SUBFAMILY CHELONINAE

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INTRODUCTION. Cheloninae is a large subfamily containing 23 genera, 12 of which are found in the New World.

PHYLOGENY. Kittel et al. (2016) presented a phylogenetic analysis of the world genera and demonstrated that the subfamily Adeliinae is nested within the subfamily Cheloninae. The Adeliinae were treated as a separate subfamily in the previous publication of the Manual of the New World genera (Shaw 1997) but are now included within the Cheloninae. Kittel et al. (2016) recognized two tribes, one containing the species without the metasomal sutures, the Chelonini, the other tribe containing the species with metasomal sutures, the Phanerotomini, including the previously recognized adeliines. Another major result of the study was the synonymy of the (sub)genus Microchelonus Szépligeti with Chelonus Panzer. Lastly, Kittel et al. (2016) discussed the potential paraphyly of Ascogaster Wesmael.

BIOLOGY. Chelonines have been considered to be solitary koinobiont egg-larval endoparasitoids of concealed Lepidoptera, especially Tortricoidea and Pyraloidea (all chelonines) (Yu et al. 2016) or Nepticulidae (adeliines; Whitfield and Wagner, 1991). However, recently Sharkey et al. (unpublished) have found three gregarious species in Costa Rica. It is not clear, whether these species inject multiple eggs into the host’s egg or whether they are polyembryonic.

COMMON GENERA. Ascogaster, Chelonus, and Phanerotoma Wesmael.

DISTRIBUTION. Cosmopolitan.

DISTINGUISHING FEATURES. Adult chelonines have a shield-like carapace that covers the metasoma, formed by the fusion the first three metasomal tergites (Dudarenko, 1974). A carapace is also found in some other braconids (e.g., Urosigalphus Ashmead and Triaspis Haliday), but they have a more reduced forewing venation (the r-m cross vein is absent). Species of the former subfamily Adeliinae also have a carapace, but not as sturdy. Chelonines (including Adeliinae) can be separated from other braconids by the absence of spiracles on both metasomal tergites 6 and 7.
Key to New World genera of Cheloninae

1. A. RS of forewing not reaching wing margin; small specimens usually under 2 mm .......................... 2
   - B. RS of forewing reaching wing margin; specimens usually longer than 2 mm .......................... 3

2 (1). A. First two metasomal terga sculptured ................................................................. Paradelius
   - B. First two metasomal terga not or only weakly sculptured .................................................. Adelius

3(1). A. With two traverse sutures on metasomal carapace ....................................................... 4
   - B. Without two traverse sutures on metasomal carapace ...................................................... 10

4(3) A. Fore wing crossvein cu-a and vein M meeting or almost so; occipital carina incomplete dorsally .......................................................... Leptochelonus
   - B. Fore wing crossvein cu-a originating far distal to M; occipital carina complete dorsally .............. 5
5(4)  A. Antenna with 23 antennal articles, including scape (S) and pedicel (P). AA. RS+M vein well distant from vein M and hitting parastigma (PS) ................................................................. 6
    B. Antenna with more than 23 antennal articles including scape (S) and pedicel (P). BB. RS+M vein hitting vein M or parastigma (PS) very close to vein M .................................................. 8

6(5)  A. Clypeus without teeth or rounded protuberances .................................................. *Phanerotomoides*
    B. Clypeus with two or more teeth or rounded protuberances ........................................ 7

7(6)  A. Metasomal carapace decurved apically and covering all segments ...................... *Phanerotoma*
    B. Metasomal carapace relatively flat apically and not covering all segments ................... *Huseyinia*

8(5)  A. Clypeus about as long as wide and without teeth or rounded protuberances ............ *Furcidentia*
    B. Clypeus distinctly wider than long and with teeth or rounded protuberances (the latter sometimes very weak) .......................................................... 9
9(8)  A. Latero-posterior margin of carapace with two very large teeth (without teeth on the posterior margin)
- B. Latero-posterior margin of carapace without large teeth .................................................Pseudophanerotoma

10(3)  A. Fore wing 1-SR+M absent .............................................................................................Chelonus
- B. Fore wing 1-SR+M present ..................................................................................................11

11(10) A. Ocelli forming an isosceles triangle .................................................................Ascogaster
- B. Ocelli forming an equilateral triangle ................................................................................Leptodrepana
GENERIC TREATMENTS

*Adelius* Haliday, 1834

**Diagnosis.** *Adelius* can be differentiated from other chelonines by the reduced wing venation (the radial vein of the fore wing does not reach the wing margin); the metasomal tergites are not sculptured or only weakly so as opposed to *Paradelius*, where the sculpturing is more pronounced.

**Biology.** Reared from leaf-mining Lepidoptera (Whitfield and Wagner, 1991).

**Diversity.** 36 described species, 22 described species in the New World.

**Distribution.** Canada to Brazil.

**Publications.** Shimbori *et al.* (2019) revised the New World species and added 19 species, additional species were added by Muesebeck (1922), Whitfield and Wagner (1991).

