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## Order Opiliones Sundevall, 1833\*

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### Introduction

The taxonomy of harvestmen is progressing at a fast pace. Many of the figures given in the previous outline Kury (2011) have changed in this short space of two years. The total number of valid species grows slowly because the new synonymies from revisions almost cancel out the new descriptions. The total of 6484 extant species of Opiliones (Kury 2011) has increased to 6534, or less than 1%.

The primary division into 4 suborders is relatively stable, in spite of the variable choice between Dyspnoi+Eupnoi versus Dyspnoi+Laniatores as a clade. However, 3 new infraorders have been proposed in Cyphophthalmi (Giribet *et al.* 2012) and familiar arrangement in Dyspnoi has been altered, with the creation of the new family Taracidae and the merging of Ceratolasmatidae into Ischyropsalididae (Schönhofer 2013). The total of 46 extant families has thus remained constant.

A considerable fraction of the valid species which has been described by older authors under lax taxonomic standards and without surviving type material are unrecognizable today. These are gradually being set aside as *nomina dubia*. However, as available and valid species, they continue to appear in the ranks, serving for no purpose other than cluttering the synoptic view and real evaluation of diversity. In this work they are not listed separately, but counted as any other species.

### Suborder Cyphophthalmi

The known diversity of the minuscule soil dwellers of the suborder Cyphophthalmi is still being multiplied (although more timidly compared to the revolution in the 2000s), mostly by Giribet and collaborators in the Indo-Malayan (Clouse 2012; Clouse *et al.* 2011; Clouse & Giribet 2012; Clouse & Schwendinger 2012) and Neotropical (Benavides & Giribet 2013, but the 8 new species were already counted in Kury 2011 because previously announced on website). Stylocellidae has been divided into 3 subfamilies (Clouse 2012); other systematic considerations were made for Australasian Pettalidae (Karaman 2012). The total of 187 extant species of Cyphophthalmi (Kury 2011) has increased to 194, or almost 4%.

### Suborder Eupnoi

Descriptions of new Eupnoi have been scarce in the biennium, but in the last two years a few isolated new species from Central Asia (Chemeris 2012), China (Zhang & Zhang 2012a), Turkey (Snegovaya & Marusik 2012) were described. A little taxonomy of Nearctic was done (Shultz 2012), and news are expected in Neopilionidae both Australasian and Neotropical (C. Taylor, pers. comm.; A. Tourinho, pers. comm.) but nothing from the hugely diverse Tropical Gagrellinae (with 1052 species, they correspond to 16% of all Opiliones, and their confuse taxonomy is a colossal challenge). Following also some updating of synonymies and better account of *nomina dubia*, the total of 1812 extant species of Eupnoi (Kury 2011) has increased to 1822, or less than 1%.

### Suborder Dyspnoi

For the Dyspnoi, the greater change was the catalogue of Schönhofer (2013), which introduced new combinations, new synonymies, consolidation of overlooked nomenclatural acts and denomination of nomina dubia. Likewise, descriptions of many new Nearctic and Palearctic species appeared (Chemeris & Kovblyuk 2012; González-Luque & Labrada 2012; Karaman 2013; Richart & Hedin 2013; Snegovaya & Marusik 2012; Zhang & Zhang 2013), and even a new genus (Schönhofer & Martens 2012). Following some updating of synonymies, which highly surpassed the new species, the total of 353 extant species of Dyspnoi (Kury 2011) has decreased to 334, or 5% less. Still more synonymies are expected because of the numerous fictitious species with fictitious localities described by Roewer (see Schönhofer 2013).

