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A taxonomic review of the genus *Pseudozonitis* Dillon (Coleoptera: Meloidae)

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ABSTRACT

The New World meloid genus *Pseudozonitis* is reviewed and its relationship to the widespread *Zonitis* is discussed. Twenty species are recognized. Included are descriptions, detailed geographical and seasonal records, and a key to species. Three species, *P. diana*, *P. florida* and *P. huetheri*, are described as new. Two nominal species, *P. castaneis* Dillon and *P. vogti* Dillon, are synonymized under *P. martini* (Fall).

Key Words. New World, blister beetles, Nemognathinae, Nemognathini, species key.

INTRODUCTION

Pseudozonitis Dillon 1952, with 20 species, is a New World genus of Meloidae. Greatest diversity occurs in the southern regions of the United States and in Mexico with representatives also in Central and South America, and the West Indies. The genus is one of eight New World genera of Nemognathini (Nemognathinae) (Pinto and Bologna 1999). Most of the species described before 1952 were placed in *Zonitis*, a widespread genus which remains difficult to define adequately (Bologna et al. 2013). Dillon (1952) separated *Pseudozonitis* from other nemognathine genera by the enlarged eyes and elongate antennae. These features have proved not to be diagnostic and cannot be relied upon for separation. Genitalic and other sexually dimorphic traits can assist in defining the genus but separation from *Zonitis*, as currently defined, remains problematic (see below).

Enns (1956) studied *Pseudozonitis* in his review of several genera of Nemognathinae. He described additional species and provided a key to species accompanied by detailed species treatments. His study largely focused on the United States fauna however. Consequently, certain species and important extralimital populations of United States species were omitted. Furthermore, the 1956 key placed emphasis on features inadequate for identification.

This included elytral color and body size which vary intraspecifically as well as features associated with the hind tibial spurs which do not provide the separation contended.

The aim of this paper is to augment Enns' study by treating the entire known range of the genus, incorporating more recent collections, and emphasizing characters which better reflect species differences. As a result the definitions of certain species are modified considerably. Included are generic and species descriptions, a discussion of the relationship of *Pseudozonitis* to other nemognathine genera, a revised key to species, a summary of seasonal and geographic distribution, and the description of three new species, *P. diana*, *P. florida*, and *P. huetheri*. Additionally, two nominal species, *P. castaneis* Dillon and *P. vogti* Dillon, are synonymized.

MATERIAL STUDIED

This work is based on 2,091 specimens from the following collections [abbreviations for most follow Evenhuis (2018)]: American Museum of Natural History, NY (AMNH); Brigham Young University (BYU); California Academy of Sciences, San Francisco (CAS); California State Collection of Arthropods, Sacramento (CSCA); E. G. Riley

Collection, College Station, TX (ERC); Florida State Collection of Arthropods, Gainesville (FSCA); Field Museum of Natural History, Chicago (FMNH); J. P. Huether Collection, Geneva, NY (JHC); M. A. Bologna Collection, University of Rome III (MBC); Mississippi State University (MEM); Museum of Comparative Zoology, Harvard University (MCZ); New Mexico State University (NMSU); R. D. Cave Collection, Ft Pierce, FL (RDCC); Ohio State University (OSUC); Paris Museum of Natural History (MNHN); Purdue University (PERC); Texas A & M University (TAMU); United States National Museum, Washington, D.C. (USNM); University of Arizona (UAIC); University of California, Berkeley (CISC); University of California, Davis (UCDC); University of California, Riverside (UCRC); University of Idaho (WFBM); University of Kansas (SEMC); University of Missouri (UMRM); University of Texas, El Paso (UTEP). Requests to study potentially important material in the Los Angeles County Museum were unsuccessful.

METHODS AND TERMINOLOGY

Several characters utilized are quantitative, given as the mean followed by range in parentheses. Except for body length, these data were recorded with an ocular micrometer mounted on a stereo dissecting microscope. In the descriptions, the sample size (N) is given for body length, the first quantitative character reported. It remains the same for all measurements that follow or is reported when this is not the case. Similarly, any subsequent report of 'N' applies to ensuing data. Descriptions of length and width assume maximum dimensions unless indicated. Body length was measured with a ruler from the occiput to the apex of the elytra. It is given as the mean (\bar{x}) based on a sample of measurable specimens representing the geographic range followed by the observed range of minimum and maximum length of all specimens available. It is the sample range that is reported for data other than body length. Unless indicated all descriptive data refer to both sexes and attempt to represent the entire geographic distribution.

Certain anatomical terms and abbreviations require explanation. Head length is the distance from the occiput to the frontoclypeal suture. Head

width is measured across the eyes (HWE) and at the tempora (HWT). The ratio l/w refers to length over width across the eyes. Head width at the eyes is almost always the maximum width. Its comparison to width at the tempora is reported (HWE/HWT) and reflects eye size; the higher the ratio the more bulged the eyes. Enlarged eyes is an important feature of *Pseudozonitis*. There is considerable variation but in all species the eyes at least attain the lateral margin of the maxillae on the underside of the head (Fig. 16). In several species they extend considerably beyond that (Fig. 17), in some cases approaching the midline. The IODV/IODD ratio reflects ventral eye extension. IODV = the interocular distance on the underside of the head; IODD = the interocular distance at the front of the head. The greater the ventral eye extension, the smaller the IODV/IODD ratio. In the key, the second couplet separates species with relatively small eyes (IODV/IODD \geq 0.5) from those with larger, bulging eyes (IODV/IODD $<$ 0.5). This ratio, also used in the Enns (1956) key, is often difficult to determine because of the position of the head. Additionally, since the ratio is dependent on the IODD, which varies intraspecifically, certain species with bulged eyes have a ratio that approaches or slightly exceeds 0.5 (e.g., see IODV/IODD ratio for *P. brevis* Enns). The difference in eye size is better reflected by comparing the ventral vs dorsal lobe of the eye. In species with larger eyes (Fig. 19) the maximum width of the ventral lobe is c. 1.5 that of the dorsal lobe and greater than the length of antennal segment I. In species with smaller eyes (Fig. 18) this ratio is 1.0-1.2, and the maximum width of the ventral lobe is subequal to the length of antennal segment I.

The antennal (primarily segments III-X) and tarsal segments of some species are described as banded. This refers to a narrow light-colored band at the apex and, in some, the base of the segment. Mouthparts are of limited value in characterizing species with the exception of mandibular shape. The degree and point of curvature toward the midline is important for separating certain species (Figs 61-64). In *Pseudozonitis* the maxillary galeae are short, lobiform and bear an apical pencillation. Minor variation in galeal length occurs but is not useful for identification.

Pronotal width is taken at the apical third or so

of the disk. In several species the hind angles are slightly flared in some individuals and provide a greater width. For meaningful comparison among species and because flaring varies intraspecifically, the l/w ratio uses width taken at the anterior position for all individuals. Head and pronotal punctation is useful for separating certain species but variation is subtle. In the descriptions densely punctate indicates crowded punctures positioned adjacent to one another or largely so. Moderately densely punctate indicates that several punctures are separated by a distance equal to or greater than their diameter.

Terms for Meloidae genitalia (Figs 73-84) follow Selander (1960, 1964, 1966) which derive from Michener (1944). The orientation (dorsal vs ventral) of male structures follows Gerber et al. (1972). It should be noted that the orientation for the male gonoforceps and aedeagus used in Gerber et al. differs from that in Selander. The aedeagus rests in the trough-like dorsal surface of the gonoforceps. An important source of variation of male genitalia in *Pseudozonitis* is the structure of the ventrally fused gonostyli comprising the apical section of the gonoforceps. The basal section is the gonocoxal plate. The dorsal edges of the gonostyli are rolled inward onto the dorsum to a varying degree (e.g. Figs 73, 75a) or not at all (Fig. 80a). In the latter case, the lateral borders of the gonostyli in dorsal view are very narrow and usually laterally compressed at the apex. This results in the apex of the gonostyli being wider laterally than dorsally (Figs 80a,b; 83a,b).

As in other Nemognathinae the filiform antennal segments in *Pseudozonitis* typically are virtually symmetrical and slightly compressed. However, some species exhibit an unusual condition in that the ventral surface of segment IV is bowed (cf. Figs 65, 66). This sort of modification is not uncommon in the subfamily Meloinae where it is confined to males, associated with courtship behavior, and intraspecifically stable (e.g. Pinto 1991). In *Pseudozonitis* however, this modification is expressed only in some individuals and, in at least one species, occurs in females as well as males.

Name-bearing types of most species were examined either directly or through photographs. Photography for plates utilized a Canon EOS 5DS R Camera and a Canon MP-E 65 mm Macro Lens.

Species are treated alphabetically.

Complete data are reported in the *Records* and *Types* sections of each species. In cases where more than one collection was made at the same locality, the individual dates are given, and the independent collectors are separated by a slash (/). Abbreviations include BL (blacklight), MVL (mercury vapor light), and UVL (ultraviolet light). The number usually preceding the collector(s) refers to number of specimens. Records published by Enns (1956) that were not verified are included only for species where the possibility of misidentification is remote. Unexamined records of two species from Oklahoma (Arnold 1976) also are included. Unverified records are indicated by asterisks (*).

TAXONOMY

Pseudozonitis Dillon

Pseudozonitis Dillon 1952: 342. Enns 1956: 700, 707, 843. MacSwain 1956: 121. Kaszab 1959: 88, 90, 102. Selander 1966: 453, 456. Werner, et al. 1966: 68. Werner 1974: 154. Bologna 1991: 47. Selander 1991: 74, 79. Martinez 1992: 11. Pinto and Bologna 1999: 580, 607. Bologna and Pinto 2001: 38; 2002: 2082, 2084. Pinto and Bologna 2002: 525, 527. Bologna, et al. 2013: 415.

Zonitis, see Enns 1956: 843 for references.

Type species— *Zonitis longicornis* Horn 1870, by original designation.

Generic diagnosis— Adult (Figs 1-13): Fully winged; elytra fully developed. Head (Figs 20-32) and pronotum (Figs 33-54) moderately densely to densely punctate; punctures small to coarse; pronotal punctures often smaller and more dense laterally than along midline; head often with a small ill-defined impunctate callus between eyes; pronotum with an incomplete impression along midline varying intraspecifically; elytra densely rugulopunctate (Fig. 57) in all but one species (Fig. 58). Color variable but never metallic; colors ranging from yellow to dark brown; elytra often vittate; mandibles usually lighter in basal half (e.g. Fig. 20) in all but one species (*P. martini*, Fig. 28); maxillae and labium, except for palpi, light in color; antennae varying from light brown to black, segments often with narrow white band at apex and, less commonly, at base. Setation fine, relatively sparse, not contributing to body color.

Eyes large, emarginate, divided into a dorsal and ventral lobe (Figs 18, 19), often bulged, extending on underside of head at least to outer margin of maxillae (Fig. 16), but usually reaching inner margin or beyond (Fig 17). Antennae elongate, extending to near or beyond middle of elytra (Fig. 5), filiform; segment III slightly shorter than IV and longer than II; segment VI 2.5-6x as long as wide. Maxillary galeae short, lobiform, apically pectinate, extending slightly beyond apex of mandibles (Fig. 24), never joined to form a proboscis. Pronotum (Figs 33-52) usually slightly wider than long, widest at apical third with sides subparallel or slightly convergent to base; hind angles somewhat flared or not. Hind tibial spurs similar (Figs 67, 68), obliquely truncate, dorsal surface of apical truncation concave. Claws cleft; dorsal blade with two rows of teeth, outer row incomplete, teeth more numerous and longer in male, their number varying with body size; ventral blade narrow, subequal in length to dorsal blade. Pygidium usually medianly emarginate. **Male.** Abdominal ventrite V emarginate and impressed along midline due to reduced sclerotization (Fig. 15); ventrite VI completely divided longitudinally. Gonoforceps (Figs 73-84) with gonostyli completely fused ventrally, recurved apically; gonocoxal plate strongly convex ventrally. Aedeagus (e.g. Fig. 76b) with a pair of sclerotized ventral lobes in apical half. **Female.** Abdominal ventrite VI usually with a distinct U- or V-shaped median emargination at apex (Figs 69-71).

Larva: The first instar of only one species, *P. maculicollis* (MacSwain), has been described (MacSwain 1956). It is characterized by its fusiform body shape, subtriangular head, entire rather than subserrate posterior margin of the abdominal sterna, and the absence of an epicranial suture, caudal setae, and tarsal setae (MacSwain 1956, Bologna and Pinto 2001). Several larval instars of *P. brevis* Enns were studied by Erickson and Werner (1974) but they were not described.

Biology: The biology of *Pseudozonitis* is largely unknown. As in other nemognathine genera its larvae are assumed to develop on provisions and immature stages of Apoidea. One species, *P. maculicollis*, has been associated with nests of *Melissodes* (Apidae) (MacSwain 1956, Erickson, et al. 1976), and another, *P. brevis*, has been partially reared on a mixture of

pollen and honey from honey bees (Erickson and Werner 1974). MacSwain (1956) states that eggs are placed on vegetation. After hatching, the first instar larvae almost certainly attain their food source through phoresy as do other nemognathine meloids (MacSwain 1956) but this has yet to be documented.

Pseudozonitis is the only genus of North American Nemognathinae with species commonly collected at light. Adults presumably feed on nectar and pollen of a variety of plants but because of the nocturnal activity of most species, few plant associations have been recorded and none indicate feeding. The enlarged eyes of most *Pseudozonitis* species appear to be associated with attraction to light. Interestingly, the five species that have not been taken at light all possess relatively small eyes. As can be seen in the species treatments, the sex ratio of material examined of most species is female biased. Whether this is a reflection of true ratio differences or differential attraction to light remains questionable. Those few species collected on vegetation are too poorly represented for meaningful comparison with those primarily taken at light.

Differential diagnosis—*Pseudozonitis* can be separated from other nemognathine genera by the enlarged eyes, filiform antennae with segment III shorter than IV but longer than II, the lobiform and apically pectinate maxillary galeae extending slightly beyond apex of mandibles, the similar obliquely truncate hind tibial spurs, the emarginate ventrite V and recurved gonostyli in males, and the distinctly emarginate ventrite VI in females of most species.

Generic comparisons—*Pseudozonitis* is most easily confused with *Zonitis*, a poorly defined and widespread genus that originally housed several of its species. Enns (1956) divided North American *Zonitis* into two subgenera, *Neozonitis* and *Parazonitis*. *Pseudozonitis* most closely resembles *Neozonitis*, which also has unmodified maxillary galeae. In *Parazonitis*, as in *Nemognatha* and *Gnathium*, the galeae are prolonged and joined to form a proboscis or sucking tube. Males of *Pseudozonitis* can best be separated from North American *Zonitis* by the emarginate and impressed ventrite V (cf. Figs 14, 15) and the recurved gonostyli (e.g. Fig. 75b). In females the emarginate ventrite VI (Figs 69-71) distinguishes most *Pseudozonitis* from North

American *Zonitis*. Additionally, in *Zonitis* antennal segment IV usually is subequal to or shorter than III, not longer as in *Pseudozonitis*. Although the enlarged eyes and elongate, filiform antennae characterize *Pseudozonitis*, similar features also are found in *Zonitis interpretis* Enns, an uncommon North American species superficially similar to *Pseudozonitis* (Enns 1956, Pinto 2017).

As indicated, the first instar larva of only one *Pseudozonitis*, *P. maculicollis*, has been described. Although considered most similar to larvae of *Zonitis*, there are several differences that support generic separation (MacSwain 1956, Bologna and Pinto 2001). Two features easily separating *Pseudozonitis* from *Zonitis* include the entire rather than subserrate posterior margin of the abdominal sterna, and the absence of tarsal setae. Consistent with adult anatomy, MacSwain (1956) noted that *Pseudozonitis* larvae are more similar to species in the subgenus *Neozonitis* (as *Z. bilineata* Group) than those of *Parazonitis* (as *Z. perforata* Group).

A close relationship and possible synonymy of *Pseudozonitis* and the Old World and Australasian genus *Zonitoschema* has been suggested (Enns 1956, Pinto and Bologna 1999). General body shape, bulged eyes and elongate, filiform antennae are common to both. However, more recent studies point to their resemblance as likely due to convergence stemming from similar nocturnal habits. Unlike those of *Pseudozonitis*, in males of *Zonitoschema* the ventral lobes of the aedeagus are not sclerotized, the sperm duct is lined apically with sclerotized rings, and abdominal ventrite V is unmodified (Bologna et al. 2013). In addition, the hind tibial spurs are spiniform in *Zonitoschema*, not obliquely truncate as in *Pseudozonitis*. The recently described African genus *Zoltanzonitis* also is superficially similar and its males do have an emarginate abdominal ventrite V. Its male genitalia, antennae and hind tibial spurs all differ however (Bologna and Pinto 2018).

Within *Zonitis*, *Pseudozonitis* appears to be most closely related to a group of poorly known, primarily South American species which can be referred to as the Elegans Group. It includes *Z. elegans* (Klug), *Z. dilatipes* Pic, *Z. surinamensis* Pic, *Z. cantharoides* Kaszab, *Z. subparallela* Pic, *Z. rufoscutellaris* Pic, *Z. monrosi* Martinez, *Z. aczeli* Martinez, and perhaps others. At least one species

of the group, *Z. xanthochroa* Wellman, occurs in southern Mexico and Central America (Champion 1892, as *Z. fulva* Dugès). Only five species were available but from their study and data gleaned from the literature it is clear that several features of the group also are shared with *Pseudozonitis*. Ventrite V in males and VI in females are similarly modified, antennal segment III is shorter than IV and segments beyond III are filiform. Unlike *Pseudozonitis*, however, the eyes in the species examined are smaller, not extending to the maxillae on the underside of the head, antennal segment II usually is longer or subequal in length to III, and the head is narrower than in *Pseudozonitis*. Also, males of the Elegans Group have enlarged and distinctly padded tarsomeres, a feature which has some counterpart in at least one species of *Pseudozonitis* (see below). Male genitalic structure apparently is variable in the Elegans Group. The reflexed gonostyli which has been considered an important difference between *Zonitis* and *Pseudozonitis* occurs in *Z. xanthochroa* but not in *Z. elegans*.

As indicated, unlike most *Zonitis*, species of *Pseudozonitis* are generally nocturnal. Interestingly, Martinez (1959) notes that nocturnal habits also characterize at least certain species of the Elegans Group. Although a tie to *Pseudozonitis* has not been proposed before, Martinez (1959), Kaszab (1960), and Pinto and Bologna (1999) suggested that these species of *Zonitis* were distinct enough to warrant generic designation. A thorough study of the Elegans Group and other elements of *Zonitis* is required to better understand their relationship to *Pseudozonitis*. At this point it appears that the Elegans Group has greater affinity to *Pseudozonitis* than to other *Zonitis*.

Species differences — Species of Nemognathini in general are notoriously difficult to identify due to minimal morphological differences and considerable intraspecific variation. Unlike many other groups of blister beetles where epigamic traits and color differences often provide excellent separation, nemognathines show minimal sexual dimorphism and color is exceptionally plastic even within local populations. *Pseudozonitis* is no exception and, perhaps, is more problematic than other genera in its tribe. Structurally, the species are relatively homogeneous, yet variability within species is considerable and often discordant. Few characters

can be used to reliably distinguish species and those that do are subtle and, in some cases, difficult to describe. In addition, the genus remains poorly represented in most collections. Only one species, *P. vaurieae* Enns, can be said to be relatively common. This is problematic in a group with considerable intraspecific variation since diagnoses of species with poor representation will minimize its extent. An additional difficulty is that virtually no biological data are available. Most species appear to be nocturnal and collections are made at light. Consequently reliable plant host records are lacking and behavior is unknown. First instar larvae, useful in the taxonomy of other meloid genera, have been described for only a single species (MacSwain 1956).

General structure and surface texture are similar in all species. Color is useful but only within broad limits. Eye size is one of the few features that can be used to divide the genus into two phenetic sections (see Key to Species). Structure of the male gonoforceps is another although its phenetic results do not coincide with those based on eye size. One relatively reliable feature for distinguishing species is pronotal coloration. It is entirely yellow or orange in some [e.g. *P. arizonica* (Van Dyke), Fig. 33]; in others the disk bears red [e.g., *P. longicornis* (Horn), Fig. 41] or brown (e.g. *P. labialis* Enns, Fig. 45) maculation. In certain species such as *P. stroudi* Enns and *P. vaurieae* the macula often is faded or entirely absent (cf. Figs 35, 36 and 37, 39). Another useful character for separating certain species is mandibular structure. The mandibles vary in robustness, degree of curvature and the point along their length where curvature begins. In *P. brevis* and *P. vigilans* (Fall) for example, the mandibles are relatively narrow, straight in the basal 2/3 of their length and curve only moderately apically (Figs 20, 21, 61). This feature is useful in distinguishing these species from others which have more robust mandibles that curve from a more basal location (e.g. Figs 22, 24, 62-64).

Elytral color, although a prominent feature of these beetles, is of limited utility for identification. The elytra are vittate in several *Pseudozonitis* - brown with narrow yellow or orange marginal, discal and sutural vittae (e.g. Figs 7-9). In most species however, there exist variants with entirely dark or entirely light-colored elytra. In some individuals the discal vitta may be greatly shortened or absent. In

some species elytral color appears to be correlated with geography or habitat. Thus in *P. vigilans* and *P. brevis* light-colored elytra are associated with sand dune habitats (Fig. 2), vittate populations are associated with other desert areas (Figs 1, 3) and the few individuals taken from non-desert regions have entirely dark elytra (Fig. 4). In other species (e.g. *P. vaurieae*) the same population can include different color forms.

The legs provide few important traits. In one species, the West Indian *P. marginata* (Fabricius), the tarsi in males, especially the foretarsi, are swollen and padded beneath. Dimorphism of tarsi to the extent found in *P. marginata* does not occur in other species, although in *P. schaefferi* (Blatchley) and certain others the tarsi in males are slightly swollen compared to females. Femoral color has been used to differentiate species. In several the femora are pale except dark at the apex; in others they are dark at the middle but pale at apex and base. Only a few species show stability for these features however. In several species the femora can also be unicolorous, entirely pale or entirely dark. The hind tibial spurs (Figs 67, 68) in *Pseudozonitis* are relatively broad and obliquely truncate at their apex. In some cases the spurs flare moderately before the apex. Enns (1956) used outer versus inner hind tibial spur length and width in species identification but, with few exceptions, these traits are unreliable. Variation is minimal at best, and often occurs within species.

Male genitalia (Figs 73-84), particularly the apical section or ventrally fused gonostyli of the gonoforceps, are useful taxonomically. The degree to which the gonostyli are manifested dorsally, their shape, the orientation of their lateral borders, and length relative to the basal gonocoxal plate allow separation of certain species. As in other Nemognathini, the aedeagus is a relatively simple structure in *Pseudozonitis*. However, its length as well as the size, shape and position of the paired ventral lobes provide additional characters. In Meloidae males sternum IX (spiculum gastrale) is a Y-shaped structure with its arms directed posteriorly (Figs 85-91). Taxonomically useful variation occurs in the specific orientation of the arms, their structure, length, and in the degree of sclerotization of the entire sternum.

Taxonomic features unique to females are

restricted to the degree of emargination of ventrite VI relative to overall ventrite length. In most species, the emargination is deep, U- or V-shaped (Figs 69-71); in others, namely *P. labialis* (Fig. 72) and *P. marginata*, it is shallow.

Intragenetic relationships — Enns (1956) divided *Pseudozonitis* into five species groups but did not consider them natural. The features used for partition, such as color, surface texture and topography, and eye size show continuous variation and require arbitrary limits of character states. Table III in Enns illustrates the considerable overlap in character states both among and within groups. Consequently there is little justification in formally partitioning the genus until a thorough phylogenetic study can be performed, one that also considers the Elegans Group of *Zonitis*.

Within *Pseudozonitis* two phenetic groups based on male genitalia are apparent; they are herein termed types 1 and 2. In type 1 genitalia, the sides of the gonostyli have little to no dorsal presence and the apex is acuminate and laterally compressed (Figs 80, 83, 84). This is characteristic of *P. labialis*, *P. impressithorax* (Pic), *P. marginata*, *P. megalops* (Champion), *P. schaefferi*, and *P. huetheri* sp. n. In type 2 genitalia, typical of all other species, the sides of the ventrally fused gonostyli are rolled over significantly onto the dorsum their entire length. This characterizes *P. arizonica*, *P. brevis*, *P. diana* sp. n., *P. florida* sp. n., *P. longicornis*, *P. martini* (Fall), *P. maculicollis*, *P. obscuricornis* (Chevrolat), *P. pallida* Dillon, *P. roseomaculatis* Dillon, *P. stroudi*, *P. vaurieae*, *P. vigilans*, and *P. vittipennis* (Horn). In these species the gonostyli usually taper apically but the apex is not acuminate or laterally compressed (Figs 73-79, 81, 82). Type 1 genitalia are similar to those in the Elegans Group of *Zonitis* and other *Zonitis* species. Certain type 1 species share other features with the Elegans Group. The more robust sternum IX in males of the Elegans Group is shared with all except *P. huetheri* where it is more slender as in species with type 2 genitalia. The enlarged, ventrally padded tarsomeres of males in the Elegans Group occurs in *P. marginata* and to a much lesser extent in *P. schaefferi*. With the exception of *P. labialis* and *P. impressithorax* being very similar, the other species featuring type 1 genitalia are not obviously related to other congeners.

Within the type 2 genitalia group, a few relationships are suggested. *Pseudozonitis vigilans* and *P. brevis* are clearly related; they are distinguished from one another only with difficulty. Similarly *P. longicornis* and *P. florida* are likely related based on similar shape of the gonostyli and sternum IX in males. *Pseudozonitis roseomaculatis* has similar gonostyli and may also be close to these two species. Overall similarity to *P. longicornis* suggests *P. obscuricornis* also is related to this assemblage. *Pseudozonitis diana* has only now been considered distinct from *P. martini* and the two likely are sister species.

It has been convenient to separate *Pseudozonitis* species into two groups based on eye size (key to species below; also in Enns 1956). However, this is not to imply relationship as eye size can vary considerably in clearly related species (e.g. *P. labialis* and *P. impressithorax*; *P. florida* and *P. longicornis*).

Key to the species of *Pseudozonitis*

1. Occurring in southern South America (Argentina, Bolivia). Pronotum with one or two large brown maculae at center of disk (as in Fig. 45)
 *impressithorax*
- 1'. Not so distributed. Pronotum variable 2
2. Eyes small, not bulged: ventral lobe only slightly wider than dorsal lobe (Fig. 18), its width subequal to length of antennal segment I; separation of eyes on underside of head (IODV) half or more the distance of separation on front of head (IODD) (Fig. 16) 3
- 2'. Eyes large, bulged: ventral lobe considerably wider than dorsal lobe (Fig. 19), its width greater than length of antennal segment I; separation of eyes on underside of head (IODV) usually less than half the distance of separation on front of head (IODD) (Fig. 17) 9
3. Pronotum bicolored, reddish and yellow, with distinct red coloration extending into basal half of disk (Figs 51, 52) 4
- 3'. Pronotum not bicolored as above, uniformly yellow or orange, at most with one or two black maculae on disk (Figs 46-50) 5

4. Pronotum including lateral panels red in apical half and broadly along midline to base; yellow coloration confined to lateral sections of base (Fig. 52). Mandibles with half their length extending beyond labrum (Fig. 32). Femora entirely dark. Antennal segments relatively broad, segment VI only 2.5-3 times as long as wide *schaefferi*
- 4'. Pronotum yellow with a large trapezoidal reddish marking at center extending from near apex to near base of disk, lateral sections entire length of disk yellow (Fig. 51). Mandibles extending only slightly beyond labrum. Femora not entirely dark, at least apex light in color. Antennal segments narrower, segment VI 3.5-4 times as long as wide *roseomaculatis*
5. Elytra dark with marginal and sutural borders orange (Figs 12, 13). Known from Florida..... *florida*
- 5'. Elytra unicolorous, completely black, brown (Figs 10, 11) or yellow. Known from SW North America..... 6^{1/}
6. Head and pronotum similar in color, both primarily bright orange. Head and pronotal punctures relatively sparse, several separated from others by distance equal to or surpassing their diameter (Fig. 48). Cismontane California. *maculicollis*
- 6'. Head brown or black, at least in part, darker than orange pronotum; if both light and similar in color, head and pronotal punctures dense, few separated from others by distance equal to or surpassing their diameter (Fig. 47). Not occurring in Cismontane California 7
7. Mandibles entirely brown (Fig. 28). Pronotum transverse, c. 0.8 as long as wide, sides from widest aspect convergent to base (Fig. 49). Pubescence light in color regardless of underlying cuticle color *martini*
- 7'. Mandibles light in basal half, contrasting with darker apex. Pronotum more elongate, c. 0.9 as long as wide, sides from widest aspect subparallel to base (Figs 47, 50). Pubescence color similar to that of underlying cuticle..... 8
8. Head with at least vertex and frons orange (Fig. 30); scutellum orange at least in part. Mandibles abruptly curved to apex. Male gonostyli acuminate and laterally compressed at apex (Figs 83a, 83b). Known from Baja California Sur. *huetheri*
- 8'. Head entirely dark, contrasting with orange pronotum (Fig. 29); scutellum dark. Mandibles more moderately curved to apex. Male gonostyli relatively blunt and not laterally compressed at apex (Figs 82a, 82b). Known from SW United States. *dianae*
9. Occurring in the West Indies..... 10
- 9'. Not occurring in the West Indies..... 11
10. Pronotum immaculate. Male with fore and middle tarsi swollen and well padded beneath; each half ventrite VI deeply cupped. Female ventrite VI with a shallow median emargination..... *marginata*
- 10'. Pronotum immaculate or, more commonly, with a median reddish macula (Figs 42, 43). Males with fore and middle tarsi unmodified, poorly padded beneath; each half of ventrite VI slightly impressed at most. Female ventrite VI with a deep U-shaped median emargination extending at least half length of segment. *obscuricornis* (in part)
11. Pronotum with a pair of large laterally placed dark maculae; maculae often fused at midline but if so usually with a medial V-shaped emargination at its anterior border (Fig. 45). Head with one or two dark maculae between antennae and/or eyes (Fig. 24). Male genitalia with gonostyli abruptly narrowing and strongly laterally compressed at apex (Figs 80a, 80b). Female with ventrite VI feebly emarginate (Fig. 72) *labialis*
- 11'. Pronotum variable but not as above, either immaculate (Figs 33, 34, 36, 39, 40), with a single reddish macula covering much of disk (Fig. 37) or with a longitudinal reddish macula along midline (Figs 35, 41, 42, 44). Male genitalia variable. Female with ventrite VI usually with a deep V- or U- shaped emargination (Figs 69-

^{1/} If entirely dark brown in color see *Species Inquirendae*, sp. 1.

- 71). 12
12. Pronotum orange to orange brown with a cruciform red macula consisting of a broad median vitta crossed apically by a broad transverse fascia which continues onto the lateral panels (Figs 37, 38). *P. vaurieae*, Form A
- 12'. Pronotum not marked as above. 13
13. Pronotum unicolorous, yellow to orange brown, sometimes slightly darker toward middle, rarely almost entirely dark brown. 14
- 13'. Pronotum bicolored, yellow to orange brown with a distinct or diffuse reddish median macula. 20
14. Elytra largely unicolorous, entirely light yellow or light yellow brown; antennae light tan in color, not darker than elytra. *P. arizonica*
- 14'. Elytra variable in color but if entirely light as above then antennae distinctly darker than elytra. 15
15. Elytra vittate and weakly rugose, punctures obsolescent (Figs 9, 58). *P. vittipennis*
- 15'. Elytra vittate or not, distinctly and extremely closely rugulopunctate (Fig. 57). 16
16. Mandibles relatively narrow, straight basally, curving moderately at about apical third (Figs 20, 21, 61). 17
- 16'. Mandibles more robust, curvature stronger and starting at more basal position (Figs 23, 25, 62-64). 18
17. Eyes distinctly bulged. Width across base of mandibles slightly less than half head width at eyes (Fig. 21). Elytral setation relatively short (Fig. 56). Male gonostyli with sides converging from base to apex (Fig. 74). *vigilans*
- 17'. Eyes not as distinctly bulged. Width across base of mandibles slightly greater than half head width at eyes (Fig. 20). Elytral setation longer, more conspicuous (Fig. 55). Male gonostyli with sides subparallel in basal half (Fig. 73). *brevis*
18. Elytra entirely pallid (W of 102° long.; Fig. 5), if vittate (E of 102° long.) then yellow discal vitta relatively wide, subequal in width to brown stripe medial to it (Fig. 6). Mandibles not abruptly curved, curving from base to apex at about a 135° degree angle and extending well beyond apex of labrum when apex adducted to midline (Fig. 23). *pallida*
- 18'. Elytra uncommonly entirely pallid, usually vittate with discal vitta narrow and distinctly narrower than medial brown stripe. Mandibles more abruptly curved to apex, curving from base to apex at about a 100° angle and, at most, extending slightly beyond labrum when apex adducted to midline (Fig. 25). 19
19. Pronotum distinctly punctate (Figs 39, 54); punctures placed laterally on disk smaller than those along midline. Male genitalia (Fig. 77) with aedeagus distinctly shorter than gonoforceps; ventral lobes relatively close to apex of aedeagus (distance from apex of aedeagus to apex of ventral lobes distinctly less than length of lobes). Ventricle VI of female relatively broad and short, c. half as long as wide and with a broad U-V shaped median emargination extending half the length of segment (Fig. 71). *vaurieae* Form B (in part)^{2/}
- 19'. Pronotum with punctures partially confluent, less distinct (Figs 36, 53), those placed laterally on disk similar in size to those along midline. Male genitalia (Fig. 76) with aedeagus subequal in length to gonoforceps; ventral lobes more distant from apex of aedeagus (distance from apex of aedeagus to apex of ventral lobes subequal to length of lobes). Ventricle VI of female longer, 0.7-0.8 as long as wide and with a V-shaped median emargination extending a fourth to a third the length of segment (Fig. 70). *stroudi* (in part)
20. Femora light in color except extreme apex black, not darker at middle. 21
- 20'. Femora darker at middle than at apex, or entirely light or largely dark except in basal half. 22
21. Pronotum distinctly punctate (Figs 39, 54); punctures placed laterally on disk smaller than those along midline. Male genitalia (Fig. 77) with aedeagus distinctly shorter than gonoforceps; ventral lobes

^{2/} If entirely pallid and male gonostyli acuminate as in Fig. 83a, see Species *Inquirendae*, sp. 2.

relatively close to apex of aedeagus (distance from apex of aedeagus to apex of ventral lobes distinctly less than length of lobes). Ventrite VI of female relatively broad and short, c. half as long as wide and with a broad U-V shaped median emargination extending half the length of segment (Fig. 71)

. *vaurieae* Form B (in part)

- 21'. Pronotum with punctures partially confluent, less distinct (Figs 36, 53), those placed laterally on disk similar in size to those along midline. Male genitalia (Fig. 76) with aedeagus subequal in length to gonoforceps; ventral lobes more distant from apex of aedeagus (distance from apex of aedeagus to apex of ventral lobes subequal to length of lobes). Ventrite VI of female longer, 0.7-0.8 as long as wide and with a V-shaped median emargination extending a fourth to a third the length of segment (Fig. 70).

. *stroudi* (in part)

22. Eyes almost contiguous on underside of head, separated by less than 1/4 distance of separation on frons. Pronotum slightly longer than wide (Fig. 44). Elytra primarily light in color, not vittate. Male genitalia with gonostyli abruptly narrowed (Fig. 84) and laterally compressed at apex. Known from S Mexico and Central America. . .

. *megalops*

- 22'. Eyes more distant on underside of head, separated by at least 1/3 distance of separation on frons. Pronotum variable. Elytra typically vittate. Male genitalia with gonostyli gradually narrowed to (Figs 78, 79) and not laterally compressed at apex. Known from United States to S Mexico. 23

23. Hind tibial spurs relatively slender, not expanded to apex (Fig. 67). Male genitalia with sides of gonostyli sinuate in lateral view (Fig. 78b); gonostyli relatively short, c. 0.6 length of gonocoxal plate (Fig. 78a). Sternum IX with arms short (Fig. 87). Known from mid- and SE United States. *longicornis*

- 23'. Hind tibial spurs expanded to apex (Fig. 68). Male genitalia (Fig. 79) with sides of gonostyli not appearing sinuate in lateral view (Fig. 79b); gonostyli longer, c. 0.9 length of gonocoxal plate

(Fig. 79a). Sternum IX with arms elongate (Fig. 86). Known from Mexico.
. *obscuricornis* (in part)

Pseudozonitis arizonica (Van Dyke, 1929)

(Figs 22, 33, 69. Map 1)

Zonitis arizonica Van Dyke 1929: 132. MacSwain 1951: 72.

