is tannish-gray above and white below in *diabola*, and it is reddish above and below in *rubra*. In *rubra*, the lower postocular is usually white, or white with a black anterior margin, and the fourth upper labial generally has a white posterior border; but in *diabola* both postoculars are entirely black and the fourth upper labial is black to the posterior margin. Ventrals and subcaudals are more numerous in *diabola* than in *rubra*. In *rubra* ventrals number 147 to 167, subcaudals 56–70. Numbers of ventrals and subcaudals of *rubra* are graphically compared with those of *diabola* in Figure 1. Both counts are higher in *diabola* than in any *rubra*. Clinal variation seems evident in the *rubra* populations for both characters. The ventral count of *diabola* might be interpreted as part of this cline, but no such interpretation is possible with regard to the subcaudals. The localities where *rubra* and *diabola* have been found are shown in Figure 2, which indicates the samples grouped in Figure 1.

Four other species of this genus are known from Texas. Three of these belong to the *nigriceps* group and the other to the *gracilis* group of Smith (1942). The latter group is represented by *T. gracilis*, which has a conical head with no black pigment, no nuchal collar, and six upper labials. The Texas representatives of the *nigriceps* group include *nigriceps*, which has no nuchal collar; *atriceps*, which may have a faint nuchal collar but no posterior black border; and *cucullata*, which has a black head and neck, but no light collar.

Acknowledgments.—We are grateful to the following people and institutions for the use of specimens: W. F. Blair, University of Texas Natural History Collection; C. M. Bogert, American Museum of Natural History (AMNH); M. Alvarez del Toro, Museo Zoologico de Tuxtla Gutierrez (MZTG); R. F. Inger, Chicago Natural History Museum (CNHM); H. M. Smith, University of Illinois Museum of Natural History (UIMNH); and C. F. Walker, University of Michigan Museum of Zoology (UMMZ). W. F. Blair also read the manuscript. We also wish to thank Mr. and Mrs. G. E. Drewry for donation of the novel specimen.

Specimens examined (*T. rubra*).—*Nuevo Leon:* CNHM 30825. *Tamaulipas–San Luis Potosi:* AMNH 66161, 79960; UMMZ 107145–46, 111042, 111044, 111046–52. *Southern Puebla–Northern Oaxaca:* AMNH 65141; CNHM 105339, 105341, 105343; UIMNH 48562–63. *Tehuantepec* (*Oaxaca*) *area:* AMNH 62644–45, 62922–25, 65884, 66796, 66959, 68025, 68883; CNHM 82728, 105340, 105342, 105344; UIMNH 3773–74, 36815, 37145–46, 48561; UMMZ 82728. *Chiapas:* UIMNH 37991, 38041; UMMZ 102239; MZTG 76, 259, 411, 425, 434, 435.

In addition, ventral and subcaudal counts were included on the basis of published information for CNHM 40813 from Nuevo Leon (Smith, 1944).

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Cnemidophorus inornatus, the Valid Name for the Little Striped Whiptail Lizard, with the Description of an Annectant Subspecies

Ralph W. Axtell

In 1858, Spencer F. Baird described two lizards, *Cnemidophorus inornatus* and *Cnemidophorus octolineatus*, on the same page of the Proceedings of the Academy of Natural Science of Philadelphia. Both new species were collected by the same man (Lt. D. N. Couch) at the same locality—the village of Pesquería Grande (subsequently changed to Villa de Garcia), in the Mexican state of Nuevo León. The two cotypes of *C. inornatus* (United States National Museum 3032), although in very poor condition, are rather dark (deep brown from many years in preservative), completely unstriped lizards hav-

ing 80 and 85 granular dorsal scale rows (according to Dr. Doris M. Cochran), while the type of *C. octolineatus* (USNM 3009) has eight light stripes on a dark background and only 66 dorsal granules.

A brief history reviewing the nomenclatorial association of *C. inornatus* and *C. octolineatus* with each other, and with the lizard commonly called the little striped whiptail may be enlightening. The descriptions of both species (Baird, 1858:255) are repeated below:

> "*Cnemidophorus inornatus,* Baird—Scales on the gular fold smaller than those on the breast anteriorly, and scarcely larger than those on the middle of the chin. Scales of back tubercular and elevated. Hind feet about two-fifths the head and body. General color light greenish olive, paler beneath. No lines on the body.
>
> Hab.—New Leon. Lt. Couch. Type No. 3032.
>
> *Cnemidophorus octolineatus,* Baird—Gular fold as in the last. Hind foot not two-fifths the head and body. Scales of back depressed. General color light greenish olive, paler beneath. Back with eight equidistant and approximated light lines.
>
> Hab.—New Leon. Lt. Couch. Type No. 3009."

Subsequently both names were retained by various authors until about 1906, after which they slipped, for unknown reasons, into the synonymy of other *Cnemidophorus.* The two names were consistently synonymized, always under different headings. Burt (1931:9) placed *C. inornatus* under *Cnemidophorus sexlineatus gularis,* and *C. octolineatus* under *Cnemidophorus sexlineatus perplexus.* Schmidt and Smith (1944) lifted *octolineatus* from synonymy to apply to a lizard occurring in the mountainous regions of central Coahuila, Mexico. Burger (1950) has more recently referred Schmidt and Smith's *octolineatus* to *Cnemidophorus sacki semifasciatus.* Smith (1946) contributed to the already growing confusion by using *octolineatus* as the subspecific name of yet another form of *C. sacki,* which recently has been identified and described as a distinct subspecies (*C. s. exsanguis*) by Lowe (1956). The name *C. inornatus* was brought out of synonymy by Burger (1950) to become a substitute name for *C. perplexus,* after it was discovered that earlier confusion in type designation had irrevocably placed the name *C. perplexus* with a lizard of a different species, and not with the little striped whiptail. See both Burger (1950) and Maslin et al. (1958) for comments on this problem. Burger (op. cit.) relegated *C. octolineatus* to the synonymy of *C. inornatus,* thus being the first to indicate that these two lizards might be identical. The implication of the possible synonymy of these two names has stirred considerable skepticism among the interested saurologists. Do two different, closely related species live at the original collecting site, or only one dimorphic species?

