

Catalogue of type specimens of invertebrates in the collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil. II. Hexapoda: Collembola, Diplura, Archaeognatha, Ephemeroptera and Blattaria

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ABSTRACT. Catalogue of type specimens of invertebrates in the collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil. II. Hexapoda: Collembola, Diplura, Archaeognatha, Ephemeroptera and Blattaria. A catalogue of type specimens of Collembola, Diplura, Archaeognatha, Ephemeroptera, and Blattaria deposited in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brazil, is presented and updated to June, 2007. It contains a total of 22 holotypes and 18 lots of paratypes of 22 species of Collembola; one holotype and one paratype of one species of Diplura; four holotypes and four paratypes of four species of Archaeognatha; 10 holotypes and thirteen lots of paratypes of 11 species of Ephemeroptera; and one holotype and two lots of paratypes of one species of Blattaria. Specific names are listed alphabetically within family, followed by bibliographical citation, original genus name, status of type, collection number and locality data.

KEYWORDS. Amazon Region; Arthropoda; INPA; taxonomy.

RESUMO. Catálogo dos espécimes-tipo da Coleção de Invertebrados do Instituto Nacional de Pesquisas da Amazônia, Manaus, Brasil. II. Hexapoda: Collembola, Diplura, Archaeognatha, Ephemeroptera e Blattaria. É apresentado um catálogo dos espécimes-tipo de Collembola, Diplura, Archaeognatha, Ephemeroptera e Blattaria depositados na Coleção de Invertebrados do Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brasil, atualizado até junho de 2007. É relacionado um total de 22 holótipos e 18 lotes de parátipos de 22 espécies de Collembola; um holótipo e um lote de parátipos de uma espécie de Diplura; quatro holótipos e quatro parátipos de quatro espécies de Archaeognatha; dez holótipos e sete lotes de parátipos de 11 espécies de Ephemeroptera e um holótipo e dois lotes de parátipos de uma espécie de Blattaria. São listados alfabeticamente em cada família os nomes das espécies, seguidos da citação bibliográfica, nome original do gênero, categoria do tipo, número de registro na coleção e dados de localidade.

PALAVRAS-CHAVE. Arthropoda; INPA; Região Amazônica; taxonomia.

The Collection of Invertebrates of the Instituto Nacional de Pesquisas da Amazônia (INPA) was initiated by Nelson Leandro Cerqueira from 1954 to 1969 based on the specimens, mainly of Culicidae (Insecta: Diptera), that he and his collaborators collected from the vicinities of Manaus and other places from the Amazon region (Hutchings *et al.* 2005). This collection was kept and improved by Lindalva Paes de Albuquerque until her retirement from the Institute in 1991. However, the formal establishment of the collection occurred in October, 1976 according to the communications of Ratcliffe & Penny (1978a) and Ratcliffe (1978) to the national and international scientific community, respectively. Insecta is the larger group in the collections holdings, summing up to over 350,000 pinned specimens, approximately the same amount in cotton layers, and a rough estimate of 4 million unsorted individuals in alcohol by the end of 2006. The first catalogue of type specimens included a list of primary and secondary types of 21 families 39 genera and 104 species of insects (63 holotypes and 245 paratypes) (Ratcliffe & Penny 1978b). The second was published by Rafael *et al.* (1983) with 12 orders,

41 families, 104 genera and 251 species of Hexapoda (194 holotypes and 462 paratypes). The collection has grown substantially since the early 1980's and the number of types has increased significantly as well. Currently, the type material of more than 900 species is deposited in the collection, of which almost 80% belongs to various Hexapoda groups.

Except for a list of the types of Tabanidae (Diptera) (Henriques 1995), no updates of this catalogue have been produced since then. Due to the large number of types which would make it impractical to present in a single volume, a sequentially numbered series of catalogues was planned (Magalhães & Pimpão 2006). This is the second part of this catalogue in which the putative type specimens of five Hexapoda groups, Collembola, Diplura, Archaeognatha, Ephemeroptera and Blattaria deposited in the INPA's Invertebrate Collection up to December, 2007 are listed.

Procedures and format of the present catalogue follow the ones established in the first part of this series (Magalhães & Pimpão 2006). Most of the specimens deposited at INPA's entomological collection are pinned, but some are preserved

as microscope slide preparations or in glass vials with 70% ethanol. If not stated otherwise, the specimens are pinned.

