

Francke, O. F. and J. A. Santiago-Blay. 1984. Redescription of *Tityus crassimanus* (Thorell, 1877), and its junior synonym *Tityus antillanus* (Thorell, 1877) (Scorpiones, Buthidae). J. Arachnol., 12:283-290.

**REDESCRIPTION OF *TITYUS CRASSIMANUS* (THORELL, 1877),
AND ITS JUNIOR SYNONYM *TITYUS ANTILLANUS* (THORELL, 1877)
(SCORPIONES, BUTHIDAE)**

Oscar F. Francke

Department of Biological Sciences
Texas Tech University
Lubbock, Texas 79409

and

Jorge A. Santiago-Blay¹

Museo de Biología, Departamento de Biología
Universidad de Puerto Rico
Rio Piedras, Puerto Rico 00931

ABSTRACT

Tityus crassimanus (Thorell, 1877), originally described from one adult female from "Mexico," is redescribed and its geographic distribution is revised to the Caribbean island of Hispaniola. *Tityus antillanus* (Thorell, 1877), originally described from two juveniles from the "Antilles," is a junior synonym of *T. crassimanus*. *Tityus crassimanus* appears to be most closely related to *Tityus michelii* Armas, from Puerto Rico. *Tityus obtusus* (Karsch, 1879), from Puerto Rico, has been confused with, and erroneously suspected of being a junior synonym of *T. crassimanus*.

INTRODUCTION

Thorell (1877) described six species in the genus *Isometrus* Hemprich and Ehrenberg, four of them from the New World. *Isometrus fuscus* Thorell, 1877, from Argentina was subsequently designated the type species of the genus *Zabius* Thorell, 1894. *Isometrus stigmurus* Thorell, 1877, from Brasil was transferred to *Tityus* C. L. Karsch, where it is still considered a valid species (Lourenço 1981). *Isometrus crassimanus* Thorell, 1877, from Mexico was also transferred to *Tityus*, where it has remained enigmatic (Hoffmann 1932) primarily because the genus *Tityus* is otherwise unknown north of Costa Rica in either Central or North America (Pocock 1902, Lourenço and Francke in press). Last, *Isometrus antillanus* Thorell, 1877, from "America (India Occidentalis) . . . ('ex Antillis')," was also transferred to *Tityus*, where its identity and taxonomic status have been

¹Present address: Department of Entomology, University of California, Berkeley, California 94720.

unclear because of its suspected conspecificity with *Tityus obtusus* (Karsch, 1879), from Puerto Rico (Pocock 1893, Armas 1977, 1982, Santiago-Blay 1983).

We have examined the holotype of *Tityus crassimanus* (Thorell), an adult female, and two juvenile syntypes of *Tityus antillanus* (Thorell). These primary types are conspecific, and thus we propose that *T. antillanus* is a junior synonym of *T. crassimanus* by page precedence. Furthermore, we have examined conspecific material from "St. Domingo" (erroneously identified by Pocock 1893 as *T. obtusus*), and from "Jamaica-Haiti", and because no *Tityus* spp. are known to occur in Mexico, we propose that the type locality as originally given for *T. crassimanus* is erroneous, and that this taxon occurs naturally on the island of Hispaniola. *Tityus obtusus* (Karsch) is a valid species, distantly related to *T. crassimanus*.

The measurements and terminology (with slight modifications for pedipalpal carinae) follow essentially those proposed by Stahkne (1970), except for trichobothrial patterns (Vachon 1974, 1975), and metasomal carinae (Francke 1977).

Tityus crassimanus (Thorell)

Figs. 1-11

Isometrus crassimanus Thorell 1877:129-131.

Phassus crassimanus: Kraepelin 1891:111.

Tityus crassimanus: Kraepelin 1899:76; Pocock 1902:44-45; Herrera 1917:271; Mello-Leitão 1931:126, 1945:302; Hoffmann 1932:357-358, 1938:319.

Isometrus antillanus Thorell 1877:134-135, 1894:371. NEW SYNONYMY.

Tityus antillanus: Pocock 1893:384-385; Kraepelin 1895:93, 1899:76; Mello-Leitão 1931:126, 1939:58, 1945:300; Waterman 1950:168; Armas 1977:2, 1982:18; Lourenço 1980:806. NEW SYNONYMY.