At the onset (1958) of preparation for my work on Texas lizards many systematic problems involving forms occurring within Texas have presented themselves. As the taxonomic status of *C. inornatus* was one of the most controversial and insecure, I decided to visit the type locality of that species to try to answer the question of dimorphism posed above, and in doing so resolve our future use of the names *C. inornatus* and *C. octolineatus.* On June 9 and 10, 1960, Michael Sabath and I collected 14 (6 ♂, 8 ♀), *Cnemidophorus inornatus* from a group of wind formed, sandy mounds (about eight feet high) across the Rio Pesquería from Villa de Garcia. Of these 14 specimens, six were completely unicolor brownish olive above, and eight were distinctly striped with eight light lines on a brownish gray to olive background. We found six unicolor and five striped members of both sexes living within a small dune area estimated to be 50 yards wide by 100 yards long. Approximately 100 yards southeast of the dunes, among several small mounds (not over one foot high), we took three more individuals, but all of these were striped. This suggests that strong selection pressure may be active outside the restricted dune area, but more evidence for this is needed. From cursory observation the ratio of striped to unicolor individuals in the main dunes population appeared to be one to one, and the number of specimens collected by Sabath and myself (both morphotypes were in equal demand) tends to substantiate this observation. Unicolored individuals were the same color as, and therefore blended with the substratum. To my eye, unicolored lizards were more difficult to trail than were the striped members. This might explain their relatively high survival rate in the main dunes, but not in peripheral non-dune areas. The venters of both color forms were similar.

Although little time was spent noting behavioral phenomena at the collection sites,

TABLE 1. COMPARISON OF THREE CHARACTERS IN BOTH COLOR FORMS OF *Cnemidophorus i. inornatus* WITH *C. i. heptagrammus* ssp. nov. MEANS IN PARENTHESES

Character	Unicolor form Villa de Garcia, Coahuila	Striped form Villa de Garcia and other loc.	*heptagrammus* Trans-Pecos Texas
Scales around mid-body			
♂	N = 1 74	N = 8 64–78 (71.1)	N = 37 55–71 (62.5)
♀	5 69–80 (75.4)	9 66–76 (69.5)	22 55–68 (64.3)
Sum of femoral pores			
♂	1 36	8 32–37 (33.9)	37 25–35 (30.9)
♀	5 30–35 (32.8)	9 29–37 (34.3)	22 28–36 (30.8)
Lamellae of fourth toe			
♂	1 31	8 27–34 (30.8)	37 25–32 (27.5)
♀	5 30–32 (31.0)	9 27–33 (30.9)	22 24–32 (27.3)

on one occasion a striped male was observed pursuing a unicolor female. Both individuals were collected to check their sex.

Although the sample is small there seems to be some correlation between a non-striped pattern and more numerous granular scale rows (Table 1). The significance of this is unexplainable at the present time and with the present material. The types of *C. inornatus* and *C. octolineatus* (supra) have such a large hiatus between granular midbody counts that some workers have regarded this character and the absence of stripes as being important enough to warrant distinction of the two forms as full species. On the grounds of what I have observed in the field and noted in the laboratory (twenty different observations per specimen), I cannot agree that they are different species. Pattern dimorphism in reptiles has caused considerable taxonomic confusion before (see Mecham, 1957, Klauber, 1936, 1939, 1944 and Smith, 1943), but now that we are aware that such genetic phenomena occur in natural populations, our ideas should be benefited by them.

If we are to abide strictly by the Rules of Zoological Nomenclature, *Cnemidophorus inornatus* is the correct name (based on line priority) for the little striped whiptail. As *C. inornatus* has never been properly characterized, a redescription follows:

Cnemidophorus inornatus Baird

Distribution.—Principally an elevated plains or alluvial flatlands whiptail occurring in Mexico from central San Luis Potosí northward through Coahuila, extreme southeastern Nuevo León, eastern Zacatecas and Durango, Chihuahua, and northeastern Sonora. In the United States it occurs from the Devil's River of Texas, westward through southern New Mexico and extreme southeastern Arizona. Vertical distribution from about 1,000 to 6,500 feet, but infrequent above 5,500 feet.

Diagnosis.—A member of the *sexlineatus* group of the genus *Cnemidophorus* with slightly enlarged postantibrachials (two to four times size of adjacent lateral scales); usually no more than two or three transverse series of slightly enlarged mesoptychials (five to ten times size of granules in gular fold); eight rows of enlarged plate-like ventral scutes; supraorbital semicircle scales seldom extending anteriorly beyond the posterior edge of frontal; dorsal granules at midbody generally fewer than any other member of group, 55 to 85, averaging 63.92; sum of femoral pores 25 to 42, averaging 30.72; preanal scales 2 to 8, averaging 3.47; dorsal markings, a series of light stripes (variable in number) on an unmarked, dark background (dark color usually becomes lighter with age); ventral surface without dark markings, but usually bluish white; chin, belly of adult males and tail of both sexes usually more vivid blue or blue-violet.

