

A synopsis of the genus *Cheiloneurus* Westwood, 1833 (Hymenoptera: Chalcidoidea: Encyrtidae) of the New World

Краткий обзор рода *Cheiloneurus* Westwood, 1833 (Hymenoptera: Chalcidoidea: Encyrtidae) Нового Света

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КЛЮЧЕВЫЕ СЛОВА. *Cheiloneurus*, Encyrtidae, гиперпаразитоиды.

ABSTRACT. The New World species of the genus *Cheiloneurus* are examined. One new name is proposed: *C. giraulti* for *C. pulcher* Girault, and *C. amplicornis* Gahan is determined to be a junior synonym of *C. banksi* Howard. A redescription of *C. marilandia* (Girault) is provided.

РЕЗЮМЕ. Изучены виды рода *Cheiloneurus* Нового Света. Для *C. pulcher* Girault предложено замещающее название *C. giraulti*, а *C. amplicornis* Gahan установлен в качестве младшего синонима *C. banksi* Howard. Приводится переописание *C. marilandia* (Girault).

The cosmopolitan genus *Cheiloneurus* Westwood (Hymenoptera: Encyrtidae) has never been revised in the limits of the New World, other than a review of the Argentinian species [De Santis, 1964]. Nevertheless, both the Nearctic and Neotropical faunas are likely to be very rich in their number of species and morphological diversity. For example, nearly each specimen of *Cheiloneurus* collected in Mexico by the senior author and half of the specimens collected in California by the junior author, appear to represent several different undescribed species, while Noyes [1980: 185] mentions “ten or more undetermined species” from the Neotropics.

To date, all *Cheiloneurus* species whose biologies are known have proven to be hyperparasitoids, and in several cases, of economically important pests. Although the exact role of hyperparasitism in biological control programs is still debated, there is a general consensus that it is deleterious [Doutt & DeBach, 1964; Rosen, 1978; Sullivan, 1987]. The impact of *Cheiloneurus* species on beneficial species has been discussed by Compere [1925], Bennett & Hughes [1959], De Santis [1964] and Weseloh [1969].

In 2001, the senior author visited several entomological collections in the United States, largely to study

the type specimens of New World *Cheiloneurus*. The results are presented here, which we hope will provide a foundation which other researchers can use to produce a revision of the genus.

MATERIALS AND METHODS. Type specimens and other material were examined at the Essig Museum of Entomology, University of California, Berkeley (EMEC), Entomological Research Museum, University of California, Riverside (UCR), California Academy of Sciences, San Francisco, California (CAS), the United States National Museum of Natural History, Washington, D.C. (USNM) and Universidad Autónoma de Tamaulipas, Ciudad Victoria, Tamaulipas, México (UAT). Additional specimens from the University of Central Florida, Orlando, Florida (UCFC) were viewed by the junior author. Terminology follows Gibson et al. (1997). The new taxonomic status of *C. giraulti* is solely attributable to V.A. Trjapitzin.

Genus *Cheiloneurus* Westwood, 1833

Type species: *Encyrtus elegans* Dalman 1820. Monotypic.

Synonyms: *Chilonevrus* Agassiz, 1846; *Chiloneurus* Förster, 1856; *Chrysopophagus* Ashmead, 1894; *Blatticida* Ashmead, 1904; *Saronotum* Perkins, 1906; *Cristatithorax* Girault, 1911; *Eusemionella* Girault, 1915; *Chrysopophagoides* Girault, 1915; *Paracheiloneurus* Girault, 1915; *Epicheiloneurus* Girault, 1915; *Eusemionopsis* Girault, 1918; *Procheiloneurus* Girault, 1920; *Raphaelana* Girault, 1926; *Lepidoneurus* Hoffer, 1957; *Metacheiloneurus* Hoffer, 1957.

The genus *Cheiloneurus* belongs to the subfamily Encyrtinae Walker, 1837, and has been placed in the tribe Cheiloneurini Hoffer, 1955, and the subtribe Cheiloneurina Hoffer, 1955 [Trjapitzin 1973; Trjapitzin & Gordh 1978; Trjapitzin 1989], although Anis & Hayat [2002] recently synonymized Cheiloneurini with Ectro-

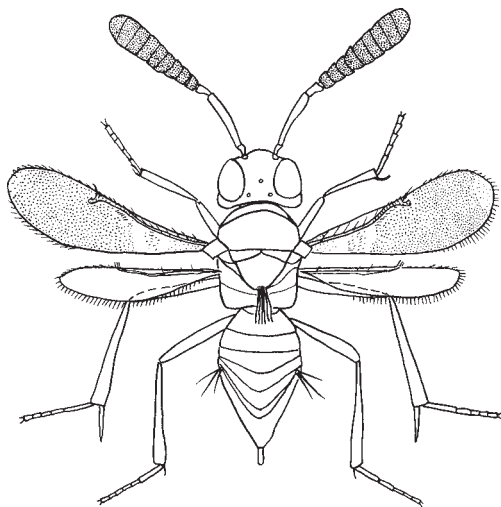


Fig. 1. *Cheiloneurus compressicornis*, female [after Clancy 1946, schematized].

