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## THREE NEW SPECIES OF HETEROSPHYRONID PSEUDOSCORPIONS FROM TRINIDAD

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Among collections of pseudoscorpions deposited at the American Museum of Natural History there occur three new species of heterosphyronid pseudoscorpions from Trinidad. These are described in the present paper. In addition, there is in-

cluded a new record that greatly extends the geographical range of a fourth species. The descriptions are based on individuals cleared in beechwood creosote and mounted in Canada balsam. Measurements were made with a calibrated ocular micrometer.

### SUBORDER HETEROSPHYRONIDA CHAMBERLIN, 1929

#### SUPERFAMILY CHTHONIOIDEA CHAMBERLIN, 1931

#### TRIDENCHTHONIIDAE BALZAN, 1891

#### *Tridenchthoniinae* Hansen, 1894

#### *Tridenchthonius trinidadensis*, new species Figures 1-3

MALE: Description based upon the holotype. Body, legs, and palpi light yellow; chelal hand about the same color as the rest of the palp; body fairly stout, palpi moderately slender, legs more slender; length of body 1.18 mm. Carapace nearly square; anterior margin weakly bilobed, medially with a well-developed epistome; epistome with serrate margin, about as wide as long, apically acute; posterior carapacial margin a little concave and with 10 marginal setae; anterior margin with 15 marginal setae; entire number of setae on carapace between 130 and 140; surface of carapace smooth except marked by net-like lines on the sides; eyes separated by about the diameter of the anterior eye; anterior eye with a convex lens, posterior eye less well developed; carapace widest at the level of the posterior eyes; length of carapace 0.43 mm., ocular width 0.43 mm., width across the posterior margin 0.41 mm.

Abdomen not much wider than the carapace; tergites entire, marked laterally by net-like lines; tergites, except the first, biseriate; formula<sup>2</sup> for tergal chaetotaxy of tergites 1 through 8 as follows: 12:5/8:5/9:6/9:8/9:8/8:8/6/8; setae of more posterior tergites not determined with certainty. Sternites 4 and 5 divided, sternite 6 partly divided, other sternites entire; sternites with scale-like markings on the lateral portions, otherwise virtually smooth; sternites uniseriate, formula for chaetotaxy of sternites 4 to 10 as follows: 6:10:10:9:8:8:10; each stigmatic sclerite with three setae; length of abdomen 0.76 mm., width 0.45 mm.

Chelicera: As in the genus; base with six accessory setae; serrula exterior apparently with 15 ligulate plates, serrula interior with 11 plates; fixed finger with a large marginal tooth followed basally by five small teeth; movable finger with two large marginal teeth followed proximally by three much smaller teeth; length of chelicera 0.3 mm.; width of base 0.185 mm.; length of movable finger 0.165 mm.

Palpus: One palpus missing from the holotype. In general nature like that shown by Chamberlin and Chamberlin

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<sup>2</sup> The numbers of setae in each two adjacent tergites are separated by a colon; the numbers of setae in the two rows of any one tergite are separated by a diagonal line, the number preceding the diagonal indicating the number of setae in the more anterior row.

(1945, figs. 1 and 2-J) for *T. cubanus* (Chamberlin) and by the same authors (1945, fig. 12-A) for *T. serrulatus* (Silvestri). Surface of podomeres unsculptured; setae fairly stout and numerous. Maxilla with two stout apical setae; posterior margin straight; 0.282 mm. long, 0.16 mm. wide. Trochanter 0.205 mm. long, 0.125 mm. wide. Femur with the flexor margin most convex just distal to the midpoint, flatly convex proximal and distal to this point; extensor margin weakly concave except convex at each end; nearly the same width throughout; length 0.48 mm., greatest width 0.106 mm. Tibia broken, measurements not secured. Chela with both margins of hand weakly convex; fingers little curved; length of entire chela 0.71 mm., width about 0.133 mm.; length of hand 0.27 mm., depth of hand not secured but probably about equal to the width; movable finger 0.45 mm. long. Tactile setae much as figured for *T. serrulatus* (Silvestri) by Chamberlin and Chamberlin (1945, fig. 12-A) except that on the fixed finger the double setae *ds* (formerly designated as *xs*) is somewhat closer to *et*, and *ist* appears closer to *esb*. Marginal teeth of each finger varying from more or less acute at the distal end of the row to flatly rounded at the proximal end; fixed finger with 64 marginal teeth, movable finger with 53 marginal teeth.

Legs: Setae numerous, most podomeres more or less bristled in general appearance; surface smooth. Each first and second coxa with a row of five (perhaps on one coxa only four) simple spines. First leg with trochanter subtriangular, 0.137 mm. long, 0.103 mm. deep; pars basalis subcylindrical, a little deeper towards the distal end than elsewhere, length 0.288 mm., depth 0.069 mm.; pars tibialis with extensor margin nearly straight, flexor margin very weakly convex, length 0.19 mm., depth 0.06 mm.; tibia subcylindrical, 0.173 mm. long, 0.05 mm. deep; tarsus very slender, tapering somewhat towards the distal end, 0.296 mm. long, 0.041 mm. deep. Fourth leg with trochanter about 0.194 mm. in length, 0.126 mm. in depth; entire femur with general shape as shown by Chamberlin and Chamberlin (1945, fig.

1) for *T. cubanus* (Chamberlin), length 0.46 mm., greatest depth 0.194 mm.; tibia with flexor margin convex, somewhat deepened in the distal half, length 0.335 mm., depth 0.091 mm.; metatarsus tapering a little towards the distal end and with a prominent pseudotactile seta near the center of the extensor margin, length 0.171 mm., depth 0.057 mm.; telotarsus subcylindrical, tapering very little towards the distal end, length 0.342 mm., depth 0.041 mm.; a pseudotactile seta not observed on the telotarsus, perhaps broken.

Genital complex: Anterior operculum with seven setae on the anterior rim of the genital aperture and probably about 10 (some broken) setae scattered on the face of the operculum anterior to the aperture; 10 or 11 setae on each lateral rim of the aperture; posterior operculum with a posterior row of nine setae, a few other setae scattered on the face of the operculum.

