



Order Lepidoptera Linnaeus, 1758

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Order **Lepidoptera** Linnaeus, 1758 (4 suborders) (15,578 genera, 157,424 species, 50/86) ^{1 2 3}

† **Unassigned early lepidopterans** (4 families)

† Family **unassigned** (12 genera, 16 species, 12/16) ⁴

† Family **Archaeolepididae** Whalley, 1985 (1 genus, 1 species, 1/1) ⁵

† Family **Mesokristenseniidae** Huang, Nel & Minet, 2010 (1 genus, 3 species, 1/3) ⁶

† Family **Eolepidopterigidae** Rasnitsyn, 1983 (1 genus, 1 species, 1/1) ⁷

† Family **Undopterigidae** Kozlov, 1988 (1 genus, 1 species, 1/1) ⁸

Suborder **Zeugloptera** Chapman, 1917 (1 superfamily)

Superfamily **Micropterigoidea** Herrich-Schäffer, 1855 (1 family)

Family **Micropterigidae** Herrich-Schäffer, 1855 (21 genera, 160 species, 3/6) ⁹

Suborder **Aglossata** Speidel, 1977 (1 superfamily)

Superfamily **Agathiphagoidea** Kristensen, 1967 (1 family)

Family **Agathiphagidae** Kristensen, 1967 (1 genus, 2 species)

Suborder **Heterobathmiina** Kristensen & Nielsen, 1983 (1 superfamily)

Superfamily **Heterobathmioidea** Kristensen & Nielsen, 1979 (1 family)

Family **Heterobathmiidae** Kristensen & Nielsen, 1979 (1 genus, 3 species)

Suborder **Glossata** Fabricius, 1775 (6 infraorders, all following)

Infraorder **Dacnonypha** Hinton, 1946 (1 superfamily)

Superfamily **Eriocranioidea** Rebel, 1901 (1 family)

Family **Eriocraniidae** Rebel, 1901 (5 genera, 29 species, 0/1)

Clade **Coelolepida** Nielsen & Kristensen, 1996 (5 infraorders, all following) ¹⁰

Infraorder **Acanthoctesia** Minet, 2002 (1 superfamily)

Superfamily **Acanthopteroctetoidea** Davis, 1978 (1 family)

Family **Acanthopteroctetidae** Davis, 1978 (2 genera, 5 species)

Infraorder **Lophocoronina** Common, 1990 (1 superfamily)

Superfamily **Lophocoronoidea** Common, 1973 (1 family)

Family **Lophocoronidae** Common, 1973 (1 genus, 6 species)

Clade **Myoglossata** Kristensen & Nielsen, 1981 (3 infraorders, all following)

Infraorder **Neopseustina** Davis & Nielsen, 1980 (1 superfamily)

Superfamily **Neopseustoidea** Hering, 1925 (1 family)

Family **Neopseustidae** Hering, 1925 (4 genera, 14 species)

Clade **Neolepidoptera** Packard, 1895 (2 infraorders, all following)