Рис. 1. *Cheiloneurus compressicornis*, самка [по Clancy 1946, схематизовано].

matini. At least 120 species have been described in the genus, distributed among the following regions as follows — 30 Australian, 36 Indo-Malayan, 23 Palearctic, 13 Afrotropical, 4 Oceania, 18 Nearctic, and 13 Neotropical (13 species, *C. chrysopae* Fullaway, *C. compressicornis* (Ashmead), *C. cupreicollis* Ashmead, *C. elegans* (Dalman), *C. flaccus* (Walker), *C. flavoscutatus* (Nikol'skaya), *C. gonatopodis* Perkins, *C. inimicus* Compere, *C. kuissebi* Prinsloo, *C. noxius* Compere, *C. pulvinariae* Dozier, *C. quadricolor* (Girault) and *C. yasumatsui* Trjapitzin, have been reported from two or more regions).

Female *Cheiloneurus* can typically be distinguished from other genera by the following combination of characters: scutellum with a apical tuft of setae [the tuft is absent in three Palearctic species, *C. submuticus* Thomson, *C. flavoscutatus* (Nikol'skaya) and *C. ridiculus* (Trjapitzin & Khlopunov), and reduced to a row of 5 short hairs in the Nearctic *C. marilandia* (Girault)]; forewing infuscate; long marginal vein and short stigmal and postmarginal veins; hypopygium extending at most 0.5x length of metasoma; ovipositor never exerted more than 0.33x length of metasoma (Fig. 1).

Sexual dimorphism is marked for the genus, and the males of many species are either unknown or can be very difficult to distinguish, hence identification keys are useful *pro tem* only for females. Three Nearctic species, *C. annulicornis* (Ashmead), *C. dubius* Howard and *C. reate* (Walker), are known only from males.

Another species, *C. kuissebi* Prinsloo, originally described from Namibia, was reported from the New World by Löhr et al. [1990]. We suspect this was a misidentification, but in lieu of seeing the specimens, include it in our synopsis.

It is presumed that all members of the genus are hyperparasitoids of various insects. Of the 120 described species, 60 (50%) have been reared from their secondary

hosts. Most of these species (41) were reared from Homoptera, including 38 from Coccidae (including *Eulecanium*, *Mesolecanium*, *Parthenolecanium*, *Physokermes*, *Pulvinaria*, *Saissetia*). Other Homoptera recorded as secondary hosts include Aclerididae (*Aclerda*, *Aclerdox*), Asterolecaniidae (*Asterodiaspis*), Eriococcidae (*Eriococcus*), Kermesidae (*Nanokermes*, *Kermes*), Margarodidae (*Icerya*), Pseudococcidae (*Antonina*, *Phenacoccus*, *Planococcus*), Psylloidea, Flatidae (*Ormenis*) and Delphacidae. *Cheiloneurus* species have also been reared from larvae of Anthophoridae (Hymenoptera), puparia of Diptera, cocoons of *Ceraeochrysa*, *Chrysopa* and *Chrysoperla* (Neuroptera: Chrysopidae), immature Coleoptera, and oothecae of Blattodea. Such a broad range of secondary hosts is typical for hyperparasitoids.

Secondary parasitism by *Cheiloneurus* has been proved for only 12 species. In most cases the primary hosts are immature stages of Encyrtidae (e.g. *Diversinervus*, *Isodromus*, *Metaphycus*, *Microterys*) and Aphelinidae, but *Cheiloneurus* also attacks Perilampidae (*Perilampus*), Platygastridae (*Platygaster*) Ichneumonidae (*Gelis*) and Dryinidae (*Haplogonatopus*, *Neodryinus*, *Pseudogonatopus*).

One paper [McCoy & Selhime, 1970] reported that upon inspection of *Sassetia oleae* (Olivier) hosts from which *C. iminicus* adults emerged, the larval remains of only a single parasitoid per scale could be found, and therefore they concluded that it was a primary parasitoid. However, as Kfir & Rosen [1981] documented, a *Cheiloneurus* larva can completely consume the primary parasitoid host, and any remaining fragments could be broken up by the emerging adult hyperparasitoid.

