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**Scorpions (Chelicerata) from Colombia.**  
**III. The scorio-fauna of pacific region (Choco), with some**  
**biogeographic considerations**

by

Wilson R. Lourenço & Eduardo Florez

Dr. Wilson R. Lourenço, Université Pierre et Marie Curie, U.F.R. des Sciences de la Vie,  
4 Place Jussieu, F - 75252 Paris Cedex 05, FRANCE.

Mr. Eduardo Florez D., INCIVA-Museo de Ciencias Naturales de Cali, A.A. 5660, Cali,  
COLOMBIA.

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**Abstract**

The tropical lowlands of the Choco region of western Colombia and adjacent Ecuador constitute the wettest part of the Neotropics and perhaps of the world. The fauna of this region has been poorly known until very recently. Progress on the study of the scorpion fauna of this region suggests an important species diversity with noticeable rates of endemism. Four families are present: Buthidae, Chactidae, Diplocentridae and Ischnuridae. Predominant distributional patterns show an Amazonian origin for most of the Buthidae and Chactidae species; *Centruroides gracilis* representing an exception. This species of Buthidae and *Tarsoporosus kugleri anchicaya* new subspecies, the only Diplocentridae observed, have affinities with Central America. The only species of Ischnuridae present, *Opisthacanthus lepturus*, belongs to a Gondwanian group and has a complex origin. Scorpion biogeographic patterns in the Choco region today correspond closely with the observations of PRANCE (1982), HAFFER (1982) and GENTRY (1982), and complement previous conclusions regarding scorpion biogeography.

**Keywords: Scorpions, Choco, Colombia, Biogeography.**

## Introduction

Although Colombian scorpions had been studied for many years, and numerous papers have been published on the scorpions of the central and east Cordilleras, as well of the regions of the Llanos and Santa Marta (GERVAIS 1844; THORELL 1876; KRAEPELIN 1914), no particular publications have dealt with the Colombian Pacific coastal region (Choco region). Only papers dealing with the scorpions of the boundaries of the Choco area, in Ecuador and Panama (POCOCK 1898, 1902) have described species common to the Choco region of Colombia.

According to GENTRY (1982), the Choco phytogeographic region may be considered to include the coastal lowlands of western Colombia and northwestern Ecuador, covered by wet and moist forest vegetation. The department of Choco in Colombia covers only the northern half of this area.

The most outstanding characteristic of Choco region is the incredibly high average yearly precipitation. According to GENTRY (1982) this can reach 11770 mm at Tutunendo in central Choco department. The Pacific Regional Atlas (1983) gives an average of 9000 mm; therefore Choco is the only place in the Neotropics in which pluvial forest (Tropical rain forest) occurs.

Material from the Colombian Pacific region is scarce in most Museum collections. Our work is primarily based on the material collected since 1988 by ourselves, when the senior author undertook some field work in the region. All available types of previous known species have been revised.

In this work we follow the methods previously used by LOURENÇO (1988) in his study of the scorpio-fauna of Ecuador. Only short descriptions are given of the new species.

### Ischnuridae family POCOCK, 1893

#### *Opisthacanthus lepturus* (PALISOT DE BEAUVOIS, 1805)

This species presents a trans-Andean relationship as defined by GENTRY (1982). It occurs only at the very north part of the Choco region, having a distribution from Panama to Magdalena and through the central Cordillera as far as Muzo in Boyaca department and Gigante in Huila department.

In Panama this species lives in the Palm tree *Scheelea zonensis* in forest formations (LOURENÇO 1981), but do not seems to be adapted to the pluvial forest of Choco (Fig. 17).

### Chactidae family POCOCK, 1893

#### *Chactas vanbenedeni* GERVAIS, 1844

This is the type-species for the genus *Chactas*; it has been described with very few details regarding its type-locality. MELLO-LEITÃO (1945) places the species *Chactas fuchsii* BERTHOLD, 1846 as a synonym of *C. vanbenedeni*; *C. fuchsii* was described from Popayan (Cauca department), a locality close to the Choco region.

According to our own observations, *Chactas vanbenedeni* seems to be common in the Choco region and it is certainly endemic to this area of Colombia. The genus *Chactas* needs revision, and many misidentifications lead to wrong conclusions about its geographic distribution of the species. For instance, MELLO-LEITÃO (1945) redescribed *C. vanbenedeni* based on specimens from Muzo (Boyaca). LOURENÇO (in press) studied material from Muzo where only *Chactas keyserlingi* POCOCK is present. LOURENÇO (in press) also tried hybridization between *Chactas vanbenedeni* from Tulua (Valle del Cauca) and *Chactas keyserlingi* from Mosquera (Cundinamarca); males and females from the different species do not recognise one another for mating.

*Chactas vanbenedeni* is distinguished by strong sexual dimorphism; Pedipalps and particularly the chelae in males are long and slender whereas, in females, the chelae is stocky and short (Fig. 1 - 2).

Among the material collected in the area of Buenaventura (Valle del Cauca), two adults specimens of *Chactas*, one male and one female represent a new species.

### *Chactas mauriesi* new species (Figs. 5 to 10)

Type data: Holotype male from Puerto Merizal de Buenaventura, Dept. Valle del Cauca, Colombia, 2/XII/1988 (E. Florez) (En corteza de troncos en descomposicion y raises de palmas; 10 m alt.). Deposited in the Museo de Ciencias naturales de Cali, Colombia (MCNC).