1. **By** Erik J. van Nieukerken, Lauri Kaila, Ian J. Kitching, Niels P. Kristensen, David C. Lees, Joël Minet, Charles Mitter, Marko Mutanen, Jerome C. Regier, Thomas J. Simonsen, Niklas Wahlberg, Shen-Horn Yen, Reza Zahiri, David Adamski, Joaquin Baixeras, Daniel Bartsch, Bengt Å. Bengtsson, John W. Brown, Sibyl Rae Bucheli, Donald R. Davis, Jurate De Prins, Willy De Prins, Marc E. Epstein, Patricia Gentili-Poole, Cees Gielis, Peter Hättenschwiler, Axel Hausmann, Jeremy D. Holloway, Axel Kallies, Ole Karsholt, Akito Y. Kawahara, Sjaak (J.C.) Koster, Mikhail V. Kozlov, J. Donald Lafontaine, Gerardo Lamas, Jean-François Landry, Sangmi Lee, Matthias Nuss, Kyu-Tek Park, Carla Penz, Jadranka Rota, Alexander Schintlmeister, B. Christian Schmidt, Jae-Cheon Sohn, M. Alma Solis, Gerhard M. Tarmann, Andrew D. Warren, Susan Weller, Roman V. Yakovlev, Vadim V. Zolotuhin, Andreas Zwick (for full contact details, see the list after **References**). The title of this contribution should be cited as "Order Lepidoptera Linnaeus, 1758. In: Zhang, Z.-Q. (Ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness".
2. The classification largely follows that in the Handbook of Zoology (Kristensen 1998), and the later update (Kristensen *et al.* 2007). Recent molecular studies of Ditrysia (Regier *et al.* 2009; Mutanen *et al.* 2010) are responsible for several novelties, such as the position of the butterflies (Papilionoidea) and the synonymy of Sesioidea with Cossoidea.
3. When possible, numbers of genera and species are based on counts in existing databases, whether published (then cited) or personal. Where not available, often for larger taxa, numbers provided by Handbook authors were updated with Zoological Record data (up to early July 2011). Lepindex (Beccaloni *et al.* 2005) has been an additional source; x/y for numbers of genera/species represented by fossil.
4. Including "homoneurous" (or probably homoneurous) lepidopteran genera not certainly placed to family (taxa listed in Table 13.1 [1, 3-6] of Grimaldi & Engel (2005), plus - at least - the following six genera: *Archiptilia* Handlirsch, 1939, *Electrocrania* Kusnezov, 1941, *Epididontus* Handlirsch, 1939, *Palaeosabatinka* Kozlov, 1988, *Parataulius* Handlirsch, 1939, and *Xena* Martins-Neto, 1999).
5. The presence of wing scales is supposed to indicate that this fossil is lepidopteran (Kristensen & Skalski 1998; Grimaldi & Engel 2005). This family and the following three are listed in "stratigraphical" order.
6. A group from the middle Jurassic of China best placed among unassigned early Lepidoptera, although this group might be sister to Micropterigidae (Huang *et al.* 2010).
7. Including with certainty only *Eolepidopterix jurassica* Rasnitsyn, 1983.
8. Including with certainty only *Undopterix sukatshevae* Skalski, 1979.
9. With the already known, but still unnamed species, the global total is around 260 species.
10. Junior homonym of Coelolepida in Agnatha, but unlikely to be confused.

- Infraorder **Exoporia** Common, 1975 (2 superfamilies)¹¹
- Superfamily **Mnesarchaeoidea** Eyer, 1924 (1 family)
 - Family **Mnesarchaeidae** Eyer, 1924 (1 genus, 7 species)
 - Superfamily **Hepialoidea** Stephens, 1829 (5 families)
 - Family **Palaesetidae** Turner, 1922 (4 genera, 9 species)
 - Family **Prototheoridae** Meyrick, 1917 (1 genus, 12 species)
 - Family **Neotheoridae** Kristensen, 1978 (1 genus, 1 species)
 - Family **Anomosetidae** Tillyard, 1919 (1 genus, 1 species)
 - Family **Hepialidae** Stephens, 1829 (62 genera, 606 species, 2/2)
- Infraorder **Heteroneura** Tillyard, 1918 (34 superfamilies, all following)
- Clade **Nepticulina** Meyrick, 1928 (1 superfamily)
 - Superfamily **Nepticuloidea** Stainton, 1854 (2 families)¹²
 - Family **Nepticulidae** Stainton, 1854 (13 genera, 819 species, 1/13)
 - Family **Opostegidae** Meyrick, 1893 (7 genera, 192 species)
 - Clade **Eulepidoptera** Kiriakoff, 1948 (33 superfamilies, all following)
 - Clade **Incurvariina** Börner, 1939 (2 superfamilies)
 - Superfamily **Andesianoidea** Davis & Gentili, 2003 (1 family)
 - Family **Andesianidae** Davis & Gentili, 2003 (1 genus, 3 species)
 - Superfamily **Adeloidea** Bruand, 1850 (5 families)¹³
 - Family **Heliozelidae** Heinemann & Wocke, 1876 (12 genera, 123 species)
 - Family **Adelidae** Bruand, 1850 (5 genera, 294 species)
 - Family **Incurvariidae** Spuler, 1898 (11 genera, 51 species)¹⁴
 - Family **Cecidosidae** Bréthes, 1916 (5 genera, 16 species)
 - Family **Prodoxidae** Riley, 1881 (9 genera, 98 species)
 - Clade **Etimonotrysia** Minet, 1984 (2 superfamilies)
 - Superfamily **Palaephatoidea** Davis, 1986 (1 family)
 - Family **Palaephatidae** Davis, 1986 (7 genera, 57 species)
 - Superfamily **Tischerioidea** Spuler, 1898 (1 family)
 - Family **Tischeriidae** Spuler, 1898 (3 genera, 110 species)¹⁵
 - Clade **Ditrysia** Börner, 1925 (29 superfamilies, all following)
 - Superfamily **unassigned** (1 family)
 - Family **unassigned** (25 genera, 100 species)¹⁶
 - Family **Millieriidae** Heppner, 1982 (3 genera, 4 species)¹⁷
 - Superfamily **Tineoidea** Latreille, 1810 (3 families)¹⁸
 - Family **Eriocottidae** Spuler, 1898 (6 genera, 80 species)
 - Family **Psychidae** Boisduval, 1829 (241 genera, 1,350 species)¹⁹
 - Family **Tineidae** Latreille, 1810 (357 genera, 2,393 species)²⁰
 - Superfamily **Gracillarioidea** Stainton, 1854 (3 families)²¹

