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Description of a New Genus of Cave Thysanuran From Texas (Nicoletiidae, Thysanura, Insecta)

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ABSTRACT

The troglobitic thysanuran described from Ezell's cave in Texas as *Nicoletia texensis* by Ulrich in 1902 is redescribed in detail and a new genus, *Texoreddellia*, is erected for it. This thysanuran is now known to occur in a large number of caves in central Texas and the adjacent Edwards Plateau. Populations from different caves vary in some cases in quantitative characters, mainly the degree of elongation of the body and appendages.

In the first years of this century a troglobitic thysanuran was found in Ezell's cave in Texas and described as *Nicoletia texensis* by Ulrich (1902). No additional specimens became available until James Reddell and his associates began their detailed survey of the Texas caves. *Nicoletia texensis* was not only collected again in its original location but also in a great number of other caves throughout central Texas and the Edwards Plateau; many of these new locality records were published by Reddell (1966).

A careful examination of this species showed that it does not belong to *Nicoletia* Gervais (type species: *Nicoletia phytophila* Gervais), nor does it fit any other known genus; a new genus is therefore erected for it in the present paper.

I am very grateful to Mr. James R. Reddell for making this material

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TEXOREDELIA, NEW GENUS

DIAGNOSIS: A nicoletioid with scales, subdivided abdominal sterna II-VII, and fused coxites of the ninth abdominal segment of the male.

DESCRIPTION: Body slender, elongate, approximately parallel-sided, thorax slightly but distinctly wider than abdomen. Scales present, numerous, multiradiate. Head only with setae; thoracic terga and abdomen dorsally and ventrally with setae and scales; legs with scales on proximal segments; mouthparts and abdominal stylets only with setae.

Pedicellus of male with unicellular glands and small sclerotized hook-shaped process. Mouthparts not specialized. Mandibles strongly sclerotized apically and with the usual teeth. Galea apically with several elongate sensory pegs. Lacinia heavily sclerotized distally; first process of lacinia pectinate. Labium without prominent lateral lobes.

Praetarsi with three simple claws, median claw glabrous, slender, almost as large as lateral claws.

Abdominal sterna II-VII subdivided into coxites and sternite. Sterna VIII and IX of male entire. Coxites on segments II-IX with stylets. Exsertile vesicles on segments II-VI, pseudovesicles on VII. Tenth tergum and caudal appendages of male without secondary sexual characters.

Parameres large, subcylindrical, somewhat constricted subapically; distal portion with specialized setae. Opening of penis longitudinal. Subgenital plate of female well developed.

Spermatophids with sperm heads longer than wide, arranged in calyx-like bundles; one bundle per spermatophid.

TYPE SPECIES: *Nicoletia texensis* Ulrich, 1902.

ETYMOLOGY: Texas, the state where these insects occur, and Reddell, the name of the collector of many of the specimens examined. Gender feminine.

DISCUSSION: *Texoreddellia* belongs to a group of nicoletioid genera, characterized by subdivided abdominal sterna II-VII and fused coxites of the ninth abdominal segment of the male; all these genera are restricted to the Western Hemisphere. *Texoreddellia* is distinguished from these genera, among other characters, in having scales and in the peculiarities of the spermatophids.

DISTRIBUTION: *Texoreddellia* is probably restricted to central Texas and the adjacent Edwards Plateau. I have examined abundant material of cave and free-living nicoletioids from other parts of the United States and from Mexico, but have not seen any *Texoreddellia*. Paclt's (1971) report of *Nicoletia texensis* from a cave in Tamaulipas, Mexico, is probably incorrect.