Etymology: Patronym in honor of our colleague Dr. Jean Paul Mauries of the Museum National d'Histoire Naturelly, Paris.

Description: Based on holotype male. Measurements on table 1.

Coloration: Base color yellow brown. Prosoma, mesosoma and metasoma, reddish brown; vesicle yellowish; eyes surrounded with black pigment. Venter yellowish; chelicerae yellow brown, infuscate on fingers; teeth reddish. Pedipalps: base color reddish brown; chelae yellow brown, fingers much darker, reddish brown. Legs yellowish with diffuse fuscous spots.

Morphology: Prosoma: carapace almost smooth; anterior margin feebly concave; median longitudinal and posterior lateral furrows distinct; median ocular tubercle distinctly anterior of middle; two pairs of lateral eyes; the anterior pair directed more toward the anterior margin of carapace. Sternum pentagonal, wider than long. Mesosoma: tergites feebly granular without keels; pectines: 7 - 7 teeth, without fulcra; distal tooth slightly wider. Genital operculum divided, with two subovale to subtriangular plates. Sternites densely punctate, acarinate; stigmata small, oval. Metasoma: segments I - V with vestigial keels; ventral obsolete; intercarinal spaces smooth. Vesicle, fusiform, acarinate and smooth. Chelicerae: movable finger with one basal and two subdistal teeth. Pedipalps: femur with four complete keels; all faces smooth. Tibia with five keels, intercarinal spaces feebly granular. Chelae with vestigial keels feebly granular. Fingers with seven rows of denticles. Trichobothriotaxie C. Legs: tarsomere II with feebly dense setae ventrally, not arranged in rows.

Description of allotype female (same data as for the holotype male). Measurements in table 1. Differs from male as indicated below.

Coloration: In general darker, more heavily infuscate than male.

Morphology: Carapace and tergites punctate to smooth. Vesicle more oval than on male.

Pectinal teeth vary considerably in size between sexes; those of male are about twice as long as on the female, 6 - 5 teeth.

### Diplocentridae family KARSCH, 1880

One single species belonging to Diplocentridae family is known from South America, *Tarsoporus klugeri* (SCHENKEL, 1932). This species was described under the genus *Diplocentrus* and transferred by FRANCKE (1978) to the new genus *Tarsoporus* FRANCKE, being its type by monotypy. Until now this is the only known species of *Tarsoporus*.

*Tarsoporosus klugeri* is known only from semi-arid areas of northern Venezuela and northeastern Colombia, departments Cesar and Guajira. Since 1988 we collected several specimens of *Tarsoporosus* in the pacific region. The specimens in question have a very similar morphology to *T. klugeri*, however in each case they were found in very wet localities of the pacific region as Anchicaya and Buenaventura that are covered by rain forest.

The elements of these presumed different populations have an almost identical morphology. However having in account the tremendous climatic differences between the pluvial forest of Choco region and these of the semi-arid regions of Guajira, we take the decision of describe the Choco population as a new geographic sub-species.

### *Tarsoporosus klugeri anchicaya* new sub-species (Figs. 11 - 12)

Type data: Holotype male from Bajo Calima, Buenaventura, Dept. Valle del Cauca, Colombia, 2/VI/1988 (E. Florez) (Pluvial tropical; suelo, enterrado en lodo, 40 m alt.).  
Deposited in MCNC.

Etymology: The name is a noun in apposition after Anchicaya, a collecting site in the Department of Valle del Cauca.

Description: Based on holotype male. Measurements on table 1.

Coloration: Base color reddish brown; prosoma, mesosoma and metasoma brown; vesicle same color as segment V. Eyes surrounded with black pigment. Venter yellowish brown; chelicera brown infuscate; teeth reddish. Pedipalps: femur and tibia reddish brown; chelae reddish, fingers darker. Legs yellowish brown, with diffuse spots.

Morphology: Prosoma: carapace feebly granular, almost smooth; median ocular tubercle distinctly anterior; three pairs of lateral eyes. Anterior margin emarginate. Venter with some setae; sternum pentagonal. Mesosoma: tergites I - VI smooth; VII tetracarinat. Genital operculum oval to ellipsoidal. Sternites smooth; stigmata elongate; pectines: 12 - 12 teeth. Metasoma: segments I - V with carinae moderate to strong. Metasomal intercarinae smooth. Telson strongly compressed dorsoventrally. Vesicle dorsally smooth, laterally and ventrally densely granular. Pedipalps: orthobothriotaxie C. Keels from moderate to vestigial. Fingers with some setae; dentate margins granular without a distinctive patterns. Legs: tarsomere I on all legs bearing dense pores. Pectinal tooth count in three paratypes:

Specimens examined: Colombia: Dept. Valle del Cauca, Anchicaya (rain forest), 1 juvenile (E. Florez), 15/II/1988 (paratype-MCNC). Bajo Calima-Buenaventura (en barro adherido a la base de tronco junto a termitero; 40 m alt.), 1♀ juvenile (G. Parra), XII/1988 (paratype-MCNC); 1♂ (E. Florez), 2/XII/1988 (holotype-MCNC). El Carmen-via al mar (350 m alt.), 1♀ (M. Baena), XI/1986 (paratype-MCNC).