11. Diversity of all families in Exoporia updated from Nielsen *et al.* (2000).

12. See van Nieukerken (2010).

13. The frequently used name Incurvarioidea is a junior synonym of Adeloidea. As the latter name has been used occasionally before 2000, ICZN article 35.5 does not apply, and priority has to be followed here.

14. The monobasic Crinopterygidae Spuler, 1898 is here considered a subfamily of Incurvariidae.

15. Updated from Diškus & Puplesis (2003).

16. This group comprises a number of genera that cannot be placed with confidence in any currently known family, although some could be attributed to one of the following superfamilies. New family group taxa are probably needed for some of these. Included here are, e.g.: the probably non-monophyletic *Pseudurgis* group, excluded from Cossidae (Mey 2007), the *Heliocosma* group, excluded from Tortricidae (Horak & Common 1996), the genus *Titanomis* Meyrick, 1888 (Hoare 2001), the genus *Allotoma* Roepke, 1944 (Holloway 1999), which is probably Bombycoidea, a number of genera excluded from Heliodinidae (Hsu & Powell 2005), *Kenguichardia* Holloway, 1987 in Noctuoidea, and several others.

17. Raised to family by Rota (2011).

18. Although Tineoidea could not be shown to be monophyletic (Mutanen *et al.* 2010), we retain it as support is conflicting for the dismembering of the superfamily.

19. Psychidae now also contain Arrhenophaninae as a subfamily (Mutanen *et al.* 2010). Diversity updated with Arrhenophanidae from Sobczyk (2011).