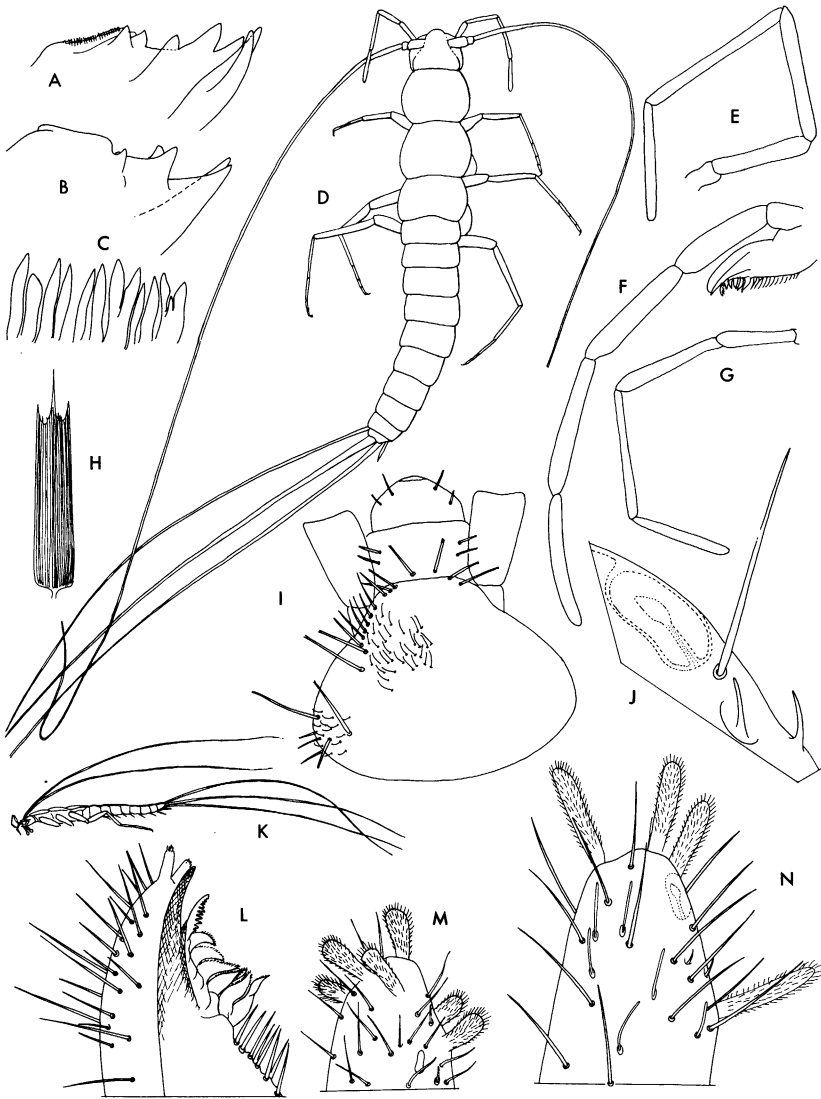


FIG. 1. *Texoreddellia texensis*. A, B. Apex of mandible. C. Denticles of molar area of mandible, high magnification. D. Female, dorsal view. E-G. Maxillary palp, different specimens. H. Scale. I. Head, dorsal view, with some of the hairs and macrochaetae. J. Detail of apical segment of maxillary palp, with sensory pegs and internal sensory organ. K. Female, side view. L. Apex of mandible. M, N. Apex of distal segment of maxillary palp. A-C, H-J, L, N, from Inner Space Cavern, Williamson Co.; D, Boehm's Cave, Medina Co.; E, K, Ezell's Cave, Hays Co.; G, M, Boyett's Cave, Hays Co.

Texoreddellia texensis (Ulrich), new combination

Figures 1-4

Nicoletia texensis ULRICH, 1902, p. 96; REDDELL, 1966, p. 28.*Nicoletia (Anelpistina) texensis*: PACLT, 1963, p. 48.

DESCRIPTION: Maximum body length 17 mm. Antennae up to twice as long as body; caudal appendages up to one and one-half times as long as body. General color whitish. Ratio of lengths of head, thorax, and abdomen as shown in figure 1D, K. Macrochaetae simple or bifid apically. Scales elongate, multiradiate, apically with one long median and two shorter lateral projections (fig. 1H).

Head as shown in figure 1D, I, with numerous hairs and macrochaetae. Scales absent. Antennae as in generic description and as illustrated in figure 1D. Unicellular glands of pedicellus of male (fig. 2A, B, D) arranged in several groups; projection of pedicellus hook-shaped, heavily sclerotized, but not pigmented, consequently not very conspicuous. Articles of distal portion of flagellum much longer than wide (fig. 2C). Mouthparts as in generic description and figures 1A-C, E-G, J, L-N. Ratios of length of segments of maxillary palps as shown in figure 1E-G. Apical segment of labial palp very slightly longer than wide (fig. 2E, F), its underside with six sensory papillae.

Thorax as shown in figure 2G; disc of nota with scattered setae and numerous scales (fig. 3A); lateral margins of nota with longer setae and macrochaetae; 1+1 sublateral macrochaetae on hind margin of nota.

