andrias, 15: 99-119, 1 fig., 2 colour plates; Karlsruhe, 15.12.2001

HUBERT HÖFER & ANTONIO D. BRESCOVIT

Species and guild structure of a Neotropical spider assemblage (Araneae) from Reserva Ducke, Amazonas, Brazil

Abstract

We present a species list of spiders collected over a period of more than 5 years in a rainforest reserve in central Amazonia –Reserva Ducke. The list is mainly based on intense sampling by several methods during two years and frequent visual sampling during 5 years, but also includes records from other arachnologists and from the literature, in total containing 506 (morpho-)species in 284 genera and 56 families. The species records from this Neotropical rainforest form the basis for a biodiversity database for Amazonian spiders with specimens from several Brazilian collections and the collection of the State Museum of Natural History Karlsruhe, where it is housed. This database will in the future facilitate species identification of Neotropical spider collections, allow comparison of morphospecies and serve as an important background for biodiversity evaluation in natural and anthropogenic habitats and the recognition of species distribution and loss. For further evaluation of the structure of Neotropical spider assemblages and their ecological function we present an analysis of the guild structure of the fauna of Reserva Ducke, although we also emphasize the lack of knowledge on natural history and behavior for many of the species.

Authors

Dr. HUBERT HÖFER, Staatliches Museum für Naturkunde, P.O. 111364, D-76063 Karlsruhe; e-mail: hubert.hoefer@smnk.de;
Dr. ANTONIO D. BRESCOVIT, Laboratório de Artrópodes, Instituto Butantan, Av. Vital Brasil 1500, CEP 05503-900,São Paulo, SP, Brazil; e-mail: adbresc@terra.com.br

Key words

Araneae, Neotropical, assemblage guilds, inventory

1. Introduction

The forest reserve „Reserva Florestal ADOLPHO DUCKE" belongs to the Instituto Nacional de Pesquisas da Amazônia (INPA) and is certainly one of the best studied areas of Amazonian rainforest. It is situated in central Amazonia, 26 km northeast of the city of Manaus (59°58'W, 2°54'S) and comprises 100 km^2 (10 x 10 km). A summarized description of geology, soil characteristics, floristic composition is presented in GENTRY's comparison of „Four Neotropical Rainforests" (GENTRY 1990). A "Flora da Reserva Ducke" has recently been presented in book form (RIBEIRO et al. 1999). PENNY & ARIAS (1982) made a first survey of the knowledge on insects of the reserve and HÖFER & BECK (1995, 1996) gave a synopsis of the arachnids collected there. Zoological species inventories have been presented by APOLINÁRIO (1993) for termites, BECK (1971) for oribatid mites, HARADA & ADIS (1997) for ants, HERO (1990) for frogs, LOURENÇO (1988) for scorpions, MAHNERT & ADIS (1985) for pseudoscorpions and WILLIS (1977) for birds. A book on the arthropod fauna of the reserve, edited by INPA scientists is in preparation.

We present here a species list of spiders collected in the reserve. The list is based on more than 2 years of intense sampling by diverse methods in ecological studies (GASNIER et al. 1995, GASNIER & HÖFER 2001, HÖFER 1997, HÖFER et al. 1994a, b, HÖFER et al. 1996, VIEIRA & HÖFER 1994, VIEIRA & HÖFER 1998), but also includes species records from frequent visual sampling over more than five years and specimens collected by other people over a period of about 20 years, which were deposited in Brazilian collections, and few additional species records from the literature.

The species records from this Neotropical rainforest represent the basis of a biodiversity database for Amazonian spiders with specimens from several Brazilian collections and the collection of the State Museum of Natural History Karlsruhe. This database will on the long run be completed by at best all records of identified species from Amazonia and also include morphospecies characterized by a character matrix to allow comparison and recognition of species identity or complementarity. The collections of several institutions will become accessible and their specimens available for comparison, thus enhancing taxonomic work but also allowing better recognition of species in ecological investigations - today internationally recognized demands (GBIF-Global Biodiversity Information Facility: www.gbif.org). The database will allow biogeographic evaluation and serve as an important background for biodiversity inventories of natural and anthropogenic habitats and the recognition of species distribution and loss.

The knowledge of natural history and ecology of spiders is essential for an understanding of the role of spiders in natural and agroecosystems (SUNDERLAND & GREENSTONE 1999), but these informations are especially scarce from tropical assemblages. Assemblage guilds (JAKSIČ & MEDEL 1990) have been proposed to be used as ecological units instead of species or other taxonomically defined units, especially in studies on the effects of spiders on pests in agroecosystems.

UETZ et al. (1999) summarized and discussed the concept and proposed and tested a guild classification for North American spider assemblages. We made a similar analysis for the spider assemblage of a Neotropical primary terra firme rainforest (Reserva Ducke) and propose here a guild classification which can be compared with classifications from other climatic and geographic zones and which has to be tested with assemblages of other Neotropical natural or anthropogenic ecosystems.

2. Material and Methods

Our own collections have been made by pitfall traps, litter quadrat sampling, ground-photoeclectors and trunk (arboreal) funnel traps (HÖFER 1990), insecticide fogging in the canopy of two trees (HÖFER et al. 1994a), intensive nocturnal transect sampling (GASNIER 1996, GASNIER & HÖFER 2001) by the aid of cap lamps, one day sampling with a protocol proposed by CODDINGTON et al. (1991) and conventional hand sampling during hundreds of excursions. Five ground-eclectors and 3 trunk funnel traps were run for 12 respectively 17 months in 1991 and 1992 within an area of about 5 hectars. The ground-eclectors enclosed 1 m^2 each, were put up in a line of 50 m and remained always 4 weeks in the same position before being moved 10 meters forward in the forest. The trunk funnel traps were mounted on three medium sized tree trunks, 50 - 70 m distant from each other, in a height of 1.5 m above ground. Arthropods caught in all these traps, filled with picric acid, were collected weekly. In two experimental sites of 400 m^2 each, within this area, we repeatedly collected 20 litter quadrat samples, which were handsorted, and run 30 pitfall traps during three periods of 4 weeks each.
In addition we checked the collections of the Instituto Nacional de Pesquisas da Amazônia (INPA) in Manaus and the Museu de Ciências Naturais (MCN) in Porto Alegre and all available literature (e.g. the numerous publications of H.W. LEVI and M.E. GALIANO) for additional species records.
Many specialists identified species from our collections and included specimens in their taxonomic work. Corinnidae were identified and revised by ALEXANDRE BONALDO (Belem), Salticidae were identified by HEIKO METZNER, Theridiidae by ERICA BUCKUP and APARECIDA MARQUES (Porto Alegre), Thomisidae by ARNO LISE (PORTO ALEGRE); PABLO GOLOBOFF (Buenos Aires) identified most of the mygalomorph spiders. Morphospecies in genera, where an identification could not be done to date, were only included with a confirmed deposition/availability of specimens.
Because the material collected with traps could only be identified or separated in morphospecies during revisionary work in the course of the last 8 years, a reasonably correct calculation of diversity indices of samples with abundances of every morphospecies is not possible. Species numbers given and dominance values are estimates based on lists with experienced assignment of juvenile specimens to species. The number of observed species including juveniles is already an estimate, because the species belonging of many juveniles cannot be finally determined. Estimation of species numbers based on adult specimens were made using the first order jackknife and the CHAO 2 function of the computer program BioDiversity Professional (Beta version 1 by LAMBSHEAD, PATERSON and GAGE). These two models have shown the best performance in the tests of TOTI et al. (2000). Due to the long lasting identification process and the failure of an encoded specimen database we could only use the total catches over the whole period of always one trap as unit and not the weekly samples. From such a weak database no accurate estimates can be derived and the resulting species estimates have to be regarded with caution.
Criteria used to analyse the guild structure of the Neotropical spider assemblage partly followed UETZ et al. (1999), but were supplemented with criteria considered important for the Amazonian spider assemblage (see table 5). Cluster analysis was done with the same method and program that UETZ et al. (1999) used, the unweighted pair group average method (Statistica, StatSoft 1997).
Most specimens from our samples will lastly be deposited in the collection of the Instituto Nacional de Pesquisas da Amazônia (INPA) in Manaus, however a large part of the material is at the moment still on loan to taxonomists or to the two authors. Abbreviations used for the collections where specimens are deposited: AMNH, American Museum of Natural History, New York, USA (N.I. PLATNICK); CAS, California Academy of Sciences, San Francisco, USA (C. GRISWOLD); IBSP, Instituto Butantan, São Paulo, Brazil (A.D. BRESCOVIT); INPA, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (C. MAGALHÃES); MACN, Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina (C. SCIOSCIA); MCN, Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil (E.H. BUCKUP); MCTP, Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil (A.A. LISE); MCZ, Museum of Comparative Zoology, Harvard, USA (L. LEIBENSPERGER); MEG, private collection of M.E. GALIANO, Buenos Aires, Argentina; MNRJ, Museu Nacional, Universidade Federal de Rio de Janeiro, Brazil (A. KURY); MZSP, Museu de Zoologia, Universidade de São Paulo, Brazil (E. CANCELLO); SMNK, Staatliches Museum für Naturkunde Karlsruhe, Germany (H. HÖFER).

3. Results

3.1 Species inventory

The species list contains at the moment 506 recognized morphospecies in 284 genera and 56 families (tab. 1). The list is highly resolved, which means that 279 species are identified, 67 (13 %) are confirmed new species. Reserva Ducke is the type locality of 39 species. For 3 species the paratypes or the first described male or female are from Reserva Ducke. When we started our study more than 20 % of the spider fauna were undescribed.
In the families Araneidae (*Eustala*), Linyphiidae, Mysmenidae, Oonopidae, Sparassidae, Theridiidae and Theridiosomatidae, additional species might well be recognized by revisional work based on our material. The list thus gives the minimum number of species recorded for the locality.
Salticidae is the most species rich family with 112 identified species (22 %) followed by Araneidae with 91 species (18 %), Theridiidae with 59 (12 %), Corinnidae with 43 (9 %) and Ctenidae with 16 species

(3 %). Mygalomorph spiders are represented by 22 species from 10 families. The ratio of species to genera (S/G) for the whole list is 1.8, for the ground eclector samples 1.9 and for the trunk funnel samples 1.8.

Continuously run traps like ground-eclectors and trunk funnels were most effective in capturing high species numbers, but single fogging procedures also contributed considerably to the species inventory (tab. 2, HÖFER et al. 1994a), demonstrating the expected (and still unrevealed) high species richness of the tropical forest canopy. Pitfall traps and quadrat samples collected considerably less species. Our manual sampling principally served to collect species living in lower vegetation and large hunting spiders of the ground, which on the other hand were rarely caught as adult specimens in the traps.

None of the mean randomized (50 runs) observed species accumulation curves from the three different methods (ground eclectors, trunk funnel traps, CODDINGTONS's protocol) reached an asymptote. Richness estimates (first order jackknife and CHAO 2) from three different sample sets, using only adult specimens, show very different values (tab. 2), all clearly below the species number of our list resulting from all methods together.

Table 1. List of species recorded from Reserva Ducke RD (ud – undescribed, tl – type locality RD, pt – paratype collected at RD, occurence – method or stratum where specimens were recorded, when no information is given it was collected manually: be – beating of vegetation, f – fogging, ge – ground eclector, ld – looking down, lu – looking up, pf – pitfall trap, te – trunk eclector, veg – in vegetation; da – dial activity: di – diurnal, no – nocturnal).

