COMPARATIVE STUDY ON SPECIES RICHNESS OF UROPODINA (ACARI: MESOSTIGMATA) IN TROPICAL FORESTS OF THE YUCATAN PENINSULA, MEXICO AND BELIZE

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Key words: Tropical forest, Uropodina, mites, Yucatan, Mexico, Belize.

Abstract

A preliminary assessment is made of the diversity of Uropodina in three forest sites in the state of Quintana Roo, Mexico. Additional comparisons were made with less extensively sampled sites in both Quintana Roo and adjacent areas in Belize and recently in Calakmul Biosphere Reserve in Campeche. Prior to this study, the uropodid fauna of the Yucatan peninsula and the adjacent areas in Belize was very poorly known, with only a single previously recorded genus for both Quintana Roo and Belize. So far we have identified 16 families, 23 genera, and 101 species in these areas. At the species level, 14.85 (15%) are described, 32 (31.68%) are very close to described species, and 54 (53.46%) are undescribed. The proportion of species or genera unique to a collection appears to be quite high, although the unstructured sampling method precludes specific numbers. Diversity in terms of numbers of species recovered in a single sample appears highest in relatively undisturbed high-canopy tropical rainforest, with 10 morphospecies in both Noh Bec (Quintana Roo), and Chiquibul (Belize)

Introduction

The infraorder Uropodina (Acari: Mesostigmata) is an abundant and species rich group of soil mites, especially in tropical forest soils. They are most common in soils with moderate to high organic content in relatively humid habitats. Economically they are generally not considered to be very important, although there is potential for their use as bioindicators [1, 5]. A number of studies on uropodine diversity have been published, but most of these focus on the north temperate, especially the European, fauna. Studies on tropical taxa are largely restricted to descriptive papers. Even at the descriptive level, the uropodid fauna of Mexico is very poorly known. A comprehensive, worldwide review of the group [4] listed only 11 genera and 61 species from Mexico.

Even less is known about the fauna of the Yucatan peninsula. Only a single genus of Uropodina, *Eutrachytes*, has been recorded for the entire peninsula [6]. Quintana Roo covers the Eastern part of the Yucatan peninsula, and contains a variety of forest types. This includes a unique type of low-canopy flood forest, largely inundated for about six months each year. The dominant tree species are *Bucida buceras L.* ("pucte"), *Haematoxylon campechianum* L ("palo de tinte"), and *Dalbergia glabra* (Mill.) Standl. This type of forest is very well represented in the Sian Ka'an Biosphere Reserve. This contrasts with the high-canopy tropical lowland forest found more inland, which is

dominated by *Swietenia* spp. ("caoba" or mahogany), *Cedrela odorata* L ("cedro"), and other commercially valuable hardwoods. Remnants of this type of forest are still found near Noh Bec.

The Calakmul Biosphere Reserve, is situated in Campeche, a State in southern Mexico located in the western part of the Yucatan Peninsula. The Reserve covers the southern part of Campeche and have geopolitics limits with Guatemala and at the eastern part with Quintana Roo. The Calakmul Biosphere Reserve includes the largest area of tropical forest in Mexico, and a part of the Mayan forest.

Calakmul is the most important region of tropical forest in North America. This area belongs to the Meso-American Biologic Corridor, in which species from Provincia Biotica Yucateca, Tehuantepec Istm, and Peten of Guatemala have a free and constant flow of movement.

The vegetation is composed mainly of a medium high canopy tropical forest, a high canopy tropical forest and a low canopy flooded forest.

Piscidia piscipula (L) Sarg, *Brosimum alicastrum* Sw, *Cedrela odorata* and *Swietenia macrophylla* King, are the dominant trees in the high and the medium canopy tropical forest, while *Bucida buceras* L , *Haematoxylon campechianum* and *Dalbergia glabra*, are the dominant trees of the low canopy flooded forests. The trees are covered with epiphytic plants such as Tillandsia, Bromeliaceae, Orchidiaceae and also lichens and bryophytes.