Pseudozonitis arizonica, Dillon 1952: 342. Enns 1956: 865. Werner, et al. 1966: 68.

Description — Body length: \bar{x} = 11.8 mm (N = 6), observed range 9-13 mm. Color relatively uniform, primarily pale yellow to pale yellow-brown. Venter often darker than dorsum. Clypeus and labrum brown in some. Antennal segments IV-XI light tan, basal segments usually darker, segments uncommonly weakly banded. Elytra usually uniformly light in color, uncommonly obsolescently vittate in basal half (see below). Wing membrane lightly pigmented. Legs with extreme apex of femora and tibiae black; tarsi variable, light yellow brown to brown except segment I of hind tarsi light yellow brown. Head and pronotum densely, coarsely punctate; pronotum with punctures confluent and indistinct in part, surface irregular, glossy. Elytra with median discal vein often prominent, running along an indistinct carina in basal half in some. Body setation light in color, somewhat longer than in most congeners.

Head l/w = 0.691 (0.65-0.73). Eyes relatively large, ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.134 (1.10-1.19); IODD/HWE = 0.354 (0.31-0.38); IODV/IODD = 0.409 (0.21-0.47). Antennal segment relative length (male): 21, 20, 25, 32, 36, 41, 38 35, 30, 28, 27; segment XI variable in length but usually distinctly shorter than VI; VI 4.5 - 6X as long as wide. Mandibles strongly curved from base. Pronotum as long as wide [l/w = 1.016 (1.00-1.06)]. Hind tibial spurs not expanded before apex, inner spur usually slightly longer than outer. **Male.** Sternum IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.7 length of gonocoxal plate; sides of gonostyli gradually convergent from base to blunt apex. Aedeagus 0.8 length of gonoforceps with ventral lobes narrowing at apex and almost 0.4 aedeagal length. **Female.** Ventrite

VI with relatively deep V-shaped emargination extending c. 0.5 length of segment.

Types — Holotype ♂. USA. *Arizona*: 6 mi. S Florence; July 23, 1924; E. P. Van Duzee, collr; (CAS, No. 2605, examined). Paratype ♀. *Arizona*: 16 mi. S Tucson; August 11, 1924; E. P. Van Duzee, collr; (CAS, examined); inappropriately designated 'allotype' by Enns (1956).

Geographic distribution — Known only from S Arizona, Sonora and Baja California Sur (Map 1).

Seasonal distribution — 34 records. June 15 – September 7. Monthly frequencies: June (2), July (15), August (13), September (4). R.H. Crandall collected this species in Tucson on four occasions in 1952, the earliest on June 15, the latest on September 5.

Adult associations — Almost a third of the records indicate collection at light. There are no plant records.

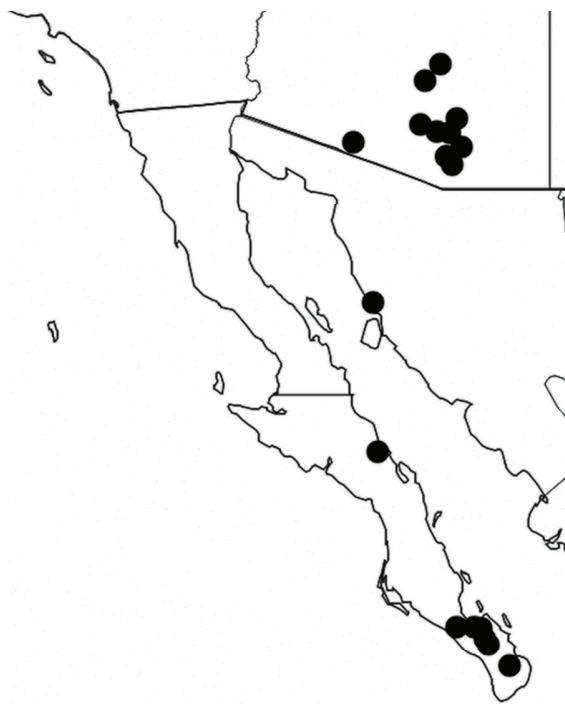
Identification — *P. arizonica* is most similar to pallid individuals of *P. pallida*, *P. brevis* and *P. vigilans*; all four have been confused in collections and the literature. The light-colored antennae should serve to separate most *P. arizonica* from the others. In *P. arizonica* the antennae are very light and similar in color to the light-colored elytra. In pallid individuals of the other species the antennae are darker than the elytra. Furthermore, the mandibles in *P. arizonica* (Fig. 22) are strongly curved; they are considerably less so in the other species (Figs 20, 21, 23). Head and pronotal punctures are coarse in *P. arizonica* and the pronotal surface texture (Fig. 33) differs as well. Its surface is more glossy and irregular with interpunctal areas varying slightly in elevation due to the partial confluence of the punctures. In similar species (Fig. 34) the punctures are relatively distinct and the interpunctal surfaces are more or less similar throughout.

Comments — Enns (1956) and Werner, et al. (1966) misidentified certain individuals of *P. pallida*, *P. brevis* and possibly *P. vigilans* as *P. arizonica*. As indicated, the former three species have entirely pallid populations which are superficially similar to *P. arizonica*. I am only aware of *P. arizonica* occurring in Arizona and Mexico. The record of this species from New Mexico is based on a misidentified specimen of *P. pallida* from Belem. The Death Valley, California, record of *P. arizonica* (Enns 1956)

also is a misidentification and instead refers to *P. brevis*. The single male from Andrade, Imperial Co., California, assigned to *P. arizonica* by Enns, was not examined but also is a likely misidentification. Andrade is in the Colorado Desert, an area where *P. arizonica* is unknown. The September collection date given for this specimen suggests it belongs to *P. vigilans*, a species known to occur in that region in fall.

The elytra in several species of *Pseudozonitis* vary from uniformly light in color to distinctly vittate. Distinct vittation is absent in material studied of *P. arizonica*. However, in two specimens from Baja California Sur (1.5 mi. E San Jorge, and 3.5 mi. NE San Pedro) the basal half of each elytron is obsolescently vittate.

Records — 42 specimens examined (14♂, 28♀). MEXICO. **Baja California Sur**: La Paz, 7 mi. W; ix-6-1971; at light; 1; G. Linsley et al.; CISC. La Paz, 26 mi. W; viii-11-1966; UVL; 1; J. Chemsak et al.; CISC. La Paz, 20 km S on Hwy 1; viii-27-1994; BL; 1; R. Morris; UMRM. Penjamo, 22 mi. NW; viii-29-1967; light trap; 1; K. Radford; F. Werner; CAS. San Jorge, 1.5 mi. E; vii-25-1971; UVL; 1; H. Real, R. Main; CAS. San Pedro, 3.5 mi. NE; ix-7-1967; 1; J. Chemsak; CISC. Santa Rita, 6 mi. SE; vi-24-1967; BL; 1; E. Sleeper, E. Fisher; CAS. **Sonora**: Desemboque; ix-1/10-1953; 1; B. Malkin; CAS. UNITED STATES. **Arizona**: Ajo Mts, Alamo Cyn; vii-24; 1; H. Leech, J. Green; CAS. Bryce Thompson Arboretum, Superior; vii-21/31-1948; 1; H. Gloyd; UAIC. Continental; vii-1974, vii-1978, vii-1979, viii-1979; 8; Lenczy; USNM. Florence, 6 mi. S; 1; (see *Types*). Green Valley; vii-1979; 1; Lenczy; USNM. Madera Cyn; viii-22-1971; BL; 1; E. Kane; CSCA. Santa Catalina Mts; viii-2-1970, viii-28-1970; 2; K. Stephan; FSCA. Santa Rita Ranch, Pima Co.; viii-1977; 1; Lenczy; USNM. Sonoran Desert Museum; viii-9/16-1962; light trap; 1; W. Nutting, S. Donan; UAIC. Tucson; vi-15-1952, vii-1-1952, vii-18-1952, ix-5-1952; 5; R. Crandall; UCRC. Tucson; vii-31-1937; 1; F. Parker; UMRM. Tucson; vii-1937?; 2; Bryant; UMRM. Tucson (2389'); vii-24-1952; at light; 1; R.B. & J.M. Selander; FSCA. Tucson, Oracle & Hardy rds; viii-7-1980; 4; J. Cicero; FSCA. Tucson, 16 mi. S; 1; (see *Types*). Vail, 8 mi. N; viii-14-1963; light trap; 1; F. Werner; UAIC. Waterman Mts; vii-7, viii-2; 2; C.



Map 1. Geographic distribution of *Pseudozonitis arizonica*.

Olson; UAIC.

***Pseudozonitis brevis* Enns, 1956**

(Figs 1, 20, 55, 61, 73. Map 2)

Pseudozonitis brevis Enns 1956: 855. Werner, et al. 1965: 69. Erickson and Werner 1974: 403.

Pseudozonitis arizonica, Enns 1956: 865 (in part).

Description — Body length: \bar{x} = 10.8 mm (N = 9), observed range 6-13 mm. Color varying from almost entirely yellow-orange to almost completely dark brown; commonly light in color except elytra brown with yellow marginal, discal and sutural vittae; discal vitta usually streak-like, rarely as wide as adjacent brown sections. Wing membrane, at most, lightly pigmented. Antennae light to dark brown, darker than elytra if elytra pallid; segments banded apically or not; basal two segments often lighter in color. Legs with femora varying extensively from entirely light-colored to entirely dark, most

commonly with dark coloration restricted to apex. Head and pronotum densely, moderately coarsely punctate; pronotal punctures distinct, crowded but not confluent. Body setation light in color, more conspicuous than in most congeners.

Head l/w = 0.733 (0.69-0.77). Eyes relatively large; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.150 (1.12-1.20); width at base of mandibles slightly greater than half width of head at eyes; IODD/HWE = 0.342 (0.28-0.38); IODV/IODD = 0.441 (0.41-0.48). Antennal segment relative length (male): 21, 21, 28, 33, 33, 32, 30, 28, 28, 25, 33; segment VI c. 5x as long as wide. Mandibles relatively slender, straight basally, curving moderately only in apical third. Pronotum width subequal to length. Hind tibial spurs similar, usually relatively narrow, not noticeably expanded before apex. Pygidium slightly to moderately emarginate apically. **Male.** Sternum IX slender, moderately sclerotized; arms, elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.6 length of gonocoxal plate; sides of gonostyli subparallel in basal half before converging to bluntly rounded apex. Aedeagus 0.8 length of gonoforceps, with ventral lobes narrowing to apex and occupying c. 0.4 aedeagus length. **Female:** Ventrite VI with distinct U-shaped emargination extending c. 0.5 length of segment.

Types — Holotype ♂, allotype ♀. USA. Arizona: Tucson; July 20, 1933; 'Bryant 127' and 'Bryant 128', resp.; FMNH (photos of holotype, FMNHINHS 2821904, examined). Enns (1956) lists 52 paratypes in his description; 17 of these were examined (see *Records*).

Geographic distribution — SW United States; primarily deserts from S Nevada and S Utah, south into Baja California and Sonora, Mexico (Map 2).

Seasonal distribution. — 74 records. April 27 – September 6. Monthly frequencies: April (3), May (9), June (36), July (21), August (4), September (1).

Adult associations — Almost 20% of the collections indicate taken at light. Collected once on *Prosopis* (Fabaceae).

Identification — The shape of the mandibles and antennal color separate pallid individuals of *P. brevis* from *P. arizonica*. Degree of eye bulging, slight difference in body setation, and, in particular, the

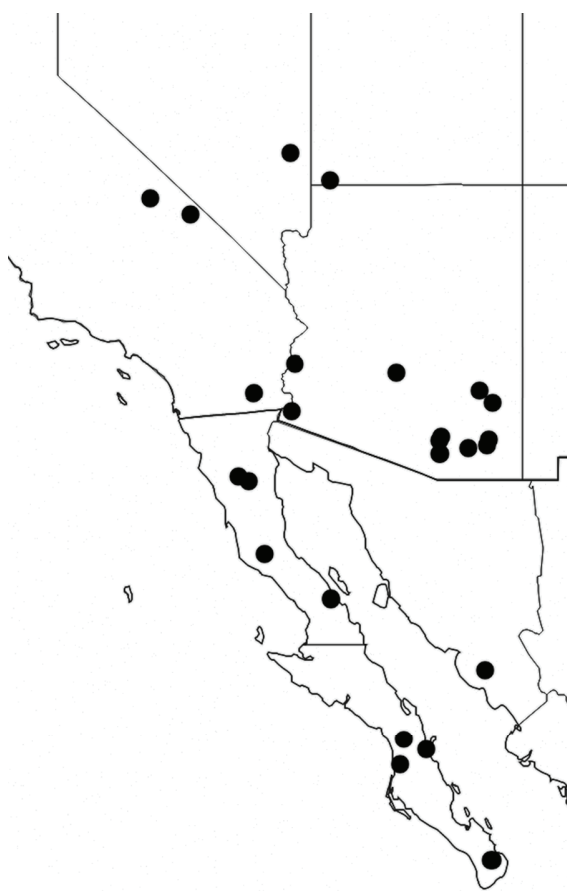
shape of the male gonoforceps, distinguish it from *P. vigilans*. A difference in seasonal distribution also may assist in separating the two. See treatment of *P. vigilans* for details.

Comments — Elytral color pattern varies considerably in *P. brevis* ranging from entirely pallid to almost entirely dark brown. Specimens from dune systems in California (Saline and Death valleys) are uniformly pallid. Most individuals from Arizona, including the holotype and allotype, are vittate (Fig. 1) although pallid specimens occur (e.g. Ehrenberg, Yuma). In some series the two color forms are mixed (e.g., nr Bylas, Tucson). In vittate specimens from Arizona and the northern state of Baja California the head, pronotum, venter and legs are primarily light in color. However, most of those from Baja California Sur are considerably darker throughout, including the pronotum. Although the yellow discal vitta is commonly quite narrow in this species, only three individuals examined have entirely dark elytra. Two are from the state of Baja California (San Fernando and San Matias Pass); the third is from near Ciudad Obregon in Sonora. In all three the remainder of the body is primarily light colored. The only entirely pallid individuals examined from Mexico are from Bahia de Los Angeles, Baja California. They were collected with specimens having vittate elytra. Similar color variation occurs in *P. vigilans*.

Two Death Valley specimens in the USNM (see *Records*) were misidentified as *P. arizonica* by Enns (1956). These individuals differ only in size from other Death Valley specimens examined by Enns and identified by him as *P. brevis*. Enns considered 10 mm to be the size limit for *P. brevis*; both misidentified specimens are larger.

Records — 154 specimens examined (59♂, 95♀). MEXICO. **Baja California:** Bahia de Los Angeles; v-15-1949; on *Prosopis glandulosa*; 1; R. Dickson; UMRM. Bahia de Los Angeles; vi-2-1981; 5; F. Werner et al.; UMRM. Bahia de Los Angeles, 1 mi S; vi-11-1967; 1; E. Sleeper, E. Fisher; CAS. San Fernando; vii-31-1938; 3; Michelbacher, Ross; CAS. San Matias Pass, 3400'; vi-30-1971; 1; C. Bellamy; CAS. Valle de Trinidad; vii-2/3-1975; 1; B. Dozier; JHC. **Baja California Sur:** Puerto Escondido (16 mi. S Loreto); vi-25-1988; 1; R. & M. Shaver; CISC. San[to] Domingo; vii-19-1938; 11; Michelbacher and Ross; CAS. San Jorge; viii-31-

1978; BL, 'MagCstScrib'; 2; E. Sleeper; CAS. San Jorge, 1.5 mi. E; vii-24/25-1971; UVL; 13; H. Real, R. Main; CAS. San Miguel Comondú; vi-22-1967; BL; 1; E. Sleeper, E. Fisher; CAS. **Sonora:** Ciudad Obregon, 14 km E (100m); vii-25-1970; 2; L. Guerra; BYU. UNITED STATES. **Arizona:** Benson; vi-21-1941, vi-30-1941, vii-1/2-1941, viii-12-1941, ix-6-1941; 8; R. Flock; UCRC. Benson; vii-30-1958; 2; P. Opler; CISC. Bylas, 3 mi SE (2000'); vii-18-1952; 3; paratypes; R.B. & R.K. Selander; FSCA. Cochise Co.; 1; FSCA. Continental; vi-1-1969; 1; K. Stephan; FSCA. Ehrenberg; vi-14-1938, vi-21-1938, vi-24-1938; 4 (3 paratypes); F. Parker; UAIC, UMRM. Ehrenberg; vi-22-1943, vi-25-1943, vi-27-1943; 3; P. Grassman; UAIC. Green Valley; v-1969, vi-1969; 3; Lenczy; USNM. Kansas Settlement, S of (base of Three Sisters Buttes; 32°01'N, 109°46'W; 4230'); vii-24-2003; 3; S. Clark; BYU. Phoenix; v-29-1947; 1; P. Grassman; NMSU. Phoenix; vi-19-1935; 1; paratype; E. Ball; UAIC. St Xavier Mission (Pima Co.); vii-29-1924; 1; J. Martin; CAS. Thatcher; vi-20-1950, vi-21-1951, vi-25/26-1951; 6; E. Taylor; CSCA, UAIC. Tucson [30 specimens from 21 collections from v-10 to vii-20, 4 collections at light, 6 paratypes; also see *Types*]. Willcox Playa; vii-24-1970; 1; K. Stephan; FSCA. Willcox Playa; viii-6-2001; 1; R. Davidson et al.; JHC. Yuma; viii; 1; paratype; CAS. **California:** Death Valley; iv-1926; 1; paratype; CAS. Death Valley; iv-22-1925, v-27-1925; 2; Blackwelder; USNM. Death Valley (Furnace Ck); iv-27-1987; 1; L. Bronson; CSCA. Death Valley (Furnace Ck); v-10-1959; at light; 1; G. Nelson; FSCA. Death Valley Natl Mon. (Furnace Ck Cmp); v-26-1975; UVL; 2; D. Starks; CISC. Imperial Co.; vii-26; 1; paratype; CAS. Saline Valley; v-26-1993; Malaise trap; 1; D. Russell; JHC. Saline Valley (dunes); vi-6/14-1976; UVL; 5; D. Giuliani; UCRC. Saline Valley (dunes); vi-10-1973; 7; UMRM. Saline Valley (Salt Marsh, 1060'); vi-7-1976, vi-28-1976, vii-1-1976; BL; 12; D. Giuliani; CSCA. Saline Valley (Morning Sun Mine, 1150'); vii-10-1977; UVL; 3; D. Giuliani; CSCA. **Nevada:** Kershaw-Ryan 'camp' [St. Prk], Lincoln Co.; vii-17-1969; 1; D. Penrose, D. Foster; WFBM. **Utah:** St George; 1; paratype; C. Palm; AMNH.



Map 2. Geographic distribution of *Pseudozonitis brevis*.

***Pseudozonitis diana* Pinto, new species**

(Figs 10, 29, 50, 65, 66, 82. Map 3)

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Pseudozonitis martini, Enns 1956: 848 (in part).
Werner, et al. 1966: 68 (in part). Erickson, et al.
1976: 960 (in part).

Description — Body length: \bar{x} = 10.3 mm (N = 6), observed range 7-13 mm. Color usually primarily dark brown to black except pronotum orange, sometimes with a small black macula at center of apical half of disk, and elytra uncommonly yellow. Head capsule largely dark brown except postocciput yellow to yellow brown, and a small

area between eye and mandibular base light; clypeus and labrum dark, labrum often darker than clypeus. Mandibles light in basal half contrasting with dark apex. Antennae brown to black, not banded. Scutellum, venter, and legs dark except trochanters and base of tibiae lighter in some. Tarsi not banded, unmodified, without light-colored pads beneath. Head and pronotum uniformly densely punctate, punctures moderately coarse to small; vertex often slightly impressed above eyes; pronotal disk slightly impressed anterolaterally. Setation associated with dark integument also dark.

Head l/w = 0.767 (0.74-0.79); eyes relatively small, not bulged, widely separated below; ventral lobe only slightly wider than dorsal lobe; head only slightly wider at eyes than at tempora [HWE/HWT = 1.042 (1.02-1.07)]; IODD/HWE = 0.431 (0.40-0.46); IODV/IODD = 0.894 (0.78-1.00) (N = 5). Antennal segment relative length (male) = 21, 17, 23, 31, 31, 31, 29, 27, 26, 24, 35; segment VI 3-4x as long as wide. Mandibles relatively straight at base, curving moderately at or slightly beyond mid-length. Pronotum slightly wider than long [l/w = 0.906 (0.87-0.94)], sides subparallel behind widest point at apical third, hind angles slightly flared or not. Hind tibial spurs similar in shape and length, only slightly expanded before tapering to apex. Pygidium distinctly emarginate medianly. **Male.** Sternum IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.6 length of gonocoxal plate; gonostyli unevenly convergent to apex, with sides subparallel or subsinuate at basal 3/5, abruptly convergent at that point to apex. Aedeagus 0.8 length of gonoforceps with ventral lobes narrowing at apex and c. 0.4 aedeagal length. **Female.** Ventricle VI with a deep, broad, U-shaped emargination, extending c. 0.5 length of segment.

Types — Holotype ♂ and allotype ♀. USA. *Arizona*: Chiricahua Mts, Cave Creek Cyn, 9 mi. 'above' Portal; vii-20-1975; on *Mimosa* sp.; G. H. Nelson, collr; FSCA. 1♂, 1♀ with same data designated paratypes (UMRM). The holotype has a small black macula on the pronotal disk; the female paratype has entirely yellow elytra.

Etymology — After my wife, Diana Gail.

Geographic distribution — Known from desert mountain ranges of SE Arizona and W Texas (Map

3).

Seasonal distribution.— 14 records. June 9 - August 2. Monthly frequencies: June (3), July (10), August (1).

Adult associations.— Five collections from various plants [*Agave* (Asparagaceae), *Mimosa* (Fabaceae) and unidentified species including an unknown Fabaceae (see *Records*)]. There are no records from light.

Identification.— *Pseudozonitis diana* (Fig. 10) is distinguished by its relatively small eyes, uniformly colored elytra and uniformly dark legs, pronotal dimensions, mandibular structure and color, and male genitalia. It is most similar to *P. martini*, the species with which it has heretofore been confused. Several differences distinguish the two. In *P. diana* the mandibles are light in the basal half and moderately curved to the apex, whereas in *P. martini* they are entirely brown and considerably more abruptly curved (cf. Figs 28, 29). In *P. diana*, the pronotum is longer relative to width (c. 0.9 as long as wide) and its sides are subparallel to the base; in *P. martini* the length is c. 0.8 the width and the sides are clearly convergent to the base (cf. Figs 49, 50). Body setation color also separates them. In *P. martini* body setation is uniformly light whereas in *P. diana*, setae associated with dark integument are similarly dark. The shape of the gonostyli in males differs as well. In *P. martini* the sides of this structure are evenly convergent from the base to apex (Fig. 81), whereas in *P. diana* convergence to the apex is distinctly uneven (Fig. 82a).

Although *P. diana* and *P. martini* are southwestern species with general range overlap (Map 3), the former is known from higher elevations and occurs in summer. *Pseudozonitis martini* occurs in spring at lower desert habitats. See treatment of *P. huetheri*, another species similar to *P. diana*.

Comments — Elytral color and presence of a black macula on the pronotum vary in *P. diana*. Most specimens have distinctly black elytra. In three individuals the elytra are entirely yellow. Two were collected with black individuals, one from Cave Creek, near Portal, Arizona (type series), the other from 'Chiricahua M.' [presumably Mts, not Monument], Arizona. The third specimen was taken in the Hueco Mts, Texas. A second specimen from the Hueco Mts, collected at a different time,

has black elytra. Male genitalia are similar in both color forms. The black pronotal macula in the apical half of the disk occurs in a third of the specimens examined. In some it is small and obsolescent.

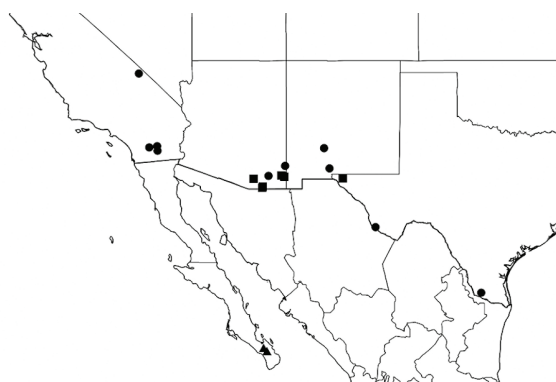
Records.—18 specimens; 6♂, 12♀. UNITED STATES. **Arizona:** Chiricahua Mts, Cave Creek, 9 mi. 'above' Portal; 4; (see *Types*). 'Chiricahua M.'; vii-19-1952, vii-27-1957, viii-2-1959; 3; D. & J. Knull; OSUC. Chiricahua Mts, 6900' (31°56.917'N, 109°18.428'W); vii-9-2013; 'swept from leguminous plant'; 2; K. Schnepf; FSCA. Huachuca Mts; vii-8-1932, vii-24; 2; R. Beamer Jr, UMRM, USNM. Huachuca Mts, Miller Cyn; vii-20; 1; H. Wenzel; OSUC. Huachuca Mts, Ramsey Cyn; vii-11-1965; 'on fl. *Agave*'; 1; F. Werner; UAIC. Huachuca Mts, 3 mi. E Montezuma Pass; vii-19-1941; 1; W. Barr; WFBM. Santa Rita Mts, 5-8000; vii; 1; F. Snow; SEMC. Santa Rita Mts, 'pass betw. Rosemont and Helvetia, 6000'; vi-17-1977; 1; 'on low plant...'; M. Hetz; UAIC. **Texas:** Hueco Mts; vi-9-1940; 1; E. Waering; FSCA. Hueco Mts, Twin Caves (N31°48'57.41", W106°03'43.76"); vi-12-2004; 1; 'on flowers'; P. Lenhart; JHC.

Pseudozonitis florida Pinto, new species

(Figs 12, 13, 31, 46. Map 11)

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Description — Body length: \bar{x} = 10.0 mm (N=5), observed range 9-12 mm. Color light to dark brown with pronotum and elytral vittae yellow to yellow-orange; scutellum, base of mandibles, trochanters, coxae, pro- and mesosternum, mesopleuron and extreme base of femora and tibiae also yellow to yellow-orange. Head light to dark brown. Antennae black, segments not banded. Pronotal disk slightly darker at center. Elytra dark brown with yellow sutural and marginal vittae confluent at apex, and a very narrow light brown discal vitta, present or not, extending from humerus to near apex. Tarsi not banded, unmodified, without light-colored pads beneath. Head with vertex slightly to distinctly impressed; pronotum slightly to distinctly impressed anterolaterally. Head and pronotum evenly, densely punctate; punctures relatively small, those on pronotum of relatively uniform size throughout. Setation similar in color to underlying cuticle.



Map 3. Geographic distribution of *Pseudozonitis diana* (squares), *P. martini* (dots), and *P. huetheri* (triangles).

Head $l/w = 0.726$ ($0.70-0.75$) ($N = 4$) as long as wide. Eyes small, ventral lobe only slightly wider than dorsal lobe; head only slightly wider at eyes than at tempora [$HWE/HWT = 1.069$ ($1.06-1.09$)]; $IODD/HWE = 0.411$ ($0.38-0.43$); $IODV/IODD = 0.773$ ($0.69-0.82$) ($N = 3$). Antennal segment relative length (male): 23, 20, 25, 38, 37, 40, 37, 37, 36, 35, 46; VI c. $4.5\times$ as long as wide. Mandibles moderately curved to apex. Pronotum slightly wider than long [$l/w = 0.930$ ($0.91-0.95$)], hexagonal with sides parallel posteriorly, hind angles very slightly flared. Hind tibial spurs similar, relatively narrow, gradually narrowing to acute apex. Pygidium moderately emarginate medianly. **Male.** Sternum IX moderately sclerotized; arms short, divergent, and robust, c. 0.25 or less length of entire sternum, blunt apically. Gonoforceps with gonostyli prominent dorsally, 0.6 the length of gonocoxal plate; gonostyli with sides distinctly convergent to apex, with dorsal surface appearing sinuate in lateral view. Aedeagus 0.8 the length of gonoforceps; ventral lobes narrowing at apex, occupying 0.3 aedeagal length. **Female.** Ventricle VI with distinct U-shaped emargination.

Types — Holotype ♀. USA. **Florida:** Port Saint Lucie (St Lucie Co.); v-22-2009; Lindgren Funnel Trap, 'w/Manuka oil & etoh'; B. Saunders, collr. Allotype ♂. **Florida:** Putnam Co., K. Ordway Preserve, E of Melrose; iv-1-1997; P. S. Skelley, collr. Both specimens deposited in FSCA. Three additional specimens designated paratypes (see *Records*). The genitalia of the allotype were dissected, placed in

glycerine and attached to the specimen pin.

Etymology — After the state of origin (noun in apposition).

Geographic distribution — Known only from Florida (Map 11).

Seasonal distribution — 4 records. April 1- April 27. The date for the holotype is May 22. However, the specimen was taken from a trap and likely captured at an earlier date.

Adult associations — Taken twice from vegetation. One collection is from flowers of palmetto, *Sabal* sp. (Arecaceae). Also see *Records*. There are no records from light.

Identification — *Pseudozonitis florida* (Figs 12, 13) is distinguished from other species by its relatively small eyes (Fig 31), unicolorous pronotum (Fig. 46), the dorsally sinuous male gonostyli (as in Fig. 78b) and the short, robust arms of sternum IX in the male (as in Fig. 87). It is most similar to *P. longicornis* and *P. roseomaculatis*. Overall body coloration is similar in all three as is the distinctive shape of the gonostyli. However, *P. florida* is separated from both by the absence of a red macula on the pronotum. From *P. longicornis*, a sympatric species, it also is distinguished by its considerably smaller eyes which are separated below the head by a distance greater than 0.6 the distance of separation above and, in addition, by the uniform size of the pronotal punctation (smaller laterally in *P. longicornis*). From *P. roseomaculatis*, *P. florida* is further separated by the absence of apical bands on the antennal segments, the almost completely black femora, and the slender hind tibial spurs. In *P. roseomaculatis* the antennal segments usually are banded, the femora are yellow apically and the hind tibial spurs are broader, and expanded before the apex. In addition, the arms of sternum IX in males are considerably longer and thinner in *P. roseomaculatis*. The short and robust sternum arms in *P. florida* is a feature shared with *P. longicornis* (Fig. 87) and not known in any other species.

Records — 5 specimens examined (3♂, 2♀). UNITED STATES. **Florida:** Crescent City; 1; paratype; Hubbard, Schwarz; USNM. Highlands Co.; iv-27-2012; 'fls. of palmetto, *Sabal* sp'; 1; paratype; K. Schnepf; FSCA. Highlands Hammock State Park; iv-14-1989; 'on *Ilex cassine* blossoms and surrounding vegetation'; 1; paratype; M. Thomas;

FSCA. Port Saint Lucie; 1; (see *Types*). Putnam Co., K. Ordway Preserve, E of Melrose; 1; (see *Types*).

***Pseudozonitis huetheri* Pinto, new species**

(Figs 11, 30, 47, 83, 89. Map 3)

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Description — Small, relatively robust; body length = 8 mm (all 3 exemplars). Color variable with two known forms. (1) Dark form: dark brown except following structures orange: frons, vertex, labrum, clypeus, gular area, postocciput, maxillae and labium (palpi excepted), scutellum, prothorax, fore coxae and trochanters. Antennae not banded apically, as dark as elytra. (2) Light form: head, pronotum and scutellum orange, elytra light brown except basal border orange; clypeus, labrum, maxillae, labium, venter, and legs entirely light yellow-brown. Antennae light brown, slightly lighter than elytra. Mandibles light in color at basal half and elytral disk uniformly colored in both forms. Wing membrane moderately pigmented, more distinctly so in dark form. Head and pronotum densely, moderately coarsely punctate; pronotum with punctures distinct, crowded, few separated from others by distance equal to their diameter except narrowly impunctate along midline. Body setation corresponding in color to underlying cuticle.

Head $l/w = 0.658$ (0.64-0.67); tempora prominent; eyes small, extending below head only to outer margin of maxillae; ventral lobe only slightly wider than dorsal lobe; $HWE/HWT = 0.986$ (0.97-1.00) (i.e., widths subequal); $IODD/HWE = 0.475$ (0.47-0.48); interocular distance on underside of head greater than that on front [$IODV/IODD = 1.121$ (1.06-1.22)]. Antennae subfiliform; segments broader than in most species; segment VI c. 3x as long as wide; relative length of segments (male): 18, 16, 21, 25, 25, 26, 23, 22, 21, 20, 26. Mandibles abruptly curved at apical half. Pronotum wider than long, $l/w = 0.930$ (0.92-0.94); disk with sides subparallel in basal 2/3; hind angles slightly flared or not. Hind tibial spurs similar, slightly expanded before apex, inner spur slightly longer than outer. Tarsi not banded, unmodified, without light-colored pads beneath. **Male.** Sternum IX moderately sclerotized, slender; arms elongate, subparallel,

blunt at apex. Genitalia with gonostyli 0.7 length of gonocoxal plate, relatively narrow, only moderately expressed dorsally, strongly and evenly convergent to acuminate apex; apex of gonostyli laterally compressed. Aedeagus 0.85 length of gonoforceps; ventral lobes narrowing only slightly to apex and occupying 0.3 aedeagal length. **Female:** Ventricle VI with a narrow V-shaped emargination at apex, extending less than 0.5 length of segment.

Types — Holotype ♂. MEXICO. *Baja California Sur*: San Pedro; ix-1-1994; R. Turnbow. Allotype ♀. *Baja California Sur*: vic. San Antonio; viii-27/ix-1-1994; J. Huether. The holotype and allotype represent the dark color form. A third specimen, a male, representing the light form (see *Records*), is not designated a paratype but bears a label - 'from original series'. All specimens deposited in FSCA. The genitalia of the holotype were dissected, placed in glycerine and attached to the specimen pin.

Etymology — After Jeffrey Huether of Geneva, New York. Dr. Huether collected one of the three known specimens of this species and was helpful in providing material for this study.

Geographic distribution — Known only from *Baja California Sur* (Map 3).

Seasonal distribution — Two specimens were collected in early September, the third either in late August or early September.

Adult associations — None recorded.

Identification — *Pseudozonitis huetheri* is most similar to *P. maculicollis*, *P. martini* and *P. diana*, but is not known to overlap geographically with any of them (see Map 3). In all three the eyes are small, only attaining the outer margin of the maxillae on the underside of the head. Also the pronotum is primarily orange, and the elytra are non-vittate and uniform in color. *Pseudozonitis maculicollis* is separated by head and pronotal punctuation, and degree of curvature of the mandibles. In *P. huetheri*, the punctures are considerably more dense than in *P. maculicollis* (cf. Figs 47, 48), and the mandibles considerably more abruptly curved. Additionally, in *P. maculicollis* the pronotum usually bears one or two black maculae. From *P. martini* and *P. diana*, *P. huetheri* is separated by the orange vertex, frons, and scutellum. The head capsule and scutellum are brown or black in the former two species. Also, in *P. martini* the mandibles are entirely brown, not light in

color at the base as in *P. huetheri*. The male genitalia (Fig. 83) separate *P. huetheri* from all three species. In *P. huetheri* the gonostyli are laterally compressed apically; in dorsal view they converge to a very narrow apex. In the other three species the apex is broadly rounded and not laterally compressed (Figs 81, 82). The apical emargination of ventrite VI helps separate females. It is narrowly V-shaped in *P. huetheri* but broadly U-shaped in the other similar species.

Comments — *Pseudonitis huetheri* is not a typical member of its genus. Superficially it appears more similar to *Zonitis*. Yet it possesses all traits associated with *Pseudonitis*. This includes the relative length of antennal segments II-IV, the modified ventrite V and recurved gonostyli in males, as well as the distinctly emarginate ventrite VI in females.

Records — Three specimens (2♂, 1♀). MEXICO. **Baja California Sur**: El Triunfo, 3 mi. S ('Ramal a El Rosario'); ix-6/7-1988; 1; A. Gilbert; FSCA. San Antonio, nr; 1; (see *Types*). San Pedro; 1; (see *Types*).

Pseudonitis impressithorax (Pic, 1927)

Zonitis impressithorax Pic 1927: 28.

Pseudonitis impressithorax, Martinez 1992: 11. Campos Soldini and García París 2014: 508.