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Actinopodidae							
Actinopus	sp.	.	.	.	MCN, SMNK	pf	no
Anapidae							
Anapis	*caluga*	PLATNICK & SHADAB	.	.	SMNK	lu	di
Anapis	sp.	.	.	.	MCN	te	
Pseudanapis	sp.	.	.	.	MCN	m	
Anyphaenidae							
Anyphaenoides	*coddingtoni*	BRESCOVIT	.	+	IBSP, USNM	te	
Hibana	*melloleitaoi*	(CAPORIACCO)	.	.	INPA, MCN	lu ge be f	di
Isigonia	*limbata*	SIMON	.	.	INPA, SMNK	te	
Patrera	sp.	.	.	.	MCN	te f	
Pippuhana	sp.	.	.	.	IBSP on loan	te	
Teudis	sp.	.	+	.	MCN	te	
Wulfila	*modesta*	CHICKERING	.	.	SMNK, MCN	te f	
Wulfilopsis	n.sp.	.	+	.	INPA	te	
gen. ?	sp.	.	.	.	IBSP on loan	te	
Araneidae							
Acacesia	cf. *cornigera*	PETRUNKEVITCH	.	.	MCN	f	
Actinosoma	*pentacanthum*	(WALCKENAER)	.	.	INPA, MCN	.	di
Alpaida	*acuta*	(KEYSERLING)	.	.	MCZ		
Alpaida	*bicornuta*	(TACZANOWSKI)	.	.	NHRM	f	
Alpaida	*carminea*	(TACZANOWSKI)	.	.	MEG, MZSP		
Alpaida	*delicata*	(KEYSERLING)	.	.	SMNK		
Alpaida	n.sp. prope *antonio*	.	+	.	SMNK on loan	ge	
Alpaida	n.sp. prope *simila*	.	+	.	SMNK on loan	ge	
Alpaida	n.sp.?	.	.	.	SMNK on loan	ge	
Alpaida	*negro*	LEVI	.	.	SMNK		
Alpaida	*tabula*	(SIMON)	.	.	SMNK	te	no
Alpaida	*trispinosa*	(KEYSERLING)	.	.	MEG	.	
Alpaida	*truncata*	(KEYSERLING)	.	.	INPA, SMNK	be	di
Alpaida	*urucuca*	LEVI	.	.	MCN		
Amazonepeira	*herrera*	LEVI	.	.	MCN		
Amazonepeira	*masaka*	LEVI	.	.	MCN		
Araneus	*guttatus*	(KEYSERLING)	.	.	MEG		
Araneus	*venatrix*	(C.L.KOCH)	.	.	MCN		
Argiope	*argentata*	(FABRICIUS)	.	.	MCN		
Bertrana	*elinguis*	(KEYSERLING)	.	.	SMNK, MEG	ge	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Chaetacis	*cornuta*	(TACZANOWSKI)	.	.	MCN		
Chaetacis	*cucharas*	LEVI	.	.	MCN		
Chaetacis	*necopinata*	(CHICKERING)	.	.	INPA		
Chaetacis	*abrahami*	MELLO-LEITÃO	.	.	MCN		
Chaetacis	*aureola*	(C.L.KOCH)	.	.	INPA, MCN, MEG		
Cyclosa	*bifurcata*	(WALCKENAER)	.	.	INPA, MCZ, SMNK	veg	
Cyclosa	*caroli*	LEVI	.	.	INPA, MCN		
Cyclosa	*diversa*	(O. P. CAMBRIDGE)	.	.	INPA, MCTP, MCN		
Cyclosa	*fililineata*	HINGSTON	.	.	INPA, MCN, SMNK		
Cyclosa	*rubronigra*	CAPORIACCO	.	.	MCTP, MCZ		
Cyclosa	*tapetifaciens*	HINGSTON	.	.	INPA, MACN, MCN, SMNK		
Cyclosa	*vieirae*	LEVI	.	.	MACN		
Dubiepeira	*dubitata*	(SOARES & CAMARGO)	.	.	MCN		
Edricus	sp.	.	.	.	MCN		
Epeiroides	*bahiensis*	(KEYSERLING)	.	.	MCN		
Eriophora	*fuliginea*	(C.L.KOCH)	.	.	MCN		
Eustala	spp.	.	.	.	MCN, SMNK	lu be te f	no
Gasteracantha	*cancriformis*	(LINNAEUS)	.	.	.	only photo	
Hingstepeira	*dimona*	LEVI	.	.	MCN, MCZ		
Hingstepeira	*folisecens*	LEVI	.	.	INPA, MCN, SMNK	veg	no
Hypognatha	*scutata*	(PERTY)	.	.	INPA		
Kapogea	*alayoi*	(ARCHER)	.	.	MCN		
Kapogea	*sexnotata*	(SIMON)	.	.	MCZ		
Larinia	sp.	.	.	.	MCN on loan		
Mangora	sp.	.	.	.	IBSP, SMNK,.MCN	veg te f	
Manogea	*porracea*	(C.L.KOCH)	.	.	INPA, MCN, MCZ		
Mecynogea	sp.	.	.	.	MCN		
Metazygia	*castaneoscutata*	(SIMON)	.	.	MCN		
Metazygia	*ducke*	LEVI	.	+	MCN		
Metazygia	*enabla*	LEVI	.	.	MCN		
Metazygia	*laticeps*	(O. P. CAMBRIDGE)	.	.	SMNK	veg	
Metazygia	*manu*	LEVI	.	.	MCN		
Metazygia	*mariahelenae*	LEVI	.	+	MACN		
Metazygia	*yucumo*	LEVI	.	.	MCN		
Micrathena	*acuta*	(WALCKENAER)	.	.	SMNK on loan		
Micrathena	*clypeata*	(WALCKENAER)	.	.	INPA, SMNK	lu f	di
Micrathena	*coca*	LEVI	.	.	MCN, MEG		
Micrathena	*evansi*	CHICKERING	.	.	INPA, MEG		
Micrathena	*excavata*	(C.L.KOCH)	.	.	INPA, MCN		
Micrathena	*exlinae*	LEVI	.	.	MCN		
Micrathena	*furcula*	(O. P.CAMBRIDGE)	.	.	MCN		
Micrathena	*horrida*	(TACZANOWSKI)	.	.	MCN	.	di
Micrathena	*kirbyi*	(PERTY)	.	male	INPA, MCN, SMNK	veg	di
Micrathena	*lata*	CHICKERING	.	.	MZSP		
Micrathena	*plana*	(C.L.KOCH)	.	.	SMNK on loan		
Micrathena	*pungens*	(WALCKENAER)	.	.	AMNH, SMNK		
Micrathena	*schreibersi*	(PERTY)	.	.	INPA, MCZ, SMNK	veg	di
Micrathena	*triangularis*	(C.L.KOCH)	.	.	INPA, MCN		
Micrathena	*triangularispinosa*	(DE GEER)	.	.	INPA, MCN, MEG		
Micrathena	*ucayali*	LEVI	.	.	MCN		
Micrepeira	*fowleri*	LEVI	.	.	INPA, MCZ		
Micrepeira	*hoeferi*	LEVI	.	.	INPA, MCN, SMNK, MCZ	veg	
Micrepeira	*tubulofaciens*	(HINGSTON)	.	.	MCN		
Ocrepeira	*maraca*	LEVI	.	.	MEG		
Ocrepeira	*albopunctata*	(TACZANOWSKI)	.	.	MCN, MEG		
Ocrepeira	*covillei*	LEVI	.	.	MCN		