Las Cuevas Research Station is situated at N 16°44' and W 88°59' in the Chiquibul Forest Reserve, which lies within a much larger area of protected forest in the Maya Mountains totaling about half a million hectares. It stands at an altitude of 494 m on undulating limestone hills and is named after the spectacular cave system at the site. With about 1,494 mm of rainfall per annum, the vegetation is of lowland, broad leafed tropical forest punctuated by stands of Caribbean pine. There are typically about 75 tree species per hectare. Hurricanes and natural fires have left their mark on the Chiquibul Forest and there is a long history of selective timber extraction except in the nearby National Park and on steep terrain. Wildlife is abundant in the area; scarlet macaws, Bairdís tapir, jaguars and ocelots, scarce in much of Central America, are relatively abundant.

The aim of this study was to make a preliminary estimate of diversity of Uropodina in these main forest types, and compare the results with samples taken from other areas in Quintana Roo, Campeche and from the adjacent, more mountainous region, of Belize. These comparisons allow some initial estimates of diversity within sites, and species overlap between sites.

Material and Methods

As part of a study on the Oribatid fauna of Quintana Roo litter and soil [8, 9] samples were taken bi-monthly from 1995-1998 in the Sian Ka'an Biosphere Reserve and Noh Bec Forest Reserve. During 2000 to 2002 seasonally were taken soil and litter samples in Calakmul Reserve Biosphere, Campeche as well as in La Union, Quintana Roo.

The remaining sites in Quintana Roo and all sites in Belize were sampled incidentally. Habitats sampled in Quintana Roo included a variety of sites with secondary forest, as well as some odd habitats such as beach debris and litter on mangrove islands. Sampled forest types in Belize included fairly dry managed pine / oak forest in the Maya Mountains, wet and almost undisturbed tropical rainforest in the Chiquibul National Park, and intermediate

sites both in (Rio Frio) and out (College of Belmopan) of the mountains. This sampling strategy aimed at qualitative, not quantitative estimates of the soil and litter fauna.

All soil and litter samples were processed in Berlese funnels, with specimens preserved in 70% ethyl-alcohol. After sorting the Uropodina to morphospecies, representatives of each type were cleared in lactophenol and mounted on microscope slides in Hoyer's solution [7]. The majority of slide-mounted specimens were dissected, with separate dorsal and ventral (+ legs) parts of the body on one slide, and mouthparts, gnathosoma and chelicerae, on a separate slide. The study is based on about 650 slide-mounted specimens, with additional material, presumably of sampled species, in 70% ethyl-alcohol. Specimens are deposited in the collections of the University of Quintana Roo and the Acarology Collection, Ohio State University.

Identifications are based largely on Karg [5] and Hirschmann [4]. It should be noted that the family and even genus level classifications of Uropodina are in a state of flux, and generic and familial assignments change substantially depending on the author cited.

Results

A total of 101 species of uropodid mites was recovered from all sites, representing 16 families and 23 genera (Tables 1, 2, 3). At the generic level, of the 23 genera identified in Quintana Roo, 14 are new records for Mexico. Similarly 9 of 10 identified genera among the Belize material are new records for that nation's fauna (Table 1).

At the species level, we could identify 15 species (14.85% of the total) with some certainty, 32 others (31.68%) are close to described species but do not match the descriptions perfectly, and the remainder 54 (53.46%) are probably new species. Notably, only 3 of the 64 species previously recorded from Mexico and Belize were recollected in this study.

The highest number of species was found in the relatively undisturbed tropical rainforests of Calakmul (Campeche), Noh Bec (Quintana Roo) and Chiquibul National Park (Belize). Single collections from each of those sites yielded representatives of 10 species. The total number of species recovered from multiple samples in Calakmul (32) was notably higher than that for Noh Bec (24) , while in Chiquibul a single sample yielded 10 species. These dates are illustrating the need for multiple sampling of a given site. Quite low diversity (3 morphospecies) was found in the samples from the pine / oak forest in the Maya Mountains.