Description — As in *P. labialis* except as follows: Apparently somewhat larger. Body length: \bar{x} = 13.1 mm (N = 8), observed range 10-18 mm. Head subtriangular; HWE/HWT = 1.082 (1.03-1.13); ventral lobe of eye only c. 1.2x width of dorsal lobe; IODD/HWE = 0.402 (0.36-0.43); distance from eye to top of head > ½ width of eye at emargination; IODV/IODD = 0.541 (0.50-0.57). Labrum without a glabrous medial sulcus. Hind tibial spurs not noticeably expanded before apex. Pygidium weakly emarginate medianly. The features of the pronotum, elytra and male genitalia, including the structure of sternum IX, are shared with *P. labialis* (as in Figs 45, 80, 88).

Types — Syntype ♂. ARGENTINA. 'La Cienega (Belén) Catamarca'; I-1926; Weisner Wolters, leg.; (photos MNHN, examined). A small handwritten Pic label, 'type', is attached to the syntype. At least one

other representative of the type series was originally housed in the C. Bruch Collection in Argentina (Pic 1927); specimen(s) may currently be in the Museo de La Plata. 'R. Argentine' is the only geographic information given in the original description.

Geographic distribution. — Known from N Argentina and south central Bolivia.

Seasonal distribution — 6 records: September 5 - January. Monthly frequencies: September (2), October (2), November (1), January (1).

Adult associations. — Martinez (1992) indicates the species has been collected at light. There are no plant associations.

Identification — *Pseudonitis impressithorax* can only be confused with *P. labialis* (see *Description*).

Comments — *Pseudonitis impressithorax*, the only species of the genus described from South America, occurs in Argentina and Bolivia (new record). Martinez (1992) considered it uncommon. The species is very similar to and most closely related to *P. labialis*. *Pseudonitis labialis* is known as far south as northern Venezuela and the two specimens examined from there do not show obvious intermediacy to *P. impressithorax*. The differences between the two are minimal but consistent. *Pseudonitis impressithorax* apparently is somewhat larger (body length = 10-18 mm), has smaller eyes, and its metatibial spurs are not expanded before the apex. The eye size difference provides the best separation. All the head capsule features given above for separating the species from *P. labialis* are a reflection of eye size. Additionally, unlike *P. labialis*, the dark macula on the pronotal side panels occurs in all individuals of *P. impressithorax* examined and is larger in size than in the former species. It is possible that these forms warrant subspecies rather than species recognition.

Records — 23 specimens examined (7♂, 16♀). ARGENTINA. **Catamarca**: La Cienega (Belén); 1; (see *Types*). Santa Maria, 4 km N, 1700 m; x-4-1968; 6; FSCA. **La Rioja**: La Rioja; xi-9-1958; 1; P. Kohler; USNM. La Rioja, 20 km N; ix-24-1968; 4; FSCA. **Salta**: Anta Department ('Chaco salteño') (Martinez 1992). **Santiago del Estero**: Rio Hondo; ix-5-1953; 7; FSCA. BOLIVIA. **Santa Cruz**: Pampagrande and surrounding area; x-1/3-1996; 4; W. Rossi; MBC.

***Pseudozonitis labialis* Enns, 1956**

(Figs 24, 45, 72, 80, 88. Map 4)

Pseudozonitis labialis Enns 1956: 863.*Pseudozonitis longicornis*, Dillon 1952: x344.

Description — Body length: \bar{x} = 12.5 mm (N = 6), observed range 9–15 mm. Color less variable than in most species. Head yellow to brown with two frequently confluent dark maculae on front, the more dorsal macula sometimes absent. Antennae brown, segments usually at least weakly banded. Pronotum yellow with two large, dark maculae on each side of midline occupying most of disk; maculae narrowly separated at midline or confluent, if confluent then anterior border medianly emarginate; lateral panels usually also with a brown macula of varying size (see *Comments*). Elytra brown with narrow yellow marginal, sutural and discal vittae, the former two joining apically or not; discal vitta usually attaining apical tenth of elytra, sometimes obsolete in apical half. Wing membrane moderately pigmented. Venter primarily brown except apical border of abdominal ventrites lighter. Legs primarily brown except coxae and trochanters yellow; femora yellow at base and apex; tibiae yellow at base; tarsi not banded. Head and pronotum densely punctate; pronotum with punctures dense, small to moderately coarse, smaller and denser laterally than along midline.

Head subtriangular to transversely oval; l/w = 0.682 (0.64–0.70); vertex not impressed or only slightly so. Eyes large, bulged; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.183 (1.13–1.22); IODD/HWE = 0.315 (0.29–0.33); distance from eye to top of head < 1/2 width of eye at emargination; IODV/IODD = 0.328 (0.24–0.44). Labrum usually with a shallow, glabrous sulcus along midline. Antennal segment relative length (male): 21, 20, 25, 32, 33, 33, 33, 30, 29, 27, 38; segment VI c. 5x as long as wide. Mandibles strongly curved entire length. Maxillary galeae slightly longer than in most species, its length (not including apical pectinate setae) subequal to that of last segment of maxillary palpi. Pronotum as long as wide [l/w = 1.008 (1.00–1.03)]; discal surface broadly impressed in apical half on either side of midline, and with a shallow median sulcus in basal half. Hind tibial spurs similar, at least slightly expanded

before apex. **Male.** Sternum IX robust, black; arms converging and tapering to a point at apex. Pygidium without median apical emargination. Gonoforceps with gonostyli not prominent dorsally, unevenly convergent to apex, sides subparallel in basal half and distinctly convergent beyond, strongly compressed laterally at apex; gonostyli 0.6 length of gonocoxal plate. Aedeagus 0.9 length of gonoforceps; ventral lobes suboval, not narrowing to apex, occupying only 0.2 aedeagal length. **Female.** Ventrite VI weakly emarginate.

Types — Holotype ♂ (No. 11465), and allotype ♀. USA. Texas: Cameron County; vi-12-1947; J.G. Edwards, collr; CAS, examined. Enns (1956) designated 20 paratypes from various Texas localities; 12 examined, including one from the type locality (see *Records*).

Geographic distribution — Known from S Texas, Mexico and N Venezuela (Map 4).

Seasonal distribution — 64 records. From April 9 – October 16 in Texas and Mexico; the two Venezuela records from February and October, respectively. Monthly frequencies: February (1), April (3), May (15), June (30), July (9), August (3), September (1), October (2).

Adult associations — 30% of the records indicate collection at light. There are no plant associations.

Identification — *Pseudozonitis labialis* is characterized by the large, often confluent, brown to black maculae present on either side of the pronotal midline (Fig. 45), the usual presence of at least one dark macula on the front of the head (Fig. 24), the weakly emarginate ventrite VI in females (Fig. 72) and the convergent, apically acuminate arms of sternum IX in males (Fig. 88). It has commonly been confused with *P. longicornis*, a species easily separated by the lack of dark maculae on the front of the head, the reddish pronotal macula, the deeply emarginate sternum VI in females and, in males, the completely different structure of genitalia and sternum IX (Figs 78, 87). A feature considered by Enns (1956) as characteristic of *P. labialis* is presence of a shallow glabrous sulcus along the midline of the labrum. Unfortunately this trait is subtle and not obvious in all individuals.

The closest relative of *P. labialis* is the allopatric *P. impressithorax* (Pic), the only exclusively South American species of *Pseudozonitis*. *Pseudozonitis*

impressithorax is known only from Argentina and Bolivia. The two are compared in the treatment of the latter species.

Comments — It is clear that the treatment of *P. longicornis* by Dillon (1952) instead refers to *P. labialis* which was undescribed at the time of his publication. This follows from both his anatomical description and the locality records provided.

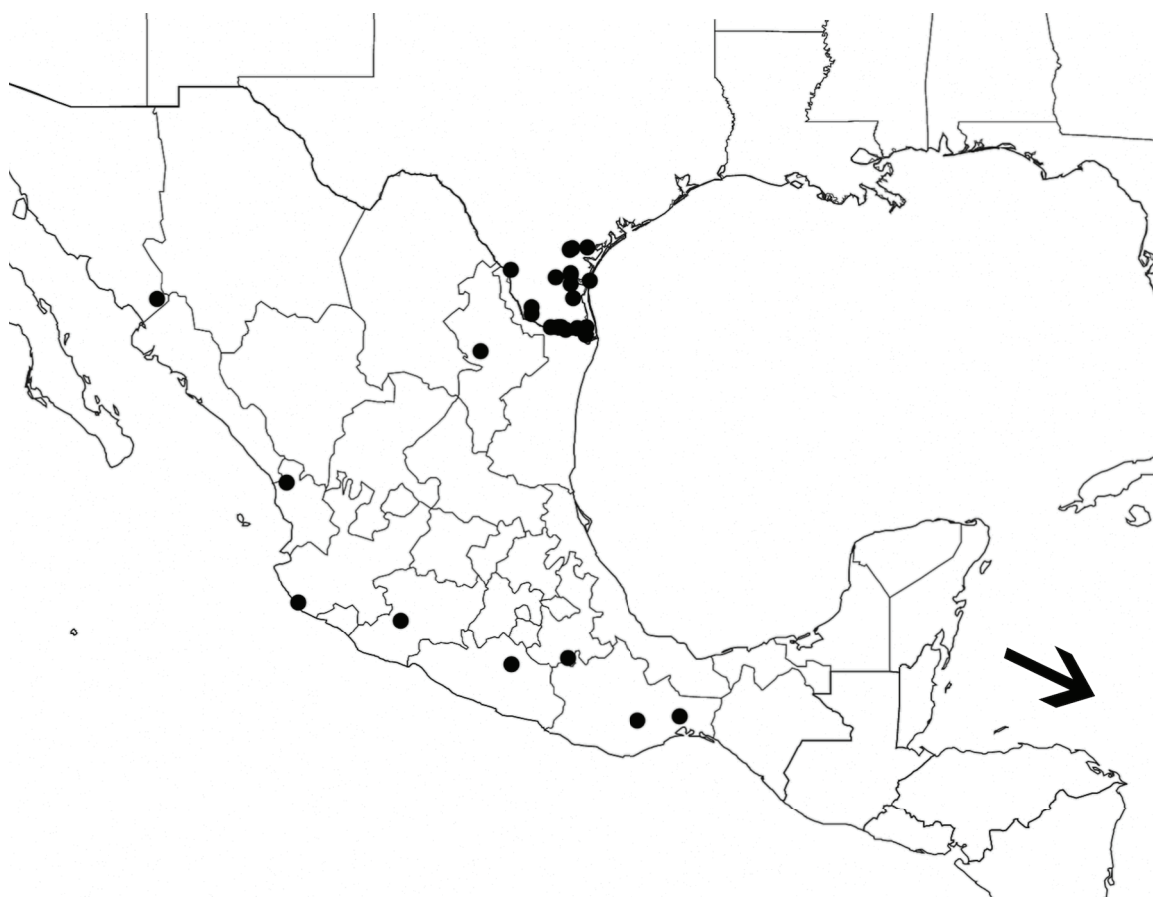
Enns (1956) considered the maxillary galeae of *P. labialis* to be longer than the labial palpi and subequal in length to the maxillary palpi. For this to be the case the elongate pencillate setae at the apex of the galeae have to be included in a length measurement. Because these setae are rarely in a position of maximum length this feature has limitations. The galeae are indeed somewhat longer in *P. labialis* than in other species but it seems more useful to restrict the length measurement to the body of the galeae without the apical setation (see *Description*).

The lateral panels of the pronotum often bear a small brown macula of varying size. It is present in all but one of the males examined and in 60% of the females.

Pseudozonitis labialis and the South American *P. impressithorax* are extremely similar and perhaps only deserve recognition at the subspecies level. Additional study in South America is required to determine if they truly are allopatric. Whether conspecific or not, the extensive combined distribution of these two similar forms in North and southern South America is not a common pattern in Meloidae. Thus far it has been noted only for two other nemognathine species, *Cissites maculata* (Swederus) and *Nemognatha chrysomeloides* (Linnaeus) (García-París, et al. 2014).

Records — 103 specimens (38♂, 65♀). MEXICO. **Jalisco**: Chamela, Inst. Biol.; vii-24/27-1984 (at light), ix-25-1986 (at light); 2; L. Stange/J. Chemsak, J. Doyen; FSCA, CISC. **Guerrero**: Oapan, 566 m (17°59'10"N, 99°26'59"W); vi-7-2011; 1; J. Amith; UCRC. **Michoacan**: Apatzingan (1200'); viii-13-1941; 1; Hoogstraal; USNM. **Nayarit**: Acaponeta, 24 mi. N; vii-4-1963; 1; F. Parker, L. Stange; FSCA. **Nuevo Leon**: Monterrey; v-1-1955; 1; V. Nieto H.; FSCA. **Oaxaca**: El Camarón, 2.7 mi. NW; vii-13-1971; at light; 1; Clark, et al.; TAMU. La Ventosa, 8 mi. N; vii-22-1973; at light; 2; Mastro,

Schaffner; TAMU. **Puebla**: Petlalcingo, 3 mi. N; viii-21-1963; 1; F. Parker, L. Stange; FSCA. **Sonora**: Alamos, 7.7 mi. SE; viii-5-1964; 1; R. Loomis; CAS. UNITED STATES. **Texas**: Armstrong; vi-6-1962; 2; P. Glick; CSCA. Bentsen-Rio Grande Valley St. Prk; v-6-1989, vi-11-1983, vi-18-1969, vi-26/28-1973, vi-27-1968 (at light), vii-9-1967; 6; Board, Hafern timer/E. Riley/G. Nelson/M. Rice/J. Tilden; CAS, FSCA, JHC, TAMU, WFBM. Brownsville; v-31-1939, vi-6-1962, vi-5-1932 (4 paratypes), vi-8-1970 (BL), vi-11-1933 (2 paratypes), vi-12-1947 (paratype), vi-14-1969 (BL), vi-25-1967, vi-25-1984, vi-29-1938 (2 paratypes), vii-10-1967, viii-1/3-1963; 24; V. Board/Board, Hafern timer/Darlington/P. Glick/A. Howden/D. & J. Knull/J. Martin/D. Riley/J. Tilden; CAS, CSCA, JHC, OSUC, TAMU, UMRM. Cameron Co.; 3 (see *Types*). Casa Santa Ana (Hidalgo Co.); v-24-2016; 1; Thomas, Wappes; JHC. Falcon Heights (Starr Co.); iv-20/21-1990, v-9-1987; 2; D. Heffern/J. Huether; JHC, TAMU. Harlingen; iv-12-2000; white light; 1; L. Bezark; JHC. Hidalgo, International Bridge; vi-1-1972; 1; D. Riley; TAMU. Hidalgo Co., Texas Experiment Station; v-1930; light trap; 1; J. Gaines; TAMU. Lake Corpus Christi St. Prk; vi-17-1948 (paratype), vi-18-1971 (at light); 2; G. Nelson; FSCA, UAIC. Kingsville; vi-2-1973, vi-7-1949, vi-17-1948 (at light), vi-20-1981, vii-5-1983; 10; W. Cross/J. Gillaspay/S. Roback; CAS, FSCA, MEM, UAIC. Kingsville, 1 mi. SE; vi-9-1989; 1; J. Schaffner; FSCA. Lake Corpus Christi St. Rec. Ar.; vi-14-1985 (BL); 3; J. Wiley; FSCA. Laredo; vii-6-1948; at light; 5; H. Barber; USNM. Los Olmos Creek at Hwy 77 (Kleberg Co.); v-3-1989; 5; E. Riley; TAMU. Mathis; vi-4-1964; 1; H. Burke; TAMU. "On Rio Grande" (Hidalgo Co.); vi-23/25-1948; 1; paratype; UAIC. Padre Island [labeled as 'Pedro Isl.']; vii-1965; 2; Lenczy; USNM. Roma, 8 mi. NW; iv-9-1994, v-2-1994; 2; J. Wappes; CSCA, FSCA. Sabal Palm Sanctuary (Cameron Co.); v-9-1986, vi-9/10-1978, x-16-1993 (UVL); 3; Blackmon et al./Downie, Wappes/J. Wappes; FSCA. San Diego, 30 mi. S; v-18-1971; at light; 3; C. Griffin; TAMU. Santa Ana National Wildlife Refuge; vi-17-1969; 1; Board, Hafern timer; TAMU. Southmost (Cameron Co.); vii-7-1967; 1; J. Tilden; CAS. Starr Co.; v-24-1947; at light; 1; G. Vogt; USNM. Welder Wildlife Refuge; v-16-1999; at light; 1; H. & A. Howden; JHC. Welder Wildlife Refuge, Headquarters area (28°06.39'N,



Map 4. Geographic distribution of *Pseudozonitis labialis* (arrow refers to distribution in Venezuela).

97°25.02'W); v-15/16-2006; UVL; 1; E. Riley; ERC. Weslaco, Texas Experiment Station; v-20-1930 (3 paratypes), v-30-1930 (paratype); light trap; 4; S. Clark; TAMU. VENEZUELA. **Aragua:** Cagua; x-8-1968; light trap; 1; UCRC. **Falcón:** Sabana Larga, nr Coro; ii-19-1986; 1; R. Miller, L. Stange; JHC.

***Pseudozonitis longicornis* (Horn, 1870)**

(Figs 8, 41, 67, 78, 87. Map 5)

Zonitis longicornis Horn 1870: 93. MacSwain 1951: 72. *Pseudozonitis longicornis*, Enns 1956: 858. Frost 1963: 140, 1966: 245, 1968: 51. Arnold 1976: 37. Ghoneim 2013: 5. Selander and Fasulo 2013: 2, 6. *Pseudozonitis roseomaculatis*, Dillon 1952: 343 (in part).

Description — Body length: \bar{x} = 11.5 mm (N

= 10), observed range 8-14 mm. Color primarily light to dark brown except pronotum lighter, yellow to yellow brown, with an elongate red or reddish-brown median macula extending most length of disk; macula shape variable, suboval to subtrapezoidal, its greatest width usually half or less pronotal width. Head usually lighter between eyes. Antennal segments often banded at apex and base of segments III-X; tarsal segments frequently similarly banded. Elytra usually yellow vittate with marginal and sutural vittae joining apically and a narrow discal vitta varying in expression but commonly extending from humerus to apical fifth (see below); elytra uncommonly entirely pallid. Wing membrane dark. Legs dark except yellow at base and apex of femora, and base of tibiae. Head and pronotum densely punctate; vertex commonly impressed at center. Pronotal punctures relatively small, those

along lateral regions of disk slightly smaller than along midline. Setation color corresponding to that of underlying cuticle.

Head transversely suboval [$l/w = 0.689$ (0.66-0.73)]. Eyes large, bulged; ventral lobe distinctly wider than dorsal lobe; $HWE/HWT = 1.215$ (1.16-1.28); $IODD/HWE = 0.310$ (0.27-0.36); $IODV/IODD = 0.429$ (0.35-0.48). Antennal segment relative length (male): 21, 20, 30, 39, 41, 43, 41, 37, 36, 36, 49; segment VI c. 5-6x as long as wide. Mandibles moderately curved from near mid-length to apex. Pronotum slightly wider than long [$l/w = 0.929$ (0.90-0.96)]. Hind tibial spurs similar, not expanded before apex, narrowing and subacute apically. **Male.** Sternum IX moderately sclerotized; arms considerably shorter than in most congeners, their length c. 0.25 that of entire sternum, blunt apically. Gonoforceps with gonostyli prominent dorsally; evenly convergent to apex; gonostyli 0.6 length of gonocoxal plate with dorsal surface appearing sinuous in lateral view. Aedeagus 0.8 length of gonoforceps; ventral lobes narrowing apically, occupying 0.3 aedeagus length. **Female.** Ventrite VI with a relatively deep U-shaped emargination, extending c. 0.5 length of segment.

Type — Holotype ♂ (No. 8073). USA. "Ill." [Illinois]; MCZ type 34109; on-line images of type examined (MCZ Type Database). Enns (1956) labelled a female from Topeka, Kansas, 'neallotype'.

Geographic distribution — Primarily SE United States with disjunct records from North Dakota (Map 5).

Adult associations — 40% of the series of *P. longicornis* indicate collection at light. There are no plant records.

Seasonal distribution — 86 records. March 3 – July 30. Monthly frequencies: March (4), April (7), May (21), June (42), July (12). All March and six of the seven April records are from Florida.

Identification — *Pseudozonitis longicornis* (Fig. 8) is characterized by its vittate elytra, reddish macula on the pronotum (Fig. 41), large eyes, and the shape of the gonostyli (Fig. 78b) and sternum IX (Fig. 87) in males. It is similar to, and likely to overlap geographically with, *P. florida*, *P. roseomaculatis*, and *P. obscuricornis*. In *P. florida* the pronotum is unicolorous (Fig. 46), lacking a red macula; also the eyes are considerably smaller ($IODV/IODD > 0.6$

in *P. florida*, < 0.5 in *P. longicornis*). *Pseudozonitis roseomaculatis* has a similar red macula on the pronotum but as in *P. florida* the eyes are considerably smaller ($IODV/IODD = c. 1.00$); also the pronotal macula in *P. roseomaculatis* is wider ($>$ half pronotal width) than in *P. longicornis*. *Pseudozonitis longicornis* is most similar to *P. obscuricornis*. They are best distinguished by male genitalia. In *P. longicornis* the dorsal borders of the gonostyli as seen in lateral view are sinuous and the gonostyli are c. 0.6 the length of the gonocoxal plate (Fig. 78); in *P. obscuricornis* the dorsal borders of the gonostyli are relatively straight and the latter is longer, c. 0.9 the length of the gonocoxal plate (Fig. 79). Additionally, the very short arms of sternum IX in males separate *P. longicornis* from *P. obscuricornis* and all other congeners except *P. florida*. Hind tibial spurs also differ. They are expanded apically in *P. obscuricornis* (Fig. 68), but not in *P. longicornis* (Fig. 67). There are minor differences in pronotal punctation. In *P. longicornis* punctures on the lateral areas of the disk are smaller than those along the midline. In *P. obscuricornis* the punctures are larger overall, and those along the lateral sections of the disk are similar in size to those along the midline. Distribution also will help separate these two species (Maps 5, 8). They approximate one another but are not known to overlap in range.

Comments — Color variation is not extensive in *P. longicornis*. Color ranges from primarily very light to dark brown. The pronotum, usually yellow, also is brown in a few specimens. In these individuals (including the holotype) the discal macula, usually red in color, also is darkened and not well demarcated from the surrounding surface. The marginal and sutural elytral vittae are present in all vittate individuals but the discal vitta varies in expression. Typically extending from the base to the apical fifth of the elytra, it uncommonly is absent entirely or fades near the middle. The discal vitta tends to be wider in specimens from Florida than elsewhere but the full range of expression seems to occur in all areas. The elytra are almost entirely pallid in a specimen from Archbold Biological Station in Florida, and in one of two specimens from McLeod, North Dakota. In almost 50% of the males examined the ventral surface of antennal segment IV is slightly bowed longitudinally (as in Fig. 66). It is

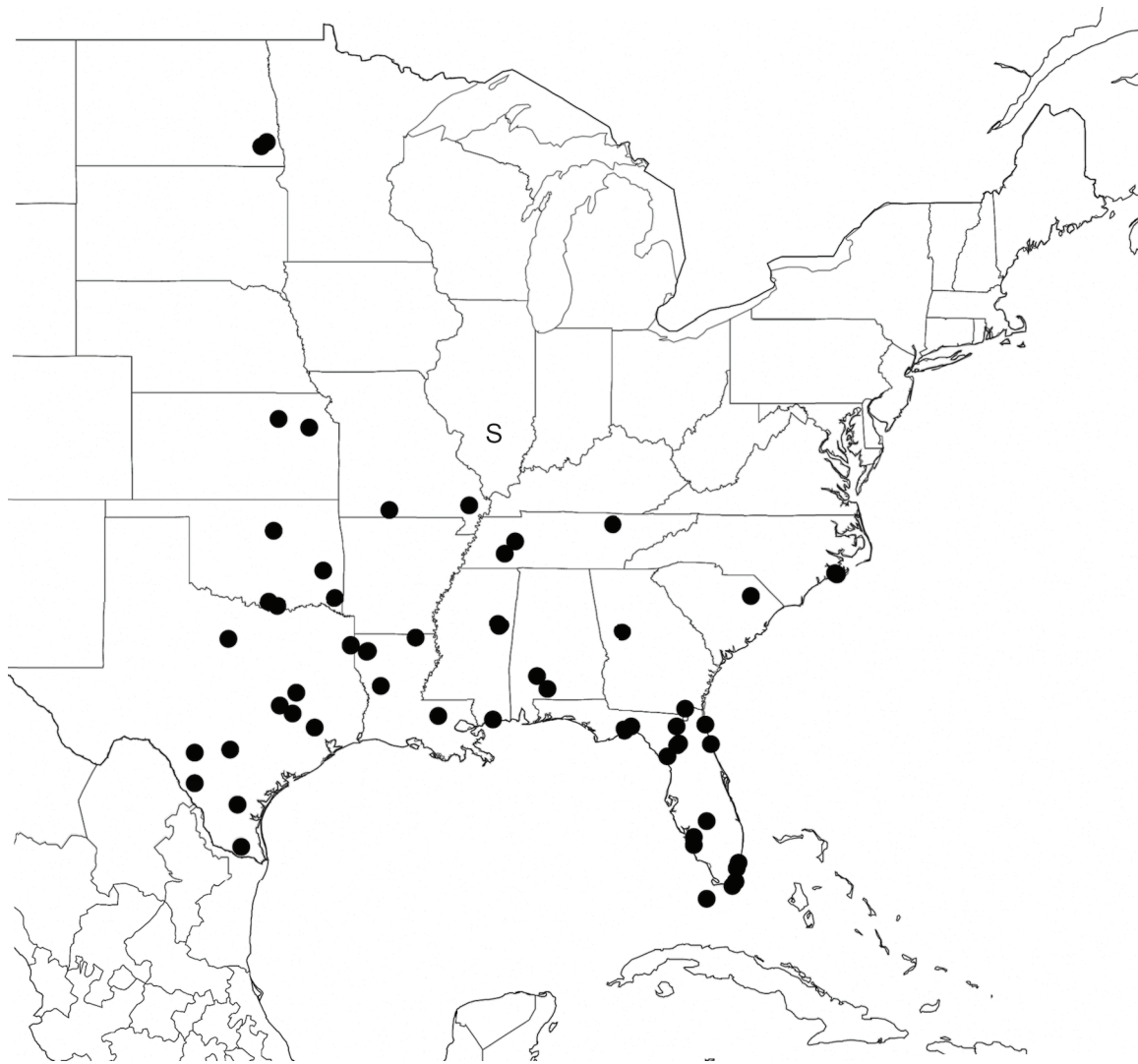
less common in females but detected in c. 15% of those studied.

Enns (1956) doubted the validity of the Illinois locality label on the holotype noting the southern distribution of this species. Collections from Missouri, as well as two independent recent records from North Dakota indicate that the range of *P. longicornis* extends farther north than previously assumed. However, I am considering questionable a single male (JHC) labeled 5 mi. N Mazatlan, Sinaloa, Mexico; v-10-1961; Howden & Martin, collrs. This location is considerably beyond the known range and habitat of *P. longicornis*. The presence of the species in western Mexico requires corroboration.

Dillon's (1952) treatment of *P. longicornis* refers to *P. labialis* which was undescribed at the time. One paratype of *P. roseomaculatis* (Dimmit Co., TX) is a male of *P. longicornis*.

Records — 189 specimens examined (44♂, 145♀). Unexamined records in Enns (1956) and Arnold (1976) indicated by (*) and (**), respectively. UNITED STATES. **Alabama:** Brewton; vi-25-1987; 1; L. Davis; FSCA. Haines Island Park (Monroe Co.); vi-2/3-2000; BL, MVL; 20; R. Turnbow, R. Morris; FSCA, UCRC. **Florida:** Alachua Co.; v-1967; 2; L. Hatrick; FSCA. Archbold Biological Station; iv-7, iv-27-1968; 2; S. Frost; UCRC. Big Pine Key (Key Deer Refuge); iii-5-1992; MVL; 2; D. Habeck et al.; FSCA. Biscayne Bay*. Dade Co.; iv-1957; 1; D. Thornton; JHC. Gainesville; v-20-1984, vi-6-1984; 2; FSCA. Gainesville; iv-20-1955, v-1967, vi-1977; 4; L. Hatrick/R. Morse/A. Muyschondt; FSCA. Gainesville, 3 mi. SW (Archer Rd Lab.); vi-5-1973; BL; 1; J. Heppner; FSCA. Gulf Hammock, 2 mi. W (Levy Co.); v-22-1974; BL; 2; B. Pape; UAIC. Key Largo; iii-18-1972; UVL; 2; L. Lampert; FSCA. Key Largo (upper end); iii-20-1982, iv-30-1979; 2; F. Havore/C. Smith; FSCA, JHC. Koreshan St. Prk (Lee Co.); v-3-1988; 2; E. Riley, F. Whitford; ERC. Matheson Hammock (Miami); v-2-1957; at light; 1; D. Paulson; FSCA. Newport, 6 mi. E; vi-11-1988; BL, MVL; 1; R. Turnbow; UCRC. Olustee; v-16-1963; BL trap; 3; S. Merkel; FSCA. Paradise Key*; iv-11-1951; at light. Royal Palm Park*; iii-22-1930. Shell Point, 1 mi. NW (30°04.12'N, 84°18.07'W); vi-5/7-2007; 1; T. Mower; BYU. Spring Creek, 1 mi. N; vi-5-1992; 'night'; 1; I. Askevold; FSCA. Washington Oaks Garden St. Prk, 2 mi. S; v-30-1993;

at light; 1; L. Skelley; FSCA. **Georgia:** Pike Co.; vii-23-1982; 1; R. Beshear; JHC. Suwannee Canal Rec. Area (Camp Cornelia); v-20-1988; BL, MVL; 1; R. Turnbow; UCRC. **Illinois:** State record only; 1; (See *Type*). **Kansas:** Riley Co.; vi; 1; Popenoe; UMRM. Topeka*; vii. **Louisiana:** Barksdale AFB (32° 28'47"N, 93° 35' 36"W); vi-23-1996; BL calcareous forest; 1; D. Pollock; MEM. Barksdale AFB (32°29'00"N, 93°35'29"W); vi-24-1996; BL calcareous prairie; 1; D. Pollock; MEM. Barksdale AFB (32°29'17"N, 93°35'13"W); vi-24-1996; BL calcareous prairie; 1; D. Pollock; MEM. Barksdale AFB (32°29'29"N, 93°35'07"W); vi-24-1996; BL calcareous prairie; 1; D. Pollock; MEM. Barksdale AFB (32°30'42"N, 93°32'42"W); vi-26-1996; BL shortleaf pine forest; D. Pollock; 1; MEM. Central, 1.2 mi. S; vi-14-1987; BL, MVL; 1; C. Barr; CISC. Chemin-A-Haut St. Prk; vi-7-1994; at light; 1; W. Chamberlain; TAMU. Kisatchie Bayou Cmpgr., Kisatchie Natl For. (Natchitoches Par.); vi-14-1984; BL, MVL; 2; C. & J. Barr; CISC. **Missouri:** Holly Preserve, 2.8 mi. NE Dexter (Stoddard Co.); vi-13-1975; BL; 1; S. Swadner et al.; UMRM. Mark Twain Natl For., Glade Top Trail (36.69353°N, 92.79652°W; Taney Co.); vii-8-2008; UVL; 2; E. & T. Riley; ERC. **Mississippi:** Gulfport, C[lower]- T[hornton] Nature Area (30°22'55"N, 89°03'23"W); v-9-2000; BL trap; 8; T. Schiefer; MEM. Noxubee National Wildlife Refuge (33°16'13"N, 88°46'42"W); vi-20-2011; at building light; 1; T. Schiefer. Noxubee National Wildlife Refuge (33°21'23"N, 88°52'56"W); vi-20-2011; BL, mixed forest; 3; T. Schiefer; MEM. Noxubee National Wildlife Refuge (33°14'29"N, 88° 49'03"W); vi-29-2011; BL, pine forest; 1; T. Schiefer; MEM. **North Carolina:** North Harlowe; vii-18-1990; 1; J. Sullivan; FSCA. Carteret Co., jct NC 101 and Core Ck; vii-30-1983; 1; J. Sullivan; FSCA. **North Dakota:** McLeod, 5 mi. NW (Ransom Co.); vii-2/4-1968, vii-3-1968; 4; A. Howden/J. Martin; JHC. Walcott, 11 mi. W; vi-30-1978; 1; J. Powers; CSIC. **Oklahoma:** Ardmore, 10 mi. S; vi-13-1999; at light; 1; G. Nelson; FSCA. Lake Texoma (UOBS); VI-30-1968; at light; 3; W. Suter; UMRM. Latimer Co.; v-1987, vi-1983, vi-1984 (UVL), vi-1985, vi-1987, vi-1988, vi-1989, vi-1995, vi-2002 (UVL); 64; K. Stephan; FSCA, TAMU, WFBM. Marshall Co.; vii-6-1969; 1; R. Arnett; FSCA. McCurtain Co.**. Payne Co.**. Red Oak, 5 mi W



Map 5. Geographic distribution of *Pseudozonitis longicornis* (S, state record only).

(Latimer Co.); vi-5-1979, vi-18-1977; 6; K. Stephan; TAMU. **South Carolina:** Florence; vii-19-1953; 1; V. Kirk; USNM. **Tennessee:** Burrville; vi-30-1956; 2; B. Benesh; UMRM. Chester Co.; vii-11-1983; 1; L. Dersch; WFBM. Crazy Doe Cmpgr., nr Natchez Trace St. Prk (Henderson Co.); vii-1-1971; at light; 1; R. Selander; JHC. **Texas:** Caddo Lake St. Prk; vi-7-1971; 1; G. Nelson; FSCA. College Station; vi-7-1990; 1; E. Riley; ERC. College Station (30° 35' 18"N, 96° 15' 12"W); v-21-2011, v-25-2011, vi-8-2005, vi-11-2005, vi-17-2005; UVL; 5; E. Riley;

ERC. Dimmit Co.; v-1-1933; 1; S. Jones; paratype of *P. roseomaculatis*; TAMU. Flynn, 5 mi. N (Leon Co.); v-28-1994; UVL; 1; E. Riley; ERC. Gause, 3 mi. N (Sugarloaf Mtn); v-30-1998; 1; Godwin, Wappes; JHC. Karnack; vi-17-1958; 1; J. Brady; UAIC. Possum Kingdom St. Prk; vi-14-2002; at light; 1; W. Chamberlain; TAMU. San Antonio*; v-25-1936. San Diego, 3 mi. S; v-14-1988; 1. Santa Ana National Wildlife Refuge (Hidalgo Co.); iv-20-1974, v-2-1987, v-3/9-1978; 4; E. Riley/F. Whitford; ERC, FSCA. State record only; 1; CSCA. The

Woodlands; vi-20/26-1978; 1; J. Wappes; USNM. Uvalde Co.; v-20-1938; 1; J. Robinson; FSCA.

***Pseudozonitis maculicollis* (MacSwain, 1951)**

(Figs 16, 48. Map 6)

Zonitis maculicollis MacSwain 1951: 73.

Pseudozonitis maculicollis, MacSwain 1956: 122.

Enns 1956: 851. Erickson, et al. 1976: 960, 965. Bologna and Pinto 2001: 61.

Description — Body length: \bar{x} = 9.4 mm (N = 7), observed range 6-11 mm. Color yellow-orange to orange-brown except elytra, antennae and legs black (coxae and trochanters usually lighter); venter varying from orange to black; head usually with a black transverse or oval macula between eyes. Pronotum in most with an often divided black transverse macula of varying size in apical half of disk. Wing membrane lightly pigmented. Head and pronotum moderately densely punctate; punctures small to moderately coarse, commonly separated from one another by a distance equal to or greater than their diameter. Body setation on dorsum including head short, inconspicuous, especially on pronotal disk, setae longer on venter and legs; color of setae corresponding to that of underlying cuticle.

Head l/w = 0.750 (0.73-0.82) (N = 5), width at eyes subequal to that at tempora [HWE/HWT = 0.994 (0.92-1.04)]. Eyes small, not bulged, with ventral lobe only slightly wider than dorsal lobe, widely separated below, not extending to inner margin of maxillae; IODD/HWE = 0.488 (0.47-0.51); IODV/IODD = 1.00 (0.90-1.11). Antennal segment relative length (male): 21, 20, 27, 32, 32, 33, 32, 33, 29, 28, 33; segment VI c. 4.5x as long as wide. Mandibles straight basally, curving moderately at apical third. Pronotum 0.991 (0.96-1.11) as long as wide. Hind tibial spurs relatively narrow, not expanded apically. Pygidium shallowly emarginate medianly. **Male.** Sternum IX moderately sclerotized, arms diverging, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.6 length of gonocoxal plate and with sides subparallel in basal half before converging to apex (as in Fig. 73). Aedeagus 0.85 length of gonoforceps; ventral lobes narrowing at apex, 0.35 aedeagal length. **Female.** Ventricle VI with broad, deep, U-shaped emargination extending c. 0.5

segment length.