FEMALE: Two gravid and one non-gravid females were mounted and serve as the basis for the following description. Measurements and observations are given as the limits of range of these three females, of which one is designated as the allotype. General appearance as in the male; body length 1.3–1.6 mm. Details of carapace and abdomen chiefly as in the male; carapace with 13 to 15 setae along the anterior margin; nine to 11 setae along the posterior margin; total setae on carapace between 130 and 150; tergites and sternites with lateral markings very weakly developed; chaetotaxy of tergites 1 through 8 as follows (based largely on the allotype and one paratype): 13–15:7–8/10–11:8–9/11–12:8–10/11–12:8–9/9–11:9–13/11–12:10–12/11–13:6–10/9–12; sternites 4 and 5 divided, others apparently entire; sternites 4 through 10 with chaetotaxy as follows (based on only two individuals): 6–7:9–10:9–10:9:8:8:8–9; carapace 0.43–0.46 mm. long, width of carapace slightly greater than the length; abdomen 0.9–1.15 mm. long, 0.54–0.57 mm. wide.

Chelicera: In general like that of the male; base with seven or eight accessory setae; fixed finger with one large marginal tooth and five or six small ones; serrula

exterior of 15 to 16 plates, serrula interior of 12 to 13 plates; length of chelicera 0.3–0.345 mm., width of base 0.19–0.2 mm.; movable finger 0.17–0.19 mm. long.

Palpus: In general as in the male except some podomeres, especially the chela, are usually slightly stouter. Maxilla 0.29–0.31 mm. long, 0.175–0.18 mm. wide, length 1.6 to 1.8 times the width. Trochanter 0.21–0.22 mm. long, 0.125–0.14 mm. wide, length 1.55 to 1.7 times the width. Femur 0.495–0.53 mm. long, 0.11–0.125 mm. wide, length 4.3 to 4.55 times the width; length of femur 1.85 to 1.95 times the length of the tibia. Tibia with outer margin weakly convex or flatly convex, inner margin almost straight; widest at the very distal end; length 0.255–0.28 mm., width 0.13–0.14 mm.; length 1.95 to 2.1 times the width. Chela with both margins flatly to weakly convex; fingers little curved; length including poorly indicated pedicle 0.71–0.74 mm., width 0.145–0.152 mm.; length 4.85 to 5.1 times the width; chela with a length 1.4 to 1.5 times the length of the femur, 2.65 to 2.8 times the length of the tibia; length of chelal hand including the weakly expressed pedicle 0.285–0.3 mm., depth of hand exactly equal to the width; length of the hand equal to 1.95 to 2 times the width; movable finger 0.45–0.46 mm. long, length 1.5 to 1.6 times the length of the hand. From the side, margins of the chelal hand appear flatly convex; fixed finger nearly straight, movable finger very little curved. Tactile setae as in the male. Fixed finger with between 65 and 70 marginal teeth; movable finger with between 50 and 60 marginal teeth.

Legs: Shape of podomeres and chaetotaxy as in the male; most podomeres, however, slightly larger. First leg with trochanter 0.152–0.156 mm. long, 0.112–0.118 mm. deep, length about 1.35 times the depth; pars basalis 0.29–0.33 mm. long, 0.072–0.076 mm. deep, length 4.05 to 4.3 times the depth; pars tibialis 0.19–0.21 mm. long, 0.06–0.065 mm. deep, length 3.2 to 3.25 times the depth; tibia 0.18–0.19 mm. long, 0.053 mm. deep, length 3.45 to 3.6 times the depth; tarsus 0.3–0.32 mm. long, 0.042–0.044 mm. deep, length 7.1 to

7.6 times the depth. Fourth leg with trochanter between 0.2 and 0.23 mm. long, 0.15–0.16 mm. deep, length 1.4 to 1.5 times the depth; entire femur 0.47–0.52 mm. long, 0.195–0.22 mm. deep, length about 2.4 times the depth; tibia 0.34–0.38 mm. long, 0.095–0.1 mm. deep, length 3.65 to 3.85 times the depth; metatarsus 0.174–0.182 mm. long, 0.06–0.07 mm. deep, length 2.65 to 2.85 times the depth; telotarsus 0.365–0.39 mm. long, 0.042–0.045 mm. deep, length 8.7 times the depth.

Genital complex: Posterior operculum with 13 to 15 marginal setae; anterior operculum with an irregular median row of six setae and three setae in a row on each lateral margin of the operculum. The gravid female allotype with a clutch of 11 eggs; a gravid female paratype with a clutch of only eight eggs.

TRITONYMPH: Description based on a single mounted paratype. Lighter in color and less sclerotic than the adult; in general, however, very similar to the holotype; carapace epistome flatly rounded, not apically acute; length of body 1.04 mm.; carapace 0.37 mm. long, 0.32 mm. wide across the posterior margin, ocular breadth 0.305 mm.

Chelicera: Trigaleate; four or five accessory setae on the base; plates of serrulae not determined; length of chelicera 0.215 mm., width of base 0.148 mm.; movable finger 0.128 mm. long.

Palpus: Lighter in color, with fewer setae, and with the femur and chela a little stouter than in the adult, but of the same general nature. Trochanter 0.17 mm. long, 0.105 mm. wide; femur 0.32 mm. long, 0.088 mm. wide; tibia 0.19 mm. long, 0.1 mm. in width; chela 0.51 mm. in length, 0.106 mm. in width; hand 0.209 mm. long, as deep as wide; movable finger 0.315 mm. long. From the side, chela with the fingers much stouter than in the adult; with three tactile setae on the movable finger and seven (excluding *ds* but including the seta of the dorsum of the hand) on the fixed finger; the tactile setae arranged as pictured for the tritonymph of *T. mexicanus* by Chamberlin and Chamberlin (1945, fig. 15-D), except that *st* is a little closer

to *sb* and farther from *t*; the fixed finger with nearly 55 marginal teeth, movable finger with about 45 marginal teeth.

**Legs:** Chaetotaxy and shape of podomeres much as in the adult; podomeres, however, smaller and considerably more stout. Three to five simple coxal spines on each first and second coxa. First leg with pars basalis 0.194 mm. long, 0.057 mm. deep; pars tibialis 0.122 mm. long, 0.053 mm. deep; tibia 0.117 mm. long, 0.045 mm. deep; tarsus 0.2 mm. long, 0.038 mm. deep. Fourth leg with entire femur 0.326 mm. long, 0.133 mm. deep; tibia 0.235 mm. long, 0.072 mm. deep; metatarsus 0.11 mm. long, 0.053 mm. deep; telotarsus 0.23 mm. long, 0.042 mm. deep.