Each order has its own numbering system. However this system encompasses only the type specimens; the holdings of non-type material have no numbers assigned to the specimens. The numbering system refers to the taxon, not to the specimens, so that in some cases holotypes and paratypes can share the same catalogue number (paratype specimens are differentiated by an Arabic numbers or letters between brackets). Each lot of type specimen is prefaced by an abbreviation of the respective order. Text between brackets refers to additional information not included in the original label. Taxonomic classification follows the Hexapoda's phylogenetic relationships proposed by Wheeler *et al.* (2001a,b).

Notwithstanding our efforts in finding type specimens that were cited in the literature as having been deposited at INPA, up to now some of them have not been found. The present catalogue lists only the types that were effectively deposited in the INPA's holdings.

RESULTS

A total of 19 holotypes and 18 lots of paratypes of 22 species of Collembola; one holotype and one paratype of one species of Diplura; four holotypes and four paratypes of four species of Archaeognatha; ten holotypes and seven lots of paratypes of 11 species of Ephemeroptera; and one holotype and two lots of paratypes of one species of Blattaria are reported.

List of type specimens

Class ELIPLURA

Order COLLEMBOLA

BOURLETIELLIDAE

fuscus Bretfeld, 2002: 113, figs. 18-22. *Adisius*.

Holotype: female, COLLE 004, mounted in four slides (a, b, c, d). Brazil, Amazonas, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 27.vii.1994, Leg. J. Adis *et al.* Paratype: male, COLLE 004, slide; data as holotype.

Remarks. The *Adisius* name was in homonímia and was substituted by *Adisianus* of the same author in the work of Bretfeld, 2003.

maculatus Bretfeld, 2002: 111, figs. 1-17. *Adisius*.

Holotype: male, COLLE 003, alcohol; Brasil, Amazonas, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 26.vii.1994, Leg. J. Adis *et al.* Paratypes: 6 spec., COLLE 003 in six slides; data as holotype.

Remarks. The *Adisius* name was in homonímia and was substituted by *Adisianus* of the same author in the work of Bretfeld, 2003.

HYPOGASTRURIDAE

coeca Oliveira & Thibaud, 1988: 300, figs. 1-8. *Willemgastrura*.

Holotype: female, COLLE 025, slide. Brasil, Amazonas, Manaus, ilha da Marchantaria, 16.xi.1986, Leg. E. Oliveira. Paratypes: 3 spec., COLLE 025, all in the same slide; data as holotype.

ISOTOMIDAE

virgata Deharveng & Oliveira, 1994: 443, fig. 1-10. *Paracerura*.

Holotype: male, COLLE 023, slide. Brazil, Amazonas, Manaus, Route ZF-02, Km 14 forêt primaire, 06.xi.1992, Leg. E. Oliveira & Sena. Paratypes: 5 spec., COLLE 023, in five slides; data as holotype.

KATIANNIDAE

aureussetosus Bretfeld, 2002: 118, figs. 43-47. *Sminthurinus*.

Holotype: female, COLLE 008, slide (a-d). Brazil, Amazonas, [Reserva Florestal Adolpho Ducke near Manaus, terra firme], 21.ii.1992, Leg. Adis *et al.*

cupiubae Bretfeld, 2002: 116, figs. 32-39. *Arborianna*.

Holotype: male, COLLE 005, alcohol. Brazil, Amazonas, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 27.vii.1994, Leg. J. Adis *et al.* Paratypes: 13 spec., COLLE 005 in two vials with alcohol, two and eleven specimens; data as holotype.

ONYCHIURIDAE

amazonica Oliveira & Thibaud, 1992: 3, figs. 1-7. *Mesaphorura*.

Holotype: male, COLLE 024, slide. Brasil, Amazonas, ZF2 in 75 km N from Manaus, 14.ix.1998.

fernandae Oliveira & Thibaud, 1992: 5, figs. 8-11. *Onychiurus*.

Holotype: female, COLLE 026, slide. Brazil, Pará, Belém, Reserva do Mocambo, EMBRAPA, i-xii.1969, Leg. E. Oliveira. Paratype: COLLE 026, slide; data as holotype.