20. See Robinson (2009). Acrolophinae are included as a subfamily of Tineidae (Mutanen *et al.* 2010).

- Family **Roeslerstammiidae** Bruand, 1850 (13 genera, 53 species)²²
 Family **Bucculatricidae** Fracker, 1915 (4 genera, 297 species)²³
 Family **Gracillariidae** Stainton, 1854 (101 genera, 1,866 species, 1/2)²⁴
 Superfamily **Yponomeutoidea** Stephens, 1829 (10 families)
 Family **Yponomeutidae** Stephens, 1829 (95 genera, 363 species)²⁵
 Family **Argyresthiidae** Bruand, 1850 (1 genus, 157 species)
 Family **Plutellidae** Guenée, 1845 (48 genera, 150 species)
 Family **Glyphipterigidae** Stainton, 1854 (28 genera, 535 species)²⁶
 Family **Ypsolophidae** Guenée, 1845 (7 genera, 163 species)
 Family **Attevidae** Mosher, 1916 (1 genus, 52 species)
 Family **Praydidae** Moriuti, 1977 (3 genera, 47 species)
 Family **Heliodinidae** Heinemann & Wocke, 1876 (13 genera, 69 species)
 Family **Bedelliidae** Meyrick, 1880 (1 genus, 16 species)
 Family **Lyonetiidae** Stainton, 1854 (32 genera, 204 species)
 Clade **Apoditrysia** Minet, 1983 (26 superfamilies, all following)²⁷
 Superfamily **unassigned** (2 families)
 Family **Prodidactidae** Epstein & Brown, 2003 (1 genus, 1 species)
 Family **Douglasiidae** Heinemann & Wocke, 1876 (2 genera, 29 species)²⁸
 Superfamily **Simaethistoidea** Minet, 1991 (1 family)
 Family **Simaethistidae** Minet, 1991 (2 genera, 4 species)
 Superfamily **Gelechioidea** Stainton, 1854 (21 families)^{29 30}
 Family **Autostichidae** Le Marchand, 1947 (72 genera, 638 species)³¹
 Family **Lecithoceridae** Le Marchand, 1947 (100 genera, 1,200 species)
 Family **Xyloryctidae** Meyrick, 1890 (60 genera, 524 species)
 Family **Blastobasidae** Meyrick, 1894 (24 genera, 377 species)³²
 Family **Oecophoridae** Bruand, 1850 (313 genera, 3,308 species)³³
 Family **Schistonoeidae** Hodges, 1998 (1 genus, 1 species)
 Family **Lypusidae** Herrich-Schäffer, 1857 (3 genera, 21 species)³⁴
 Family **Chimabachidae** Heinemann, 1870 (2 genera, 6 species)
 Family **Peleopodidae** Hodges, 1974 (7 genera, 28 species)³⁵

21. Although Roeslerstammiidae is older than Gracillariidae, Gracillarioidea can be used as superfamily name, following ICZN article 35.5: Roeslerstammioidae has never been used as a published name prior to 2000.
22. Amphitheridae Meyrick, 1914 is a junior synonym: see van Nieukerken & Karsholt (2006).
23. *Tritymba* Lower, 1894 (with nine Australian species), is transferred from Plutellidae to Bucculatricidae following the results of the analysis by Mutanen *et al.* (2010).
24. See De Prins & De Prins (2011a).
25. Since the monophyly of the extended Yponomeutidae in the sense of Kyrki (1990) had already been strongly questioned (e.g. Dugdale *et al.* 1998), and in molecular analyses (Mutanen *et al.* 2010, C. Mitter pers. obs.) constituent taxa never form a monophylum, we have placed Argyresthiidae, Praydidae and Attevidae as separate families.
26. This now includes subfamilies Orthoteliinae (extended, see Heppner 2003), Acrolepiinae (see Gaedike 1997) and Glyphipteriginae.
27. The order of superfamilies in Apoditrysia is very tentative; and their relationships are still unsettled.
28. Douglasiidae have been removed from Gracillarioidea, as two separate molecular analyses consistently placed them in Apoditrysia (Mutanen *et al.* 2010; Kawahara *et al.* 2011).
29. The position of Gelechioidea in Apoditrysia follows Kaila (2004) and Mutanen *et al.* (2010). However, its sister group is completely unknown. Therefore, we tentatively place this superfamily at the base of Apoditrysia. The present division into families is highly tentative; new molecular results indicate the need for future changes.
30. As previously noted (Hodges 1998), there are senior names for Gelechiidae and Depressariinae that should be suppressed due to their infrequent and forgotten use. At least at superfamily level, ICZN Article 35.5 probably applies. An application for suppression of these names will be prepared by some of the present authors.
31. In addition to the groups included by Hodges (1998), Autostichidae now also contains Glyphidocerinae and Deocloninae. The monotypic genus *Oecia* Walsingham, 1897, formerly in Schistonoeidae: Oeciinae, is here placed in subfamily Holcopogoninae (Gozmány 2000).
32. Elevation to family level and placement of Blastobasidae is updated from Baldizzone *et al.* (2006) and supported by Kaila (2004) and Bucheli & Wenzel (2005).
33. Contains the subfamilies Oecophorinae and Deuterogoniinae (see Saito 2005). Stathmopodidae are here treated as a separate family.
34. Lypusidae were synonymised with Amphisbatidae Spuler, 1910 by Heikkilä & Kaila (2010), but Amphisbatidae is the junior synonym. Most of the genera previously included in Amphisbatidae (e.g. Hodges 1998; Lvovsky 2011) have now been moved to Depressariinae in Elachistidae.
35. New synonym: Carcinidae Meyrick, 1906 (based on *Carcina* Hübner, 1825), invalid as it is a junior homonym of Carcinidae MacLeay, 1838 (based on *Carcinus* Leach, 1814) in Malacostraca: Decapoda, Brachyura.