### Suborder Laniatores

Works on Neotropical Laniatores (Agoristenidae, Biantidae, Cosmetidae, Cranaidae, Fissiphalliidae, Gonyleptidae, Stygnidae, Stygnopsidae) continued its steady stream, either with description of isolated species (Alegre-B. & Armas 2012; Bragagnolo 2013; Cruz-López & Francke 2012; 2013; DaSilva & Pinto-da-Rocha 2012; Kury 2013; Kury & Ferreira 2012; Mendes & Barros 2013; Ochoa & Pinto-da-Rocha 2013; Silva *et al.* 2013; Villarreal-M. & Kury 2012) or with new assignments (Pinto-da-Rocha *et al.* 2012) or generic reviews (Bragagnolo & Pinto-da-Rocha 2012; Kury 2012a; Kury 2012b; Pinto-da-Rocha & Tourinho 2012). Isolated species of Indo-Malayan Laniatores (Epedanidae, Podoctidae, Zalmoxidae) were described from China (Zhang & Zhang 2012b; Zhang *et al.* 2013) and Philippines (Sharma *et al.* 2012). In Australasia there have been few species descriptions (Zalmoxidae, Sharma 2012). The Afrotropical realm was almost abandoned in the last biennium (exception: Mendes & Kury 2012, who described Triaenonychidae from Madagascar). A new subfamily of Agoristenidae has been described from the Andes (Kury 2012b). The total of 4129 extant species of Laniatores (Kury 2011) has increased to 4183, or 52 species, 1%.

### Fossil species

After the significant changes introduced to the fossil Opiliones in the past decade, mainly by Dunlop and collaborators, this 2010s decade started timidly with contributions of few species (Dunlop *et al.* 2013), but no major systematic changes. The total of 35 fossil species of Opiliones (Kury 2011) has increased to 37, or 6%.

### Diversity by realm

As expected, Tropical realms concentrate most of the opilionofauna. The Neotropics and Indo-Malayan are the most diverse realms with respectively 2691 species (41%) and 1337 species (20%). That is, together they have almost 2/3 of the Opiliones. The third most diverse realm is the Palearctic with 819 species (13%), mostly because of its sheer size. Afrotropical has only 745 species (11%). Australasia with 564 species has 9% and Nearctic with 379 species has less than 6%. The total sum of species of all realms is slightly different from the total Opiliones because a few species are shared between realms.

### Classification

Order **Opiliones** Sundevall, 1833 (4 suborders, 46 extant families, 3 fossil families, 1649 extant genera, 18 fossil genera, 6534 extant species, 37 fossil species)<sup>1</sup>

Suborder **Cyphophthalmi** Simon, 1879 (6 families)<sup>2 3</sup>

**Incertae sedis** (3 genera, 3 species)

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1. Fossil taxa are indicated by a dagger (†) placed before the name. In the subtaxa counts, the word “fossil” is used as opposed to “extant”, and wherever there is no indication, “extant” is to be assumed.
  2. Family composition follows Boyer *et al.* (2007) and Giribet *et al.* (2010; 2012), noting that monophyly of Sironidae is not universally recovered.
  3. Detailed information on genera and species may be found in Giribet (2000). This reference however is quickly becoming obsolete by the fast pace of discovery of new taxa and taxonomic refinements.