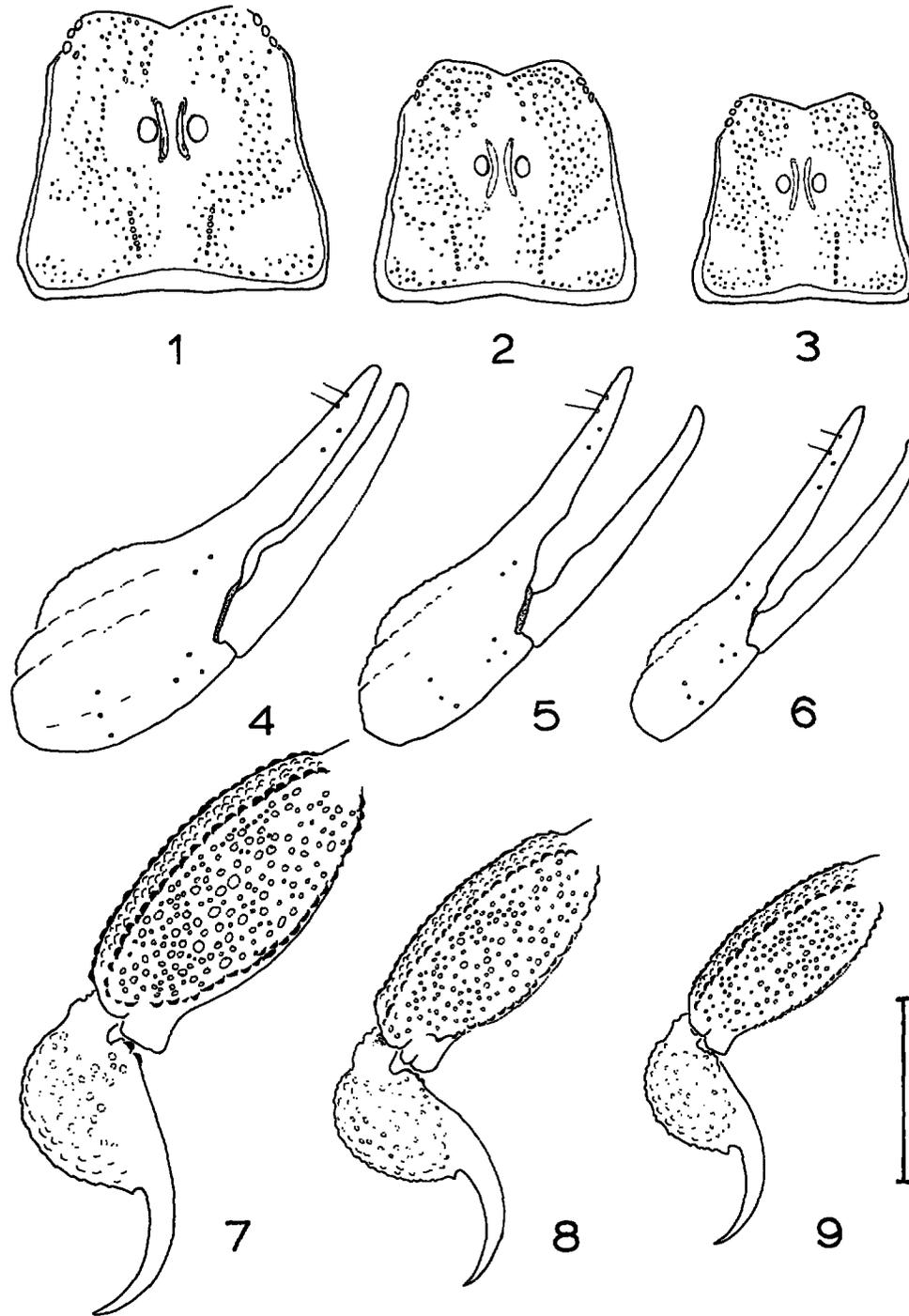
Tityus obtusus: Pocock 1893:379-380 [misidentification, not *T. obtusus* (Karsch)].

Type data.—Holotype of *T. crassimanus*, an adult female from "Mexico, Mus. Godeffr. 1869," deposited at the Section for Entomology (coll. Thorell No. 43/26), Naturhistoriska Riksmuseet, Stockholm; examined. Lectotype (hereby designated) of *T. antillanus*, a juvenile female, and one juvenile male paralectotype (hereby designated), from "America, Antilles (Cederström)," deposited at the Section for Entomology (coll. Thorell No. 43/23), Naturhistoriska Riksmuseet, Stockholm; examined.

