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Order Hymenoptera*

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Abstract

An updated classification of the order Hymenoptera is provided with the current numbers of genera and species described so far specified. The order is composed of 2 suborders, 27 superfamilies, 132 families, 8423 extant genera with an additional 685 extinct genera. Considered one of the most species-rich insects orders a total of 153088 extant species have been described, in addition to 2429 extinct species.

Key words: Hymenoptera, wasps, bees, ants, classification, diversity

Introduction

The present list concerns the current classification and described diversity of the order Hymenoptera which includes all wasps, bees and ants. Classification of extant superfamilies follows Sharkey (2007) and Sharkey *et al.* (2011). The number of described and here included genus-group and species-group taxa are, unless otherwise stated, updated until April 2012, while family-group taxa are updated until August 2013. In the counts for fossil genera and species, only extinct taxa are included, not fossil representatives of extant taxa.

The taxa of Hymenoptera are divided into two suborders (Symphyta and Apocrita), with 27 superfamilies (9 superfamilies in Symphyta and 18 in Apocrita) and 132 families. It is noteworthy that 17 of these families have been described since year 2000 and that 16 of these newly recognized families represent now extinct families only known from fossils. New genera and species are frequently encountered and our most recent estimate total 8423 extant genera with an additional 685 extinct genera. Considered one of the most species-rich insect orders, behind only Coleoptera and Lepidoptera, there is a total of 153088 extant and described species, in addition to 2429 extinct described species.

Diversity estimates based on described species for some of the parasitic wasp families can be misleading. There is a rich literature on the family Cynipidae with much ongoing research, but the classification is currently changing and many new species are being described especially from the northern Neotropical and Oriental regions. At the same time several groups remain without modern revisions, and there is a wealth of synonyms particularly due to separate names of morphologically different generations in the subfamily Cynipinae. Diversity counts for Figitidae and several other large families of parasitic Hymenoptera also bear little relationship to the actual diversity. All major groups of Figitidae (most of the subfamily Eucoilinae, the major genera in Charipinae, plus some genera of Figitinae, Anacharitinae and Aspicerinae) remain without modern revisions, and there are very few current workers in the group. To exemplify this, of the 919 currently formally valid species names in Eucoilinae, current researchers have examined less than 50% of the types and assessed the generic combination—at most 400 species are confirmedly valid and actually recognizable. Even in Europe, the historically best known area, at least 50% of the species present in collections are in fact still undescribed, and for the rest of the world, this ratio is much higher (Forshage, pers. obs.). For real numbers of species of Figitidae, the only figure someone has dared to estimate is an approximately 14,000 (Nordlander, 1984).

Classification

Order **Hymenoptera** Linnaeus, 1758 (2 suborders) (8,423 (and †684) genera, 152,677 (and †2,428) species)

Suborder **Symphyta**¹ (9 superfamilies, 25 families)

Superfamily **Anaxyeloidea** Martynov, 1925 (1 family)

Family **Anaxyelidae** Martynov, 1925 (1 (and †12) genera, 1 (and †32) species)

Superfamily **Cephoidea** Newman, 1834 (2 families)

Family **Cephalidae** Newman, 1834 (21 (and †3) genera, 160 (and †6) species)

† Family **Sepulcidae** Rasnitsyn, 1968 (†15 genera, †38 species)

† Superfamily **Karatavitoidea** Rasnitsyn, 1963 (1 family)

† Family **Karatavitidae** Rasnitsyn, 1963 (†5 genera, †6 species)

Superfamily **Orussoidea** Newman, 1834 (2 families)

Family **Orussidae** Newman, 1834 (16 (and †2) genera, 82 (and †3) species)

† Family **Paroryssidae** Martynov, 1925 (†4 genera, †10 species)

Superfamily **Pamphilioidea** Cameron, 1890 (3 families)

Family **Megalodontesidae** Konow, 1897 (1 (and †1) genera, 42 (and †1) species)

1. Taeger *et al.* 2010; Taeger & Blank 2012.

Family **Pamphiliidae** Cameron, 1890 (10 (and †3) genera, 291 (and †5) species)
 † Family **Xyelydidae** Rasnitsyn, 1986 (†8 genera, †20 species)
 Superfamily **Siricoidea** Billberg, 1820 (6 families)
 † Family **Daohugoidae** Rasnitsyn & Zhang, 2004 (†1 genus, †1 species)
 † Family **Praesiricidae** Rasnitsyn, 1968 (†6 genera, †8 species)
 † Family **Protosiricidae** Rasnitsyn & Zhang, 2004 (†1 genus, †1 species)
 † Family **Pseudosiricidae** Handlirsch, 1908 (†1 genus, †14 species)
 † Family **Sinosiricidae** Hong, 1975 (†1 genus, †1 species)
 Family **Siricidae** Billberg, 1820 (11 (and †9) genera, 111 (and †13) species)
 Superfamily **Tenthredinoidea** Latreille, 1803 (8 families)
 Family **Argidae** Konow, 1890 (58 (and †1) genera, 897 (and †7) species)
 Family **Blasticotomidae** Thomson, 1871 (2 (and †1) genera, 12 (and †1) species)
 Family **Cimbicidae** W. Kirby, 1837 (16 (and †6) genera, 182 (and †19) species)
 Family **Diprionidae** Rohwer, 1910 (11 (and †2) genera, 136 (and †2) species)
 † Family **Electrotomidae** Rasnitsyn, 1977 (†1 genus, †1 species)
 Family **Pergidae** Rohwer, 1911 (60 genera, 442 species)
 Family **Tenthredinidae** Latreille, 1803 (400 (and †14) genera, 5500 (and †79) species)
 † Family **Xyelotomidae** Rasnitsyn, 1968 (†14 genera, †21 species)
 Superfamily **Xiphydrioidea** Leach, 1819 (1 family)
 Family **Xiphydriidae** Leach, 1819 (28 genera, 146 species)
 Superfamily **Xyeloidea** Newman, 1834 (1 families)
 Family **Xyelidae** Newman, 1834 (5 (and †47) genera, 63 (and †93) species)

Suborder **Apocrita** (18 superfamilies, 105 families)

† Superfamily **Ephialtitoidea**² Handlirsch, 1906 (1 family)
 † Family **Ephialtitidae** Handlirsch, 1906 (†2 genera, †60 species)
 Superfamily **Trigonaloidea**³ Cresson, 1887 (2 families)
 † Family **Maimetshidae**⁴ Rasnitsyn, 1975 (†9 genera, †11 species)
 Family **Trigonalidae**⁵ Cresson, 1887 (16 (and †4) genera, 92 (and †5) species)
 Superfamily **Megalyroidea** Schletterer, 1889 (1 family)
 Family **Megalyridae**⁶ Schletterer, 1889 (8 (and †11) genera, 43 (and †40) species)
 Superfamily **Stephanoidea** Leach, 1815 (1 family)
 Family **Stephanidae**⁷ Leach, 1815 (11 (and †4) genera, 342 (and †8) species)
 Superfamily **Ceraphronoidea** Haliday, 1833 (4 families)
 Family **Ceraphronidae**⁸ Haliday, 1833 (15 genera, 304 (and †2) species)
 Family **Megaspilidae**⁹ Ashmead, 1893 (12 (and †1) genera, 299 (and †12) species)

2. <http://www.taxapad.com/taxapadmain.php>.