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Parawixia	*hypocrita*	(O. P.CAMBRIDGE)	.	.	MCN	veg	
Parawixia	*kochi*	(TACZANOWSKI)	.	.	INPA, MCN	veg te	no
Parawixia	*tarapoa*	LEVI	.	.	MCN	wasp prey	
Pronous	*tuberculifer*	KEYSERLING	.	.	MCZ		
Spilasma	*duodecimguttata*	(KEYSERLING)	.	.	INPA, MCN, SMNK		
Testudinaria	sp.	.	.	.	SMNK	lu	no
Verrucosa	sp.	.	.	.	SMNK	lu te	no
Wagneriana	*acrosomoides*	(MELLO-LEITÃO)	.	.	INPA		
Wagneriana	*bamba*	LEVI	.	.	MCN		
Wagneriana	*jelskii*	(TACZANOWSKI)	.	.	INPA, CAS		
Wagneriana	*lechuza*	LEVI	.	.	MCN		
Wagneriana	*maseta*	LEVI	.	.	INPA		
Wagneriana	*neblina*	LEVI	.	.	MCN		
Wagneriana	*transitoria*	(C.L.KOCH)	.	.	MCN		
Xylethrus	*scrupeus*	SIMON	.	.	SMNK	veg	
Barychelidae							
Strophaeus	sp.	.	.	.	AMNH on loan	ge	
Caponiidae							
Caponinae	sp.	.	.	.	AMNH on loan	ge	
Nops	sp.	.	.	.	INPA, MCN	ge	
Clubionidae							
Clubiona	aff. kiwoa	.	.	.	MCN on loan		
Elaver	sp.	.	.	.	IBSP	te	
Corinnidae							
Abapeba	*hoeferi*	BONALDO	.	+	MCN, SMNK	te	
Abapeba	*lacertosa*	SIMON	.	.	INPA, MCN, SMNK	te	
Abapeba	*taruma*	BONALDO	.	.	INPA, SMNK	te	
Apochinomma	sp.	.	.	.	BONALDO on loan		
Castianeira	sp.2	.	.	.	MCN, SMNK	ge	
Castianeira	sp.4	.	.	.	MCN, SMNK	te	
Castianeira	sp.6	.	.	.	MCN, SMNK	te	
Corinna	*ducke*	BONALDO	.	+	INPA, MCN, SMNK	ge te	
Corinna	*recurva*	BONALDO	.	+	INPA, MCN, SMNK	ge pf te	
Corinna	grupo *ducke* n.sp. 2	.	+	.	INPA (BONALDO on loan)	ge	
Corinna	grupo *ducke* n.sp. 3	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 4	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 5	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 6	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 7	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 9	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 11	.	+	.	INPA (BONALDO on loan)	te	
Corinna	grupo *ducke* n.sp. 12	.	+	.	INPA (BONALDO on loan)	m	
Corinna	grupo *ducke* n.sp. 13	.	+	.	INPA (BONALDO on loan)	m	
Creugas	n.sp.	.	+	.	INPA (BONALDO on loan)	te	
Ecitocobius	*comissator*	BONALDO & BRESCOVIT	.	+	INPA	with ants	
Falconina	n.sp.	.	+	.	INPA (BONALDO on loan)	.	
Mazax	cf. *pax*	.	.	.	SMNK	sandy area veg	
Myrmecotypus	sp.	.	.	.	SMNK	f	
Myrmecium	*bifasciatum*	(TACZANOWSKI)	.	.	INPA, SMNK	veg te	
Myrmecium	cf. *gounelley*	SIMON	.	.	SMNK on loan	veg	
Myrmecium	cf. *velutinum*	SIMON	.	.	SMNK on loan	veg	
Parachemmis	*manauara*	BONALDO	.	.	MCN, INPA, IBSP, SMNK	te	
Parachemmis	n.sp. 1	.	+	.	INPA (BONALDO on loan)	te	
Parachemmis	n.sp. 2	.	+	.	INPA (BONALDO on loan)	te	
Simonestus	n.sp. 3	.	+	.	INPA (BONALDO on loan)	te	
Simonestus	n.sp. 5	.	+	.	INPA (BONALDO on loan)	termite nest	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Simonestus	n.sp. 7	.	+	.	INPA (Bonaldo on loan)	te	
Sphecotypus	cf. *niger*	.	.	.	INPA (Bonaldo on loan)	f	di
Stethorrhagus	*lupulus*	Simon	.	.	MCN, SMNK	te f	
Tapixaua	*callida*	Bonaldo	.	+	INPA, SMNK	te	
Trachelinae gen.	n.sp.2	.	.	.	INPA (Bonaldo on loan)	te	
Trachelinae gen.	n.sp.4	.	.	.	INPA (Bonaldo on loan)	te	
Trachelinae gen.	n.sp.5	.	.	.	INPA (Bonaldo on loan)	te	
Trachelinae gen.	n.sp.6	.	.	.	INPA (Bonaldo on loan)	te	
Tupirinna	*rosae*	Bonaldo	.	+	INPA, IBSP, SMNK	te	
Tupirinna	n.sp. 1	.	+	.	INPA (Bonaldo on loan)	m	
Xeropigo	n.sp. 5	.	+	.	INPA (Bonaldo on loan)	te	
Ctenidae							
Acanthoctenus	*spiniger*	Keyserling	.	.	IBSP on loan	m	no
Asthenoctenus	*longistylus*	Brescovit & Simó	.	.	INPA, SMNK	te	no
Centroctenus	*acara*	Brescovit	.	+	INPA, IBSP, SMNK	ld	no
Centroctenus	*auberti*	(Caporiacco)	.	.	MCN, INPA, SMNK	te	no
Centroctenus	*miriuma*	Brescovit	.	.	SMNK	te	no
Centroctenus	*ocelliventer*	(Strand)	.	.	INPA, IBSP, MCN, SMNK	te	no
Ctenus	*amphora*	Mello-Leitão	.	.	INPA, IBSP, SMNK	ge ld te	no
Ctenus	*crulsi*	Mello-Leitão	.	.	INPA, IBSP, SMNK	ge ld	no
Ctenus	*inaja*	Höfer, Brescovit & Gasnier	+	.	NPA, MCN	te	no
Ctenus	*manauara*	Höfer, Brescovit & Gasnier	.	+	INPA, SMNK	m	no
Ctenus	*minor*	F.O. P. Cambridge	.	.	INPA, MCN	m	no
Ctenus	*villasboasi*	Mello-Leitão	.	.	INPA, SMNK	ld	no
Cupiennius	*celerrimus*	Simon	.	.	IBSP, MCN, SMNK, UA	veg	no
Enoploctenus	n.sp.	.	+	.	INPA, IBSP, MCN, SMNK	te	no
Gephyroctenus	n.sp.	.	+	.	MCN	ge bete	
Phoneutria	*fera*	Perty	.	.	SMNK, MCN	veg te	no
Phoneutria	*reidyi*	(F.O. P. Cambridge)	.		SMNK, MCN	veg te	no
Ctenizidae							
Ummidia	sp.	.	.	.	AMNH on loan	m	no
Cyrtaucheniidae							
Bolostromus	sp.	.	.	.	INPA, IBSP,SMNK on loan	ge qu	
Fufius	sp.	.	.	.	MCN, AMNH on loan	ge in wasp nest	
Rhytidicolus	sp.	.	.	.	AMNH on loan	pf	
Deinopidae							
Deinopis	sp.	.	.	.	MCN	lu be te	no
Dictyna	sp.	.	.	.	MCN	f	
Thallumetus	sp.	.	.	.	INPA, IBSP	ge	
Dipluridae							
Diplura	sp.	.	.	.	MCN	qu pf ld te	no
Masteria	n.sp.1	.	+	.	SMNK, MCN, AMNH on loan	qu ge pf te	
Masteria	n.sp.2	.	+	.	SMNK, MCN, AMNH, on loan	qu ge pf te	
Gnaphosidae							
Amazoromus	*becki*	Brescovit & Höfer	.	+	INPA, SMNK	te	
Amazoromus	*kedus*	Brescovit & Höfer	.	+	INPA, SMNK, MCN	te	
Apopyllus	sp.	.	.	.	IBSP on loan		
Apodrassodes	sp.	.	.	.	SMNK on loan	te	
Cesonia	sp.	.	.	.	MCN		
Zimiromus	n.sp. aff. *nadleri*	.	+	.	IBSP on loan	te	
Zimiromus	*kleini*	Buckup & Brescovit	.	.	INPA, IBSP, MCN, SMNK	veg	
Zimiromus	*syenus*	Buckup & Brescovit	.	.	INPA, IBSP, MCN, SMNK	veg	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Hahniidae							
gen. ?	sp.	.	.	.	INPA, MCN, SMNK on loan		
Tama	aff. *crucifera*	.	.	.	IBSP, SMNK on loan	te f	
Idiopidae							
Idiops	sp.	.	.	.	MCN, SMNK	ge te	no
Linyphiidae							
Erigone	sp.	.	.	.	MCN		
Sphecozone	sp.	.	.	.	MCN	ge	
Orthobula	n.sp.	.	+	.	MCN on loan	ge	
Lycosidae							
Aglaoctenus	*castaneus*	(Mello-Leitão)	.	.	MCN	ge	di
Lycosa	group *thorelli* sp.	.	.	.	SMNK	pf	
Microstigmatidae							
n.gen.	n.sp.	.	+	.	INPA, SMNK on loan	qu ge pf	
Mimetidae							
Arocha	sp.	.	.	.	IBSP		
n.gen.	n.sp.	.	+	.	MCN on loan	ge	
Ero	sp.	.	.	.	MCN	ge lu be te	
Gelanor	sp.	.	.	.	MCN	m	
Mimetus	group *melanostoma* sp.	.	.	.	MCN		
Cheiracanthium	*inclusum*	(Hentz)	.	.	INPA, MCN	veg	
Teminius	*insularis*	(Lucas)	.	.	SMNK	pf	
Mysmenidae							
Microdipoena	sp.	.	.	.	SMNK	ge	
Mysmenopsis	sp.	.	.	.	SMNK	ge	
Nemesiidae							
Neodiplothele	n.sp.	.	+	.	AMNH on loan	ge	
cf. *Nesticus*	sp.	.	+	.	MCN on loan		
gen. ?	sp.	.	+	.	MCN on loan	m	no
Ochyroceratidae							
Ochyrocera	n.sp. p	.	+	.	SMNK	pf	
Ochyrocera	*hamadryas*	Brignoli	.	+	SMNK	pf	
Ochyrocera	n.sp. b	.	+	.	SMNK, MCN	ge pf te	
Speocera	*amazonica*	Brignoli	.	+	SMNK	qu ge	
Speocera	*irritans*	Brignoli	.	.	SMNK	qu ge	
Speocera	*molesta*	Brignoli	.	+	SMNK	qu ge	
Speocera	n.sp. iw	.	+	.	SMNK	ge pf	
Speocera	n.sp. j	.	+	.	SMNK	pf	
Speocera	n.sp. m	.	+	.	SMNK	ge	
Speocera	n.sp. pn	.	+	.	SMNK	qu	
Oecobiidae							
Oecobius	cf. *concinnus*	Simon	.	.	IBSP on loan	f juv.	
Oonopidae							
cf. Ischnothyreus	sp.	.	.	.	SMNK	ge be	
Gamasomorpha	cf. *patquiana*	Biraben	.	.	SMNK on loan	ge	
Gamasomorphinae	sp.	.	.	SMNK on loan		ge te	
Gamasomorphinae	sp.	.	.	.	SMNK on loan	ge te	
Gamasomorphinae	sp.	.	.	.	SMNK on loan	ge te	
Neoxyphinus	*termitophilus*	(Bristowe)	.	.	MCN	pf q	
Oonopinae	sp.	.	.	.	SMNK on loan	ge te	
Oonopinae	sp.	.	.	.	SMNK on loan	ge te	
Oonopinae	sp.	.	.	.	SMNK on loan	ge te	
Oonopinae	sp.	.	.	.	SMNK on loan	ge te	
Xyccarph	*myops*	Brignoli	.	+	INPA, MCN, SMNK	qu ge	
Xyccarph	*wellingtoni*	Höfer & Brescovit	.	+	INPA, MCN, SMNK	qu	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Oxyopidae							
Hamataliwa	sp.	.	.	.	MCN	ge	
Oxyopes	sp.	.	.	.	MCN	te	
Peucetia	sp.	.	.	.	MCN, SMNK	m	di
Schaenicoscelis	sp.	.	.	.	MCN	m	
Tapinillus	sp.	.	.	.	IBSP on loan	m	
Palpimanidae							
Fernandezina	sp.	.	.	.	IBSP	m	
Otiothops	*hoeferi*	Bonaldo & Brescovit	.	+	INPA, SMNK	pf	
Otiothops	*oblongus*	Simon	.	.	INPA, MCN, SMNK	ge te f	no
Paratropididae							
Paratropis	sp.	.	.	.	MCN, SMNK	qu ge pf	no
Philodromidae							
Paracleocnemis	sp.	.	.	.	MCTP on loan	f	
Pholcidae							
Carapoia	*fowleri*	Huber	.	.	INPA, SMNK, MCZ, MCTP	ge lu te	
Carapoia	*ocaina*	Huber	.	.	INPA, SMNK	ge	
gen. ?	sp.	.	.	.	SMNK on loan	ge pf	
Mesabolivar	*aurantiacus*	(Mello-Leitão)	.	.	INPA, MCN, MCTP, SMNK	ge lu te	di
Mesabolivar	*difficilis*	(Mello-Leitão)	.	.	SMNK	.	di
Modisimus	sp.	.	.	.	SMNK	ge	
Metagonia	*taruma*	Huber	.	.	INPA, MCN	ge	
Litoporus	*dimona*	Huber	.	.	SMNK	te	
Pisauridae							
Ancylometes	*rufus*	(Walckenaer)	.	.	INPA, SMNK	mte	no
Ancylometes	*terrenus*	Höfer & Brescovit	.	+	INPA, SMNK	m	no
Architis	*nitidopilosa*	Simon	.	.	SMNK	lu be te	di
Architis	*tenuis*	Simon	.	.	SMNK	tef	di
Staberius	*spinipes*	(Taczanowski)	.	.	SMNK	ld	
Thaumasia	*annulipes*	F.O. P. Cambridge	.	.	SMNK, MCN	m	no
Thaumasia	sp.	.	.	.	SMNK, MCN	mte	no
Prodidomidae							
Lygromma	*gasnieri*	Brescovit & Höfer	.	pt	INPA, IBSP, SMNK	ge pf	
Lygromma	*huberti*	Platnick	.	.	INPA, IBSP, MCN, SMNK	ge pf	
Salticidae							
Acragas	*castaneiceps*	Simon	.	.	MCN		
Acragas	cf. *procalvus*	Simon	.	.	SMNK		
Acragas	*quadriguttatus*	(F.O. P. Cambridge)	.	.	INPA		
Amphidraus	*duckei*	Galiano	.	+	INPA, SMNK	tef	
Amphidraus	n.sp. 2	.	+	.	INPA, SMNK	ge te	
Amphidraus	n.sp. 3	.	+	.	INPA, SMNK	ge te	
Amyceae	sp.	.	.	.	SMNK	ge veg	
Amycus	*flavicomis*	Simon	.	.	INPA, SMNK		
Amycus	*spectabilis*	C.L.Koch	.	.	MCN		
Arachnomura	n.sp. 1 prope *hieroglypha*		.	+	SMNK		
Arachnomura	n.sp. 2 prope *hieroglypha*		+	.	INPA, SMNK		
Asaracus	*semifimbriatus*	(Simon)	.	.	MCN		
Balmaceda	n.sp. prope *anulipes*	.	+.	.	INPA, SMNK	te	
Bellota	*violacea*	Galiano	.	+	MNRJ, MACN		
Breda	cf. *variolosa*	Simon	.	.	INPA; MCN		
Breda	n.sp. prope *spinimana*	.	+.	.	INPA, SMNK	te	
cf. *Tariona*	sp. I	.	.	.	SMNK	f	
cf. *Tariona*	sp. II	.	.	.	INPA, SMNK	te	
cf. *Zygoballus*	sp.	.	.	.	SMNK	f	
Chinoscopus	n.sp. prope *flavus*	.	+	.	SMNK		