Geographic Variation.—The number of dorsal stripes in *C. inornatus* is known to vary geographically. Burger (1950:3) observed

variation in dorsal striping, but presumably regarded it as broadly clinal over the entire range of the species (decrease in striping from southeast to northwest), and therefore not usable for defining discreet subpopulations. Fugler and Webb (1956) presented additional evidence of variation, but confined their discussion to the lizards from a single collection site. With regard to dorsal striping, the populations of *C. inornatus* that I have observed segregate into four fairly homogeneous geographic populations: 1) eight-striped populations on the high plateau of Mexico, in the states of San Luis Potosí and Zacatecas, 2) eight-striped populations (a split vertebral stripe) in arid west central Nuevo León and southeastern Coahuila, 3) seven-striped populations (a single vertebral stripe) in northern Coahuila (a broad hiatus or relictual populations may occur in central Coahuila), eastern Chihuahua, Trans-Pecos Texas and up the Pecos River Valley to central New Mexico, and 4) six-striped populations (no vertebral stripe) in western New Mexico, southeastern Arizona, northeastern Sonora, and western Chihuahua. Material for the above observations has come from both cursory and concentrated field work on this problem since 1955. As Mr. Kenneth Williams of the University of Illinois has been working on western members of the species for several years, I have conceded treatment of these forms to him, and will concentrate solely on eastern representatives of *C. inornatus* for the remainder of this paper.

There is a consistent difference in the dorsal striping of *C. inornatus* populations from two definable ecological and physiographic regions in northeastern Mexico. As additional characteristics add weight to the striping difference, I believe these two populations should receive subspecific recognition.

Cnemidophorus inornatus inornatus Baird
Eight Striped Whiptail
Fig. 1, A & B

Cnemidophorus inornatus Baird, 1858: 255; Boulenger, 1885: 360, Cope, 1900: 590; Gadow, 1906: 373; Burger, 1950; 2 (part); Smith and Taylor, 1950: 184 (part).

Cnemidophorus octolineatus Baird, 1858: 255; Cope, 1900: 589; Gadow, 1906: 373.

Cnemidophorus sexlineatus gularis, Burt, 1931: 98.

Cnemidophorus sexlineatus perplexus, Burt, 1931: 122.

Lectotype.—Adult female, USNM 3032 A (by present designation)[1] collected by Lt. D. N. Couch in 1853.

Type Locality.—25° 49′ N–100° 35′ W, Pesquería Grande (= Villa de Garcia), Nuevo León, Mexico. Elevation, 2,500 ± feet.

Diagnosis.—A subspecies of *Cnemidophorus inornatus* with a dorsal pattern of eight light stripes on a gray to brownish green ground color, or a brownish green dorsum without markings; dorsal granular scales at midbody usually 69 or more in both sexes (73% of sample); lamellae on longest toe of hindleg usually 30 or more in both sexes of (79% of sample); and paravertebral light stripes (first lateral from split vertebral stripes) reaching anteriorly to enlarged occipital scales, absent or not clearly defined on parietals or supraoculars.

Description.—This description is based on 24 specimens (9 ♂, 15 ♀). All measurements are in millimeters.

Maximum snout-vent length of male 60.7, of female 63.2; average length of adults (those over 50.0) 57.6; total length of largest specimen examined 203.6 (♂); forelimbs averaging 31 per cent of snout-vent in males, 30 per cent in females; hindlimbs averaging 66 per cent of snout-vent in males, 63 per cent in females; length from axilla to groin 48 per cent of snout-vent in males, 51 per cent in females.

Number of dorsal granules at midbody 65 to 80 (71.6 ± 0.96); sum of femoral pores 29 to 37 (33.9 ± 0.45); transverse lamellae on longest phalange of hindfoot 27 to 34 (30.9 ± 0.41); usually three or more supraorbital semicircle scales contacting lateral edge of frontoparietal; number of enlarged preanals variable, from 3 to 7 (4.14); ventrals from gular fold through preanals 35 to 41 (38.0). There appears to be little variation within the relatively small geographic range of this form.

Two strikingly different color phases exist (Fig. 1, A & B), one phase with eight light stripes, and another without stripes. In both phases the ground color is brownish gray, usually with a greenish iridescent tint. The dorsal head coloration is similar to that of the body. In the striped phase, the paravertebral light lines do not continue anteriorly across the occipitals onto the parietals or supraoculars. Ventrally the head, body and tail, and the sides of the head are bluish in most individuals. Distally the tail

[1] Burger (1950) designated USNM 3022a as the lectotype for *C. inornatus*. As this number is incorrect, and as no identifying marks were placed on the selected specimen or tag, I have marked and redesignated a lectotype.