Family **Elachistidae** Bruand, 1850 (161 genera, 3,201 species)³⁶
 Family **Syringopidae** Hodges, 1998 (1 genus, 1 species)
 Family **Coelopoetidae** Hodges, 1978 (1 genus, 3 species)
 Family **Stathmopodidae** Janse, 1917 (44 genera, 408 species)
 Family **Epimarptidae** Meyrick, 1914 (1 genus, 4 species)³⁷
 Family **Batrachedridae** Heinemann & Wocke, 1876 (10 genera, 99 species)
 Family **Coleophoridae** Bruand, 1850 (5 genera, 1,386 species)³⁸
 Family **Momphidae** Herrich-Schäffer, 1857 (6 genera, 115 species)
 Family **Pterolonchidae** Meyrick, 1918 (2 genera, 8 species)
 Family **Scythrididae** Rebel, 1901 (30 genera, 669 species)³⁹
 Family **Cosmopterigidae** Heinemann & Wocke, 1876 (135 genera, 1,792 species)⁴⁰
 Family **Gelechiidae** Stainton, 1854 (500 genera, 4,700 species)⁴¹
 Superfamily **Alucitoidea** Leach, 1815 (2 families)
 Family **Tineodidae** Meyrick, 1885 (12 genera, 19 species)⁴²
 Family **Alucitidae** Leach, 1815 (9 genera, 216 species)⁴³
 Superfamily **Pterophoroidea** Latreille, 1802 (1 family)
 Family **Pterophoridae** Latreille, 1802 (90 genera, 1,318 species)⁴⁴
 Superfamily **Carposinoidea** Walsingham, 1897 (2 families)⁴⁵
 Family **Copromorphidae** Meyrick, 1905 (9 genera, 43 species)
 Family **Carposinidae** Walsingham, 1897 (19 genera, 283 species)
 Superfamily **Schreckensteinoidea** Fletcher, 1929 (1 family)
 Family **Schreckensteiniidae** Fletcher, 1929 (2 genera, 8 species)
 Superfamily **Epermenioidea** Spuler, 1910 (1 family)
 Family **Epermeniidae** Spuler, 1910 (10 genera, 126 species)⁴⁶
 Superfamily **Urodoidea** Kyrki, 1988 (1 family)
 Family **Urodidae** Kyrki, 1988 (3 genera, 66 species)
 Superfamily **Immoidea** Common, 1979 (1 family)
 Family **Immidae** Common, 1979 (6 genera, 245 species)
 Superfamily **Choreutoidea** Stainton, 1858 (1 family)
 Family **Choreutidae** Stainton, 1858 (18 genera, 406 species)
 Superfamily **Galacticoidea** Minet, 1986 (1 family)
 Family **Galacticidae** Minet, 1986 (3 genera, 19 species)
 Superfamily **Tortricoidea** Latreille, 1802 (1 family)
 Family **Tortricidae** Latreille, 1802 (1,071 genera, 10,387 species)⁴⁷
 Superfamily **Cossoidea** Leach, 1815 (7 families)⁴⁸

