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Mexican Species

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**Two New Anoles (Reptilia: Iguanidae)  
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Mexican Species**

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*Abstract:* *Anolis isthmicus*, herein described, is a large, yellowish-brown species characteristic of xeric thorn scrub and rock outcrops in foothill ravine habitat northwest of Tehuantepec, Oaxaca. It is closely related to *A. subocularis* which occurs farther west in Oaxaca and in Guerrero, but differs from that species in having finer scalation, relatively long hind limb and tibia and having a row of small median scales separating the supraorbital semicircles. *Anolis quercorum*, also herein described, is a small, slender, gray species of montane oak forest in northwestern Oaxaca. It is most like *A. microlepidotus* of Guerrero, but differs in having smooth rather than rugose head scales, a longer hind limb and coarser scalation on the body. *A. nebuloides*, a poorly understood species, is here redescribed from a freshly collected topotypical series from Putla, near the Guerreran border in the mountains of western Oaxaca. *A. simmonsii*, known from only three specimens from the coastal region of southwestern Oaxaca, is like *nebuloides* in various respects, especially in the possession of much enlarged and heavily keeled dorsal scales. There is some possibility that *simmonsii* is a variant of the species *nebuloides*.

\* \* \*

In the course of field work in Mexico in early 1977 I collected series of *Anolis* at several localities. Two of these series appear to be of new and undescribed species despite the fact that both were collected in areas adjacent to the Interamerican Highway and well known to herpetologists. Because there are many similar species of small Mexican anoles and the

present species lack striking recognition characters but combine the characters of various others, they have not been previously recognized as distinct. They are described below.

*Anolis isthmicus* new species

*Holotype*. - Adult ♂ University of Kansas Natural History Museum (KU) no. 176034 from 19.5 km WNW Tehuantepec, Oaxaca, Mexico, collected 11 February 1977 by H. S. Fitch.

*Paratopotypes*. - KU nos. 176036-176049 and Milwaukee Public Museum (MPM) nos. 16295-16297.

*Paratypes*. - KU no. 33853 from 3.2 km N and 16 km W Tehuantepec, 37780 from 4.8 km NW Tehuantepec, and 42667, 42668, 42669 from 9.6 km NNW Tehuantepec, and KU no. 176035 from 8 km WNW Tehuantepec.

*Definition*. - Large (average adult male S-V 56 mm); tail moderately long (1.8 times S-V); dorsal scales keeled, small (most often 60 to 70 rows between axilla and groin); ventral scales heavily keeled and mucronate, fairly small (often 44-54 rows between axilla and groin); usually 130-150 scales around mid-body; head scales flat or somewhat bulging but not keeled except on snout; supraorbital semicircles normally separated by 1 row of small scales on midline; interparietal separated from semicircles by one or two scales; five or six rows of loreals; usually three much enlarged supraoculars, wider than long, and together forming an oval disc, surrounded by much smaller scales and separated from semicircles by one row of small scales; hind limb elongate extending beyond eye when folded forward; widened lamellae on 4th hind toe most often 12; supralabials to mid-eye usually 7 (8 or 6); body yellowish tan dorsally with traces of black chevron-like middorsal marks; ventral surface ivory, immaculate; limbs and toes faintly banded; dewlap reddish-orange but with its scales and adjacent skin pale yellow, separating the more deeply colored areas between scale rows into about seven longitudinal stripes; dewlap large, extended back on chest to level of elbow, outer margin of dewlap pale grayish yellow; eye dark; scales of lower eyelid mostly whitish; low dorsal crest on neck and forebody, interrupted at shoulder.

*Description of holotype*. - Length S-V 57 mm, tail 99 mm, live weight 3.65 gm, length of head (from anterior edge of tympanum) 13.7 mm, width of head 9.0 mm, ear opening 1.75 x .9 mm, hind limb extending forward to front of eye, forelimb extending forward well beyond tip of snout and back nearly to rear of thigh, about 136 scales counted around mid-body of which 24 dorsals are somewhat enlarged, keeled, and hexagonal, about 36 rows on each side are minute, discoidal or tuberculate, and the 40 rows of ventral scales are enlarged, heavily keeled, and mucronate; 63 middorsal scales and 48 midventrals from axilla to groin level; three pairs of much enlarged supraoculars forming on each side an oval disc, the second and third