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Chinoscopus	*gracilis*	(TACZANOWSKI)	.	.	MACN		
Chinoscopus	*maculipes*	CRANE	.	.	MACN, MNRJ	f	
Chira	sp.	.	.	.	INPA, SMNK	te	
Chirothecia	sp.	.	.	.	MCN		
Chloridusa	sp.	.	.	.	MCN		
Corcovetella	n.sp. prope *aemulatrix*	.	+.	.	INPA	ge	
Coryphasia	sp.	.	.	.	SMNK on loan	te	
Corythalia	cf. *electa*	(PECKHAM)	.	.	SMNK		
Corythalia	sp. I	.	.	.	SMNK, INPA	ge te	
Corythalia	sp. II	.	.	.	INPA		
Corythalia	sp. III	.	.	.	SMNK		
Corythalia	sp. IV	.	.	.	SMNK		
Corythalia	n.sp. prope *valida*	.	+	.	SMNK on loan		
Cytaeinae gen.	sp.	.	.	.	SMNK	te	
Descanso	*ventrosus*	GALIANO	.	+	MZSP, MACN		
Encolpius	*guaraniticus*	GALIANO	.	.	SMNK		
Erica	cf. *eugenia*	PECKHAM & PECKHAM	.	.	SMNK		
Euophrys	sp.	.	.	.	MCN		
Eustiromastix	*falcatus*	GALIANO	.	.	MCN		
Fissidentati gen. prope *Balmaceda*	sp.	SIMON	.	.	SMNK, INPA	te	
Fissidentati gen. prope *Salticus*	sp.	.	.	.	SMNK	te	
Fluda	*opica*	(PECKHAM & PECKHAM)	.	.	MACN, MCN, SMNK		
Fluda	cf. *angulosa/nigritarsis*	.	.	.	SMNK		
Freya	cf. *rufohirta*	(SIMON)	.	.	INPA, SMNK		
Freya	cf. *perelegans*	SIMON	.	.	SMNK		
Freya	n.sp. prope *exculta*	SIMON	+	.	INPA, SMNK	ge te f	
Freya	*dureti*	GALIANO	.	pt	MACN, MNRJ		
Frigga	*kessleri*	(TACZANOWSKI)	.	.	SMNK??		
Gypogyna	*forceps*	SIMON	.	.	SMNK		
Hypaeus	*miles*	SIMON	.	.	INPA, SMNK	te	
Hypaeus	*triplagiatus*	SIMON	.	.	SMNK on loan		
Itata	*tipuloides*	SIMON	.	.	INPA	f	
Lyssomanes	*amazonicus*	PECKHAM, PECKHAM & WHEELER	.	.	INPA, SMNK		
Lyssomanes	*longipes*	(TACZANOWSKI)	.	.	INPA, SMNK	be	
Lyssomanes	n.sp. prope *nigrofimbriatus*		+	.	INPA		
Lyssomanes	n.sp. prope *taczanowskii*	.	.	.	INPA		
Lyssomanes	n.sp. prope *velox*	.	+	.	INPA		
Lyssomanes	*quadrinotatus*	SIMON	.	.	INPA		
Lyssomanes	aff. *tapuiramae*	GALIANO	.	.	MCN on loan		
Lyssomanes	aff. *unicolor*	(TACZANOWSKI)	.	.	MCN on loan		
Lyssomanes	*ceplaci*	GALIANO	.	.	SMNK		
Mago	*acutidens*	SIMON	.	.	INPA, SMNK		
Mago	*longidens*	SIMON	.	.	MCN		
Mago	n.sp. prope *fonsecai*	SOARES & CAMARGO	+	.	INPA		
Mago	*steindachneri*	(TACZANOWSKI)	.	.	SMNK		
Mago	sp.	.	.	.	SMNK, INPA	ge te	
Magoninae	sp. 1	.	.	.	SMNK	te	
Magoninae	sp. 2	.	.	.	SMNK	te	
Martella	*pasteuri*	GALIANO	.	+	MNRJ, MACN		
Metaphidippus	sp.	.	.	.	MCN		
Myrmarachne	*sumana*	GALIANO	.	+	INPA, MACN	te f	
Myrmarachne	n.sp. prope *sumana*	.	+.	.	SMNK		
Myrmarachne	cf. *brasiliensis*	MELLO-LEITÃO	.	.	INPA	te	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Nagaina	cf. *tricincta*	SIMON	.	.	SMNK		
Noegus	*comatulus*	SIMON	.	.	INPA	ge	
Noegus	sp. I	.	.	.	INPA, SMNK	te	
Noegus	sp. II	.	.	.	INPA, SMNK	f	
Noegus	sp. III	.	.	.	SMNK	f	
Noegus	*fuscimanus*	(TACZANOWSKI)	.	.	INPA	ge	
Nycerella	*aprica*	(PECKHAM & PECKHAM)	.	.	MNRJ, MACN	ge	
Nycerella	*melanopygia*	GALIANO	.	+	MACN, MNRJ	ge	
Pachomius	*sextus*	GALIANO	.	+	MZSP, MACN		
Pachomius	*dybowskii*	(TACZANOWSKI)	.	.	MACN		
Pensacola	n.sp. prope *tuberculotibiata*		+	.	SMNK	te	
Phiale	cf. *crocea*	C.L.KOCH	.	.	SMNK	te	
Plexippeae	sp.	.	.	.	SMNK		
Plexippus	*paykulli*	(SAVIGNY & AUDOUIN)	.	.	INPA, SMNK		
Pluridentati n.gen. A	n.sp. 1	.	+	.	SMNK, INPA	ge	
Pluridentati n.gen. A	n.sp. 2	.	+	.	INPA	ge	
Pluridentati n.gen. B	n.sp.	.	+	.	SMNK, INPA	te	
Pluridentati n.gen. C	n.sp.	.	+	.	SMNK	ge	
Psecas	sp.	.	.	.	.	only photo	
Rudra	n.sp.	.	+	.	MCTP on loan		
Saiteae gen.	sp. A	.	.	.	SMNK, INPA	ge	
Saiteae gen.	sp. B	.	.	.	SMNK, INPA	ge	
Saiteae gen.	sp. C	.	.	.	SMNK	ge	
Saiteae gen.	sp. D	.	.	.	SMNK	ge	
Saiteae gen.	sp. E	.	.	.	SMNK, INPA	ge te	
Sarinda	cf. cayennensis	(TACZANOWSKI)	.	.	SMNK on loan		
Sarinda	cf. longula	(TACZANOWSKI)	.	.	SMNK	f	
Scopocira	sp.	.	.	.	MCN		
Sidusa	*angulitarsis*	SIMON	.	.	INPA	te	
Stenodeza	*acuminata*	SIMON	.	.	SMNK		
Synageleae gen. prope *Semorina*	sp.	.	.	.	SMNK		
Synemosyna	n.sp.	.	+	.	MCN, SMNK	te	
Thiodininae gen.	sp.	.	.	.	SMNK		
Tullgrenella	sp. 1	.	.	.	SMNK	te	
Tullgrenella	sp. 2	.	.	.	SMNK	te	
Vinnius	n.sp. prope *calcarifer*	.	+	.	SMNK on loan		
Wedoquella	n.sp. prope *denticulata*	.	+	.	SMNK	ge	
Zygoballus	sp.	.	.	.	SMNK		
Scytodidae							
Scytodes	*piroca*	RHEIMS & BRESCOVIT	.	.	INPA, IBSP, SMNK	ge	
Scytodes	*balbina*	RHEIMS & BRESCOVIT	pt	.	INPA, MCN, SMNK	ge veg	
Scytodes	*martiusi*	BRESCOVIT & HÖFER	.	+	INPA, IBSP, SMNK	ge	
Scytodes	*paarmanni*	BRESCOVIT & HÖFER	.	+	INPA, IBSP, MCN, SMNK	ge	
Segestriidae							
cf. *Ariadna*	n.sp.	.	+	.	INPA, SMNK on loan	te	
Selenopidae							
Selenops	*ducke*	CORRONCA	.	+	MCN	ge te	
Selenops	*kikay*	CORRONCA	.	.	MCN	te	
Selenops	*lavillai*	CORRONCA	.	.	SMNK	te	
Senoculidae							
Senoculus	sp.	.	.	.	MCN	ge te	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Sparassidae							
Olios	sp.1	.	.	.	IBSP on loan	te	
Olios	sp.2	.	.	.	IBSP on loan	te	
Olios	sp.3	.	.	.	IBSP on loan	te	
gen.?	sp.1	.	.	.	IBSP on loan	ge te	
gen.?	sp.2	.	.	.	IBSP on loan	ge te	
gen. ?	sp.3	.	.	.	IBSP on loan	f	
Sparianthinae	sp.1	.	.	.	IBSP on loan	ge	
Sparianthinae	sp.2	.	.	.	IBSP on loan	ge	
Symphytognathidae							
Anapistula	*secreta*	GERTSCH	.	.	MCN	ge qu	
Symphytognatha	sp.	.	.	.	MCN		
Synotaxidae							
Synotaxus	sp. 1	.	.	.	MCN		
Tetrablemmidae							
Monoblemma	*becki*	BRIGNOLI	.	+	SMNK		
Tetragnathidae							
Azilia	sp. 1	.	.	.	MCN		
Chrysometa	*flava*	(O. P.CAMBRIDGE)	.	.	GALIANO		
Chrysometa	*flavicans*	(CAPORIACCO)	.	.	GALIANO		
Chrysometa	*guttata*	(KEYSERLING)	.	.	GALIANO		
Chrysometa	*minuta*	(KEYSERLING)	.	.	GALIANO		
Chrysometa	n.sp.	.	+	.	SMNK on loan		
Dolichognatha	*ducke*	LISE	.	+	MCTP	veg	
Glenognatha	sp.	.	.	.	MCN on loan		
Leucauge	*argyra*	(WALCKENAER)	.	.	INPA	veg	
Leucauge	sp.	.	.	.	SMNK	lu be	no
Mecynometa	sp.	.	.	.	MCN	veg	
Metabus	sp.	.	.	.	MCN		
Nephila	*clavipes*	(LINNAEUS)	.	.	.	only photo	di
Tetragnatha	sp.	.	.	.	MCN	be	di
Theraphosidae							
Acanthoscurria	sp.	.	.	.	INPA	ge	no
Avicularia	sp.	.	.	.	INPA	te	no
Cyriocosmus	*elegans*	(SIMON)	.	.	SMNK	qu	
Cyriocosmus	*sellatus*	(SIMON)	.	.	MCN	ge te	
Dryptopelma	*rondoni*	(LUCAS & BÜCHERL)	.	.	INPA	ge	no
Ephebopus	cf. *murinus*	(WALCKENAER)	.	.	SMNK	m	no
Ephebopus	*uatuman*	LUCAS, SILVA & BERTANI	.	.	INAP, SMNK	m	no
Holothele	sp.	.	.	.	SMNK		
Tapinauchenius	sp.	.	.	.	INPA	te	
Theraphosa	*blondi*	(LATREILLE)	.	.	INPA, SMNK	m	no
Theridiidae							
Achaearanea	*schneirlai*	LEVI	.	.	SMNK	ge be	di
Achaearanea	*trapezoidales*	(TACZANOWSKI)	.	.	SMNK	te	
Achaearanea	*dalana*	BUCKUP & MARQUES	.	.	MCN		
Achaearanea	*hieroglyphica*	(MELLO-LEITÃO)	.	.	MCN		
Achaearanea	*hirta*	(TACZANOWSKI)	.	.	MCN on loan	f	
Achaearanea	*nigrovittata*	(KEYSERLING)	.	.	MCN		
Anelosimus	*eximus*	(KEYSERLING)	.	.	MCN	be te	di
Anelosimus	*studiosus*	(HENTZ)	.	.	MCN on loan	f	
Argyrodes	*altus*	KEYSERLING	.	.	MCN		
Argyrodes	*amplifrons*	O. P.CAMBRIDGE	.	.	MCN on loan		
Argyrodes	*analiae*	GONZALES & CASTRO	.	.	MCN on loan		
Argyrodes	*attenuatus*	(O. P.CAMBRIDGE)	.	.	MCN	lu f	no
Argyrodes	*dracus*	(CHAMBERLIN & IVIE)	.	.	SMNK	te	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Argyrodes	*duckensis*	Gonzales & Castro	+	.	MLP		
Argyrodes	*godmani*	Exline & Levi	.	.	MCN on loan		
Argyrodes	*metaltissimus*	(Soares & Camargo)	.	.	MCN on loan		
Argyrodes	sp.	.	.	.	SMNK		
Cerocida	*ducke*	Marques & Buckup	.	+	INPA, MCN, SMNK	be	
Chrosiothes	*venturosus*	Marques & Buckup	.	+	INPA, MCN	f	
Chrysso	*calima*	Buckup & Marques	.	.	MCN on loan		
Dipoena	*alta*	Keyserling	.	.	SMNK	ge f	
Dipoena	*atlantica*	Chickering	.	.	MCN	ge f	
Dipoena	*bryantae*	Chickering	.	.	MCN	ge f	
Dipoena	*conica*	(Chickering)	.	.	MCN	ge	
Dipoena	*cordiformis*	Keyserling	.	.	INPA, MCN, SMNK	ge	
Dipoena	*donaldi*	Chickering	.	.	MCN	ge f	
Dipoena	*duodecimguttata*	Chickering	.	.	MCN	ge	
Dipoena	*hortoni*	Chickering	.	.	MCN	ge	
Dipoena	*kuyuwini*	Levi	.	.	MCN	ge	
Dipoena	*militaris*	Chickering	.	.	MCN	ge be	di
Dipoena	n.sp.	.	+	.	MCN	ge f	
Dipoena	*puertoricensis*	Levi	.	.	MCN on loan	ge	
Dipoena	*tiro*	Levi	.	.	INPA, SMNK	ge te	
Echinotheridion	*lirum*	Marques & Buckup	.	+	INPA, MCN		
Episinus	*erythrophtalmus*	(Simon)	.	.	MCN	f	
Episinus	*malachinus*	(Simon)	.	.	MCN on loan		
Episinus	*salobrensis*	(Simon)	.	.	MCN, SMNK	lu	no
Euryops	*taczanowskii*	(Simon)	.	.	MCN on loan		
Helvibis	sp.	.	.	.	MCN, SMNK	lu	no
Latrodectus	sp.	.	.	.	SMNK	open sandy area	di
Nesticodes	*rufipes*	(Lucas)	.	.	SMNK		
Phoroncidia	cf. *moyobamba*	Levi	.	.	SMNK	be	di
Spintharus	*flavidus*	Hentz	.	.	SMNK	f	
Spintharus	*hentzi*	Levi	.	.	MCN	be f	di
Tekellina	*bella*	Marques & Buckup	.	+	INPA, MCN	te	
Tekellina	*crica*	Marques & Buckup	.	+	INPA, MCN	te	
Theridion	*crispulum*	Simon	.	.	MCN on loan		
Theridion	*hispidum*	O. P.Cambridge	.	.	MCN on loan	f	
Theridion	sp.1	.	.	.	MCN on loan	te	
Theridion	sp.2	.	.	.	MCN on loan	m	
Theridion	sp.3	.	.	.	MCN on loan	m	
Theridion	sp.4	.	.	.	MCN on loan	m	
Theridion	sp.5	.	.	.	MCN on loan	m	
Theridula	*puebla*	Levi	.	.	MCN		
Thwaitesia	*affinis*	O. P.Cambridge	.	.	SMNK	f te	
Thwaitesia	*bracteata*	(Exline)	.	.	MCN, SMNK	f	
Thwaitesia	*simoni*	(Keyserling)	.	.	MCN, SMNK	ge ld lu be te	no
Tidarren	sp.	.	.	.	MCN on loan		
Theridiosomatidae							
Chthonos	sp.	.	.	.	SMNK on loan	be	di
Epeirotypus	sp.	.	.	.	SMNK on loan		
Naatlo	sp.	.	.	.	SMNK on loan	ge ld lu	
Theridiosoma	sp.	.	.	.	MCN	qu	
Thomisidae							
Aphantochilus	*rogersi*	O. P.Cambridge	.	.	INPA, MCTP	m	di
Deltoclita	sp.	.	.	.	MCN		
Dietinae	sp.	.	.	.	MCN		
Epicadinus	sp.	.	.	.	MCN	be f	di
Majellula	sp.	.	.	.	MCN	lu be teno	