Types — Holotype ♂ (No. 6211) and allotype ♀. USA. *California*: Tracey; vii-29-1949; on *Frankenia grandifolia*; J. MacSwain, collr; CAS; examined. MacSwain (1951) designated 85 paratypes of *P. maculicollis* from the type locality. Enns (1956) examined 20 of these; I could only find 11 for this study (CAS, CISC).

Geographic distribution — Cismontane California from the San Francisco Bay Area south to Orange County (Map 6).

Seasonal distribution — 13 records. June 25 - August 13. Monthly frequencies: June (5), July (4), August (4).

Adult associations — The type series was taken from flowers of *Frankenia grandifolia* C. & S. (Frankeniaceae) (MacSwain 1951). An independent collection from the type locality was made on *Melilotus* (Fabaceae). This species is not known to be attracted to light.

Larval hosts — *Melissodes minuscula* LaBerge (Apidae) (Erickson, et al. 1976; record from material collected by P. Torchio). *Pseudozonitis maculicollis* also was considered a probable parasite of *Melissodes* sp. by MacSwain (1956). This is the only known larval host of *Pseudozonitis*.

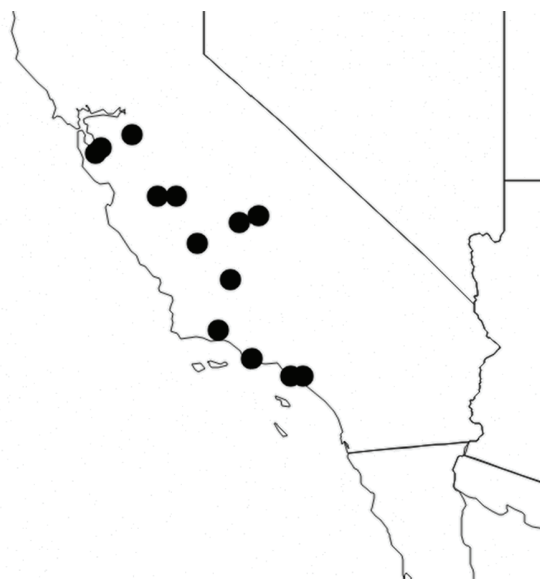
Identification — Although they are not known to overlap geographically, *P. maculicollis* can only be confused with *P. martini*, *P. diana* and *P. huetheri*. Color of the head and punctation density separate them. In *P. maculicollis* the head, except for the frontal macula, is orange, and the pronotum is less densely punctate. In *P. martini* and *P. diana*, by contrast, the head is uniformly dark, and the pronotum is more densely punctate (cf. Figs 48, 49, 50). *Pseudozonitis martini* is further separated by the uniformly dark colored mandibles (Fig. 28); they are light colored in the basal half in *P. maculicollis* as they are in other *Pseudozonitis*. The distinctly less curved mandibles also distinguishes *P. maculicollis* from *P. martini* and *P. huetheri*.

Comments — Intraspecific variation is minimal in this species. The black maculation on the head and pronotum varies in size and is completely absent on the head of about a fourth of the specimens examined. One specimen (Fresno Co., CA) lacks maculae on the head and pronotum. On the pronotum the maculae can be paired and suboval or fused forming

a transverse marking. At an extreme (e.g. specimen from Harbor City, CA) the entire apical portion of the pronotal disk is black.

A virtually entirely black specimen from Bolsa Chica, Orange Co., California, may belong to this species. It is tentatively considered distinct and briefly treated below as species #1 (see *Species Inquirendae*).

Records — 29 specimens examined (10♂, 19♀). Unexamined records from Enns (1956) indicated by (*). **UNITED STATES. California:** Avenal, 6 mi. SW (Tar Cyn); viii-3-1959; 1; R. Snelling; UCRC. Buttonwillow, 5 mi. N; vii-4-1961; 2; R. Macdonald; CSCA, UCRC. Cypress*; vi-25-1935. Goleta; vii-8-1959; 1; J. Bath; UCRC. Los Angeles Co.; 1; CAS. 'Harbor City/San Pedro'; 1; D. Beck; JHC. Lower Panoche Creek (Fresno Co.); vi-28-1952; 1; H. Robinson; CSCA. Mendota, 20 mi. W; 'parasite of *Melissodes minuscula*'; 4; P. Torchio; FSCA. Newark (Coyote Hills); vii-1-1990; 1; R. Langston; CAS. Palo Alto; vii-2-1976; 1; UCDC. Point Mugu (Ventura Co.); viii-13-1937; 'sea-level marsh'. Three Rivers; viii-1-1929; 1; R. Beamer; SEMC. Tracy; vi-30-1949; on *Melilotus*; 1; W. Chamberlain; TAMU. Tracy; 13; (see *Types*). Visalia; vi-28-1970; 'ex. roadside weeds, mullein, etc.'; 1; J. Gilley; CSCA.



Map 6. Geographic distribution of *Pseudozonitis maculicollis*.

***Pseudozonitis marginata* (Fabricius, 1781)**
(Fig. 91)

Lagria marginata Fabricius 1781: 159.

Epicauta annulicornis Chevrolat 1877: ix.

Lytta delauneyi Fleutiaux and Sallé 1889: 433.

Zonitis lineata Champion 1896: 53.

Zonitis strigata Wellman 1910: 25; n. name for *Zonitis lineata* Champion, nec. Melsheimer 1846.

Zonitis guanicana Wolcott 1950: 321

Zonitis annulicornis, Vaurie 1950: 11.

Pseudozonitis marginata, Selander and Bouseman 1960: 214, 1961: 190. Genaro 1996: 385. Capriles 1967: 51. Valentine and Ivie 2005: 279. Peck 2005: 160, 2006: 190, 2009a: 20, 2009b: 34, 2011: 31, 2016: 167. Ivie, et al. 2008: 252, 271. Turnbow and Thomas 2008: 43. Ivie 2009: 67. Peck, et al. 2014: 88.

Description — Body length: \bar{x} = 13.8 mm (N = 10), observed range 11-16 mm. Color variable; primarily yellow-orange except antennae light to dark brown, basal three segments often darker; elytra varying from entirely yellow-orange to light brown with yellow-orange marginal, sutural and discal vittae; femora with apex black, rarely completely light; tibiae and tarsi light to moderately dark brown, uncommonly with tibiae yellow-orange basally. Antennae and tarsi banded or not. Pronotal disk sometimes darker at middle but without a distinct macula. Wing membrane almost colorless. Head and pronotum densely punctate, punctures relatively small; pronotal punctures along midline slightly larger than those laterally. Body setation color similar to that of underlying cuticle.

Head l/w = 0.708 (0.68-0.74) (N = 8); occiput not impressed. Eyes large, bulged; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.117 (1.08-1.15); IODD/HWE = 0.263 (0.22-0.29); IODV/IODD = 0.367 (0.26-0.44). Antennal segment relative length (male): 21, 23, 24, 36, 38, 41, 38, 37, 34, 33, 39; segment VI c. 5x as long as wide. Mandibles strongly curved from near middle to apex. Pronotum about as long as wide [l/w = 0.936 (0.91-0.97) (N = 9)]. Hind tibial spurs similar, only slightly expanded before apex. Pygidium weakly emarginate medianly. **Male.** Tarsi modified; fore tarsi

moderately swollen, middle and hind tarsi slightly so; all tarsomeres with a distinct, light-colored pad beneath. Ventrite VI unique, each half deeply cupped. Sternum IX robust, unique; arms widened, expanded and incised apically with a subapical ventrally directed tab. Gonoforceps with gonostyli not prominent dorsally, strongly, evenly convergent from base to apex; gonostyli strongly compressed laterally at apex, c. 0.75 length of gonocoxal plate. Aedeagus 0.8 length of gonoforceps with ventral lobes narrowing slightly or not at apex, occupying 0.25 aedeagal length. **Female.** Tarsi unmodified. Ventrite VI weakly emarginate.

Types — Selander and Bouseman (1960) provide information on types: the type of *Lagriia marginata* is deposited in the Hunterian Collection in Glasgow [type locality given as 'South America']; that of *Z. lineata* Champion is in the British Museum; those of *E. annulicornis*, *L. delauneyi*, and *Z. guanicana* were not located.

Geographical distribution — Broadly distributed in the West Indies.

Seasonal distribution — 68 records (including those in Selander and Bouseman 1960). February 29 – November 29. Monthly frequencies: February (1), March (2), April (8), May (20), June (25), July (6), August (2), September (2), October (1), November (1). The species has been recorded in Cuba in February, May and June (Genaro 1996). There is no suggestion of a correlation between seasonal occurrence and geography.

Adult associations — One third of the records indicate collection at light. There are no plant associations.

Identification — *Pseudozonitis marginata* is the most unique species in the genus. The swollen tarsi, strongly modified ventrite VI, and the apically bifid arms of sternum IX in males (Fig. 91) distinguish *P. marginata* from all other *Pseudozonitis*. The weakly emarginate ventrite VI separate females from those of the sympatric *P. obscuricornis* which have a deep U-shaped emargination (cf. Figs 7 & 10, Selander and Bouseman 1960). The absence of a red pronotal macula and the usual black coloration at the apex of the femora further separate *P. marginata* from most *P. obscuricornis*.

Comments — Color of elytra, legs and antennae vary in *P. marginata*. Elytral color varies considerably,

ranging from entirely light yellow-orange to brown with light-colored vittae. As indicated by Selander and Bouseman (1960), intraspecific elytral color differences explain the extensive synonymy in this species. Variation is continuous and lacks any obvious geographic correlation. Selander and Bouseman (1960; Fig. 4, Table 4) arbitrarily divided variants into five color classes, from entirely yellow-orange or immaculate (0) to brown with distinct and relatively narrow marginal, sutural and discal yellow-orange vittae (4). They originally noted that class 0 was known only in the extreme north (The Bahamas) and south (Grenada) but later reported it from Guadeloupe and Martinique (Selander and Bouseman 1961). More recent collections show class 0 also represented on St Lucia and Dominica. It has yet to be reported from the Greater Antilles, however. The entire range of variation can occur on individual islands (e.g. Martinique, Grenada), although thus far all material from Guadeloupe (70 specimens, 3 series) represents class 0.

The femora in *P. marginata* are usually yellow-orange with black at the apex. However, in some specimens from Dominica and Puerto Rico they are completely yellow-orange. Similarly, the tibiae, usually entirely dark are yellow-orange in the basal half in specimens from the Dominican Republic and some individuals from Puerto Rico. The antennae vary from light to dark brown, although the basal three segments are almost always dark. In some specimens the antennal segments (III and beyond) have a light band at the base and apex.

A single male from Dominica has the modified form of antennal segment IV (as in Fig. 66) which occurs sporadically in certain other species (e.g. *P. longicornis*, *P. diana*).

As indicated in the introductory material, *P. marginata* appears most closely related to *P. labialis*, *P. impressithorax*, *P. megalops* and possibly *P. schaefferi*, all mainland taxa. The male genitalia of these species are similar and, at least in *P. schaefferi*, the fore tarsi in males are slightly swollen. Selander and Bouseman (1960) also proposed relationship to the Central American *P. megalops*. This was based on a tentative identification of a single male from Oaxaca as *P. megalops*. This specimen was examined. It is not *P. megalops* but represents an undescribed species (see *Species Inquirendae*, sp.

2). Based on male genitalia it is most similar to the above assemblage.

Records — 98 specimens examined (23♂, 75♀). Unexamined records from Selander and Bouseman (1960) included and indicated with asterisk (*).

CUBA. Sierra de Cubitas; vi-1955; 1; F. de Zayas; FSCA. See Genaro (1996) for additional Cuban records. DOMINICA. Archbold Tropical Research Center, Mt. Joy; v-25/31-1995 (MVL), v-30/31-1994, vi-1/7-1995 (MVL); 20; TAMU. Cabrits Natl Prk; vi-27-2004; BL trap; 2; R. Turnbow; JHC. Mt. Joy; vi-21, vi-3-1992, vi-7-1992; 3; K. Arnold et al.; TAMU. Roseau, 5 km NE, Springfield Plantation; vi-22-2004; at light; 1; L. Obrien; JHC. Roseau Botanical Garden; vi-18-2004; at light; 1; C. & L. Obrien; JHC. Springfield, ATRC; v-28-1996, vi-7-1996 (at light); 2; S. Hill/J. Woolley; TAMU. Springfield Estate, Mt. Joy; vi-2-1995; 3; TAMU. Springfield Estate; v-12/19-2005; 1; W. Reeves; BYU. DOMINICAN REPUBLIC. Barahona, 11 km S; v-15/17-1985; 1; J. Wappes; UCR. Buena Vista, 2 mi. N; vii-19-1996; BL, MVL; 1; R. Turnbow; JHC. Cabo Rojo (Pedernales Prov.); xi-28/xii-2-1991; 'Coast thorn scrub, swim pool surface'; 1; Masner, Peck; JHC. Villa Elisa, 4-8 km N; v-10-1985; 6; J. Wappes; CASC, FSCA, UCR. Villa Elisa, 4.8 km N; v-31-1994; BL, MVL; 1; M. Thomas; FSCA. Villa Elisa, 5 km N; v-10/18-1985; 3; E. Giesbert; FSCA. GRENADA. Balthazar*. Grand Anse; vi-21-1977; 1; L. Tanaka; CAS. Grand Etang Lake, 1900'; vi-13-1977; 1; R. Woodruff; FSCA. Mirabeau Agriculture School (St Andrew Par.); v-26-1990, vi-14-1990; at light, BL trap; 2; M. Thomas; FSCA. GUADELOUPE. Camp Jacob*; v. Domaine Duclos; vi-24/28-1960; 7; P. & C. Vaurie; FSCA. Pointe St Rose; vii-25-1984; 3; S. Johnson; ERC. GUANA. Island record only; vii-5/23-1985; 1; S. & P. Miller; USNM. HAITI. Port-au-Prince; iv-1925; 1; G. Wollcott; USNM. JAMAICA. Duncans; viii-8-1966; 1; A. Howden; JHC. Hardwar Gap; vii-11-1966; 1; Howden, Becker; JHC. Mandeville*; v-1958. MARTINIQUE. Absalon rainforest; vi-16-1960; 1; C. & P. Vaurie; FSCA. Diamant; vi-17-1960; 1; C. & P. Vaurie; FSCA. Morne-Rouge; vi-13-1960; 1; C. & P. Vaurie; FSCA. PUERTO RICO. Aguas Buenas*; iv-8-1944. Casa Cabuy, nr Florida; viii-2-1999; MVL/UVL; 1; J. Eger; FSCA. Guánica Forest, nr Playa Tamarindo (Hwy 333); v-27-1986;

1; E. Riley, D. Rider; ERC. Isla Verde; v-18-1966; 3; A. Cochran; USDA. Mayaguez*; ii-29-1940, iv-25-1942, v-1938, v-1940, v-12-1939. Mayaguez; vi-11-1914; 1; R. Van Zwalenburg; FSCA. San Sebastian*, iv-7-1939, vii-1938. ST. CROIX. Country record only, v-1-1941; 3; H. Beaty; USNM. Caanan; vi-5-1951; 6; G. Seaman; FSCA, USDA. ST LUCIA. Country record only; iii-27-1936*, iv-21-1936*. Country record only; ix-4-1984; 1; UCR. Escap Community, 46 m, (Micoud District) (13.8324°N, 60.8986°W); vi-11-2009, vi-14-2009; 7; H. Hinkson; BYU. ST. VINCENT. Cane Hall; ix-27-1991; BL trap; 1; R. Woodruff; FSCA. Hermitage Forestry Cottage (St Patrick Par.); x-11/13-1991; BL trap; 2; R. Woodruff; FSCA. THE BAHAMAS. Andros Island, Fresh Creek*; iv-23-1953.

Additional Records — *P. marginata* has also been recorded from Montserrat (Ivie, et al. 2008), Barbados (Peck 2009b), St John (Michael Ivie, pers. comm.), and the Cuban island of La Juventud (Genaro 1996).

Pseudozonitis martini (Fall, 1907)

(Figs 28, 49, 81. Map 3)

Zonitis martini Fall 1907: 257. MacSwain 1951: 72.

Pseudozonitis martini, Dillon 1952: 342. Enns 1956: 848 (in part). Werner, et al. 1966: 68 (in part).

Erickson, et al. 1976: 960 (in part)

Pseudozonitis castaneis Dillon 1952: 345. Enns 1956: 849.

New synonymy.

Pseudozonitis vogti Dillon 1952: 343. Enns 1956: 850.

New synonymy.

Description — Body length: \bar{x} = 9.4 mm (N = 9), observed range 7-12 mm. Color usually light to dark brown except pronotum orange with disk in some bearing a small to mid-sized median black macula at center or in apical half; elytra unicolorous, varying from yellow to, most commonly, light brown, always lighter than head capsule. Head capsule dark brown, darker than clypeus and labrum. Mandibles entirely dark brown. Antennae dark brown, not banded. Scutellum, venter and legs uniformly brown. Wing membrane moderately dark. Head irregularly densely punctate with small impunctate or less densely punctate areas particularly on occiput, with a shallow, transverse impression above eyes present or not. Pronotum with disk usually slightly depressed

anterolaterally and with a median impressed line in basal half present or not, moderately to densely punctate; punctures small to moderately coarse, usually less dense along midline. Body setation uniformly cinereous to light yellow.

Head l/w = 0.768 (0.75-0.82) (N = 5). Eyes relatively small, not bulged, widely separated below; ventral lobe only slightly wider than dorsal lobe; HWE/HWT = 1.014 (0.98-1.03) (i.e., widths subequal); IODD/HWE = 0.421 (0.37-0.48); IODV/IODD = 0.781 (0.45-0.85) (N = 4). Antennal segment relative length (male) = 18, 16, 27, 30, 32, 31, 30, 30, 28, 28, 38; antennal segment VI c. 3.5x as long as wide. Mandibles strongly, abruptly curved at mid-length. Pronotum transverse, considerably wider than long [l/w = 0.807 (0.78-0.83) (N = 6)], sides converging to base from widest point. Hind tibial spurs similar in shape and length, usually slightly expanded before tapering to apex. Pygidium slightly to distinctly emarginate medianly. **Male.** Sternum IX moderately sclerotized, slender; arms diverging slightly, elongate, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.7 length of gonocoxal plate, gradually convergent to blunt, evenly rounded apex. Aedeagus 0.8 length of gonoforceps; ventral lobes narrowing at apex, 0.3 aedeagal length. **Female.** Ventrite VI with a deep, broadly U-shaped emargination.

Types.— Holotype ♂. USA. *New Mexico*: Engle; v-1902; MCZ type 24310; on-line images of type examined (MCZ Type Database). Of *castaneis* Dillon: Holotype ♀. USA. *Texas*: Presidio; iv-2-1945; 'on *Sphaeralcea angustifolia* foliage'; USNM; examined. Of *P. vogti* Dillon: Holotype ♂. *Texas*: Starr Co.; iv-6-1947; 'beating flowers and foliage of *Prosopis juliflora*'; G. Vogt; USNM; examined.

Geographic distribution — Known from deserts of SW United States, from California east to Texas (Map 3).

Seasonal distribution — 10 records. March 17 - May 14. Monthly frequencies: March (2), April (6), May (2).

Adult associations Collected twice on *Prosopis* (Fabaceae) and once on *Sphaeralcea* (Malvaceae). There are no records from light.

Identification — The non-bulged, relatively small eyes, uniformly colored elytra, transverse pronotum, uniformly dark mandibles and light-

colored body setation separate *P. martini* from congeners. It is closest to *P. diana*, with which it has been confused. They are easily separated by color and curvature of the mandibles, shape and dimensions of the pronotum, body setation color and male genitalia (see *P. diana*).

Comments — *Pseudozonitis castaneis* and *P. vogti* are synonymized with *P. martini*. Both have been known only from holotypes. Enns (1956) considered them possible synonyms of *P. martini* but they were tentatively retained based on the light-colored elytra. In *P. vogti* the elytra are light brown and do not differ significantly from other *P. martini*. The elytra are yellow in the type of *P. castaneis*. While none of the other known *P. martini* have yellow elytra, elytral color alone cannot justify separation at the species level in this genus. Similar variation occurs in several congeners, including *P. diana*, its closest relative. I do not agree with Dillon's description of the metatibial spurs of *P. castaneis*. He indicates that they are dissimilar with 'the inner spur longer and distinctly more robust than outer'. As in other representatives of *P. martini* they are more or less similar. The spurs do differ somewhat from conspecifics in that they do not expand slightly before the apex but are of similar width their entire length. It should be noted that the holotype of *P. castaneis* is quite small, c. 7 mm in length.

Enns (1956) reported one specimen of *P. martini* from San Diego collected in 1890 and housed in the California Academy of Sciences (Blaisdell Collection). I was unable to locate the specimen and do not list it in the *Records*. This record is suspect. Not only is coastal California outside the known range of *P. martini* but early collections indicating San Diego may refer to San Diego Co. instead, which would include the desert areas of SE California where *P. martini* is found. I also was unable to verify the Enns record of the species from Gila Bend, Arizona (April 17, 1938; F. H. Parker Collection) and collected on flowers of *Tamarix* (Tamariceae). Considering the locality and early date of collection there is little doubt that the record does refer to *P. martini*. However, because the *P. martini* of Enns is a mixture of two species it is not mapped or listed in the *Records*.

The original description of *Z. martini* is based

on two specimens. The male is from Engle, New Mexico (MCZ), which Fall considered the type, and a female from Mesilla Park, New Mexico (USNM). The latter bears a paratype label although it was not designated as such by Fall. Enns (1956) designated this specimen as 'lectoallotype' although no such label currently is attached to it.

Enns (1956) indicated that *P. martini* occurs in Mexico but did not give details. This record was also cited by Garcia-París, et al. (2007). I have not located Mexican specimens. Considering that Enns' concept of *P. martini* included the new species, *P. diana*, the record remains ambiguous.

Records — UNITED STATES. 10 specimens examined (5♂, 5♀). **Arizona:** Peloncillo Mts; iv-27-1924; 1; CISC. Sunsites, 7 mi. W; iii-17-1989; 1; C. Skillman; JHC. **California:** Borrego Valley (San Diego Co.); iv-2-1978; 1; C. Goodpasture; UCDC. Death Valley, 'Furn. Cr. Cp.'; iv-3-1939; 1; K. Hagen; CISC. Harper's Well (Imperial Co.); iii-18-1939; 1; CISC. Salton Sea; iv-8-1962; 1; UCRC. **New Mexico:** Engle (holotype of *P. martini*, see *Types*). Mesilla Park; v-14; on mesquite; 1; M. Cockerell; USNM. **Texas:** Presidio (holotype of *P. castaneis*, see *Types*). Starr Co. (holotype of *P. vogti*, see *Types*).

Pseudozonitis megalops (Champion, 1892)

(Figs 44, 84. Map 7)

Zonitis megalops Champion 1892: 386, Fig. 26. Vaurie 1950: 10 (in part).

Pseudozonitis megalops, Enns 1956: 871. Garcia-París, et al. 2007: 171, 238.

Description — Body length: \bar{x} = 11.9 mm (N = 8), observed range 8-15 mm. Relatively slender. Color primarily light yellow-brown to light brown. Frons, base of elytra and venter often darker. Antennae, apex of tibiae and tarsi brown usually with narrow light bands at base and apex of most antennal segments and tarsomeres I-III. Femora entirely light yellow-brown or darker at middle. Pronotum with an elongate, reddish median macula extending along most of disk, macula tapering at base, its maximum width less than half pronotal width. Scutellum also primarily red. Head and pronotum very densely punctate, punctures relatively

small, those on head smaller than on pronotum. Elytra densely rugulopunctate but more shallowly so than in congeners. Wing membrane, at most, lightly pigmented. Body setation similar in color to underlying cuticle.

Head l/w = 0.737 (0.72-0.77) (N = 4). Eyes large, bulged; ventral lobe considerably wider than dorsal lobe (c. 1.5x as wide); HWE/HWT = 1.141 (1.09-1.19; IODD/HWE = 0.255 (0.24-0.28); eyes very closely approaching on underside of head, IODV/IODD = 0.164 (0.13-0.20). Antennal segment relative length (male): 21, 20, 22, 29, 34, 35, 33, 31, 30, 29, 35; segment VI 5-6x as long as wide. Mandibles moderately, evenly curved from base. Pronotum slightly longer than wide [l/w = 1.081 (1.05-1.10)]. Hind tibial spurs slightly expanded before apex, inner spur slightly longer. Pygidium distinctly emarginate medianly. **Male:** Sternum IX robust, black; arms slightly convergent, tapering and acuminate at apex. Gonoforceps with gonostyli not prominent dorsally, convergent to very narrow apex, apex moderately compressed laterally; gonostyli 0.7 length of gonocoxal plate. Aedeagus 0.8 length of gonoforceps, strongly curved dorsally at apex; ventral lobes suboval, not narrowing at apex, occupying 0.35 aedeagal length. **Female:** Ventrite VI with a deep U-shaped emargination.

Type — Holotype ♀, deposited in the British Museum of Natural History (Enns 1956); type locality given by Champion (1892) as Guatemala, Volcan de Atitlan, 3000 ft. Attempts to obtain information on the holotype were unsuccessful.

Geographic distribution — S Mexico and Central America (Map 7).

Seasonal distribution — 13 records. January 11 - June 24. Monthly frequency: January (3), February (2), March (3), April (3), June (2).

Adult associations — Three collections taken at light. There are no plant associations.

Identification — *Pseudozonitis megalops* is distinguished by the relatively elongate, red-maculate pronotum (Fig. 44), the pallid elytra, bulging eyes which almost meet on the underside of the head, and male genitalia characterized by the abruptly narrowed (Fig. 84) and laterally compressed apex of the gonostyli. This genitalic difference separates *P. megalops* from all other species which also have a red pronotal macula. The distinctive structure of

sternum IX in males (as in Fig. 88) is shared with *P. labialis* and *P. impressithorax*. All three also have the apex of the gonostyli laterally compressed, although it is less markedly so in *P. megalops*.

Comments — Most of the references to this species in Vaurie (1950) refer to *P. vaurieae* (see Enns 1956). A male specimen from Oaxaca, Mexico, tentatively identified as *P. megalops* in Selander (1954), and Selander and Bouseman (1960), is an undescribed species. It is treated below as ‘sp. 2’ (see *Species Inquirendae*).

The single female from Veracruz also has two small elongate red maculae on the lateral margins of the pronotum at mid-length.

Records — 13 specimens examined (6♂, 7♀). COSTA RICA. La Pacifica, 4 km NW Canas; iii-18/24-1974; at light; 1; P. Opler; CISC. EL SALVADOR. San Salvador; ii-18-1959; 1; E. Gerberg; FSCA. Santa Tecla, 900 m; iv-11-1971; 1; L. Steinhäuser; FSCA. GUATEMALA. Finca San Rafael Olimpo, Cuyotenango (Such.), 1700'; vi-24-1966; 1; J. Campbell; JHC. Volcan de Atitlan (see *Type*). MEXICO. **Chiapas**: Chiapa [de Corzo]; iii-13-1953; 1; R. Bechtel, E. Schlinger; CISC. El Aguacero, 680 m; vi-17/18-1990; 1; R. Cunningham; JHC. **Veracruz**: ‘Las Tuxtlas’ [nr San Andres Tuxtla]; iv-9/13-1993; 1; J. Wappes; JHC. NICARAGUA. Chontales (Enns 1956). PANAMA. Barro Colorado Isl. (Canal Zone); i-9/15-1985 (BL), i-20-1964, ii-10-1967, iii-22-1955, iv-13-1963; 5; R. Akre/L. Buttner/C. Rettenmeyer/H. Wolda; FSCA, SEMC, UCRC, UCDC. Canal Zone; i-11-1957; at light; 1; FSCA.

***Pseudozonitis obscuricornis* (Chevrolat, 1877)**

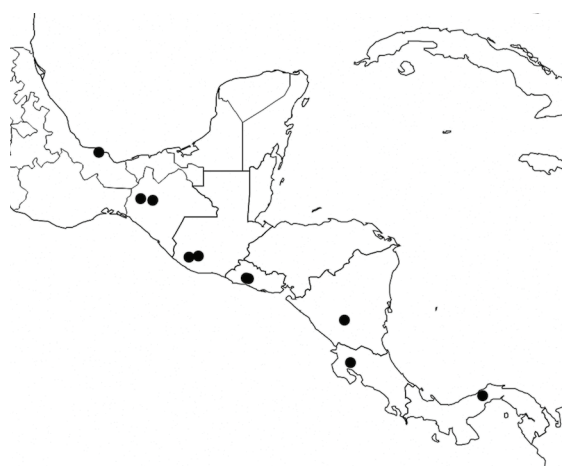
(Figs 42, 43, 68, 79, 86. Map 8)

Epicauta obscuricornis Chevrolat 1877: x.

Zonitis smythi Wolcott 1950: 321.

Pseudozonitis obscuricornis, Selander and Bouseman 1960: 218, 1961: 191. Capriles 1967: 51. Valentine and Ivie 2005: 279. Ivie 2009: 67. Peck, et al. 2014: 88.

Description — Body length: \bar{x} = 11.1 mm (N = 12), observed range 8-15 mm. Color variable. Head and pronotum yellow to yellow-orange; head often darker at occiput; venter yellow-orange to



Map 7. Geographic distribution of *Pseudozonitis megalops*.

brown; antennae brown, banded at base and apex of segments III-X; tarsi often similarly banded. Pronotum usually with a light orange to red elongate median macula, its width variable but commonly c. 0.5 maximum discal width, widening toward base or not (i.e., subtrapezoidal or oblong in shape). Elytra entirely yellow to partially or completely dark brown, often darker at base; commonly vittate with yellow marginal and sutural vittae joining apically or not, and a discal vitta varying in expression, extending at most from humerus to near apical tenth of disk. Wing membrane moderately darkened. Legs with femora entirely yellow-orange to almost entirely dark brown except at very base, commonly also light in color at apex; tibiae light at base, dark at apical half; tarsi dark but often with segment I of hind tarsi yellow. Head and pronotum densely, moderately coarsely punctate; pronotal punctures distinct, those on lateral sections of disk similar in size to those along midline. Body setation uniformly light in color.

Head l/w = 0.693 (0.67-0.73) (N = 9); vertex not impressed. Eyes large, moderately bulged; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.102 (1.08-1.13); IODD/HWE = 0.305 (0.27-0.36); IODV/IODD = 0.374 (0.33-0.53). Antennal segment relative length (male, West Indies): 21, 21, 25, 33, 35, 37, 36, 35, 32, 32, 39; (male, Mexico): 21, 22, 24, 32, 34, 36, 34, 33, 29, 29, 32; segment VI c. 5x as long as wide. Mandibles moderately to strongly curved from near middle to apex. Pronotum about as

long as wide [$l/w = 1.008 (0.93-1.05)$]. Hind tibial spurs expanded before apex, inner spur sometimes somewhat wider. **Male:** Sternum IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, elongate, 0.9 length of gonocoxal plate, evenly convergent from base to apex; dorsal surface not sinuate in lateral view. Aedeagus 0.7 length of gonoforceps; ventral lobe narrowing at apex, occupying c. 0.4 aedeagal length. **Female:** Ventrite VI with a deep U-shaped emargination extending 0.5 or more length of segment (see Selander and Bouseman 1960, Fig. 10).

Types — Of *E. obscuricornis*. USA. Puerto Rico. Type(s?) not located (Selander and Bouseman 1960). Of *Z. smythi*. Lectotype ♀. Puerto Rico: Guánica; USNM (design. Selander and Bouseman 1960; not examined).

Geographic distribution — The West Indies and Mexico (Map 8).

Seasonal distribution — Mexico, 10 records. December 14 - August 31. Monthly frequencies: December (1), January (1), February (1), March (2), April (1), May (2), July (1), August (1).

West Indies (including records from Selander and Bouseman 1960, 1961), 16 records. March 29 - November 6. Monthly frequencies: March (1), April (2), May (5), June (5), July (2), November (1).

Adult associations — Four collections, including the large series from St Lucia, were taken at light. There are no plant associations for this species.

Identification — The usual presence of a red pronotal macula, femoral color, relatively large eyes, somewhat expanded hind tibial spurs, and male genitalia distinguish *P. obscuricornis*. It is most similar to *P. longicornis* although the two do not appear to overlap geographically (Maps 5, 8). Genitalic structure provides the best separation. In *P. obscuricornis* the gonostyli are not sinuate dorsally in lateral view as they are in *P. longicornis* and the gonostyli are considerably longer relative to the gonocoxal plate (cf. Figs 78, 79). In addition, the arms of sternum IX in male *P. obscuricornis* are of normal length, not considerably shortened as in *P. longicornis* (cf. Figs 86, 87). The expanded hind tibial spurs (cf. Figs 67, 68), somewhat longer pronotum, and relatively uniform pronotal punctures (somewhat smaller laterally than along midline in

P. longicornis) provide additional separation. Also, in most *P. longicornis* the head is darker, with the frons usually brown. In *P. obscuricornis* the frons is yellow.

Two other species likely to be confused with *P. obscuricornis* in Mexico are *P. roseomaculatis* and *P. stroudi*. Both also have a reddish macula on the pronotum and vittate elytra. The considerably smaller eyes easily distinguishes *P. roseomaculatis*, and femoral color (yellow except black at apex) separates *P. stroudi*. The coarser and partially confluent pronotal punctures also separates *P. stroudi*. *Pseudozonitis megalops*, a southern Mexico and Central American species, also has a red pronotal macula and may overlap with *P. obscuricornis*. The more elongate pronotum, pallid elytra, larger eyes which almost meet on the underside of the head, and male genitalic differences separate the two.

Comments.— Color varies considerably in this species. Material examined from the West Indies ranges from almost completely yellow-orange with unicolorous light elytra and femora to more typical coloration with dark brown elytra bearing yellow vittae and completely or partially dark femora. Similarly the reddish pronotal macula varies from deep red to completely absent. In male meloids the genitalic structures are typically uniformly light yellow-brown to brown in color. However, in several males of *P. obscuricornis*, the apex of the gonoforceps and/or aedeagus is black, contrasting with the lighter color of the remainder of the structure. Almost the entire range of variation in all these traits is represented in a single large series of 237 specimens from St Lucia. Selander and Bouseman (1960) also comment on color variation in this species. Variation to the extent observed in the West Indies may not characterize Mexican representatives although too little material is available for adequate comparison. In any case, femoral coloration is considerable ranging from almost entirely yellow-orange with only slight infuscation at the middle to entirely dark brown except at the very base. The elytra of all Mexican specimens examined are vittate and all have a well developed red pronotal macula. The blackened apex of the male genital structures, common in the West Indies, does not occur in the Mexican males available. Interestingly this color variant has been noted in a small number of *P. longicornis*, the species

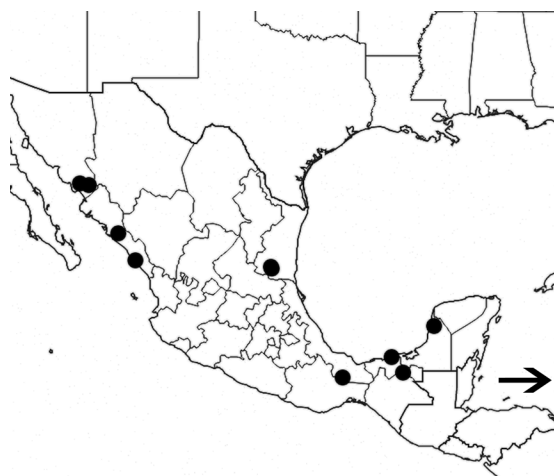
most similar to *P. obscuricornis*.

Pseudozonitis obscuricornis has, until now, been considered a West Indian endemic (Ivie 2009, Peck 2014). That this species also occurs in southern Mexico but not the southeastern United States further supports Selander and Bouseman's (1960) contention that the meloid fauna of the Caribbean islands dispersed there from the neotropical part of the mainland.