narrowly in contact with supraorbital semicircles; semicircles narrowly in contact separated for most of their length by 4 small median scales, the semicircles themselves consisting of six pairs of much enlarged scales, convex and bulging, but not keeled; 2 postmentals; 4 postrostrals, 6 scales between nasals; supralabials and infralabials each in 7 pairs (excluding several minute scales at posterior end of each series); loreals in 5 rows; scales on top of head smooth except those on muzzle which are rugose; widened lamellae on 4th toe of hind foot 13 and 12 on left and right sides, 10-10 on 3rd toes, 9-9 on 5th toes. On front feet there are 8 to 10 widened lamellae on all digits except the inner pair; body yellowish brown with wavy broken transverse black bars; limbs and tail with dark bands; ventral surface ivory; dewlap reddish-orange streaked with yellow along scale rows.

*Variation.* - Of 14 males collected, 8 appeared to be adults of from 52-63 mm S-V (mean  $56.1 \pm 1.28$ ). Curiously, no adult females were captured or seen. However, 5 preserved specimens (KU) included 3 females that seemed adult, with lengths (S-V) of 49, 50 and 58 mm (no. 37780); the latter was exceeded in length by only one of the 8 males although there must have been some shrinkage in preservation. These meager data do not provide much clue as to the extent of sexual size difference in *A. isthmicus*. However, it is noteworthy that two similar neighboring species show the extreme of sexual size difference for mainland anoles. It was speculated (Fitch, 1976) that this difference between the sexes was correlated with dry climate and the resultant short, concentrated, and stressful breeding season, putting a premium on male display, courtship and aggression. If this trend is borne out, *A. isthmicus* also should have relatively large males and small females.

*A. isthmicus* varied in all scale characters examined, as follows: scales around body  $140 \pm 1.96$  (124-155); middorsal scales from axilla to groin  $59.6 \pm 1.47$  (54-74); midventral scales from axilla to groin  $49.5 \pm 0.98$  (42-61); supraorbital semicircles completely separated by intervening row of small scales on midline in 16, in contact for at least part of their length in 7; interparietal in contact with supraorbital semicircle in one instance, separated by single scale in 9 instances, separated by 2 scales in 18 instances and separated by 3 scales in 10 instances (considering left and right sides separately); supralabials to mid-eye 7-7 in 39%, 6-7 or 7-6 in 26%, 7-8 or 8-7 in 9%, 6-6 and 8-8 each in 13% (N = 23). Mean tail length in 8 adult males is  $181 \pm 2.02\%$  S-V (173-188%). Mean dewlap area of 6 adult males is  $605 \text{ mm}^2$  (534-700).

*Comparisons.* - Many other species of *Anolis* are present in nearby parts of Mexico and need to be considered in ascertaining that *A. isthmicus* is a distinct and valid species. Most of these have distinctive characters of color, external morphology or habitat by which they could be readily distinguished. One specimen of *A. isthmicus* (KU 37778) had been identi-

fied as *A. schiedi*, doubtless from the key in Smith and Taylor (1950) and the character: "tibia distinctly longer than head". *A. schiedi*, 144 years after its description, is still known only from the holotype, of unknown provenance. However its characters are well known through descriptions and illustrations of Bocourt (1873), Stuart (1955) and Smith and Lafe (1945). *A. schiedi* is one of a group of similar and closely related species including *milleri*, *matudai*, *breedlovei*, *cobanensis* and *polyrhachis*, all occurring in cool, wet, montane habitats (Smith, 1968). These are markedly smaller lizards than *A. isthmicus* and also are much different in lepidosis, having ventrals smooth or only faintly keeled, dorsals minute and supraocular discs with many small scales that are heavily keeled.

Other KU specimens of *A. isthmicus* were identified as *A. nebuloides*, which has served as a catch-all for various Pacific Coastal Mexican anoles. Comparison with topotypical *nebuloides* indicates many differences; in *nebuloides* about 10 dorsal scale rows are abruptly enlarged, approximately the same size as ventrals, and heavily keeled. *A. nebuloides* is smaller than *isthmicus*, lives in more humid habitat, and has a purplish-pink rather than reddish-orange dewlap. *A. nebulosus* is the common anole of western Mexico. However, it could not readily be confused with *isthmicus* as it is distinctive in small size, short hind limb, yellow dewlap and relatively minute ear opening.