## Buthidae family SIMON, 1879

### *Centruroides gracilis* (LATREILLE, 1804)

This Buthidae species has a Neartic origin with a centre of dispersion in Mexico. *Centruroides gracilis* is a comun species in Colombia and can be found in enclaved arid areas in the Pacific region where rain forests are predominant.

A large description is given by SISSOM & LOURENÇO (1987).

### *Ananteris gorgonae* LOURENÇO & FLOREZ, 1989

This species was recently described by the authors from Gorgona island, situated in face of Cauca's pacific coast Department. New collecting shows the presence of this species in continental Colombia.

Gorgona island has the same climatic conditions as Choco region with an important pluvial forest (PALTA 1986). Yearly precipitation reaches 10000 mm.

*Ananteris gorgonae* is endemic to the Choco region, including Gorgona island.

### *Tityus asthenes* **POCOCK, 1893 (Figs. 3 - 4)**

This is a common species in the Choco region. It was described from the north of Ecuador and recently LOURENÇO (1988) confirmed its status as being a polymorphic species based on material collected in the region of Coca, north of Ecuador. *Tityus asthenes* is also present in Gorgona island (LOURENÇO & FLOREZ, 1989). This species can be considered as a typical element of the broader Choco region.

### *Tityus forcipula* (**GERVAIS, 1844**)

This very particular species was treated by LOURENÇO (1984) in a study dealing with the *Tityus forcipula* group. It was described from Popayan, south of the Colombian Pacific region and is without any doubt a typical element of the Choco region; its distribution ranges from the north of Ecuador (LOURENÇO 1988) to the south of Colombia.

According to our observations it can be found at the sea level (Buenaventura area), but also in altitudinal rain forest at more than 1000 m, as in Penas Blancas (Valle del Cauca).

### *Tityus intermedius* **BORELLI, 1899**

This species described from Ibana, Ecuador, remains poorly known. LOURENÇO (1980) discussed the status of it in relation to the *Tityus trivittatus* complex, showing its non relation to this group.

Only the type from Ecuador was examined; MELLO-LEITÃO (1945) however indicates this species for Colombia. The type-locality can be included in the south part of Choco region. New specimens from Colombia will be of great interest to establish the real status of *T. intermedius*.

Among the material collected in the area of Buenaventura (Valle del Cauca), two adult females of *Tityus* do not correspond to any known species of the Pacific region. These new species are related to *Tityus festae* BORELLI and to *Tityus pachyurus* POCOCK, both found in Panama. Several differences in color and morphology can be observed among these three species.

### *Tityus sastrei* new species (Figs. 13 to 16)

Type data: Holotype female from Bajo Calima-Buenaventura, Dept. Valle del Cauca, Colombia, 1/VI/1988 (E. Florez) (en interior de tronco en descomposicion, 40 m alt.).

Deposited in MCNC.

Etymologie: Patronym in honor of our colleague Dr. Claude Sastre of the Museum National d'Histoire Naturelle, Paris.

Description: Based on holotype female. Measurements on table 1.

Coloration: Base color reddish brown. Prosoma: carapace reddish brown; eyes surrounded with black pigments. Mesosoma: brown with a black longitudinal strip over the median keel. Metasoma: segments I to III yellowish brown; IV - V reddish brown. Vesicle: same color as segment V. Venter yellowish brown. Chelicerae yellowish; fingers very dark. Pedipalps: base color yellowish brown with several white spots. Fingers much darker. Legs yellowish with diffuse fuscous spots.

Morphology: Carapace feebly granular; anterior margin with a median concavity. Anterior median superciliary and posterior median keels moderate. All furrows moderately deep. Median ocular tubercle distinctly anterior of middle. Three pairs of lateral eyes. Sternum subtriangular. Mesosoma: tergites feebly granular, almost smooth. Median keel moderate in all tergites. Tergite VII pentacarinata, all keels strong crenulate. Venter: genital operculum divided longitudinally. Pectines: pectinal tooth count 21 - 21. Sternites almost smooth with elongate stigmata; VII with four moderate keels. Metasoma: segments I - IV dorsolateral and lateral supramedian keels strong crenulate. Lateral infra-median keels on I complete, strong crenulate; on II represented by only two to three distal granules; on III - IV absent. Ventrolateral keels strong, crenulate. Ventral submedian keels strong crenulate. Intercarinal spaces feebly granular. Segment V, dorsolateral keels moderate; lateromedian keels obsolete; ventrolateral and ventromedian keels strong, crenulate. Lateral intercarinal spaces feebly granular. Telson, moderately granular; moderate curved aculeus. Dorsal surface rounded smooth; ventral surface coarsely granular; subaculeus tooth moderate; spinoid. Chelicerae dentition as in other *Tityus*. Ventral aspect of both fingers and manus with dense, long setae. Pedipalps: femur tetracarinata; tibia hexacarinata. Chelae, all carina moderate; all different faces feebly granular. Movable fingers with 16 oblique rows of granules. Trichobothriotaxie, orthobothriotaxie A-Alpha. Legs: tarsus ventrally with numerous short fine setae.

One female-paratype (MNCN) same locality as for the holotype. Pectinal tooth count 20 - 20.

### Ecological considerations

As pointed out in the beginning of this paper, most of the species of the Choco region have an Amazonian origin. They share many similar ecological characteristics with Amazonian species, concerning habitat and microhabitat.