PSEUDACHORUTIDAE

herberti Arlé & Rufino, 1976: 99, figs. 1-12. *Pseudachorutes*

Paratype: COLLE 022, alcohol; [Brasil, Amazonas], Manaus, rio Cuieiras, 21.xi.1974, Leg. E. Rufino.

SMINTHURIDAE

caputalba Bretfeld, 2002: 121, figs. 55-67. *Sphyrotheca*.

Holotype: female, COLLE 007, mounted in three slides (a, b, c). Brazil, Amazonas, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 26.viii.1992, Leg. J. Adis *et al.* Paratype: male COLLE 007, mounted in three slides (a, b, c); locality data as holotype.

coeruleocapitata Bretfeld, 2002: 123. Figs 68-75. *Sphyrotheca*.

Holotype: male, COLLE 006, mounted in three slides (a, b, c). Brazil, Amazonas, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 26.viii.1992, Leg. J. Adis *et al.*

SMINTHURIDIDAE

bivirgata Bretfeld, 2002: 119. *Sphaeridia*.

Holotype: male, COLLE 001, mounted in three slides (a, b, c). Brazil, Amazonas, Manaus, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 26.viii.1992, Leg. J. Adis *et al.*

cerastes Bretfeld & Gauer, 1994: 117, figs. 2 (a-e). *Sphaeridia*.

Holotype: male, COLLE 010, alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 03.x.1989, Leg. U. Gauer]. Paratypes: 2 spec., COLLE 010, mounted in two slides (a,b); data as holotype.

clara Bretfeld & Gauer, 1994: 116. Figs. 3 (a-c). *Sphaeridia*.

Holotype: male, COLLE 011, alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 31.x.1990, Leg. U. Gauer]. Paratypes: 4 spec., COLLE 011, in the same vial, alcohol; locality data as holotype.

coronata Bretfeld & Gauer, 1994: 116, fig 4 (a-d). *Sphaeridia*.

Holotype: male, COLLE 012, alcohol. [Brazil, Amazonas, igapó of Rio Tarumã Mirim near Manaus, 29.viii.1989, Leg. U. Gauer]. Paratypes: 6 spec., COLLE 012, all preserved in a vial with alcohol; data as holotype.

duckei Bretfeld, 2002: 120, figs. 50-54. *Sphaeridida*.

Holotype: female, COLLE 002, slide. Brazil, Amazonas, Manaus, Reserva Florestal Adolpho Ducke near Manaus, terra firme, 27.vii.1994, Leg. J. Adis et al.

fibulifera Bretfeld & Gauer, 1994: 116, fig 5 (a-e). *Sphaeridida*.

Holotype: male, COLLE 013, alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 03.x.1989, Leg. U. Gauer]. Paratypes: 3 spec., COLLE 013, all in a vial with alcohol; data as holotype.

franklinae Bretfeld & Gauer, 1994: 120, fig 6 (a-d). *Sphaeridida*.

Holotype: male, COLLE 014, in a vial with alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 31.x.1990, Leg. U. Gauer]. Paratypes: 4 spec., COLLE 014, three in a vial with alcohol in the same vial of holotype and one mounted in slide; data as holotype.

martii Bretfeld & Gauer, 1994: 121, fig 8 (a-e). *Sphaeridida*.

Holotype: male, COLLE 016, slide. Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 24.ix.1971, Leg. U. Irmler.

pilleata Bretfeld & Gauer, 1994: 122, fig 9 (a-e). *Sphaeridida*.

Holotype: male, COLLE 019, alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim near Manaus, 03.x.1989, Leg. U. Gauer]. Paratypes: 3 spec., COLLE 019, two in a vial with alcohol and one mounted in slide; locality data as holotype.

robusta Bretfeld & Gauer, 1994: 123, fig 10. *Sphaeridida*.

Holotype: male, COLLE 017, mounted in three slides (a, b, c). Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim, 24.ix.1971, Leg. U. Irmler.

squamifera Bretfeld & Gauer, 1994: 125, fig 10 (a-e) *Sphaeridida*

Holotype: male, COLLE 018, alcohol. [Brazil, Amazonas, Manaus, igapó of Rio Tarumã Mirim, 03.x.1989, Leg. U. Gauer]. Paratypes: 4 spec., COLLE 018, two in a vial with alcohol together the holotype vial and two in slides; locality data as holotype.