Diagnosis.—Medium to large sized species. Adults light brown with pedipalp fingers and metasomal segments IV-V plus telson dark brown; mesosoma with three fuscous longitudinal bands, often quite faint. Dorsolateral keels of metasoma without enlarged distal teeth; intercarinal spaces on IV-V grossly granulose except dorsally. Pectinal tooth count 16-18; basal middle lamellae on females swollen. Fixed finger of pedipalp chela with 12-14 imbricated rows of denticles, and with moderate notch basally; movable finger with 14-15 imbricated rows of denticles plus an apical subrow of 3-6 denticles, and with moderate basal lobe.

Description of holotype.—Measurements in Table 1.

Prosoma. Carapace light brown; moderately to lightly infuscate on interocular triangle, region of posterior submedian carinae, and one median and two lateral areas along posterior margin. Superciliary crests moderate, smooth; all other carinae absent. Moderately granulose throughout except median and lateral furrows (Fig. 1). Venter yellowish-brown; sternum elongate pentagonal (Fig. 10).



Figs. 1-9.—*Tityus crassimanus* (Thorell): 1-3, carapace; 4-6, pedipalp chela; 7-9, metasomal segment V and telson. 1, 4, 7, holotype adult female of *Tityus crassimanus* (Thorell), from "Mexico"; 2, 5, 8, presumed subadult female from Haiti; 3, 6, 9, juvenile lectotype female of *Tityus antillanus* (Thorell) from "Antilles." All drawings at same scale to illustrate ontogenetic changes, scale = 5 mm.

Table 1.—Measurements (in mm) of *Tityus crassimanus* (Thorell).

	Holotype ♀ <i>crassimanus</i>	Subadult ♀ Haiti	Lectotype ♀ <i>antillanus</i>	Adult ♂ Haiti
Total length	76.2	60.5	52.4	63.3
Carapace length	7.5	6.3	5.7	6.0
median width	7.0	5.5	4.9	5.1
Mesosoma length	20.4	14.6	13.2	15.2
Metasoma length	48.3	39.6	33.5	42.1
I length/width	6.4/4.5	5.2/3.7	4.4/3.0	5.6/3.2
II length/width	7.9/4.4	6.6/3.6	5.4/2.8	7.1/3.2
III length/width	8.4/4.6	7.0/3.7	5.6/2.8	7.4/3.6
IV length/width	8.7/4.8	7.0/3.8	6.1/2.8	7.6/4.0
V length/width	9.0/4.8	7.3/3.5	6.2/2.9	7.5/4.1
Vesicle length/width	5.2/3.7	4.2/3.0	3.7/2.3	4.6/3.1
Aculeus length	2.7	2.3	2.1	2.3
Pedipalp length	27.5	23.8	20.9	24.5
Femur length/width	6.3/2.3	5.3/1.9	4.9/1.6	5.8/1.8
Tibia length/width	7.5/3.4	6.2/2.7	5.7/2.4	6.6/2.5
Manus length/width	6.9/4.3	5.6/3.1	4.3/2.1	6.1/3.1
Underhand length	5.4	4.6	3.4	5.0
Movable finger length	8.3	7.7	6.9	7.1
Pectinal teeth left/right	17-17	16-17	17-17	17-16

Mesosoma. Tergites light brown, with three faint longitudinal bands produced by irregular fuscous markings on the posterior half of each tergite. Tergal median longitudinal keel absent on I-II; weak, vestigially granulose on distal half of III-VI. Tergite VII with four serrate longitudinal keels. Tergites densely granulose throughout; granules rounded, small to medium sized. Sternopectinal area yellowish-brown; pectinal teeth 17-17, basal middle lamellae moderately swollen (Fig. 10). Sternites yellowish-brown, smooth; sternites VII with submedian keels vestigial to obsolete, lateral keels weak to vestigial, smooth.

Metasoma. Segments I-III medium brown, slightly infuscate ventrally; IV-V and telson dark brown. Dorsolateral keels on I-III weak, on IV moderate; on I-II with weak, widely spaced serrations; on III with small rounded granules; on IV with large rounded granules. Lateral suprmedian keels on I-III moderate, on IV weak; on I-II with evenly spaced medium serrations; on III with rounded granules; on IV with large, low rounded granules. Lateral median keels on I complete, moderate, serrate; on II present on distal one-half, weak to moderate, serrate; on III-IV obsolete. Lateral inframedian and ventral submedian keels on I weak, on II moderate, on III-IV strong; on I with weak, evenly spaced serrations; on II-III with evenly spaced medium serrations; on IV grossly serrato-granulose. Segment V dorsolateral, ventrolateral, and ventral median carinae moderate, with large, low rounded granules (Fig. 7). Intercarinal spaces: on I-III with progressively denser and coarser granulation posteriorly and ventrolaterally; on IV-V with very dense, almost confluent coarse granulation except dorsally (Fig. 7). Telson vestigially granulose; subaculear spine vestigial.