Legs as in figures 2H-J; coxae and tibiae with scales in addition to setae. Praetarsus as in generic description and as shown in figure 2K. Length/width ratio of hind tibiae from 3.8 to 8.8.

Abdominal terga with scales arranged in transversal rows (fig. 3F); terga anteriorly with scales substituted by spinelike setae equally arranged in transversal rows (fig. 3B), with only one row on anterior two or three terga, becoming more numerous and occupying up to one-half the length of tergum on segments IV-VII, few in number on segment VIII, and absent on IX and X. Terga with short setae along posterior margin; posterolateral angles with a few macrochaetae (fig. 3H). Tergum X (fig. 3G, J, L) in both sexes shallowly emarginate apically. Setae inserted along lateral margins; posterior angles with 2+2 larger setae, a few hairs also on emargination.

Abdominal sterna and stylets as in generic description and figure 3E, I, K, N. Disc of sterna covered with scales arranged in transversal rows and with a few scattered setae; setae also along hind margin. Sternites with 2+2 macrochaetae as shown in figure 3E. Sterna VIII and IX of male as shown in figure 3K, N. Penis and parameres as in generic descrip-

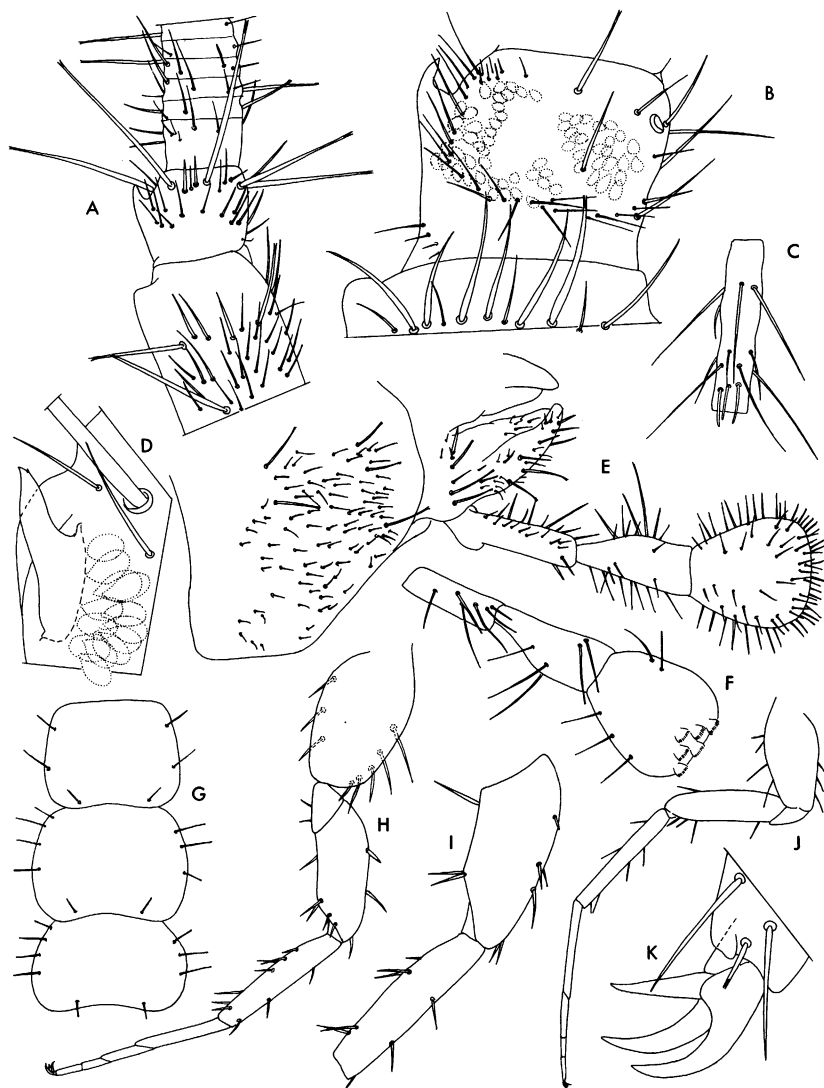


FIG. 2. *Texoreddellia texensis*. A. Male, basal portion of antenna. B. Pedicellus of male, higher magnification. C. Article of apical portion of antenna. D. Hook-shaped appendage of pedicellus, male, with surrounding area, high magnification. E. Portion of labium with palp, ventral. F. Labial palp, dorsal. G. Thoracic nota, dorsal, with macrochaetae. H. Hind leg, male. I. Portion of second pair of legs, male. J. Hind leg of different male. K. Praetarsus with claws. A-I, K, male from Inner Space Cavern, Williamson Co.; J, Ezell's Cave, Hays Co.; G, Boehm's Cave, Medina Co.

