

Myriapoda at 'Reserva Ducke', Central Amazonia/Brazil*

by

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Abstract

Myriapoda contains the four recent classes Chilopoda, Diplopoda, Paurpoda and Symphyla. In total, 159 families, 2166 genera and >15162 species are known world-wide. Twenty-nine families, >93 genera and >401 described species occur in Amazonia. One-fifth of the families presently known in the myriapods are represented in Amazonia. About 3% of all described species live, and at least 9% of the species estimated

*Dedicated to Prof. Dr. Harald Sioli on the occasion of his 90th anniversary.

to exist world-wide in Myriapoda are assumed to live in Amazonia. From the forest reserve 'Reserva Ducke' near Manaus, 22 families, 38 genera and 73 described species are known at present. The Chilopoda represent 5 families, 9 genera, 23 species and one undescribed morphospecies, the Diplopoda 13 families, 18 described genera, 14 species and 19 undescribed morphospecies, the Pauropoda 2 families, 7 genera, 31 species, and the Symphyla 2 families, 4 genera and 5 species. All names are listed.

Keywords: Myriapoda, diversity, Amazonia, Brazil, Neotropics.

Resumo

Myriapoda contém as quatro recentes classes Chilopoda, Diplopoda, Pauropoda e Symphyla. No total, 159 famílias, 2166 gêneros e >15162 espécies são conhecidas mundialmente. Vinte e nove famílias, >93 gêneros e >401 espécies descritas ocorrem na Amazônia. Um quinto das famílias miriápodes conhecidas atualmente é representada na Amazônia. Cerca de 3% de todas as espécies em Myriapoda descritas vivem na Amazônia, e no mínimo 9% das espécies estimadas de existirem mundialmente acredita-se viverem na Amazônia. Da reserva florestal 'Reserva Ducke' perto de Manaus existem atualmente 22 famílias, 38 gêneros e 73 espécies descritas. Os Chilopoda representam 5 famílias, 9 gêneros, 23 espécies descritas e 1 morfoespécie não-descrita, os Diplopoda 13 famílias, 18 gêneros descritos, 14 espécies e 19 morfoespécies não-descritas, os Pauropoda 2 famílias, 7 gêneros, 31 espécies, e os Symphyla 2 famílias, 4 gêneros e 5 espécies. Todos os nomes estão alistados.

Introduction

The forest reserve Reserva Florestal Adolpho Ducke ('Reserva Ducke') is part of the National Institute for Amazonian Research (INPA) at Manaus, Brazil, and one of the best studied areas of Amazonian rainforest. Located 26 km northeast of the capital of Amazônia (59°58'W, 02°54'S), it comprises 10 x 10 km. A description of its geology, soil characteristics and floristic composition is given by GENTRY (1990), PENNY & ARIAS (1982), and RIBEIRO et al. (1999). A synopsis of the insects at Reserva Ducke is found in PENNY & ARIAS (1982). Zoological species inventories have been presented e.g. for Arachnida (ADIS 2002; HÖFER & BECK 1995, 1996; HÖFER & BRES-COVIT 2001), termites (APOLINÁRIO 1993), ants (ADIS et al. 1998; HARADA & ADIS 1998), frogs (HERO 1990), and birds (WILLIS 1977). A book on the arthropod fauna of the reserve edited by INPA scientists is in preparation. The source material for this contribution on Myriapoda derives from the book 'Amazonian Arachnida and Myriapoda' (ADIS 2002).

Myriapoda contains 4 recent classes: 1. Chilopoda (centipedes), 2. Diplopoda (millipedes), 3. Pauropoda (pauropods), and 4. Symphyla (symphylans) (cf. MINELLI & GOLOVATCH 2001; PARKER 1982). These classes represent the Antennata. Members of this group are wingless terrestrial arthropods with antennae and a trunk not distinctly subdivided into thorax and abdomen. Myriapods have long been treated as a natural class of the phylum Arthropoda. The affinities of the groups among themselves and to the remaining arthropods are now being questioned due to molecular and morphological investigations (BOORE et al. 1998; FRIEDRICH & TAUTZ 1995; KRAUS & KRAUS 1994; REGIER & SHULTZ 2001).