3. This name has been spelled in two ways: Trigonalidae and Trigonalidae. The family was proposed as Trigonalidae by Cresson (1887) and is based on the genus *Trigonalys* Westwood (1835). Westwood did not provide the derivation of his genus-group name, but it must be assumed that *Trigonalys* is to be treated as a noun in the nominative singular. It is presumably a compound word. If Latin, the first part of the name “trigonium” is a noun meaning triangle but the second part is ambiguous; it might come from the Greek “alys” or it might be an arbitrary combination of letters. Only in the latter case does ICZN Article 29.3.3 apply and the stem adopted by Cresson, who establishes the new family-group taxon, must be accepted as the correct spelling, namely Trigonalidae.

4. Perrichot *et al.* 2011.

5. Lelej 2003a; Poinar 2005.

6. Rasnitsyn 1975; Belokobylskij 1998; Perrichot 2009.

7. Aguiar 2004a, 2004b, 2005, 2006; Aguiar & Jennings 2005, 2010; Aguiar *et al.* 2010; Achterberg & Yang 2004; Achterberg & Quicke 2006; Engel & Grimaldi 2004; Engel 2005b; Hong *et al.* 2010, 2011; Hong & Xu 2011.

8. Johnson & Musetti 2004; Evans *et al.* 2005.

9. Dessart 2001; Martinez 2003; Takada 2009; Peñalver & Engel 2006.

- † Family **Radiophronidae**¹⁰ Ortega-Blanco, Rasnitsyn & Declòs, 2010 (†2 genera, †2 species)
 † Family **Stigmaphronidae**¹¹ Kozlov, 1975 (†8 genera, †25 species)
- Superfamily **Evanioidea** Latreille, 1802 (5 families)
 † Family **Andreneliidae**¹² Rasnitsyn & Martínez-Declòs, 2000 (†1 genus, †1 species)
 Family **Aulacidae**¹³ Shuckard, 1841 (2 (and †10) genera, 185 (and †18) species)
 Family **Evaniidae**¹⁴ Latreille, 1802 (21 (and †9) genera, 449 (and †19) species)
 Family **Gasteruptiidae**¹⁵ Ashmead, 1900 (6 genera, 496 species)
 † Family **Praeaulacidae**¹⁶ Rasnitsyn, 1972 (†10 genera, †39 species)
- Superfamily **Mymarommatoidea** Debauche, 1948 (3 families)
 † Family **Alavarommatidae**¹⁷ Ortega-Blanco, Peñalver, Delclòs & Engel, 2011 (†1 genus, †1 species)
 † Family **Gallorommatidae**¹⁸ Gibson, Read & Huber, 2007 (†1 genus, †3 species)
 Family **Mymarommatidae**¹⁹ Debauche, 1948 (3 (and †2) genera, 10 (and †10) species)
- Superfamily **Proctotrupeoidea** Latreille, 1802 (11 families)
 Family **Austroniidae**²⁰ Kozlov, 1975 (1 (and †1) genera, 3 (and †1) species)
 Family **Heloridae** Förster, 1856 (1 (and †9) genera, 12 (and †13) species)
 † Family **Iscopinidae** Rasnitsyn, 1980 (†10 genera, †39 species)
 † Family **Jurapriidae** Rasnitsyn, 1983 (†1 genus, †1 species)
 † Family **Mesoserphidae**²¹ Kozlov, 1970 (†16 genera, †33 species)
 Family **Pelecinidae**²² Haliday, 1839 (1 (and †5) genera, 3 (and †8) species)
 Family **Peradeniidae**²³ Naumann & Masner, 1985 (1 genus, 2 (and †1) species)
 Family **Proctorenyxidae**²⁴ Lelej & Kozlov, 1999 (2 genera, 2 species)
 Family **Proctotrupidae** Latreille, 1802 (28 (and †15) genera, 403 (and †26) species)
 Family **Roproniidae** Bradley, 1905 (2 (and †4) genera, 20 (and †5) species)
 Family **Vanhorniidae** Crawford, 1909 (3 genera, 5 species)
 † Genera unplaced to family (†2 genera, †3 species)
- Superfamily **Diaprioidea** Haliday, 1833 (5 families)
 Family **Diapriidae**²⁵ Haliday, 1833 (190 (and †7) genera, 2048 (and †22) species)
 Family **Ismaridae**²⁶ Thomson, 1858 (1 genus, 29 species)
 Family **Maamingidae**²⁷ Early, Masner, Naumann & Austin, 2001 (1 genus, 2 species)
 Family **Monomachidae**²⁸ Ashmead, 1902 (2 genera, 30 species)

10. Ortega-Blanco *et al.* 2010.

11. McKellar & Engel 2011.

12. Rasnitsyn & Martínez-Declòs 2000.

13. Turrisi *et al.* 2009; Jennings & Krogmann 2009.

14. Deans 2005; Kawada & Azevedo 2007; Deans & Kawada 2008; Rasnitsyn & Brothers 2007; Zhang & Rasnitsyn 2008; Peñalver *et al.* 2010; Deans *et al.* 2012.

15. Jennings & Austin 2002; Macedo 2009.

16. Zhang & Rasnitsyn 2008.

17. Ortega-Blanco *et al.* 2011a.

18. Engel & Grimaldi 2007a.

19. Gibson *et al.* 2007; Huber *et al.* 2008.

20. Kozlov in Rasnitsyn 1975.

21. <http://osuc.biosci.ohio-state.edu>.

22. Engel & Grimaldi 2006a.

23. Johnson *et al.* 2001.

24. Lelej & Kozlov 1999; He *et al.* 2002.

25. Perrichot & Nel 2008.

26. <http://osuc.biosci.ohio-state.edu>.