Records — 278 specimens examined (115♂, 163♀); includes a single series of 237 specimens from St. Lucia. Unexamined West Indian records in Selander and Bouseman (1960, 1961) indicated by (*). **MEXICO.** **Campeche:** Campeche, 15 km N; iv-4-2002; 2; Thomas, Robacher; JHC. **Chiapas:** Catazaja, 5 mi. S; i-13-1982; 2; D. Thomas, E. Case; UMRM. **Oaxaca:** Rio Coazacoalacos and Rt. 185, 22 mi. W; xii-14-1955; 1; UCRC. **Sinaloa:** Culiacan, 15 mi. S; iii-17-1962; 5; E. Parker, L. Stange; FSCA. Mazatlan, 5 mi. N; viii-31-1964; BL; 1; G. Noonan; CAS. **Sonora:** Alamos; ii-27-1963; 1; P. Arnaud Jr; CAS. Navajoa; iii-25-1963; 1; D. Denning; UCDC. **Tamaulipas:** Bocatoma, 7 km SSE Gómez Farias; v-19/23-1979; 3; E. Riley; UMRM. Gómez Farias; v-8-1994; 1; J. Wappes; JHC. **Tobasco:** Frontera, 17 mi. E; vii-11-1963; 4; J. Doyen; CISC.

WEST INDIES: **DOMINICAN REPUBLIC.** Reserva Científica, Villa Elisa (19°44'46.1"N, 71°15'27.5"W); vi-24-2010; UVL/MVL.; 3; S. Lingafelter; JHC. Villa Elisa, 4-8 km N; v-10-1985; 3; J. Wappes; FSCA, UCRC. Villa Elisa, 5 km N; vi-2-1994; 2; R. Turnbow, M. Thomas; FSCA, JHC. **GUADELOUPE.** Bois de Fefé; v-16-1983; 2; E. Giesbert; FSCA. Domaine Duclos; vi-24/28-1960; 2; P. & C. Vaurie; FSCA. Matouba*, 1900 ft.; vi-29-1960. **HAITI.** Port-Au-Prince; iii-29-1972, iv-13-1972, iv-17-1972, v-23-1973; 4; B. Dozier; FSCA. **JAMAICA.** Kingston; 1958; 1; M. Locke; FSCA. St Andrew, Molyne Rd*; v-15-1949. **PUERTO RICO.** Guánica*; vii-30-1913. Guánica insular forest; xi-6-1953; 1; Capriles; FSCA. Guánica Forest; vi-30-1955 (at light), vii-29-1969; 2; H.&A. Howden/Ramos, Maldonado; FSCA, JHC. **ST LUCIA.** Piton St Esprit, 571m; v-25/29-2009; UVL; 237; R. Winton; CSCA.

Additional Records — *P. obscuricornis* also has been recorded from Guana (Valentine and Ivie 2005), Dominica, Saint John and Tortola (Michael



Map 8. Geographic distribution of *Pseudozonitis obscuricornis* (arrow refers to West Indian distribution).

Ivie, pers. comm.).

Pseudozonitis pallida Dillon, 1952

(Figs 5, 6, 15, 23, 59, 60, 62, 75. Map. 9)

Pseudozonitis pallidus Dillon 1952: 344.

Pseudozonitis pallida, Enns 1956: 866. Arnold 1976: 37. Berrios-Ortiz 1985: 180.

Pseudozonitis arizonica, Enns 1956: 865 (in part). Werner, et al. 1966 (in part).

Pseudozonitis roseomaculatis, Dillon 1952 (in part, see Enns 1956).

Description — Body length: \bar{x} = 13.7 mm (N = 15), observed range 9-18mm. Color pale yellow, yellow-orange or light yellow-brown except antennae, extreme apex of femora, apical portion of tibiae and tarsomeres dark brown to black. Antennal segments III-X usually banded apically. Tarsomeres variable, banded apically or not. Elytra unicolorous or, less frequently, weakly vittate. Wing membrane, at most, lightly pigmented. Head and pronotum densely, moderately coarsely punctate; punctures distinct, not confluent; surface only moderately shiny, not glossy. Body setation light in color, short.

Head l/w = 0.703 (0.67-0.75) (N = 6). Eyes relatively large; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.182 (1.12-1.25); IODD/

HWE = 0.344 (0.30-0.37); IODV/IODD = 0.252 (0.20-0.33). Antennal segment relative length (male): 21, 21, 28, 39, 40, 42, 40, 37, 35, 31, 35; segment VI 5-6x as long as wide. Mandibles only moderately curved, less abruptly so than in most species, extending beyond labrum. Pronotum varying from slightly wider than long to slightly longer than wide. Hind tibial spurs similar, only slightly expanded before apex; apical truncation of spurs with hyaline rim in western populations (see *Comments*). **Male.** Sternum IX moderately sclerotized, slender; arms divergent, blunt apically. Gonoforceps with gonostyli prominent dorsally, 0.6 length of gonocoxal plate; gonostyli with sides moderately convergent to blunt apex. Aedeagus 0.8 length of gonoforceps with ventral lobes narrowing to apex, occupying 0.3 aedeagus length. **Female.** Ventrite VI with relatively deep V or U-shaped emargination extending c. 0.5 segment length.

Types — Holotype ♂ (photo examined), allotype ♀ (examined). USA. *Texas*: College Station; June 5/17, 1934; H. J. Reinhard; TAMU. All paratypes examined (TAMU): Three from type locality and nine others from various Texas localities (see *Records*).

Geographic distribution — Southwestern and southern states, from Arizona east to Georgia and Florida, with a single record from Chihuahua, Mexico (Map 9).

Seasonal distribution — 113 records. April 26 - October 5. Monthly frequencies: April (2), May (3), June (13), July (54), August (32), September (8), October (1).

Adult associations — 30% of the collections indicate collection at light. There are no plant records.

Identification — The generally pallid coloration, large size and extension of the moderately curved mandibles beyond the labrum (Fig. 23) characterize this species. Throughout most of its range west of 102° longitude *P. pallida* is the only species of *Pseudozonitis* with entirely pallid elytra, pronotum and head, and enlarged eyes. Only at the extreme western edge of the range in Arizona does it overlap with *P. arizonica* and entirely pallid populations of *P. brevis* and *P. vigilans*. From *P. arizonica* it is separated by mandibular curvature (abruptly curved in *P. arizonica*; considerably less so and clearly extending beyond the labrum in *P. pallida* (cf. Figs 22,

23). Also in *P. arizonica* the antennae are very light brown, similar in color to the elytra. By contrast, in *P. pallida* the antennae are considerably darker than the elytra. From *P. vigilans* and *P. brevis*, mandibular structure also provides separation. In both species the mandibles are straight at the basal 2/3, curving only at the apex (Fig. 61) and do not appreciably surpass the labrum (Figs 20, 21). In *P. pallida* the mandibles are curved from mid-length (Fig. 62) and extend beyond the labrum (Fig. 23). Additionally, the hyaline rim of the obliquely truncate apex of the hind tibial spurs (Fig. 60) characterizes most western *P. pallida* but not the other species.

East of 102° longitude only *P. pallida* has both an entirely pallid elytra and a pronotum always without a red macula. Specimens with vittate elytra can be separated from all congeners except *P. florida* by the absence of a red macula on the pronotum. From *P. florida*, *P. pallida* also is separated by the considerably larger eyes (IODV/IODD < 0.6) and, in vittate specimens, by its relatively wide discal vitta (cf. Figs 6, 12).

Comments — The elytra of *P. pallida* are weakly vittate in some individuals. This vittation is similar to that in other species except the three light-colored vittae are wider and contrast minimally with the modestly darker adjacent surfaces (Fig. 6). Enns (1956) described this species as usually having pallidly vittate elytra. A more extensive sampling of material suggests that this trait varies geographically. Vittate individuals are only known to occur east of 102° longitude. None of the numerous specimens examined from W Texas, New Mexico and Arizona are vittate. The single specimen from Chihuahua also lacks vittae. However, approximately 50% of the specimens examined from eastern Texas, Oklahoma and Arkansas are vittate. Only seven individuals from Florida and Georgia were available; all are vittate. Vittate and non-vittate individuals are known from the same series. For example, of the two individuals from Hope, Arkansas, one is vittate, the other is not.

A feature of the hind tibial spurs also varies geographically and is concordant with elytral variation. In most specimens west of 102° longitude the apex of the each spur is ringed, at least in part, by a narrow hyaline rim (Fig. 60). This feature has not been detected in specimens to the east (Fig. 59).

Variation in pronotal dimensions, although minor, also occurs. In western populations the pronotum is usually slightly wider than long [$l/w = 0.989$ (0.96-1.03) ($N = 8$)]; in eastern populations the pronotum is slightly longer than wide [$l/w = 1.032$ (0.99-1.08) ($N = 8$)]. As indicated in the distribution map (Map 9) there is a considerable gap separating western Texas populations of *P. pallida* from those examined in eastern Texas and Oklahoma. Collections from this intermediate zone are necessary to better interpret variation. Thus far, other traits examined, including male genitalia, appear to be relatively homogeneous throughout the species range.

The Belen, New Mexico, record of *P. arizonica* (Enns 1956, Werner, et al. 1966) is a misidentification of *P. pallida*. Specimens from the western half of the range of *P. pallida* have frequently been confused with *P. arizonica* in collections. According to Enns (1956) two specimens from College Station, Texas, and designated paratypes of *P. roseomaculatis* by Dillon (1952), are misidentifications of *P. pallida*.

Records.— 276 specimens (71♂ 205♀); unverified Enns (1956) and Arnold (1976) records indicated by (*) and (**), respectively. **MEXICO.** **Chihuahua:** La Bufa, Sierra Madre Mts; vii-7-1972; 1; D. Giuliani; CAS. **UNITED STATES.** **Arizona:** Congress, 6.5 mi. NE; vii-7-2012; 1; J. Gruwall; CAS. Nogales; vii-11-1902; 1; Oslar; JHC. Sunsites, 5 mi. NW (Cochise Co.); vii-7-2012; 1; J. Huether; JHC. **Arkansas:** Fairbanks; vi-6-1937; 1; D. & J. Knoll; OSUC. Hope; vii-25-1931; 2; CAS. Red River at Hwy 41 (Little River Co.); vii-25-2003; 1; UCRC. **Florida:** Branford; viii-4-1939*. Cross City; viii-22-1938; 1; USNM. Plant City; viii-15-1939*. Gainesville; viii-1-1956; 1; F. Mead; FSCA. Lake City; viii-4-1962; at light; 1; D. Byrne; FSCA. Levy Co.; vii-13-1954; 1; H. Weems; FSCA. Old Town; vii-11-1939; 1; R. Beamer; FSCA. State record only; 1; USNM. **Georgia:** Adel; viii-11-1939; 1; A. Hardy; CSCA. **Louisiana:** Alexandria; vii-23-1938*. Ruston; vii-10-1950*. **New Mexico:** Albuquerque; vii-1-1948; 2; D. Giuliani; CSCA. Anthony, 0.2 mi. N Texas line (Franklin Mts); vii-1996, viii-1996, viii-1997; 'creosote bush community'; 6; R. Worthington; UTEP. Belen; vii-20-1936; 1; R. Beamer; UMRM. Caprock, 9.5 mi. W; vii-27-1989; 3; E. Riley, C. Wolfe; TAMU. Carlsbad, 26 mi. E; vii-15-1977; 2; TAMU. Dona

Ana Co., 'Port of Entry'; ix-6-1970; 1; R. Turnbow; UCRC. Eddy Co. (32°24'N, 103°47.6'W); vii-21-1979; at light; 1; D. Delorme, C. McHugh; TAMU. Eddy Co. (32°23'N, 103°51.4'W); vii-14-1979; at light; 1; D. Delorme, C. McHugh; TAMU. Eddy Co. (32°19.7'N, 103°46.9'W); vii-15/16-1979; 1; at light; D. Delorme, et al.; TAMU. Eddy Co. (32°21.4'N, 103°46.9'W); vii-23-1979; at light; 1; D. Delorme, C. McHugh; TAMU. Eddy Co. (32°19.7'N, 103°46.9'W); vii-15/16-1979; at light; 1; D. Delorme et al.; TAMU. Eddy Co. ('10.5 mi. E Jct. Hwy 31 on Hwy 128'); vii-5-1991; BL, MVL; 2; E. Riley; ERC. Hondo; vii-25-1963; 1; R. Enzie; BYU. Jal, 4.3 mi. S; vii-6-1991; 'BL, MVL on sand dunes'; 6; E. Riley, C. Wolfe; ERC. Las Lunas, 20 mi. W; viii-2/5-1977; 'piñon juniper'; 1; S. Peck; JHC. Luna; 1; CAS. Mescalero Sands 'Park'; vii-13-1999, vii-23-1998; 6; Wappes, Huether; TAMU, USNM. Roswell, 36 mi. E on Hwy 38 (Mescalero Sandhills Rec. Area; vii-31-2000; at light; 5; G. Nelson; FSCA. San Antonio, near; viii-6-1953; 1; R. & J. Selander; FSCA. San Antonio, 22 mi. E; vii-25/26-1996, viii-14-1996; 'sandhills'; 6; Wappes, Huether; TAMU, USNM. San Antonio, 23 mi. E; viii-27-1997; BL, MVL, 'sandhills'; 3; Wappes, Turnbow; FSCA, UMRM. Socorro Co. (Rt. I-25, mile marker 167, rest stop); viii-17/19-1994, viii-19-2008 (at light); 7; J. Huether, F. Skillman Jr; JHC. Socorro, 15 mi N; ix-2-2012; 'in spider web'; 3; J. Huether, W. Warner; JHC. Socorro, 20 mi. N; vii-23-1978; 'freeway dunes', at night; 3; F. Andrews, A. Hardy; CSCA. Truth or Consequences; viii-3-1968; 1; R. Biggam; JHC. Truth or Consequences (Rio Grande), 4400'; vii-29-1965; at light; 2; G. Byers, W. Atchley; SEMC. White Sands Natl Mon. (32.72147°N, 106.38922°W); viii-26-2011; 'at night, gypsum dunes/interdune flats'; 1; K. Wetherill et al.; UCRC. White Sands Natl Mon, 'Heart of the Sands'; vii-28-2000; 1; Kinsley, Hill; BYU. Willard, 6.5 mi. E; viii-4-1999; 1; C. Smith; UCDC. **Oklahoma:** Beaver Co.**. Buncomb Creek, Lake Texoma; vii-15-1968; BL; 6; R. Arnett; FSCA. Hughes Co.**. Jackson Co.**. Lake Texoma St Prk; vii-9-1971; UVL; 1; G. Nelson; FSCA. Lake Texoma (UOBS); vi-30-1968, vii-3-1968, vii-26-1969; at light; 6; W. Suter; UMRM. Lake Texoma, 2 mi. E Willis; vi-17-1972, vi-29-1972, vii-4-1972; at light; 5; R. Thorpe; UCDC. Lake Texoma, 2 mi. E Willis; vi-

1965; 1; B. Valentine; OSUC. Marshall Co.; vii-13/14-1969; BL; 1; R. Arnett; FSCA. Okfuskee Co.**. Thackerville, 1 mi. S, 840'; vii-23-1969; at light; 1; SEMC. **Texas:** Armstrong (Kenedy Co.); vi-6/7-1962, viii-8-1971 (BL); 2; P. Glick, W. Tyson; CSCA. Armstrong (King Ranch); ix-10-1960; 1; JHC. Big Bend Natl Prk, 'Rio Grande'; iv-26-1979; 1; D. Bogar; TAMU. Brazos Co.; vii-1-1969, vii-18-1960; light trap; 2; FSCA, JHC. Chaparral Wildlife Management Area, 8 mi. W Artesia Wells (Dimmit Co.); v-19-1999; 1; C. Nelson; BYU. Chaparral [W] MA (La Salle, Co., 28°17'36", -99°22'55"); vi-17-2002; 1; T. McCabe; JHC. Clint, nr (Adams Farm); vii-11-1972; light trap; 1; C. Burgess; TAMU. College Station; 5; (see *Types*). College Station; vi-17-1933; 1; paratype; H. Reinhard; UMRM. College Station; vii-13-1979, ix-10-1976; 2; C. Agnew/J. Ables; TAMU. College Station (30°35'18"N, 96°15'12"W); viii-31-2005, ix-1/4-2005; 3; E. Riley; ERC. Crane Co., 'jct. 1053/1233'; vii-16/17-1996, vii-24, vii-27; sandhills; 29; J. Wappes; CSCA, FSCA, JHC, TAMU, USNM. Dallas; vi-19-1948; at light; 1; G. Ball; UAIC. Dimmit Co.; v-30-1934; light trap; 1; paratype; S. Jones; TAMU. El Paso; vii-1-1967; 1; R. Smith; TAMU. El Paso Co., 'TAES Farm'; vii-6-1972, vii-28-1972, viii-11/12-1972; light trap; 4; C. Burgess; TAMU. Fabens, 2 mi. N; viii-23-2000; 1; J. Huether; JHC. Fabens, 4 mi. N (San Felipe Prk); viii-23-2000; 27; J. Huether; JHC. Gaines Co.; 1; FSCA. Giddings; ix-2-1977; UVL; 1; R. Polgler; TAMU. Horizon City; vii-26/27-1972; light trap; 1; C. Burgess; TAMU. Horizon City, 15 km E (31°40'40"N, 106°02'29"W); viii-18-2001; 'ex orange dunes, MVL'; 22; J. Oswald; TAMU. Hueco Tanks, 3 mi. S (FR 2775); viii-19-2002; 1; F. Skillman Jr; JHC. Hueco Tanks St Prk; viii-15-1976; 1; UCDC. Kenedy Co., 'Riskin Ranch' (27°10'N, 97°40'W); viii-17-1976; 1; J. Gillasp; TAMU. Leon Co.; iv-30-1937; at light; 2; J. Robinson; CAS, FSCA. Luling; v-17-1953; 2; M. Wasbauer; CISC. Madison Co.; vii-20-1931; 3; paratypes; Bibby, Tate; TAMU. Monahans; vii-1977; 8; Lenczy; UAIC, USNM. Monahans, 3 mi. E; viii-19-1983; 1; E. & M. Riley; ERC. Monahans Sandhills; vii-24-1976, vii-25-1998; UVL; 6; G. Nelson; FSCA. Monahans Sandhills St. Prk; vii-10-1994 (at light), vii-21-1972, viii-2-1987, viii-5-1970 (at light); 11; C. & J. Barr/W. Chamberlain/R.

Selander; CISC, FSCA, TAMU. Morris Co.; vi-27-1937; 4; paratypes; TAMU. Nacogdoches; ix-5-1968; at light; 1; L. Brown; TAMU. Sarita, 5 mi. S; ix-4-1996; 1; J. Wappes; JHC. Terrell; vii-11-1950*. Tyler; x-5-1937; 1; paratype; TAMU. Waco; vi-21-1968; 1; W. Tyson; CSCA. Winkler Co., '1.2 mi. W Jct 115 on 874'; vii-28-1989; 16; E. Riley; ERC. The Woodlands (Montgomery Co.); vi-10/15-1979; 1; J. Wappes; FSCA.

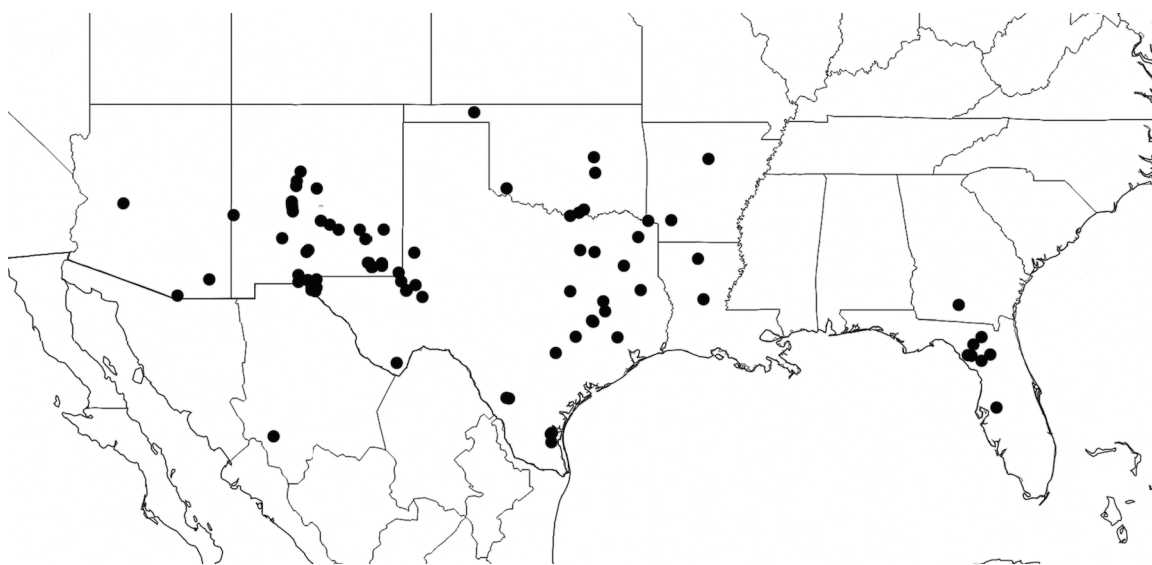
***Pseudozonitis roseomaculatis* Dillon, 1952**

(Figs 18, 51. Map 10)

Pseudozonitis roseomaculatis Dillon 1952: 343. Enns 1956: 861.

Description —Body length: \bar{x} = 10.6 mm (N = 7), observed range 8-13 mm. Color variable except pronotum always yellow with a large trapezoidal reddish macula at center extending from near apex to near base of disk, base of macula greater than half discal width. Head capsule entirely yellow to entirely dark brown, most commonly darkest at frons and vertex and lighter just above clypeus, on occiput, postocciput, and on underside. Antennae dark brown with apex of segments III-X often banded. Scutellum yellow to black, some with a median black longitudinal vitta. Elytra entirely yellow to entirely black, most commonly vittate with a marginal, sutural and a narrow discal vitta. Wing membrane moderately pigmented. Venter yellow to black, abdomen often dark with apical ventrites lighter. Legs with femora dark except lighter at base and apex, some with fore and middle femora entirely light. Head and pronotum densely, moderately coarsely punctate; punctures somewhat less dense along midline of pronotal disk. Setation similar in color to underlying cuticle.

Head l/w = 0.732 (0.70-0.77) (N = 5); vertex frequently impressed at center. Eyes relatively small, not extending to inner margin of maxillae on underside of head; ventral lobe only slightly wider than dorsal lobe (c. 1.2x as wide); HWE/HWT = 1.022 (0.98-1.05) (i.e., widths subequal); IODD/HWE = 0.425 (0.39-0.45); IODV/IODD = c. 1.0. Antennal segment relative length (male): 21, 16, 22, 32, 33, 33, 33, 32, 31, 29, 37; segment VI 3.5-4x as long as wide. Mandibles straight at base, curving



Map 9. Geographic distribution of *Pseudozonitis pallida*.

moderately at apical half. Pronotum slightly wider than long [$l/w = 0.909$ (0.88-0.93)]. Hind tibial spurs robust, expanded before apex. **Male.** Sternum IX moderately sclerotized; arms elongate, divergent, blunt apically. Gonoforceps with gonostyli prominent dorsally, sides slightly unevenly convergent to apex; gonostyli 0.65 length of gonocoxal plate, with dorsal surface appearing sinuous in lateral view. Aedeagus 0.8 length of gonoforceps; ventral lobes narrowing at apex, occupying 0.4 aedeagal length. **Female.** Ventricle VI with deep, very broad, U-shaped emargination extending c. 0.5 length of segment.

Types — Holotype ♂ (photo examined), allotype ♀ (examined). USA. Texas: Bexar Co.; 1931; H. B. Parks (TAMU). Sixteen paratypes with same data as holotype and allotype, examined (TAMU). As also indicated by Enns (1956), a paratype of *P. roseomaculatis* listed by Dillon from Dimmitt Co., Texas (examined), is a male of *P. longicornis*. Enns also noted that two other paratypes of *P. roseomaculatis* in Cornell University (from College Station, TX) are misidentifications of *P. pallida* (not examined).

Geographic distribution — Extreme S Texas, NW and S Mexico, and Honduras (Map 10). Enns (1956) discounted a record from Illinois (state label only) in the Illinois Natural History Survey collection (not examined).

Seasonal distribution — 23 records. Most records between May 25 - July 19. Monthly frequencies: March (1, Honduras), May (2), June (16), July (3), October (1, Sonora).

Adult Associations — Three records indicate collection at light; also taken a single time on *Condalia* (Rhamnaceae) and *Ceanothus* (Rhamnaceae), respectively.

Identification — *Pseudozonitis roseomaculatis* is distinguished by the large reddish subtrapezoidal macula on the pronotum (Fig. 51) and the relatively small eyes (Fig. 18) which do not reach the inner margin of the maxillae on the underside of the head. In addition, the femora usually are dark at the middle and light-colored at the base and apex; in a few the femora are entirely light. As in *P. longicornis* and *P. florida*, the dorsal surface of the gonostyli in males appears sinuous in lateral view (as in Fig. 78b). *Pseudozonitis longicornis*, the most similar species, is separated by its considerably larger eyes and usually smaller pronotal macula. Both species differ from *P. roseomaculatis* by the shorter arms of sternite IX in males and the relatively narrow hind tibial spurs. *Pseudozonitis florida* is further distinguished by the absence of a pronotal macula. *Pseudozonitis martini*, a species with small eyes, is possibly partially sympatric with *P. roseomaculatis*. Vittate elytra are unknown in *P. martini* but *P.*

roseomaculatis individuals with unicolorous black or yellow elytra could be confused. The uniformly black legs in *P. martini*, as well as the absence of the large red pronotal macula separate them.

Comments — As indicated in the description, this species varies considerably in color. The elytra can be entirely black, entirely yellow or vittate. Of the 51 specimens recorded for elytral color 39, or 76%, are vittate with light-colored marginal, sutural and discal vittae; four individuals lack a sutural vitta; six are entirely black and two entirely yellow. When present, the discal vitta is quite narrow and usually darker than the sutural and marginal vittae. This variation is not obviously correlated with geography. All except the completely pallid phenotype occur in the type series from Bexar Co., Texas. Of the two specimens from Honduras, one has entirely black elytra, the other is vittate. The elytra are entirely yellow in the two specimens from Chiapas, Mexico. This is not associated with overall light coloration. In both specimens the venter and scutellum are black.

The reddish trapezoidal mark on the pronotum varies in intensity. In a few it is only slightly darker than the surrounding yellow cuticle; in others it is deep red with black coloration along the midline.

Records — 53 specimens (21♂, 32♀). HONDURAS. Country label only; iii-15-1989; 1; C. Buenrosmo; TAMU. **Olancha:** San Francisco de la Paz, 9 km N; vi-14-1997; 1; R. Cave; RDCC. MEXICO. **Chiapas:** Sumidero; vi-27-1990; 1; R. Turnbow; JHC. 'Tuxtla G.- Sumidero'; vi-10-1991; 'flowering tree'; 1; F. Skillman Jr.; JHC. **Sinaloa:** Mazatlan, 5 mi. N; vii-19-1972; 1; G. Nelson; FSCA. **Sonora:** Alamos, 13 mi. SE; x-30-1972; 1; G. Nelson; FSCA. UNITED STATES. **Texas:** Armstrong (Kenedy Co.); vi-6-1962; 4; P. Glick; CSCA. Bexar Co.; 1931; 18; H. Parks; (see *Types*); TAMU. Brownsville; v-25-1939, v-31-1939, vi-8-1934, vi-25-1930, vii-11-1962 (light trap); 8; D. & J. Knull/J. Martin; CAS, CSCA, OSUC. Brownsville (Clint's Palm Nursery); vi-22-1969; UVL; 2; R. Heitzman; FSCA. Ft Sam Houston; vi-10-1952, vii-1952; 7; B. Adelson; CISC. Lake Corpus Christi St. Prk; vi-19-1971; 1; G. Nelson; JHC. Leon Valley; vi-20-1983 (on *Condalia*), vi-25-1977 (UVL); 2; G. Nelson; FSCA. New Braunfels; vi-7-1942; 2; E. Ross; CAS. San Antonio; vi-30-1968; at light; 1; G. Nelson; FSCA. San Antonio (Olmos Prk); vi-23-

1947; 'sweeping *Ceanothus* sp.'; 1; B. White; CAS. San Antonio, 1 mi. E; vi-6-1942; 1; E. Ross; CISC.

***Pseudozonitis schaefferi* (Blatchley, 1922)**
(Figs 32, 52, 90. Map 11)

Zonitis schaefferi Blatchley 1922: 28. MacSwain 1951: 72. *Pseudozonitis schaefferi*, Dillon 1952: 343. Enns 1956: 844.

Description — Body length: \bar{x} = 9.3 mm (N = 9), observed range 8-11 mm. Color primarily brown to black except as follows: head above eyes and on underside yellow; mandibles yellow in basal half; pronotum with red to reddish brown coloration in apical half including lateral panels and continuing broadly along midline almost to basal margin; apical, basal margins and basolateral areas of disk yellow. Elytra with yellow marginal and sutural vittae extending to near, or confluent at, apex, discal vitta narrow, yellow, extending from humerus to apical fifth or entirely absent. Venter in some with yellowish coloration laterally on abdominal ventrites and on coxae and trochanters. Antennae not banded. Wing membrane moderately pigmented. Head and pronotum densely, moderately coarsely to coarsely punctate; punctures slightly larger at and adjacent to midline of pronotum; head with a small ill-defined callus between eyes; vertex slightly impressed or not. Setation similar in color to underlying cuticle.

Head l/w = 0.804 (0.78-0.86) (N = 5). Eyes relatively small, not bulged, not extending beyond outer margin of maxillae on underside of head; ventral lobe subequal in width to dorsal lobe; HWE/HWT = 1.043 (1.00-1.10); IODD/HWE = 0.56; IODV/IODD = 0.894 (0.87-0.94). Antennae relatively short, not quite attaining middle of elytra; segments subfiliform, broader than in other species, segment VI only 2.5-3.0x as long as wide; relative segment length (male) = 21, 20, 23, 28, 30, 29, 26, 25, 23, 19, 25; segment XI usually slightly shorter than segments IV-VI. Mandibles relatively long, moderately and gradually curved to apex, c. half their length extending beyond labrum. Pronotum distinctly wider than long [l/w = 0.867 (0.84-0.91)]. Hind tibial spurs similar, relatively narrow, not expanded, gradually narrowing to apex. Pygidium not emarginate medianly or only slightly so. **Male:**



Map 10. Geographic distribution of *Pseudozonitis roseomaculatis*.

Tarsi slightly swollen relative to female. Sternum IX robust; arms relatively long, converging, blunt at apex. Gonoforceps with gonostyli only moderately prominent dorsally, 0.7 length of gonocoxal plate, with sides converging evenly to subacuminate apex, apex moderately compressed laterally. Aedeagus 0.8 length of gonoforceps, with ventral lobes narrowing at apex, occupying 0.35 aedeagal length. **Female:** Ventricle VI with a distinct but narrow U-shaped emargination, extending c. 0.5 length of segment.

Type — Holotype ♂. USA. **Florida:** ‘Skinner’s hammock near Dunedin’; ii-9-1921; W. S. Blatchley, collr (photo examined; PERC – 0066265). Skinner’s Hammock is now known as Hammock Park. Enns (1956) inappropriately designated a female from Enterprise, Florida (v-30) as ‘neallotype’ (USNM).

Geographic distribution — SE United States, with a single record from New Jersey (Map 11).

Seasonal distribution — 14 records (including from Enns 1956). February 4 - May 30. Monthly frequencies: February (1), March (1), April (9), May (3).

Adult associations — Collected once at light. Blatchley (1922) reported that the holotype was beaten from dead vines of an unidentified plant.

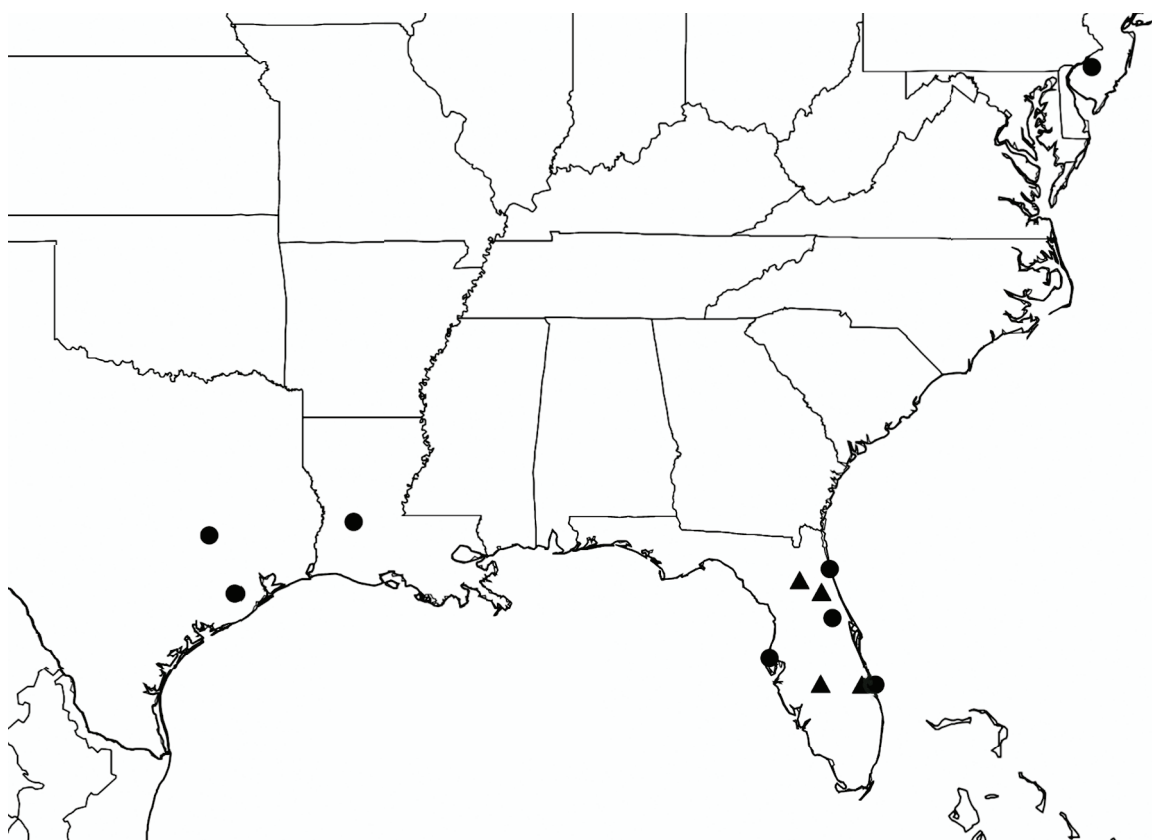
Identification — The distinctive reddish marking on the pronotum (Fig. 52) and the small eyes which do not extend beyond the outer margin of the maxillae on the underside of the head, distinguish this species from all congeners. Only in

P. vaurieae is the pronotum similarly patterned. In both the tranverse section of the reddish coloration extends onto the lateral panels in the apical half of the pronotum and posteriorly along the midline. *Pseudozonitis vaurieae* does not appear to be closely related. Unlike *P. schaefferi* it has large bulging eyes, more distinctly curved mandibles, differently structured male genitalia and distinctly filiform, elongate antennae.

Comments — The only relatively recent records of *P. schaefferi* are from Louisiana and Texas (1967-2007). Although most of the collections of this species are from Florida, the latest record from the state is Blatchley’s 1921 collection of the type. Enns (1956) did report a few Florida records that presumably lacked year of collection on the label (see *Records*) but most if not all of these appear to originate from the collections of early entomologists (Blanchard, Fall, Bolter, LeConte, Liebeck).

Enns (1956) considered a male specimen in the MCZ labeled ‘Tyngs [borough], Massachusetts’, as probably erroneous.

Records — 11 specimens examined (9♂, 2♀); unverified Enns (1956) records indicated by (*). UNITED STATES. **Florida:** Dunedin, near; 1; (see *Type*); ii-9-1921. Enterprise (Volusia Co.); iv-16*, iv-21*, iv-22*, iv-25, iv-26, v-5*, v-30; 6; CAS, OSUC, UMRM, USNM. [Fort] Capron*; iv-14. St Augustine*, iv-19-1919. **New Jersey:** Clementon; v-30-1906; 1; OSUC. **Louisiana:** Elizabeth; iv-20-1967; ‘flying’; 1; L. Pickard; TAMU. **Texas:** Brazos Bend St Prk (Fort Bend Co.); iii-12-2000; 1; E. Riley; ERC. College Station (‘Riley Estate’, 30°35’18”N, 96°15’12”W); iv-13-2007; UVL.; 1; E. Riley; ERC.



Map 11. Geographic distribution of *Pseudozonitis schaefferi* (dots) and *P. florida* (triangles).

***Pseudozonitis stroudi* Enns, 1956**
(Figs 25, 35, 36, 53, 70, 76. Map 12)

Zonitis, n. sp., Stroud 1950: 668.