In Myriapoda, 159 families, 2166 genera and >15162 described species are known. Since 1982, the increase in world-wide described Myriapoda species was 13% (about 110 species/year). Twenty-nine families, >93 genera and >401 described species occur in Amazonia. Data show that one-fifth of the families presently known in the myriapods are represented in the bioregion Amazonia. About 3% of all described species live, and at least 9% of the species estimated to exist world-wide in Myriapoda are assumed to

live in Amazonia (cf. ADIS 2002). From Reserva Ducke near Manaus, 22 families, 30 genera and 71 described species are known at present. Holotypes and several paratypes of new species that have been described since 1975 from Central Amazonia are housed in the Entomological Collection of INPA at Manaus, Brazil.

1. Chilopoda

The class Chilopoda contains five orders: Geophilomorpha, Lithobiomorpha, Craterostigmomorpha, Scolopendromorpha, and Scutigleromorpha. Chilopoda presently comprise 21 families, 324 genera and >3262 species world-wide. Nine families, 26 genera and >91 described species occur in Amazonia. From Reserva Ducke, 5 families, 9 genera and 22 described species are known at present.

1.1 Geophilomorpha

Geophilomorphs can be easily identified by their very elongated trunk provided with a high number of leg-bearing segments. In species from the Neotropical region this number lies between 27 and 151. The size of geophilomorphs in Central and South America ranges between 5 mm and 14 cm. Most geophilomorphs live in the soil, under stones and in litter, where sufficient humidity is guaranteed. In the Neotropics they appear to occur both in forest and in open habitats, especially in the litter and soil, with peculiar adaptations to periodically inundated forests (see MORAIS et al. 1997). Geophilomorph centipedes are usually found in the field as isolated specimens. Exceptions are represented by the females with their brood of eggs or juveniles. Geophilomorphs prey on small invertebrates, mainly those inhabiting soil and litter. All members of the order are blind and are primarily adapted for a life in dark environments, usually underground. The antennae (of 14 articles in all members of the order) perform important sensorial functions, mostly tactile and chemical. Geophilomorphs have separate sexes but, mostly, a poorly developed sexual dimorphism (see ADIS (2002) for further information).

Geophilomorpha presently comprise 14 families, 180 genera and 1100 species world-wide. Six families, 13 genera and 30 described species occur in Amazonia. The families are Ballophilidae, Geophilidae, Macronicophilidae, Mecistocephalidae, Schendylidae, and Oryidae. None of these is endemic to Amazonia but one of them, i.e. Macronicophilidae, is only known from South America. Most Amazonian species belong to the Geophilidae and the Schendylidae (the largest families in the order, both distributed world-wide) with seven and ten species respectively. At the generic level *Ribautia* and *Schendylops* are the largest with five and six Amazonian species respectively, these being two of the most speciose genera of geophilomorphs. Amazonian Geophilomorpha show a high level of endemism at the species level, with twenty-three species exclusively known from this subregion. Of these, two belong to the endemic genus *Hyphydrophilus* (Geophilidae); of the other 21 species, four belong to *Ribautia*, two to *Macronicophilus*, three to *Pectiniunguis*, six to *Schendylops*, four to *Ityphilus* and one to *Taeniolinum* (see ADIS (2002) and FODDAI et al. (2000) for identification). From Reserva Ducke, 3 families, 4 genera and 8 described species are known at present (Table 1). All taxa are 'endemic', i.e. only known from the Amazonian subregion (see ADIS 2002).

Table 1: Geophilomorpha species at Reserva Ducke.

Geophilidae

Ribautia BRÖLEMANN, 1909

1. *R. ducalis* PEREIRA, MINELLI & BARBIERI, 1995
2. *R. proxima* PEREIRA, MINELLI & BARBIERI, 1995

Schendylidae

Pectiniunguis BOLLMAN, 1889

3. *P. ducalis* PEREIRA, MINELLI & BARBIERI, 1995
- Schendylops* COOK, 1899
4. *S. continuus* (PEREIRA, MINELLI & BARBIERI, 1995)
 5. *S. oligopus* (PEREIRA, MINELLI & BARBIERI, 1995)

Ballophilidae

Ityphilus COOK, 1899

6. *I. calinus*
 7. *I. crabilli*
 8. *I. demoraisi* PEREIRA, MINELLI & BARBIERI, 1995
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Ecological publication on Geophilomorpha from Reserva Ducke

ADIS, J., MINELLI, A., DE MORAIS, J.W., PEREIRA, L.A., BARBIERI, F. & J.M.G. RODRIGUES (1996): On abundance and phenology of Geophilomorpha (Chilopoda) from central Amazonian upland forests. - *Ecotropica* 2: 165-175.