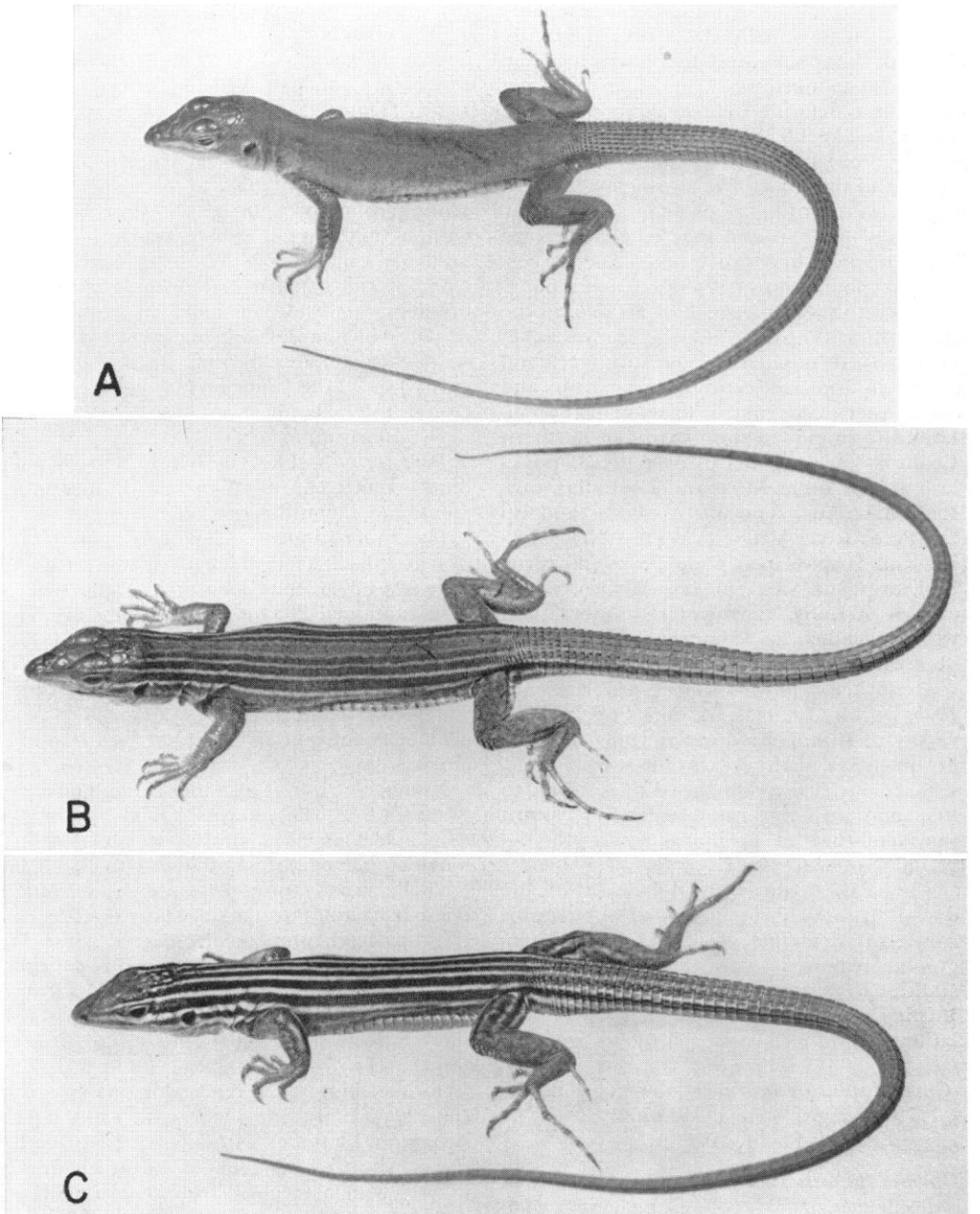

Fig. 1. (A and B) *Cnemidophorus inornatus inornatus*, both from Villa de Garcia, Nuevo León, Mexico. (A) RWA 2784 ♀, total length 172.1 mm.; (B) RWA 2793 ♀, total length 194.3 mm. (C) *C. i. heptagrammus* ssp. nov., 4 mi. W. Terlingua, Brewster Co., Texas (RWA skel. ♂).

is usually purplish blue. Sexual dichromatism is evident with ventral coloration in adult males being vivid blue-gray and in females gray with only a slight tint of blue. Juvenile coloration is unknown. Two to eight scales may be present between the vertebral stripes. The vertebral dark field is lighter than the lateral dark fields, and in several specimens there is a faint indication of two additional (9th and 10th) light lines in this area.

The eight striped pattern is consistent (100% of 17 specimens). Whether this consistency will be maintained throughout the entire range of the subspecies has yet to be determined.

Comparisons.—Cnemidophorus inornatus inornatus differs from the more northerly distributed seven-lined form in possessing 1) eight dorsal light lines, or none at all; 2) a lighter brownish green or brownish gray dorsal ground color (not dark gray to black); 3) a ventral coloration of blue-gray (♂) or gray (♀), as compared to much brighter sky blue (♂) or bluish white (♀) in the seven-lined form; 4) dorsal granules usually 69 or more; 5) usually 30 or more lamellae under longest toe of hindfoot; 6) usually three or more small posterior semicircular scales contacting the frontoparietals; and 7) paravertebral dorsal light stripes fading abruptly on the occipital region of the head, and not continuing as a well defined line onto parietals, supraorbital semicircles or supraoculars.

As only the seven and eight-lined populations are to be discussed formally here, I will not attempt to compare either of these populations with the more westerly distributed populations. At least some of the differences between the several forms of the species are incorporated in the diagnoses of the two populations considered here.

Intergradation.—The sample material used in the above description shows no definite tendency toward integradation with any other subspecies. Fugler and Webb (1956) reported a population of *C. inornatus* near Parras, Coahuila, from which they collected individuals having seven striped (eight) and eight striped (six) patterns. The Parras area might be a location favorable for the meeting and admixture of populations from the highlands of southern Coahuila and the Coahuilan lowlands to the northeast (see fig. 2). The populations occurring within that area might just as easily be recognized as a northern segment of the highland Coahuila-Zacatecas populations which are showing clinal loss of an eight striped condition toward the west, for it is known that specimens from northeastern Zacatecas are mostly eight-striped while those from lower elevations in northeastern Durango are seven-striped. Of course there may be three-way contact of populations in the Parras area. Much additional material will have to be examined before this problem can be resolved.