Fifteen species were found in more than one site, 5 of which shared between Quintana Roo and Belize. In contrast, a total of 58 species (79%) were found in only a single site. This undoubtedly reflects undersampling in some sites, but it is still suggestive of high levels of site specificity. Similar numbers on site specificity were recorded for oribatid mites in Venezuela [2] and Phytoseiidae, Hydracarina, and fungus mites in Australia [10]. At the generic level, 7 genera were found in both Quintana Roo and Belize, but *Brasiluropoda* and the *Dipolyaspis* were found only in Belize, while *Chiropturopoda*, *Phymatodiscus*, *Planodiscus*, *Polyaspinus*, *Rotundabaloghia*, *Trachyuropoda*, *Trichouropodella*, *Uroactinia*, *Eutrachytes*, and *Urodiaspis* were collected only in Quintana Roo, while *Discourella* and *Monomacrodinychus* were collected in Campeche and Belize. It seems likely that more intensive collecting will show that more genera are shared between these areas.

An indication of seasonality could be obtained for Noh Bec, Sian Ka'an and Calakmul, the sites that were sampled systematically. As perhaps expected, the number of

species recovered seems to increase in the rainy season. Interestingly, this effect seems less for the Sian Ka'an flood forest site than for the high tropical rainforest sites at Noh Bec and Calakmul.

Discussion

Tropical forests, even more so than their temperate counterparts, provide a great number of habitats that conceivably could be exploited by Uropodina (litter, bark, rotting wood, bromeliads, mushrooms, vertebrate and invertebrate nests, etc.), only two of which, soil and litter, we have sampled consistently. The fact that even this restricted sampling yielded more than 101 species suggest that the uropodid fauna may indeed be very extensive. For comparison, intensive studies of forest soil and litter Uropodina in France and Belgium yielded only 19 species [1].

The biogeographic affinities of this fauna are varied. One of the more peculiar distributional patterns identified involves two species of *Uropoda (Phaulodinychus)* collected on detritus and sea weed on the beach. One of these has highly convoluted peritremes suggesting plastron respiration. It is close to *P. mitis* (Leonardi 1899) from Italy, and near identical to *P. marihirschmanni* Hiramatsu 1977. The latter was found in beach wreck on the coast of Japan [3] associated with a second species, *P. maritima* Hiramatsu 1977. Our second species appears identical to *P. maritima*, thus mimicking the species pair found in a similar habitat but in a geographically very different site. This example reinforces the idea that habitat differentiation may be the key to uropodid differentiation.

In a more general sense, Southern Mexico is forms a bridge between the temperate fauna of the Holarctic region and the tropical fauna of Central and South America. This is also expressed in the uropodid fauna (Table 1, Fig. 1). A survey of geographical affinities of the genera located in Quintana Roo and Belize [based on records in 4] shows that 8 out of 19 have a mainly tropical or Neotropical distribution. Notably, many of these genera are associated with ants (Formicidae). A total of 4 genera are known mostly from the Holarctic region or temperate regions in both hemispheres. An additional 6 genera might be considered cosmopolitan, and one, *Phymatodiscus*, was previously known only from the Australasian region.

Even though at generic level the genus found in Campeche are the same like in Quintana Roo at species level are a big difference between those found in Sian Ka'an, Noh-Bec and the species found in Calakmul.

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Legends to the figures:

Fig.1 Geographic distribution of Uropodina from Mexico and Belize (Based on the known distribution of the Genera).

Table 1. Species richness and geographic distribution of Uropodoidea from Campeche, Quintana Roo, Mexico and Belize.

Table 2. Uropodina from Tropical forests in Mexico and Belize (collects from 1995 to1998).

Table 3. Uropodoidea mite fauna of Calakmul, Campeche and La Union, Quintana Roo: Species list, sites with records and distribution in different vegetation zones, (collects from 2000 to 2002).

Fig.1 Geographic distribution of Uropodina from Mexico and Belize (Based on the known distribution of the Genera).