Family / Genus	Species	Author	ud	tl	collection	occurence	da
Misumenops	sp.	.	.	.	MCN	te	
Onocolus	sp.	.	.	.	MCN		
Stephanopoides	*simoni*	KEYSERLING	.	.	INPA, MCN	te	
Strophius	sp.	.	.	.	MCTP on loan		
Synaema	sp.	.	.	.	SMNK		
Titidius	*galbanatus*	(KEYSERLING)	.	.	MCN		
Titidius	*rubescens*	CAPORIACCO	.	.	INPA, SMNK		
Tmarus	sp.	.	.	.	MCN	lu be f	
Tobias	sp.	.	.	.	MCTP on loan		
Titanoecidae							
cf. *Goeldia*	sp.	.	.	.	IBSP on loan	ge	
Trechaleidae							
Dossenus	*marginatus*	SIMON	.	.	SMNK	te f	
Paradossenus	*longipes*	(TACZANOWSKI)	.	.	MCTP		
Rhoicinus	*urucu*	BRESCOVIT & OLIVEIRA	.	.	MCN, UA		
Trechalea	*amazonica*	F.O. P. CAMBRIDGE	.	.	INPA, MCN	te	no
Trechalea	*macconnelli*	POCOCK	.	.	INPA, SMNK	ge te	no
Uloboridae							
Miagrammopes	sp. 1	.	.	.	SMNK	lu be	no
Miagrammopes	sp. 2	.	.	.	SMNK	ge lu	no
Miagrammopes (Mumaia)	sp.	.	.	.	INPA, SMNK	lu	di
Philoponella	sp.1	.	.	.	MCN	m	
Philoponella	*vittata*	(SIMON)	.	.	SMNK	m	
Uloborus	sp.	.	.	.	MCN, SMNK		
Zosis	aff. *peruvianus*	.	.	.	SMNK	lu	no
Zosis	*geniculatus*	(OLIVER)	.	.	INPA, SMNK	ld	di
Zodariidae							
Tenedos	n.sp. 1	.	+	.	MCN, IBSP	qu ge pf ld	no
Tenedos	n.sp. 2	.	+	.	MCN, IBSP	qu ge pf ld	no
Zoridae							
Odo	sp.	.	+	.	IBSP on loan	te	

Table 2. Number of individuals and species collected by different methods (sampling intensity = ratio of individuals to species; all = all specimens including juveniles).

method	ground-eclectors	trunk funnel traps	pitfall traps	litter quadrat sampling	canopy fogging	Coddington's protocol	visual search in lower strata
nr. of traps/ samples	5 traps	3 traps	30 traps	20 samples	20 funnels	11 samples	> 100 excursions
time run/nr. of sampling events	12 months 1x	17 months 1x	4 weeks 1x	5x	2 trees 3x	1 day + 1 night	5 years intensive 20 years records
sampling intensity all / only adults	10.9 / 6.7	22.4 / 10.0	5.8 / 5.5	3.1 /-	2.9 / 1.6	3.2 / 3.4	66
all individuals	1649	3941	302	124	235	266	.
only adults	626	1503	177		81	88	appr. 2000
nr. of species observed (all)	136	178	52	40	80	82	.
nr. of species observed (adults)	93	152	32	32	50	26	appr. 300
nr. of species estimated (adults):							
Jackknife 1	135.4	214	.	.	.	40.5	.
Chao 2	175.6	342	.	.	.	42	.

3.2 Assemblage structure and guilds

Salticidae heavily dominated the samples from the ground eclectors (56 % of individuals and 23 % of species). All other families had less than 10 % of the individuals (tab. 3). Salticids were also abundant and species rich on the tree trunks with 21 % of individuals and 20 % of species (tab. 4).

Even in the continuously over one year run traps few species have been collected in high abundances and many species with few or even one specimen. A probably undescribed salticid species dominated the total capture of the three trunk funnels with >16 % (Saiteae gen. E sp.), an undescribed species of *Gephyroctenus* (Ctenidae) accounted for 7 % and adults of the the corinnid *Tupirinna rosae* BONALDO for 4 % of all individuals captured by this method. In ground eclectors the most abundant species was also an undescribed pluridentate salticid with 8 % (only adults), followed by a fissidentate salticid with 5 % (only adults) of all individuals. Four species of the genus *Ctenus* at least visually dominated the ground surface (GASNIER 1996, HÖFER et al. 1994b).

Most of the species captured and recorded on the ground were at least occasionally also captured in the trunk funnels. Not at last by fleeing from the frequent hunting raids of army ants (*Eciton burchelli*, *Labidus praedator*)(GASNIER et al. 1995, VIEIRA & HÖFER 1994) many spiders move actively to the trunk region of the trees. Although there are certainly real trunk inhabiting species in many families (e.g. *Alpaida septemmammata* and *Alpaida tabula* in Araneidae, *Gephyroctenus* sp. in Ctenidae, Corinnidae spp., Salticidae spp.), in our matrix only Selenopidae are marked as exclusively to be found on trunks.

Table 3. Structure of the ground spider assemblage sampled by ground eclectors.

Family	Ind.	% of all	Species	% of species
Salticidae	905	56.2	27	23.3
Corinnidae	86	5.3	6	5.2
Pholcidae	76	4.7	5	4.3
Oonopidae	55	3.4	10	8.6
Ctenidae	53	3.3	3	2.6
Araneidae	53	3.3	5	4.3
Mygalomorphae	48	3.0	12	10.3
Zodariidae	38	2.4	1	0.9
Theridiidae	34	2.1	9	7.8
Gnaphosidae	29	1.8	2	1.7
Linyphiidae	29	1.8	1	0.9
Ochyroceratidae	25	1.6	3	2.6
Sparassidae	25	1.6	2	1.7
Pisauridae	13	0.8	1	0.9
Theridiosomatidae	13	0.8	2	1.7
Thomisidae	13	0.8	2	1.7
Scytodidae	12	0.7	2	1.7
Oxyopidae	11	0.7	1	0.9
Palpimanidae	6	0.4	1	0.9
Symphytognathidae	6	0.4	1	0.9
Caponiidae	5	0.3	2	1.7
Mysmenidae	5	0.3	2	1.7
Anapidae	2	0.1	1	0.9
Anyphaenidae	2	0.1	2	1.7
Lycosidae	2	0.1	2	1.7
Senoculidae	2	0.1	1	0.9
Uloboridae	2	0.1	2	1.7
Selenopidae	1	0.1	1	0.9

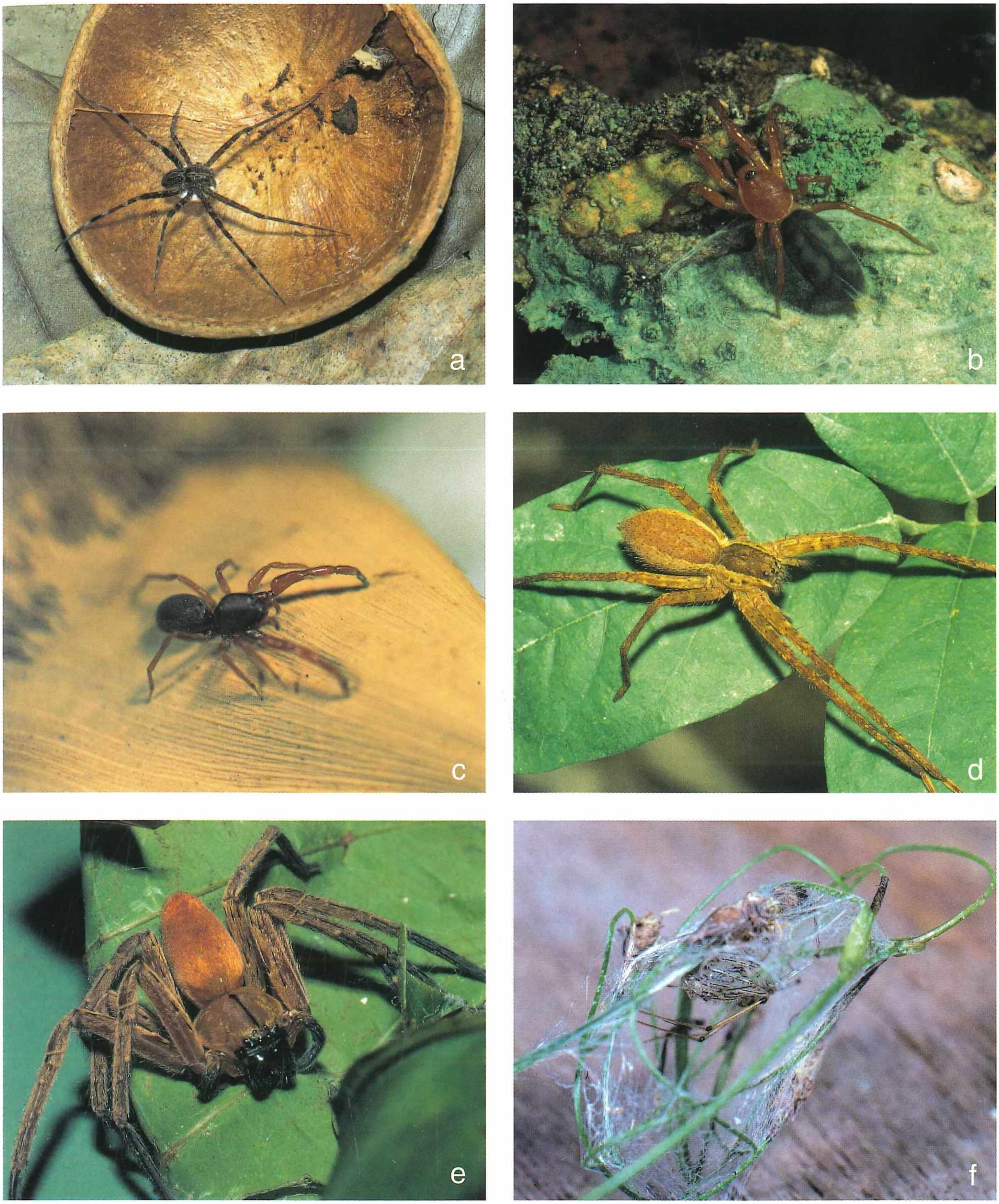

Plate 1. a) *Thaumasia* sp. (Pisauridae), a representative of the ”ground ambusher” guild.
b) *Nops* sp. (Caponiidae), a representative of the ”litter stalker” guild.
c) *Otiothops hoeferi* (Palpimanidae), another representative of the ”litter stalker” guild.
d) *Cupiennius celerrimus* (Ctenidae), a ”nocturnal aerial ambusher”.
e) *Olios* sp. (Sparassidae), another representative of the ”nocturnal aerial ambusher” guild.
f) *Scytodes* sp. (Scytodidae), a spitting spider in its retreat. These spiders hunt stalking around and were included in the guild of "nocturnal aerial runners".