Habits and Habitat.—This is a shy whiptail, more difficult to approach and collect than its northern relative. The period of greatest diurnal activity during June appears to be the morning hours (from 8:00 to 11:30 AM), with very little to no activity in the afternoon. The few observations indicate that females make up the majority of active individuals after about 11:00 AM. Individuals seem to prefer rather flat, grassy alluvial deposit areas or gentle slopes where there are intermittent open areas. They forage for food along the edges of grassy patches where they can remain close to protective cover and shade. The population at Villa de Garcia occurs in an area of small sandy hillocks covered by thorny vegetation, with areas of grass and weeds on the flats between. Farther westward, specimens were found on the more xeric, sparsely vegetated Plan de Guadalupe, a flat bolson, adobe-fill area broken by many crescentric Upper Cretaceous sandstone cuestas.

Distribution.—(Fig. 2). This lizard is restricted so far as is known to the intermontane valleys and bolson basins drained by the Rio Pesquería, Rio Salinas, Rio Tortuga, Arroyo San Diego and Arroyo Huisache. It has been found as far north as Gloria in the upper Rio Sabinas drainage, but apparently does not occur north of Monclova, Coahuila. Locality records follow: MEXICO.—*Coahuila:* 26° 42′ N–101° 23′ W, at Gloria (R. W. Axtell collection 1376); 26° 40′ N–101° 23′ W, WSW. Gloria (RWA 1371–2); 26° 38′ N–101° 23′ W, S. Gloria (RWA 2773); 26° 13′ N–101° 18′ W, N. Guadalupe (RWA 2778); 26° 03′ N–101° 21′ W, S. Guadalupe (RWA 2770–1); 26° 05′ N–101° 21′ W, S. Guadalupe (RWA 2772); 26° 08′ N–101° 03′ W, E. Reata (RWA 2794). *Nuevo León:* 25° 48′ N–100° 35′ W, S. Villa de Garcia (RWA 2779–93).

Restriction of the name *C. i. inornatus* to striped whiptail populations occurring in southeastern Coahuila and west-central Nuevo León, leaves the *C. inornatus* populations of northern Coahuila, northeastern Chihuahua, western Texas and southeastern New Mexico nameless. I therefore propose:

Cnemidophorus inornatus heptagrammus *ssp. n.*
Seven Striped Whiptail
Fig. 1, C

Cnemidophorus perplexus Baird and Girard, 1852: 128 (part); Strecker, 1909: 14; Van Denburgh, 1922: 495 (part); Schmidt and Smith, 1944: 86; Smith, 1946: 412 (part); Jameson and Flury, 1949: 64; Brown, 1950:

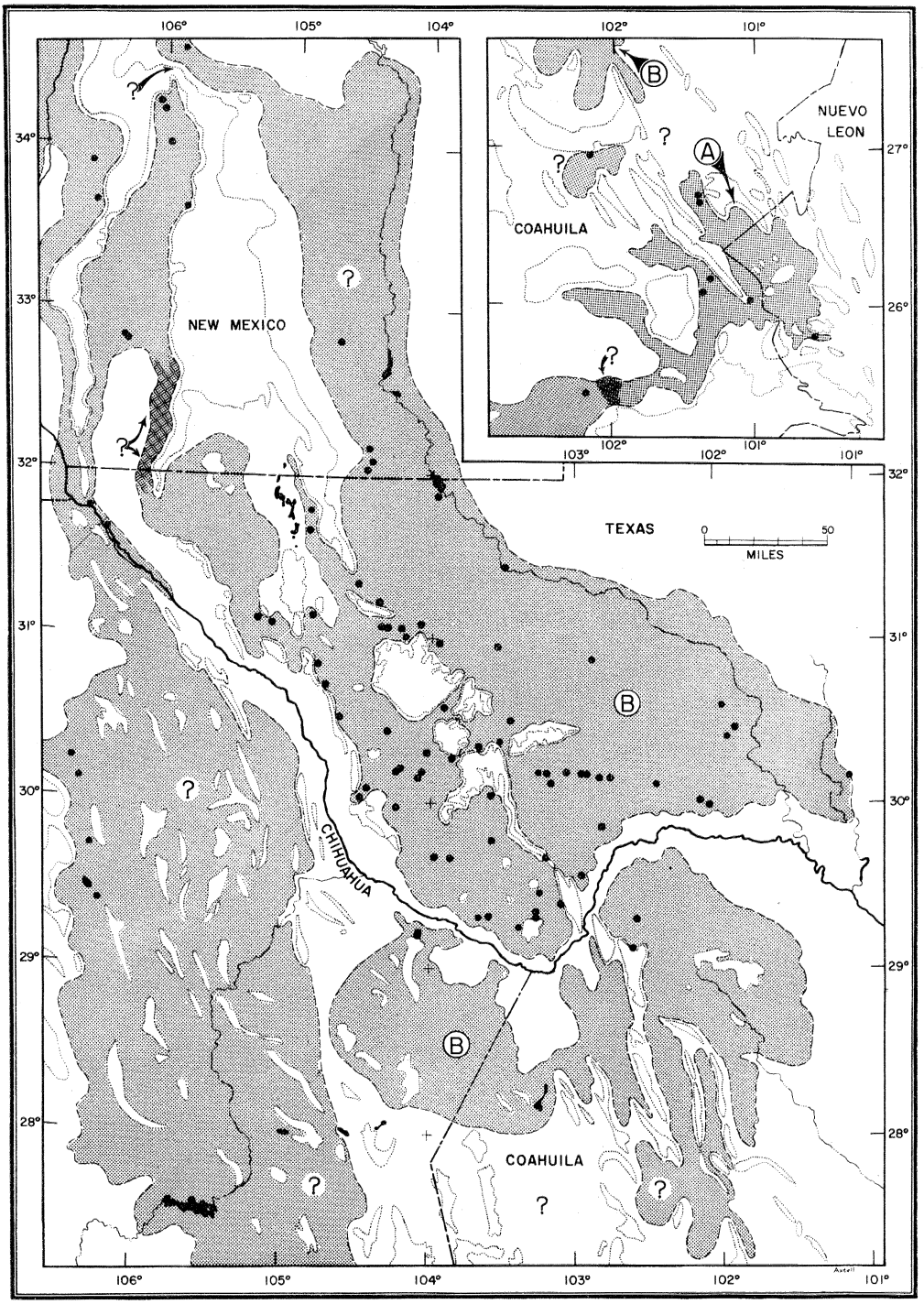

Fig. 2. Map of a part of the hypothetical range of *Cnemidophorus inornatus*, with black dots representing locality and reliable literature records. The distributions of *C. i. inornatus* (A), and *C. i. heptagrammus* (B), and extralimital forms are shown. White areas surrounded by stipple are not considered to be habitable by *C. inornatus*. Supposed areas of intergradation are marked by overlapping stipple, and areas of questionable range are marked by question marks (?).

127; Milstead, Mecham and McClintock, 1950: 553; Schmidt, 1953: 146 (part); Milstead, 1957: 228; Minton, 1958 (1959): 45.

Cnemidophorus sexlineatus, Gadow, 1906: 302 (part).

Cnemidophorus sexlineatus perplexus, Burt, 1931: 122 (part).

Cnemidophorus inornatus, Burger, 1950: 2 (part); Smith and Taylor, 1950: 184 (part); Milstead, 1953: 411; Schmidt, 1953: 146 (part); Stebbins, 1954: 288 (part); Axtell, 1959: 100.

Holotype.—Adult male, RWA 1758, collected by Ralph W. Axtell, May 16, 1959.

Type Locality.—30° 11′ 30″ N–103° 09′ W, 5 mi. ESE. Marathon, Brewster County, Texas. Elevation 4,150 feet.

Diagnosis.—A race of *Cnemidophorus inornatus* with a dorsal pattern of seven light stripes on a dark gray to black ground color; dorsal granular scales at midbody usually less than 69 (89%) in both sexes; lamellae on longest toe of hindfoot usually less than 30 (84%) in both sexes; and paravertebral light stripes reaching anteriorly to parietals, supraorbital semicircles or supraoculars.

Description of Holotype.—An adult male, snout-vent length 58.4; tail length 130.0 (complete); foreleg 18.0 (ratio foreleg to snout-vent 0.308); hindleg 38.8 (ratio hindleg to snout-vent 0.664); head length 13.6, width 9.0; snout to posterior edge of interparietal 13.0; axilla-groin length 29.0 (ratio axilla-groin to snout-vent 0.497); circumferential dorsal granular scales at midbody 59; lamellar count for manus 9–12–15–15–11 (R), 10–13–14–14–11 (L), for pes 17–27–20–15–10 (R), 15–28–20–14–10 (L); 161 dorsal scales from interparietal to first enlarged scales of tail; 15–15 femoral pores; 37 ventrals from enlarged preanals to gular granules; enlarged preanals 4; circumferential number of caudals 20 mm. posterior from vent, 16. Diagnostic characteristics of head scutellation few. Most notable are: posterior three supraoculars cut off completely on right side and partially on left side by row of ciliary granules projecting medially; row of ciliary granules includes small supernumery scale split off posterior edge of anterior supraocular; 2–2 posterior semicircular scales contacting frontoparietals posterolaterally; small supernumery scale between anterior parts of left parietal, interparietal and median posterior edge of frontoparietal; 13 enlarged occipital scales; 5–5 supralabials; 6–6 enlarged infralabials bordering supralabials below, and projecting for some distance past last supralabial; 1–1 preoculars; 3–3 suboculars; 3–3 postoculars; 9–8 superciliaries; 6–6 chinshields; sublabials reaching anteriorly to third infralabials. Color pattern (in alcohol), seven cream-white stripes extending from enlarged head scales to base of tail or hindleg; vertebral stripe stops at enlarged occipitals; paravertebral stripes continue anteriorly to second and third supraoculars on both sides; dorsolateral stripes continue anteriorly along superciliaries to loreals; lateral stripes begin anteriorly at lower edge of eye, continue to groin, and extend along anterior edge of femora; lateral stripes begin anew behind femora and continue until they fade out on proximal fifth of tail; short light stripes extend from posterior edge of tympanic opening to merge with light ventral coloration above insertion of forelegs; dark gray ground color between light stripes becomes lighter below lateral stripes; light, lineate markings on dark background on dorsal parts of both fore and hindlimbs; tail grayish proximally changing to bluish gray distally; keel tips of proximal caudal scales blackish; bluish white ventral coloration extending dorsally to midpart of loreal and subocular region on head, to enlarged scales on anterior faces of both limbs, to several granules above enlarged ventral scales on body, and to lateral scales of tail; granular scales under foreleg, granules on postfemoral region, enlarged scales of tibia, preanal region, and median ventral part of tail cream-white, not tinted with blue.