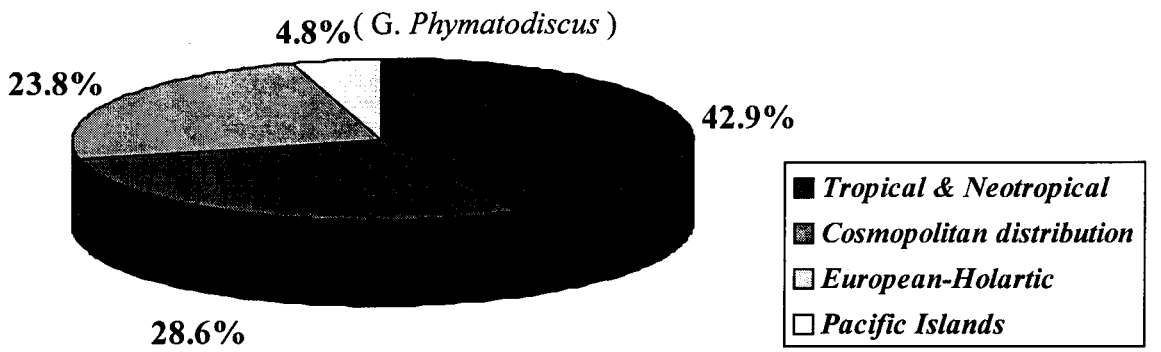


Table 1. Species richness and geographic distribution of Uropodoidea from Campeche, Quintana Roo, Mexico and Belize.

Family Genus	Number of morphospecies in this study			Number of described species	General geographic distribution
	Campeche	Q. Roo	Belize	Total	
Diarthrophallidae					
Brasiluropoda		0	1*	14	Neotropic
Cyllibulidae					
C. (Cyllibula)	2	1	1*	13	T & N.T
C. (Baloghicyllibula)	1	2	2*	16	T & N.T
Oplitidae					
Oplitis	3	4	1	156	Cosmopolitan
Trachyuropodidae					
Phymatodiscus	1	1*		10	T&O
Trachyuropoda	3	8		91	Cosmopolitan
Polyaspinidae					
Polyaspinus		1*		10	Oriental Europe 1 sp Bolivia
Polyaspididae					
Polyaspis	2	1*	4*	15	Holarctic, Neotropic
Dipolyaspis			1*	3	Holarctic
Trichocyllibidae					
Planodiscus		1*		48	Neotropic
Trematuridae					
Trichouropoda	5	7	1*	390	Cosmopolitan
Trichouropodellidae					
Trichouropodella	2	5		9	Tropical
Trigonuropodidae					
Trigonuropoda	3	5	2	83	Tropical
Uroactinidae					
Uroactinia		1		49	Tropical
Chiropturopoda		2*		6	T. African
Urodiaspididae					
Urodiaspis	1	1*		22	Europe. H. Orient
Urodinychidae					
Uroobovella *Rotundabaloghia*	3	5	2*	290	Cosmopolitan
Eutrachytidae					
Eutrachytes		1		141	Neotropic
Discourellidae					
Discourella	1		1*	71	Cosmopolitan
Uropodidae					
Uropoda	1				
U. (Phaulodinychus)	2	5	2	177	Cosmopolitan
U. (Cilliba)	1	3*	1*	16	Holartic
Monomacrodinychus	1				Cosmopolitan, Neotrop.
Total spp.	32	54	19		

* New genus record for either Mexico or Belize.

Table 2. Uropodina from Tropical forests in Mexico and Belize (collects from 1995 to1998).