1.2 Lithobiomorpha

Lithobiomorphs are short bodied chilopods whose length very seldom exceeds 3 centimetres. As adults they have a fixed number of 15 pairs of legs while their long and attenuate antennae are formed by a variable number of articles, from 13 to more than 100. Lithobiomorphs are usually found in litter and leaf mould, but they move into logs or deeper into the soil during the cold season, at least in temperate regions. They inhabit woodlands as well as more open habitats; others are cavernicolous. Some species are also frequently found in suburban areas (see ADIS (2002) for further information).

Lithobiomorpha presently comprise 2-3 families, 95 genera and 1500 species worldwide. Representatives of 3 families have been collected from the Neotropical Region, i.e. Lithobiidae, Anopsobiidae (often treated as a subfamily of Henicopidae), and Henicopidae. Only the last one has been found in Amazonia. Two described species of the genus *Lamyctes* have been recorded from the Manaus region but not yet from Reserva Ducke: (a) *Lamyctes emarginatus* (NEWPORT, 1844) from Manaus (terra firme: in garden litter) as well as from Ilha de Marchantaria in the Rio Solimões-Amazonas (seasonal várzea); (b) *L. adisi* ZALESSKAJA, 1994 from Rio Tarumã Mirim (seasonal igapó) (see ADIS (2002) for identification).

1.3 Scolopendromorpha

Scolopendromorphs are among the commonest invertebrate predators in Amazonia. Their body length ranges from 10 mm to about 26 cm. Adults feed on nearly all groups of terrestrial invertebrates and even on some vertebrates like small lizards, frogs, mice,

etc. Being euryphagous predators, scolopendromorphs feed on other chilopods, especially the slow-moving geophilomorphs, as well as on members of other genera of Scolopendromorpha. Yet there are no unequivocal records of cannibalism. Because of their venom, scolopendromorphs are capable of killing a victim of a somewhat larger size and weight than the predator itself. Smaller, mainly eyeless scolopendromorphs are hypogean, while larger representatives are nocturnal, hiding in natural shelters during daytime.

Scolopendromorph centipedes can be divided into two main groups according to their habitats. The first group consists of nocturnal solitary hunters which usually hide under stones, logs, bark, in the canopies or in litter during daytime. These are large (up to 200-220 mm long) to medium-sized creatures (40-70 mm long); the overwhelming majority of Amazonian species belong to the genera *Rhysida*, *Scolopendra*, *Cormocephalus*, *Arthrorhabdus*, *Rhoda*, *Dinocryptops*, *Scolopocryptops* and the bulk of *Otostigmus* (*Parotostigmus*) spp. The second group includes smaller (10-40 mm long), mainly eyeless forms which are characterized by a hypogean way of life. These seem to be active all over the day in the lowest strata of litter, at the litter/soil interface, and/or in the uppermost soil, leaving their usual habitat just occasionally. On the whole, this group is represented in Amazonia by species belonging to the genera *Cryptops* and, in part, *Tidops*. The species of genus *Newportia* seem to occupy an intermediate position: about half of Amazonian *Newportia* species are typical for the second group, while the others seem to bridge the two groups. The second group appears to be poorly presented in Amazonia, where huge areas are known to be regularly flooded for several months every year (see ADIS (2002) for further information).

Scolopenromorpha presently comprise 3 families, 32 genera and 581 species worldwide. Two families, 11 genera and 57 described species occur in Amazonia. No scolopendromorph taxa of generic level is presently known as Amazonian endemic; all genera occurring in Amazonia are also present at least in other areas of the Neotropical realm. However, at the species level, six genera contain 15 species that are considered endemic in Amazonia (see ADIS (2002) for identification). From Reserva Ducke, 2 families, 5 genera, 15 described species and one undescribed morphospecies are known at present (Table 2).

1.4 Scutigermorpha

Scutigermorphs are short bodied chilopods of few centimetres length, with a fixed number of 15 pairs of legs in the adult, as in Lithobiomorpha. The antennae are very long, as are the legs, whose length increases from the anterior to the posterior pairs. The trunk is fusiform and, uniquely in the order, it is not dorso-ventrally flattened. From above only seven large terga are recognizable. Scutigermorpha have separate sexes which can be easily distinguished: the females have simply structured gonopods, the males only four anal styli without taxonomic significance (see ADIS (2002) for further information).