Pseudozonitis stroudi Enns 1956: 868. Werner, et al. 1966: 69.

Pseudozonitis vaurieae, Enns 1956: 871 (in part).

Description — Body length: \bar{x} = 10.4 mm (N = 7), observed range 7-14 mm. Color yellow-orange except antennae, tarsi, apical 1/2-2/3 of tibiae and extreme apex of femora dark, and elytra almost always vittate. Elytra light to dark brown with narrow yellow sutural, marginal and discal vittae; sutural and marginal vittae usually ending before elytral apex. Wing membrane without appreciable pigment. Head light brown in some. Pronotum usually with an elongate orange to red median macula which typically narrows slightly posteriorly; macula width c.0.4 that

of disk. Antennal segments usually banded. Head and pronotum coarsely, densely punctate. Pronotal surface almost subrugose with punctures crowded, confluent in part, never separated by distance equal to their diameter, those on lateral surface of disk similar in size to those along middle. Setation color similar to that of underlying cuticle.

Head l/w = 0.709 (0.64-0.75). Eyes moderately large and bulged; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.087 (1.04-1.12); IODD/HWE = 0.367 (0.33-0.39); IODV/IODD = 0.366 (0.33-0.39). Antennal segment relative length (male): 21, 21, 27, 33, 35, 36, 31, 32, 29, 29, 33; segment VI 4-5x as long as wide. Mandibles not straight at base, strongly curved from mid-length to apex. Pronotum usually slightly wider than long [l/w = 0.972 (0.93-1.00)]; hind angles slightly flared or not. Hind tibial spurs similar, relatively narrow, expanding slightly, at most, before narrowing to apex. **Male:** Sternum

IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, evenly convergent to apex, 0.55 length of gonocoxal plate. Aedeagus subequal in length to gonoforceps; ventral lobes narrowing to apex, occupying 0.3 aedeagal length; ventral lobes more basally placed than in other species, the distance from apex of aedeagus to apex of lobes subequal to lobe length. **Female:** Ventrite VI elongate, 0.7-0.8 as long as wide, with a relatively narrow V-shaped emargination extending 0.2-0.3 segment length.

Types — Holotype ♀. USA. *New Mexico*: Otero Co.; near White Sands National Monument, Ridingers Motel; viii-8-1947; at light; SEMC (photo examined); one paratype ♀, same data as holotype, examined. Ridingers is described by Stroud (1950), the collector of the type, as on the margin of a dune area approximately 20 mi. ENE of Lake Lucero. Allotype ♂. USA. *Texas*: Presidio; x-10-1947; at light; J. Russell; USNM; examined.

Geographic distribution — SW North America from S Nevada south to Sinaloa and Baja California Sur, west to W Texas (Map 12).

Seasonal distribution — 49 records. July 19 – October 24. Monthly frequencies: July (8), August (30), September (8), October (3). The only collection of *P. stroudi* taken after late August in the United States is the allotype from Presidio, Texas, taken in October. The species also appears primarily in July and August in mainland Mexico. It appears to occur later in Baja California Sur; of the eight records six are from September and two from October.

Adult associations — A third of the collections of *P. stroudi* are labeled as taken at light. There are no plant associations.

Identification — *Pseudozonitis stroudi* is distinguished by its pronotal features which include the usual presence of a median red elongate pronotal macula, and relatively uneven discal surface with coarse, partially confluent punctures which are of similar size laterally and medianly. Male genitalia and structure of ventrite VI in females also are useful for identification.

Two typically vittate sympatric species likely to be confused with *P. stroudi* are *P. obscuricornis* and *P. vaurieae* (Form B). From *P. obscuricornis*, it is separated by femoral color. In *P. stroudi* the femora are light in color except black at the apex. Femoral

color varies in *P. obscuricornis* from entirely yellow to entirely black but is not known to express the pattern in *P. stroudi*. Individuals of *P. stroudi* without a distinct pronotal macula (Fig. 36) are potentially confused with Form B of *P. vaurieae*. Pronotal surface structure provides the easiest separation. Unlike *P. stroudi*, in *P. vaurieae* the surface is smoother, the punctures along the lateral surfaces are dense, distinct (Fig. 39) and smaller than those near the middle (also cf. Figs 53, 54). Males of *P. stroudi* can also be separated by the more basally placed ventral lobes of the aedeagus (cf. Figs 76b, 77b). Females can be distinguished by ventrite VI and its median emargination. In *P. stroudi* this sclerite is considerably longer (0.7-0.8 as long as wide), the median emargination is V-shaped and extends only about a third the length of the segment (Fig. 70). In *P. vaurieae* ventrite VI is c. 0.4 as long as wide, the median emargination is U-shaped and extends, c. 0.5 the segment length (Fig. 71).

Comments — There is relatively little elytral color variation in this species. All except one specimen examined have vittate elytra. The single exception, from Culiacan, Sinaloa, Mexico, has uniformly light yellow-brown elytra. The expression of a well-defined red pronotal macula varies (Figs 35, 36). Although the center of the pronotal disk is darker than the yellow peripheral areas in all specimens, a distinct orange or red elongate macula is not always present. It does occur in almost all material examined from Mexico but varies, including within series, in specimens from Arizona and W New Mexico where about a third of the individuals lack a clear-cut macula.

Female bias characterizes collections of most species of *Pseudozonitis*. However this bias is extreme in *P. stroudi* where 90% of the individuals examined are female. Of the 77 US specimens available only two are male; the nine additional males are from Mexico.

One of the paratypes designated for *P. vaurieae* by Enns (1956) is assignable to *P. stroudi*. This specimen, from Blythe, California, is part of a series which does also include *P. vaurieae*.

Records — 119 specimens (11♂, 108♀). MEXICO. **Baja California Sur**: La Paz, 25 mi. W; ix-4-1959; light trap; 2; K. Radford, F. Werner; CAS. Loreto, 33.8 mi. NNW; ix-24-1981; BL; 7;

F. Andrews, D. Faulkner; CSCA. Mulege, 9.2 mi. SSE; ix-23-1981; BL; 1; F. Andrews, D. Faulkner; UCRC. San Jorge, 1.5 mi. E; vii-24-1971; UVL; 1; H. Real, R. Main; CAS. San Lucas, 6 mi. NE; x-25-1968; BL; 1; E. Sleeper, J. Moore; CAS. San Lucas, 9 mi. N, 1000'; x-24/25-1968; BL; 1; E. Sleeper, J. Moore; CAS. San Pedro, 3.5 mi. NE; ix-7-1967; 5; J. Chemsak; CISC. Santiago, 4 mi. NE (Las Cuevas Rd); ix-28-1967; 4; G. Marsh; CISC. Sierra Giganta, 1 km S Huatamote, 300 m; ix-6/7-1981; 1; E. Fisher, R. Westcott; CAS. **Chihuahua**: Meoqui, 6 mi. N; ix-2-1950; 1; R. Smith; CISC. **Sinaloa**: Culiacan, 250'; vii-21-1958; 1; H. Evans; JHC. Mazatlan, 40 mi. N; vii-27-1952; at light; 2; J. Lattin; CISC. Pericos, 26 mi. N; viii-13-1960; 4; P. Arnaud et al.; CAS. Sinaloa [de Leyva?], 18 mi. S; ix-2-1964; BL; 1; L. Hawkins; WFBM. Villa Union, 3 mi. E; vii-24-1972; 1; J. & M. Chemsak, A. & M. Michelbacher; CISC. **Sonora**: Benjamin Hill, 6 mi. S; viii-6-1963; BL; 3; E. Sleeper; CAS. [Ciudad] Obregon, 20 mi. NNW; viii-20-1969; at light; 3; Doyen, Haddock; CISC. UNITED STATES. **Arizona**: Apache, 4 mi. S (Cochise Co.); viii-6-1967; 1; F. Andrews; CSCA. Cottonwood; viii-16-1931; 1; paratype; K. Maehler; CAS. Douglas; viii-15-1958; 19; W. Bowen/P. Marsh/C. Moore/P. Opler/R. Rice; CISC, FSCA, UCRC. Douglas; viii-20-1958; 5; J. Marston; FSCA. Globe; 2 (1 paratype); CAS, UMRM. Globe; viii-5-1953; 1; F. Parker; UMRM. Lowell, 5 mi. E (Cochise Co.); viii-15-1958; 4; R. James; FSCA. Portal; vii-20-1958, viii-25-1963; 7; J. Marston/A. Raske; FSCA, JHC. Portal, 3 mi. N (San Simon Rd.); viii-4-1976; UVL; 1; FSCA. Portal, 6 mi. N; viii/ix-1971; BL, '*Flourensia* plot'; 1; J. Pinto; UCRC. Rice (Gila Co.); viii; 1; D. Duncan; UCDC. San Bernardino Ranch, 3750' (Cochise Co.); 1; paratype; F. Snow; CSCA. San Bernardino Ranch, 3600'; viii-16-1949; at light; 1; paratype; F. Werner, W. Nutting; UMRM. San Bernardino [Ranch]; viii-7-1955; 1; Butler; UAIC. Tucson; vii; vii-31-1940 (paratype), viii-8-1939 (paratype); 3; UMRM. **California**: Blythe; viii-9-1937; 1 (paratype of *P. vaurieae*); M. Embury; CAS. **Nevada**: Carp-Elgin Rd., 6.9 mi. N of I-15 (Lincoln Co.) (35°56'N, 114°21'W); viii-19-2006; UVL; 4; W. Warner; JHC. **New Mexico**: Anthony, 1200 m, 'on I-10 at rd. side prk & TX state line'; viii-1996, viii-23-1997; 'lower bajada'; 5; R. Worthington; UTEP. Las Cruces; viii-

28-2011; 1; T. Johnson; NMSU. Lordsburg; viii-15-1960; 1; J. Drew; CAS. Lordsburg, 16 mi. W (32°14'01"N, 108°57'12"W); viii-15-2012; at light; 1; MEM. Pyramid Peak (Dona Ana Co.); viii-26-1930; 1; paratype; F. Fosberg; CAS. Rodeo; viii-4-1961, viii-9-1959, viii-19-1958, viii-23-1958; 9; J. Lawrence/G. Pitman; CISC, FSCA. White Sands Natl Mon., nr (Otero Co.); viii-8-1947; at light; (see *Types*); 2; UMRM, SEMC. **Texas**: Fabens, 2 mi. N; viii-23-2000; 1; J. Huether; JHC. Presidio; 1; (see *Types*). Presidio; viii-10-1968; 1; J. Hafernik; TAMU. Van Horn; vii-19-1995; 1; J. Huether; JHC.

Pseudozonitis vaurieae Enns, 1956

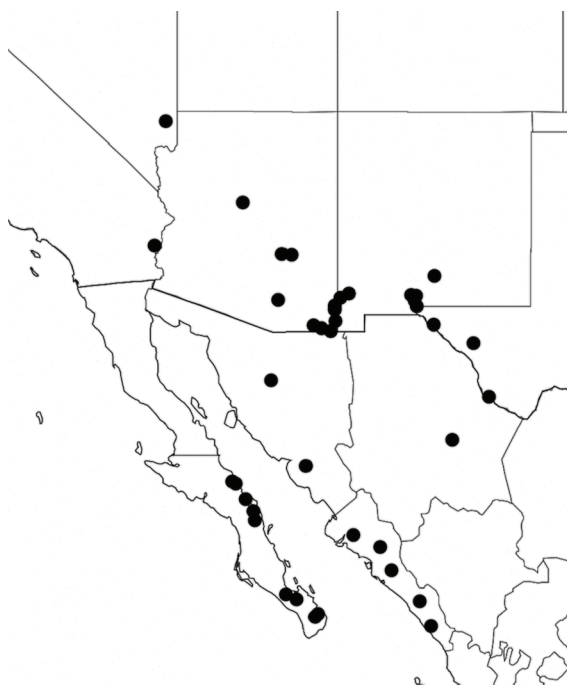
Zonitis megalops, Vaurie 1950: 10 (in part.

Pseudozonitis megalops, Selander 1954: 92.

Pseudozonitis vaurieae Enns 1956: 871. Werner, et al. 1966: 69. García-Paris, et al. 2007: 171, 238.

Description — Body length ranging from 7-18 mm. Color variable, typically yellow-orange except antennae, legs and usually elytra dark in part. Head yellow to dark brown. Antennae usually with most segments at least lightly banded at apex and base. Tarsi and apical 1/2 - 2/3 of tibiae black. Femora varying from entirely yellow to entirely black, usually light except black at apex, never darker at middle than at apex. Elytra varying from completely light yellow to completely dark but typically vittate, light to dark brown with narrow yellow sutural, marginal and discal vittae; discal vitta varying in width, often very narrow and streak-like, terminating before elytral apex; marginal and sutural vittae continuous at apex or not. Wing membrane, at most, lightly pigmented. Eyes large, bulged, extending beneath head to inner margin of maxillae. Mandibles moderately to strongly curved from apical half. Head and pronotum densely punctate, punctures small to moderately coarse; pronotal punctures crowded but distinct, those laterally on disk smaller than those along midline. Setation light in color, relatively short on dorsum.

Head l/w = 0.65-0.79; HWE/HWT = 1.10-1.23; IODD/HWE = 0.21-0.36. Antennal segment relative length (male): 21, 23, 25, 39, 40, 40, 37, 34, 34, 33, 38; segment VI c. 5x as long as wide. Hind tibial spurs similar, expanding moderately before



Map 12. Geographic distribution of *Pseudozonitis stroudi*.

apex. **Male.** Sternum IX moderately sclerotized, slender; arms elongate, subparallel, blunt at apex. Gonoforceps varying in shape but with gonostyli prominent dorsally. Aedeagus 0.8 length of gonoforceps; ventral lobes narrowing to apex, occupying 0.35 aedeagal length; distance from apex of aedeagus to apex of ventral lobes less than length of latter. **Female.** Ventrite VI relatively broad and short, about half as long as wide, with a broad U to V-shaped medial emargination at apex extending 0.5 the length of segment.

Types — Holotype ♂, allotype ♀. MEXICO. *Durango*: Pedriceña (4500'); August 19, 1947; M. Cazier, collr; AMNH. Photo of holotype (Cat. No. 1532) available from AMNH Type Database, examined. Allotype not examined. Enns (1956) designated 60 paratypes of *P. vaurieae* (22 examined; see *Records*).

Intraspecific Variants

P. vaurieae is divided into forms A and B. The holotype represents Form A. The paratypes represent both. Of the 22 examined, 11 represent Form A, and

11 are Form B. The two are treated separately below. Form B occurs predominantly in Mexico where it occurs with Form A. United States populations of *P. vaurieae* are predominantly Form A. Justification for dividing the species is given in the *Discussion* section at the end of the species treatment.

As indicated, the two forms of *P. vaurieae* are sympatric in Mexico. They also have been collected together on five occasions in Mexico; these are indicated in the *Records* section of each form by the symbol (‡).

Form A

(Figs 7, 19, 26, 37, 38, 57, 63, 77. Map 13)

Description — Body length: \bar{x} = 13.4 mm (N = 14), observed range 8-18 mm. Pronotum with a large reddish or reddish brown cruciform macula consisting of a broad median longitudinal vitta crossed apically by a broad transverse fascia which continues onto the lateral panels of the pronotum; macula extending most the length of disk but not attaining the apical or basal borders. Venter generally entirely yellow orange but abdominal area entirely or partially darker in some. Mandibles relatively slender and elongate, distance from frontal suture to apex of mandibles (when positioned at midline) = 1.11 (1.00 - 1.23) (N = 20) distance between antennal sockets. Eyes narrowly separated on underside of head [IODV/IODD = 0.247 (0.15-0.32)]. Pronotum usually slightly longer than wide [l/w = 1.015 (0.99-1.07)], often with hind angles slightly flared. **Male:** Gonoforceps with gonostyli varying from increasing slightly in width from middle to apex (Fig. 77a), to distinctly convergent from base to apex (as in Figs 75a, 76a).

Geographic distribution — Known from the Colorado River in California, east to New Mexico and SW Texas, south to Chiapas and Baja California Sur (Map 13). Form A does not appear to follow Form B in the hot deserts of SE California and NE Baja California, but is broadly sympatric with it in mainland Mexico and Baja California Sur.

Seasonal distribution — 154 records. Primarily June 18 - October 11, with a single record from April. Monthly frequencies: April (1), June (4), July (67), August (68), September (13), October (1).

Adult associations — 37% of the records indicate collection at light. There are no plant

associations.

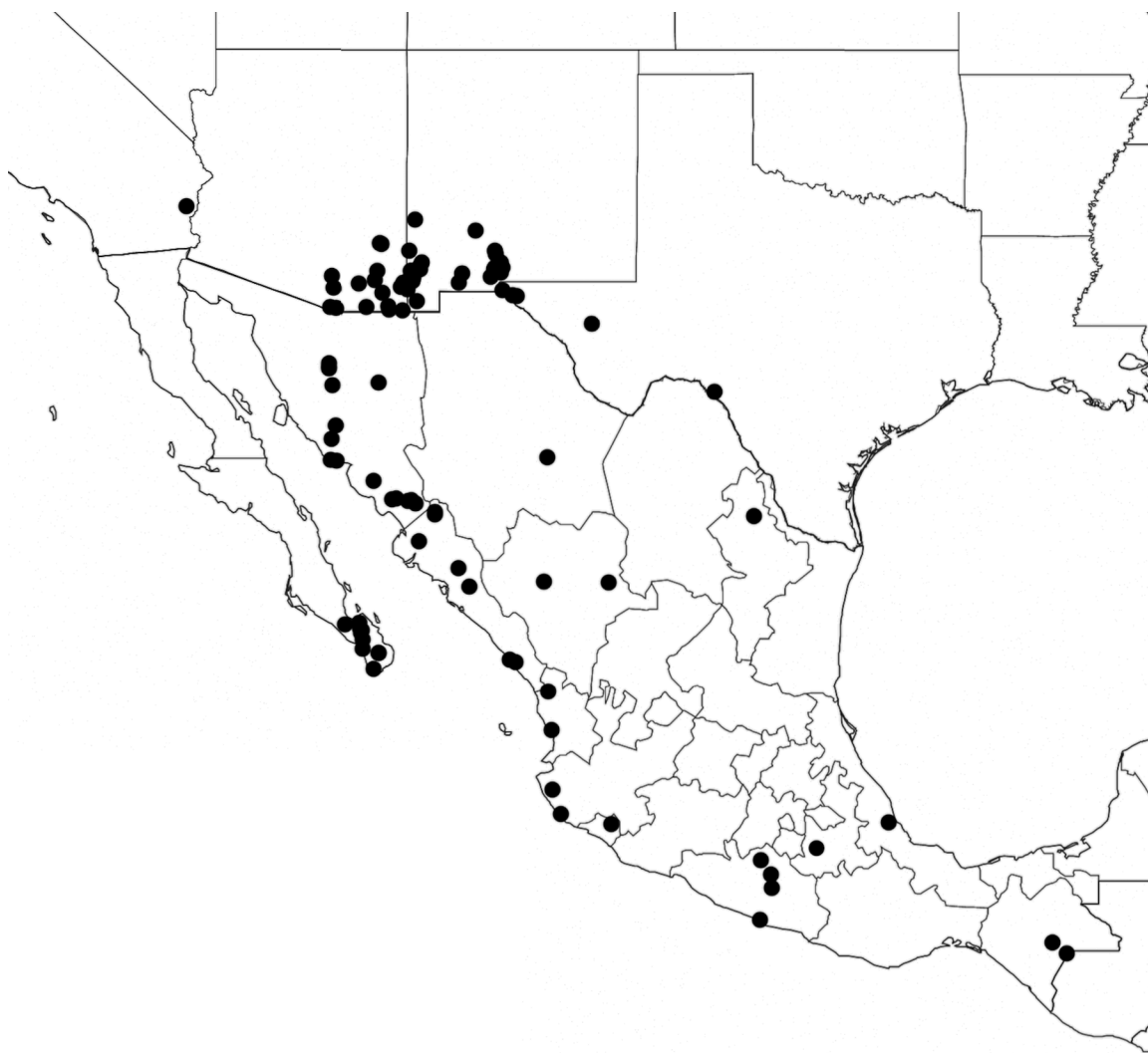
Identification — The enlarged eyes (Fig. 19) coupled with the cruciform maculation (Figs 37, 38) distinguishes Form A of *P. vaurieae* from all other *Pseudozonitis*. See below for further separation from Form B.

Comments — As defined here Form A is characterized primarily by the presence of the cruciform pronotal macula. In a few specimens the macula lacks the transverse apical fascia on the disk but retains reddish or orange coloration on the lateral panels. Elytral color pattern also varies. Although most are vittate as described above, in a small number of specimens (c. 5%) the elytra are completely yellow or light yellow-brown. There is no obvious geographic trend to the variation and both vittate and uniformly light-colored phenotypes can occur in the same series.

Records — 235 specimens (80♂, 155♀). MEXICO. **Baja California Sur:** Cabo San Lucas, 9 mi. N; ix-9-1988, ix-15-1988; BL; 4; E. Riley; TAMU. El Rosario, nr. (4.3 mi. W on Hwy 1 on Ramal a El Rosario); ix-6/7-1988; 1; E. Riley; TAMU. La Paz; ix-4/9-1967; 1; J. Chemsak, M. Michelbacher; CISC. La Paz, 2 mi. S; viii-7-1966; 1; J. Chemsak; CISC. La Paz, 9 mi. S; viii-17-1982; 1; F. Havore; FSCA. La Paz, 10-22 km S (Rt. 1); viii-26-1994; 2; J. Huether; JHC. La Paz, 20 km S; viii-26, viii-27-1994 (BL), ix-1-1994 (BL)†; 5; J. Huether/J. Wappes; FSCA, JHC. La Paz, 25 mi. W; viii-30-1959; light trap; 2; K. Radford, F. Werner; CAS. Miraflores, 5 km NW; viii-12-1980; BL; 1; W. Barr; WFBM. San Pedro, 3.5 mi. NE; ix-7-1967; 2; J. Chemsak; CISC. Santiago, 6 mi SW; viii-31-1959; light trap; 4; K. Radford, F. Werner; CAS. Todos Santos, 4 mi. N; ix-2-1959; light trap; 3; K. Radford, F. Werner; CAS. **Chiapas:** Comitán, 31 mi. SE; vi-18-1965; at light; 1; H. Burke et al.; TAMU. Las Cruces, 15 mi. W; vii-27-1952; 1; E. Gilbert, C. MacNeil; CISC. **Chihuahua:** Concho, 7.1 mi. W; vii-23-1982; BL; 1; F. Andrews; JHC. **Colima:** Colima; vii-27-1973; 2; D. Riley; TAMU. **Durango:** El Entronque, 35 mi. S (5000'); vii-21-1952; 2; paratypes; R.K. & B.J. Selander; FSCA. Pedriceña; 1; (see *Types*). **Guerrero:** Acapulco; vi-21-1935; 1; paratype; M. Embury; CAS. Iguala, 18 mi. W; viii-21-1981; 2; CAS. Iguala, 24 mi. S; vii-18-1963; 2; F. Parker, L. Stange; FSCA. Zumpango, 10 mi. N; vii-

22-1963; 2; F. Parker, L. Stange; FSCA. **Jalisco:** Chamela, nr; vii-9/19-1993†, vii-15-1990; 6; J. Huether, J. Wappes; FSCA, JHC. Chamela, Estacion de Biología; vi-24-1980 (at light), vii-10/20-1985, vii-16-1985, vii-24-1987; 4; Atkinson, Noguera/A. Garcia-Aldrete/E. Giesbert/J. McCarty; CISC, FSCA, UCRC. Tomatlan, 13 mi. N; viii-4-1981; at light; 1; P. Jump; UAIC. **Nayarit:** Acaponeta; viii-15-1960; 1; P. Arnaud Jr et al.; CAS. San Blas; vii-5-1972; 1; K. Stephan; FSCA. **Nuevo Leon:** Vallecillo; vi-3/5-1951; 1; paratype; P. Hurd; CAS. **Puebla:** Izucar de Matamoros, 3 mi. E; iv-25-1962; 3; F. Parker, L. Stange; UCRC. **Sinaloa:** Culiacan, 16.4 mi. N; viii-24-1971; 5; J. Cicero; FSCA. Choix; viii-5-1968, viii-12-1969, viii-18-1969; 6; T. Sears et al.; UCDC, UCRC. Choix, 4 mi. N (Arroyo del Saucillo)†; vii-4-1968; 1; T. Sears, et al.; UCDC. Mazatlan; ix-13-1918; 1; CAS. Pericos, 26 mi. N; viii-13-1960; 1; P. Arnaud Jr et al.; CAS. San Blas, 1 mi. W; vii-11-1974; UVL; 1; R. Mangan, D. Chandler; UMRM. Villa Union, 9.7 mi. NE; viii-25-1971; 1; J. Cicero; FSCA. **Sonora:** Alamos; vii-28/29-1957; 1; R. Arnett; FSCA. Alamos, 13 km W; ix-1-1975; 1; B. Villegas; CISC. Benjamin Hill; vii-24-1957; at light; 1; R. & J. Selander; FSCA. Benjamin Hill, 6 mi. S; viii-6-1963, viii-26-1963; BL; 4; E. Sleeper; CAS. Ciudad Obregon; vii-4-1960; at light; 2; W. Gibson; UAIC. Guaymas; viii-5-1940; 1; paratype; R. Allen; CAS. Guaymas, 40 mi. N; viii-29-1959; 4; A. Menke, L. Stange; FSCA. Hermosillo, 40 mi. N; viii-8-1960; 2; P. Arnaud Jr et al.; CAS. Hermosillo, 42 mi. S; viii-12-1952; 1; paratype; M. Cazier et al.; UMRM. Llano, 25 mi. S; vii-13-1950; 1; J. Figg-Hoblyn; CAS. Moctezuma, 17 km SW; vii-11/12-1983†; UVL; 1; S. McCleave, P. Jump; UAIC. Navajoa; viii-8-1959†, viii-15-1964 (at light), viii-19-1962; 3; H. Daly/L. Larson/E. Michelbacher; CISC, UMRM. Navajoa, 5 mi. E; viii-11-1960; 1; P. Arnaud Jr; CAS. San Carlos Bay; viii-10-1960; 1; P. Arnaud Jr et al.; CAS. **Veracruz:** Rinconada, 6 mi. SE; ix-29/30-1975; at light; 1; J. Powell, J. Chemsak; CISC. UNITED STATES. **Arizona:** Benson; vii-14-1989 (at light), vii-16-1947 (at light, paratype), viii-10-1945, vii-24-1992; 5; R. Flock/J. & M. Huether/J. Huether/ F. Werner; JHC, UAIC, UCRC. Congress, 6.5 mi. NE; viii-7-1970; BL; 1; J. Gruwell; CAS. Continental; vii-1972, vii-1976, vii-1979; 4; Lenczy; USNM. Douglas; 2; J.

- Russell; USNM. Douglas; viii-21-1971; at light; 2; S. McCleave; UAIC. Douglas, 3 mi. N; viii-17-1968; at light; 1; V. Roth; FSCA. Douglas, 17 mi. E; viii-3-1967; BL; 4; S. & S. Frommer; UCRC. Elfrida, 5 mi. N; viii-3-1972; 2; J. Cicero; FSCA. Gleeson, 1 mi. W; vii-26-1949; at light; 1; paratype; F. Werner, W. Nutting; UAIC. Hereford, ½ mi. W (4150'); vii-9-1974, vii-15-1974; 2; E. Hoebeke; JHC. Nogales; vii-15-1952, vii-22-1903, x-11-1898; 3; D. & J. Knull/ Koebele/Oslar; CAS, OSUC. Paradise (Chiricahua Mts); viii-11-1966; at light; 1; L. Anderson; UCRC. Pearce, 11 mi. S; vii-30-2000; at light; 1; J. Huether; JHC. Peña Blanca [Lake]; vii-24-1960; 1; K. Roeber; UAIC. Portal; vii-25-1969, vii-29-1978 (at light), vii-30-1965 (at light), viii-2-1965 (at light), viii-6-1983, viii-10-1980, viii-11-1983; 10; B. Dozier/A. Evans/S. Gorodenski/L. Hawkins Jr/ G. Nelson/E. Riley; CAS, ERC, FSCA, MEM, UCRC, WFBM. Portal, 1.5 mi. 'from'; viii-10-1977; at light; 2; K. Cooper; UCRC. Portal, nr; viii-3-1965; 'BL trap on desert'; 1; R. Arnett Jr; FSCA. Portal, 3 mi. N; viii-2-1975, viii-3/4-1976; UVL; 3; G. Nelson; FSCA. Portal, 3.7 rd. mi. N; vii-26-1976; 2; A. Evans; UCRC. Portal, 6 mi. N; viii/ix-1971; BL; 1; J. Pinto; UCRC. Portal, 8 mi. N; vii-16-2001; BL; 1; S. Lingafelter; JHC. Rincon Valley; viii-6-1978; UVL; 1; UAIC. Robles Jct., 18 mi. SW (Brown Cyn); viii-11-1991; 1; L. Bezark; JHC. Safford; vii-24-1940 (paratype), vii-31-1952, viii-5-1954 (light trap); 4; CAS, UAIC, UMRM. Southwestern Research Station (nr Portal); vii-19-1976, vii-21/26-1971, viii-1971; 4; L. Anderson/ L. Lampert; FSCA, UCRC. San Bernardino Ranch (Cochise Co.); vii-14-1975; at light; 1; S. McCleave; UAIC. St Xavier Mission; vii-29-1924; 1; paratype; E. VanDuzee; CAS. Sunsites, 7 mi. NW; vii-7-2012; 1; JHC. Texas Cyn (Cochise Co.); vii-27-1992; 1; J. & M. Huether; JHC. Thatcher; viii-13-1950; 2; E. Taylor; FSCA. Tucson; vii-24-1951, viii-21-1968; 2; R. Robinson/K. Stephan; FSCA, TAMU. Tucson Mtn Prk; viii-1-1980; BL; 1; J. Pinto; UCRC. Vail, 8 mi. N; viii-7-1966; UV trap; 1; F. Werner; UAIC. Willcox; vii-31-1970 (BL), viii-9/10-1970 (UV trap); 8; S. Kozloski; CSCA, UAIC. **California:** Blythe; viii-9-1932; 2; paratypes; M. Embury; CAS. **New Mexico:** Afton Pump[ing] Station, 1 mi. SE (Dona Ana Co., 32.1139862°N, 106.8530587°W); vii-25/28-1970; BL; 2; J. Gruwell; CAS. Anapra (= Sunland Park); vii-13-1964; 1; J. Eyer; NMSU. Animas Mts, 1706 m ('Godfrey Place', Hidalgo Co.); vii-26-1981; 1; S. Dobrott; UAIC. Cienega Lake (Hidalgo Co.); viii-4-1967; 1; L. Anderson; UCRC. Columbus, 6 mi. NW; vii-24/31; 1; J. Gruwell; CAS. Cotton City; viii-10-1964; 1; D. Jennings; NMSU. Deming, 14 mi. SE, 4500' (Rockhound St. Prk); viii-1-1989, viii-17-2004; 3; J. Heppner; FSCA. 'Jornada Val. Site Playa' (Dona Ana Co., 32.682683°N, 106.759254°W); vii-21-1972; 1; T. Bellows; NMSU. Las Cruces; vii-16-1966, vii-23-1954, viii-2-1962; 3; H. Cott/D. Jennings/J. Lopez; FSCA, NMSU. Las Cruces, 40 km NNE (Jornada LTER Site); viii-8-1985; 1; S. Van Vactor; NMSU. Lordsburg; vii-30-1966; 1; J. Tilden; CAS. Lordsburg, 3 mi. S; vii-28-1972; 1; R. Westcott; WFBM. Lordsburg, 5 mi. NE; viii-21-1971; 1; E. Grissell, R. Denno; UCDC. Lordsburg, 16 mi. W (32°14'01"N, 108°57'12"W); viii-15-2012; at light; 4; R. Brown; MEM. Mesilla Park, 3900'; viii-18-1980; 1; G. Forbes; NMSU. Organ; viii-4-1959; 1; R. Selander, J. Schaffner; FSCA. Organ Mts ('foothills off Baylor Cyn Rd'); viii-6/7-2006; UVL; 2; J. McClarin; NMSU. Pyramid Peak (Dona Ana Co.); viii-12-1970; 1; F. Fosberg; CAS. Road Forks, nr (jct. I-10 & Rt 80); vii-11-2012 (at light), vii-12-2013, vii-14-2013, ix-5-2012; 17; J. & M. Huether/J. Huether, C. O'Brien/J. Huether, W. Warner; JHC. Rodeo; viii-7-1958; 1; C. Moore; FSCA. Rodeo, 10-16 km N (1300'); vii-26-1992; at light; 2; H. & A. Howden; JHC. Rodeo, 19 km N; vii-29-1992; 1; H. & A. Howden; JHC. Truth or Consequences; viii-2-1968; 1; R. Biggam; JHC. University Park; vii-31-1963; at light; 1; J. Watts; NMSU. Virden; vii-9-1962, vii-29-1965; 2; B. Campbell/G. Gomez; NMSU. Whitewater Public Camp, Gila Natl Forest (Catron Co.); vii-11/14-1970; BL; 1; J. Gruwell; CAS. **Texas:** Amistad Reservoir (Val Verde Co.); vii-24-1975; 1; M. Mispagel; CAS. El Paso Co. (Texas Agr. Exp. Sta.); vii-29-1977; light trap; 1; C. Burgess; TAMU. Horizon City; vii-26/27-1977; light trap; 1; TAMU. Kent (Culberson Co.); vii-27-1971; 1; FSCA.



Map 13. Geographic distribution of *Pseudozonitis vaurieae*, Form A.

Form B

(Figs 17, 39, 54, 64, 71, 85. Map 14)

Description — Differs from Form A as follows: Averaging smaller in size [body length: \bar{x} = 10.9 mm (N = 10), observed range 7-14 mm], but somewhat less slender. Eyes often more separated on underside of head [IODV/IODD = 0.363 (0.19-0.61)]. Mandibles more robust, shorter, distance from frontal suture to apex of mandibles (when

positioned at midline) = 0.949 (0.85-1.12) (N = 23). Pronotum usually slightly wider than long (l/w = 0.964, 0.92-1.04) with hind angles not flared or only slightly so; disk without a reddish cruciform macula, instead either uniformly yellow-orange, or, more typically, with a large ill-defined darker orange area at center blending into lighter yellow areas peripherally; entirely dark orange in some. Elytra usually somewhat more lustrous and with punctures slightly larger. **Male.** Gonoforceps with gonostyli

convergent from base to apex (as in Fig. 76a).

Geographic distribution — Known from the deserts of California south into Baja California Sur and, in mainland Mexico, west of the Sierra Madre Occidental, from Sonora south to Chiapas (Map 14). Single collections are recorded from Arizona and New Mexico. Form B is broadly sympatric with Form A in Baja California Sur and throughout much of its range in mainland Mexico.

Seasonal distribution — 78 records. April 9 – October 21. Monthly frequencies: April (5), May (6), June (27), July (15), August (15), September (3), October (7). Form B is not entirely synchronic with Form A (See *Discussion*).

Adult associations 30% of the records indicate collection at light. Taken once beating *Lysiloma candidum* Brandege (Fabaceae) and once from *Chrysothamnus* sp. (Asteraceae).

Identification — Form B is best separated from Form A by the absence of the cruciform red macula on the pronotum. In addition, the mandibles generally are shorter and more robust (cf. Figs 63, 64). The distance from the frontal suture to the apex of the mandibles usually is less than the distance between the antennal sockets whereas the reverse obtains in Form A (see *Descriptions* of both forms). The broader pronotum without or only with minimally flared hind angles also helps characterize Form B.

Unlike Form A, Form B populations of *P. vaurieae* can be confused with other species, *P. stroudi* in particular. Both are of similar size, usually have vittate elytra and similarly colored femora, and have mandibles which curve strongly from mid-length. Pronotal punctation, male genitalia and structure of ventrite VI in females provide separation. In *P. vaurieae* the pronotal punctures are distinct and smaller laterally than toward the middle, whereas in *P. stroudi* the punctures are larger, similar in size throughout and partially confluent (cf. Figs 36, 39 and 53, 54). The position of the aedeagal ventral lobes also differ in the two. In *P. vaurieae* the lobes approach the apex of the aedeagus more closely than in *P. stroudi* (cf. Figs 76b, 77b). Ventrite VI also differs in females. In *P. vaurieae* this sclerite is much wider, about one-half as long as wide, and the median emargination extends about one-half its length (Fig. 71). In *P. stroudi*, ventrite VI is 0.7-0.8 as long as wide and the emargination only extends a

third or less its length (Fig. 70).