![Image of Adelius sp.](image_url)

Figure 1. *Adelius* sp.
**Ascogaster** Wesmael, 1835

**Diagnosis.** Metasomal carapace without sutures; forewing vein RS+M present; ocelli forming an isosceles triangle.

**Biology.** Mostly reared from Tortricidae; more rarely Geometridae (Shaw 1983).

**Diversity.** 176 described species, 21 described species in the New World, hundreds more undescribed.

**Distribution.** Cosmopolitan; recorded from Canada to Peru.

**Publications.** Shaw (1983) revised the Nearctic species.

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**Figure 2.** Ascogaster sp.
**Chelonus** Panzer, 1806

**Diagnosis.** Metasomal carapace without sutures, forewing vein RS+M absent.

**Biology.** Reared from various Lepidoptera, including Lyonetiidae, Gracillariidae, Momphidae, Noctuidea, Coleophoridae, Cosmopterigidae, Gelechiidae, Yponomeutidae, Pyralidae, Tortricidae, and Cochylidae (Marsh 1979; McComb 1968).

**Diversity.** 216 described species in the New World, hundreds more undescribed.

**Distribution.** Cosmopolitan.

**Publications.** Marsh (1979), McComb (1968), many new species added by Papp (2016).

Figure 3. *Chelonus* sp.
**Dentigaster** Zettel, 1990

**Diagnosis.** Metasomal carapace strongly arched, with two sutures; apex of female carapace with two very distinguished teeth; head and mesosoma coarsely sculptured.

**Biology.** Unknown.

**Diversity.** Nine described species.

**Distribution.** Only Neotropical, from Panama to Argentina.

**Publications.** Zettel (1990a, description and key to species).

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**Figure 4.** *Dentigaster* sp.
**Furcidentia** Zettel, 1990

**Diagnosis.** Metasomal carapace with two sutures; antenna with more than 23 flagellomeres, clypeal teeth present or absent.

**Biology.** Unknown.

**Diversity.** Six described species.

**Distribution.** Only in the Neotropics.

**Publications.** Revision by Kittel (2018).

![Furcidentia sp.](image_url)

*Figure 5. Furcidentia sp.*
Huseyinia Zettel, 1990

Diagnosis. Metasomal carapace with two sutures, second tergite distinctly longer than third tergite; distal median part of third tergite weakly sclerotized; tergites 4-8 exposed and medially not sclerotized.

Biology. Unknown.

Diversity. Rare; one described species.

Distribution. Ecuador and Peru.


Note. Huseyinia is a new name for Fisheriola Zettel, 1990 which is a primary homonym.

Figure 6. Huseyinia sp.
**Leptochelonus** Zettel, 1990

**Diagnosis.** Metasomal carapace with two sutures; forewing m-cu arising directly in line with 2RS; occipital carina dorsally interrupted; clypeus without teeth.

**Biology.** Unknown.

**Diversity.** One described species.

**Distribution.** Chile.

**Publications.** Zettel (1990a).

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![Image of Leptochelonus sp.](image_url)

*Figure 7. Leptochelonus sp.*
**Leptodrepana** Shaw, 1983

**Diagnosis.** Metasomal carapace without sutures; forewing vein RS+M present; ocelli forming an equilateral triangle.

**Biology.** Mostly unknown; one attacks Plutellidae (Shaw 1983).

**Diversity.** 34 species in the New World.

**Distribution.** Cosmopolitan.


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*Figure 8. Leptodrepana* sp.
**Paradlius** de Saeger, 1942

**Diagnosis.** Just like *Adelius*, *Paradelius* can be differentiated from other chelonines by the reduced wing venation (the radial vein of the fore wing does not reach the wing margin); however, unlike *Adelius*, the metasomal tergites are strongly sculptured.

**Biology.** Reared from leaf-mining Lepidoptera (Nepticulidae) (Whitfield and Wagner, 1991).

**Diversity.** Seven species, four from the New World.

**Distribution.** U.S.A. to Costa Rica.


![Figure 9. *Paradelius* sp.](image-url)
**Phanerotoma** Wesmael, 1838

**Diagnosis.** Metasomal carapace with two sutures; antenna with 21 flagellomeres; propodeum coarsely sculptured, with distinct carinae or rugosities; margin of clypeus with small teeth.


**Diversity.** 206 described species, 72 described species in the New World, hundreds more undescribed.

**Distribution.** Cosmopolitan and very common.


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**Figure 10.** *Phanerotoma* sp.
Phanerotomoides Zettel, 1990

Diagnosis. Metasomal carapace with two sutures; propodeum antero-medially smooth and polished, posteriorly and laterally punctate; margin of clypeus rounded.

Biology. Unknown.

Diversity. One described species.

Distribution. Brazil.


Figure 11. Phanerotomoides sp.
**Pseudophanerotoma** Zettel, 1990

**Diagnosis.** Metasomal carapace with two sutures; head and mesosoma finely punctate; carapace flat and without teeth at apex.

**Biology.** Unknown.

**Diversity.** 14 described species

**Distribution.** Nearctic and Neotropical regions.


![Figure 12. Pseudophanerotoma sp.](image)
REFERENCES