tion and figure 3M–O. Median sternal plate of eighth segment of female and coxites VIII and IX as shown in figure 4A–C. Ovipositor stout (fig. 4A), of variable length, from falling slightly short of apex of stylets IX to surpassing stylets by a distance equal to their length. Gonapophyses subdivided into 12–15 articles; their chaetotaxy as shown in figure 4E–G. Basal articles of anterior gonapophyses with a few scattered setae.

Diameter of spermatophids approximately 40 μ . Spermatozoa arranged in bundles averaging 16 (fig. 3C, D); length of heads of spermatozoa about 25 μ .

MATERIAL EXAMINED: In addition to the caves enumerated by Reddell (1966) the species was also found in the following caves: Bandera County: Fog Fissure, Fossil Cave; Bexar County: Headquarters Cave; Comal County: Bad Weather Pit, Grosser's Sink, Fischer Cave, Voges Cave; Edwards County: Big Mutha Cave, Deep Cave; Kerr County: Seven Room Cave, Stowers Cave, Smith Cave; Medina County: Lutz Cave; Travis County: Tooth Cave; Uvalde County: Davy Crockett Cave; Williamson County: Inner Space Caverns.

Texoreddellia texensis is thus known from the following counties of Texas: Bandera, Bexar, Comal, Edwards, Hays, Kendall, Kerr, Kinney, Mason, Medina, Menard, Pecos, Real, San Saba, Terrell, Travis, Uvalde, Val Verde, and Williams.

DISCUSSION: The specific identity of our material with *Nicoletia texensis* Ulrich is beyond doubt, because recently collected topotypic specimens fully agree with the original description and no other nicoletiine species was found in this or any other cave in Texas.

Paclt (1963) synonymized *Nicoletia (Anelpistina) wheeleri Silvestri* with *Nicoletia texensis*. Wygodzinsky (1963) showed this synonymy to be incorrect, which was admitted later by Paclt (1971). Paclt (*op. cit.*) reported the species from the Quintero caves in Tamaulipas, Mexico; I have seen numerous nicoletiine specimens from these caves, all belonging to one species, which is not a *Texoreddellia*.

Texoreddellia texensis has been found in many caves in Texas as mentioned under Distribution. Although all specimens agree in their qualitative characters, there is considerable variation in the degree of elongation of the body, antennae, maxillary palps (fig. 1E–G), legs (fig. 2H, J), ovipositor, and caudal appendages. I have used the ratio length/width of the hind tibiae as an indicator of elongation; the higher the ratio, the more slender and elongate the legs. Plotting the ratios obtained from numerous measurements, I found that specimens showed little variation within each cave population, but significant variation between populations. No geographic correlation of these ratios was found; it is probable that the degree of elongation is the expression not of geographical but of