27. Early *et al.* 2001.

28. Johnson & Musetti 2012.

- † Family **Spathiopterygidae**²⁹ Engel & Ortega-Blanco, 2013 (†3 genera and †3 species)
 Superfamily **Platyastroidea** Haliday, 1833 (1 family)
 Family **Platygastridae** Haliday, 1833 (236 (and †20) genera, 5385 (and †45) species)
 † Superfamily **Serphitoidea** Brues, 1937 (1 family)
 † Family **Serphitidae**³⁰ Brues, 1937 (†3 genera, †9 species)
 Superfamily **Cynipoidea** Latreille, 1802 (8 families)
 Family **Austrocynipidae**³¹ Riek, 1971 (1 genus, 1 species)
 Family **Cynipidae**³² Latreille, 1802 (74 (and †3) genera, 1412 (and †11) species)
 Family **Figitidae** Hartig, 1840 (148 (and †10) genera, 1571 (and †11) species)
 † Family **Gerocynipidae**³³ Liu & Engel, 2007 (†3 genera, †5 species)
 Family **Ibaliidae**³⁴ Thomson, 1862 (3 (and †1) genera, 20 (and †2) species)
 Family **Liopteridae** Ashmead, 1895 (10 (and †2) genera, 153 (and †2) species)
 † Family **Protimaspidae**³⁵ Liu & Engel, 2007 (†1 genus, †1 species)
 † Family **Stolamissidae**³⁶ Liu & Engel, 2007 (†1 genus, †1 species)
 Superfamily **Chalcidoidea**³⁷ Latreille, 1817 (23 families)
 Family **Agaonidae**³⁸ Walker, 1846 (20 (and †2) genera, 762 (and †4) species)
 Family **Aphelinidae** Thomson, 1876 (29 (and †1) genera, 1078 (and †1) species)
 Family **Azotidae**³⁹ Nikol'skaya & Yasnosh, 1966 (1 genus, 92 species)
 Family **Chalcididae** Latreille, 1817 (90 (and †3) genera, 1469 (and †5) species)
 Family **Cynipencyrtidae**⁴⁰ Trjapitzin, 1973 (1 genus, 1 species)
 Family **Encyrtidae** Walker, 1837 (493 (and †2) genera, 4058 (and †3) species)
 Family **Eriaporidae**⁴¹ Ghesquière, 1955 (5 genera, 22 species)
 Family **Eucharitidae** Walker, 1846 (57 (and †1) genera, 427 (and †1) species)
 Family **Eulophidae** Westwood, 1829 (334 (and †2) genera, 4969 (and †3) species)
 Family **Eupelmidae** Walker, 1833 (51 (and †4) genera, 931 (and †5) species)
 Family **Eurytomidae** Walker, 1832 (97 (and †1) genera, 1453 (and †3) species)
 † Family **Khutelchalcididae** Rasnitsyn, Basibuyuk & Quicke, 2004 (†1 genus, †1 species)
 Family **Leucospidae**⁴² Walker, 1834 (4 (and †1) genera, 134 (and †1) species)
 Family **Mymaridae** Haliday, 1833 (96 (and †13) genera, 1437 (and †20) species)
 Family **Ormyridae** Förster, 1856 (3 genera, 125 species)
 Family **Perilampidae** Förster, 1856 (17 (and †1) genera, 284 (and †1) species)
 Family **Pteromalidae** Dalman, 1820 (619 (and †6) genera, 3544 (and †20) species)
 Family **Rotoitidae**⁴³ Bouček & Noyes, 1987 (2 genera, 2 species)
 Family **Signiphoridae** Howard, 1894 (4 genera, 78 species)
 Family **Tanaostigmatidae** Ashmead, 1904 (9 (and †1) genera, 93 (and †1) species)

29. Engel *et al.* 2013.

30. Ortega-Blanco *et al.* 2011b.

31. Ronquist 1999.

32. Liljeblad 2002.

33. Liu *et al.* 2007a.

34. Liu & Nordlander 1994; Liu *et al.* 2007; Liu & Engel 2010.

35. Liu *et al.* 2007a.

36. Liu *et al.* 2007a.

37. Noyes 2012.

38. Peñalver *et al.* 2006.

39. Heraty *et al.* (2013) revised the status of this family. The included taxa were previously found in Aphelinidae.

40. Heraty *et al.* (2013) revised the status of this family. The included taxa were previously found in Tanaostigmatidae.

41. Heraty *et al.* (2013) revised the status of this family. The included taxa were previously found in Aphelinidae.

42. Engel 2002.

43. Gibson & Huber 2000.

- Family **Tetracampidae** Förster, 1856 (15 (and †5 (+†1 from Mymaridae, unpubl.) genera, 44 (and †8 (+†1 from Mymaridae, unpublished) species)
- Family **Torymidae** Walker, 1833 (82 (and †5) genera, 900 (and †13) species)
- Family **Trichogrammatidae** Haliday, 1851 (97 (and †3) genera, 881 (and †3) species)
- Superfamily **Ichneumonoidea** Latreille, 1802 (3 families)
- Family **Braconidae** Nees, 1811 (1057 (and †5) genera, 19205 (and †206) species)
- Family **Ichneumonidae**⁴⁴ Latreille, 1802 (1575 genera, 24025 (and †216) species)
- † Family **Praeichneumonidae**⁴⁵ Rasnitsyn, 1983 (†1 genus, †5 species)
- † Superfamily **Bethylonymoidea** Rasnitsyn, 1975 (1 family)
- † Family **Bethylonymidae**⁴⁶ Rasnitsyn, 1975 (†2 genera, †17 species)
- Superfamily **Chrysidoidea** Latreille, 1802 (9 families)
- Family **Bethylidae**⁴⁷ Haliday, 1839 (84 (and †11) genera, 2340 (and †13) species)
- Family **Chrysididae**⁴⁸ Latreille, 1802 (81 (and †6) genera, 2500 (and †9) species)
- Family **Dryinidae**⁴⁹ Haliday, 1833 (41 (and †2) genera, 1605 (and †19) species)
- Family **Embolemidae**⁵⁰ Förster, 1856 (2 (and †1) genera, 39 (and †9) species)
- † Family **Falsiformicidae**⁵¹ Rasnitsyn, 1975 (†1 genus, †1 species)
- † Family **Plumalexiidae**⁵² Brothers, 2011 (†1 genus, †1 species)
- Family **Plumariidae**⁵³ Bischoff, 1914 (7 genera, 22 species)
- Family **Sclerogibbidae**⁵⁴ Ashmead, 1902 (3 (and †1) genera, 20 (and †2) species)
- Family **Scolebythidae**⁵⁵ Evans, 1963 (4 (and †5) genera, 6 (and †7) species)
- Superfamily **Vespoidea**⁵⁶ Latreille, 1802 (10 families)
- Family **Bradynobaenidae**⁵⁷ de Saussure, 1892 (10 genera, 188 species)
- Family **Formicidae**⁵⁸ Latreille, 1802 (299 (and †132) genera, 12199 (and †620) species)
- Family **Mutillidae**⁵⁹ Latreille, 1802 (210 (and †1) genera, 4302 (and †12) species)
- Family **Pompilidae**⁶⁰ Latreille, 1804 (125 (and †2) genera, 4855 (and †16) species)
- Family **Rhopalosomatidae**⁶¹ Ashmead, 1896 (4 (and †4) genera, 72 (and †4) species)
- Family **Sapygidae**⁶² Latreille, 1810 (12 (and †1) genera, 66 (and †1) species)
- Family **Scoliidae**^{63 64} Latreille, 1802 (143 (and †5) genera, 560 (and †17) species)
- Family **Sierolomorphidae**⁶⁵ Krombein, 1951 (2 genera, 11 (and †1) species)
- Family **Tiphidae**⁶⁶ Leach, 1815 (120 (and †5) genera, 2000 (and †17) species)
- Family **Vespidae**⁶⁷ Latreille, 1802 (268 (and †3) genera, 4932 (and †11) species)