**TYPE LOCALITY:** The type collection consists of the male holotype, the gravid female allotype, two gravid female paratypes, two non-gravid female paratypes, and one tritonymph paratype from the Navy Base, southwest Trinidad, British West Indies. The collection was made by Mr. R. Ingle in November, 1944.

**REMARKS:** Our form is certainly new, not agreeing with any form previously described in the literature. It appears difficult at this time to point out relationships between *T. trinidadensis* and other species of the genus, but our new species can be recognized by a combination of characteristics including: the number of setae on the carapace, the length:width ratios of the palpal podomeres, the nature of the epistomal process of the carapace, and the position of the tactile setae of the chela.

### ***Tridenchthonius mexicanus***

Chamberlin and Chamberlin, 1945

*Tridenchthonius mexicanus* CHAMBERLIN AND CHAMBERLIN, 1945, Bull. Univ. Utah, vol. 35, no. 23, pp. 57-61, fig. 15-A-N.

**MALE:** Some of the more important measurements of the single specimen from Trinidad follow: body (abdomen somewhat contracted) 1 mm. long; carapace 0.39 mm. long, 0.42 mm. wide across the posterior margin. Palp with trochanter 0.185 mm. long, 0.113 mm. wide; femur 0.415 mm. long, 0.103 mm. wide; tibia 0.22 mm. long, 0.115 mm. wide; chela 0.625 mm. long, 0.129 mm. wide; depth of

chela 0.125 mm., length 0.23 mm.; movable finger 0.4 mm. in length. Fourth leg with entire femur 0.387 mm. long, 0.164 mm. deep; tibia 0.281 mm. long, 0.076 mm. deep; metatarsus 0.136 mm. long, 0.05 mm. deep; telotarsus 0.277 mm. long, 0.037 mm. deep.

**LOCALITY RECORD:** A single male from the same collection as the type specimens of *T. trinidadensis*, as described above. The collection was made by Mr. R. Ingle at the Navy Base, southwest Trinidad, in November, 1944.

**REMARKS:** The present locality record extends greatly the geographical range of this species, which formerly was known only from Mexico.

## **CHTHONIIDAE HANSEN, 1894**

### **Tribe Chthonini Chamberlin, 1929**

#### ***Pseudochthonius heterodentatus*, new species**

Figures 4-8

**MALE:** Except as indicated, the description of the male is based on three individuals, the male holotype and two male paratypes; measurements are given as the range of variation of the three individuals. Body and appendages yellow to light yellowish brown; body and appendages slender. Carapace subquadrate in general outline, anterior margin little convex, medial portion markedly serrate; lateral margins a little curved, posterior margin somewhat concave; anterior margin with six stout setae, the lateral one of each side shorter than the others; posterior margin with two setae; total setae of carapace 18; two eyes, large, strongly corneate; carapace and the sclerotized area of the first tergite separated by a very wide arthropodal membrane; surface of carapace marked by net-like lines; carapace widest just behind the eyes, somewhat narrowed posteriorly in most individuals; measurements of body and carapace as follows: length of body 1.4-1.45 mm.; carapace 0.39-0.42 mm. long, 0.37-0.45 mm. wide; posterior breadth 0.32-0.37 mm., ocular breadth 0.37-0.42 mm.; abdomen about 1 mm. long, 0.45-0.55

mm. wide. Chaetotaxy of tergites 1 through 8 as follows: 4:4:4:4:6:6:6:6; tergites entire, surface marked by net-like lines, setae long and relatively stout; sternites less strongly marked than the tergites, entire; fourth sternite with 10 setae, apparently each sternite of the central part of the body with about the same number.

Chelicera: Fairly slender; upper surface of base marked by weakly developed scale-like markings; base with the interior, the subbasal, and the exterior setae present and, in addition, two small accessory setae; flagellum apparently of about six feathered setae, so branched that an accurate count cannot be made; chelicera 0.29–0.32 mm. long, base 0.15–0.16 mm. wide. Fixed finger with seven or eight acute, conical marginal teeth. Movable finger fairly stout; inner margin with 12 to 15 conical and acute denticles; serrula exterior of 15 ligulate plates; galeal seta inserted proximal to the midpoint of the finger and not extending beyond the finger tip; spinneret vestigial, occurring as a very minute spine-like denticle located some distance from the finger tip or, in some instances, evidently wanting; movable finger 0.15–0.16 mm. long.

Palpus: Slender; setae few, either long and stout or very small; surface chiefly smooth although very weak scale-like markings may occur on areas of the femur, tibia, and chelal hand. Maxilla with posterior margin truncate and nearly at right angles to the median margin; apical lobe with two strong and well-separated setae; two setae near the articulation of the maxilla and the trochanter, and one seta on the anterior half of the face of the maxilla; length of maxilla about 0.34 mm., width about 0.16 mm. Trochanter smooth, with a few setae on the flexor surface; length 0.175–0.18 mm., width 0.11 mm., length 1.6 to 1.65 times the width. Femur with margins nearly parallel in the proximal half but convex beyond; 11 large and stout setae on the flexor surface, arranged in two rows; several minute setae on the extensor surface; length 0.53–0.55 mm., width 0.123–0.128 mm.; length 4.3 to 4.45 times the width. Tibia gradu-