*Chactas vanbenedeni*, *Chactas mauriesi*, *Ananteris gorgonae*, *Tityus asthenes*, *Tityus forcipula* and *Tityus sastrei*, were found under rotten wood, under bark and under stones. Some of the areas in which these species live have such heavy rainfall (see introduction) that they may be temporarily inundated. Under such circumstances the scorpions can climb as do Amazonian species (e.g. *Tityus cambridgei*, *Tityus metuendus* and *Chactopsis amazonicus*), moving upward in the vegetation and trees.

### Conclusions

This paper indicates how interesting is the Choco scorpio-fauna and demonstrates that it is highly endemic. Here we list all known species. A more detailed paper, dealing with biogeographic aspects of the Choco region is in preparation and will be published in a near future.

### Resumen

Las tierras bajas tropicales de la region Choco, del occidente de Colombia y adyacentes de Ecuador, constituyen la zona mas humeda del neotropico y quizas del mundo. La fauna de esta region ha sido pobrememente estudiada, hasta muy recientemente. El progreso en el estudio de la fauna de escorpiones de esta region, sugiere una importante diversidad de especies con rangos notables de endemismo. Cuatro familias estan presentes: Buthidae, Chactidae, Diplocentridae e Ischnuridae. Los patrones distribucionales predominantes muestran un origen amazonico para la mayoria de las especies de Buthidae y Chactidae; *Centruroides gracilis* representa una excepcion. Esta especie de Buthidae y *Tarsoporosus kugleri anchicaya* subespecie nueva, e unico Diplocentridae observado, tienen afinidades con la escorpiofauna de Centro América. El unico Ischnuridae presente, *Opisthacanthus lepturus*, pertenece a un grupo Gondwano y tiene un origen mas complejo. Los patrones Biogeograficos actuales

de los escorpiones de la región Choco, corresponden estrechamente a los resultados de PRANCE (1982), HAFFER (1982) y GENTRY (1982), y ellos complementan resultados previos de la biogeografía de escorpiones.