Variation.—Based on 63 specimens (39 ♂, 24 ♀) from Trans-Pecos Texas and extreme northwestern Coahuila, Mexico. All measurements are in millimeters.

Maximum snout-vent length of male 65.2, of female 67.2, average of adults (individuals over 50.0) 55.9; total length of largest specimen examined 191.8 (♂); forelimbs averaging 31 per cent of snout-vent in males, 30 per cent in females; hindlimbs averaging 66 per cent in males, 64 per cent in females; length from axilla to groin 49 per cent in males, 53 per cent in females.

Number of dorsal granules at midbody 55 to 71 (mean ± standard error 64.1 ± 0.16); sum of femoral pores 25 to 36 (30.9 ± 0.29); number of transverse lamellae on longest phalange of hindfoot 24 to 32 (27.4 ± 0.24); two or less supraorbital semicircle scales contacting lateral edge of frontoparietal, at least on one side (75%); number of enlarged preanals from 2 to 6, averaging 3.6; ventrals from gular fold through preanals 34 to 42 averaging 37.2.

A pattern of seven white, cream, or yellowish light stripes on a ground color of varying shades of gray or black exists throughout the range of this subspecies. In examining 515 specimens I have found only 16 exceptions to the seven-striped pattern. Exceptions usually involve partial or complete absence, or splitting of the vertebral stripe. Dorsal head coloration is usually greenish olive to brown, and therefore lighter than the ground color of the body. The paravertebral light stripes extend anteriorly to either the parietals, supraorbital semicircles, or supraocular scales, giving the enlarged posterior head scales a vivid pattern. The sides and ventral surface of the head, and the ventral surface of the neck, body, limbs, and tail (with exception of lighter areas around the anal region), are sky blue in adult males and bluish to light bluish white in adult females. Distally the tail is sky blue to purplish blue in adults of both sexes and in juveniles. Ontogenetic change, although present, is not marked. Juvenile ground coloration is usually black, changing to lighter grayish black with adulthood. The light stripes are usually brighter in the young and may be yellowish in some individuals.

Comparisons.—Included under *C. i. inornatus.*

Intergradation.—The dearth of material from east-central Coahuila precludes any analysis of intergradation of this form with *C. i. inornatus.* A geographically intermediate population situated between *C. i. inornatus* and *C. i. heptagrammus* ranges has been found in the old lake basins of the Cuatro Cienegas area, Coahuila (see inset, Fig. 2). Although I have examined only one specimen (which has six light stripes instead of seven) from this area, its affinity was clearly with *heptagrammus* or other western forms, and not with *inornatus.*

Habitat.—This diurnal lizard occurs predominately on alluvial flats in sub-xeric to xeric vegetative associations throughout its range. It may be found on sandy, silty, or gravel flats and washes, and may occasionally wander onto adjacent sloping areas. It rarely frequents rough, excessively rocky areas. Population density seems to be related to the amount of vegetative cover in an area, with few individuals in extremely barren areas, a high density in open areas intermingled with patches of shrubs and grass, and again in low density in areas with complete grass cover.

Distribution.—(Fig. 2). *C. i. heptagrammus* occurs from northwestern Coahuila and eastern Chihuahua, Mexico, northward through Trans-Pecos Texas, and up the valley of the Pecos River to east-central New Mexico. Vertical distribution from about 1,000 to 5,500 feet. Locality data for 515 specimens and additional reliable records follow: MEXICO.—*Coahuila*: 29° 20′ N–102° 35′ W, S. Agua Salada (RWA 2828); 29° 08′ N–102° 32′ W, SW. La Noria (RWA 2826–27, 2852–62). *Chihuahua:* 29° 12′ N–104° 06′ W, in Sierra Rica (RWA 2796–2825, 2839–53); 29° 10′ N–104° 04′ W, in Sierra Rica (RWA 2854–55). NEW MEXICO.—*Eddy Co.*: Artesia, 15 mi. W. (University of Michigan Museum of Zoology); Carlsbad Caverns Nat. Park Hdqrs., 2 mi. W. (UMMZ); White City, 7 mi. SW., 10 mi. SW. (UMMZ). *Torrance Co.*: Lucy, 1.4 mi. SW. (RWA 1560, 1571–75). TEXAS.—*Brewster Co.*: Alpine, 5 mi. W. (RWA 1803–8), 10 mi. E. (Minton 1959), 22 mi. S. (RWA 1856–58), 44 mi. S. (RWA 1729); Big Bend Nat. Park Hdqrs., 8 mi. N. (Minton 1959); Black Gap Wildlife Manag. Area (Texas Natural History Collection—121 spec.); E. Burro Mesa (Brown, 1950), Dagger Flat (Minton, 1959); Hovey (Brown, 1950); Government Spring (Brown, 1950); Green Gulch (Brown, 1950); Longfellow, 46 mi. S. (TNHC 11705); Marathon (Minton, 1959), 4.3 mi. E. (RWA 1747–56), 5 mi. ESE. (RWA 1758–9), 5.5 mi. SE. (RWA 1762), 12 mi. E. (RWA 1768), 18 mi. E. (RWA 1769), 25 mi. E. (RWA 1783); McKinney Spring (Texas Cooperative Wildlife Collection 1152); Oak Springs, Chisos Mts. (TCWC 12946); Persimmon Gap (Minton, 1959); Terlingua (Brown, 1950), 4 mi. W. (RWA). *Culberson Co.*: 31° 21′ N–104° 31′ W, NW. Borracho (RWA 2486); Kent, 3 mi. S., 4 mi. W., 8 mi. W. (Brown, 1950); Lobo, 3 mi. SW. (RWA 1677); 31° 49′ N–104° 49′ W, SSW. Pine Springs (TNHC 20204); Van Horn, 9 mi. N., 40 mi. N. (Brown, 1950). *El Paso Co.*: El Paso, 11 mi. SE. (Brown, 1950). *Hudspeth Co.*: Sierra Blanca, 7.2 mi. ESE. (RWA 1695–7), 14 mi. ESE. (RWA 1681–84). *Jeff Davis Co.*: 30° 48′ N–104° 44′ W, S. Lobo (RWA 2035–7); Fort Davis (Brown, 1950); Madera Canyon (TNHC 7035); 30° 59′ N–103° 55′ W, NW. Toyahvale (RWA 2864). *Loving Co.*: Carlsbad, 40 mi. S. (Brown, 1950). *Pecos Co.*: nr. Fort Stockton (Brown, 1950). *Presidio Co.*: 29° 40′ N–103° 52′ W, Bandera Mesa (RWA 2865); Marfa (Brown, 1950), 9 mi. E. (TCWC 2832–3), 9.5 mi. SW. (RWA 1866–67, 1911–14, 2004), 11 mi. ESE. (RWA 1660–61), 11 mi. SW. (RWA 1891), 14 mi. SW. (RWA 1898, 2011), 19.1 mi. NW. (RWA 1662), 26 mi. SW. (RWA 1904), 63 mi. S. (TNHC—7 spec.); 30° 01′ N–104° 30′ W, in Pinto Canyon (RWA 2684);