ally widened towards the distal end; flexor margin straight to very weakly convex except at the basal end; extensor margin weakly convex; setae few and small, except one long seta on the flexor-distal corner; length 0.23–0.24 mm., width 0.115–0.123 mm., length 1.95 to 2.05 times the width. Chela from the dorsad with margins a little convex, fingers nearly straight; over-all length of chela 0.74–0.75 mm., width 0.122–0.129 mm., length 5.8 to 6.15 times the width; hand 0.235 mm. long, depth about equal to the width, hand 1.8 to 1.95 times as long as wide; fixed finger 0.5–0.52 mm. long, 2.1 to 2.2 times the length of the hand; movable finger 0.46–0.48 mm. long. From the side, chelal hand with a weakly convex dorsal margin, ventral margin more convex but often somewhat flatly convex in the center; fixed finger weakly sigmoid in shape, movable finger weakly curved especially in the distal half. Movable finger with about 30 teeth; these are retroconical, contiguous, and weakly cuspid at the distal end of the row but rounded and acuspid at the basal end of the row; teeth extend along nearly the entire finger margin. Fixed finger with "heterodont" dentition; distal two-thirds of the finger margin with a double row of acute, conical, cusp-bearing teeth, which, when viewed from most directions, appear to be alternately short and long; these teeth of the double row well separated and 20 to 23 in number, extending from the tip of the finger to a point little proximal to tactile seta *ist*; distal one-third of the finger margin with about nine acuspid and rounded teeth; transition between the two types of teeth more or less abrupt. Movable finger with tactile setae as follows: *t* one-fourth or a little more of the finger length from the tip; *st* less than three areolar diameters basal to *t*; *sb* about one-fourth or a little more of the finger length from the proximal margin; *b* nearly twice as far from *sb* as from the proximal finger margin. Fixed finger with *et* and *ds* very distal in position, about one-eighth or slightly less of the finger length from the tip of the finger and separated by no more than one areolar diameter; *est* about one-fourth of the finger length from the tip;

*it* distal to the level of *est* by less than three areolar diameters; *ist* as far from *et* as from the proximal finger margin, considerably proximal to the midpoint of the finger; *esb* and *eb* near the finger base and separated by less than two areolar diameters; *isb* and *ib* near the midpoint of the dorsum of the hand, often a little basal to the midpoint.

**Legs:** Observations and measurements based on the holotype and one male paratype, the measurements of the latter being given in parentheses immediately after the measurements of the former, whenever the two show a significant difference. As near as can be ascertained from the material at hand, each coxa I has two spines, each coxa II has six spines. Legs for the most part slender except the femora of the third and fourth legs; surfaces of podomeres mostly sculptured by net-like or scale-like markings, which are stronger on the basal than on the distal podomeres; setae somewhat sparse except fairly numerous on the tibiae and the tarsi; tarsal claws very slender. First leg with subtriangular trochanter, outer margin moderately convex, length 0.129 (0.127) mm., depth 0.096 (0.092) mm.; pars basalis 0.313 (0.315) mm. long, 0.064 (0.065) mm. deep near the distal end; pars tibialis with nearly straight extensor margin, flexor margin very weakly convex, slightly deepened distally, length 0.167 mm., depth 0.05 mm.; tibia subcylindrical, length 0.19 mm., depth 0.04 mm.; tarsus very slender, gradually narrowed towards the distal end, length 0.3 mm., depth 0.034 mm. Fourth leg with femur stout, both flexor and extensor margins a little convex, flatly so on the pars tibialis, deepest across the pars basalis, length of entire femur 0.5 mm., depth 0.225 (0.215) mm.; tibia curved in the basal half, nearly straight beyond, length 0.293 (0.296) mm., depth 0.072 mm.; metatarsus deepest across the proximal margin, a long tactile seta (broken from most specimens) inserted near the basal fourth, length 0.18 mm., depth 0.055 mm.; telotarsus slender, subcylindrical but tapering a little towards the distal end, length 0.304 (0.3) mm., depth 0.034 mm.

**Genital complex:** Essentially like the

genital complex of *P. homodentatus* Chamberlin, 1929, as shown by his figures (Chamberlin, 1929, figs. O and P).

**FEMALE:** Description based on the female allotype. General appearance as in the male except body and appendages are a little larger. Carapace and abdomen like those of the male except perhaps a few more setae on sternite 4 (setae small, broken, difficult to secure an accurate count), and the anterior margin of the carapace appears almost straight. Body of allotype about 1.6 mm. long, carapace 0.48 mm. long, 0.48 mm. wide; abdomen 1.13 mm. long, 0.67 mm. wide.

**Chelicera:** Identical with that of the male except the spinneret is well developed and contains the openings of gland ducts; in addition, the chelicera is larger than in the male; length of chelicera 0.34 mm.; length of movable finger 0.183 mm.

**Palpus:** As in the male except podomeres a little larger; measurements as follows: maxilla 0.37 mm. long, 0.16 mm. wide; trochanter 0.2 mm. long, 0.13 mm. wide; femur 0.63 mm. in length, width 0.148 mm.; tibia with length of 0.266 mm., width of 0.134 mm.; chela 0.85 mm. long, 0.148 mm. wide; chelal hand about 0.275 mm. in length; fixed finger 0.58 mm. long, movable finger 0.54 mm. long. Teeth and tactile setae as in the male.

**Legs:** As in the male except podomeres a little larger; first leg with trochanter 0.146 mm. long, 0.112 mm. deep; pars basalis 0.353 mm. long, 0.076 mm. deep; pars tibialis 0.185 mm. long, 0.057 mm. deep; tibia 0.212 mm. in length, 0.045 mm. in depth; tarsus 0.326 mm. long, 0.036 mm. deep. Fourth leg with entire femur 0.565 mm. long, 0.24 mm. deep; tibia 0.342 mm. in length, 0.082 mm. in depth; metatarsus 0.205 mm. long, 0.065 mm. deep; telotarsus 0.33 mm. in length, 0.036 mm. in depth.

**Genital complex:** As near as can be determined, the genital complex of the allotype resembles closely that of *P. insularis* Chamberlin, 1929, as indicated by Chamberlin (1929, fig. N).

**DEUTONYMPH:** Description based on one deutonymph paratype; tritonymph and protonymph unknown. Similar in general

appearance to the adult except lighter in color, smaller in size, and with legs somewhat stouter. Carapace as in the adult except widest near the center instead of just behind the eyes; as near as can be determined from the present specimen, the chaetotaxy of the carapace and tergites is identical with that of the adult; sternal chaetotaxy not observed. Body length 0.74 mm.; carapace about 0.26 mm. long, 0.25 mm. wide; posterior breadth of carapace 0.225 mm., ocular width 0.215 mm.; abdomen about 0.48 mm. long, 0.22 mm. wide.