44. Wahl 1999; Yu *et al.* 2005.

45. Kopylov 2012.

46. Rasnitsyn 1975; Rasnitsyn & Zhang 2010.

47. Vargas-Rojas & Terayama 2006; Huber 2009; Carpenter 1992; Ploëg & Nel 2004.

48. Kimsey & Bohart 1990; Engel 2006.

49. Olmi & Virla 2006; Engel 2005a; Olmi *et al.* 2011a.

50. Olmi 2006a; Olmi *et al.* 2011b; Perrichot & Engel 2011; Ortega-Blanco *et al.* 2011c.

51. Rasnitsyn 1975.

52. Brothers 2011.

53. Huber 2009; Brothers 2011.

54. Olmi 2006b; Engel & Grimaldi 2006b.

55. Brothers 2006; Engel & Grimaldi 2007b.

56. This equals Scoliioidea Latreille, 1802 + Pompiloidea Latreille, 1804 + Vespoidea Latreille, 1802 + Formicoidea Latreille, 1802 *sensu* Rasnitsyn 1988.

57. Lelej 2003b.

58. <http://antcat.org> (accessed March 2012).

59. Brothers 2003; Lelej 2005.

60. Engel & Grimaldi 2006c.

61. <http://rhopalosomatidae.hymis.eu> (accessed August 2013).

62. Kurzenko 2009; Bennett & Engel 2005.

Superfamily **Apoidea** Latreille, 1802 (13 families)

- Family **Ampulicidae**⁶⁸ Shuckard, 1840 (6 (and †7) genera, 200 (and †8) species)
- Family **Andrenidae**⁶⁹ Latreille, 1802 (77 (and †3) genera, 2917 (and †11) species)
- † Family **Angarosphecidae**⁷⁰ Rasnitsyn, 1975 (†13 genera, †44 species)
- Family **Apidae**⁷¹ Latreille, 1802 (209 (and †22) genera, 5749 (and †87) species)
- Family **Colletidae**⁷² Lepeletier de Saint Fargeau, 1841 (86 genera, 2547 (and †2) species)
- Family **Crabronidae**⁷³ Latreille, 1802 (242 (and †24) genera, 8773⁷⁴ (and †29) species)
- Family **Halictidae**⁷⁵ Thomson, 1869 (79 (and †7) genera, 4327 (and †22) species)
- Family **Megachilidae**⁷⁶ Latreille, 1802 (76 (and †6) genera, 4096 (and †34) species)
- Family **Melittidae**⁷⁷ Schenck, 1860 (15 (and †2) genera, 187 (and †4) species)
- † Family **Mellitosphecidae**⁷⁸ Poinar & Danforth, 2006 (†1 genus, †1 species)
- † Family **Paleomelittidae**⁷⁹ Engel, 2001 (†1 genus, †1 species)
- Family **Sphecidae**⁸⁰ Latreille, 1802 (19 (and †1) genera, 724⁸¹ (and †1) species)
- Family **Stenotritidae**⁸² Cockerell, 1934 (2 genera, 21 species)

Apocrita incertae sedis (3 families)

- † Family **Archaeocynipidae**⁸³ Rasnitsyn & Kovalev, 1988 (†2 genera, †3 species)
- † Family **Eostephanitidae** Hong, 2002 (†1 genus, †1 species)
- † Family **Kuafuidae**⁸⁴ Rasnitsyn & Zhang, 2010 (†3 genera, †3 species)

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- 63. Osten (2005) ignored Argaman's classification and lists only 43 valid genera for Scoliidae. While Argaman's division of the family into 143 genera is not supported by phylogenetic analysis or proper diagnosis, the family obviously is very diverse and in need of a generic revision based on a phylogeny.
 - 64. Argaman 1996; Osten 2005; Zhang 2006.
 - 65. Gorbatojskij & Lelej 1998; Rasnitsyn 2000.
 - 66. Kimsey 1991; Kimsey 2006; Engel *et al.* 2009.
 - 67. Carpenter & Rasnitsyn 1990; Sarmiento & Carpenter 2006; Brothers & Rasnitsyn 2008.
 - 68. http://research.calacademy.org/ent/catalog_sphecidae.
 - 69. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 70. http://research.calacademy.org/ent/catalog_sphecidae.
 - 71. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 72. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 73. http://research.calacademy.org/ent/catalog_sphecidae.
 - 74. Updated August 2013.
 - 75. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 76. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 77. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 78. Michez *et al.* 2012.
 - 79. Michener 2007; Michez *et al.* 2012; Ascher & Pickering 2012.
 - 80. http://research.calacademy.org/ent/catalog_sphecidae.
 - 81. Updated August 2013.
 - 82. Michener 2007; Ascher & Pickering 2012.