*A. cuprinus* is a much more similar species, of essentially the same size, color and general appearance as *isthmicus* and occurring in the same sort of xeric, foothill-ravine habitat 120 km farther east on the east side of the Isthmus (Smith, 1964; Lynch and Smith, 1966; Henderson and Fitch, 1975; Fitch *et al.*, 1976). As yet it is known only from the vicinity of Zanatepec, Oaxaca. It differs as follows: 4-6 rows of dorsals somewhat enlarged; ventrals only weakly keeled, not mucronate; 2 rows (instead of one) of enlarged supraoculars; 2 rows of scales (instead of one row) between supraorbital semicircles, dorsal head scales mostly keeled; no enlarged postanal scales in males; dewlap blood red instead of red-orange.

*A. subocularis* is the most similar species and probably the one that is most closely related. It was named from Tierra Colorada, Guerrero (Davis, 1954) some 450 km west of Tehuantepec, but specimens have been found east along the coast as far as Puerto Escondido, Oaxaca, bridging much of the spatial gap between *subocularis* and *isthmicus*. The two are similar in size, coloration, and general appearance. Both are characteristic of xeric habitats, but probably *isthmicus* occurs in those that are most xeric, while *subocularis*, in keeping with its extensive geographic range, has been found under a considerable variety of habitat conditions. *A. subocularis* differs from *isthmicus* as follows: both dorsal and ventral scales larger (count around body usually between 110 and 140 vs. 130 and 150, dorsal count from axilla to groin 40 to 55 vs. 55 to 70, ventral count usually 30 to 42

vs. 42 to 54); supraorbital semicircles usually in contact along midline for their full length or partly separated by an occasional small median scale instead of completely separated by an intervening row of median small scales in *isthmicus*; widened lamellae on 4th toe most frequently 11, whereas 12 is modal in *isthmicus*; supralabials anterior to mid-eye usually either 6, or 7 in approximately equal frequency, whereas 7 is modal for *isthmicus*; granular scales of lower eyelid predominantly black while those of *isthmicus* are mainly pale colored; hind limb relatively short usually extending forward to about mid-eye in preserved specimens, with head length averaging 102.5% of tibia (hind limb extending forward beyond eye in *isthmicus*, with head length consistently less than tibia, averaging 92.5%); occasional isolated red or salmon scales on ventral surface, which is uniform whitish or ivory in *isthmicus*.

The specimens of *A. subocularis* available for comparison were mostly from the coastal region of southeastern Guerrero (near Marquelia) and adjacent Oaxaca (near Rio Grande, Guachupin, La Estancia, Jamiltepec) and no fresh topotypical material was available. However, the holotype of *subocularis* (TCWC 8675) and other adult males from near Tierra Colorada and Acapulco in Guerrero were examined. These seem more slender, longer-legged, and finer-scaled than the anoles in the series from southeastern Guerrero and southwestern Oaxaca, which eventually may prove to be subspecifically or even specifically distinct from *subocularis*.

*Ecology.* - *Anolis isthmicus* was found to be restricted in habitat requirements, and could easily be overlooked in the general area where it occurs — thorn-scrub woodland in the foothills northwest of Tehuantepec. The anoles were found by following narrow, rocky ravines back onto steep hillsides where there were extensive outcrops of igneous rock that were deeply pitted and fissured, providing abundant hiding places. Some of the anoles seen retreated time after time into the same crevice when approached, and consistently avoided capture. The anoles tended to be more common along the edges of outcrops than in extensive rocky areas where vegetation was sparse. Approximately two-thirds of those seen were on rock surfaces and the remainder were on trunks of small trees near their bases. Average height above ground level of six anoles was 61 cm. Average body temperature of five was 30.5°C. The ravines where these anoles were found emptied into wider ravines with lower gradients and gravelly bottoms where the only anoles were occasional *A. sericeus*. Seemingly *A. isthmicus* and *A. sericeus* overlap in habitat and spatially, but the much smaller and more slender *A. sericeus* is usually found climbing on low vegetation and does not seem to invade the rock outcrops that are the main habitat of *A. isthmicus*. *A. sericeus* has a much wider ecological range in the general region.