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36. Elachistidae here include subfamilies Elachistinae, Depressariinae, Hypertrophinae, Ethmiinae, Aeolanthinae, Stenomatinae, Agonoxeninae and Parametriotinae (Hodges 1998; Kaila 2004).
37. Previously considered a subfamily of Batrachedridae.
38. Updated from Baldizzone *et al.* (2006). In contrast to Hodges (1998), Coleophoridae, Momphidae, Blastobasidae and Pterolonchidae are here treated as separate families.
39. Updated from Passerin d'Entreves & Roggero (2007).
40. Updated from Sinev (2002).
41. Based on an estimate for the largest subfamily Gelechiinae and actual counts of Physoptilinae, Dichomeridinae and Pexicopiinae.
42. Updated from Gielis (2003). Tineodidae appeared as paraphyletic in a molecular analysis (Mutanen *et al.* 2010). Based on that work, *Isonomeutis* Meyrick, 1988 from New Zealand is moved here from Copromorphidae.
43. Updated from Gielis (2003).
44. Updated from Gielis (2003).
45. The name Copromorphoidea Meyrick, 1905, introduced by Meyrick (1928), is a junior synonym of Carposinoidea, which although introduced as a superfamily by Diakonoff (1961), and several times used before 2000, is attributable to Walsingham (1897) as the author of the family on which the name is based.
46. Updated from Gaedike (1996).
47. See Baixeras *et al.* (2010).
48. Cossoidea and Sesiioidea were never monophyletic and were much intermixed in recent molecular analyses (Regier *et al.* 2009; Mutanen *et al.* 2010). Although the monophyly of these superfamilies together is also uncertain, we tentatively synonymise Sesiioidea with Cossoidea. It is possible that only by combining them with Zygaenoidea will a well-supported monophyletic group be eventually achieved.

- Family **Brachodidae** Agenjo, 1966 (14 genera, 137 species)⁴⁹
 Family **Cossidae** Leach, 1815 (151 genera, 971 species)⁵⁰
 Family **Dudgeoneidae** Berger, 1958 (6 genera, 57 species)⁵¹
 Family **Metarbelidae** Strand, 1909 (18 genera, 196 species)⁵²
 Family **Ratardidae** Hampson, 1898 (3 genera, 10 species)
 Family **Castniidae** Boisduval, 1828 (34 genera, 113 species)
 Family **Sesiidae** Boisduval, 1828 (154 genera, 1,397 species)⁵³
 Superfamily **Zygaenoidea** Latreille, 1809 (12 families)
 Family **Epipyropidae** Dyar, 1903 (9 genera, 32 species)
 Family **Cyclotornidae** Meyrick, 1912 (1 genus, 5 species)
 Family **Heterogynidae** Rambur, 1866 (1 genus, 10 species)
 Family **Lacturidae** Heppner, 1995 (8 genera, 120 species)
 Family **Phaudidae** Kirby, 1892 (3 genera, 15 species)⁵⁴
 Family **Dalceridae** Dyar, 1898 (11 genera, 80 species)
 Family **Limacodidae** Duponchel, 1845 (301 genera, 1,672 species)
 Family **Megalopygidae** Herrich-Schäffer, 1855 (23 genera, 232 species)
 Family **Aididae** Schaus, 1906 (2 genera, 6 species)
 Family **Somabrachyidae** Hampson, 1920 (4 genera, 8 species)
 Family **Himantopteridae** Rogenhofer, 1884 (11 genera, 80 species)⁵⁵
 Family **Zygaenidae** Latreille, 1809 (170 genera, 1,036 species)
 Clade **Obtectomera** Minet, 1986 (12 superfamilies, all following)
 Superfamily **Whalleyanoidea** Minet, 1991 (1 family)
 Family **Whalleyanidae** Minet, 1991 (1 genus, 2 species)
 Superfamily **Thyridoidea** Herrich-Schäffer, 1846 (1 family)
 Family **Thyrididae** Herrich-Schäffer, 1846 (93 genera, 940 species)
 Superfamily **Hyblaeoidea** Hampson, 1903 (1 family)
 Family **Hyblaeidae** Hampson, 1903 (2 genera, 18 species)
 Superfamily **Calliduloidea** Moore, 1877 (1 family)
 Family **Callidulidae** Moore, 1877 (7 genera, 49 species)
 Superfamily **Papilionoidea** Latreille, 1802 (7 families)⁵⁶
 Family **Papilionidae** Latreille, 1802 (32 genera, 570 species, 3/4)⁵⁷
 Family **Hedylidae** Guenée, 1858 (1 genus, 36 species)
 Family **Hesperiidae** Latreille, 1809 (570 genera, 4,113 species, 2/2)
 Family **Pieridae** Swainson, 1820 (91 genera, 1,164 species, 5/6)
 Family **Riodinidae** Grote, 1895 (1827) (146 genera, 1,532 species, 3/4)
 Family **Lycaenidae** Leach, 1815 (416 genera, 5,201 species, 1/1)
 Family **Nymphalidae** Rafinesque, 1815 (559 genera, 6,152 species, 11/21)
 Superfamily **Pyraloidea** Latreille, 1809 (2 families)⁵⁸
 Family **Pyralidae** Latreille, 1809 (1,055 genera, 5,921 species)
 Family **Crambidae** Latreille, 1810 (1,020 genera, 9,655 species)
 Superfamily **Mimallonoidea** Burmeister, 1878 (1 family)
 Family **Mimallonidae** Burmeister, 1878 (27 genera, 194 species)