References

- Achterberg, C. van & Quicke, D.L.J. (2006) Taxonomic notes on Old World Stephanidae (Hymenoptera): description of *Parastephanellus matsumotoi* sp. n. from Japan, redescription of *Commatopus xanthocephalus* (Cameron) and keys to the genera *Profoenatopus* van Achterberg and *Megischus* Brullé. *Tijdschrift voor Entomologie*, 149, 215–225.
<http://dx.doi.org/10.1163/22119434-900000202>
- Achterberg, C. van & Yang, Z.Q. (2004) New species of the genera *Megischus* Brullé and *Stephanus* Jurine from China (Hymenoptera: Stephanoidea: Stephanidae), with a key to world species of the genus *Stephanus*. *Zoologische Medelingen Leiden*, 78, 101–117.
- Aguiar, A.P. (2004a) World catalog of the Stephanidae (Hymenoptera: Stephanoidea). *Zootaxa*, 753, 1–120.
- Aguiar, A.P. (2004b) Additions to the revision of the genus *Hemistephanus* Enderlein (Hymenoptera: Stephanidae), with inclusion of four taxa and description of two new species. *Papéis Avulsos de Zoologia*, 44, 13–43.
<http://dx.doi.org/10.1590/s0031-10492004000200001>
- Aguiar, A.P. (2005) A New and Unusual Species of Stephanidae (Hymenoptera), with a Discussion on its Phylogenetic Implications. *Journal of Hymenoptera Research*, 14, 1–6.
- Aguiar, A.P. (2006) The Stephanidae (Hymenoptera) of Mexico, with description of six new species and key to western *Foenatopus* Smith. *Zootaxa*, 1186, 1–56.
- Aguiar, A.P. & Jennings, J.T. (2005) First record of Stephanidae (Hymenoptera) from New Caledonia, with descriptions of four new species of *Parastephanellus* Enderlein. *Zootaxa*, 1001, 1–16.
- Aguiar, A.P. & Jennings, J.T. (2010) Order Hymenoptera, family Stephanidae. In: van Harten, A. (Ed.), *Arthropod fauna of the United Arab Emirates. Vol. 3*. Dar Al Ummah Printing, Publishing, Distribution & Advertising, Abu Dhabi, pp. 299–305.
- Aguiar, A.P., Jennings, J.T. & Turrisi, G.F. (2010) Three new Middle–Eastern species of *Foenatopus* Smith (Hymenoptera: Stephanidae) with a new host record and key to species with two spots on the metasoma. *Zootaxa*, 2714, 40–58.
- Argaman Q. (1996) Generic synopsis of Scoliidae (Hymenoptera, Scoloidea). *Annales Historico–Naturales Musei Nationalis Hungarici*, 88, 171–222.
- Ascher, J.S. & Pickering, J. (2012) *Discover Life bee species guide and world checklist (Hymenoptera: Apoidea: Anthophila)*. http://www.discoverlife.org/mp/20q?guide=Apoidea_species (accessed February 20, 2012).
- Belokobylskij, S.A. (1998) Fam. Megalyridae. In: Lehr P.A. (Ed.), [*Key to the Insects of Russian Far East*, Vol. 4, pt. 3]. Dalnauka, Vladivostok, pp. 657–659. (In Russian).
- Bennett, D. J. & Engel, M.S. (2005) A primitive sapygid wasp in Burmese amber (Hymenoptera: Sapygidae). *Acta zoologica cracoviensia*, 48B, 1–9.
<http://dx.doi.org/10.3409/173491505783995608>
- Brothers, D.J. (2003) The first fossil Ephutini (Hymenoptera: Mutillidae), a new species of *Ephuta* Say from Dominican amber. *Acta zoologica cracoviensia*, 46 (suppl. - Fossil Insects), 101–107.
- Brothers, D.J. (2006) Familia Scolebythidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 391–392.
- Brothers, D.J. (2011) A new Late Cretaceous family of Hymenoptera, and phylogeny of the Plumariidae and Chrysidoidea (Aculeata). *ZooKeys*, 130, 515–542.
<http://dx.doi.org/10.3897/zookeys.130.1591>
- Brothers, D.J. & Rasnitsyn, A.P. (2008) A new genus and species of Euparagiinae from the Late Cretaceous of southern Africa (Hymenoptera: Vespidae). *Alavesia*, 2, 73–76.
- Carpenter F.M. (1992) Superclass Hexapoda. In: Kaesler, R.I. (Ed.), *Treatise on Invertebrate Paleontology, Part R Arthropoda 3–4*. Geological Society America, Boulder, Colorado, pp. 1–655.
- Carpenter, J.M. & Rasnitsyn, A.P. (1990) Mesozoic Vespidae. *Psyche*, 97, 1–20.
<http://dx.doi.org/10.1155/1990/67312>
- Cresson, E.T. (1887) Synopsis of the families and genera of the Hymenoptera of America, North of Mexico, together with a catalogue of the described species, and bibliography. *Transactions of the American Entomological Society, Supplementary volume*, i–vi, 1–350.
<http://dx.doi.org/10.5962/bhl.title.5531>
- Deans, A.R. (2005) Annotated catalog of the world's ensign wasp species (Hymenoptera: Evaniidae). *Contributions of the American Entomological Institute*, 34, 1–164.