Reports on the biology of *Cheiloneurus* species include studies of *C. bonariensis* De Santis [De Santis & Virla, 1991], *C. claviger* (Thomson) [Saakian-Baranova et al., 1971], *C. compressicornis* (Clancy 1946), *C. inimicus* [Compere, 1925; Maple, 1947], *C. noxius* Compere [Le Pelley, 1937; Maple, 1947; Weseloh, 1969, 1971a, 1971b, 1972; Weseloh & Bartlett, 1971] and *C. paralia* [Kfir & Rosen, 1981]. All studies of larvae indicate the first instar larvae are endoparasitic, caudate and apneustic.

Keys to species of *Cheiloneurus* have been published for the United States [Gahan, 1914], Argentina [De Santis 1964], the Afrotropical region [Compere, 1938], the Palearctic region [Trjapitzin, 1971, 1989], Britain and Scandinavia [Claridge, 1958], Japan [Ishii, 1928], India [Hayat et al., 1975; Khan & Agarwal, 1978; Anis & Hayat, 2002] and Hawaii [Beardsley, 1976].

Synopsis of species

1. *Cheiloneurus albicornis* (Howard, 1881)

Fig. 2.

Howard, 1881: 363–364 (*Chiloneurus*); Girault, 1916: 300–301; Peck, 1951: 498; 1963: 436–437; Oatman et al., 1964: 981; Gordh, 1979: 933–934.

MATERIAL EXAMINED. 1 ♀ — USA, Iowa, type series (USNM); 2 ♀♀ — New Hampshire, Mt. Washington, 5500', 20 Aug 1981, N. Goulet, det. J.S. Noyes (USNM).

DISTRIBUTION. USA (NH-SC, LA, MO, IA, WI, CO), Canada (Ontario).

HOSTS. *Kermes* sp., *Eulecanium caryae* (Fitch); *Mesolecanium nigrofasciatum* (Pergande); *Parthenolecanium corni* Bouché; *P. fletcheri* (Cockerell); *Physokermes piceae* (Schrank); *Pulvinaria acericola* (Walsh & Riley); *P. vitis* (Linnaeus).

REMARKS. This species is one of the most easily recognizable New World *Cheiloneurus*, due to the completely white funicle of females. In the Palaearctic region there are three species of *Cheiloneurus* whose females have completely white antennae: *C. phenacocci* Trjapitzin 1964, *C. quercus* (Mayr 1876) and *C. kanagawaensis* Ishii 1928. In contrast to *C. albicornis*, all funicle segments of the latter two species are longer than wide, while *C. phenacocci* has a very narrow frontovertex (about 0.15x maximum head width).

2. *Cheiloneurus albinotatus* De Santis, 1964

Fig. 8.

De Santis, 1964: 351–353; Noyes, 1980: 185.

DISTRIBUTION. Argentina (Buenos Aires).

HOSTS. Reared from *Asterodiaspis* (= *Planchonia arabidis*) (Signoret).

REMARKS. Male unknown. *Asterodiaspis arabidis* has also been recorded as a host for *C. kollari* (Mayr 1876) in the Palaearctic region.

3. *Cheiloneurus angulatus* De Santis, 1964

Fig. 9.

De Santis, 1964: 345–347; 1979: 222; Noyes, 1980: 185.

DISTRIBUTION. Argentina (Buenos Aires), Uruguay.

HOSTS. Unknown.

REMARKS. Male unknown.

4. *Cheiloneurus annulicornis* (Ashmead, 1900)

Ashmead, 1900: 369 (*Sphaeropisthus*); Peck, 1951: 483 (*Baeocharis*); 1963: 371 (*Baeocharis*); Gordh, 1979: 956 (*Baeocharis*); Noyes & Woolley, 1994: 1131.

DISTRIBUTION. USA (FL).

HOSTS. Unknown.

REMARKS. Female unknown.

5. *Cheiloneurus banksi* (Howard, 1898)

Fig. 16.

[= *Cheiloneurus amplicornis* Gahan, 1914; **syn.n.**]

Howard, 1898: 247 (*Chrysopophagus*); Gahan, 1914: 247 (*Cheiloneurus amplicornis*); Peck, 1951: 499 (*Chrysopophagus*); Peck, 1963: 443 (*Chrysopophagus*); Burks, 1967: 242 (*Chrysopophagus amplicornis*); Gordh, 1979: 935 (*Chrysopophagus*); Noyes & Woolley, 1994: 1331.