The 19 *A. isthmicus* collected on 9, 10 and 11 February 1977 consisted of 6 large males (mostly exceeding 50 mm S-V and 3 grams), four smaller

adult or subadult males, and 9 juveniles. Lengths (S-V) in mm of the latter were: 34, 36, 36, 37, 37, 37, 40, 42, 43, thus forming a fairly uniform size group, with weights from .80 to 1.63 gm but mostly in the neighborhood of 1 gm or a little more. From analogy with other species it is estimated that hatchlings are a little more than 20 mm in length, S-V, and the young in this series are about 4 months old. Allowing somewhat more than a month for incubation, the breeding period that produced these young probably would have been in August or September — during the rainy season and paralleling the timing of reproduction in other Pacific Coastal species such as *cuprinus*, *dunni*, *gadovi*, *subocularis*, and *taylori*.

*Etymology.* - From the Greek: ἰσθμῖος "of the isthmus" (of Tehuantepec).

*Anolis quercorum* new species

*Holotype.* - Adult ♂ KU no. 176050 from 26 km SE Nochixtlán (2.5 km NW Cuesta Blanca, Highway 190), Oaxaca, Mexico, 3 February 1977 by H. S. Fitch.

*Paratopotypes.* - KU nos. 176051-176078 and MPM no. 16294; adult males, females and subadults collected at the same time as the holotype.

*Definition.* - Small (42 mm S-V or less), slender, tail unbanded, about  $1\frac{3}{4}$  times S-V; ventrals large, keeled, usually 37-43 from axilla to groin level; dorsals keeled, minute, usually 50-61 from axilla to groin level; scales on top of head smooth and flat; supraorbital semicircles usually (77%) in contact along midline for at least part of their length but with from 1 to 3 small median scales partly separating them in the majority of specimens; usually three much enlarged supraoculars, wider than long, and together forming an oval disc, surrounded by much smaller scales and separated from semicircles by one row of small scales; limbs unbanded, moderately short (hind limb reaching somewhat beyond ear when extended forward); color pale olive gray with contrasting reddish-brown head, undersurface whitish; dewlap pink, well developed in male, rudimentary in female; widened lamellae under 4th hind toe usually 9 or 10; ear opening relatively small, usually markedly smaller than interparietal; loreals usually in 3 or 4 horizontal rows.

*Description of holotype.* - Length (S-V) 42 mm, tail 74 mm, live weight 1.90 gm, length of head (from anterior edge of tympanum) 11.0 mm, width of head 7.2 mm, ear opening 1.0 x .75 mm, area of extended dewlap 198 mm<sup>2</sup>; hind limb extending forward to front of ear, front limb extending forward to point between eye and nostril and back to a point barely short of groin; approximately 114 scales around mid-body, of which 26 are enlarged ventrals, dorsal scales gradually becoming smaller away from midline but with irregularities and occasional scales larger or smaller than those adjacent, on both back and sides; most scales on back and sides keeled; ventrals keeled; 40 middorsal scales and 36 midventrals from

axilla to groin level; three pairs of much enlarged supraoculars forming on each side an oval disc which is separated from supraorbital semicircles by one row of small scales; all scales on top of head smooth; semicircles in contact for part of their length but with 3 small scales intercalated on midline; interparietal about equal to ear in area, separated from semicircle on each side by 2 scales; 8 pairs of supralabials and 7 of infralabials (not including several minute scales at posterior end of each series); loreals in 3 rows on each side; a shallow frontal depression; 10 widened lamellae on 4th toe of each hind foot, 9 lamellae on each 3rd toe, 7 and 6 lamellae on 5th toe, 5 and 6 lamellae on 2nd toe; front feet have 5, 6, or 7 widened lamellae on 2nd, 3rd and 4th digits; 3 postrostrals, 4 internasals, 6 intercanthals, 2 postmentals; body greenish olive with faint irregular black marks; head brownish olive; limbs and tail with no discernible banding; ventral surface dull white; dewlap bright pink.

*Comparisons.* - Of the many anole species that occur in the same general region with *A. quercorum*, most are readily separated on characters of size, color, or lepidosis, but *A. microlepidotus* (Davis, 1954) is similar in size, scalation and general appearance. Also it is similar in habitat, as both are inhabitants of open, upland oak woodlands, and obviously they are closely related. However, *A. microlepidotus* differs as follows: scales on top of head rugose instead of smooth as in *quercorum*; conspicuous dark band on top of head between eyes (not developed in *quercorum*); head olive like body, not contrasting reddish-brown as in *quercorum*; hind limb shorter extending forward to point between shoulder and ear (usually beyond ear in *quercorum*); middorsal scales between axilla and groin more than 67 (less than 67 in *quercorum*); midventral scales between axilla and groin usually more than 46 (usually less than 46 in *quercorum*); widened lamellae on 4th hind toe average 8 (usually 9 or 10 in *quercorum*); prominent ridges bordering deep frontal depression laterally (scarcely developed in *quercorum*); tail, limbs and toes having faint dark bands (absent in *quercorum*, or so poorly defined as to be hardly discernible).