Scutigermorpha presently comprise 1-2 families, 16 genera and >80 species worldwide. Knowledge of the Neotropical species is very scanty and scattered. Only two described species, representing the genus *Pselliodes* CHAMBERLIN, 1921 of the family Psellioididae, occur in Amazonia. One of these, *P. guildingii* (NEWPORT, 1844), was collected at Manaus (Amazonas) but not yet at Reserva Ducke. It showed a geographical range from Central Amazonia to the mouth of the Amazon River (see ADIS (2002)

for identification).

Table 2: Scolopendromorpha species at Reserva Ducke (* = Amazonian endemic).

Scolopendridae

Otostigminae

1. *Otostigmus (Parotostigmus) muticus* KARSCH, 1888

Cryptopinae

2. *Cryptops (Cryptops) galathea* MEINERT, 1886
3. *C. (Cryptops) heathi* CHAMBERLIN, 1914
4. *C. (Cryptops) sp.*

Scolopendrinae

5. *Cormocephalus (Cormocephalus) andinus* (KRAEPELIN, 1903)
6. *Cormocephalus (Cormocephalus) brasiliensis* HUMBERT & DE SAUSSURE, 1870

Newportiidae

Newportiinae

7. * *Newportia adisi* SCHILEYKO & MINELLI, 1999
8. *N. brevipes* POCOCK, 1891
- 9a. *N. ernsti ernsti* POCOCK, 1891
- 9b. *N. ernsti fossulata* BÜCHERL, 1942
10. *N. lasia* CHAMBERLIN, 1921
11. *N. monticola* POCOCK, 1890
12. * *N. patavina* SCHILEYKO & MINELLI, 1999
13. *N. pusilla* POCOCK, 1893
14. *N. stolli* (POCOCK, 1896)
15. *N. weyrauchi weyrauchi* CHAMBERLIN, 1955

Scolopocryptopinae

16. *Tidops collaris* (KRAEPELIN, 1903)
-

2. Diplopoda

Comprising probably about 80,000 species, of which perhaps only some 11-12% have been described, Diplopoda represent one of the largest classes not only among Myriapoda but also within the entire Animal Kingdom, apparently the third greatest in terrestrial Arthropoda following the Insecta and the Arachnida. As their Latin name suggests, the bulk of body segments in millipedes have two legpairs each. None of the millipede species supports a thousand legs, the record being 750. The size of adult millipedes ranges from 2 mm to more than 30 cm. The largest species in Amazonia are several *Orthoporus*, *Gymnostreptus* and "*Rhinocricus*" species reaching a length of up to 15 cm, yet larger forms tend to occur closer to the Andean region only. Diplopoda are peaceful, mostly cryptic animals protecting themselves solely by their largely solid, calcified teguments and poisonous or repelling secretions. Millipede poison can be dangerous, especially the cyanide-containing one of Polydesmida, but there has been no

record of man falling victim to such poisoning. In Amazonia, millipedes mainly occur in forest habitats, basically the forest floor. They chiefly inhabit litter and rotting wood, often with intricate niche segregation mechanisms involving differences in body size and shape, developmental strategies, phenologies, physiologies (food preferences in particular), etc. For example, smaller flat-bodied diplopods (e.g. pyrgodesmids, glomeridesmids) tend to occur at the interface between the soil and litter as well as in thin humus in the uppermost soil and/or rotten wood, and/or under bark. Medium-sized millipede species, both flat-bodied and worm-like, or juliform, seem to prefer to live inside or upon the litter as well as in rotting wood. In contrast, larger millipedes tend to be surface-dwellers. Good climbers occur among various diplopod groups, small (like polyxenidans) as well as large (like some Platyrrhacidae or Chelodesmidae). Different developmental stages of the same species often show differing microhabitat preferences, with e.g. juveniles confined to the uppermost soil, the middle to late instars to the litter stratum, while the adults to walking upon litter or climbing on vegetation, or both (see ADIS (2002) for further information).

Diplopoda presently comprise 131 families, 1800 genera and 11000 species worldwide. Sixteen families, 55-60 genera and 250 described species occur in Amazonia (see ADIS (2002) for identification). From Reserva Ducke, 13 families, 18 described genera, 14 described species and 19 undescribed morphospecies are known at present (Table 3).