Families / Genera	Mexico										Belize						
	1	2	¾	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Diarthrophallidae Tragard,1946																	
1.- *Brasiluropoda* sp											*						
Cyllibulidae Hirschmann in Wisniewsky,1999																	
2.- *Cyllibula* (*Baloghicyllibula* * ca. *mexicana*)													*				
3.- " sp.1	*																
4.- " sp. 2												*					
5.- " sp. 3													*				
6.- *Cyllibula* (*Baloghicyllibula*) *paraguayensis* Zirngiebl-Nicol *et* Hirschmann, 1977									*	*							
7.- *Cyllibula* (*Cyllibula*) sp. 1									*	*	*		*				
8.- " sp. 2	*																
Oplitidae Johnston, 1968																	
9.- *Oplitis* sp. 1									*	*							
10.- *Oplitis* ca. *belizensis*		*		*	*	*											
11.- " sp.2						*	*										
12.- " sp.3						*											
13.- *Opilitis* ca. *peckisimilis*	*	*															
14.- " ca. *structura*															*		
15.- *Oplitis uncinata,* Zirngiebl-Nicol *et* Hirschmann, 1973									*	*							
16.- *Oplitis castrisimilis,* Zirngiebl-Nicol *et* Hirschmann, 1973									*								
Trachyuropodidae Berlese,1917																	
17.- *Phymatodiscus* sp. 1	*																
18.- *Trachyuropoda* sp. 1									*								
19.- *Trachyuropoda quadriauricularia* Hirschmann, 1976										*							
20.- *Trachyuropoda baloghisimilis* Hirschmann, 1976									*	*							
21.- *Trachyuropoda* ca. *schusteri*										*							
22.- " ca. *mesofovea*									*								
23.- " ca. *trinidades*									*								
24.- " sp. 2									*	*							
25.- " ca. *baloghisimilis*	*																
26.- " ca *gracilis*	*																
27.- " ca. *mahunkai*					*												
28.- " ca. *similiathiasae*			*														
Polyaspinidae Tragardh, 1941																	
29.- Polyaspinus sp. 1.		*															
Polyaspididae Berlese, 1913																	
30.- *Polyaspis* sp. 1									*	*		*					
31.- " sp. 2																*	
32.- " sp. 3												*					

33.-	"	sp. 4											*				*
	"	sp. 5	*														
34.-																	
35.-	"	sp. 6		*													
36.-	*Dipolyaspis*	sp. 1								*							
Thrichocyllibidae Hirschmann in Wisniewski, 1979																	
37.-	*Planodiscus*	sp.	*								*						
Trematuridae Berlese, 1917																	
38.-	*Trichouropoda solarissima*	Hirschmann, 1978	*	*													
39.-	*Trichouropoda*	ca. *solarissima*															
40.-	*Trichouropoda cocosensis* Hirschmann *et* Wisnieswski, 1988									*							
41.-	*Trichouropoda*	ca. *cienfuegi*									*						
42.-	"	ca. *kryptopoda*									*						
43.-	"	ca. *fumiakii*											*				
44.-	"	ca. *serratasimilis*	*														
45.-	"	sp. 1	*														
46.-	"	sp. 2	*														
47.-	"	ca.. *bellatula*				*		*									
48.-	"	ca. *coprophila*								*	*						
Trichouropodellidae Hirschmann in Wisnieswski, 1979																	
49.-	*Trichouropodella panamensis,*	Hirschmann *et* Zirngiebl-Nicol, 1972								*	*						
50.-	*Trichouropodella magna,*	Hirschmann *et* Zirngiebl-Nicol, 1972								*							
51.-	"	sp. 1				*											
52.-	"	sp. 2					*										
53.-	"	sp. 3				*											
54.-	"	sp. 4	*														
55.-	"	sp. 5		*													
Trigonuropodidae Hirschmann in Wisniewski, 1979																	
56.-	*Trigonuropoda*	sp. 1												*			
57.-	"	sp. 2											*				
58.-	"	sp. 3				*	L *	K *									
59.-	"	sp. 4						K *									
60.-	"	ca. *cubaendrodyia*		*				*									
61.-	"	sp. 5		*													
62.-	"	sp. 6	*														
63.-	"	sp. 7	*														
64.-	*Trigonuropoda cubazicsiia,*	Hirschmann, 1975								*	*						
65.-	*Trigonuropoda cubaloghia,*	Hirschmann, 1975								*	*						
66.-	*Trigonuropoda*	ca. *difoveolata*								*	*						
Uroactiniidae Johnston, 1968																	
67.-	*Uroactinia*	sp. 1									*						
68.-	*Uroactinia*	ca. *rarosae*						C *									
69.-	*Chiropturopoda*	sp. 1									*						