- Infraorder **Sternophthalmi** Giribet *et al.*, 2012 (3 families)  
     Family **Neogoveidae** Shear, 1980 (9 genera, 23 species)  
     Family **Ogoveidae** Shear, 1980 (1 genus, 3 species)  
     Family **Troglosironidae** Shear, 1993 (1 genus, 13 species)  
 Infraorder **Scopulophthalmi** Giribet *et al.*, 2012 (1 family)  
     Family **Pettalidae** Shear, 1980 (9 genera, 64 species)  
 Infraorder **Sternophthalmi** Giribet *et al.*, 2012 (2 families)  
     Family **Sironidae** Simon, 1879 (7 extant genera, 52 extant species, 2 fossil species)  
     Family **Stylocellidae** Hansen & Sørensen, 1904 (6 extant genera, 1 fossil genus, 36  
         extant species, 1 fossil species)<sup>4</sup>  
 Suborder **Eupnoi** Hansen & Sørensen, 1904 (2 superfamilies)<sup>5</sup>  
     Superfamily **Caddoidea** Banks, 1892 (1 family)  
         Family **Caddidae** Banks, 1892 (6 genera, 24 extant species, 1 fossil species)  
     Superfamily **Phalangoidea** Latreille, 1802 (3 extant families, 1 fossil family)<sup>6</sup>  
         **Phalangoidea incertae sedis** (6 fossil genera, 6 fossil species)<sup>7</sup>  
         Family † **Kustarachnidae** Petrunkevitch, 1949 (1 fossil genus, 1 fossil species)  
         Family **Neopilionidae** Lawrence, 1931 (20 genera, 64 species)  
         Family **Phalangidae** Latreille, 1802 (55 extant genera, 1 fossil genus, 394 extant  
             species, 4 fossil species)  
         Family **Sclerosomatidae** Simon, 1879 (153 extant genera, 2 fossil genera, 1341  
             extant species, 5 fossil species)  
 Suborder **Dyspnoi** Hansen & Sørensen, 1904 (2 superfamilies)<sup>8</sup>  
     **Dyspnoi incertae sedis** (4 fossil genera, 4 fossil species)<sup>9</sup>  
     Superfamily **Ischyropsalidoidea** Simon, 1879 (3 families)  
         Family **Ischyropsalididae** Simon, 1879 (3 genera, 33 species)  
         Family **Sabaconidae** Dresco, 1970 (1 genus, 37 extant species, 1 fossil species)  
         Family **Taracidae** Schönhofer, 2013 (3 genera, 15 species)  
     Superfamily **Troguloidea** Sundevall, 1833 (4 extant families, 2 fossil families)  
         Family **Dicranolasmatidae** Simon, 1879 (1 genus, 16 species)  
         Family † **Eotrogulidae** Petrunkevitch, 1955 (1 fossil genus, 1 fossil species)<sup>10</sup>  
         Family **Nemastomatidae** Simon, 1872 (21 genera, 173 extant species, 4 fossil  
             species)  
         Family † **Nemastomoididae** Petrunkevitch, 1955 (1 fossil genus, 2 fossil species)  
         Family **Nipponopsalididae** Martens, 1976 (1 genus, 4 species)  
         Family **Trogulidae** Sundevall, 1833 (4 genera, 56 extant species, 1 fossil species)  
 Suborder **Laniatores** Thorell, 1876 (2 infraorders)<sup>11</sup>

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4. † *Palaeosiro* Poinar, 2008, originally assigned to the Sironidae, belongs to Stylocellidae (Ronald Clouse, pers. comm., 2013).
  5. The family Stygophalangiidae Oudemans, 1933 has been erected for a species of the underground waters of Macedonia, but it is probably a member of the Acari. It is no longer cited in connection with the Opiliones.
  6. Composition of extant families follows basically Crawford (1992), adding the changes proposed by Taylor (2011) regarding *Megalopsalis* Roewer 1923 and related genera.
  7. I gathered here not only the Phalangoidea incertae sedis, but also the Eupnoi incertae sedis of Dunlop *et al.* (2004), Dunlop & Anderson (2005), Huang *et al.* (2009) and Garwood *et al.* (2011).
  8. Internal arrangement in extant Dyspnoi follows Schönhofer (2013).
  9. In spite of the original placement of † *Halitherses* Giribet & Dunlop, 2005 in the Troguloidea, later work (Garwood *et al.* 2011) did not support this inclusion.
  10. *Eotrogulus*, the only included and type genus of Eotrogulidae, was tentatively included in Trogulidae by Dunlop (2007), therefore the status of Eotrogulidae as an independent family is doubtful at best.
  11. Hypotheses of deep relationships in the Laniatores are somewhat changing of late. A compromise is made here among Giribet & Kury (2007), Giribet *et al.* (2010) and Sharma & Giribet (2011).