3. Pauropoda

Pauropods are the smallest myriapods, 0.5-1.5 mm long, and are progoneate, dignathous, blind, with eight to eleven leg-bearing trunk segments in the adult stage. They are divided into two orders, Hexamerocerata with a 6-segmented antennal stalk and 10-11 pairs of legs as adults, and Tetramerocerata, with a 4-segmented stalk and 8-10 pairs of legs as adults. The pauropods inhabit a variety of soil types. They are sometimes found in litter and decaying logs and several species occur also under bark and moss carpets, where darkness, humidity and temperature are suitable. Because they cannot burrow they are confined to crevices and tunnels already present. In Amazonia they have been collected in non-flooded upland (terra firme) forests, pastures as well as in seasonal inundation forests. Two species of Pauropodidae (Tetramerocerata) were observed to suck out the content of fungal hyphae. In Hexamerocerata the presence of solid food particles in the intestinal cavity, e.g. plant fragments, spores, and also setae, mouthparts, and claws from arthropods was found. The sexes are easily distinguished in subadults and adults: males have two conical penes, females a single almost concealed genital aperture. Sexual dimorphism is rare (see ADIS (2002) for further information).

Pauropoda presently comprise 5 families, 29 genera and 700 species world-wide. Two families, 8 genera and 55 described species occur in Amazonia. The majority of species have been described only very recently, their occurrence outside the Amazonian sampling sites is unknown (cf. ADIS (2002) for identification). From Reserva Ducke, 2 families, 7 genera and 31 described species are known at present (Table 4).

Table 3: Diplopoda species at Reserva Ducke (described species and undescribed morphospecies; pt = pantropical).

Polyxenida	22. <i>Penteporella</i> sp.
Lophoproctidae	23. Gen. sp. 1
1. <i>Ancistroxenus comans</i> (LOOMIS, 1934)	24. Gen. sp. 2
	25. Gen. sp. 3
Glomeridesmida	26. Gen. sp. 4
Glomeridesmidae	27. Gen. sp. 5
2. <i>Glomeridesmus</i> sp.	28. Gen. sp. 6
Polydesmida	Siphonophorida
Chelodesmidae	Siphonophoridae
3. <i>Phlyzakiium</i> sp.	29. <i>Siphonophora</i> sp.
4. Gen. sp. 1	
5. Gen. sp. 2	Spirostreptida
Cryptodesmidae	Pseudonannolenidae
6. Gen. sp.	30. <i>Epinannolene</i> sp. 2
Cyrtodesmidae	Spirostreptidae
7. <i>Agnurodesmus siolii</i> GOLOVATCH, 2001	31. Gen. sp. 1
8. <i>Cyrtodesmus</i> sp.	32. Gen. sp. 2
Fuhrmannodesmidae	Stemmiulida
9. <i>Moojenodesmus bethaniae</i> GOLOVATCH, 1992	Stemmiulidae
10. <i>M. irmgardae</i> GOLOVATCH, 1992	33. <i>Stemmiulus wellingtoni</i> (MAURIÈS, 1984)
11. Gen. sp.	
Oniscodesmidae	
12. <i>Crypturodesmus</i> sp.	
Paradoxosomatidae	
13. <i>Onciurosoma affine</i> GOLOVATCH, 1992	
14. <i>Orthomorpha coarctata</i> (DE SAUSSURE, 1860) – pt	
Pyrgodesmidae	
15. <i>Adisiella circularis</i> GOLOVATCH, 2000	
16. <i>A. geniculata</i> GOLOVATCH, 2000	
17. <i>Docodesmus hirudiformis</i> GOLOVATCH, 2000	
18. <i>Poratia obliterata</i> (KRAUS, 1960)	
19. <i>Pseudoporatia perplexa</i> GOLOVATCH, 2000	
20. <i>Tauricollarium biramosum</i> GOLOVATCH, 2000	
21. <i>T. uniramosum</i> GOLOVATCH, 2000	

Table 4: Pauropoda species at Reserva Ducke.