70.-	*Chiropturopoda* sp. 2				*													
71.-	" sp. 3						C C *											
Urodiaspididae Tragardh, 1944																		
72.-	*Urodiaspis* sp. 1							*										
Urodinychidae Berlese, 1917																		
73.-	*Uroobovella* sp. 1								*									
74.-	" sp. 2	*																
75.-	" ca. *magna*														*			
76.-	" sp. 3							*										
77.-	" ca. *faceta*						*								*			
78.-	" ca. *assamomarginata*								*									
79.-	" ca. *hamata*									*	*							
80.-	" ca. *japonica*							*										
81.-	*Rotundabaloghia liriformes*, Hirschmann, 1992										*							
82.-	*Rotundabaloghia* sp. 1	*																
Discourellidae Baker and Wharton, 1952																		
83.-	*Discourella* sp.									*								
84.-	*Discourella* ca. *porosa*											*						
Uropodidae Kramer, 1882																		
85.-	*Eutrachytes maya*, Krantz,1969									*								
86.-	*Uropoda* sp.1								*									
87.-	*U. (Phaulodinychus) difoveolatassimilis*, Hirschmann, 1972								*									
88.-	U. (*Phaulodinychus*) ca. *schusterii*								*	*								
89.-	U. (*Phaulodinychus*) *similibrasiliensis*, Hirschmann, 1992									*								
90.-	U. (*Phaulodinychus*) ca. *difoveolatassimilis*	*										*						
91.-	U. (*Phaulodinychus*) sp. 1	*																
92.-	" ca. *marihirschmanni*			T *														
93.-	" ca. *maritima*			*														
94.-	Uropoda ca. *luculenta*	*																
95.-	U. (Cilliba) sp. 1								*									
96.-	U. (Cilliba) sp. 2	*																
97.-	" sp. 3	*																
98.-	" sp. 4		*															
99.-	" sp. 5											*						
100.-	" sp. 6																	*
Macrodinychus																		
101.-	*Monomacrodinychus* ca. *paraguayensis*								*									

Collect sites

N°	Collect sites	Notes
1.	Noh-Bec, Q. Roo	
2.	Sian Ka'an, Q. Roo	
3/4.	Punta Herrero , Tulum, Q. Roo	
5.	Islot Canche Balam, Q. Roo	
6.	Coba, Quintana Roo	