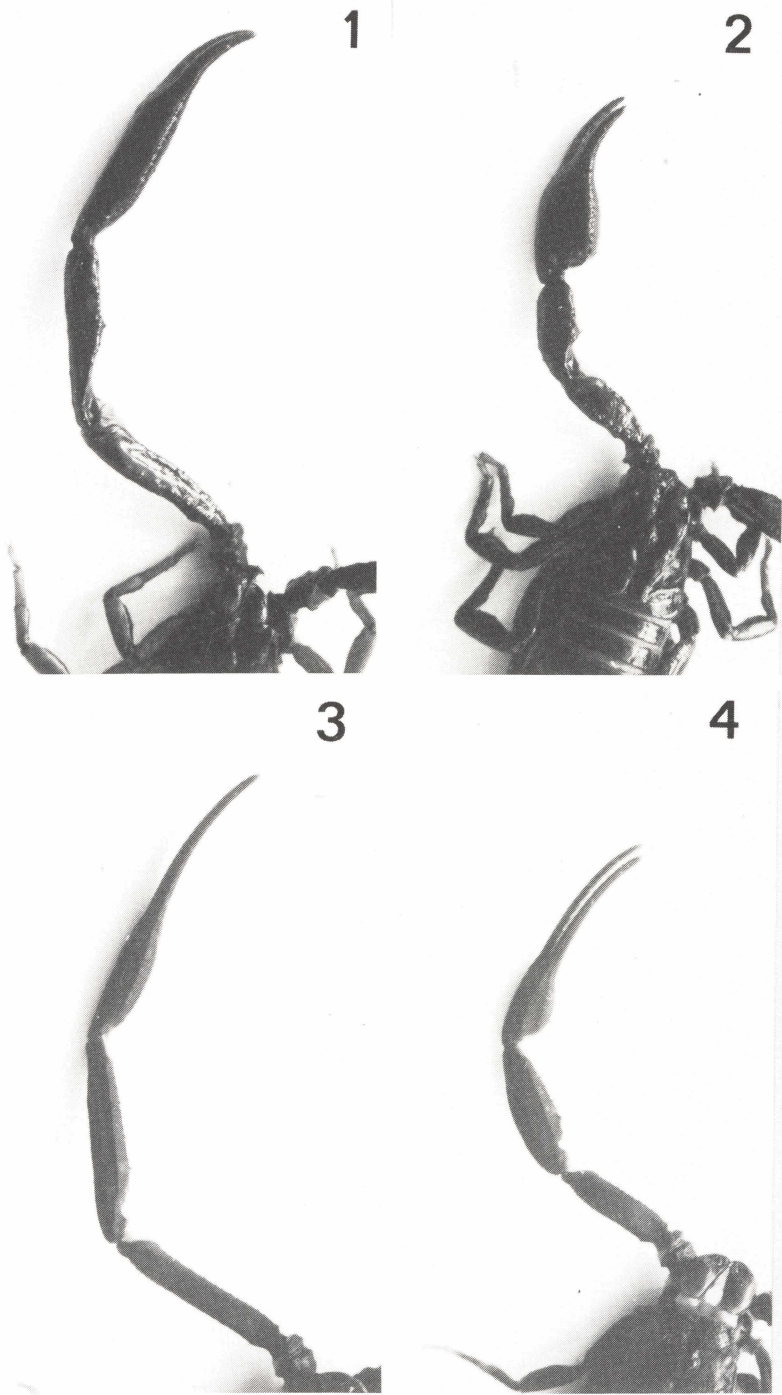
### References

- FRANCKE, O.F. (1978): Systematic revision of Diplocentrid scorpions (Diplocentridae) from Circum-Caribbean Lands.- Special Publ. The Museum Texas Tech Univ. 14: 1 - 92.
- GENTRY, A.H. (1982): Phytogeographic patterns as evidence for a Choco refuge.- In: PRANCE, G.T. (ed.): Biological diversification in the tropics. Columbia Univ. Press, NY: 112 - 136.
- GERVAIS, P. (1844): Remarques sur la famille des Scorpions.- Archs. Mus. Hist. nat., Paris 4: 201 - 240.
- HAFFER, J. (1982): General aspects of the refuge theory.- In: PRANCE, G.T. (ed.): Biological diversification in the tropics. Columbia Univ. Press, NY: 6 - 24.
- IGAC (1983): Atlas regional pacifico.- Minis. Hacienda y Cred. Publ., Bogota: 96 pp.
- KRAEPELIN, K. (1914): Beitrag zur Kenntnis der Skorpione und Pedipalpen Columbiens.- Mem. Soc. Sci. nat., Neuchatel 5: 15 - 28.
- LOURENÇO, W.R. (1980): Contribution à la connaissance systématique des Scorpions appartenant au "complexe" *Tityus trivittatus* KRAEPELIN, 1898 (Buthidae).- Bull. Mus. natn. Hist. nat., Paris 4e sér., 2, sect. A (3): 793 - 843.
- LOURENÇO, W.R. (1981): A propos de l'indication d'un néotype pour *Opisthacanthus lepturus* (PALISOT DE BEAUVOIS, 1805) (Scorpionidae).- Rev. Arachnol. 3 (2): 45 - 52.
- LOURENÇO, W.R. (1984): Etude systématique de quelques espèces appartenant au complexe *Tityus forcipula* (GERVAIS, 1844) (Scorpiones, Buthidae).- Bull. Mus. natn. Hist. nat., Paris 4e sér., 6, sect. A (3): 729 - 739.
- LOURENÇO, W.R. (1988): La faune des Scorpions de l'Equateur. I. Les Buthidae. Systématique et biogéographie.- Rev. suisse Zool. 95 (3): 681 - 697.
- LOURENÇO, W.R. (in press): Les Scorpions (Chelicerata) de Colombie. II. Les faunes des régions de Santa Marta et de la cordillère orientale. Approche biogéographique.- Senckenbergiana biol.
- LOURENÇO, W.R. & E. FLOREZ (1989): Los escorpiones (Chelicerata) de Colombia. I. La fauna de la isla Gorgona. Aproximación biogeográfica.- Caldasia 16 (76): 66 - 70.
- MELLO-LEITÃO, C. (1945): Escorpiões sul-americanos.- Arq. Mus. nac., Rio de Janeiro 40: 1 - 468.
- PALTA, J.A. (1986): Aspectos ecológicos y de vegetación.- In: Isla de Gorgona. Capítulo X. Biblio. Banco Popular, textos universitarios: 211 - 221.
- POCOCK, R.I. (1898): Descriptions of some scorpions from Ecuador.- Ann. Mag. nat. Hist., ser. 7, 1: 413 - 422.
- POCOCK, R.I. (1902): Arachnida, Scorpiones.- In: TAYLOR & FRANCIS (eds.): Biologia centrali-americana. London: 1 - 71.
- PRANCE, G.T. (1982): Forest refuges: evidence from woody angiosperms.- In: PRANCE, G.T. (ed.): Biological diversification in the tropics. Columbia Univ. Press, NY: 137 - 158.
- SISSOM, W.D. & W.R. LOURENÇO (1987): The genus *Centruroides* (Scorpiones: Buthidae) in South America.- J. Arachnol. 15 (1): 11 - 28.
- THORELL, T. (1876): On the classification of scorpions.- Ann. Mag. nat. Hist., ser. 4, 17: 1 - 15.