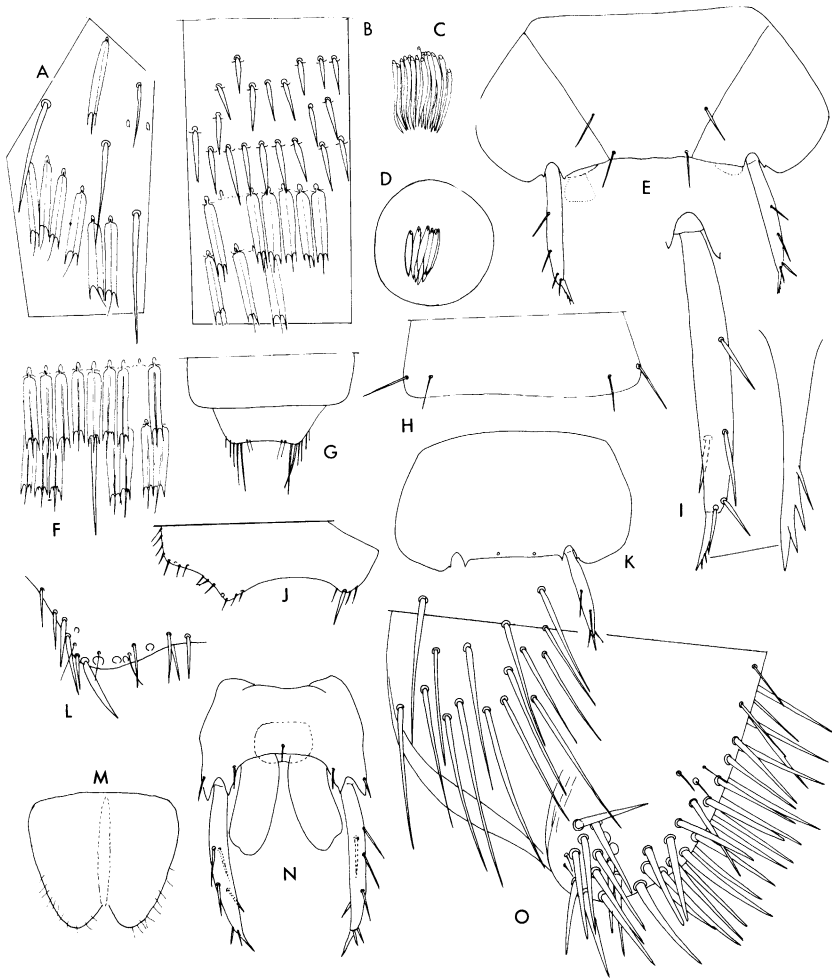


FIG. 3. *Texoreddellia texensis*. A. Setae and scales of posterolateral area of mesonotum. B. Spinelike setae and scales of portion of abdominal tergum V. C. Bundle of sperm heads inside spermatolophid. D. Spermatolophid. E. Abdominal sternum III. F. Scales of abdominal sternum. G. Apex of abdomen, female, dorsal view. H. Abdominal tergum V, with macrochaetae of posterolateral areas. I. Stylet of abdominal segment III, and apical spine, magnified. J. Portion of abdominal tergum X, male. K. Abdominal sternum VIII, male. L. Portion of abdominal tergum X, female. M. Penis, schematic. N. Abdominal sternum IX, male, with penis, parameres, and stylets. O. Apical portion of paramere. A-F, I-O, Inner Space Cavern, Williamson Co.; G, H, Boehm's Cave, Medina Co.

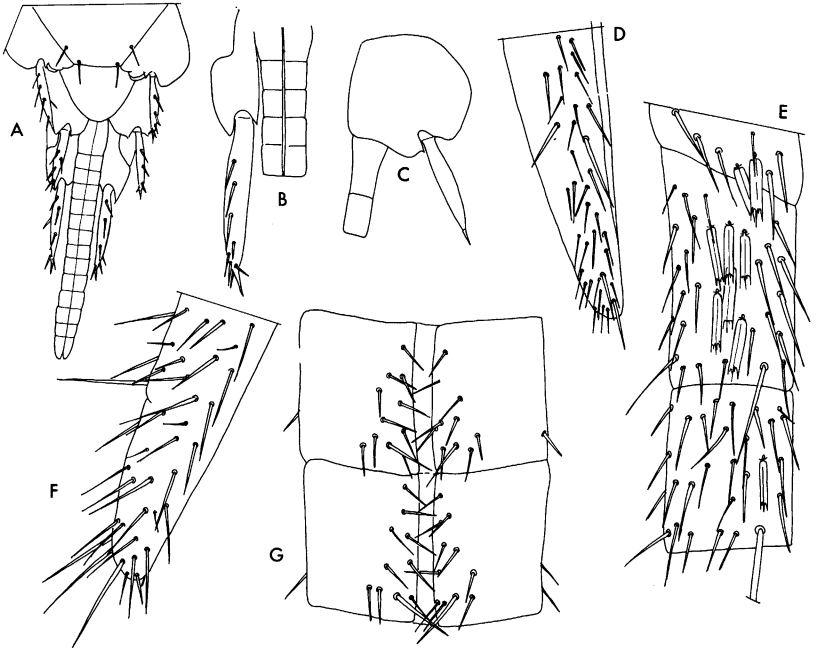


FIG. 4. *Texoreddellia texensis*, female. A. Genital region, seen from below. B. Coxite and stylet of abdominal segment VIII, with base of anterior gonapophyses. C. Coxite and stylet of abdominal segment IX, with base of posterior gonapophysis. D. Apical portion of posterior gonapophysis. E. Basal segments of anterior gonapophysis. F. Apical segments of anterior gonapophysis. G. Basal segments of posterior gonapophysis. A-G, Inner Space Caverns.

ecological factors of the cave or the precise site in the cave where the respective population occurs.

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