Hexamerocerata

Millotauropodidae

Millotauropus REMY, 1950

1. *M. temporalis* (HÜTHER), 1968

Polypauropoides REMY, 1959

30. *P. biclaviger* SCHELLER, 1994

31. *P. cuneatus* SCHELLER, 1997

Tetramerocerata

Pauropodidae

Pauropodinae

Allopauropus SILVESTRI, 1902

2. *A. (A.) bicorniculus* SCHELLER, 1994
3. *A. (A.) dundoensis* REMY, 1955
4. *A. (A.) ovalis* SCHELLER, 1994
5. *A. (A.) rodriguesi* SCHELLER, 1994
6. *A. (A.) uncinatus* SCHELLER, 1994
7. *A. (Decapauropus) adisi* SCHELLER, 1994
8. *A. (D.) anomaios* SCHELLER, 1997
9. *A. (D.) bicornutus* SCHELLER, 1994
10. *A. (D.) brachypodus* SCHELLER, 1994
11. *A. (D.) campinaranicus* SCHELLER, 1997
12. *A. (D.) disappendicalis* SCHELLER, 1997
13. *A. (D.) ieenus* SCHELLER, 1997
14. *A. (D.) irmgardae* SCHELLER, 1994
15. *A. (D.) manausensis* SCHELLER, 1994
16. *A. (D.) neotropicus* SCHELLER, 1994
17. *A. (D.) pachyflagellus* SCHELLER, 1997
18. *A. (D.) petiolatus* SCHELLER, 1994
19. *A. (D.) tenuis* REMY, 1948
20. *A. (D.) tohoius* SCHELLER, 1997
21. *A. (Perissopauropus) amphikomus* SCHELLER, 1997

Hemipauropus SILVESTRI, 1902

22. *H. piriformis* SCHELLER, 1994

Stylopaupoides REMY, 1956

23. *S. dytanekes* SCHELLER, 1999

Scleropauropodinae

Scleropauropus SILVESTRI, 1902

24. *S. beritae* SCHELLER, 1997
25. *S. fissus* SCHELLER, 1994
26. *S. tarumamirimi* SCHELLER, 1994

Polypauropodinae

Polypauropus REMY, 1932

27. *P. ichimbus* SCHELLER, 1997
28. *P. tropicus* SCHELLER, 1994
29. *P. duckensis* SCHELLER, 1999

Ecological publication on Pauropoda from Reserva Ducke

SHELLER, U. & J. ADIS (2000): Possible parthenogenesis in *Allopaupopus* (Myriapoda: Pauropoda). - In: WYTWER, J. & S.I. GOLOVATCH (eds.): Progress in studies on Myriapoda and Onychophora. Fragmenta Faunistica 43, Suppl.: 173-179.

4. Symphyla

Symphylans are progoneate, blind, centipede-like, whitish myriapods most often ranging in size from 2 to 8 mm. They have long moniliform antennae and at the posterior end of the trunk two conical cerci with spinning glands. Symphylans have adapted to life in many different biotopes, from open grassland to dense forests, from subantarctic to tropical climates. In Central Amazonia they have been collected in different types of non-flooded upland (terra firme) and seasonal inundation forests as well as in pastures. Though symphylans most often are true soil-dwellers, they can live in many different habitats: in leaf litter, in the upper humus layer, under stones and branches lying on the soil surface, and in pure soil, both in upper layers and in the mineral subsoil. In many forests they are often found under bark and moss, both on the ground and on tree trunks. The diet varies, large species (in Amazonia *Hanseniella*) may all be herbivorous and need living roots or seedlings as food. Small species (in Amazonia *Scolopendrellopsis*, *Symphylella* and *Ribautiella*), may be fungivorous or are humus feeders. There are no outer sexual organs but the males and females can be distinguished in adult/subadult stages: males have two semicircular sclerites around the opening, females not (see ADIS (2002) for further information).

Symphyla are the smallest class within the Myriapoda. They presently comprise 2 families, 13 genera and 200 species world-wide. Both families, 4 genera and 5 described species occur in Amazonia (see ADIS (2002); SHELLER & ADIS (1996) for identification) and are known from Reserva Ducke as well (Table 5).

Table 5: Symphyla species at Reserva Ducke.

Scolopendrellidae

Ribautiella BRÖLEMANN, 1926

1. *Ribautiella amazonica* SHELLER, 1984

Scolopendrellopsis BAGNALL, 1913

2. *Scolopendrellopsis tropicus* SHELLER, 1992

Symphylella SILVESTRI, 1902

3. *Symphylella adisi* SHELLER, 1992

Scutigereidae

Hanseniella BAGNALL, 1913

4. *Hanseniella arborea* SHELLER, 1979

5. *Hanseniella orientalis* (HANSEN, 1903)

Ecological publication on Symphyla from Reserva Ducke

ADIS, J., SHELLER, U., MORAIS, J.W. DE, ROCHUS, C. & J.M.G. RODRIGUES (1997): Symphyla from Amazonian non-flooded upland forests and their adaptations to inundation forests. - In: ENGHOFF, H. (ed): Many legged animals. - A collection of papers on Myriapoda and Onychophora: 307-317. Ent. Scand. Suppl. 51: 329 pp.

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