- Infraorder **Insidiatores** Loman, 1900 (2 superfamilies)<sup>12</sup>
- Superfamily **Travunioidea** Absolon & Kratochvil, 1932 (3 families)
    - Family **Nippononychidae** Suzuki, 1975 (4 genera, 10 species)
    - Family **Paranonychidae** Briggs, 1971 (7 genera, 26 species)
    - Family **Travuniidae** Absolon & Kratochvil, 1932 (13 extant genera, 1 fossil genus, 41 extant species, 1 fossil species)
  - Superfamily **Triaenonychoidea** Sørensen, 1886 (2 families)
    - Family **Synthetonychiidae** Forster, 1954 (1 genus, 14 species)
    - Family **Triaenonychidae** Sørensen, 1886 (107 genera, 477 species)
- Infraorder **Grassatores** Kury, 2002 (6 superfamilies, 25 families)<sup>13</sup>
- Grassatores incertae sedis** (62 genera, 88 extant species, 1 fossil species)
    - Superfamily **Assamioidea** Sørensen, 1884 (2 families)
      - Family **Assamiidae** Sørensen, 1884 (267 genera, 483 species)
      - Family **Pyramidopidae** Sharma *et al.* 2011 (14 genera, 46 species)
    - Superfamily **Epedanoidea** Sørensen, 1886 (5 families)
      - Family **Epedanidae** Sørensen, 1886 (70 genera, 174 species)
      - Family **Petrobunidae** Sharma & Giribet, 2011 (2 genera, 5 species)
      - Family **Podoctidae** Roewer, 1912 (54 genera, 132 species)
      - Family **Sandokanidae** Özdikmen & Kury 2007 (6 genera, 72 species)
      - Family **Tithaeidae** Sharma & Giribet, 2011 (6 genera, 39 species)
    - Superfamily **Gonyleptoidea** Sundevall, 1833 (7 families)
      - Family **Agoristenidae** Šilhavý, 1973 (27 genera, 76 species)
      - Family **Cosmetidae** Koch, 1839 (125 genera, 719 species)
      - Family **Cranidae** Roewer, 1913 (75 genera, 165 species)
      - Family **Gonyleptidae** Sundevall, 1833 (272 genera, 829 species)<sup>14</sup>
      - Family **Manaosbiidae** Roewer, 1943 (27 genera, 47 species)
      - Family **Stygnidae** Simon, 1879 (30 genera, 104 species)
      - Family **Stygnopsidae** Sørensen, 1932 (9 genera, 40 species)
    - Superfamily **Phalangodoidea** Simon, 1879 (1 family)
      - Family **Phalangodidae** Simon, 1879 (22 genera, 117 species)
    - Superfamily **Samooidea** Sørensen, 1886 (5 families)
      - Family **Biantidae** Thorell, 1889 (33 genera, 134 species)
      - Family **Escadabiidae** Kury & Pérez, 2003 (6 genera, 8 species)
      - Family **Kimulidae** Pérez *et al.* 2007 (10 genera, 36 species)
      - Family **Samoidae** Sørensen, 1886 (24 genera, 47 extant species, 2 fossil species)
      - Family **Stygnommatidae** Roewer, 1923 (1 genus, 33 species)
    - Superfamily **Zalmoxoidea** Sørensen, 1886 (4 families)
      - Family **Fissiphalliidae** Martens, 1988 (1 genus, 7 species)
      - Family **Guasiniidae** González-Sponga, 1997 (2 genera, 3 species)

12. Here I have partly followed the numerous changes proposed by Mendes (2009), e.g., fusing the Briggsidae Özdikmen & Demir 2008 and the Cladonychiidae Hadži, 1935 with the Travuniidae.

13. In the recent literature, superfamilies of Grassatores are in a state of flux. Again I have opted for a compromise, greatly congruent with Sharma & Giribet (2011). Assignment of genera to families for the Neotropical groups follows Kury (2003).

14. In Gonyleptidae there have been recently a great number of subfamily reviews which exerted a great impact on the inner organization of the subfamilies, almost always resulting in a great deal of new generic and specific synonymies, e.g., DaSilva & Gnaspini (2010) and Mendes (2001). Total species number remained more or less constant because the descriptions of new species cancelled out the synonymies.

Family **Icaleptidae** Kury & Pérez, 2002 (2 genera, 2 species)

Family **Zalmoxidae** Sørensen, 1886 (66 genera, 209 species)

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