STURMIIDAE

truncivivus Bretfeld & Gauer, 1999: 280, fig 1-3. *Sturmius*.

Holotype: female, COLLE 009, alcohol. [Brazil, Amazonas, Manaus, on a living tree trunk in blackwater inundation forest (igapó) near Manaus, 12.ii.1991, Leg. U. Gauer]. Paratypes: 14 spec., COLLE 009 in three vials with alcohol, two with five specimens and the other with four; locality data as holotype.

Class DIPLOURA

Order DIPLURA

PARAJAPYGIDAE

adisi Pagés, 2000: 214. *Parajapyx*.

Holotype: male, DIPLU 001, in one slide; Brazil, Am-env [sic], Manaus, Rio Tarumã Mirim blackwater inundation forest, 28.x.1981, Leg. J. Adis. Paratypes: 10 spec., DIPLU 001, all mounted in slides, being one specimen designated as allotype; locality data as holotype.

Class INSECTA

Order ARCHAEOGNATHA

MEINERTELLIDAE

adisi Wygodzinsky, 1978: 303, fig 2. *Neomachilellus*.

Holotype: male, ARCHA 001, alcohol. [Brazil, Amazonas, Tarumã Mirim, near Manaus, no date, Leg. J. Adis]. Paratypes: 7 spec., ARCHA 002 in five vials with alcohol, three with one specimen and two with two specimens, being one the allotype; data as holotype.

adisi Sturm, 1983: 791. figs. 13-15. *Meinertellus*.

Holotype: male, ARCHA 005, mounted in two slides (a,b). [Brazil, 20 Km NW] Manaus, [Rio Tarumã Mirim], 18.viii.1979, Leg. J. Adis. Paratypes: 2 spec., females, ARCHA 006, mounted in two slides (a,b); locality data as holotype.

amazonicus Sturm, 1983: 803, figs. 42-54. *Neomachilellus*.

Holotype: male, ARCHA 007, mounted in two slides (a,b). [Brazil, Amazonas], Manaus, [ZF2, BR-174], viii.1979, Leg. J. Adis et al. Paratype: female, ARCHA 008, mounted in two slides (a,b); data as holotype.

scandens Wygodzinsky, 1978: 304, figs. 4-5. *Neomachilellus*.

Holotype: male, ARCHA 003, alcohol. [Brazil, Amazonas, Tarumã Mirim, near Manaus, no date, Leg. J. Adis]. Paratype: female, ARCHA 004, in a vial with alcohol; date of collection unknown.

Order EPHEMEROPTERA

CAENIDAE

irmleri Puthz, 1975: 411. figs. 1-7. *Brasilocaenis*.

Holotype: male imago, EPHEM 001, in a vial with alcohol. Brazil, Amazonas, Manaus, lago Murutá, 05.x.1971, Leg. U. Irmler.

LEPTOPHLEBIIDAE

amazonicus Savage & Peters, 1983: 556, figs. 19-21, 63, 102, 116, 128-129, 158, 168. *Miroculis (Atroari)*.

Holotype: male imago, EPHEM 014, in a vial with alcohol, except right and left hindwings. Brazil, Amazonas, Rio Maraúia, armadilha de luz, 10.i.1963, Leg. E. J. Fittkau.

arsia Savage & Peters, 1983: 580, figs. 35-39, 78-80, 94, 168. *Hermanellopsis*.

Holotype: male subimago, EPHEM 016, in a vial with alcohol. Brazil, Amazonas, Rio Cuieiras, 24.iv.1961, Leg. E. J. Fittkau.

duckensis Savage & Peters, 1983: 554, figs. 49-50, 64, 114-115, 127, 168. *Miroculis (Atroari)*.

Holotype: male imago, EPHEM 012, in a vial with alcohol and parts mounted in three slides, one with one leg, one with right fore and hindwings and one with genitalia. Brazil, Amazonas, Reserva Florestal Adolpho Ducke, 26.vi.1961, Leg. E. J. Fittkau. Paratypes: 6 spec., EPHEM 012, two mounted in two slides and four in four vials with alcohol; locality data as holotype.

fittkauai Savage & Peters, 1983: 529, figs. 10-12, 45-46, 58-60, 81-82, 91, 96, 97-98, 124-125, 168. *Miroculis (Miroculis)*.