*Anolis forbesi* is a small species known only from the holotype collected in Puebla, 14 km N Izucar de Matamoros (Smith and Van Gelder, 1955). It has some characters in common with *A. quercorum* — small size, keeled ventrals, minute dorsal scales, short limbs, and small ear opening. However, the differences are sufficiently numerous and important to leave no doubt that the two are distinct. *A. forbesi* has 2 series of 4 or 5 enlarged supraoculars on each side contrasting with the one series of 3 in *quercorum*; it has the supraorbital semicircles separated by a row of median scales, whereas they are in contact in *quercorum*; it has 12 lamellae under the 4th toe, whereas 9 or 10 are the usual numbers in *quercorum*; it has the ventral surface dusky, mottled and speckled, whereas *quercorum* is immaculate whitish ventrally; it has 6 rows of loreal scales, whereas *quercorum* usually has only 3 or 4 rows.



*Variation.* - Twelve adult males averaged  $39.4 \pm 1.62$  mm (36-42) S-V and 6 adult females averaged  $34.8 \pm 1.95$  (33-38). Tail length averaged  $170 + 1.90\%$  (155-185) of snout-vent. Weight averaged  $1.53$  (1.24-1.90) gm in adult males and  $1.09$  (.79-1.40) gm in adult females. Scale counts around mid-body averaged  $121.4 \pm 1.49$  (104-136). Middorsal scales between axilla and groin levels averaged  $53.5 \pm 1.21$  (40-68), and midventral scales in the same distance averaged  $39.8 \pm .66$  (34-48). In 6 specimens the supraorbital semicircles were in contact for their full length, in 7 they were separated by a row of small median scales, and in others there was partial separation by a single scale (2), 2 scales (8), or 3 scales (2). Widened lamellae on the 4th hind toe were 10 in 27 instances, 9 in 17, 11 in 6, and 12 in 2. Scales between the interparietal and the supraorbital semicircles were 2 on each side in 20, 3 on each side in 8, and 2-3 in one.

*Ecology.* - *Anolis quercorum* was found in open montane oak woodland. Body temperatures (N = 12) averaged  $24.4 \pm .76^\circ\text{C}$  (19.8-28.8), lower than those of most lowland anoles, but higher than those of several montane species. In most instances body temperature of an individual anole was slightly higher than adjacent air temperature, but clear-cut instances of basking were not observed. Of 32 *A. quercorum* observed, 56% were on stems of woody plants, 38% were in leaf litter of oak trees, and 6% were on rocks. Those that were climbing were mostly on oak stems or tree trunks  $27.76 + 4.06$  cm (1.7-61.0) above ground level. Stems that the lizards were climbing averaged  $23.5$  (1.65 to 122.0) cm in diameter. Compared with some other species, these lizards were unwary and easily caught. They ran for relatively short distances and could be closely approached. The main defensive behavior seemed to be flattening against the stem, depending on the dull, cryptic pattern for concealment.

Of the 30 *A. quercorum* captured, 18 were considered adults. The other 12 were well-grown young that tended to be uniform in size (28-35 mm S-V) and averaged approximately half of adult male weight. Adult females were not gravid at the time of collection in early February, and evidently there had been no reproduction for many months, probably not since the rainy season of the previous summer.

*Etymology.* - The specific name *quercorum* is Latin, "of the oaks", referring to the habitat of this species.

*Remarks.* - Specimens of this species were reported (as *A. microlepidotus*) from .8 km N Portillo San Andrés at 2200 m and 3.2 km E Ixtepeji at 1830 m by Fitch *et al.* (1976).

#### Comments on the Anole Fauna of Western Mexico

Despite a predominantly xeric climate, the Pacific Coast of Mexico west of the Isthmus of Tehuantepec has a rich anole fauna with some 13 species (*adleri*, *dunni*, *gadovi*, *liogaster*, *megapholidotus*, *microlepidotus*,

*nebuloides*, *nebulosus*, *omiltemanus*, *schmidti*, *sericeus*, *subocularis*, and *taylori*) besides the new species here named and certain enigmatic species known mainly from the type specimens (*macrinii*, *simmonsii* and *utowanae*). It is noteworthy that of all the species listed only *sericeus* extends east beyond the Isthmus of Tehuantepec or extends north into the Gulf of Mexico versant. Thus there is a high incidence of endemism and in fact most of the species listed have extremely limited geographic ranges, insofar as known.