MATERIAL EXAMINED. 1 ♀, syntype — USA: Texas, Brazos Co., College Station, 31 Aug 1890, N. Banks (USNM); 1 ♀ — Dallam Co., Dalhart, Oct 1912, C.N. Ainslie, Type No. 18801, Webster No. 5571, *Cheiloneurus amplicornis* Gahan (USNM); 1 ♀ — Arizona, Atascosa Mtns. [= Santa Cruz Co.: Atasco Mountains?], 21 Sep 1937, R.H. Crandall (EMEC); 1 ♀ — California, Riverside Co., Riverside, 7 Feb 1936, J.D. Maple, *Eriococcus*; 1 ♀ — Santa Ana River, 5 Jun 1936, J.D. Maple, ex *Pseudococcobius* in *Eriococcus* on *Croton californica* (both EMEC).

DISTRIBUTION. USA (CA, AZ, NM, TX).

HOSTS. *Eriococcus* sp.; *Antonina graminis* (Maskell).

REMARKS. Male unknown.

6. *Cheiloneurus bonariensis* De Santis, 1986

Fig. 7.

[= *Cheiloneurus cristatus* De Santis, 1956, non *Cheiloneurus cristatus* (Girault, 1915)]

De Santis, 1956: 72–76 (*C. cristatus*); 1964: 337–340 (*C. cristatus*); 1979: 222 (*C. cristatus*); 1986: 79; Noyes, 1980: 185 (*C. cristatus*); De Santis & Virla, 1991: 6–13.

DISTRIBUTION. Argentina (Buenos Aires), Uruguay.

HOSTS. Dryiniidae.

REMARKS. Females can be either fully winged or brachypterous. Males only known from fully winged specimens.

7. *Cheiloneurus compressicornis* (Ashmead, 1894)

Fig. 1.

Ashmead, 1894: 245–246 (*Chrysopophagus*); Clancy, 1946: 432–440 (*Chrysopophagus*); Maple, 1947 (*Chrysopophagus*): 72; Muma, 1959: 152; Peck, 1951: 499 (*Chrysopophagus*); 1963: 443 (*Chrysopophagus*); Burks, 1967: 242 (*Chrysopophagus*); Gordh, 1979: 935 (*Chrysopophagus*); Noyes & Woolley, 1994: 1331.

MATERIAL EXAMINED. 1 ♀ — USA, Mississippi, Type No. 1465 (USNM); 1 ♀ — California, Orange Co., Mar 1923, H.M. Armitage, ex *Chrysopa*; 1 ♀ — Costa Mesa, 22 June, H. Compere (both EMEC); 1 ♀ — Riverside Co., Riverside, 31 Mar 1925, host on *Sonchus*, H. Compere; 1 ♀ — same label, Apr 1925, H. Compere, (both EMEC).

DISTRIBUTION. USA (NC-LA, IA, MO, CA), Mexico (Nuevo Leon).

HOSTS. *Ceraeochrysa cubana* (Hagen), *C. sanchezi* (Navas); *Chrysopa bimaculata* Hagen; *Chrysoperla plorabunda* (Fitch), *C. rufilabris* (Burmeister); *Isodromus iceryae* Howard, *Perilampus chrysopae* Crawford and *Gelis tenellus* (Say) through *Chrysoperla carnea* (Stephens); *I. niger* Ashmead through *Chrysopa nigricornis* Burmeister (= *mayuscula* Banks).

8. *Cheiloneurus cupreicollis* (Ashmead, 1886)

Fig. 17.

[= *Cheiloneurus funiculus* Howard, 1887]

Ashmead, 1886: 131 (*Chiloneurus*); Howard, 1897: 148 (*Cheiloneurus funiculus*); De Santis, 1956: 72; 1964: 340–343; 1979: 223 (*C. funiculus*); Peck, 1951: 437; 1963: 498; Gordh, 1979: 934; Noyes, 1979: 150–151; 1980: 185.

DISTRIBUTION. USA (FL), Grenada, Mexico, Trinidad, Anguilla, Argentina (Buenos Aires), Australia.

HOSTS. Reared from “*Lecanium* sp.” and *Planococcus citri* (Risso).

REMARKS. *C. funiculus* was described from Grenada and synonymized with *C. cupreicollis* by Noyes [1979], who also listed a single female from Australia [this listing was not repeated in Noyes, 2002].

9. *Cheiloneurus cushmani* Crawford, 1911

Crawford, 1911: 126; Peck, 1951: 498; 1963: 437; Gordh, 1979: 934.