Chelicera. Chela yellow with faint variegated fuscosity; fingers brown. Dentition with basic familial plan (Vachon 1973); one ventral tooth on fixed finger.

Pedipalps. Femur light brown, with faint variegated fuscosity. Femur pentacarinat: dorsal anterior, dorsal posterior, and ventral anterior keels moderate, with sharp medium-

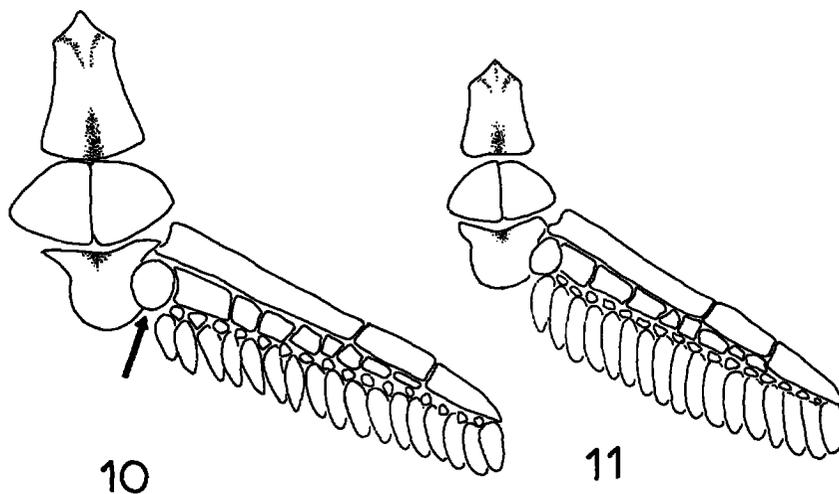
sized tubercles; median anterior keel with sharp medium and large tubercles; median posterior keel weak, with small granules. Femoral intercarinal spaces with moderately dense small granulation, except smooth ventrally. Orthobothriotaxia A-alpha (Vachon 1975).

Tibia light brown, with faint variegated fuscosity. Anterior dorsal, anterior median, anterior ventral, and dorsal median keels with moderate, sharp medium tubercles; posterior dorsal, posterior median and posterior ventral keels weak to vestigial, faintly granular to smooth. Tibial intercarinal spaces with sparse to moderately dense small granulation. Orthobothriotaxia A (Vachon 1974).

Chela light brown, with faint variegated fuscosity; fingers dark brown. Chelal carinae weak, faintly granulose (Fig. 4); intercarinal spaces granulose, especially on internal aspect. Fixed finger with shallow basal notch, with 14 rows of denticles; movable finger with low basal lobe, with 15 rows and an apical subrow of 3-4 denticles. Orthobothriotaxia A (Vachon 1974).

Legs yellowish-brown, with faint variegated fuscosity.

Lectotype female of *Tityus antillanus*.—Measurements in Table 1. The most noticeable differences, other than size, from the holotype of *T. crassimanus* are age related changes (we estimate the lectotype to be one or two molts away from sexual maturity). The lectotype lacks the intense darkening of the pedipalp chela fingers and distal segments of the metasoma, and has more mottled variegations throughout. The vesicle is slightly more granulose, and the subaculear tooth appears slightly larger (Fig. 9); however, females presumed to be subadult show the gradual transition from the condition in the juvenile lectotype to the adult female (Fig. 8). The lectotype has the pedipalp chelae proportionately narrower and thinner (Table 1, Figs. 4, 6), the basal notch on the fixed finger is shallower, as is the basal lobe on the movable finger; although once again presumed subadult females show the gradual transition in these characters (Fig. 5). The lectotype has 13 rows of denticles on the fixed finger of the pedipalps, and 14 rows plus an apical subrow on the movable finger; however, this is well within the range of variation encountered (see below).



Figs. 10, 11.—Sternopectinal area of *Tityus crassimanus* (Thorell); 10, female with slightly swollen basal middle lamella (arrow); 11, male.