The one main exception to the latter statement is *A. nebulosus*, whose range extends some 1800 km from southern Sonora southeast into Oaxaca, in a great variety of habitats. Its geographic variation has not been studied. Records of *A. nebuloides* are almost as widespread, but are much less numerous, and it seems that many of them are erroneous.

All of the species listed belong to the Beta Division of the genus, and within that division belong to the *Chrysolepis* Species Group (Etheridge, 1960). Notwithstanding this relationship, they differ greatly in size, proportions of body, head, limbs and tail, color, and lepidosis. To some extent all these characters reflect adaptations to special habits and habitats. A morphological character that is common to many and perhaps all members of the group (except *A. sericeus*) in western Mexico is found in the lepidosis of the supraocular region. There is a series of three much enlarged scales, each wider than long, and combined forming a broadly oval supraocular disc, surrounded by relatively small, sometimes granular, scales. Insofar as known to me, this distinctive supraocular disc of three enlarged scales is not present in other species groups of mainland anoles nor in members of the *Chrysolepis* Species Group that occur in Central America or South America. Its presence has no obvious adaptive significance, but instead probably indicates close relationship in the group of West Coast Mexican species.

#### Comments on *Anolis nebuloides*

*A. nebuloides* (Bocourt, 1873) was described from Putla, Oaxaca, a few kilometers east of the Guerreran border and 90 km inland from the Pacific Ocean. Despite its specific name this species is not easily confused with *A. nebulosus*, differing in markedly larger size, purplish-pink rather than yellow dewlap, much enlarged and heavily keeled dorsal scales, relatively larger ear opening, and many other details. There are published records of *A. nebuloides* from throughout much of western Mexico, from southern Chihuahua to eastern Oaxaca. However, Davis (1954) in comparing his newly described *A. subocularis*, stated: "... *Anolis nebuloides* ... so far as I can determine, does not occur in Guerrero." This statement was based on extensive field experience, and Davis explained that various specimens of *subocularis* had previously been identified as *nebuloides*. Unless *nebuloides* has been overlooked in Guerrero, most of the published

records, extending from Chihuahua southeast through Michoacán, are disjunct from the range of the "typical" population in western Oaxaca and may well pertain to other species. Certainly every published record of *nebuloides* merits scrutiny. Typical specimens have not been generally available, and some statements in the literature have given erroneous impressions of the characters of *nebuloides*.

In February 1977 I visited Putla and collected 12 *A. nebuloides* — 9 at 3 and 8 km N Putla, 1 at 8 km N Mesones, and 2 at Amuzgos. Three were adult males, 5 were subadult males and the remaining 4 were juveniles. Most were collected in the moist, tropical habitat of a banana grove, one in lush vegetation of a wet ravine bottom in pine forest, and two among boulders in dry upland pine forest.

The following description was made of a newly collected live adult male. Body dull olive with two dorsal longitudinal reddish-brown lines on each side, separated by a wider pale brown area extending from above foreleg nearly to groin; belly pale, grayish; iris dark; dewlap extending to mid-belly, purplish-pink with a wide yellow outer margin, and with about 9 rows of pale bluish scales; dorsal crest prominent on neck, absent in shoulder area, and relatively low on back; hind limb extends forward to ear; ear relatively small.

Before preservation the three adult males had snout-vent lengths of 51, 48 and 46 mm. Other characters of the preserved specimens were as follows: ten rows of dorsals much enlarged, heavily keeled, about same size as ventrals; scales counted around mid-body average 118 (111-129); dorsals counted at mid-back from axilla to groin levels average 34.5 (32-39); ventrals counted at mid-belly from axilla to groin levels average 32 (30-35); supralabials to mid-eye usually 6 (or 5 or 7); suboculars separated from supralabials by small intercalated scales, at least beneath anterior part of eye; most frequently 1 row of small scales sometimes 2 rows, separating supraorbital semicircles; 2 or 3 scales separating interparietal from supraorbital semicircles on each side at narrowest point.