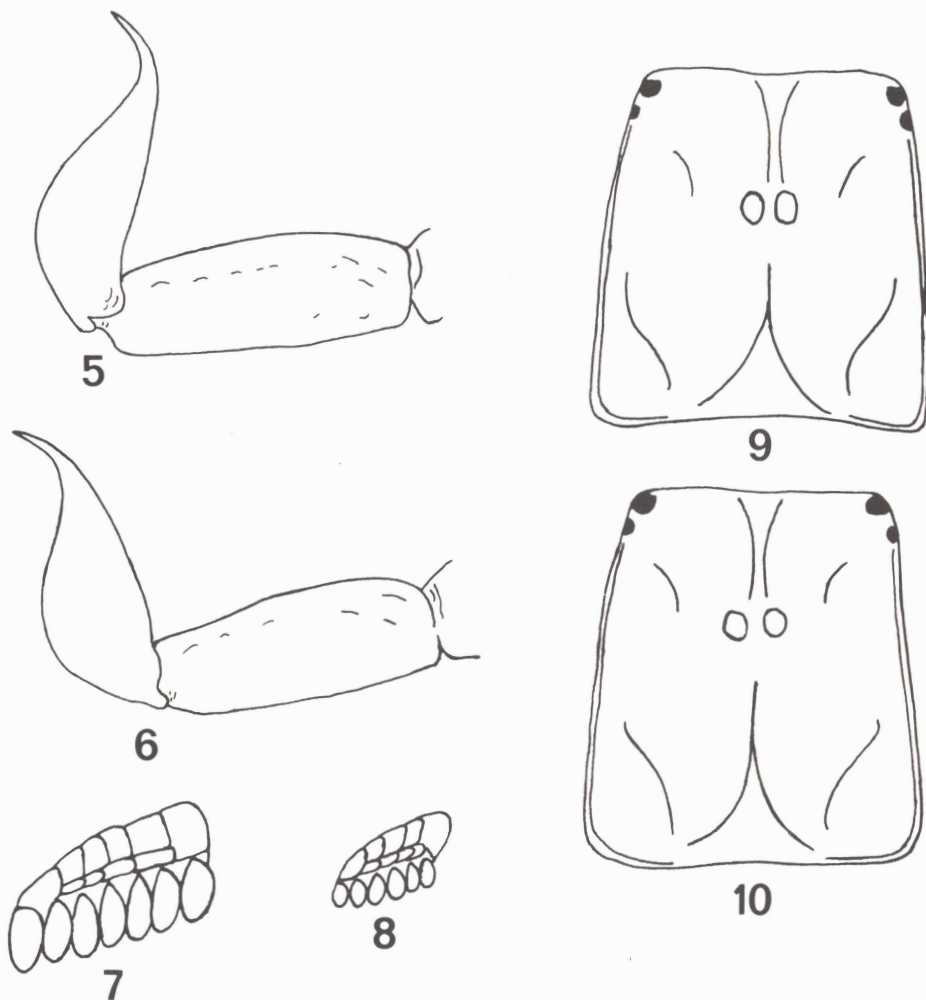
Table 1: Measurements in mm of the described species.

	<i>Chactas mauriesi</i>		<i>T. k. anchicaya</i>		<i>Tityus sastrei</i>
	♂	♀	♂	♀	♀
Carapace length	3,4	3,1	5,7	5,5	6,8
anterior width	2,5	2,3	4,3	3,6	5,5
Metasoma segment I					
length	1,3	1,0	3,6	2,9	4,4
width	1,9	1,4	4,3	4,2	3,7
Metasoma segment V					
length	3,2	2,8	6,6	5,2	7,8
width	1,1	1,2	3,8	3,6	3,8
depth	1,2	1,3	2,6	2,7	3,6
Vesicle					
width	1,2	1,2	3,4	3,2	3,2
depth	1,0	1,0	2,2	2,4	3,0
Chela					
width	1,7	1,8	3,7	3,1	2,7
depth	2,3	1,7	5,7	4,7	2,8
Mov. Finger					
length	2,8	2,5	5,8	5,4	8,9





Figs. 1 to 4:  
Pedipalps. 1 and 2: *Chactas vanbenedeni*, 1 - ♂, 2 - ♀. 3 and 4: *Tityus asthenes*, 1 - ♂, 2 - ♀.



Figs. 5 to 10:

*Chactas mauriesi*. 5 and 6: 5th metasomal segment and telson, 5 - ♂, 6 - ♀. 7 and 8: Pectines, 7 - ♂, 8 - ♀. 9 and 10: Carapace, 9 - ♂, 10 - ♀.