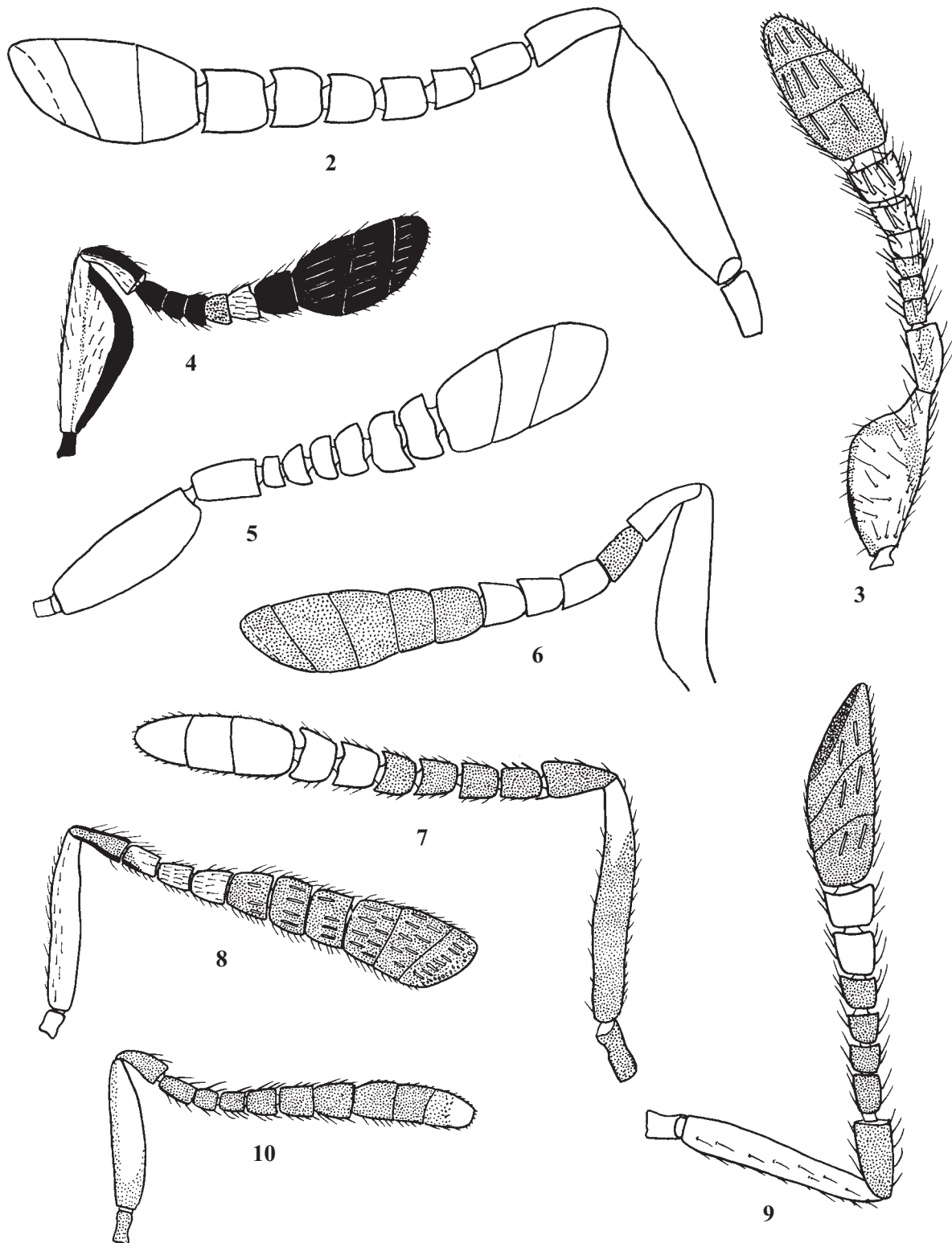
DISTRIBUTION. USA (VA).

HOSTS. Reared from *Kermes* sp.

10. *Cheiloneurus dubius* (Howard, 1885)

Howard, 1885: 17, 42 (*Chiloneurus*); Ashmead, 1900: 401; Peck, 1951: 498; 1963: 437; Gordh, 1979: 934.

DISTRIBUTION. USA (MA, WI, MO, MT).



Figs. 2-10. Female antennae of *Cheiloneurus* spp.: 2 — *C. albicornis*; 3 — *C. praenitens*; 4 — *C. inimicus*; 5 — *C. pulvinariae*; 6 — *C. swezeyi*; 7 — *C. bonariensis*; 8 — *C. albinotatus*; 9 — *C. angulatus*; 10 — *C. elegans*. 3 — after Waterston, 1922; 4 — after Compere, 1925; 6 — after Swezey, 1903, schematized; 7-10 — after De Santis, 1964, schematized.