#### Comments on *Anolis simmonsii*

*A. simmonsii* was named by Holman (1964) from Rio Canoa 26 km west of Pinotepa Nacional in southwestern Oaxaca from a small, supposedly adult, male holotype (UIMNH 52899) and a damaged juvenile hypoparatype (52903) from the same locality. In this same paper 3 specimens of *A. nebuloides* were mentioned, collected 8 km west from the *simmonsii* locality. Curiously, however, *simmonsii* was compared only with *A. pygmaeus* of Chiapas, not with *nebuloides*, whose type locality was nearby, nor with *subocularis* which according to Davis' statements (1954) might be the species most likely to be found in that area.

In defining *simmonsii* Holman described scales on top of head as weakly

keeled, enlarged scales of supraorbital semicircles very weakly keeled, dorsal body scales larger than ventrals, both sets keeled, and 5 or 6 enlarged scales in several series in supraorbital semicircles. However, his figure of the head from the dorsal view clarifies and modifies this latter statement showing three greatly enlarged supraoculars, much as in other Guerreran and southern Oaxacan species, except that there are also three somewhat enlarged scales in a second row lateral to the three largest scales and bordering them. These intermediate sized scales are all less than one-fourth the size of the enlarged scales but are shown considerably larger on the right side of the anole's head than on the left. Smith (1968a) described a third specimen of *simmonsi* from 32 km southwest of Juchatengo (approximately 160 km east of the type locality): it had "three large supraoculars on each side, narrowly contacting semicircles." Also, Smith mentioned its large size (49 mm S-V, ♀) and its supraorbital semicircles broadly in contact, separated by one scale from the interparietal, thus differing from the holotype which has 2 rows separating the semicircles and 3 rows separating the interparietal from them.

Intensive search by me at and near the type locality of *A. simmonsi* in 1972 and 1977, produced many *A. subocularis* but no *A. simmonsi*. However more specimens are acutely needed to determine the range of variation in *simmonsi* and whether it is indeed a valid species. Actually most of the characters listed by Holman (1964) and Smith (1968a) for *simmonsi* could apply to *nebuloides*. Especially, *simmonsi* differs from most Mexican species but resembles *nebuloides* in its much enlarged and heavily keeled dorsal scales.

In most anoles the ventrals are markedly larger than the dorsals, and these in turn are larger than the granular lateral scales. In *nebuloides* the much enlarged dorsals approximate the size of the ventrals, but both series vary considerably in size. It is not clear that one series is definitely larger than the other and the difference is therefore not suitable as a key character, although it has been so used by some authors. Possession of the three intermediate sized supraoculars may be a peculiarity of the holotype of *simmonsi* rather than a regular trait of a population or species.

Table I. Comparison of selected characters in *Anolis quercorum* and *A. microlepidotus*.

	<i>A. quercorum</i>			<i>A. microlepidotus</i>		
	Mean	Range	N	Mean	Range	N
Middorsal scales axilla to groin	53.5 ± 1.21	40-68	30	74.6	66-87	5
Midventral scales axilla to groin	39.8 ± .66	34-48	30	52.1	44-61	5
Widened lamellae on 4th hind toe	9.8 ± .16	8-12	55	8.0 ± .35	6-10	10
Point reached by forward extended hind limb	Between eye and ear	Mid-eye to rear edge of ear	30	Angle of jaw	Mid-neck to ear	5

Table 2. Comparison of selected characters in *Anolis isthmicus*, *A. quercorum*, and certain other anole species of southern Mexico.

	<i>cuprinus</i>	<i>forbesi</i>	<i>isthmicus</i>	<i>microlepidotus</i>	<i>nebuloides</i>	<i>nebulosus</i>	<i>quercorum</i>	<i>schiedi</i>	<i>sericeus</i>	<i>simmonsii</i>	<i>subocularis</i>
Snout-vent length, mm, ♂	63	—	56	—	47	42	39	50	45	—	51
Snout-vent length, mm, ♀	47	—	—	48	—	42	35	—	41	49	39
Head scales: keeled (K), rugose (R), smooth (S)	K	S	S	R	K	K	S	K	S	K	R
Semicircle contact: full (F), partial (P), separated (S)	S	S	P	P	S	P	P	S	S	F or S	P
Dorsals: granular (G), enlarged (E), size of ventrals (V)	E	G	E	G	V	V	E	G	E	V	E
Adpressed hind limb reaches: shoulder (S), ear (E), eye (Y)	Y	—	Y+	S	E	E	E+	—	E?	—	Y
Supraocular disc of scales: 3, 4-6, 7-9, 10 or more	7-9	4-5	3	3	3	3	3	10+	7-9	3 or 4-6	3
Tibia-to-head ratio: longer (L), shorter (S)	S	—	L	S	S	S	S	L	S	S	S
Ear opening compared with interparietal: minute (M), smaller (S), same size (I), larger (L)	L	M	S	S	S	M	I	I	M	—	I
Postanals of male: enlarged (E), not enlarged (N)	N	—	E	E	E	N	E	—	N	—	E
Dewlap: Orange (Or), Pink (Pi), Purple (Pu), Red (Re), Yellow (Ye), with Blue central spot (B)	Re	—	Or	Re	Pu	Ye	Pi	—	Or-B	—	Or-Re