Chelicera: Much like that of the female; length of chelicera 0.173 mm., width of base 0.09 mm. Fixed finger with six marginal teeth. Movable finger with nine or 10 denticles on the inner margin; spinneret developed as in the female except more acute terminally and the gland ducts are less distinct; serrula exterior of 11 ligulate plates; length of movable finger 0.096 mm.

Palpus: General features somewhat as in the adult but podomeres smaller in actual size. Trochanter 0.098 mm. long, 0.065 mm. wide. Femur apparently with no more than seven long setae on the flexor surface; much more cylindrical in shape than in the male and little widened in the distal half; the flexor margin weakly convex, the extensor margin weakly concave; length of femur about 0.245 mm., width 0.057 mm. Tibia with pedicle stouter than in the adult, length 0.122 mm., width 0.063 mm. Chela with margins of hand very little convex, the extensor margin almost straight; fingers much stouter than in the adult; length of chela 0.406 mm., width 0.065 mm.; length of hand 0.129 mm.; fixed finger a little more than 0.28 mm. in length. Marginal teeth of chelal fingers like those of the adult but fewer in number; the long, acute, and widely spaced teeth of the double marginal row of the fixed finger about 17 or 18 in number; accurate count of other marginal teeth not secured. Movable finger with only two setae: *t* about one-third of the finger length from the tip, *st* about two areolar diameters proximal to *t*. Fixed finger with *et* and *ds* much as in the adult except

about one-sixth of the finger length from the tip; *it* about one-third of the finger length from the tip; *est* no more than two areolar diameters basal to the level of *it*; *ist* midway between *it* and the proximal margin of the finger; *eb* basal, *esb* wanting; one seta (*ib* or *isb*?) located somewhat distal to the midpoint of the dorsum of the hand, the other seta (either *isb* or *ib*) normally present in the adult is wanting in the deutonymph.

Legs: Podomeres, especially the distal ones, much stouter than in the adult; measurements not secured since the legs were not dissected from the mounted deutonymph. Coxa II with three spines; coxa I with one or two weakly developed, almost rudimentary spines.

TYPE LOCALITY: From a series of specimens collected between November 16, 1943, and February 23, 1944, by Dr. A. H. Strickland near St. Augustine, Trinidad, British West Indies. Collections were made from surface litter and soil on a cacao estate. The collection includes the holotype male, two paratype males, the allotype female, and one deutonymph paratype. All are mounted on slides. In the same series of collections were found *Novohorus cinereus* Hoff, 1945, *Neopachyolpium longum* Hoff, 1945, and the new species of *Tyrannochthonius* described below.

REMARKS: *Pseudochthonius heterodentatus* appears to be more closely related to *P. homodentatus* Chamberlin, 1929, from Venezuela, than to any other species. Two differences very useful for separation of *P. heterodentatus* and *P. homodentatus* are: (1) in the former the palpal femur of the male has a length of 4.25 to 4.45 times the width, while in *P. homodentatus* the femur has a length 4.7 times the width; and (2) the fixed chelal finger of *P. heterodentatus* has "heterodont" teeth while in *P. homodentatus* the dentition is "homodont." In addition to these two differences, the serrula exterior of *P. heterodentatus* consists of a greater number of plates and the fixed palpal finger has the tactile seta *et* relatively closer to *ds* than in *P. homodentatus*.

An opportunity is taken here to call attention to the care necessary in determin-

ing the "homodont" or "heterodont" nature of the marginal teeth of the chelal fingers. In the present species, *P. heterodontatus*, these teeth appear to be "heterodont" as a result of the teeth's being arranged in two longitudinal rows with the teeth of one row alternating in position with those of the other row. When viewed from certain positions, the teeth of one row appear shorter than the teeth of the other row, but when the chelal finger is placed in strict lateral view, the teeth appear to be equal in length. If great care is not taken, an error may easily be made regarding the nature of the teeth.

Of particular significance in the genus *Pseudochthonius* is the sexual dimorphism shown by the cheliceral spinneret or reduced galea. In the female and in the deutonymph, a fairly well-developed spinneret is present, but in the male the spinneret is vestigial and sometimes even wanting. The nature of the spinneret is used by Chamberlin (1929) and Beier (1932) as one of the characteristics for separation in their keys of *P. homodontatus* Chamberlin, 1929 (known only from the male), and *P. simoni* Balzan, 1891, and *P. insularis* Chamberlin, 1929 (the last two described only from females). Chamberlin (1929) indicated that the difference shown by the galea between *P. homodontatus* and the other two species is not likely a sexual one. In the present species, however, for which both the male and the female are known, it is obvious that the nature of the spinneret is indeed sexual in nature. It is very probable that this sexual dimorphism will be demonstrated in other species of *Pseudochthonius* as soon as both sexes become known.

#### ***Tyrannochthonius insulae*, new species**

Figures 9-11

MALE: Unknown.

FEMALE: Except as indicated, the measurements and ratios are given as the limits of range and are based on 10 specimens (the holotype and nine female paratypes). Body and appendages yellow in color; appendages moderately slender to slender; body elongate, 0.9-1.05 mm. in length. Carapace nearly square in general outline;

widest at a point little posterior to the eyes; a little narrower across both the anterior and the posterior margins; lateral margins very weakly convex; anterior margin with a triangular and acute epistome having virtually an entire margin; anterior margin of carapace with one seta at each side of the base of the epistome and two small setae just anterior to and near each eye (the more ventrally placed seta near the eye is small and difficult to observe in some specimens); posterior margin with two setae, these more medial than lateral in position; total number of setae on the carapace is 18; carapace unsculptured except for net-like lines on the sides; two eyes present, the eye of each side about its own diameter from the anterior margin of the carapace; carapace 0.29-0.3 mm. long, maximum width about equal to the length. Abdomen slender, little convex laterally; each tergite with four setae, none observed with six; the setae of each tergite placed as a pair towards each lateral margin, leaving the median area of the tergite devoid of setae; sternites with more setae than the tergites, as many as eight to 10 on the sternites of the ventral portion of the abdomen; sternites unsculptured; abdomen 0.6-0.75 mm. long, width a little greater than one-half of the length and between 0.38 and 0.43 mm.