Vittate individuals of *P. brevis* and *P. vigilans* also are similar to Form B but are easily separated by mandible shape. Unlike in *P. vaurieae* the mandibles in these species are narrower, straight basally and only curve in their apical third (cf. Figs 61, 64).

Comments — As in Form A, the vast majority of Form B have dark-colored elytra with narrow yellow vittae. In a few individuals (c. 4%) the elytra are entirely light colored; these are scattered throughout the geographic range. Less commonly (five individuals, all from Baja California) the elytra are completely dark.

The Ocotillo Wells, California, record for Form B is questionable. The record is based on a specimen with two labels as follows: 'San Diego Co./Calif. vi-14-44'// 'Ocotillo'//. Ocotillo Wells is in San Diego Co. and a Federally recognized variant name for the locality is 'Ocotillo'. There also is the town Ocotillo in adjacent Imperial Co. Alternately 'Ocotillo' could refer to a plant association.

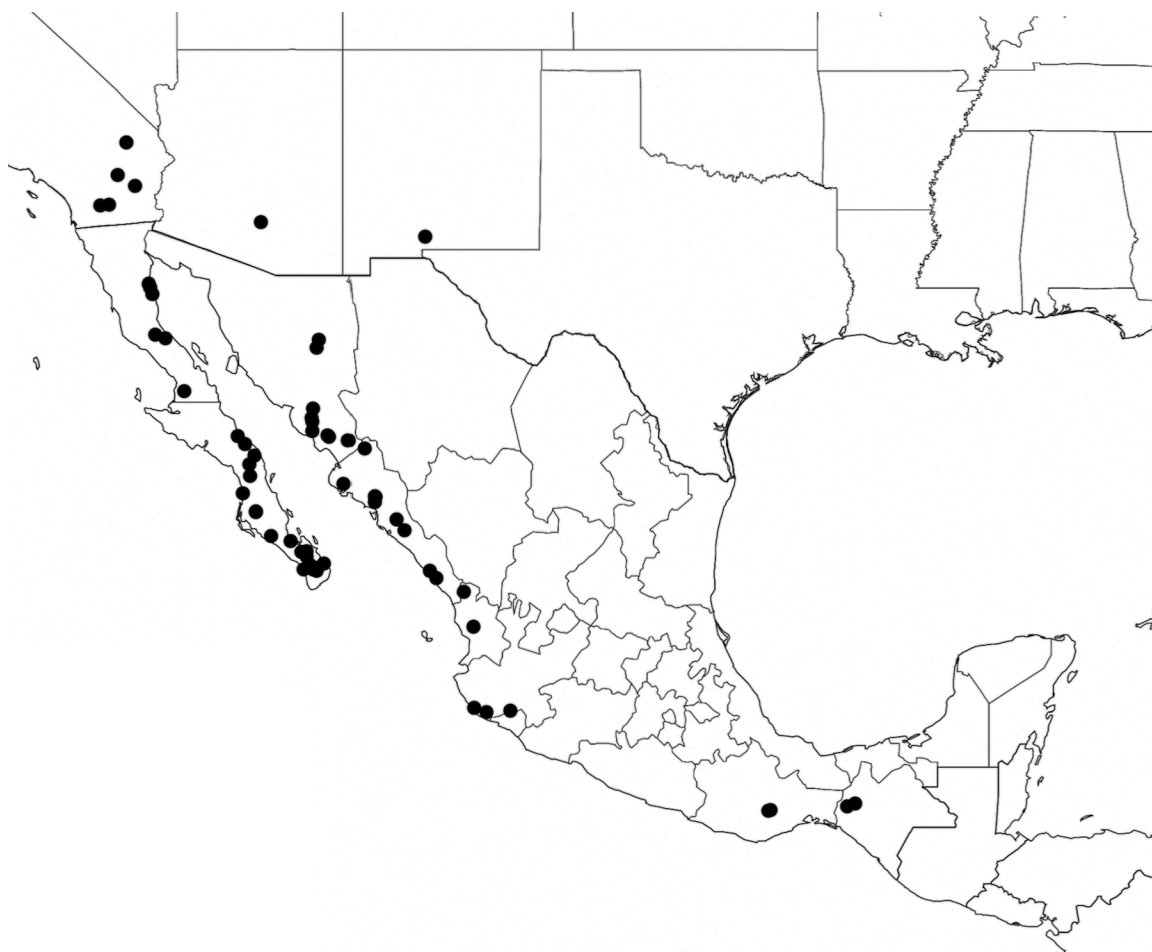
Records — 222 specimens (93♂, 126♀, 3 sex unknown). MEXICO. **Baja California:** Cataviña, 5 km N; viii-7-1992; 1; H. Howden; JHC. Las Arrastras, 7 mi. N; vi-8-1967; BL; 19; E. Sleeper, E. Fisher; CAS. San Felipe; v-18-1963, vi-4-1967; 6; R. Davis, J Webb/ J. Hall; CAS, UCRC. San Felipe; vi-15-1952; 1; paratype; M. Cazier et al.; UMRM. San Felipe, 5 mi. N; vi-3-1961; at light; 3; H. Howden, G. Nelson; JHC. San Felipe, 15 mi. S; vi-6-1967; BL; 11; E. Sleeper, E. Fisher; CAS. **Baja California Sur:** Bahia Concepcion, SE shore; iv-23-1995; 'beating *Lysiloma candida*'; 1; R. Westcott; WFBM. Boca de la Sierra; vi-25/28-1967; BL; 1; E. Sleeper, E. Fisher; CAS. La Burrera; vii-5-1967; BL; 1; E. Fisher; CAS. La Paz, 14 mi. NW; iv-23-1974; 1; R. Hardy; CSCA. La Paz, 17 mi. S (Bahia de los Muertos); iv-22-1987; 5; R. & M. Shaver; UCDC. La Paz, 20 km S†; viii-26/ix-1-1994; 2; J. Wappes; FSCA. Las Barracas; iv-29-1984 (BL), v-18-1984 (BL), v-27-1984 (BL), vi-9-1984 (Malaise trap); 9; P. DeBach; UCRC. Mezquital; vii-28-1938; 1; paratype; Michelbacher, Ross; CAS. Mulege, 1 mi. S; viii-27-1959; 1; K. Radford, F. Werner; CAS. Puerto Lacondito [not located]; vii-10/14-1989; 1; R. Shaver; UCDC. San[to] Domingo; vii-19-1938; 1; paratype; Michelbacher, Ross; CAS. San Miguel Comondú, 2 mi. S; vi-22-1967; BL; 3; E.

Sleeper; CAS. [San Miguel] Comondú, 20 mi. N; vii-23-1938; 1; paratype; Michelbacher, Ross; CAS. [San] Venancio; vii-17-1938; 6 (2 paratypes); Michelbacher, Ross; CAS. 'Ramal El Coro'; viii-27-1994; BL; 1; R. Morris; UMRM. San Jorge, 1.5 mi. E; vii-24-1971; UVL; 3; H. Real, R. Main; CAS. Santa Rita, nr; viii-8-1980; 3; C. Bellamy; CAS. Santa Rosalia, 38.6 km S (100 m); v-30/31-1973; BL, 'tropical scrub'; 18; E. Sleeper; CAS. Todos Santos, nr; viii-30-1994; 5; J. Huether; JHC. Todos Santos, 1 km S; viii-29-1994; BL; 1; R. Morris; UMRM. Todos Santos, 13 mi. E (Hwy 19); ix-17/18-1968; 1; E. Riley; TAMU. Triunfo; vii-15-1938; 1; paratype; Michelbacher, Ross; CAS. Triunfo, 6 mi. N; vii-15-1938; 1; paratype; Michelbacher, Ross; CAS. Villa Constitucion, 13 mi. N (450'); xi-7-1968; BL; 1; E. Sleeper, F. Moore; CAS. **Chiapas**: Cintalapa, 28 mi. W; iv-9-1962; 2; F. Parker, L. Stange; UCRC. Ocozacoatlán, 16 km W (El Aguacero); x-5-1986; 1; E. Giesbert; FSCA. **Colima**: El Terrero, 4-6000'; ix-30-1991; 2; J. Wappes; FSCA. **Jalisco**: Melaque, 21 km N; x-16/22-1987; at light; 12; Chemsak, Powell; CISC. Chamela, Estacion de Biología; x-1-1991 (BL), x-4/15-1981, x-9-1985, x-16-1988, x-21-1992; 7; Brickerood, Ross/L. Menchaca/Morris et al./J. McCarty/R. Usela; CAS, CSIC, FSCA, UCRC. Chamela, nr Estacion de Biología; vii-9/19-1993; 2; J. Huether et al.; JHC, UMRM. **Nayarit**: Jesus Maria; vi-26-1955; 1; B. Malkin; CISC. **Oaxaca**: El Camaron, 2.7 mi. NW; at light; 1; Clark et al.; TAMU. El Camaron [Yautepec], 5 mi. W; v-20-1969; 1; H. Howden; JHC. **Sinaloa**: Acaponeta, 20 mi. N; vi-25-1960; at light; 2; L. Willahan; FSCA. Choix, 4 mi. NW (Arroyo del Saucillo); vii-4-1968; 1; T. Sears et al.; UCDC. Culiacan; vi-23-1960; at light; 1; L. Willahan; FSCA. Culiacan, 19 mi. S; vi-22-1963; 1; J. Doyen; CISC. Culiacan, 57 mi. N (400') ('km 1509, Mex. 15'); vi-19-1968; 2; A. Hardy et al.; UCRC. Guamuchil; vi-14-1961; 5; F. Parker; UCRC. Guamuchil, 16 mi. S; vi-16-1961, vi-30-1963; 33; F. Parker; FSCA, UCRC. Los Mochis; vi-9-1922; 2; paratypes; C. Dodds; CAS. Los Mochis; vii-22-1955; at light; 2; R. & J. Selander; JHC. Mazatlan, 5 mi. N; vii-1-1965; 5; J. & M. Chemsak, E. & J. Linsley; CISC. Villa Union, 4 mi. S; vi-23-1963; 1; J. Doyen; CISC. **Sonora**: Alamos, 7 mi. SE (Arroyo Cuchujaqui); vi-19-1963; 1; J. Doyen; CISC. Alamos, 7.7 mi. SE; 1; R. Loomis; CAS.

Ciudad Obregon; vii-14-1960, vii-24-1960; at light; 4; W. Gibson; UAIC. [Ciudad] Obregon, 15 mi. S; vi-22-1955; 1; D. Giuliani; CAS. Ciudad Obregon, 22 mi. N; vi-11-1962; 1; D. Janzen; CISC. Cocorit; v-23-1962; 1; L. Stange; FSCA. Moctezuma, 17 km SW (944 m); vii-11/12-1983 (UVL); vii-21/22-1980 (at light); 5; S. McCleave, P. Jump; UAIC. Navajoa; viii-8-1959; 1; M. Larson; UMRM. Navajoa, 1 mi. NW; vi-27; 1; E. Sleeper et al.; CAS. Ures, 30 mi. E ('on rd. to Moctezuma'); viii-12-1969; 1; A. Hardy, B. Cheary; UCRC. UNITED STATES. **Arizona**: Picacho (Pinal Co.); vi-18-1961; 1; F. Parker; FSCA. **California**: Amboy, 10 mi. NE; vi-26-1954; 2; L. Moore; BYU. Desert Center, 14 mi. SE (Corn Springs); vi-11-1993; 1; B. & F. Carr; JHC. Joshua Tree Natl Mon. (Pleasant Valley, Fried Liver Wash); vi-30-1965; BL; 1; E. Sleeper, S. Jenkins; CAS. Ocotillo [Wells?] (San Diego Co.); vi-14-1949; 1; G. Marsh; JHC. San Felipe Ck, Tamarisk Grove Ranger Sta. (San Diego Co.); vi-14-1961; 1; N. Hasegawa; CAS. **New Mexico**: Las Cruces, 10 mi. E; viii-8-1950; 1; paratype; on *Chrysothamnus* sp.; J. MacSwain; CAS.

Discussion — Enns (1956) did not address the considerable variation that occurs in *P. vaurieae*. He stated that the red cruciform pronotal markings were 'within moderately broad limits' ... 'a remarkably constant feature' of the species. This statement holds if we only consider US populations which are predominantly Form A. Furthermore, the original description of *P. vaurieae* gives body length as varying from 10-18 mm and only specimens at least 10 mm in body length will adequately resolve in the Enns key. Among the paratypes of *P. vaurieae*, however, are several Form B individuals, all except one are from Mexico where it appears to be dominant. These lack the typical reddish pronotal maculation and a few are less than 10 mm in length. It is clear that although recognizing a broader definition of the species as reflected in the paratype designations, Enns' treatment of the species is satisfactory only for Form A.

It can be argued that the two forms of *P. vaurieae* warrant species recognition. The fact that the two are sympatric over part of their respective range and in some cases are syntopic, supports species recognition. Also, although both forms are represented in desertic areas of Baja California Sur,



Map 14. Geographic distribution of *Pseudozonitis vaurieae*, Form B.

Sonora and Sinaloa, only Form B has been taken in the hot deserts of NE Baja California and SE California (cf. Maps 13, 14). There also is a degree of allochrony. Although the two overlap seasonally, Form B appears to occur earlier and, perhaps, also later than Form A. Thus in one area of general sympatry where both are well represented (Sonora and Sinaloa), Form A has not been taken earlier than July (27 records) whereas 13 of 24 records of Form B are prior to July. Both forms also occur in the Chamela area of Jalisco. At this location Form A has been taken only from June 24 to August 9 (7 records), whereas of the seven collections of Form B only one is from August; the remainder is from October.

Similarly in Baja California Sur all 14 records of Form A are from August and September. Of the 27 collections of Form B only 8 are from August and September; the remainder is earlier (April into July).

Form B is not treated as distinct because I have been unable to find any character which provides adequate separation except pronotal color pattern. Other features such as structure of the male genitalia, pronotal dimensions, mandibular structure and eye size show continuous variation. For example, in Form A, the male gonostyli do not usually converge and even diverge slightly from base to apex (Fig. 77a). In Form B the gonostyli converge as they do in most *Pseudozonitis* (as in Fig. 76a). Yet both

states and intermediates occur in Form A. Most individuals can be separated to form by mandibular structure. Again, however, intermediacy occurs. In addition, a few individuals assigned to Form A based on pronotal maculation (e.g., 3 mi. E Izucar de Matamoros, Puebla) resemble Form B for other traits. Also, although the absence of the cruciform macula on the pronotum defines Form B, there are a few individuals in which the pronotal side panels alone are rosaceous in color but the disk is not or only slightly so. These are assigned to form based on pronotal dimensions and mandibular length. That they occur in zones of sympatry suggests some level of genetic continuity. In my opinion, the two forms likely represent species experiencing a degree of hybridization in zones of contact but additional study is required to better define taxonomic structure. This species complex seems to be an excellent candidate for molecular investigation.

***Pseudonitis vigilans* (Fall, 1907)**

(Figs 2, 3, 4, 21, 34, 56, 74. Map 15)

Zonitis vigilans Fall 1907: 257. MacSwain 1951: 72.
Pseudonitis vigilans, Dillon 1952: 342. Enns 1956: 850.

Description — Body length: $\bar{x} = 9.7$ mm ($N = 11$), observed range 7-14 mm. Color varying from, most commonly, almost entirely light yellow-orange, to yellow-orange except elytra, venter and legs brown or black. Elytra vittate in some, with typical marginal, discal and sutural yellow vittae, discal vitta relatively wide, not streak-like, at least subequal in width at some point along its length to adjacent lateral and medial brown stripes. Head often darker than pronotum. Antennae light to dark brown, darker than elytra if elytra pallid; segments weakly banded apically or not. Pronotum always uniformly light in color, without markings. Legs with femora varying from entirely pallid to entirely dark, commonly light colored with apex black; with varying degree of black on apical 3/4 of tibiae and tarsi. Wing membrane, at most, lightly pigmented. Head and pronotum densely, moderately coarsely punctate; pronotal punctures distinct, crowded but not confluent. Body setation light in color, relatively short.

Head l/w = 0.701 (0.67-0.74). Eyes large,

bulged; ventral lobe distinctly wider than dorsal lobe; HWE/HWT = 1.210 (1.15-1.25); width at base of mandibles slightly less than half width at eyes; IODD/HWE = 0.363 (0.31-0.42); IODV/IODD = 0.336 (0.25-0.47). Antennal segment relative length (male): 21, 21, 29, 35, 37, 39, 36, 36, 36, 34, 40; segment VI 4-5x as long as wide. Mandibles relatively slender, straight basally, curving only at apical third. Pronotum width subequal to length. Hind tibial spurs usually relatively narrow, not noticeably expanded before apex. Pygidium entire or slightly emarginate apically. **Male.** Sternum IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.6 length of gonocoxal plate; gonostyli evenly convergent from base to apex. Aedeagus 0.8 length of gonoforceps, with ventral lobes narrowing at apex, occupying c. 0.3 aedeagus length. **Female.** Ventricle VI with a broad V- to U-shaped emargination which does not quite attain 0.5 length of segment.

Type — Holotype ♂. USA. "Cal"; MCZ type 24311; on-line images of type examined (MCZ Type Database). Enns (1956) labeled a female from San Diego, California, 'neallotype' (MCZ).

Geographic distribution — SW North America from S California and S Arizona south to Baja California Sur (Map 15).

Seasonal distribution — 27 records. Monthly frequencies: April (8), May (4), July (1), August (1), September (6), October (7). Apparently bimodal in desert habitats. Most collections are from the Algodones Dunes in SE California where they were made in April/May and in September/October. Arizona and Baja California Sur collections are from September and October. The two records from July and August (La Mision, Baja California; San Diego, California) are the only collections not from a desert habitat.

Adult associations — Six of the 28 collections labeled as taken at light. There are no plant records.

Identification — *Pseudonitis vigilans* can be confused with two other Southwestern species, *P. arizonica* and *P. brevis*. *P. arizonica* is a pallid species and is similar only to light-colored individuals of *P. vigilans*. The considerably lighter antennae in *P. arizonica* which is similar in color to the elytra will immediately separate it from pallid *P. vigilans*.

which has antennae considerably darker than the elytra. Also, the more abruptly curved mandibles in *P. arizonica* distinguishes it from *P. vigilans* (cf. Figs 21, 22).

Separation from *P. brevis* is more difficult. In *P. vigilans* the eyes are more bulged and slightly larger (cf. Figs 20, 21), and body setation usually is less obvious. The difference in setation length in the two species is best observed along the lateral section of the elytra (cf. Figs 55, 56). The difference in eye size is reflected in *P. vigilans* by its head width at the base of the mandibles being slightly less than half the maximum head width across the eyes. In *P. brevis* this ratio is slightly over half. The most satisfactory means of separation is examining male genitalia. In *P. brevis* the sides of the gonostyli are parallel at the base before converging to the apex (Fig. 73), whereas in *P. vigilans* the sides converge evenly from the very base (Fig. 74). This difference is consistent throughout the range of both species. Vittate individuals of the two may also be separable by the width of the yellow discal vitta. This vitta is wider in *P. vigilans* relative to the adjacent brown stripes compared to *P. brevis* (cf. Figs 1, 3). This difference requires corroboration since few vittate series of *P. vigilans* were available for study.

Month of collection also may be helpful in separating these species. Although it is impossible to discount collecting bias, records suggest that *P. vigilans* and *P. brevis* have minimal seasonal overlap. The former occurs primarily in spring and autumn. It has never been collected in June, and the two collections in July and August are localities near the coast. By contrast, *P. brevis* is most commonly collected during the summer months. Interestingly, at Santo Domingo, Baja California Sur, the only locality where both species have been collected, *P. vigilans* occurred in late October and *P. brevis* was taken in mid-July. The single record of *P. brevis* from an unspecified locale in Imperial Co., California, is from July. Although *P. vigilans* has been commonly taken in Imperial Co. there are no records after May and before September.

Comments — Elytral color pattern is the most obvious feature which varies. Material from the Pallen and Algodones dune systems in SE California is uniformly pallid (Fig. 2). The large series from Organ Pipe National Monument is primarily vittate

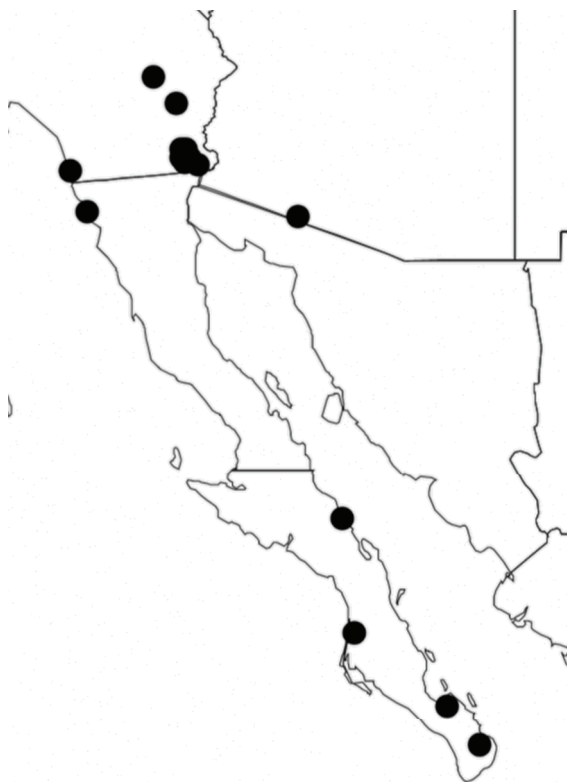
(Fig. 3) but four of the 33 specimens are pallid. In the few individuals near the coast the elytra are entirely dark (Fig. 4). In Baja California Sur all individuals are pallid except those from Santo Domingo which are vittate.

The previous concept of *P. vigilans* (see Enns 1956) included only the form with black elytra (Fig. 4). San Diego was the only specific locality indicated in his work. Pallid individuals have been identified in collections as *P. arizonica* or *P. brevis*; vittate individuals have been identified as *P. brevis*. A female from Mission Dam (San Diego, CA) in the CAS, considered by Enns (1956) as *P. vigilans*, is misidentified; it may belong to an undescribed species. Its color pattern is similar to the dark form of *P. vigilans* but the eyes are considerably smaller and the mandibles more basally curved. Males are needed for further clarification.

P. vigilans and *P. brevis* are similar, and females in particular are difficult to separate. Eye size and body setation differ but, as indicated above, both are difficult to quantify. The decision to consider them distinct was based primarily on the consistent difference in gonostyli structure in males (cf. Figs 73, 74). Thirty dissections throughout the range of both were examined. This included the one locality (Santo Domingo, BCS) where both were collected. The difference in seasonal distribution detailed above also supports species recognition.

Records — 135 specimens examined (45♂, 90♀). MEXICO. **Baja California:** La Mision; vii-3-1956; 1; E. Sleeper; CAS. **Baja California Sur:** La Paz; x-12-1968; BL; 13; E. Sleeper, F. Moore; CAS. Santiago, 4 mi. NE (Los Cuevos Rd); ix-28-1967; 1; G. Marsh; CISC. San[to] Domingo; x-23-1941; 5; Ross, Bohart; CAS. San Lucas; x-20-1979; 1; W. Chamberlain; TAMU. UNITED STATES. **Arizona:** Organ Pipe Natl Mon. (Quitobaquito); ix-30-1961; BL; 33; E. Sleeper; CAS. **California:** Algodones Dunes (2.5 mi. NE Coachella Bridge #1; 32°51'41"N, 115°4'6"W); iv-17-1979; BL; 1; CSCA. Algodones Dunes (5.1 mi. SE Coachella Bridge #3; 32°0'13"N, 115°11'17"W); iv-18-1979; 1; CSCA. Brawley, 20 mi. E (sand dunes); iv-29-1985; at light; 9; W. Chamberlain; TAMU. Glamis; x-12-1965; 1; UCDC. Glamis; iv-1981, x-1979; 12; Lenczy; USNM. Glamis (sand dunes); v-5-1970; 2; B. Cheary, A. Hardy; UCRC. Glamis, 1.3 mi. SW;

ix-2-1973, x-28-1977; 2; J. Cicero; FSCA, UMRM. Glamis, 1.3 mi. SW; ix-20-1987; 1; R. Cunningham; JHC. Glamis, 1.3 rd mi. W; ix-14-1979; 1; A. Evans; UCRC. Glamis, 1.4 mi. W; iv-22-1972; 3; J. Cicero; FSCA. Glamis, 1.5 mi. SW; x-24/25-1977; 1; J. Cicero; FSCA. Glamis, 3 mi. N; iv-9-1972; 1; A. Hardy; UCRC. Glamis, 3 mi. NW; ix-16-1972; BL; 1; A. Hardy, M. Wasbauer; CSCA. Glamis, c. 4.5 mi. SW (Algodones Dunes); v-12-1984; 1; M. Johnson, R. Velten; UCRC. Glamis, 7 mi. SE (32°55'20"N, 114°59'14"W); v-1/15-1979; 1; CSCA. Imperial Co., Ogilby Rd & Hwy 8; iv-26; 18; J. Cicero; FSCA. Palen Dunes; iv-27-1978; MVL; 19; F. Andrews, A. Hardy; CSCA. San Diego; 1; G. Field; CAS. San Diego; viii-10-1891; 2 [only 1 with date]; F. Blaisdell; CAS. State label only; 1; (see *Type*). Twenty-nine Palms, 23 mi. E; v-5-1962; 1; M. Hain; UCRC.



Map 15. Geographic distribution of *Pseudozonitis vigilans*

***Pseudozonitis vittipennis* (Horn, 1875)**

(Figs 9, 27, 40, 58. Map 16)

Zonitis vittipennis Horn 1875: 155. MacSwain 1951: 72.
Pseudozonitis vittipennis, Dillon 1952: 342. Enns 1956: 852. Werner, et al. 1966: 69. Erickson, et al. 1976: 960.

Description—Body length: \bar{x} = 10.4 mm (N = 8), observed range 6-12 mm. Moderately stout; surface shiny. Color yellow-orange except femora at extreme apex, tibiae at apical half or more, tarsi and antennae brown; elytra brown with yellow vittae. Elytra with marginal, sutural and discal vittae; marginal and sutural vittae confluent at apex; discal vitta usually relatively broad, wider at base than brown stripes to either side, confluent apically with the other vittae or not, and also usually confluent with marginal vitta at base. Antennae feebly banded or not. Head and pronotum immaculate. Venter usually uniformly yellow-orange, abdomen sometimes darker. Head and pronotum moderately densely and moderately coarsely punctate with several punctures separated from others by their own diameter. Elytra unique for genus, shiny, rugulose, obsolescently punctate. Wing membrane unpigmented. Setation on pronotum and elytra short, suberect, longer and recumbent on head and venter; setae color similar to that of underlying cuticle.

Head relatively broad, l/w = 0.654 (0.61-0.69) (N = 5); eyes moderately large and bulged; ventral lobe c. 1.3 width of dorsal lobe; HWE/HWT = 1.106 (1.06-1.12); $IODD/HWE$ = 0.454 (0.44-0.49); $IODV/IODD$ = 0.432 (0.40-0.48). Antennal segment relative length (male): 21, 18, 24, 30, 30, 32, 30, 29, 26, 26, 33; segment VI c. 4x as long as wide. Mandibles curving strongly at middle. Pronotum wider than long [l/w = 0.955 (0.91-0.98)]. Hind tibial spurs slightly expanded before apex, inner spur usually slightly longer. Pygidium emarginate medianly. **Male:** Sternum IX moderately sclerotized, slender; arms elongate, divergent, blunt at apex. Gonoforceps with gonostyli prominent dorsally, 0.65 length of gonocoxal plate; sides of gonostyli evenly convergent from base. Aedeagus 0.8 length of gonoforceps; ventral lobes narrowing at apex; occupying 0.3 length of aedeagus. **Female:** Ventrite VI with deep but relatively narrow U-shaped

emargination extending c. 0.5 length of segment.

Type.—Holotype ♂. USA. *Arizona*; MCZ type 8296; on-line images of type examined (MCZ Type Database). Enns (1956) labelled a female from 15 mi. W Lordsburg, New Mexico, as ‘neallotype’ (MCZ).

Geographic distribution — SW North America from the Mojave Desert in California, east to W Texas (Map 16).

Seasonal distribution — 53 records. A late summer, early fall species. August 7 – October 5. Monthly frequencies: August (19), September (33), October (1).

Adult associations — Two collections examined taken on *Gutierrezia* (Asteraceae); one indicates *G. sarothrae* (Pursh) Britton & Rusby. Enns (1956) reports an additional record from *Gutierrezia*. All three collected in Arizona. The single California specimen was taken from *Ambrosia eriocentra* (A. Gray) Payne (Asteraceae). Nine of the 52 series examined indicate collected at light.

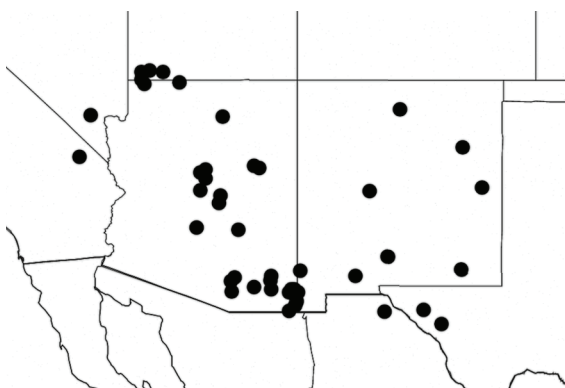
Identification — *Pseudozonitis vittipennis* is not likely to be confused with any other species. It is the only species with shiny rugulose and obsolescently punctate elytra (Fig. 58). In all other species the elytra are distinctly, densely punctate (Fig 57). The uniformly yellow-orange head and pronotum, vittate elytra usually with a relatively wide discal vitta, and mandibles strongly curving from midlength are additional distinguishing characteristics.

Comments — *Pseudozonitis vittipennis* is perhaps the most uniformly colored species in the genus. All specimens examined have a yellow-orange head and pronotum, and elytra with three yellow vittae which, for the most part, vary only slightly in width. The only deviant specimen is the single representative from California. Unlike conspecifics its venter is quite dark and the elytra are almost completely dark brown except for the narrow marginal and sutural vittae, and very narrow, streak-like discal vitta.

Records — 73 specimens examined (10♂, 63♀). Unexamined records in Enns (1956) indicated by (*). MEXICO. *Chihuahua*: Samalayuca; viii-2-1950; at light; 1; R. Smith; CISC. UNITED STATES. *Arizona*: State label only; 1; (see *Type*). Apache, 18 mi. S (Cochise Co.); ix-18-1978; 1; A. Mayor; UCRC. Apache, 6 mi SE (Skeleton Cyn Rd, Cochise

Co.); viii-30-2000; 2; J. Huether; JHC. Apache, 8 mi. NE (Cochise Co.); ix-8-1958; on *Gutierrezia sarothrae*; 2; P. Hurd; CISC. Benson; ix-6-1941; 1; R. Flock; UCRC. Chiricahua M[ts?]; ix-14-1938; 1; D. & J. Knull; OSUC. Cottonwood, 6 mi. NE; ix-6-1962; 3; B. Macdonald; UCDC, UCRC. Fredonia; 1; Ball; UAIC. Globe; ix-3, ix-4-1945, ix-6-1945, ix-14; 4; D. Duncan/R. Flock; CAS. Green Valley; ix-1976; 1; Lenczy; USNM. Holbrook*; viii-13-1939. Joseph City; viii-24-1952; 1; H. Leech, J. Green; CAS. Montezuma Well, Rimrock; ix-17-1952; at light; 1; M. Sutton; USNM. Payson; ix-1976; 5; Lenczy; USNM. Payson, 18 mi. S; ix-18-1968; ‘BL in *Acacia*, *Juniperus*, *Salix*, *Fraxinus* area’; 1; P. Bartholomew; CAS. Pearce; ix-1-1991; 1; R. Miller, L. Stange; FSCA. Phoenix*; ix-29-1940. Portal; ix-8-1970; at light; 1; R. Turnbow; FSCA. Portal, 4700’; viii-25-1964; at light; 1; M. Cazier et al.; UCRC. Portal, 5 mi. W; ix-2-1970; 1; J. Pinto; UCRC. Portal, 5.7 mi. E; ix-11-1978; 1; J. Woolley; UCRC. San Bernardino Ranch (Cochise Co.), 3750’*; viii. Skeleton Canyon (Cochise Co.); viii-30-1974; 1; F. Havore; FSCA. Sedona; viii-30-1989; ix-2-1988 (‘night lite’); 2; D. Thomas/B. Mathison; UMRM, CSCA. St Xavier (Pima Co.); x-5-1969; 1; K. Stephan; FSCA. Tuba [City]; 1; J. Sherman; USNM. Tucson; viii-26-1935, ix-5-1939, ix-20-1932; 3; Bryant/F. Parker; CSCA, UAIC, CISC. Wolf Hole, 11.7 mi. N (Mohave Co.); ix-6-1970; UVL; 1; A. Hardy; UCRC. Yavapai Co., 6 mi. N jct 69 & 79 hwy (Dugas Rd.); ix-12-1969; 1; B. Cheary et al.; CSCA. Willcox; ix-2-1959; 1; G. Stage; CSCA. Willcox Playa (Cochise Co.); viii-29-1970; 1; K. Stephan; CSCA. *California*: Cedar Canyon, T13N, R15E, S31 (San Bernardino Co.); viii-18-1970; on *Ambrosia eriocentra*; 1; R. Goeden, D. Ricker; UCRC. *Nevada*: Las Vegas, 2026’; ix-2-1909; 1; UMRM. *New Mexico*: Carlsbad; ix-2-1967; 1; F. Andrews; CSCA. Conchas Dam (San Miguel Co.); viii-28-1968; 1; D. Flynn; JHC. Lordsburg, 15 mi. W; viii-30-1949; ‘grassy desert’; 1; F. Werner, W. Nutting; UAIC. Luna Co.; Rt. 549, 4.2 mi. E I-10 exit 102; ix-4; 1; J. Huether, W. Warner; JHC. Melrose; ‘fall, 1947’; 1; J. Russell; USNM. [Ojo] Caliente, Taos Co.; viii-13-1962; 2; J. Linsley; CISC. Rodeo (Hidalgo Co.); viii-12-1958; 2; G. Pitman; FSCA. Socorro, 15 mi. N; ix-2-2012; ‘spider web’; 1; J. Huether, W. Warner; JHC. White Sands Natl

Mon.; 32.72147°N, 106.38922°W; viii-26-2011; 1; K. Wetherill; UCRC. **Texas:** Sierra Blanca, 11-15 mi. N; viii-26-1997; 2; Wappes, Turnbow; JHC, CSCA. State label only; 1; FSCA. Van Horn; viii-23-1967; 1; W. Hanson; UCRC. **Utah:** Paradise/Snow Cyn (Washington Co.); ix-1-1983; 8; D. Beck, J. Wrublik; JHC. Red Cliffs Cmpgrd (Washington Co.); viii-22-1991; 1; L. Liu; BYU. Red Cliffs Rec. Area (37°13.43'N, 113°24.35'W), 3217'; ix-13-2006; 1; R. Mower; BYU. Springdale; ix-11/13-1996; BL; 2; J. Powell; CISC. Virgin R[iver] (Washington Co.); ix-3-1993; BL; 2; BYU.



Map 16. Geographic distribution of *Pseudozonitis vittipennis*.

Species Inquirendae

Two individuals, each belonging to a different species, could not be placed in this study. Both are males. Each is unique and may represent new species. They are treated below as sp. 1 and sp. 2.

Pseudozonitis sp. 1. UNITED STATES. **California:** Orange Co., Bolsa Chica Bay; vii-2-1962; F. G. Andrews; CSCA. This is the only representative of the genus that is entirely dark brown. It is small, 7 mm in length, with relatively small eyes. It is closest to *P. maculicollis* and was taken near the southern limits of that species. It runs to couplet 6 in the key but does not adequately resolve. The specimen differs from *P. maculicollis* only in color and the ventrally bowed segment IV of the antennae (as in Fig. 66). A bowed antennal segment IV is not known in *P. maculicollis*.

However, since this modification does vary intraspecifically in other species, its presence in the Bolsa Chica Bay specimen does not preclude conspecificity.