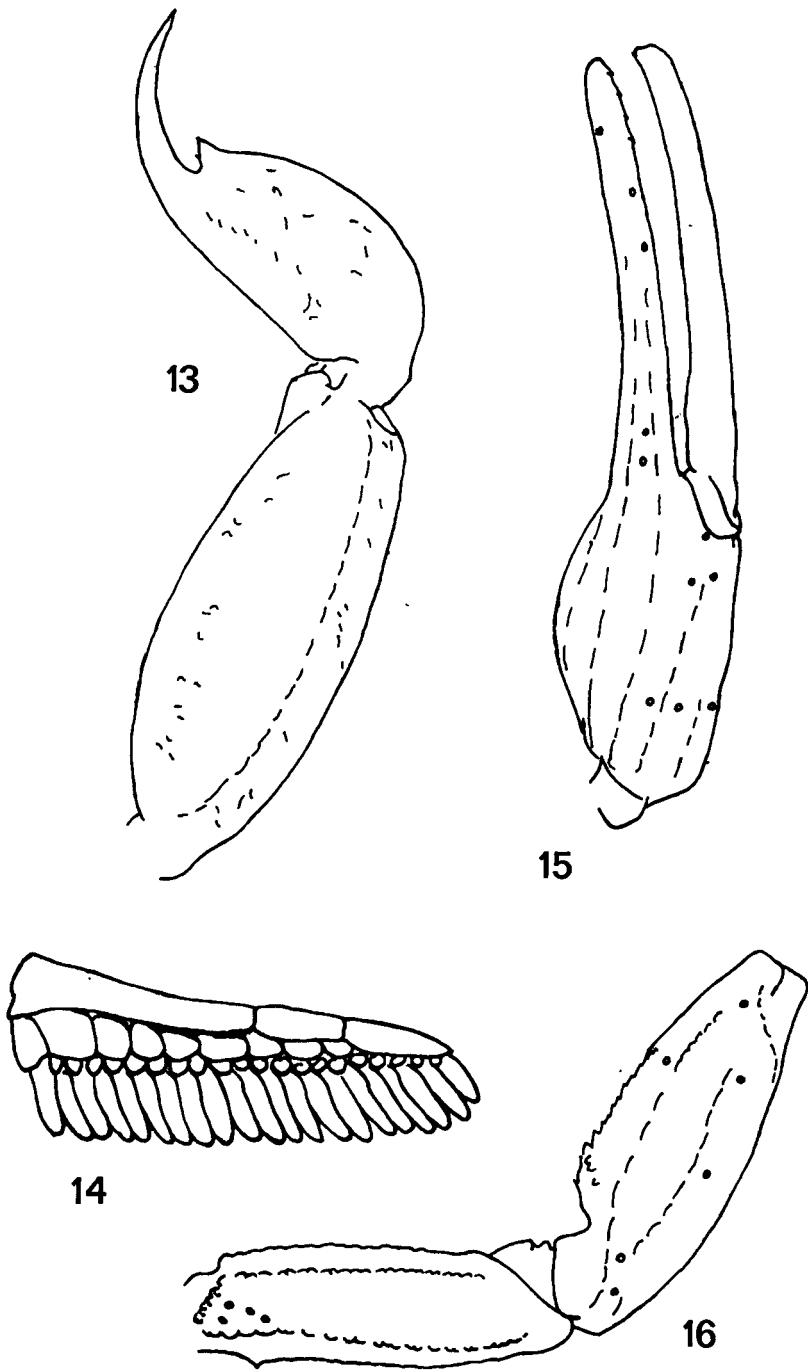


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Figs. 11 and 12:  
*Tarsoporosus klugeri anchicaya*, paratype - ♀ dorsal and ventral aspects.



Figs. 13 to 16:

*Tityus sastrei*, holotype - ♀. 13: 5th metasomal segment and telson. 14: Pectine. 15: Chela.  
16: Femur and Tibia of pedipalps.

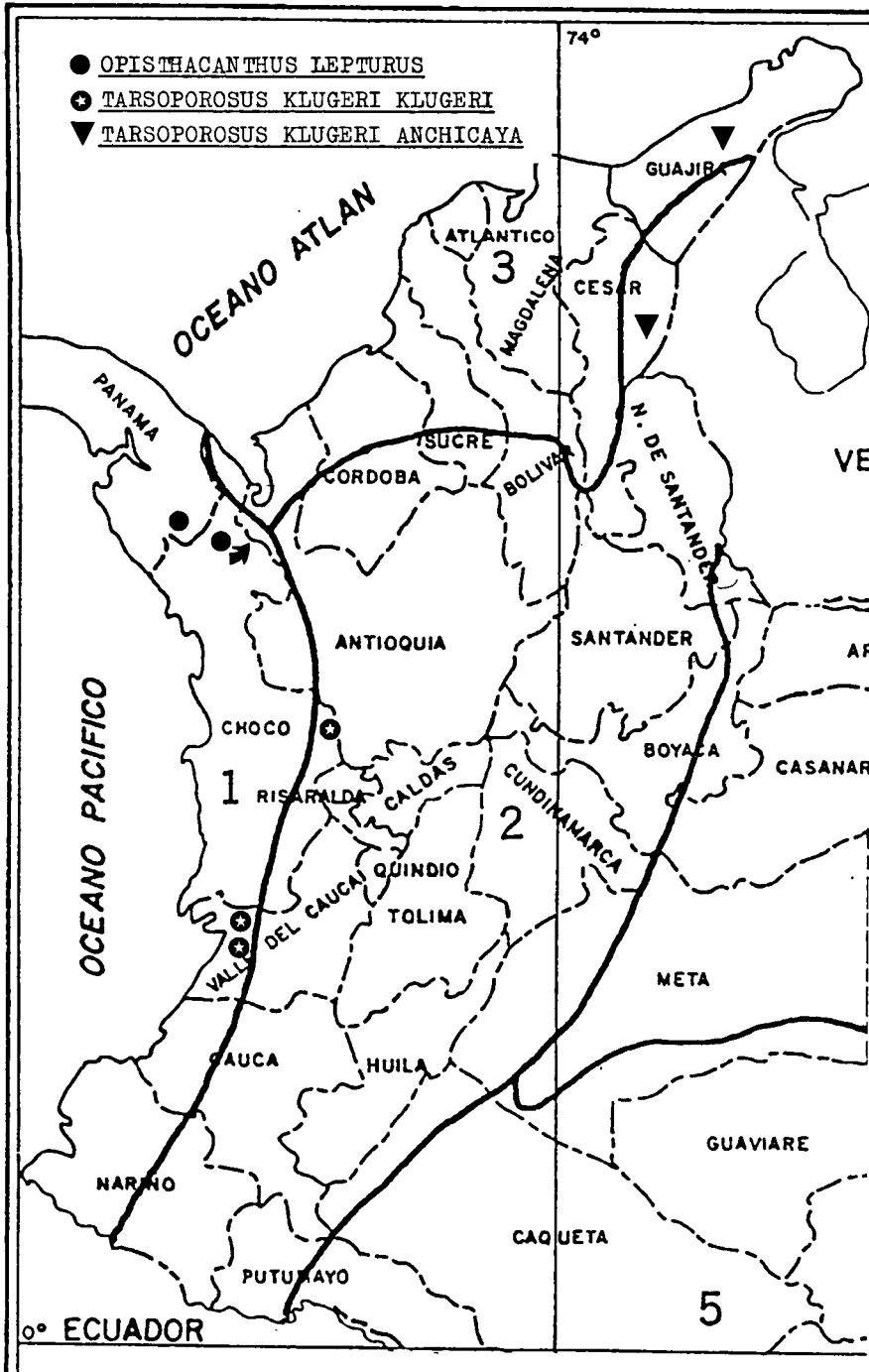


Fig. 17:  
Distribution of Ischnuridae and Diplocentridae.