Chelicera: Base fairly stout, fingers slender, yellow in color; surface of base smooth except for a few granules bearing minute spinules and located on the inner and outer surfaces near the base of the fingers; outer margin angular near the base; six or seven plumose setae in the flagellum; base with the interior and sub-basal setae very long, the basal and exterior setae shorter, and a single accessory seta placed proximal to the midpoint of the outer surface; length of chelicera 0.233-0.244 mm., width of base 0.127-0.135 mm., length usually between 1.8 and 1.9 times the width. Fixed finger with one large marginal denticle followed proximally by six to eight much smaller ones; tip of finger brown in color and very sclerotic. Movable finger gently curved; tip sclerotic; inner margin with about 12 small conical denticles, the denticles in the center



of the row somewhat larger than those at each end; basal portion of finger much wider than the rest of the finger; galeal seta located near the midpoint of the finger; serrula exterior of 17 to 19 ligulate plates; galea wanting, although a slightly modified and swollen area of the outer margin of the finger just proximal to the apical tooth appears to receive two or three gland ducts; length of movable finger 0.145–0.155 mm.

Palpus: Moderately slender, surface smooth, setae mostly long and acuminate. Maxilla with two prominent setae on the apical process, two setae on the rim of the trochantic foramen, and one a little behind the rim of the foramen; outer margin of maxilla evenly convex and well rounded at the juncture with the posterior margin; length 0.21–0.24 (usually between 0.22 and 0.23) mm., width 0.11–0.113 mm., length 1.97 to 2.2 times the width. Trochanter fairly stout; flexor margin unevenly convex; length 0.125–0.135 mm., width 0.075–0.083 mm., length 1.6 to 1.7 times the width. Femur somewhat cylindrical in shape, flexor margin nearly straight except near the ends, extensor margin weakly concave; slightly wider in the distal one-third than elsewhere; pedicle not well differentiated; several long setae located chiefly on the flexor and the subdorsal surfaces; length 0.285–0.315 mm.; width 0.071–0.078 mm., length 4 to 4.25 times the width. Tibia narrow at the base and gradually widened towards the distal end; extensor margin flatly convex, flexor margin straight or a little concave; length 0.152–0.163 mm., width 0.081–0.092 mm., length 1.77 to 1.88 times the width. Chela with hand fairly stout, fingers very slender and little curved; flexor margin convex, extensor margin much less convex; two tactile setae located near the midpoint of the dorsum of the hand; a stout and conspicuous spine-like seta located at the base of the inner surface of the fixed finger near the level of the external basal and subbasal setae; chela 0.46–0.495 mm. long, 0.095–0.11 mm. wide, length 4.5 to 4.85 (rarely less than 4.65) times the width; hand length 0.15–0.165 mm.; depth of hand subequal to the width, between 0.098 and 0.108 mm.; movable finger 0.308–0.328

mm. long. From the side, chelal hand is fairly stout, ventral margin weakly convex, dorsal margin a little angular at the level of the tactile setae; fixed finger nearly straight except near the tip, movable finger gently curved and a little shorter than the fixed finger. Movable finger with four tactile setae: *t* located just within the distal third of the finger; *st* separated from *t* by about two areolar diameters; *b* removed from the basal margin of the finger by about the width of the finger at the level of *b*; *sb* a little closer to *b* than to *st*. Fixed finger with *it* located about one-third of the finger length from the tip; *est* less than one areolar diameter distal to the level of *it*; *et* approximately midway between the level of *it* and the finger tip with *ds* nearly twice as far from the finger tip as from *et*; *eb* and *esb* located at the very base of the finger and separated by about one areolar diameter; *ist* about one areolar diameter distal to the level of *esb*; *isb* and *ib* near the midpoint or slightly proximal to the midpoint of the dorsum of the hand. Fixed finger with widely and more or less evenly spaced teeth, arranged along the entire margin; the teeth alternately large and small in the central part of the row but of one size near each end; between 25 and 30 teeth (counting both large and small), conical and acute in shape and with cusps on all of the teeth except the small ones of the central part of the row. Movable finger with the teeth of the distal two-thirds of the row as on the opposing finger, about 15 in number; teeth of the proximal one-third of the row very much flattened and entirely acuspid, about 10 in number.

Legs: Coxa II with five to eight (usually six or seven) well-separated and stout blades forming the coxal spines, these blades distally widened, terminally denticulate, and deeply incised. Podomeres of legs, especially the distal ones, slender; surface smooth; setae acuminate, fairly numerous on the distal podomeres. First leg with the pars basalis subcylindrical but deepened slightly at the distal end; the pars tibialis deepened distally; tibia subcylindrical; tarsus narrowed gradually towards the distal end. Measurements as

follows (based on four individuals, including the holotype): pars basalis 0.163–0.171 mm. long, 0.046–0.047 mm. deep, length 3.55 to 3.64 times the depth; pars tibialis 0.088–0.093 mm. long, 0.039–0.04 mm. deep, length 2.2 to 2.4 times the depth; tibia 0.095–0.099 mm. long, 0.031–0.032 mm. deep, length 2.96 to 3.1 times the depth; tarsus 0.171–0.182 mm. long, 0.027–0.028 mm. deep, length 6.23 to 6.5 times the depth. Fourth leg with femur stout, deepest across the distal end of the pars basalis; margins of the pars tibialis flatly to weakly convex; tibia distally deepened; metatarsus deepest across the proximal end; telotarsus subcylindrical. Measurements of podomeres of the fourth leg as follows (based on three individuals): entire femur 0.265–0.273 mm. long, 0.116–0.118 mm. deep, length 2.27 to 2.32 times the depth; tibia 0.178–0.184 mm. long, 0.053–0.056 mm. deep, length 3.27 to 3.36 times the depth; metatarsus 0.078–0.082 mm. long, 0.04–0.041 mm. deep, length 1.94 to 2 times the depth; telotarsus 0.17–0.178 mm. long, 0.03–0.0305 mm. deep, length 5.68 to 5.84 times the depth.

Genital complex: Very simple; posterior operculum in the form of an obtusely angled and slightly sclerotized rim; this rim may become centrally arched and rounded instead of angular in specimens treated with potassium hydroxide solution.