Variability.—Notable variation among the four males and seven females examined, other than that due to ontogeny as noted above for the lectotype of *T. antillanus*, occurs in pectinal tooth counts and pedipalp finger dentition. In males there were four pectinal combs with 16 tooth, and four combs with 17 teeth (two asymmetrical individuals); in females one comb with 16 teeth, 12 combs with 17 teeth, and one comb with 18 teeth (two asymmetrical individuals). The fixed finger of the pedipalps had 12 rows of denticles on 4 chelae, 13 rows on 12 chelae, and 14 rows on five chelae (one fixed finger was broken and could not be accurately counted); three of the eleven specimens had asymmetrical row counts between the right and the left chela. Excluding the apical subrow of 3-6 denticles, the movable finger had 14 rows on 13 chelae and 15 rows on nine chelae; only one specimen had asymmetrical row counts between the right and the left chela. There is a light trend for immatures to have lower row counts than adults, but the sample size is inadequate to test this trend statistically.

Specimens examined.—Holotype adult female of *Tityus crassimanus* (Thorell) from "Mexico," collector unknown, 1869 (Naturhistoriska Riksmuseet, Stockholm; coll. Thorell No. 43/26); lectotype juvenile female and one paralectotype juvenile male of *Tityus antillanus* (Thorell) from "America, Antilles," Cederström, collection date unknown (Naturhistoriska Riksmuseet, Stockholm; coll. Thorell No. 43/23); one adult male from "St. Domingo," collector and date unknown [British Museum (Natural History), London; ex dry collection No. 13—misidentified by Pocock 1893 as *Tityus obtusus* (Karsch)]; one adult male, three adult females, one presumed subadult male, and two presumed subadult females from "Jamaica Haiti," collector and date unknown (Muséum National d'Histoire Naturelle, Paris; RS-0858).

Interspecific comparisons.—*Tityus crassimanus* differs significantly from *Tityus obtusus* (Karsch), with which it has been confused (Pocock 1893, Armas 1977, 1982), as follows: on *T. obtusus* the metasomal carinae are moderately strong and finely serrate throughout, and the dorsolateral keels end distally in a pointed, enlarged tooth; the intercarinal spaces on segments IV-V are shagreened to densely and minutely granulose except dorsally; the femoral anteromedian keel has numerous (15+) small granules rather than fewer (ca. 10) tall tubercles; and the manus is smooth on the internal aspect.

Tityus crassimanus appears to be most closely related to *Tityus michelii* Armas, from Puerto Rico. Adult specimens of *T. michelii* are only about half the size (30-35 mm total length) of adult specimens of *T. crassimanus*. Adult *T. michelii* have the vesicle smooth, and a pectinal tooth count range of 14 to 16. Finally, and most significant, the basal middle lamellae on the pectines of adult female *T. michelii* is not swollen, whereas it is swollen on adult female *T. crassimanus*.

Mello-Leitão (1945) erroneously referred *T. crassimanus* to his "Formenkreise L" (*Tityus asthenes* group) along with 10 other nominal taxa characterized as being dark brown or black; whereas *T. antillanus* was referred to the monotypic "Formenkreise G" (*Tityus antillanus* group). Indeed, the characters used by Mello-Leitão (1945) to characterize "Formenkreise G" are useful in separating *T. crassimanus* from almost all other *Tityus* species: medium to large size, with three distinct longitudinal bands (faded occasionally), dorsolateral keels of metasoma without enlarged distal teeth, basal middle lamellae on pectines of females swollen, and movable finger of pedipalp chela with well developed basal lobe.

ACKNOWLEDGMENTS

We express our gratitude to the following curators, and their respective institutions, for the loan of the specimens which made this study possible: Mr. T. Kronstedt, Naturhistoriska Riksmuseet, Stockholm; Mr. P. D. Hillyard and Mr. F. R. Wanless, British Museum (Natural History), London; Mr. W. R. Lourenço, Muséum National d'Histoire Naturelle, Paris; Mr. L. F. de Armas, Instituto de Zoología, Academia de Ciencias de Cuba, La Habana; and Dr. G. B. Edwards, Florida State Collection of Arthropods, Gainesville. Our special thanks to Mr. J. C. Cokendolpher, Mr. W. R. Lourenço, and Mr. W. D. Sissom for their constructive criticisms of the typescript. Financial support was received from the Institute for Museum Research, Texas Tech University (OFF), and the Decanto de Estudiantes, Universidad de Puerto Rico (JASB).