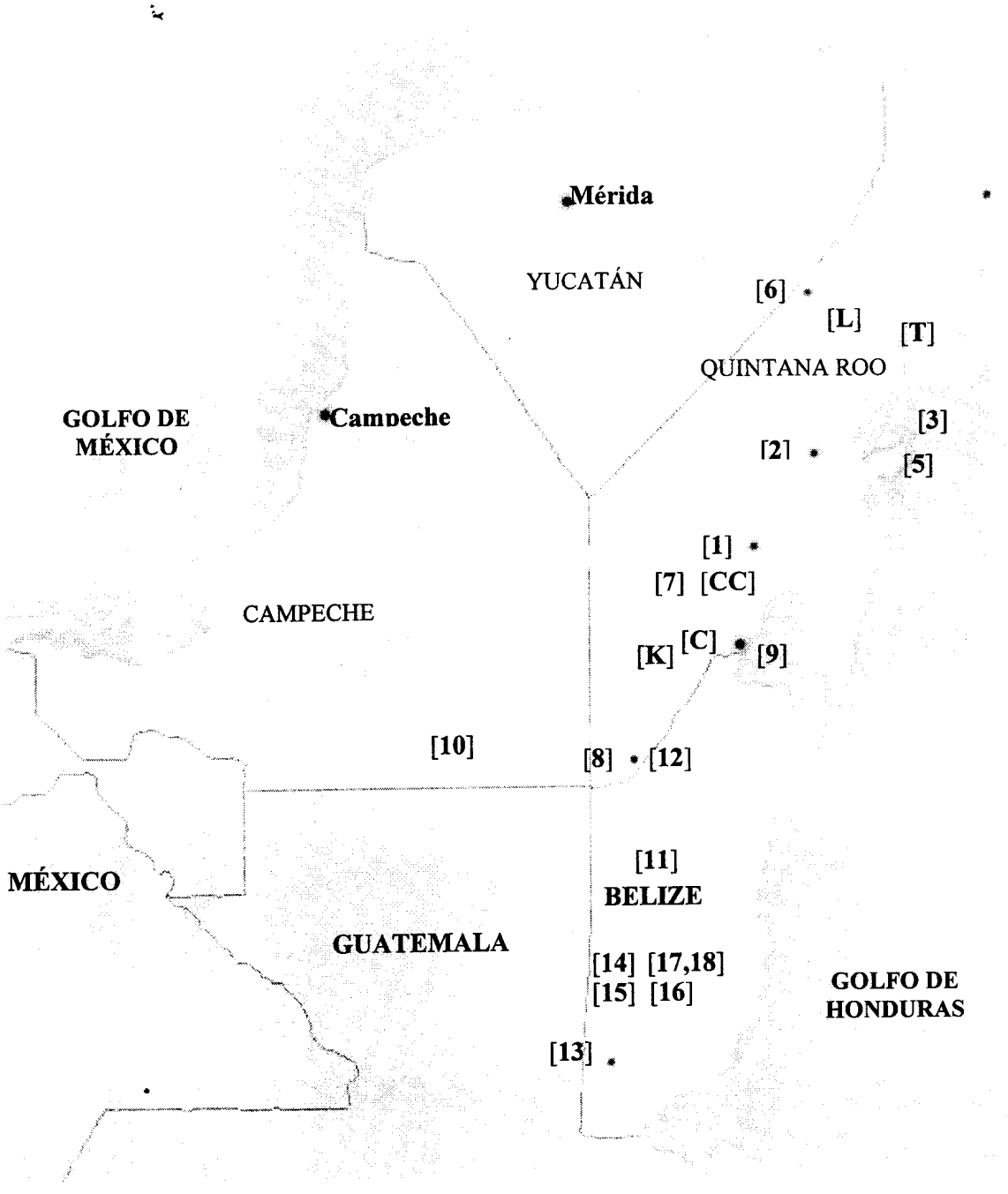
7.	San Felipe Bacalar, Q. Roo	
8.	La Union, Q. Roo	First collect
9.	Ex. culture earthworm (Oligochaeta).	
10.	Calakmul, Campeche	
11.	La Unión, Q.Roo	Second collect
12.	Belize	
13.	Chiquibul National Park	
14.	Caves	
15.	Shore stream . Rio Frio	
16.	Hill, slope near Rio Frio stream	
17.	W.F. Pine Forest	
18.	Slope . Pine Forest	
L.	Lol Be, Q.Roo	
K.	Kohunlich, Q.Roo	
C.	Chetumal, Q.Roo	
CC.	CECUSE, Chapingo; Q.Roo	
T.	Tulum, Q.Roo	

Table 3. Uropodoidea mite fauna of Calakmul, Campeche and La Union, Quintana Roo: Species list, sites with records and distribution in different vegetation zones, (collects from 2000 to 2002).