83. Rasnitsyn & Kovalev 1988.

84. Rasnitsyn & Zhang 2010.

- Deans, A.R. & Kawada, R. (2008) *Alobevania*, a new genus of Neotropical ensign wasps (Hymenoptera: Evaniidae), with three new species: integrating taxonomy with the World Wide Web. *Zootaxa*, 1787, 28–44.
- Deans, A.R., Yoder, M.J. & Dole, K. (2012) Evanioidea Online - catalog of information about evanioid wasps (Hymenoptera). <http://evanioidea.info> (accessed 20.03.2012).
- Dessart, P. (2001) Les Megaspilinae ni européens, ni américains 2. Les *Dendrocerus* Ratzeburg, 1852, à mâles non flabellicornés (Hymenoptera Ceraphronoidea Megaspilidae). *Belgian Journal of Entomology*, 3, 3–124.
- Early, J.W., Masner, L., Naumann, I.D. & Austin, A.D. (2001) Maamingidae, a new family of proctotrupoid wasp (Insecta: Hymenoptera) from New Zealand. *Invertebrate Taxonomy*, 15, 341–352.
- Engel, M.S. (2002) The first leucospid wasp from the fossil record (Hymenoptera: Leucospidae). *Journal of Natural History*, 36, 435–441.
<http://dx.doi.org/10.1080/00222930110059682>
- Engel, M.S. (2005a) A dryinine wasp in Burmese amber (Hymenoptera: Dryinidae). *Polskie Pismo Entomologiczne*, 74, 485–494.
- Engel, M.S. (2005b) The crown wasp genus *Electrostephanus* (Hymenoptera: Stephanidae): Discovery of the female and a new species. *Polskie Pismo Entomologiczne*, 74, 317–332.
- Engel, M.S. (2006) A new cuckoo wasp of the genus *Ceratochrysis* in amber from the Dominican Republic (Hymenoptera: Chrysididae). *Polskie Pismo Entomologiczne*, 75, 499–504.
- Engel, M.S. & Grimaldi, D.A. (2004) The first Mesozoic stephanid wasp (Hymenoptera: Stephanidae). *Journal of Paleontology*, 78, 1192–1197.
- Engel, M.S. & Grimaldi, D.A. (2006a) A diminutive peleciniid wasp in Cretaceous amber from New Jersey (Hymenoptera: Peleciniidae). *Northeastern Naturalist*, 13, 291–297.
- Engel, M.S. & Grimaldi, D.A. (2006b) The first Cretaceous sclerogibbid wasp (Hymenoptera: Sclerogibbidae). *American Museum Novitates*, 3515, 1–7.
- Engel, M.S. & Grimaldi, D.A. (2006c) The first Cretaceous spider wasp (Hymenoptera: Pompilidae). *Journal of the Kansas Entomological Society*, 79, 359–368.
- Engel, M.S. & Grimaldi, D.A. (2007a) New false fairy wasps in Cretaceous amber from New Jersey and Myanmar (Hymenoptera: Mymarommatoidea). *Transactions of the Kansas Academy of Science*, 110, 159–168.
- Engel, M.S. & Grimaldi, D.A. (2007b) Cretaceous Scolebythidae and phylogeny of the family (Hymenoptera: Chryridoidea). *American Museum Novitates*, 3568, 1–16.
- Engel, M.S., Ortega-Blanco J. & Bennett D.J. (2009) A remarkable tiphiiform wasp in mid-Cretaceous amber from Myanmar (Hymenoptera: Tiphiidae). *Transactions of the Kansas Academy of Science*, 112, 1–6.
<http://dx.doi.org/10.1660/062.112.0201>
- Engel, M.S., Ortega-Blanco, J., Soriano, C., Grimaldi, D.A., & Martinez-Delclos, X. (2013) A new lineage of enigmatic diaprioid wasps in Cretaceous amber (Hymenoptera, Diaprioidea). *American Museum Novitates*, 3771, 1–23.
<http://dx.doi.org/10.1206/3771.2>
- Evans, G.A., Dessart, P. & Glenn, H. (2005) Two new species of *Aphanogmus* (Hymenoptera: Ceraphronidae) of economic importance reared from *Cybocephalus nipponicus* (Coleoptera: Cybocephalidae). *Zootaxa*, 1018, 47–54.
- Gibson, G.A.P. & Huber, J.T. (2000) Review of the family Rotoitidae (Hymenoptera; Chalcidoidea), with description of new genus and species from Chile. *Journal of Natural History*, 34, 2293–2314.
<http://dx.doi.org/10.1080/002229300750037901>
- Gibson, G.A.P., Read, J. & Huber, J.T. (2007) Diversity, classification and higher relationships of Mymarommatoidea (Hymenoptera). *Journal of Hymenoptera Research*, 16, 51–146.
- Gorbatovskij, V.V. & Lelej, A.S. (1998) Fam. Sierolomorphidae. In: Lehr P.A. (Ed.), [*Key to the Insects of Russian Far East, Vol. 4, pt. 3*]. Dalnauka, Vladivostok, pp. 683–684. (In Russian).
- He, J.-H., Ma, Y. & Chen, X.-X. (2002) A new record of Proctorenyxidae from China (Hymenoptera: Proctotrupeoidea). *Acta Zootaxonomia Sinica*, 27, 630. (In Chinese).
- Heraty, J.M., Burks, R.A., Cruaud, A., Gibson, G.A.P., Liljeblad, J., Munro, J., Rasplus, J.-Y., Delvare, G., Janšta, P., Gumovsky, A., Huber, J.T., Woolley, J.B., Krogmann, L., Heydon, S.L., Polaszek, A., Schmidt, S., Darling, D.C., Gates, M.W., Mottern, J., Murray, E., Molin, A.D., Triapitsyn, S., Baur, H., Pinto, J.D., Noort, S.v., George, J., & Yoder, M.J. (2013) A phylogenetic analysis of the megadiverse Chalcidoidea (Hymenoptera). *Cladistics*.
<http://dx.doi.org/10.1111/cla.12006>.
- Hong, C.D., Achterberg, C. van & Xu, Z.F. (2010) A new species of *Megischus* Brullé (Hymenoptera, Stephanidae) from China, with a key to the Chinese species. *ZooKeys*, 69, 59–64.
<http://dx.doi.org/10.3897/zookeys.69.738>
- Hong, C.D., Achterberg, C. van & Xu, Z.F. (2011) A revision of the Chinese Stephanidae (Hymenoptera, Stephanoidea). *ZooKeys*, 110, 1–108.
<http://dx.doi.org/10.3897/zookeys.110.918>
- Hong, C.D. & Xu, Z.F. (2011) A newly recorded genus and species of family Stephanidae (Hymenoptera, Stephanoidea) from China. *Entomotaxonomia*, 33, 71–73.

- Huber, J.T. (2009) Biodiversity of Hymenoptera. *In: Footitt, R.G. & Adler, P.H. (Eds.), Insect biodiversity: science and society*. Blackwell Publishing, pp. 303–323.
<http://dx.doi.org/10.1002/9781444308211>
- Huber, J.T., Gibson, G.A.P., Bauer, L.S., Liu, H. & Gates, M. (2008) The genus *Mymaromella* (Hymenoptera: Mymarommatidae) in North America, with a key to described extant species. *Journal of Hymenoptera Research*, 17, 175–194.
- International Commission on Zoological Nomenclature (ICZN). (1999) *International Code of Zoological Nomenclature. Fourth Edition*. ICZN, London . i–xxx + 306 pp.
- Jennings, J.T. & Austin, A.D. (2002) Systematics and distribution of world hyptiogastrine wasps (Hymenoptera: Gasteruptionidae). *Invertebrate Systematics*, 16, 735–811.
http://dx.doi.org/10.1071/it01048_co
- Jennings, J.T. & Krogmann, L. (2009) A new species of *Pristaulacus* Kieffer (Hymenoptera; Aulacidae) from Baltic amber. *Insect Systematics & Evolution*, 40, 201–207.
<http://dx.doi.org/10.1163/187631209x440069>
- Johnson, N.F. & Musetti, L. (2004) Catalog of the systematic literature of the superfamily Ceraphronoidea (Hymenoptera). *Contributions of the American Entomological Institute*, 33, 1–149.
- Johnson, N.F. & Musetti, L. (2012) Genera of the parasitoid wasp family Monomachidae (Hymenoptera: Diapriidae). *Zootaxa*, 3188, 31–41.
- Johnson, N.F., Musetti, L. & Janzen, J.-W. (2001) A new fossil species of the Australian endemic genus *Peradenia* Naumann & Masner (Hymenoptera: Proctotrupoidea, Peradeniidae) from Baltic Amber. *Insect Systematics & Evolution*, 32, 191–194.
<http://dx.doi.org/10.1163/187631201x00146>
- Kawada, R. & Azevedo, C.O. (2007) Taxonomic revision of the Neotropical ensign wasp genus *Decevania* (Hymenoptera: Evaniidae). *Zootaxa*, 1496, 1–30.
- Kimsey, L.S. (1991) Relationships among the tephritid wasp subfamilies (Hymenoptera). *Systematic Entomology*, 16, 427–438.
<http://dx.doi.org/10.1111/j.1365-3113.1991.tb00677.x>
- Kimsey, L.S. (2006) Familia Tephritidae. *In: Hanson, P.E. & Gauld I.D. (Eds.), Hymenoptera de la Región Neotropical*. The American Entomological Institute, Gainesville, pp. 575–583.
- Kimsey, L.S. & Bohart, R. (1990) *The Chrysidid Wasps of the World*. Oxford University Press, Oxford, 652 pp.
- Kopylov, D.S. (2012) New species of Praeichneumonidae (Hymenoptera, Ichneumonidae) from the Lower Cretaceous of Transbaikalia. *Paleontological Journal*, 46, 66–72.
<http://dx.doi.org/10.1134/s0031030112010078>
- Kurzenko, N.V. (2009) [Fam. Sapygidae–sapygids]. *In: Storozhenko S.Y. (Ed.), [Insects of Lazovsky nature reserve]*. Dalnauka, Vladivostok, pp. 224–225. (In Russian).
- Lelej, A.S. (2003a) A review of the family Trigonalysidae (Hymenoptera) of the Palaearctic region. *Far Eastern Entomologist*, 130, 1–7.
- Lelej, A.S. (2003b) Review: G. Pagliano. Revisione della sottofamiglia Apterogyninae (Hymenoptera: Bradynobaenidae) Museo Regionale di Scienze Naturali. Torino, 2002, 387 pp. *Entomologicheskoe obozrenie*, 82, 526–527. (In Russian).
<http://dx.doi.org/10.1002/mmzn.20040800120>
- Lelej, A.S. (2005) *Catalogue of the Mutillidae (Hymenoptera) of the Oriental Region*. Dalnauka, Vladivostok, 1–252.
- Lelej, A.S. & Kozlov, M. A. (1999) Proctorenyxidae nom. n. and *Proctorenyxa* nom. n. a new replacement names for Remyxidae Kozlov and *Remyxa* Kozlov (Hymenoptera, Proctotrupoidea). *Far Eastern Entomologist*, 74, 6–7.
- Liljeblad, J. (2002) *Phylogeny and evolution of gall wasps (Hymenoptera: Cynipidae)*. Dissertation Uppsala University, Sweden.
- Liu, Z. & Engel, M.S. (2010) Baltic amber Ibalidae (Hymenoptera: Cynipoidea): a new genus with implications for the phylogeny and historical biogeography of the family. *Systematic Entomology*, 35, 164–171.
<http://dx.doi.org/10.1111/j.1365-3113.2009.00494.x>
- Liu, Z., Engel, M.S. & Grimaldi, D. (2007a) Phylogeny and geological history of the cynipoid wasps (Hymenoptera: Cynipoidea). *American Museum Novitates*, 3583, 1–48.
- Liu, Z. & Nordlander, G. (1994) Review of the family Ibalidae (Hymenoptera: Cynipoidea) with keys to genera and species of the world. *Entomologica Scandinavica*, 25, 377–392.
- Liu, Z., Ronquist, F. & Nordlander, G. (2007b) The cynipoid genus *Paramblynotus*, phylogeny and historical biogeography. *Bulletin of the American Museum of Natural History*, 304, 1–151.
- Macedo, A.C.C. (2009) Generic classification for the Gasteruptioninae (Hymenoptera: Gasteruptionidae) based on a cladistic analysis, with the description of two new Neotropical genera and the revalidation of *Plutofoenus* Kieffer. *Zootaxa*, 2075, 1–32.