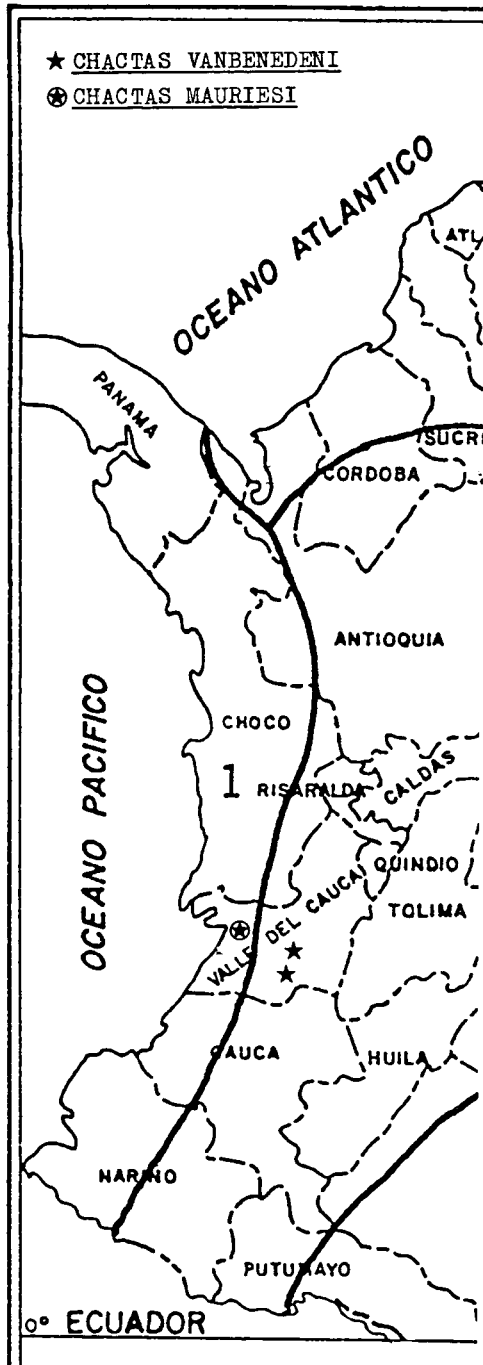


Fig. 18:  
 Distribution of Chactidae.

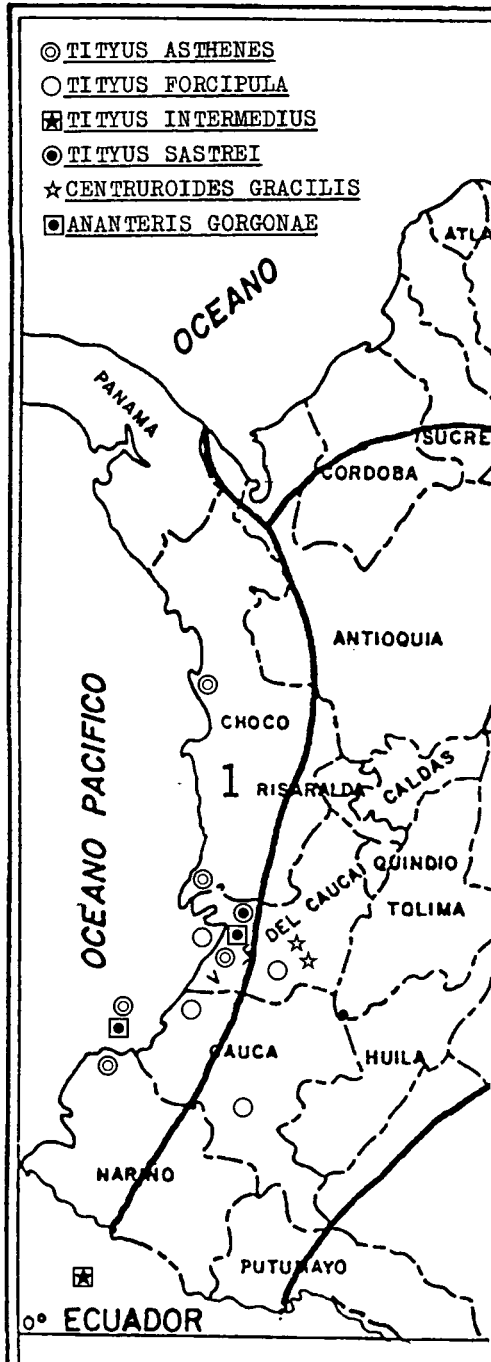


Fig. 19:  
Distribution of Buthidae.