LITERATURE CITED

- Armas, L. F. de. 1977. Redescrpción de *Tityus obtusus* (Karsch, 1879) (Scorpionida, Buthidae). Poeyana, No. 178, pp. 1-7.
- Armas, L. F. de. 1982. Adiciones a las escorpiofaunas (Arachnida, Escorpiones) de Puerto Rico y República Dominicana. Poeyana, No. 237, pp. 1-25.
- Herrera, M. 1917. Los alacranes de México. Bol. Div. Est. Biol. México, 2:265-275.
- Hoffmann, C. C. 1932. Monografías para la entomología médica de México. II. Los escorpiones de México. 2a. Parte: Buthidae. An. Inst. Biol., México, 4:243-361.
- Hoffmann, C. C. 1938. Nuevas consideraciones acerca de los alacranes de México. An. Inst. Biol., México, 9:317-337.
- Francke, O. F. 1977. Scorpions of the genus *Diplocentrus* from Oaxaca, Mexico (Scorpionida, Diplocentridae). J. Arachnol., 4:145-200.
- Karsch, F. 1879. Scorpionologische Beiträge. II. Mitt. Muench. Entomol. Ver., 3:97-136.
- Kraepelin, K. 1891. Revision der Skorpione. I. Die Families der Androctonidae. Jahrb. Hamb. wiss. Anst., 8:1-144.
- Kraepelin, K. 1895. Nachtrag zu Theil I. Der Revision der Scorpione. Jahrb. Hamb. wiss. Anst., 12:73-96.
- Kraepelin, K. 1899. Scorpiones und Pedipalpi. Das Tierreichs, 8:1-265.
- Lourenço, W. R. 1980. Contribution à la connaissance systématique des Scorpions appartenant au "complexe" *Tityus trivittatus* Kraepelin, 1898 (Buthidae). Bull. Mus. Nat. Hist. nat., Paris, 4e ser., 2, sect. A, no. 3, pp. 793-843.
- Lourenço, W. R. 1981. Sur la systématique des scorpions appartenant au complexe *Tityus stigmurus* (Thorell, 1877) (Buthidae). Rev. Brasil. Biol., 41:351-362.
- Lourenço, W. R. and O. F. Francke. in press. The identity of *Tityus floridanus* and *Tityus tenuimanus* (Scorpiones, Buthidae). Florida Entomol.
- Mello-Leitão, C. de. 1931. Divisão e distribuição do género *Tityus* Koch. An. Acad. Brasil. Cien., 3:119-150.
- Mello-Leitão, C. de. 1939. Revisão do género *Tityus*. Physis, sec. C., 18:57-76.
- Mello-Leitão, C. de. 1945. Escorpiões Sul-americanos. Arq. Mus. Nac., Rio de Janeiro, 40:1-468.
- Pocock, R. I. 1893. Contributions to our knowledge of the arthropod fauna of the West Indies. Part 1. Scorpiones and Pedipalpi; with a supplemental note upon the freshwater decapoda of St. Vincent. J. Linn. Soc. London, 24:374-409.
- Pocock, R. I. 1902. Arachnida: Scorpions, Pedipalpi, and Solifugae. Biologia Centralia-Americana. London, 72 pp.
- Santiago-Blay, J. A. 1983. Annotated list of the scorpion taxa reported for Puerto Rico and the adjacent islands. Science-Ciencia, 10:92-93.
- Thorell, T. 1877. Etudes Scorpilogiques. Atti Soc. Ital. Sci. Nat., Milano, 19:75-272.
- Thorell, T. 1894. Scorpiones exotici R. Musei Historiae Naturalis Florentini. Bull. Soc. Entomol. Italiana, 25:365-387.

- Vachon, M. 1974. Etude des caractères utilisés pour classer les familles et les genres de Scorpions. Bull. Mus. Nat. Hist. nat., Paris, ser. III, No. 140, Zoologie 104, pp. 857-958.
- Vachon, M. 1975. Sur l'utilisation de la trichobothriotaxie du bras des pedipalpes des Scorpions (Arachnides) dans le classement des genres de la famille des Buthidae Simon. C. R. Acad. Sci. Paris., ser. D, 281:1597-1599.
- Waterman, J. A. 1950. Scorpions in the West Indies with special reference to *Tityus trinitatis*. Caribbean Med. J., 12:167-177.

Manuscript received October 1983, revised January 1984.