Рис. 2-10. Усики самок *Cheiloneurus* spp.: 2 — *C. albicornis*; 3 — *C. praenitens*; 4 — *C. inimicus*; 5 — *C. pulvinariae*; 6 — *C. swezeyi*; 7 — *C. bonariensis*; 8 — *C. albinotatus*; 9 — *C. angulatus*; 10 — *C. elegans*. 3 — по Waterston, 1922; 4 — по Compere, 1925; 6 — по Swezey, 1903, схематизовано; 7-10 — по De Santis, 1964, схематизовано.

HOSTS. "*Lecanium* sp."; *Kermes* sp.

REMARKS. Female unknown.

11. *Cheiloneurus elegans* (Dalman, 1820)

Fig. 10.

Dalman, 1820: 151, 384–385 (*Encyrtus*); Westwood, 1833: 343; Mayr 1876: 745–747 (*Chiloneurus*); Thomson, 1876: 150 (*Chiloneurus*); Mercet, 1921: 443–445 (*Chiloneurus*); Gahan, 1933: 60–64; Hill & Pickney, 1940: 5–6; Ferrière, 1952: 594; Nikolskaya, 1952: 456 (*Chiloneurus*); Hoffer, 1957: 340–342; Claridge, 1958: 157–158; Nikolskaya, 1963: 469 (*Chiloneurus*); Peck, 1951: 498; 1963: 437–438; Parker, 1960: 168, 176; Erdős, 1964: 298 (*Chiloneurus*); Burks, 1967: 242; Noyes, 1980: 185; Trjapitzin, 1971: 125; 1978: 300; Gordh, 1979: 934; De Santis, 1979: 222; Myartseva, 1984: 164, 252–253; Herthetvzian, 1986: 79–81; Trjapitzin, 1987: 559; 1989: 308; Trjapitzin & Ruíz-Cancino, 2000: 88–93.

MATERIAL EXAMINED. 2 ♀♀ — USA, Maryland. Washington Co.: Funkstown, 20 Jun 1916, ex Hessian fly.

DISTRIBUTION. USA (NY-VA), Canada, Mexico (Morelos), Ecuador (Galapagos Islands), Argentina, Portugal (Madeira), Spain, France, England, Germany, Switzerland, Austria, Czech Republic, Slovakia, Hungary, Croatia, Serbia, Macedonia, Italy, Greece, Denmark, Sweden, Finland, Rumania, Bulgaria, Russia, Lithuania, Moldavia, Ukraine, Israel, Georgia, Armenia, Azerbaidzhan, Turkey, Cyprus, Kazakhstan, Turkmenistan, Uzbekistan, Tadzhikistan, Mongolia, Algeria.

HOSTS. Hyperparasitoid of *Mayetiola destructor* Say (Diptera: Cecidomyiidae), through *Platygaster zosinae* Walker in USA; *Pulvinaria vitis* Linnaeus and *Kermes* sp. in Europe.

REMARKS. Since the Nearctic host record is so distinct from those from the Palaearctic, it is likely that the records of *C. elegans* represent a complex of sibling or cryptic species, or two biological races of one species [Ferrière, 1952].

12. *Cheiloneurus flaccus* (Walker, 1847)

[= *Cheiloneurus americanus* (Perkins, 1906)]

Walker, 1847: 21 [*Encyrtus* (*Cerchysius*)]; Ashmead, 1900: 30 (*Cerchysius*); Perkins, 1906: 260 (*Saronotum americanum*); Peck, 1951: 499 (*Chrysopophagus americanus*); 1963: 443 (*Chrysopophagus americanus*); Burks, 1967: 242 (*Chrysopophagus americanus*); Burks, 1975: 147–148; Beardsley, 1976: 207 (*Chrysopophagus americanus*); Gordh, 1979: 935 (*Chrysopophagus*); Noyes & Hayat, 1984: 249; Noyes & Woolley, 1994: 1331; Nishida, 1997: 133 (*Cheiloneurus americanus*).

MATERIAL EXAMINED. 1 ♀ — USA, California. Monterey Co.: Marina Beach State Park, 5 miles NE Seaside, 26 Aug 1981, J.B. Whitfield (UCR); 2 ♀♀ — Arizon, Maricopa Co.: Arlington, 5 Apr & 2 May 1952, swept from alfalfa, F. Werner & G. Butler (UCR). Mexico. Tamaulipas. Gomes Farnas, Res. "El Cielo", Valle de Ovnis (Arroyo), 2 Jul 1995, V.A. Trjapitzin, 1 ♀ (UAT).

DISTRIBUTION. USA (FL, NC, OH, AZ, CA), Mexico (Tamaulipas), Hawaii.