49. This includes also Pseudocossinae Heppner, 1984 (see Minet 1991).
 50. Cossidae in the sense of the Handbook (Edwards *et al.* 1998) and Davis *et al.* (2008) were not monophyletic in recent molecular analyses (Regier *et al.* 2009; Mutanen *et al.* 2010). Here they include only Zeuzerinae, Hypoptinae and Cossinae, almost as the treatment in Schoorl (1990). For diversity of Old World taxa see Yakovlev (2011).
 51. Dudgeoneidae now also include Cossulinae, following Mutanen *et al.* (2010), a relationship already suggested by Edwards *et al.* (1998).
 52. Afrotropical diversity from De Prins & De Prins (2011b), to which two Oriental genera and ca. 20 species are added.
 53. Diversity follows Pühringer & Kallies (2011).
 54. Family status of Phaudidae is supported by molecular analyses (Niehuis *et al.* 2006; Mutanen *et al.* 2010).
 55. Anomoeotidae Hering, 1937 are here regarded as subfamily of Himantopteridae (Mutanen *et al.* 2010).
 56. Current placement and composition of butterflies (including Hesperidae and Hedylidae) is strongly supported by both large molecular studies (Regier *et al.* 2009; Mutanen *et al.* 2010). Diversity numbers follow G. Lamas' database, only partly published (Lamas 2008).
 57. *Chilasa* Moore [1881] is included in *Papilio* Linnaeus, 1758 as a junior synonym, following the most recent phylogenetic studies (Zakharov *et al.* 2004; Simonsen *et al.* 2011).
 58. Diversity based on two databases (Beccaloni *et al.* 2005; Nuss *et al.* 2010).