- Martinez, J.J. (2003) Una nueva especie de *Dendrocerus* (Hymenoptera: Megaspilidae) de La Pampa, Argentina. *Revista de la Sociedad Entomológica Argentina*, 62, 65–68.
- McKellar, R.C. & Engel, M.S. (2011) New Stigmaphronidae and Megaspilidae (Hymenoptera: Ceraphronoidea) from Canadian Cretaceous amber. *Cretaceous Research*, 32, 794–805.
<http://dx.doi.org/10.1016/j.cretres.2011.05.008>
- Michener, C.D. (2007) *The Bees of the World, Second Edition*. Johns Hopkins University Press, Baltimore, xvi+953.
- Michez, D., Vanderplanck, M. & Engel, M.S. (2012) Fossil bees and their plant associates. In: Patiny, S. (Ed.), *Evolution of Plant–Pollinator Relationships*. Cambridge University Press, Cambridge, pp. 103–164.
<http://dx.doi.org/10.1017/cbo9781139014113.006>
- Nordlander, G. (1984) Vad vet vi om parasitiska Cynipoidea? *Entomologisk Tidskrift*, 105, 36–40.
- Noyes, J. (2012) Universal Chalcidoidea Database. World Wide Web electronic publication. <http://www.nhm.ac.uk/chalcidooids> (accessed March 2012).
- Olmi, M. (2006a) Familia Embolemidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 397–399.
- Olmi, M. (2006b) Familia Sclerogibbidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 393–395.
- Olmi, M., Guglielmino, A. & Vollaro, M. (2011a) Revision of fossil species of *Dryinus* belonging to *constans* group, with description of a new species (Hymenoptera: Dryinidae). *Zootaxa*, 2981, 43–55.
- Olmi, M., Rasnitsyn, A.P. & Guglielmino, A. (2011b) The first record of Embolemidae (Hymenoptera Chrysidoidea) in the Rovno Amber (Upper Eocene) of Ukraine: a male of *Ampulicomorpha succinalis* Brues. *Paleontological Journal*, 45, 73–76.
<http://dx.doi.org/10.1134/s0031030111010138>
- Olmi, M. & Virla, E. (2006) Familia Dryinidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 401–418.
- Ortega-Blanco, J., Delclòs, X. & Engel, M.S. (2011c) The wasp family *Embolemidae* in Early Cretaceous amber from Spain (Hymenoptera: Chrysidoidea). *Journal of the Kansas Entomological Society*, 84, 36–42.
- Ortega-Blanco, J., Delclòs, X., Peñalver, E. & Engel, M.S. (2011b) Serphitid wasps in Early Cretaceous amber from Spain (Hymenoptera: Serphitidae). *Cretaceous Research*, 32, 143–154.
<http://dx.doi.org/10.1016/j.cretres.2010.11.004>
- Ortega-Blanco, J., Peñalver, E., Delclòs, X. & Engel, M.S. (2011a) False fairy wasps in Early Cretaceous amber from Spain (Hymenoptera: Mymarommatoidea). *Paleontology*, 54, 511–523.
<http://dx.doi.org/10.1111/j.1475-4983.2011.01049.x>
- Ortega-Blanco, J., Rasnitsyn, A. P. & Delclòs, X. (2010) A new family of ceraphronoid wasps from Early Cretaceous Álava Amber, Spain. *Acta Palaeontologica Polonica*, 55, 265–276.
<http://dx.doi.org/10.4202/app.2009.0014>
- Osten, T. (2005) Checkliste der Dolchwespen der Welt (Hymenoptera: Scoliidae). 62. *Bericht der Naturforschenden Gesellschaft Augsburg*, 220, 1–63.
- Peñalver, E. & Engel, M.S. (2006) Two wasp families rare in the fossil record (Hymenoptera): Perilampidae and Megaspilidae from the Miocene of Spain. *American Museum Novitates*, 3540, 1–12.
- Peñalver, E., Engel, M.S. & Grimaldi, D.A. (2006) Fig wasps in Dominican amber (Hymenoptera: Agaonidae). *American Museum Novitates*, 3541, 1–16.
- Peñalver, E., Ortega-Blanco, J., Nel, A. & Delclòs, X. (2010) Mesozoic Evaniidae (Insecta: Hymenoptera) in Spanish amber: reanalysis of the phylogeny of the Evanioidea. *Acta Geologica Sinica*, 84, 809–827.
- Perrichot, V. (2009) Long-tailed wasps (Hymenoptera: Megalyridae) from Cretaceous and Paleogene European amber. *Paleontological Contributions*, 1, 1–35.
- Perrichot, V. & Engel, M.S. (2011) A new micropterous species of *Embolemus* Westwood from Baltic amber (Hymenoptera: Embolemidae). *Annales de Paleontologie*, 97, 1–7.
- Perrichot, V. & Nel, A. (2008) A new belytine wasp in Cretaceous amber from France (Hymenoptera: Diapriidae). *Alavesia*, 2, 203–209.
- Perrichot, V., Ortega-Blanco, J., McKellar, R.C., Delclòs, X., Azar, D., Nel, A., Tafforeau, P. & Engel, M.S. (2011) New and revised maimetshid wasps from Cretaceous ambers (Hymenoptera, Maimetshidae). *ZooKeys*, 130, 421–453.
- Ploëg, G. de & Nel, A. (2004) A new bethylid wasp from the Lowermost Eocene amber of France (Hymenoptera: Bethylinidae: Bethylinae). *Geologica Acta*, 2, 75–82.
- Poinar, G. (2005) Fossil Trigonidae and Vespidae (Hymenoptera) in Baltic amber. *Proceedings of the Entomological Society of Washington*, 107, 55–63.