HOSTS. Hyperparasitoid of Cicadellidae (Homoptera) through *Haplogonatopus vitiensis* Perkins and *Pseudogonatopus hospes* Perkins.

REMARKS. Male unknown.

13. *Cheiloneurus gahani* (Dozier, 1927)

Fig. 13.

Dozier, 1927: 270–271 (*Achryso-phagus*); De Santis, 1964: 355–357 (*Achryso-phagus*); Noyes, 1980: 185.

DISTRIBUTION. Argentina (Buenos Aires), Puerto Rico.

HOSTS. *Planococcus citri*.

REMARKS. Male unknown.

14. *Cheiloneurus giraulti* Trjapitzin, **nom. nov.**

Fig. 11.

Girault, 1911: 170 (*Cristatithorax pulcher*); Peck, 1951: 498 (*Cheiloneurus pulcher*); 1963: 439 (*Cheiloneurus pulcher*); Gordh, 1979: 934 (*Cheiloneurus pulcher*).

MATERIAL EXAMINED. USA. Illinois. *Cristatithorax/Blatticida pulcher*, Type No. 127 (slide) (USNM).

DISTRIBUTION. USA (IL).

HOSTS. *Nanokermes pubescens* (Bogue).

REMARKS. Male unknown. In 1904, Ashmead described *Blatticida pulchra* from Australia. After studying the type of *B. pulchra*, Trjapitzin & Gordh [1978] synonymized *Blatticida* under *Cheiloneurus*, thus making *C. pulcher* Girault a junior homonym. *Cheiloneurus giraulti* is proposed as a replacement name, a patronym in the masculine gender.

15. *Cheiloneurus inimicus* Compere, 1925

Fig. 4.

Compere, 1925: 296–302; Maple, 1947: 71; Peck, 1951: 498; 1963: 438; Burks, 1967: 242; McCoy & Selhime, 1970: 618–619; De Santis, 1972: 59–60; Gordh, 1979: 934; De Santis, 1979: 223; Noyes, 1980: 185.

MATERIAL EXAMINED. 1 ♀ (holotype) — USA, California. Los Angeles Co.: Pasadena, 4 May 1925, H. Compere (USNM); 1 ♀ — 1 Oct 1962, ex Coccidae on *Olea europaea* (EMEC); 1 ♀ (paratype) — [Sierra Madre-Lamanda Park Citrus Association Insectary], 4 May 1929, ex *Saissetia oleae*, H. Compere (EMEC); 1 ♀ — Butte Co.: Oroville, 11 Aug 1955, R.L. Doult (EMEC); 1 ♀ — Mexico, Tamaulipas, Ciudad Victoria, 17 Zacatecas, 3 Mar 1996, ex Coccidae on *Citrus sinensis*, V.A. Trjapitzin & E.Y. Chouvakhina, N378 (UAT).

DISTRIBUTION. USA (CA, TX, FL), Mexico (Tamaulipas), Argentina, Brazil.

HOSTS. *Saissetia oleae*; reared experimentally from *Metaphycus lounsburyi* (Howard), an endoparasitoid of *S. oleae*; reared from *Physokermes insignicola* (Crawford) parasitized by *M. physokermis* (Timberlake).

REMARKS. Compere [1925] studied the egg and larva of *C. inimicus* — the egg has no aeroscopic plate, and the first instar larva is caudata.

16. *Cheiloneurus kansensis* (Girault, 1917)

Girault, 1917a: 447 (*Chrysopophagus*); Peck, 1951: 499 (*Chrysopophagus*); 1963: 444 (*Chrysopophagus*); Gordh, 1979: 935 (*Chrysopophagus*); Noyes & Woolley, 1994: 1131.

DISTRIBUTION. USA (Kansas).

HOSTS. Unknown.

REMARKS. Male unknown.

17. *Cheiloneurus kusebi* Prinsloo, 1985

Prinsloo, 1985: 102–103; Löhr et al., 1990: 420.

DISTRIBUTION. Namibia, Brazil.

HOSTS. Unknown.

REMARKS. This species was originally described from Namibia, but was reportedly reared from the cassava mealybug, *Phenacoccus manihoti* Matile-Ferrero, on cassava in Brazil [Löhr et al. 1990]. Although it is possible that *C. kuisebi* may have been accidentally introduced into the New World from Africa, we suspect this is a misidentification.

18. *Cheiloneurus lineascapus* Gahan, 1910

Gahan, 1910: 207–208; Smith & Compere, 1928: 242, 271–272; Peck, 1951: 498; 1963: 438; Gordh, 1979: 934.