TRITONYMPH: Except as indicated to the contrary, measurements and ratios are given as the limits of range secured by measuring five individuals. General body outline as in the adult except lighter in color, smaller in size, and most appendages a little stouter; body length 0.63–0.74 mm. Carapace and abdomen much like those of the adult except the epistome is weaker and less acute; length of carapace 0.22–0.24 mm., greatest width 0.22–0.25 mm.; abdomen 0.38–0.52 mm. long, 0.21–0.31 mm. wide.

Chelicera: Essentially as in the adult but lighter in color, smaller in size, and with only 14 to 16 ligulate plates in the serrula exterior; galea represented by an area more swollen than in the adult; chelicera 0.175–0.183 mm. long, base 0.099–0.103

mm. wide, length 1.7 to 1.83 times the width; movable finger 0.11–0.115 mm. in length.

Palpus: From the dorsad, shape of podomeres much as in the adult; measurements as follows: trochanter 0.1–0.103 mm. long, 0.061–0.065 mm. wide, length 1.57 to 1.65 times the width; femur 0.205–0.215 mm. long, 0.054–0.057 mm. wide, length 3.6 to 3.9 times the width; tibia 0.115–0.125 mm. long, 0.064–0.069 mm. wide, length 1.72 to 1.91 times the width; chela 0.345–0.357 mm. long, 0.07–0.076 mm. wide, length 4.7 to 4.95 times the width; chelal hand 0.11–0.117 mm. long, depth 0.076–0.079 mm.; length of movable chelal finger 0.235–0.242 mm. From the side, general appearance of the chelal hand and finger as in the adult except the fingers are somewhat stouter. Movable finger with three tactile setae: *b* in the basal one-fifth of the finger length and removed from the proximal finger margin by about one and one-half times the width of the finger at the level of *b*; *t* and *st* separated by less than two areolar diameters, with *t* nearer to the finger tip than to *b* and with *st* further from the finger tip than from *b*; *sb* wanting. Fixed finger with *est* and *it* a little distal to the midpoint of the finger and usually a little further from *ist* than from the finger tip; *ds*, *et*, *ist*, *eb*, and *esb* much as in the adult; a single seta, probably *sb*, on the dorsum of the hand; a well-developed non-tactile seta, probably the rudiment of the tactile seta *isb*, noticed in most individuals on the dorsum of the hand near *sb*; a spine-like seta present at the base of the fixed finger on the inner margin as in the adult. Teeth much as in the adult except slightly fewer in number (24 to 27 on the fixed finger) and a little less well developed.

Legs: Usually five coxal spines on each coxa II; other details of the legs essentially as in the adult except the podomeres are smaller and stouter. Measurements of the first leg (from three individuals) as follows: pars basalis 0.114–0.118 mm. long, 0.038–0.039 mm. deep, length 2.95 to 3.12 times the depth; pars tibialis 0.065 mm. long, depth between 0.034 and 0.035 mm.; tibia 0.068–0.069 mm. long, 0.028 mm.

deep; tarsus 0.125–0.129 mm. long, 0.025 mm. deep. Measurements of the fourth leg (one paratype only) as follows: tibia 0.136 mm. long, 0.045 mm. deep; metatarsus 0.06 mm. long, 0.035 mm. deep; tarsus 0.129 mm. long, 0.03 mm. deep.

**DEUTONYMPH:** Unless otherwise indicated, the measurements and ratios are the limits of range based upon measurements of five paratypes. General features as in the tritonymph but more lightly colored, smaller, and appendages somewhat stouter; body 0.45–0.55 mm. long. Carapace with very weak and much flattened epistome, otherwise as in the tritonymph; carapacial chaetotaxy apparently as in the adult; carapace 0.17–0.18 mm. long, 0.175–0.185 mm. wide. Abdomen with chaetotaxy as in the adult except there appears to be a maximum of six setae on the sternites of the central part of the abdomen; length of abdomen 0.27–0.37 mm., width equal to about one-half of the length.

**Chelicera:** Slightly stouter than in the tritonymph; basal seta wanting but sub-basal, interior, and exterior setae as well as the accessory seta present; usually six teeth (including the large distal one) on the inner margin of the fixed finger and about nine teeth on the movable finger margin; serrula exterior with only 12 to 13 ligulate plates; length of chelicera 0.125–0.133 mm., width of base 0.075–0.08 mm., length 1.65 to 1.72 times the width; length of movable finger between 0.08 and 0.088 mm.

**Palpus:** From the dorsad, general appearance much like that of the tritonymph except smaller, lighter in color, and palpal podomeres a little stouter; measurements follow: trochanter 0.076–0.079 mm. long, 0.049–0.051 mm. wide, length 1.52 to 1.58 times the width; femur 0.144–0.163 mm. long, 0.042–0.045 mm. wide, length 3.45 to 3.65 times the width; tibia 0.086–0.093 mm. long, 0.053–0.055 mm. wide, length 1.62 to 1.72 times the width; chela 0.25–0.266 mm. long, 0.056–0.058 mm. wide, length 4.45 to 4.65 times the width; chelal hand 0.083–0.086 mm. long, 0.057–0.061 mm. deep; movable finger 0.17–0.182 mm. long. In side view, chelal

hand and fingers stouter than in the tritonymph. Movable finger with *t* and *st* separated by less than two areolar diameters, the former distal to the midpoint of the finger, the latter proximal to the midpoint. Fixed finger with *est* and *it* at about the midpoint of the finger; with *ds*, *et*, *ist*, *eb*, and *ib* as in the tritonymph; *esb* wanting; the spine-like seta present on the inner surface of the base of the fixed finger as in the adult. Teeth less well developed than in the tritonymph; fixed finger with 15 to 20 teeth, alternately large and small except at the very ends of the row; movable finger with seven or eight widely spaced but fairly well-developed teeth in the distal part of the finger, the proximal tooth about on a level with tactile seta *t*; between these teeth of the movable finger sometimes occur weak and smaller teeth, giving a total of 10 to 12 teeth on the finger; teeth of the proximal part of the row vestigial.

**Legs:** Smaller, stouter, and lighter in color than in the tritonymph; each coxa II with two to four (usually three) spines, similar to the coxal spines of the adult.