30° 05′ N–104° 27′ W, NE. Ruidosa (RWA 2054–6, 2571); Valentine, 9 mi. W. (TNHC 4130–32), 10 mi. WSW. (TNHC—230 spec.), 11 mi. W. (TNHC 2886–95), 12 mi. SE. (RWA 2019–23). *Reeves Co.*: Balmorhea, 15 mi. E. (Brown, 1950); nr. Toyahvale (Brown, 1950). *Terrell Co.*: Comstock, 54.8 mi. WNW. (TNHC 243); Dryden, 2 mi. E. (RWA 2698); Sanderson, 21 mi. E. (RWA 2690–1); Sheffield, 13 mi. S. (TNHC 7753–4), 15 mi. S. (TNHC 7839+), 18 mi. S. (TNHC 8331+), 21 mi. S. (TNHC 8196+). *Ward Co.*: Pecos River at Pecos (Brown, 1950).

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Summary

Both *Cnemidophorus inornatus*, an unstriped whiptail lizard, and *C. octolineatus*, a striped lizard were described from Pesquerí Grande, Nuevo León, Mexico, by S. F. Baird (1858). A collecting visit to that locality (now known as Villa de Garcia) corroborated the existence of both color forms at one locality, and led to the discovery that they are conspecific. *Cnemidophorus inornatus* has priority over *C. octolineatus* and becomes the valid name for the species. The *C. inornatus* populations from Villa de Garcia differ significantly from one of the annectant populations. The divergent population, which occupies northern Coahuila and Chihuahua, Mexico, western Texas, and east-central New Mexico is named *Cnemidophorus inornatus heptagrammus* ssp. n., in allusion to its consistently seven-lined pattern.

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Comparative Accumulation of Radioactive Zinc in Young Rainbow, Cutthroat and Brook Trout[1, 2]

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THE lethal action of dissolved salts of heavy metals on fish has been investigated in earlier studies by Carpenter (1927) and Jones (1938). The metabolic role of some of these same metal ions, known in low concentrations to play important parts as enzyme activators and essential nutritional components in various animals, has been little investigated in fish to the present time, however.

Interest in zinc accumulation, particularly Zinc 65, has recently been initiated by the Japanese especially in the vicinity of Bikini Atoll where observations on the nature of radioactive contamination in fish after the atom bomb explosion and zinc localization in certain pelagic forms have recently been published by Amano, *et al.* (1955), Saiki, *et al.* (1955) and Yamada (1955). The radioactive isotope of zinc was discovered to be responsible for much of the biological activity found in this area. Since zinc, in extremely low concentration, is known to be important from a nutritional viewpoint and yet also known to limit survival (Affleck, 1952) it was thought to be of interest to determine the rate of accumulation of this ion and to investigate its subsequent localization. Since comparative studies on ion accumulation in fish are also much needed, the uptake in three different species was studied.

MATERIAL AND METHODS

Fingerling trout ranging in size from 38–52 mm and in age from 7–8 months were obtained from the fish hatchery at Kalispell, Montana, during the months of July and August in 1958. The species employed were rainbow trout, *Salmo gairdneri*, of the Winthrop Washington Strain, brook trout, *Salvelinus fontinalis*, from the hatchery at Omak, Washington, and cutthroat trout, *Salmo clarki*, grown at the Kalispell Hatchery.

The fish were incubated at 10–12.5°C in a water bath at the Biological Station of Montana State University and natural lighting occurred throughout the experiment. The animals were placed singly in 600 ml. Pyrex beakers containing 200 ml. of radioactive zinc solution made up in filtered Flathead Lake water. The top of each beaker was covered

[1] The aid of Mr. B. H. Cook, Head Manager, and Mr. Fred J. Howard, Assistant Hatchery Manager, of the Kalispell Fish Hatchery, United States Fish and Wildlife Service is gratefully acknowledged in supplying fingerling trout for this experimentation.

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A Reconsideration of the Nomenclature of the Small Whiptail Lizards (Cnemidophorus) of Southwestern Texas

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