Holotype: male imago, EPHEM 011, in a vial with alcohol. Brazil, Pará, Akahe Creek, near Tiriós, 15.iii.1962, Leg. E. J. Fittkau. Paratypes: 22 spec., EPHEM 011, in seven vials with alcohol, one with two specimens, one with one specimen, one with four specimens, one with one specimen, one with six specimens, one with one specimen, one with four specimens (one is allotype), and three mounted in three slides.

froehlichi Ferreira & Dominguez, 1992: 179, figs. 1-7. *Hermanella (Guayakia)*.

Paratypes: 27 spec., EPHEM 017, in three vials with alcohol: one with 15 specimens, one with ten specimens and one with two specimens. Brazil, São Paulo, Córrego do Pedregulho, vii-viii.1989, Leg. M. J. N. Ferreira & C. Froehlich.

maculatus Savage & Peters, 1978: 294, figs. 1-14, 15-24. *Fittkaulus*.

Holotype: male imago, EPHEM 002, specimen in two vials with alcohol, one with nymphal exuvia, one with one specimen and parts mounted in three slides: one with leg, one with right fore wing and one with genitalia. Brazil, Pará, Akahe Creek, near Tiriós, 15.iii.1962, Leg. E. J. Fittkau. Paratypes: 10 spec., in three vials with alcohol and one slide: EPHEM 003, imago (allotype), EPHEM 004 with six specimens, with part of paratype mounted in a slide and EPHEM 005 with three specimens; data as holotype.

marauiæ Savage & Peters, 1983: 517, figs. 13-15, 57, 99-102, 121-123, 142-147, 157, 168. *Miroculis (Miroculis)*.

Holotype: male, EPHEM 006, specimen in one vial with alcohol and parts mounted in two slide: one with right fore and hindwings and one with genitalia. Brazil, Amazonas, Rio Maraúia, 28.i.1963,

- Leg. E. J. Fittkau. Paratypes: 14 spec. in four vials with alcohol and two slides: EPHEM 007 being one designated allotype with wings mounted in a slide, EPHEM 008 with three specimens in a vial with alcohol and wing mounted in a slide; EPHEM 009 with two specimens in a vial with alcohol and EPHEM 010 with eight specimens in a vial with alcohol; data as holotype.
- oepa** Lopes, da Silva & Py-Daniel 2003: 196, figs. 1-6, 7-12.
Ulmeritoides.
 Holotype: male larvae, EPHEM 018, alcohol. Brazil, Roraima, Rio Uraricoera, Igarapé Xiquibá, 14.x.1987, Leg. V. Py-Daniel et al. Paratypes: 12 spec., EPHEM 018 in six vials with alcohol, one with eight nymphs, one with four nymphs, three with legs and one with body. Brazil, Roraima, Rio Uraricoera, Igarapé Vermelho, 12.vii.1987, Leg. V. Py-Daniel & L. Aquino.
- pallida** Savage & Peters, 1983: 574, figs. 40-41, 75-76, 168.
Microphlebia.
 Holotype: male subimago, EPHEM 015, in alcohol with leg and right fore and hindwings mounted in two slides. Brazil, Amazonas, Rio Branquinho, near junction with Rio Cuiéiras, N of Manaus, 19.viii.1961, Leg. E. J. Fittkau. Paratypes: 2 spec., EPHEM 015, in two vial with alcohol, except one paratype with a right fore hiding in a slide; locality data as holotype.
- wandae** Savage & Peters, 1983: 546, figs. 61-62, 103-104, 168.
Miroculis (Yaruma).
 Holotype: male subimago, EPHEM 013, in a vial with alcohol, except genitalia in a slide and right fore and hindwings mounted in one slide. Brazil, Amazonas, Rio Marauá, 03.ii.1963, Leg. E. J. Fittkau.
- Order BLATTARIA
 BLABERIDAE
- fenestrata** Zompro & Fritzsher, 1999: 213, figs 1-4.
Lucihormetica.
 Holotype: male, BLATT 001, in a vial with alcohol. Brazil, Amazonas, Tarumã-Mirim, 29-30.v.1980, Leg. J. Adis. Paratypes: 10 spec., BLATT 001, in eight vials with alcohol; locality data as holotype.
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