- Rasnitsyn, A.P. (1975) [Hymenoptera Apocrita of the Mesozoic]. [*Transactions of the Paleontological Institute Academy Sciences U. S. S. R. 147*], 134 pp. (In Russian).
- Rasnitsyn, A.P. (1988) An outline of evolution of the hymenopterous insects (order Vespida). *Oriental Insects*, 22, 115–145.
- Rasnitsyn, A.P. (2000) An extremely primitive aculeate wasp in the Cretaceous amber from New Jersey (Vespida: ?Sierolomorphidae). In: Grimaldi, D.A. (Ed.), *Studies on Fossils in Amber, with Particular Reference to the Cretaceous of New Jersey*. Backhuys Publishers, Leiden, pp. 327–332.
- Rasnitsyn, A.P. & Brothers, D.J. (2007) Two new hymenopteran fossils from the mid-Cretaceous of southern Africa (Hymenoptera: Jurapriidae, Evaniidae). *African Invertebrates*, 48, 193–202.
- Rasnitsyn, A.P. & Kovalev, O.V. (1988) The oldest Cynipoidea (Hymenoptera: Archaeocynipidae fam. n.) from the Early Cretaceous Transbaikalia. *Vestnik Zoologii*, 1, 18–21. (In Russian).
- Rasnitsyn, A.P. & Martínez-Declòs, X. (2000) Wasps (Insecta: Vespida = Hymenoptera) from the Early Cretaceous of Spain. *Acta Geologica Hispanica*, 35, 65–95.
- Rasnitsyn, A.P. & Zhang, H.-C. (2010) Early evolution of Apocrita (Insecta, Hymenoptera) as indicated by new findings in the Middle Jurassic of Daohugou, Northeast China. *Acta Geologica Sinica*, 84, 834–873.
<http://dx.doi.org/10.1111/j.1755-6724.2010.00254.x>
- Ronquist, F. (1999) Phylogeny, classification and evolution of the Cynipoidea. *Zoologica Scripta*, 28, 139–164.
<http://dx.doi.org/10.1046/j.1463-6409.1999.00022.x>
- Sarmiento, C.E. & Carpenter, J.M. (2006) Familia Vespidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 539–555.
- Sharkey, M.J. (2007) Phylogeny and classification of Hymenoptera. *Zootaxa*, 1668, 521–548.
- Sharkey, M.J., Carpenter, J.M., Vilhelmsen, L., Heraty, J., Liljeblad, J., Dowling, A.P.G., Schulmeister, S., Murray, D., Deans, A.R., Ronquist, F., Krogmann, L. & Wheeler, W.C. (2011) Phylogenetic relationships among superfamilies of Hymenoptera. *Cladistics*, 27, 1–33.
<http://dx.doi.org/10.1111/j.1096-0031.2011.00366.x>
- Taeger, A. & Blank, S.M. (2012) ECatSym – Electronic World Catalog of Symphyta (Insecta, Hymenoptera) Program version 3. 10, data version 38 (07.12.2011) Digital Entomological Information, Müncheberg. <http://sdei.de/ecatsym/> (accessed 01.02.2012).
- Taeger, A., Blank, S. & Liston, D. (2010) World Catalog of Symphyta (Hymenoptera). *Zootaxa*, 2580, 1–1064.
- Takada, H. (2009), Description of a new *Dendrocerus* species (Hymenoptera: Megaspilidae) hyperparasitic on *Stomaphis* aphids and additional notes on their primary parasitoid, *Protaphidius nawaii* (Braconidae), and another hyperparasitoid, *Euneura stomaphidis* (Pteromalidae). *Entomological Science*, 12, 91–97.
<http://dx.doi.org/10.1111/j.1479-8298.2009.00309.x>
- Turrisi, G.F., Jennings, J.T. & Vilhelmsen, L. (2009) Phylogeny and generic concepts in the parasitoid wasp family Aulacidae (Hymenoptera: Evanioidea). *Invertebrate Systematics*, 23, 27–59.
<http://dx.doi.org/10.1071/is08031>
- Vargas-Rojas, J.M. & Terayama, M. (2006) Familia Bethyidae. In: Fernández, F. & Sharkey, M.J. (Eds.), *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá, D.C., pp. 427–442.
- Wahl, D.B. (1999) Classification and Systematics of the Ichneumonidae (Hymenoptera). Available at <http://hymfiles.biosci.ohio-state.edu/catalogs/ichneumonids/> (accessed 15 February 2012).
- Westwood, J.O. (1835) Specimens were exhibited of various Hymenopterous Insects, partly from the collection of the Rev. F. W. Hope, and partly from that of Mr. Westwood. They were accompanied by characters by Mr. Westwood. *Proceedings of the Zoological Society of London*, 3, 51–54.
- Yu, D. S., Achterberg, C. & Horstmann, K. (2005) *Interactive Catalogue of World Ichneumonoidea Taxonomy, biology, morphology and distribution Compact Disc (Master version)* Taxapad. Vancouver, Canada.
- Zhang, H.-C., Rasnitsyn, A.P. (2008) Middle Jurassic Praeaulacidae (Insecta: Hymenoptera: Evanioidea) of Inner Mongolia and Kazakhstan. *Journal of Systematic Palaeontology*, 6, 463–487.
<http://dx.doi.org/10.1017/s1477201907002428>
- Zhang, J.-F. (2006) A proscolline wasp (Insecta: Hymenoptera: Scoliidae) from Shandong peninsula, East Asia. *Cretaceous Research*, 27, 788–791.