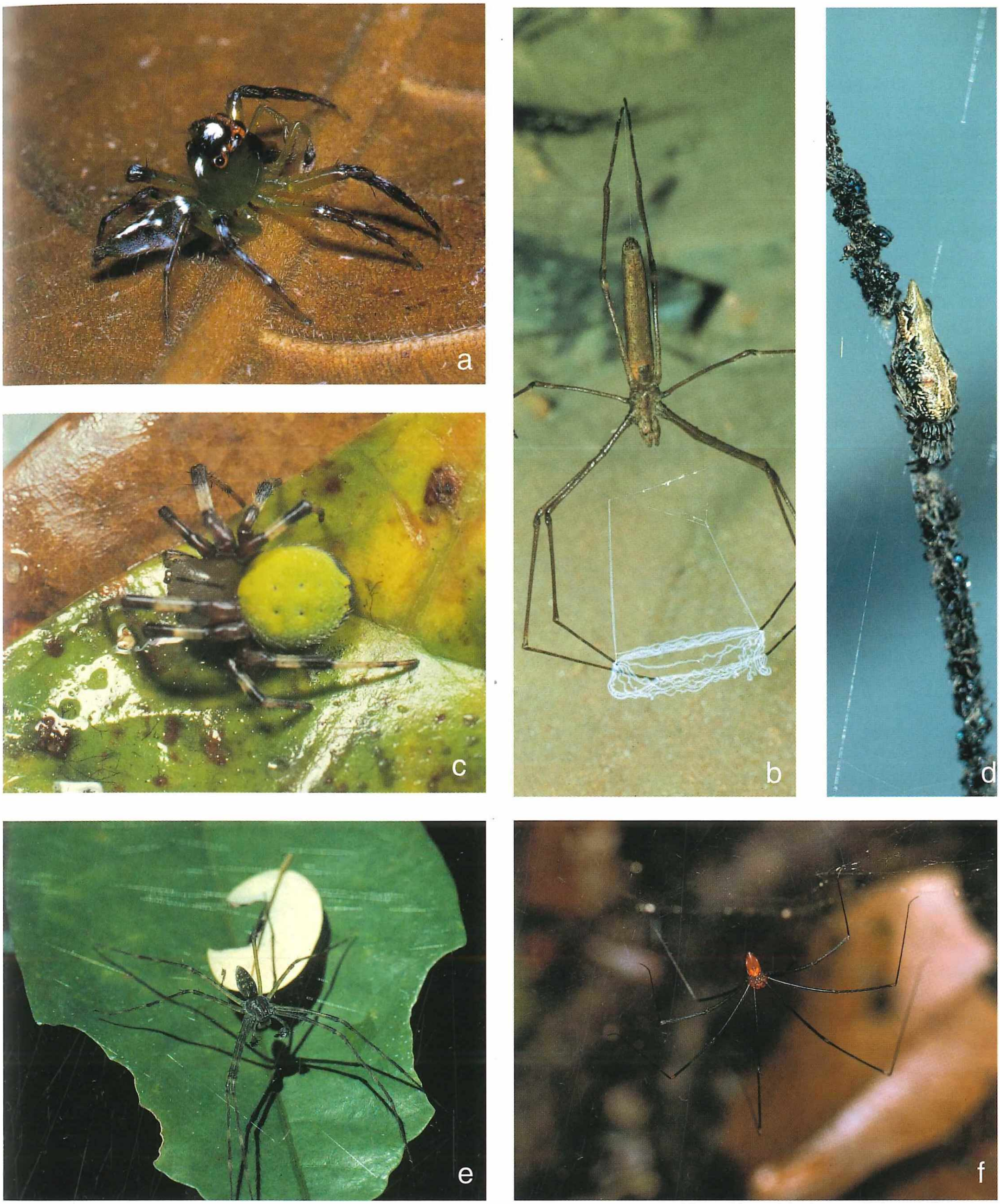

Plate 2. a) *Noegus* sp. (Salticidae), a representative of the "nocturnal aerial runner" guild.
b) *Deinopis* sp. (Deinopidae), although phylogenetically considered orb-weavers, these spiders hunt by using a very special casting net held by the forelegs; they belong to the "nocturnal ground weaver" guild.
c) *Dubiepeira dubitata* (Soares & Camargo) (Araneidae), an "aerial orb weaver".
d) *Cyclosa* sp., another "aerial orb weaver".
e) *Architis* sp. (Pisauridae), a representative of the "sedentary sheet weavers".
f) *Mesabolivar aurantiacus* (Mello-Leitão) (Pholcidae), a "sedentary sheet weaver".

3.2.1 Ecological characterization of the families

For many families we followed the characterization of UETZ et al. (1999), because it reflects common arachnological knowledge and we had no differing observations from the tropical species (tab. 5). In some cases, however, characterization of a family is totally different, due to the representation of the family by a single species or genus with a different natural history, e.g. *Aglaoctenus* for Lycosidae and *Architis* for Pisauridae, both web-building representatives of families with no web-building species in temperate regions. For the same reason two families were splitted in their ecological characterization (Dipluridae and Pisauridae; tab. 5).

Table 4. Structure of the trunk spider assemblage sampled by trunk funnel traps.

Family	Ind.	% of all	species	% of species
Salticidae	836	21.2	38	25.3
Idiopidae	539	13.7	1	0.7
Corinnidae	505	12.8	18	12.0
Ctenidae	427	10.8	8	5.3
Pisauridae	365	9.3	5	3.3
Oonopidae	255	6.5	5	3.3
Pholcidae	251	6.4	4	2.7
Gnaphosidae	84	2.1	5	3.3
Sparassidae	84	2.1	5	3.3
Dipluridae	61	1.5	2	1.3
Mimetidae	55	1.4	1	0.7
Segestriidae	53	1.3	1	0.7
Scytodidae	48	1.2	2	1.3
Selenopidae	48	1.2	1	0.7
Theridiidae	45	1.1	8	5.3
Ochyroceratidae	43	1.1	2	1.3
Caponiidae	42	1.1	2	1.3
Anyphaenidae	36	0.9	8	5.3
Liocranidae	31	0.8	1	0.7
Araneidae	23	0.6	7	4.7
Palpimanidae	13	0.3	1	0.7
Deinopidae	11	0.3	1	0.7
Hersiliidae	10	0.2	1	0.7
Theraphosidae	9	0.2	2	1.3
Thomisidae	8	0.2	5	3.3
Trechaleidae	7	0.2	2	1.3
Linyphiidae	6	0.1	1	0.7
Miturgidae	3	0.1	1	0.7
Oxyopidae	3	0.1	1	0.7
Mygalomorphae	3	0.1	3	2.0
Senoculidae	2	0.05	1	0.7
Uloboridae	2	0.05	2	1.3
Zoridae	2	0.05	1	0.7
Hahniidae	1	0.03	1	0.7
Theridiosomatidae	1	0.03	1	0.7
Zodariidae	1	0.03	1	0.7
Lycosidae	1	0.03	1	0.7
Anapidae	1	0.03	1	0.7

Our tropical assemblage includes spiders in 34 families not occuring in North America and thus not included in UETZ et al.'s analysis. This was one of the main reasons to repeat their analysis with our database. Characterization of these families was based primarily on own observations and the representation of the species in our ground, trunk and canopy samples, completed by the rather scarce informations in the literature on tropical spiders (SILVA & CODDINGTON 1996). For many species we had enough observations on presence in different strata, activity or hunting manner to classify their families: Anyphaenidae (pers. obs. ADB), Ctenidae (part. *Ctenus*: GASNIER 1996, GASNIER & HÖFER 2001, HÖFER et al. 1994b; and *Phoneutria*: TORRES-SANCHEZ 2000), Dipluridae, Paratropididae and Pholcidae (pers. obs. HH), Pisauridae (AZEVEDO 2000, HÖFER & BRESCOVIT 2000) and Trechaleidae (pers. obs.). However, for many other families we still know very few on their natural history, but deduced informations from their representation in the different traps (Caponiidae, Corinnidae, Ochyroceratidae, Oonopidae, Palpimanidae, Scytodidae, Zodariidae). Other representatives were so rare in traps and never observed alive, that classification has to be regarded as provisional (most mygalomorphs, Gnaphosidae, Miturgidae, Prodidomidae, Symphytognathidae, Tetrablemmidae, Titanoecidae). In the very diverse and well known families Araneidae, Salticidae and Theridiidae and the surprisingly diverse and abundant family Corinnidae an ecological classification is a rather problematic generalization, which certainly does not reflect the diverse natural history strategies of the species included. The family Ctenidae includes real ground spiders like *Ctenus* and *Centroctenus*, the last one living in burrows, but also species living on trunks, twigs and branches like *Enoploctenus*, *Gephyroctenus* and on foliage like *Cupiennius* and juvenile *Phoneutria*. It was therefore difficult to decide wether this family should be splitted or treated as a whole (which we did), due to their uniform hunting manner.
Based on our observations at night we consider most of the species of the tropical assemblage nocturnal, but we are aware of the lack of data on diel activity of spiders.

3.2.2 Guild classification analysis

Summarizing the dendrogram in figure 1 we propose 12 guilds for the tropical spider assemblage. The cluster analysis shows a clear separation in hunting and web-building spiders. Within the hunters ground living spiders are separated from spiders hunting in the vegetation above ground. Within the ground hunters a first guild is herein called "ground ambushers" and includes sedentary spiders, e.g. the burrowing mygalomorphs (Actinopodidae, Barychelidae, Ctenizidae, Idiopidae, Nemesiidae) and spiders with frequent site changes like pisaurids of the genera *Ancylometes* and *Thaumasia* (Plate 1 a), all being nocturnal hunters.

Table 5. Matrix for the cluster analysis of spider guilds. web use: 0-none, 1-hunt on web, 2-hunt off web; plant use: 0-none, 1-on foliage, 2-between plants ; site tenacity: 0-sedentary, 1-frequent site change, 2-mobile; other columns: 0 - absence and 1 - presence of ecological characteristic.

				web type			hunting manner			stratum							
Family	**included genera**	web	web use	sheet	space	orb	ambush	stalk	pursue	burrow	ground	trunk	vegetation	plant use	site tenacity	diurnal	nocturnal
Actinopodidae	*Actinopus*	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1
Anapidae	*Anapis, Pseudanapis*	1	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0
Anyphaenidae	various	0	0	0	0	0	0	0	1	0	0	1	1	1	2	0	1
Araneidae	many	1	1	0	0	1	0	0	0	0	1	1	1	2	1	1	1
Barychelidae	*Strophaeus*	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1
Caponiidae	*Nops*	0	0	0	0	0	0	1	0	0	1	1	0	0	2	0	1
Clubionidae	*Clubiona, Elaver*	0	0	0	0	0	0	0	1	0	0	1	1	1	2	0	1
Corinnidae	various	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
Ctenidae	various	0	0	0	0	0	1	0	0	0	1	1	1	1	1	0	1
Ctenizidae	*Ummidia*	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1
Cyrtaucheniidae	various	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1
Deinopidae	*Deinopis*	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1
Dictynidae	*Dictyna, Thallumetus*	1	1	0	1	0	0	0	0	0	0	0	1	1	0	1	0
Dipluridae 1	*Masteria*	0	0	0	0	0	0	1	0	0	1	1	0	0	2	0	1
Dipluridae 2	*Diplura, Linothele*	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	1
Gnaphosidae	various	0	0	0	0	0	0	0	1	0	1	1	0	0	2	0	1
Hahniidae	gen.?	1	2	1	0	0	0	0	0	0	1	0	0	0	1	0	1
Hersiliidae	*Tama*	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	1
Idiopidae	*Idiops*	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1
Linyphiidae	various	1	2	0	1	0	0	0	0	0	1	1	0	0	1	1	0
Liocranidae	*Orthobula*	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0
Lycosidae	*Aglaoctenus*	1	1	1	0	0	0	0	0	0	0	0	1	2	0	1	0
Microstigmatidae	n.gen.	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0	1
Mimetidae	various	0	0	0	0	0	0	1	0	0	0	1	1	1	2	1	1
Miturgidae	*Teminius*	0	0	0	0	0	0	0	1	0	1	0	0	0	2	1	0
Mysmenidae	*Microdipoena, Mysmenopsis*	1	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0
Nemesiidae	*Neodiplothele*	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Ochyroceratidae	various	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1
Oonopidae	various	0	0	0	0	0	0	1	0	0	1	1	0	0	2	0	1
Oxyopidae	various	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	0
Palpimanidae	*Fernandezina, Otiothops*	0	0	0	0	0	0	1	0	0	1	1	0	0	2	0	1
Paratropididae	*Paratropis*	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1
Philodromidae	*Paracleocnemis*	0	0	0	0	0	1	0	0	0	0	0	1	1	2	1	0
Pholcidae	various	1	1	1	0	0	0	0	0	0	1	1	1	1	0	1	0
Pisauridae 1	*Ancylometes, Thaumasia*	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	1