Ranges: *cuprinus*, Zanatepec, SE Oax.; *forbesi*, Izucar de Matamoros, Puebla; *isthmicus*, foothills NW Tehuantepec, Oax.; *microlepidotus*, mountains of central Guerr.; *nebuloides*, Putla vicinity, W Oax.; *nebulosus*, Son. to Guerr.; *quercorum*, mountains of NW Oax.; *schiedi*, unknown (possibly Veracruz); *sericeus*, S Mexico to Costa Rica; *simmonsii*, SW Oax.; *subocularis*, coastal Guerrero.

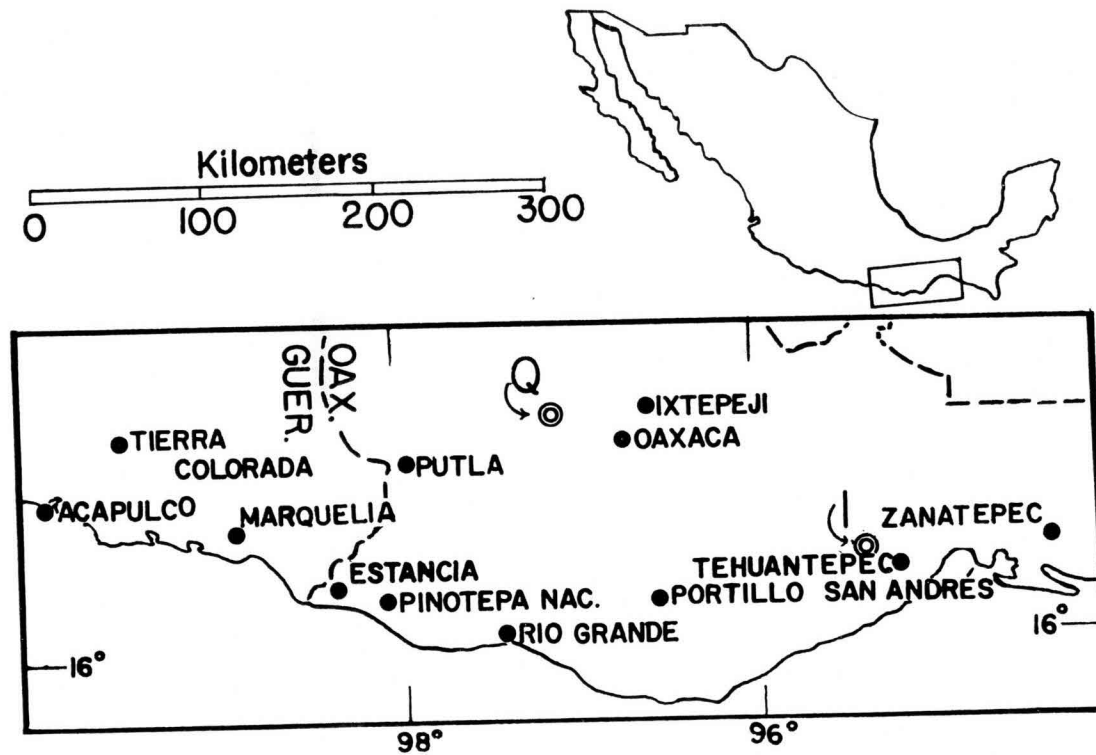


Figure 1. Map of Pacific coastal area of southern Mexico in Guerrero and Oaxaca; double circles show localities of *Anolis isthmicus* (I) and *A. quercorum* (Q), dots show localities of various other species of anoles mentioned in the text.

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