Pseudozonitis sp. 2. MEXICO. **Oaxaca:** Tehuantepec; vi-24-1955; 'light'; R.B. & J.M. Selander; FSAC. This specimen was misidentified as *P. megalops* by Selander (1954), and Selander and Bouseman (1960). Pronotal structure and color as well as male genitalia do not match that species. The body, including the pronotum, is entirely pale, except for the darker antennae, apex of mandibles, palpi, and tarsi. The eyes are very large, bulged and approach one another ventrally. Antennal segment IV is bowed (as in Fig. 66), the mandibles are strongly curved from the middle and the pronotum is distinctly wider than long ($l/w = 0.89$). The male gonostyli are not prominent dorsally, gradually taper to an acuminate apex (as in Fig. 83a) but the apex is not laterally compressed. In *P. megalops* the gonostyli taper more abruptly to an acuminate apex (Fig. 84) and the apex is laterally compressed.

This specimen almost certainly represents a new species. The single male is damaged. For this reason and because of the ambiguity of a modified antennal segment IV in this genus, I hesitate to describe it without additional material. It superficially resembles *P. pallida* but differs by the more strongly curved mandibles which do not extend beyond the labrum, the larger eyes, and very different male genitalia. Also, a similarly modified antennal segment IV is not known to occur in *P. pallida*. In the key to species this specimen runs unsatisfactorily to *P. vaurieae* B at couplet 19. Male genitalia immediately separate the two (cf. Fig. 76 for gonoforceps similar to *vaurieae* B and Fig. 83 of *huetheri* which resembles the genitalia of sp. 2).

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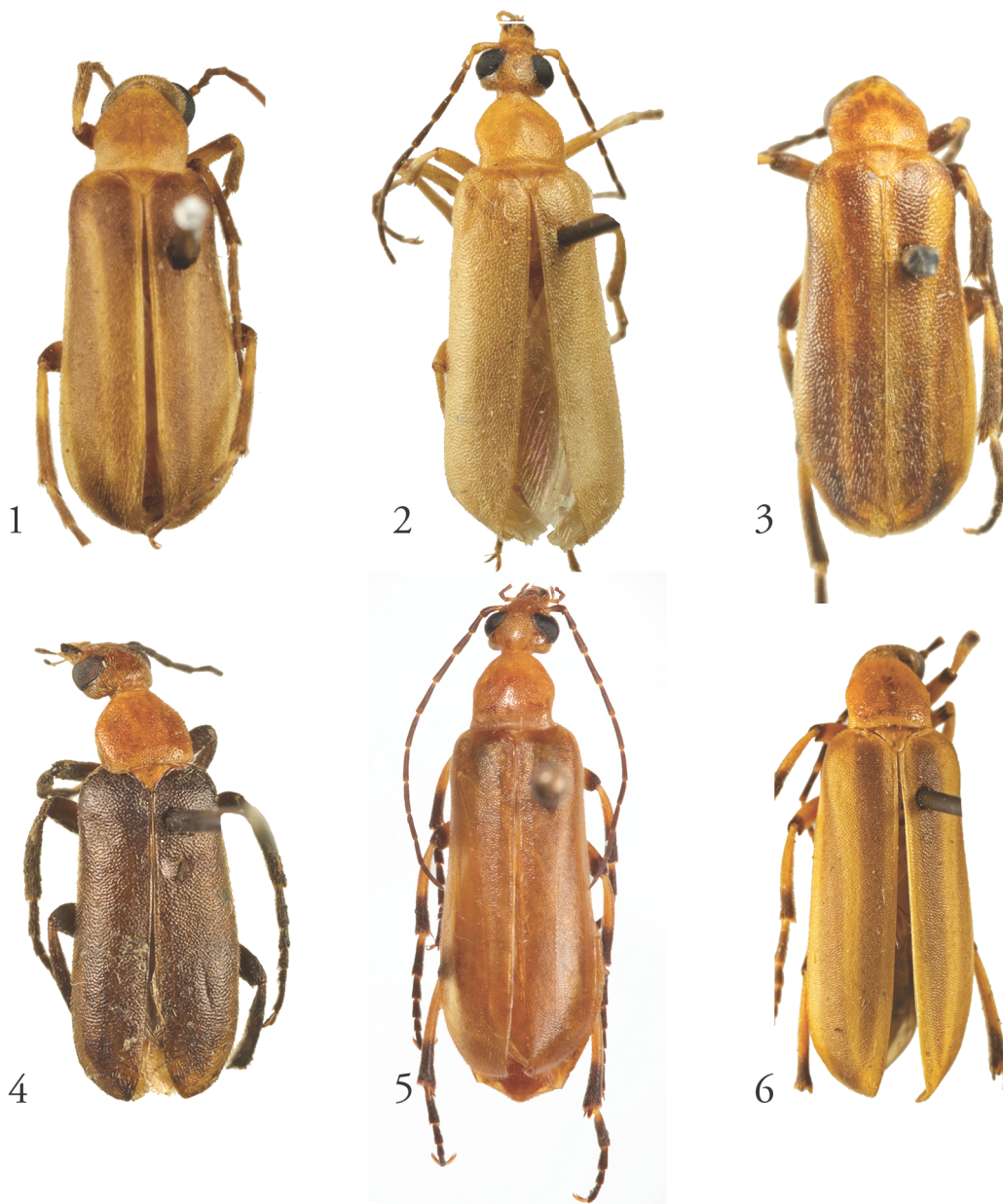
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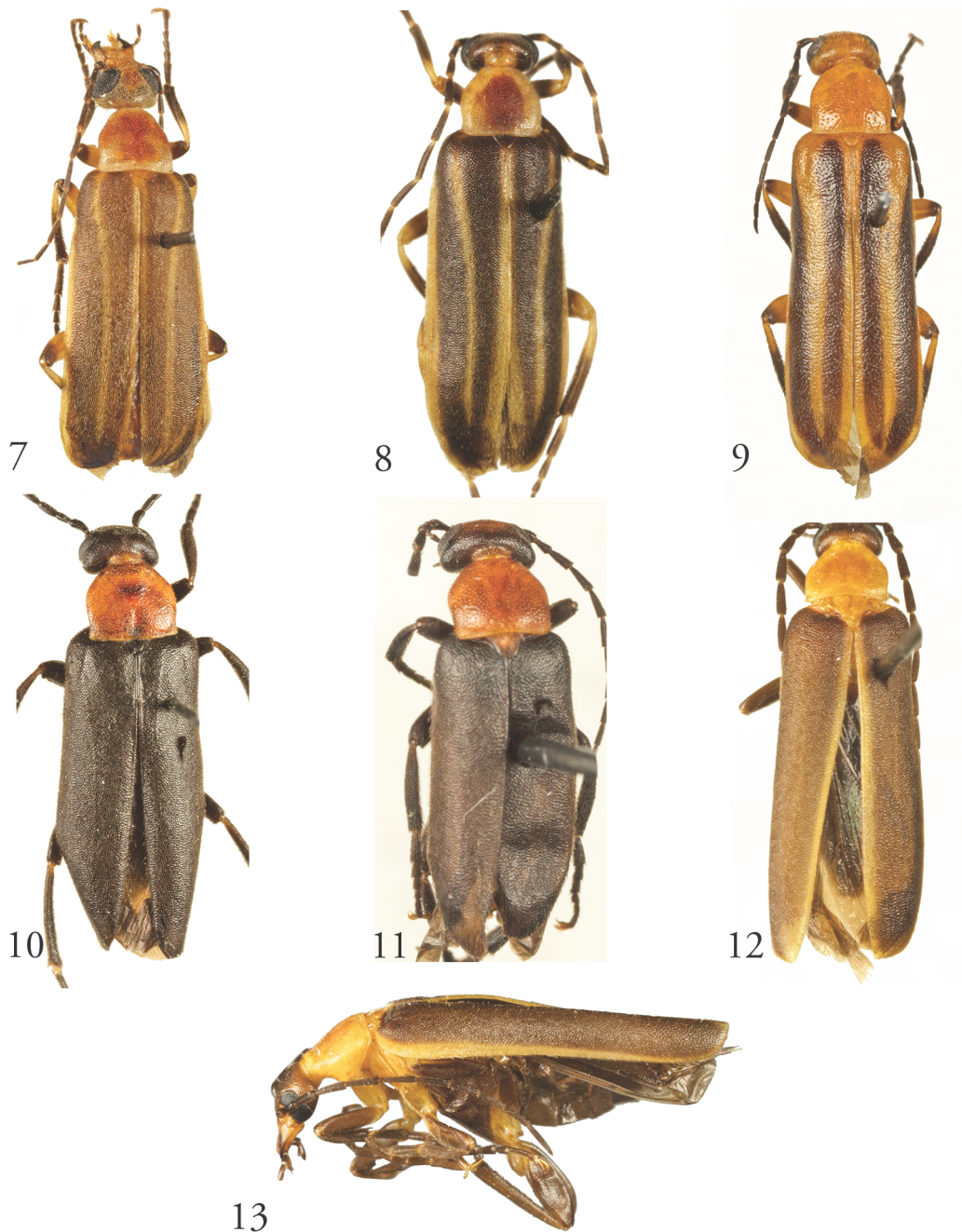
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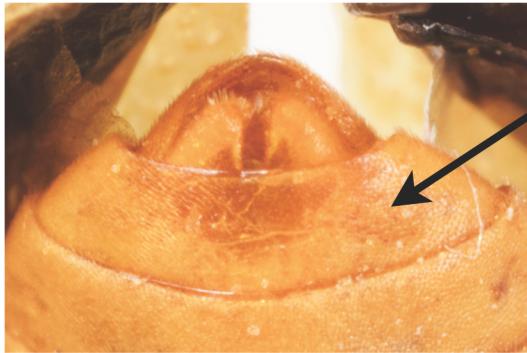
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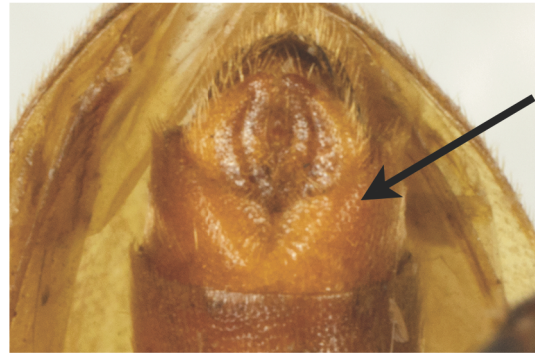
Figs 1-6. Habitus. 1. *P. brevis*; 2. *P. vigilans* (pallid form); 3. *P. vigilans* (vittate form); 4. *P. vigilans* (dark form); 5. *P. pallida* (pallid form); 6. *P. pallida* (vittate form).



Figs 7-13. Habitus. 7. *P. vaurieae* (Form A); 8. *P. longicornis*; 9. *P. vittipennis*; 10. *P. diana*; 11. *P. huetheri*; 12. *P. florida*; 13. *P. florida* (lateral).

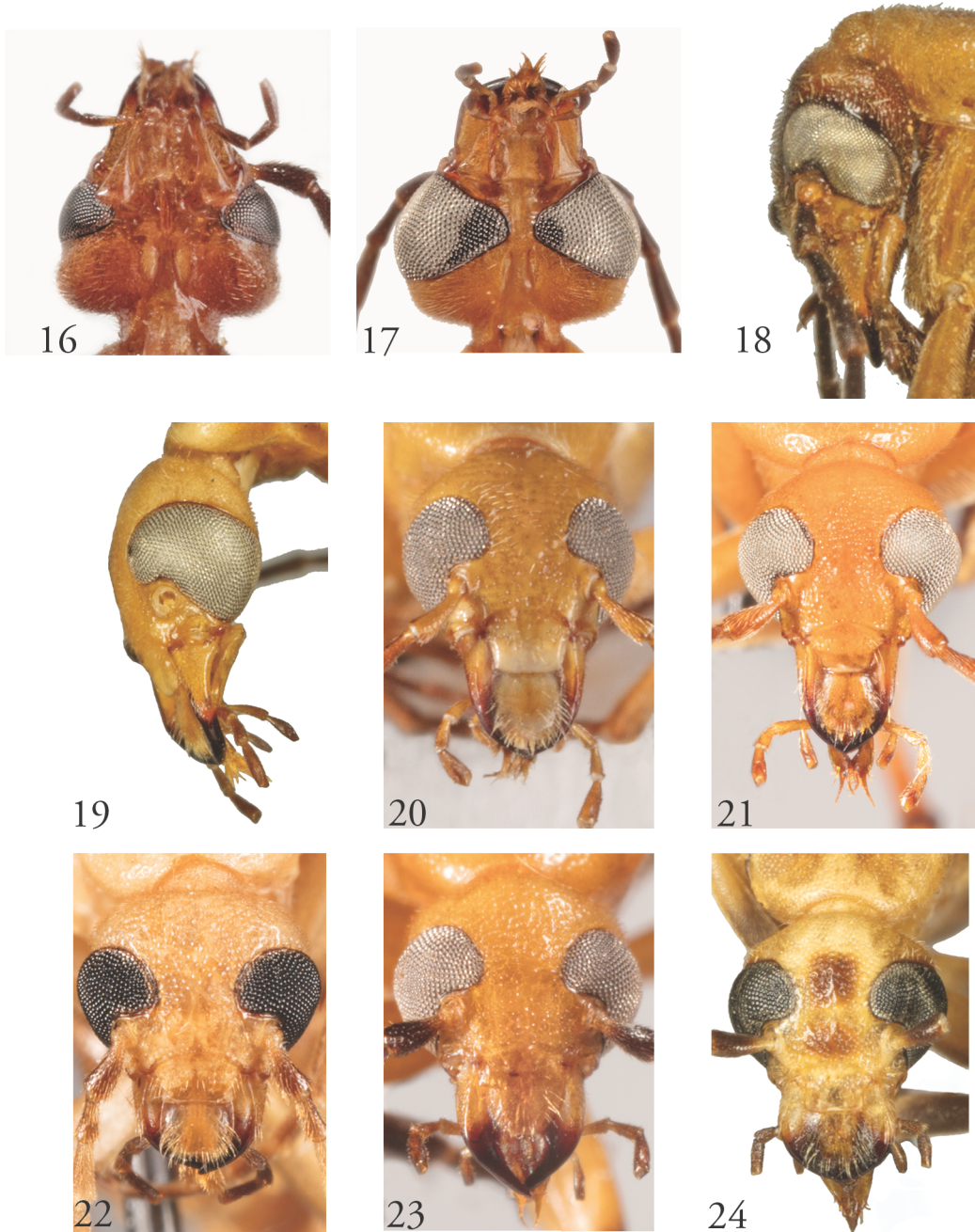


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Figs 14-15. Variation in structure of male abdominal apex in Nemognathini. 14. *Zonitis dunniana* Casey (arrow to unmodified ventrite V); 15. *Pseudozonitis pallida* (arrow to modified ventrite V).



Figs 16-24. Heads. 16. *P. maculicollis*; 17. *P. vaurieae* (Form B); 18. *P. roseomaculatis* (showing narrow ventral lobe of eye); 19. *P. vaurieae* (Form A) (showing wide ventral lobe of eye); 20. *P. brevis*; 21. *P. vigilans*; 22. *P. arizonica*; 23. *P. pallida*; 24. *P. labialis*.



Figs 25-32. Heads. 25. *P. stroudi*; 26. *P. vaurieae* (Form A); 27. *P. vittipennis*; 28. *P. martini*; 29. *P. diana*; 30. *P. huetheri*; 31. *P. florida*; 32. *P. schaefferi*.



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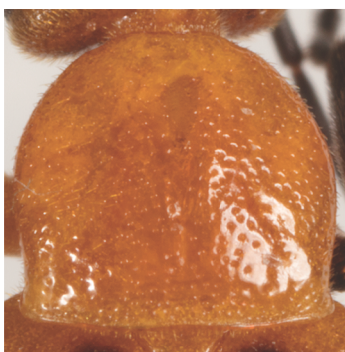
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Figs 33-41. Pronota. 33. *P. arizonica*; 34. *P. vigilans*; 35. *P. stroudi*; 36. *P. stroudi* (variant); 37. *P. vaurieae* (Form A); 38. *P. vaurieae* (Form A, lateral); 39. *P. vaurieae* (Form B); 40. *P. vittipennis*; 41. *P. longicornis*.



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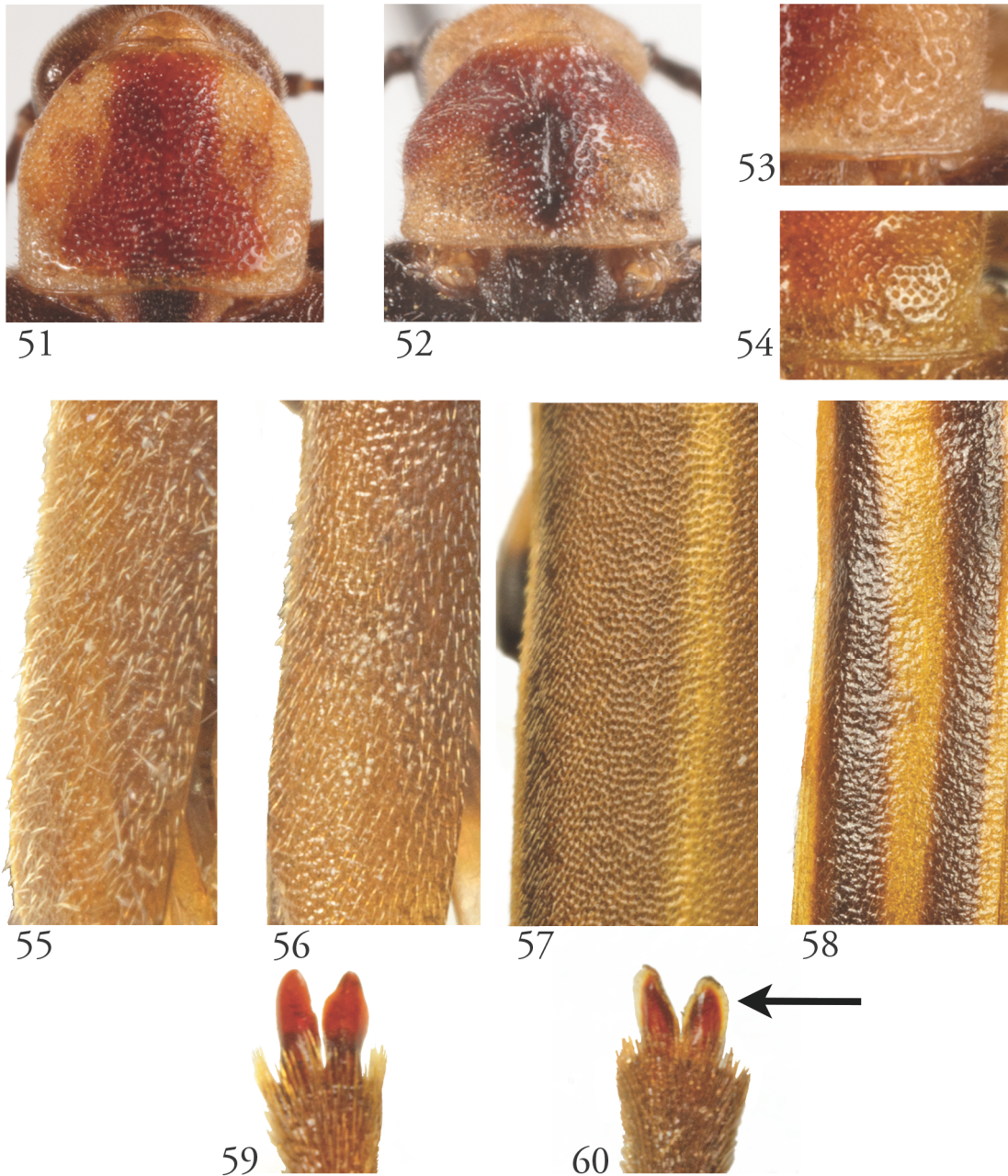


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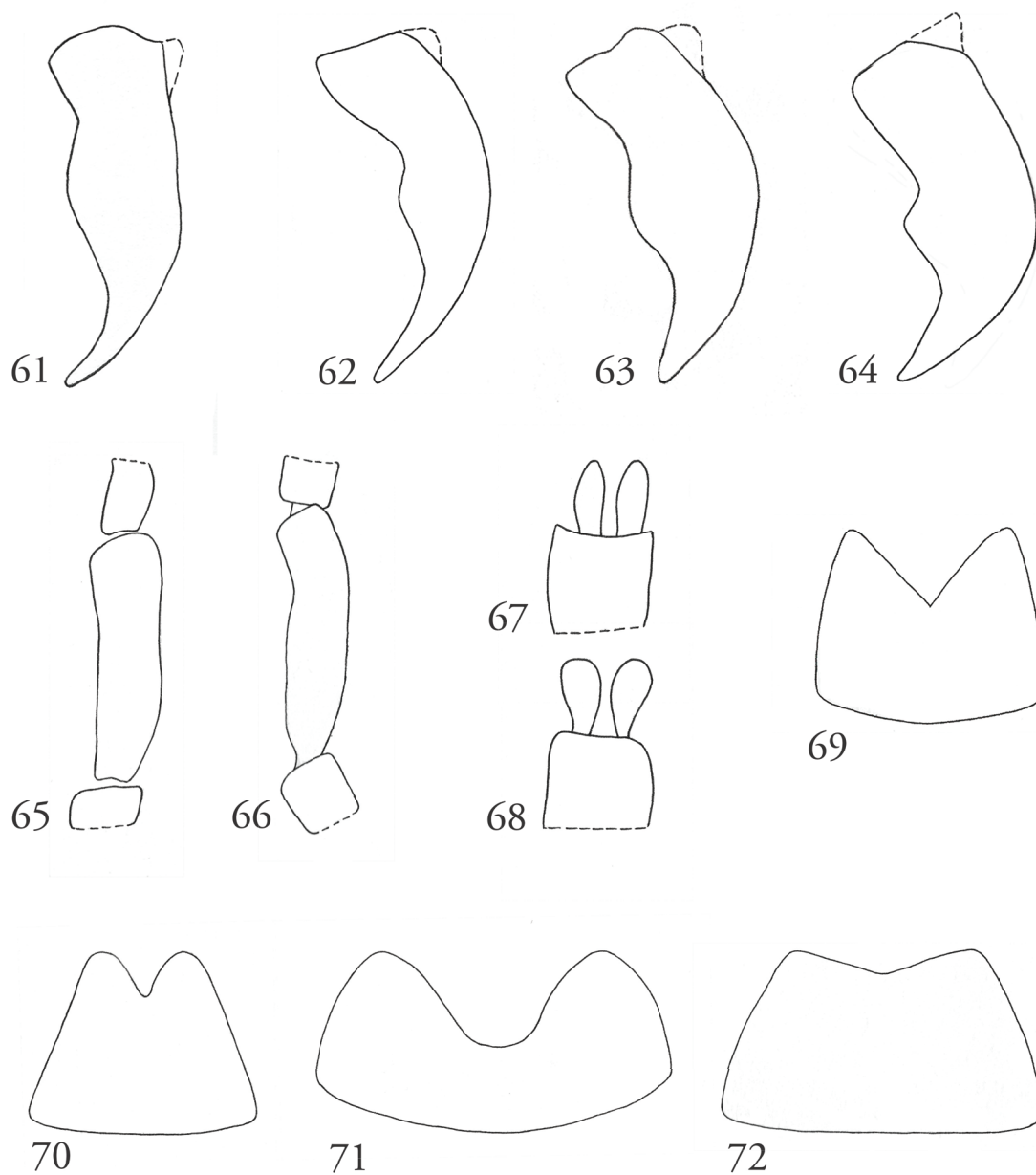


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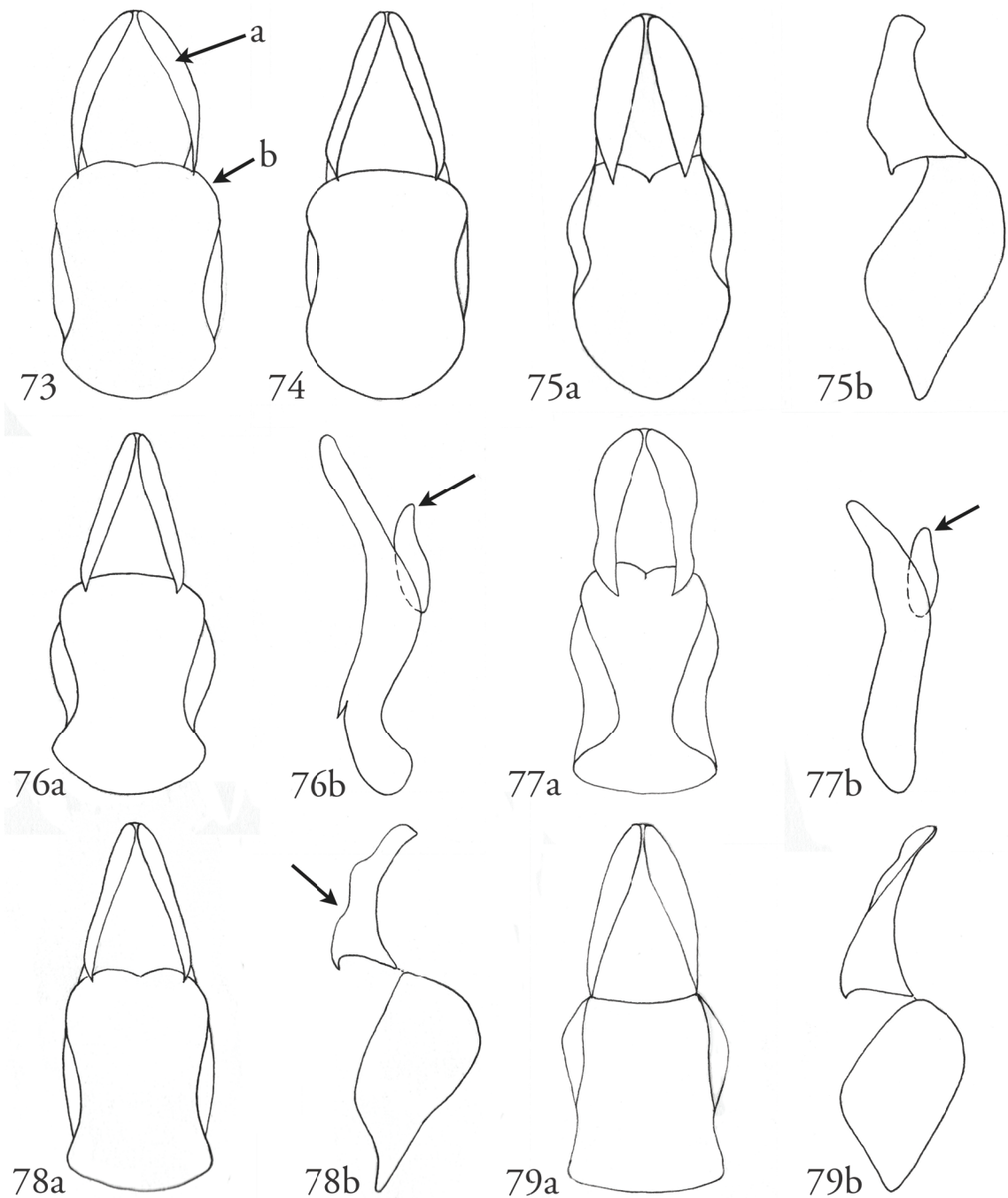
Figs 42-50. Pronota. 42. *P. obscuricornis*; 43. *P. obscuricornis* (variant); 44. *P. megalops*; 45. *P. labialis*; 46. *P. florida*; 47. *P. huetheri*; 48. *P. maculicollis*; 49. *P. martini*; 50. *P. diana*.



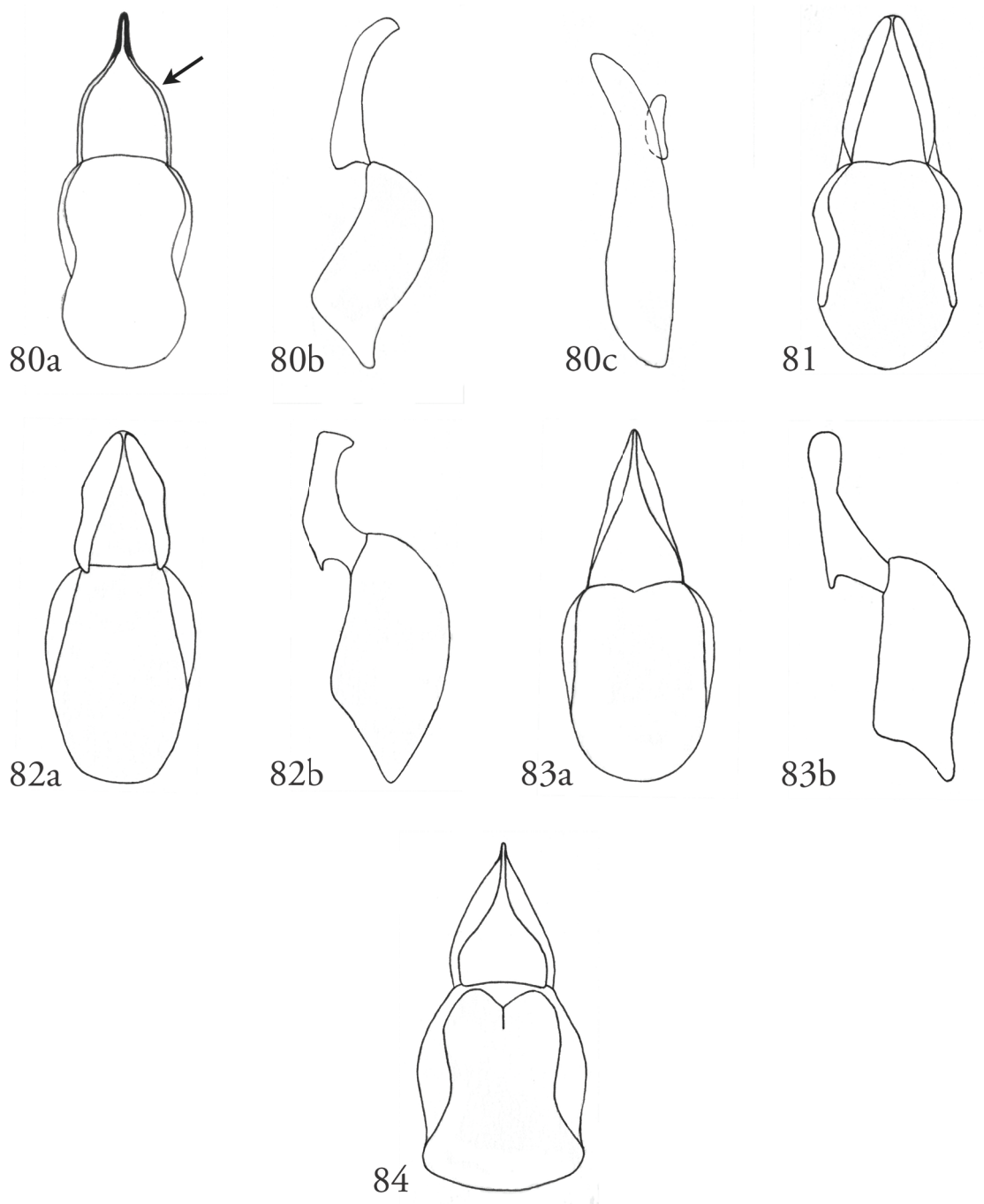
Figs 51-60. Pronota (51-54), elytra (55-58; c. 4.5x), Hind tibial spurs, ventral view (59, 60). 51. *P. roseomaculatis*; 52. *P. schaefferi*; 53 *P. stroudi* (detail, basolateral section of disk); 54. *P. vaurieae* (Form B; detail, basolateral section of disk); 55. *P. brevis*; 56. *P. vigilans*; 57. *P. vaurieae* (Form A); 58. *P. vittipennis*; 59. *P. pallida* (E of 102° long.); 60. *P. pallida* (W of 102° long.; arrow to hyaline rim of spur).



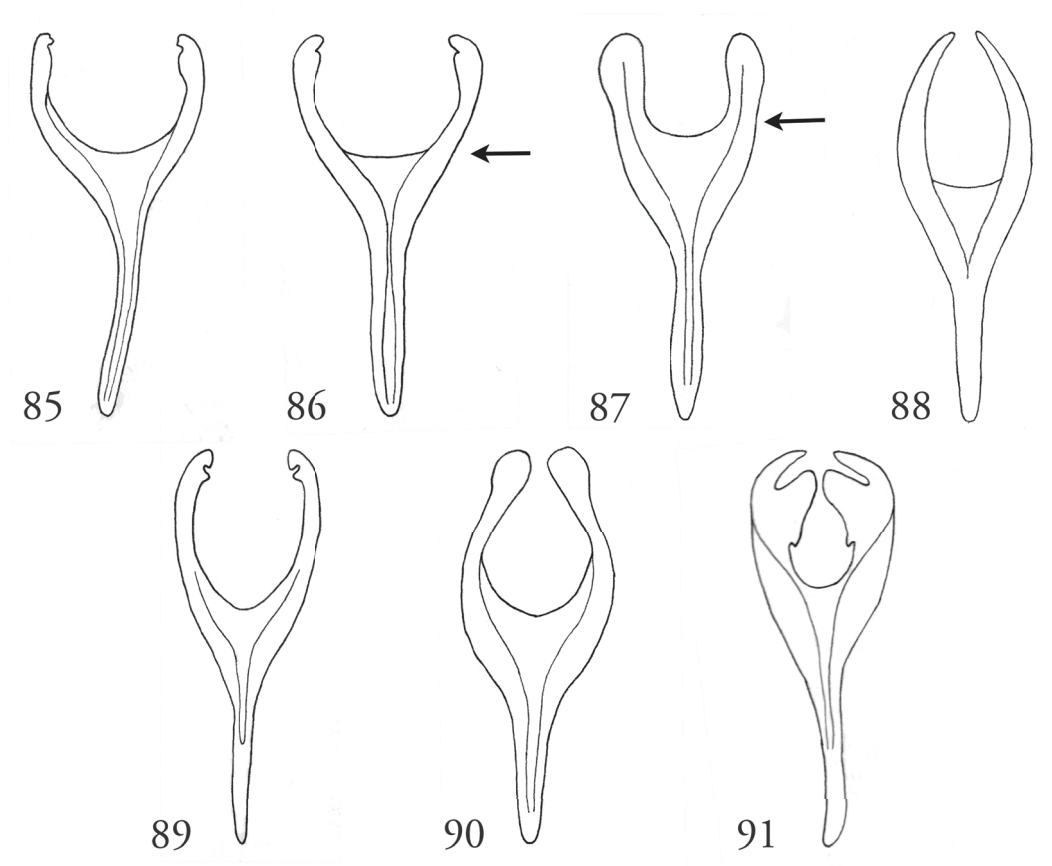
Figs 61-72. Mandibles (61-64), male antennal segment IV, lateral (65, 66), hind tibial spurs (67, 68), and female ventrite VI (69-72). 61. *P. brevis*; 62. *P. pallida*; 63. *P. vaurieae* (Form A); 64. *P. vaurieae* (Form B); 65. *P. diana*; 66. *P. diana* (variant); 67. *P. longicornis*; 68. *P. obscuricornis*; 69. *P. arizonica*; 70. *P. stroudi*; 71. *P. vaurieae* (Form B); 72. *P. labialis*.



Figs 73-79. Male gonoforceps (gf) and aedeagi (aed); dorsal (d) and lateral (l) views. 73. *P. brevis*, gf-d ('a' to gonostyli, 'b' to gonocoxal plate); 74. *P. vigilans*, gf-d; 75a. *P. pallida*, gf-d; 75b. *P. pallida*, gf-l; 76a. *P. stroudi*, gf-d; 76b. *P. stroudi*, aed-l (arrow to apex of ventral lobe); 77a. *P. vaurieae* (Form A), gf-d; 77b. *P. vaurieae* (Form A), aed-l (arrow to apex of ventral lobe); 78a. *P. longicornis*, gf-d; 78b. *P. longicornis*, gf-l (arrow to sinuate dorsum of gonostylus); 79a. *P. obscuricornis*, gf-d; 79b. *P. obscuricornis*, gf-l.



Figs 80-84. Male gonoforceps, (gf) and aedeagi (aed); dorsal (d) and lateral (l) views 80a. *P. labialis*, gf-d (arrow to gonostyli); 80b. *P. labialis*, gf-l; 80c. *P. labialis*, aed-l; 81. *P. martini*, gf-d; 82a. *P. diana*, gf-d; 82b. *P. diana*, gf-l; 83a. *P. huetheri*, gf-d; 83b. *P. huetheri*, gf-l; 84. *P. megalops*, gf-d.



Figs 85-91. Male sternum IX (dorsal, apex at top). 85. *P. vaurieae* (Form B); 86, *P. obscuricornis* (arrow at base of arm); 87, *P. longicornis* (arrow at base of arm); 88, *P. labialis*; 89. *P. huetheri*; 90. *P. schaefferi*; 91. *P. marginata*.