Pisauridae 2	*Architis, Staberius*	1	1	1	0	0	0	0	0	0	0	1	1	1	0	1	0
Prodidomidae	*Lygromma*	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	1
Salticidae	many	0	0	0	0	0	0	1	0	0	1	1	1	1	2	1	1
Scytodidae	*Scytodes*	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0
Segestriidae	*Ariadna*	0	0	0	0	0	0	0	1	0	0	1	1	1	2	0	1
Selenopidae	*Selenops*	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	1
Senoculidae	*Senoculus*	0	0	0	0	0	1	0	0	0	0	0	1	1	2	0	1
Sparassidae	various	0	0	0	0	0	1	0	0	0	1	1	1	1	2	0	1
Symphytognathidae	*Anapistula, Symphytognatha*	1	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0
Synotaxidae	*Synotaxus*	1	1	0	1	0	0	0	0	0	0	0	1	1	1	1	0
Tetrablemmidae	*Monoblemma*	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1
Tetragnathidae	various	1	1	0	0	1	0	0	0	0	0	0	1	2	0	1	0
Theraphosidae	various	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	1
Theridiidae	many	1	1	0	1	0	0	0	0	0	1	1	1	1	1	1	0
Theridiosomatidae	various	1	1	0	0	1	0	0	0	0	1	0	1	2	1	1	0
Thomisidae	various	0	0	0	0	0	1	0	0	0	1	1	1	1	2	1	0
Titanoecidae	*Goeldia*	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	1
Trechaleidae	*Trechalea, Dossenus*	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1
Uloboridae	various	1	1	0	0	1	0	0	0	0	0	0	1	2	1	1	0
Zodariidae	*Tenedos*	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	1

The abundant species of *Ctenus* also should belong here. Within this guild only theraphosids include a few species living in the vegetation (*Avicularia*) and Idiopidae (*Idiops* sp.) living on trunks.

The second large cluster is characterized by a more active hunting behavior, the spiders are stalkers and runners, which pursue their prey. The typical litter inhabiting spiders belong here and are further subdivided by diel activity. The nocturnal cluster includes a guild characterized by a sedentary lifestyle, the "sedentary nocturnal ground hunters" (tiny Tetrablemmids, small Cyrtauchenids and one species of *Paratropis*), and a cluster formed by spiders with frequent site changes, splitted into a guild characterized by hunting by pursuing, the "nocturnal ground runners" (Gnaphosidae, Prodidomidae, Zodariidae), and a guild of "litter stalkers" *(Masteria*, Caponiidae – plate 1b, Microstigmatidae, Oonopidae, Palpimanidae – plate 1c). Miturgidae and Liocranidae are considered the only ground living diurnal spiders forming the guild "diurnal ground runners", but some Castianeirinae and Corinninae might also belong here.

Within the hunters in the vegetation above ground (aerial) a separation by the activity period of the day creates a small cluster called the guild of "diurnal aerial hunters" with the ambushing Philodromidae and the more active Oxyopidae. The larger cluster of nocturnal foliage hunters is further subdivided in the guild of "nocturnal aerial ambushers" including some species of Ctenidae (plate 1 d), Hersiliidae, Selenopidae, Senoculidae, Sparassidae (plate 1 e) and Trechaleidae and the guild of "nocturnal aerial runners" formed by the stalkers and pursuers of Anyphaenidae, Corinnidae, Mimetidae, Scytodidae (plate 1 f) and Salticidae (plate 2 a). The position of Thomisidae, which were considered diurnal, ambushing on the ground as well as on trunks and on foliage is uncertain within the large cluster.

The large web-building spider cluster is also further subdivided into mainly ground living spiders and spiders building their webs in the vegetation (aerial webs). Ground web-builders are mostly nocturnal with different kinds of webs forming the guild "nocturnal ground weavers" (*Deinopis* (plate 2 b), Dipluridae, Hahniidae, Ochyroceratidae, Titanoecidae); and the guild of "diurnal ground orb weavers" (Anapidae, Linyphiidae, Mysmenidae, Symphytognathidae). Within the web builders in vegetation the typical orb-weavers (Araneidae (plate 2 c,d), Tetragnathidae, Theridiosomatidae, Uloboridae) form a guild "aerial orb weavers"; *Aglaoctenus* (Lycosidae), *Architis* (Pisauridae; plate 2 e) and the pholcids (plate 2 f) the guild "sedentary sheet weavers" and Dictynidae, Linyphiidae, Synotaxidae and Theridiidae the guild "aerial space web builders", both guilds considered to be predominantly diurnal.

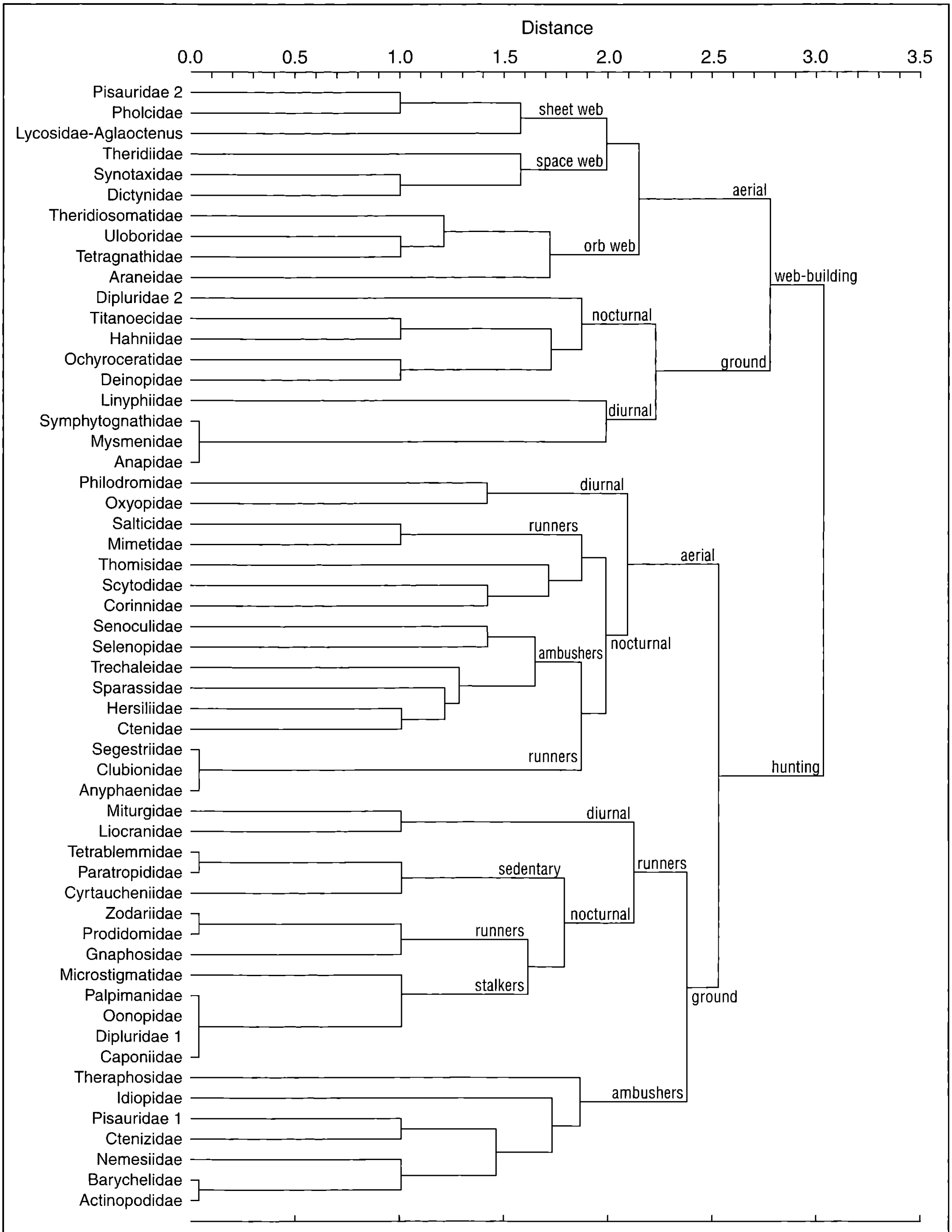

Figure 1. Guild classification dendrogram for 53 spider families resulting from a cluster analysis of the matrix in table 5 by the unweighted pair-group average method.

4. Discussion

As pointed out by CODDINGTON et al. (1991), COLWELL & CODDINGTON (1994) and TOTI et al. (2000) we need quick and accurate sampling protocols and species richness estimators to evaluate species numbers in natural and disturbed areas to be able to evaluate and hopefully decrease species losses. Many estimators have been developed and proposed in the last years, and been tested with a few theoretic and real data sets (COLWELL & CODDINGTON 1994, TOTI et al. 2000). However, even in well known North-American faunas, for which identification of at least adults is possible, a final evaluation of the performance of the estimators is difficult, because the observed species accumulation curves do not reach asymptotes, which means that the actual species number of a site is rarely known. This is especially true for tropical faunas, where many species are not at all or not adequately described and even adults cannot be easily identified. Consequently comparisons and calculations are done on morphospecies level, which is a very labour intensive task when the number of samples increases. Without character matrices or drawings the comparison of samples from different researchers in different collections is impossible and this hinders evaluation of beta and gamma diversity. Therefore we started joint effort in building a database of Amazonian spiders based on our species list from Reserva Ducke which will be amplified to central Amazonian spiders.

The low richness estimates, even from the methods with high sampling intensity show the method dependence of the results. Our sampling with CODDINGTON's protocol which should overcome this problem on the other hand was not sufficient. Method dependent species numbers are not only caused by unsatisfiable efficiency of the method itself, but also by the restricted occurence of many species in different strata or microhabitats. Our personal estimate for the spider assemblage of the studied area (10 hectars) is 550 - 600 species.

Species-to-genera-ratios from our trap samples are relatively high when compared with North American spider fauna (CODDINGTON et al. 1996, EDWARDS 1993), where they were below 1.6 for single collection sets and only reached values above 2.0 for larger areas. The total number of species, so far recorded from the tropical site Reserva Ducke is higher than in temperate spider assemblages in North America (hardwood forest: 89 species – CODDINGTON et al. 1996) and Europe (beech forest: 95 species, DUMPERT & PLATEN 1985, spruce forest: 76 species – HÖFER 1989), which is not surprising. It is within the range of the few comparably sampled Neotropical sites: Cóndor montane forest: 228 species (SILVA 1992), Pakitza: 324 (one forest type), 498 species (several forest types)(SILVA & CODDINGTON 1996), Cuzco Amazonico (probably two forest types) approximately 440 species (SILVA 1996), Samiria inundation forest 1140 morphospecies (SILVA 1996), all in Peru. Our own collections of spiders with CODDINGTON's sampling protocol in Bolivian lowland forest islands in savanna (3 days and nights) resulted in 189 morphospecies (HÖFER & BRESCOVIT 1994). Trap sampling in an Amazonian inundation forest resulted in 210 species (HÖFER 1997).

Distribution of species among families is rather similar compared to other Neotropical assemblages (HÖFER 1997, SILVA 1996).

As was already pointed out by several authors (CODDINGTON et al. 1996, EDWARDS 1993) each method is sampling a different array of species and not one can be used as a single universal sampling method for species estimation. Sampling protocols, like the one proposed by CODDINGTON et al. (1991) are recommendable, especially when completed by methods accessing the species rich litter fauna. They are better suited for species estimation because they produce a high number of single samples, but the necessary effort in the field for a suitable number of samples is high, and if not repeated, gives only a snapshot of the species richness. Continously run traps may overcome this weakness and sample also more seasonally restricted species, but have other restrictions. Trunk funnel traps showed the highest species capture in the studied tropical assemblage and have a relatively high portion of adults, which facilitates identification. In combination with litter samples and ground eclector samples they would give a good base for the real species richness of an area which can be visited repeatedly over a longer period. However the cross-comparison of all morpho-species between all single samples of these traps is especially difficult and labour intensive for tropical faunas.