**TYPE LOCALITY:** The female holotype, 53 female paratypes, 19 tritonymph paratypes, and six deutonymph paratypes in collections made by A. H. Strickland between November 16, 1943, and February 23, 1944, from surface litter and soil on a cacao estate near St. Augustine, Trinidad, British West Indies. The collections were made beneath Trinidadian and Ecuadorian cacao trees and young immortelle shade trees. All of the type specimens are mounted on slides.

**REMARKS:** *Tyrannochthonius insulae* is the third species of the genus to be reported from the Western Hemisphere. Our new species easily may be distinguished from one of these New World forms, *T. johnstoni* (Chamberlain, 1923) from Lower California, by the nature of the coxal spines on coxa II and from the other form, *T. centralis* Beier, 1931, from Central America, by marked differences in the size and shape of the palpal chela and the dentition and chaetotaxy of the chelal fingers. *Tyrannochthonius insulae* appears to show considerable relationship to the

African species, *T. brevimanus* Beier, 1935. Separation of *T. insulae* and *T. brevimanus* is readily made, however, since *insulae* has two setae on the posterior carapacial margin while *brevimanus* has four; the palpal femur is stouter and shorter in *insulae*; and the tactile setae *ib* and *isb* are nearer the midpoint of the hand in *insulae* than in *brevimanus*.

One of the peculiarities about the present species is that the males are either absent or, as a result of a lack of sexual dimorphism, the two sexes cannot be distinguished. If males occur in this species, some sexual dimorphism might be expected

since differences have been reported between sexes in the related species *T. terribilis* (With, 1906). All the adults of *T. insulae* have exceedingly simple and similar genital structures, which resemble the condition described by With (1906) for the female of his *T. terribilis*: "The genital opening (?) [*sic!*] is rhombic and backwards limited by two chitinous ridges, which together establish an obtuse angle." None of our specimens have genital structures at all comparable to those figured by With (1906, pl. 1, fig. 1b) for the male of *T. terribilis*.

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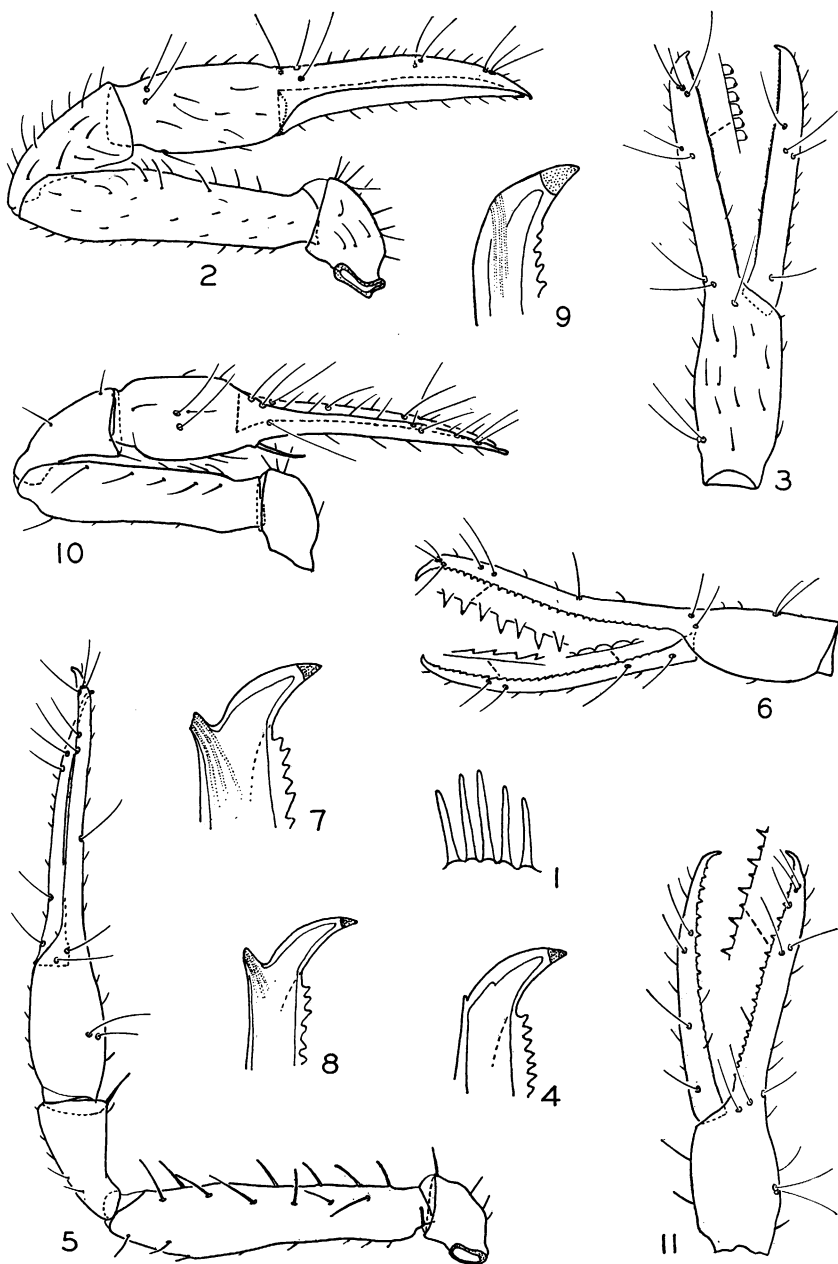


Fig. 1. *Tridenchthonius trinidadensis*, new species, spines of right coxa II, male holotype.

Fig. 2. Idem, dorsal view of palp, female allotype.

Fig. 3. Idem, lateral view of chela, female allotype.

Fig. 4. *Pseudochthonius heterodentatus*, new species, tip of movable cheliceral finger, male holotype.

Fig. 5. Idem, dorsal view of palp, male holotype.

Fig. 6. Idem, lateral view of chela, male holotype.

Fig. 7. Idem, tip of movable cheliceral finger, female allotype.

Fig. 8. Idem, tip of movable cheliceral finger, deutonymph paratype; drawn to a much larger scale than used in figures 4 and 5.

Fig. 9. *Tyrannochthonius insulae*, new species, tip of cheliceral finger, female paratype.

Fig. 10. Idem, dorsal view of palp, female holotype.

Fig. 11. Idem, lateral view of chela, female holotype.