Family Genus Specie	Geographical distribution	Collect sites			Distribution in vegetation zones	
		Calakmul Campeche	La Union Q.Roo	Cozumel Q.Roo	High canopy tropical forest	Med. canopy tropical forest
Diarthrophallidae	Brazil					
1.- *Brasiluropoda*				✓		✓
Cyllibulidae						
2.- *C. (Cyllibula)* sp.1		✓	✓		✓	✓
3.- *C. (Cyllibula)* sp.2		✓				✓
4.- *C. (Baloghicyllibula) paraguayensis*	Paraguay	✓				✓
Oplitidae						
5.- *Oplitis* sp.				✓		
6.- *Oplitis uncinata*	Brazil	✓				
7.- *Oplitis castrisimilis*	Brazil	✓		✓	✓	✓
Trachyuropodidae						
8.- *Phymatodiscus* sp.		✓		✓	✓	
9.- *Trachyuropoda baloghisimilis*	Chile	✓			✓	
10.- *Trachyuropoda quadriauricularia*		✓				✓
11.- *Trachyuropoda* sp.		✓				✓
Polyaspinidae						
12.- *Polyaspinus*						
Polyaspididae						
13.- *Polyaspis* sp.1 N. sp.		✓			✓	
14.- *Polyaspis* sp.2 N. sp		✓	✓	✓	✓	✓
15.- *Polyaspis* sp.3 N. sp.		✓			✓	
16.- *Dipolyaspis*						
Trichocyllibidae						
17.- *Planodiscus*						
Trematuridae						
18.- *Trichouropoda* ca. *coprophila*	Florida	✓		✓	✓	✓
19.- *Trichouropoda* ca. *cienfuegi*	Cuba	✓	✓	✓		✓
20.- *Trichouropoda solaris*	Guatemala	✓			✓	✓
21.- *Trichouropoda* ca. *kryptopoda*	Ghana, Africa	✓	✓		✓	✓
22.- *Trichouropoda cocosensis*	Costa Rica	✓				✓
Trichouropodellidae						
23.- *Trichouropodella panamensis*	Brazil	✓				✓
24.- *Trichouropodella magna*	Brazil		✓		✓	
Trigonuropodidae						
25.- *Trigonuropoda cubazicsiia*	Cuba	✓			✓	✓
26.- *Trigonuropoda cubaloghia*	Cuba	✓				✓
27.- *Trigonuropoda* ca. *difoveolata*	New Guinea	✓	✓			✓
Uroactinidae						
28.- *Uroactinia*						
29.- *Chiropturopoda* sp.				✓		✓
Urodiaspididae						
30.- *Urodiaspis* sp.1		✓			✓	
Urodinychidae						
31.- *Uroobovella* ca. *hamata*	Guatemala	✓			✓	✓
32.- *Uroobovella liriformes*		✓	✓	✓		✓
33.- *Urobovella* ca. *teres*		✓				✓

Eutrachytidae			✓		✓
34.- *Eutrachytes maya*					
Discourellidae		✓	✓		✓
35.- *Discourella*					
Uropodidae		✓		✓	✓
36.- *Uropoda* sp.1		✓	✓		✓
37.- *U. (Phaulodinychus)* ca. *schusterii*	Brazil	✓		✓	
38.- *U. (Phaulodinychus) difoveolatassimilis*	Brazil	✓		✓	
39.- *U. (Phaulodinychus) similibrasiliensis*	Paraguay	✓			✓
40.- *U. (Cilliba)*		✓	✓	✓	✓
41.- *Monomacrodinychus* ca. *paraguayensis*					

Fig. 2. Map of Yucatan Peninsula (collecting sites).



N°	Collect sites	N°	Collect sites
1.	Noh-Bec, Q. Roo	13.	Chiquibul National Park
2.	Sian Ka'an, Q. Roo	14.	Caves
3/4.	Punta Herrero , Tulum, Q. Roo	15.	Shore stream . Rio Frio
5.	Islot Canche Balam, Q. Roo	16.	Hill, slope near Rio Frio stream
6.	Coba, Quintana Roo	17.	W.F. Pine Forest
7.	San Felipe Bacalar, Q. Roo	18.	Slope . Pine Forest
8.	La Union, Q. Roo	L.	Lol Be, Q.Roo
9.	Ex. culture earthworm (Oligochaeta).	K.	Kohunlich, Q.Roo
10.	Calakmul, Campeche	C.	Chetumal, Q.Roo
11.	La Unión, Q.Roo	CC.	CECUSE, Chapingo; Q.Roo
12.	Belize	T.	Tulum, Q.Roo

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Legends to the figures:

Fig.1 Geographic distribution of Uropodina from Mexico and Belize (Based on the known distribution of the Genera).

Fig. 2. Map of Yucatan Peninsula (collecting sites).

Table 1. Species richness and geographic distribution of Uropodoidea from Campeche, Quintana Roo, Mexico and Belize.

Table 2. Uropodina from Tropical forests in Mexico and Belize (collects from 1995 to1998).

Table 3. Uropodoidea mite fauna of Calakmul, Campeche and La Union, Quintana Roo: Species list, sites with records and distribution in different vegetation zones, (collects from 2000 to 2002).