The dominance of the active salticid hunters and the hunting spiders in general (80 % of all individuals in ground eclectors and 92 % in trunk funnel traps) is certainly biased by the activity dependence of these two trap types, but is also a characteristic of tropical spider assemblages (JOCQUÉ 1984), mainly resulting from the rarity of the species rich and abundant linyphiids in temperate forests.

Guild classification not surprisingly resembles much the one found by UETZ et al. (1999) with the most distinctive ecological characteristic of web use, however followed by a second classification step into ground living spiders and spiders active in higher strata (called aerial spiders), which was not so obvious in UETZ et al's analysis of the North American assemblage. The classification in ground and aerial spiders however appeared strongly in the tratement of another North American spider assemblage (CODDINGTON et al. 1996) and is certainly pushed by the separation of ground and aerial sampling methods. Further subdivisions of the hunting spider cluster as well as the web-

building spider cluster appeared through differences in foraging manner and diel activity. Many spiders in Amazonian terra firme forests were observed to be nocturnal, a supposed effect of the high diurnal predation pressure (CODDINGTON et al.1996). This hypothesis is also strengthened by our observations on other visual predation preventing strategies like ant mimikry, mimetic form and colour of the body and the frequence of retraites and burrows (HÖFER & BECK 1996), together with the already recognized immense diversity of diurnal predators like lizards and understorey birds in these tropical habitats (see GENTRY 1990).
Due to the higher diversity of the tropical assemblage, becoming obvious in the higher number of families put in the analysis, more than the 6 - 8 clusters of UETZ et al. (1999) seam reasonable at this time. Additional guilds are defined by the main stratum and the diel activity, both characters supposed to be of importance for the use of the prey resources. There is no doubt that the allocation of some families has still to be confirmed or changed, due to the lack of knowledge of their natural history or due to the diversity of lifestyles represented by the different species. The latter is the case in ctenids which are inside the foliage cluster due to the fact that at least the *Phoneutria* species live most of their time in the vegetation. However the most abundant representatives, the *Ctenus* species are characteristic ground living spiders. The family could equally well be included in the ground ambusher guild or be splitted. The usefulness and applicability of our guild classification for studies of tropical spider assemblages has now to be tested.

Acknowledgements
We are especially grateful to Prof. Dr. LUDWIG BECK, to whom we dedicate this publication for sustaining our scientific work during all the years of this study. He, himself has studied the ecology of Arachnids in the Reserva Ducke in 1965/66. We thank all taxonomists who identified spiders for us or gave taxonomic advice, namely A. BONALDO, E. BUCKUP, M. E. GALIANO, P. GOLOBOFF, P. LEHTINEN, H. W. LEVI, A. A. LISE, H. METZNER, R. OTT and N. PLATNICK. The Instituto Nacional de Pesquisas da Amazônia (INPA) kindly gave the permission to enter and work in the reserve and loaned the material to us. The German Science Foundation (DFG), the Brazilian Research Council (CNPq) and the von-KETTNER-foundation, Karlsruhe financed the studies. We thank our colleagues Dr. A. BONALDO, Dr. T GASNIER, Dr. W. HANAGARTH and Dr. H. JAPYASSÚ for valuable comments on the manuscript.

5. Literature

APOLINÁRIO, F. B. (1993): Composição faunística e hábitos de nidificação de térmitas (Insecta: Isoptera) em floresta de terra firme da Amazônia Central. – 72 pp.; Master thesis, INPA/FUA, Manaus.

AZEVEDO, C. S. de (2000): Ecologia de *Ancylometes gigas* (PICKARD-CAMBRIDGE, 1897) (Araneae: Pisauridae), uma aranha errante que vive próximo a corpos de água em uma floresta tropical úmida. – 44 pp.; Master thesis, INPA/FUA, Manaus.

BECK, L. (1971): Bodenzoologische Gliederung und Charakterisierung des amazonischen Regenwaldes. – Amazoniana, **3**: 69-132.

CODDINGTON, J., GRISWOLD, C. E., SILVA DÁVILA, D., PENARANDA, E. & LARCHER, S. F. (1991): Designing and testing sampling protocols to estimate biodiversity in tropical ecosystems. – In: DUDLEY, E. C. (ed.): Proceedings of the Fourth International Congress of Systematic and Evolutionary Biology: 44-60; Portland, OR (Dioscorides Press).

CODDINGTON, J. A., YOUNG, L. H. & COYLE, F. A. (1996): Estimating spider species richness in a Southern Appalachian cove hardwood forest. – J. Arachnol., **24**:11-128.

COLWELL, R. K. & CODDINGTON, J. A. (1994): Estimating terrestrial biodiversity through extrapolation. – Phil. Trans. Royal Soc. (Ser. B), **345**: 101-118.

DUMPERT, K. & PLATEN, R. (1985): Zur Biologie eines Buchenwaldbodens 4. Die Spinnenfauna. – Carolinea, **42**: 75-106.

EDWARDS, R. L. (1993): Can the species richness of spiders be determined. – Psyche, **100**: 185-208.

GASNIER, T R. (1996): Ecologia comparada de quatro espécies de aranhas do gênero *Ctenus* (Walckenaer)(Araneae, Ctenidae) em uma floresta na Amazônia Central: bases para um modelo integrado de coexistência. 76 pp., Ph.D. thesis, INPA/FUA, Manaus.

GASNIER, T R., HÖFER, H. (2001): Patterns of abundance of four species of wandering spiders (Ctenidae: *Ctenus*) in a forest in central Amazonia. – J. Arachnol., **29**: 95-103.

GASNIER, T R., HÖFER, H. & BRESCOVIT, A. D. (1995): Factors affecting the „activity-density" of spiders on tree trunks in an Amazonian rainforest. – Ecotropica, **1** (2): 69-77.

GENTRY, A. H. (1990): Four Neotropical rainforests. – New Haven, London (Yale University Press).

HARADA, A. Y & ADIS, J. (1997): The ant fauna of tree canopies in Central Amazonia: a first assessment. – In: STORK, N. E., ADIS, J., and DIDHAM, R. K. (eds): Canopy arthropods: 382-400; London (Chapman & Hall).

HERO, J. - M. (1990): An illustrated key to tadpoles occuring in the Central Amazon rainforest, Manaus, Amazonas, Brasil. – Amazoniana, **11**(2): 201-262.

HÖFER, H. (1989): Beiträge zur Wirbellosenfauna der Ulmer Region: I. Spinnen (Arachnida: Araneae). – Mitt. Ver. Naturwiss. Math. Ulm/Donau, **35**: 157-176.

HÖFER, H. (1990): The spider community (Araneae) of a Central Amazonian blackwater inundation forest (Igapó). – Acta Zool. Fennica, **190**: 173-179.

HÖFER, H. (1997): The spider communities. – In: JUNK, W. J. (ed.): The central Amazonian river floodplains. Ecology of a pulsing system. Ecological Studies, **126**: 373-383; Berlin (Springer-Verlag).

HÖFER, H. & BECK, L. (1995): Die Spinnentierfauna des Regenwaldreservats "Reserva Ducke" in Zentralamazonien I. – Natur und Museum, **125** (12): 389-401.

HÖFER, H. & BECK, L. (1996): Die Spinnentierfauna des Regenwaldreservats "Reserva Ducke" in Zentralamazonien II. – Natur und Museum, **126** (3): 69-85.

HÖFER, H. & BRESCOVIT, A. D. (1994): Ergebnisse der Bolivien-Expedition des Staatlichen Museums für Naturkunde Karlsruhe: Spinnen (Araneae). – Andrias, **13**: 99-112.

HÖFER, H. & BRESCOVIT, A. D. (2000): A revision of the Neotropical spider genus *Ancylometes* BERTKAU (Araneae: Pisauridae). Insect Systematics & Evolution, **31**: 323-360.

HÖFER, H., BRESCOVIT, A. D., ADIS, J. & PAARMANN, W. (1994a): The spider fauna of Neotropical tree canopies in Central Amazonia. First Results. – Stud. Neotrop. Fauna Environm., **29** (1):23-32.

HÖFER, H., BRESCOVIT, A. D. & GASNIER, T R. (1994b): The wandering spiders of the genus *Ctenus* (Ctenidae, Araneae) of Reserva Ducke, a rainforest reserve in central Amazonia. – Andrias, **13**: 81-98.

HÖFER, H., MARTIUS, C. & BECK, L. (1996): Decomposition in an Amazonian rain forest after experimental litter addition in small plots. – Pedobiologia, **40**: 570-576.

JAKSIĆ, E. M. & MEDEL, R. G. (1990): Objective recognition of guilds: Testing for statistically significant species clusters. – Oecologia, **82**: 87-92.

JOCQUÉ, R. (1984): Considerations concernant l'abondance relative des araignées errantes et des araignées à toile vivant au niveau du sol. – Revue Arachnol., **5** (4):193-204.

LOURENÇO, W. R. (1998): Synopsis of the Scorpion fauna of the Manaus region, Amazonas State, Brazil, with description of two new species. – Amazoniana, **10**(3): 327-338.

MAHNERT, V. & ADIS, J. (1985): On the occurence and habitat of pseudoscorpions (Arachnida) from Amazonian forest of Brazil. – Stud. Neotrop. Fauna Environm., **20**: 211-215.

PENNY, N. D. & ARIAS, J. R. (1982): Insects of an Amazon forest. – 269 pp.; New York (Colombia University Press).

RIBEIRO, J. E. L. da S., HOPKINS, M. J. G., VICENTINI, A., SOTHERS, C. A., COSTA, M. A. da S., BRITO, J. M. de, SOUZA, M. A. D. de, MARTINS, L. H. P., LOHMANN, L. G., ASSUNCÃO, P. A. C. L., PEREIRA, E. da C., SILVA, C. F. da, MESQUITA, M. R. & PROCÓPIA, L. C. (1999): Flora da Reserva Ducke: Guia de identificação das plantas vasculares de uma floresta de terra-firme na Amazônia Central. – 816 pp.; Manaus (INPA, DFID).

SILVA, D. (1992): Observations on the diversity and distribution of the spiders of Peruvian montane forests. – Mem. Mus. Hist. Nat. U.N.M.S.M. (Lima), **21**: 31-37.

SILVA, D. (1996): Species composition and community structure of peruvian rainforest spiders: a case study from a seasonally inundated forest along the Samiria river. – Rev. Suisse Zool., Vol. hors serie: 597-610.

SILVA, D. & CODDINGTON, J. A. (1996): Spiders of Pakitza (Madre de Dios, Perú): Species richness and notes on community structure. – In: WILSON, D. E. & SANDOVAL, A. (eds.): Manu. The Biodiversity of Southeastern Peru: 253-311; Washington (Smithsonian Institution).

SUNDERLAND, K. D. & GREENSTONE, M. H. (1999): Summary and future directions for research on spiders in agroecosystems. – J. Arachnol., **27**: 397-400.

TORRES-SANCHEZ, M. P. (2000): Padrões espaciais de abundância, ciclo reprodutivo e variação de tamanho de adultos de *Phoneutria fera* PERTY e *Phoneutria reidyi* F. O. PICKARD-CAMBRIDGE (Araneae, Ctenidae) na Reserva Florestal ADOLPHO DUCKE, Amazonas, Brasil. – 89 pp.; Master thesis, INPA, UA, Manaus.

TOTI, D. S., COYLE, F. A. & MILLER, J. A. (2000): A structured inventory of Appalachian grass bald and heath bald spider assemblages and a test of species richness estimator performance. – J. Arachnol., **28**: 329-345.

UETZ, G. W., HALAJ, J. & CADY, A. B. (1999): Guild structure of spiders in major crops. – J. Arachnol., **27**: 270-280.

VIEIRA, R. S. & HÖFER, H. (1994): Prey spectrum of two army ant species in central Amazonia, with special attention on their effect on spider populations. – Andrias, **13**: 189-198.

VIEIRA, R. S. & HÖFER, H. (1998): Efeito do forrageamento de *Eciton burchelli* (Hymenoptera, Formicidae) sobre a araneofauna de liteira em uma floresta tropical de terra firme na Amazônia Central. – Acta Amazonica, **28** (3): 345-351.

WILLIS, E. O. 1977 Lista preliminar das aves da parte noroeste e áreas vizinhas da Reserva Ducke Amazonas Brasil. – Rev. Bras. Biol., **37**: 585-601.