.** Characters distinguishing this subspecies from the nominate form are outlined above. *Phyllodactylus w. hispaniolae* differs from *P. w. sommeri* in having a higher mean ( $\bar{x}$  = 2.8 versus 2.0) and modal (3 versus 2) number of scales in the first postmental scale row, and a higher mean number of scales in the second postmental series ( $\bar{x}$  = 6.8 versus 4.3) (data from Schwartz 1979). The juvenile color pattern of *P. w. hispaniolae* consists of brown transverse bars with black edges, whereas that of *P. w. sommeri* is more starkly black and white.

• **REMARKS.** This form was first collected near Monte Río, Azua Province, Dominican Republic in 1974 by Fred G. Thompson of the Florida State Museum (Schwartz 1979). Schwartz and Thomas (1975) regarded these specimens as conspecific with *Phyllodactylus wirshingi*. Schwartz et al. (1978) subsequently noted that material had been collected near La Descubierta, Independencia Province.

### 3. *Phyllodactylus wirshingi sommeri* Schwartz Haitian Leaf-toed Gecko

*Phyllodactylus wirshingi sommeri* Schwartz 1979:424. Type locality, "9.3 km W Ça Soleil, 92 m, Département de l'Artibonite, Haiti." Holotype, Museum of Comparative Zoology (MCZ) 156201 (an adult male, original number Albert Schwartz Field series [ASFS] V46800), collected by William W. Sommer, 14 July 1978 (examined by AMB).

• **DIAGNOSIS.** See above for the features that distinguish *P. w. sommeri* from *P. w. wirshingi* and *P. w. hispaniolae*.

• **REMARKS.** Schwartz (1979) noted that "Ça Soleil is the name of the intersection of the main north-south road between Gonaïves and Cap-Haïtien and the dirt road that goes to Coridon on the southern coast of the Presqu'île du Nord Ouest."

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