- Clade **Macroheterocera** Chapman, 1893 (5 superfamilies)⁵⁹
- Superfamily **Drepanoidea** Boisduval, 1828 (3 families)⁶⁰
 - Family **Cimeliidae** Chrétien, 1916 (2 genera, 6 species)⁶¹
 - Family **Doidae** Donahue & Brown, 1987 (2 genera, 6 species)⁶²
 - Family **Drepanidae** Boisduval, 1828 (122 genera, 660 species)
 - Superfamily **Lasiocampoidea** Harris, 1841 (1 family)
 - Family **Lasiocampidae** Harris, 1841 (224 genera, 1,952 species)
 - Superfamily **Bombycoidea** Latreille, 1802 (10 families)⁶³
 - Family **Apateleodidae** Neumoegen & Dyar, 1894 (10 genera, 145 species)⁶⁴
 - Family **Eupterotidae** Swinhoe, 1892 (53 genera, 339 species)
 - Family **Brahmaeidae** Swinhoe, 1892 (7 genera, 65 species)⁶⁵
 - Family **Phiditiidae** Minet, 1994 (4 genera, 23 species)⁶⁶
 - Family **Anthelidae** Turner, 1904 (9 genera, 94 species)⁶⁷
 - Family **Carthaeidae** Common, 1966 (1 genus, 1 species)
 - Family **Endromidae** Boisduval, 1828 (12 genera, 59 species)⁶⁸
 - Family **Bombycidae** Latreille, 1802 (26 genera, 185 species)
 - Family **Saturniidae** Boisduval, 1837 (169 genera, 2,349 species)
 - Family **Sphingidae** Latreille, 1802 (206 genera, 1,463 species, 2/2)
 - Superfamily **Geometroidea** Leach, 1815 (4 families)
 - Family **Epicopeidae** Swinhoe, 1892 (9 genera, 20 species)
 - Family **Sematuridae** Guenée, 1858 (6 genera, 40 species)
 - Family **Uraniidae** Leach, 1815 (90 genera, 686 species)
 - Family **Geometridae** Leach, 1815 (2,002 genera, 23,002 species)⁶⁹
 - Superfamily **Noctuoidea** Latreille, 1809 (6 families)⁷⁰
 - Family **Oenosandridae** Miller, 1991 (4 genera, 8 species)
 - Family **Notodontidae** Stephens, 1829 (704 genera, 3,800 species)
 - Family **Erebidae** Leach, 1815 (1,760 genera, 24,569 species)⁷¹
 - Family **Euteliidae** Grote, 1882 (29 genera, 520 species)⁷²
 - Family **Nolidae** Bruand, 1847 (186 genera, 1,738 species)
 - Family **Noctuidae** Latreille, 1809 (1,089 genera, 11,772 species)⁷³

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59. We prefer to use the term Macroheterocera for the well-supported moth clade identified in recent large molecular studies (Regier *et al.* 2009; Mutanen *et al.* 2010), to avoid confusion with the popular term macrolepidopterans, now freed for popular use for a polyphyletic assemblage of larger moths and butterflies.
60. Inclusion of Cimeliidae and Doidae follows tentatively recent molecular results (Regier *et al.* 2009; Mutanen *et al.* 2010) and is supported by some morphological characters.
61. See Yen & Minet (2007) for synonymy of Axiidae Rebel, 1919 (a homonym of Axiidae Huxley, [1879] in Malacostraca: Decapoda) and its replacement by the name Cimeliidae.
62. Doidae are moved from Noctuoidea, see Drepanoidea above.
63. Classification of Bombycoidea follows Zwick *et al.* (2011).
64. Removed from Bombycidae and raised to family by Zwick (2008).
65. Lemoniidae were synonymized with Brahmaeidae by Zwick (2008).
66. Removed from Bombycidae and raised to family by Zwick *et al.* (2011).
67. Removed from Lasiocampoidea by Zwick *et al.* (2011).
68. Zwick *et al.* (2011) synonymized three groups with Endromidae: Mirinidae, Primostictini and Oberthueriini (previously placed in Bombycidae - Prismoctictinae).
69. Diversity updated from Scoble & Hausmann (2007).
70. The classification of Noctuoidea follows the recent studies of Zahiri *et al.* (2011) and Lafontaine & Schmidt (2010). Doidae are moved from Noctuoidea to Drepanoidea (see there). The six families recognized were all highly supported in the molecular analyses (Zahiri *et al.* 2011). Molecular analyses are as yet inconclusive in establishing robust phylogenetic relationships among the four families of quadrid noctuoids, so the traditional sequence based on morphology is followed, placing Euteliidae after Erebidae and Nolidae before Noctuidae.
71. Erebidae include the former families Arctiidae Leach, 1815 and Lymantriidae Hampson, 1893 as subfamilies. Micronoctuidae Fibiger, 2005 is subordinate within Hypenodinae (Lafontaine & Schmidt 2010; Zahiri *et al.* 2011). Diversity is updated from Poole (1989), numbers for arctiines and lymantriines are estimates.
72. Euteliidae comprise Euteliinae and Stictopterinae (Zahiri *et al.* 2011). Diversity is updated from Poole (1989).
73. Noctuidae comprise essentially the triline noctuoids (see Lafontaine & Schmidt 2010; Zahiri *et al.* 2011). Diversity is updated from Poole (1989).

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