MATERIAL EXAMINED. 1 ♀ — USA, Maryland, Prince Georges Co.: College Park, 1 May 1898, N858, "Type" (USNM); 1 ♀ — Florida, Orange Co.: Orlando, University of Central Florida, S.M. Fullerton, malaise trap, sand pine/rosemary scrub, 31 Jan 1992, UCFC 0123537; 1 ♀ — Walt Disney World, C-4 Stout site S15.16 T 24S R 27E, Z. Prusak & S.M. Fullerton, malaise trap, xeric oak/flatwoods, 20 Oct.–2 Nov. 1998, UCFC 0001868 (both UCFC); 1 ♀ — California, Los Angeles Co.: Claremont, 24 Jun 1934, ex *Kermes nigropunctatus*, J.D. Maple (EMEC).

DISTRIBUTION. USA (MD, FL, LA, CA).

HOSTS. Hyperparasitoid of *Saissetia oleae* through *Metaphycus lounsburyi*; *Kermes nigropunctatus* (Ehrhorn & Cockerell); *Kermes* sp. on oak (*Quercus*).

REMARKS. In the original description, this species was reportedly reared from a *Kermes* sp. on lilac in Maryland, but this is probably erroneous, because as far as is known, *Kermes* species are restricted to oaks.

19. *Cheiloneurus loretanus* De Santis, 1972

Fig. 14.

De Santis, 1972: 60; 1979: 223; Noyes, 1980: 185.

DISTRIBUTION. Argentina (Misiones).

HOSTS. Unknown.

REMARKS. Male unknown.

20. *Cheiloneurus marilandia* (Girault, 1917)

Fig. 18.

Girault, 1917b: 1–2 (*Habrolepopteryx*); Peck, 1951: 479 (*H. marylandia*, unjustified emendation); 1963: 352 (*H. marylandia*); Gordh, 1979: 964 (*Habrolepopteryx*); Noyes & Woolley, 1994: 1331.

MATERIAL EXAMINED. USA. Maryland. Prince Georges Co.: Glenn Dale, meadow, 21 May 1917. A.A. Girault. Dry insect with head and antennae on microscopic slide prepared by Girault and labelled: "Type number 21410 USNM, *Habrolepopteryx marilandia* Girault ♀" (USNM).

DISTRIBUTION. USA (MD).

HOSTS. Unknown.

REMARKS. Girault collected a single female in Maryland, and provided a brief description (as well as the remarkable and inspiring verse "'Pon catching *Habrolepopteryx*") in a private publication [Girault, 1917b]. Since then, this species has never been collected. In 1995, the senior author collected a similar, though apterous, form in Mexico (Sierra Madre Occidental, Biosphere Natural Reserve "El Cielo"). To help ascertain whether this Mexican form represents a new species or is conspecific with *C. marilandia*, we present a redescription of the latter.

DESCRIPTION. Head (frontal view) scarcely higher than wide (22.5:22). Width of vertex about 0.25x maximum

head width. Malar space 0.5x eye height. Antennae (Fig. 18) inserted near mouth. Distance between antennal toruli a little less than distance from a torulus to ventral eye margin (5.5:6.5). Lower margin of head only slightly concave. Pronotum conical, posteriorly 2x broader than long. Mesoscutum about as long as pronotum and 2x wider than long. Scutellum as long as mesoscutum and somewhat wider than long (13:10). Forewings narrow, but not shortened. Gaster conically pointed, shorter than mesosoma (13:10). Cerci situated about 0.33 way from the base of gaster. Ovipositor thick, exerted part of sheath about 0.2 length of gaster.

Head, mesosoma and gaster dark. Mesoscutum golden-violet-bronze. Tegulae brown-black. Scutellum yellowish-white, with curved dark transverse subapical stripe, occupying about 1/6 of scutellum length. Forewings darkened, with hyaline base (up to the level of the base of marginal vein), and oblong transverse clear marking beyond apex of stigmal vein, and clear marking at hind margin of wing. Hind wings hyaline. Fore leg (including coxae) more or less clear, with darkened tarsi. Apical 0.5 of middle tibiae and 1–4 tarsomeres of midtarsus clear; mesotibial spur darkened. Base of hind tibiae clear. Propodeum with strong golden-green luster. Second metasomal segment (Mt₂) with strong violet-green luster, the rest of the metasoma with violet luster. Ovipositor sheaths dark. Mesoscutum with short, silvery adpressed hairs. Tuft of hairs near apex of scutellum reduced, formed by five short black hairs situated in a longitudinal row. Body length not given by Girault, and impossible to measure on slide.

21. *Cheiloneurus nigrescens* Howard, 1897

Fig. 15.

[= *Cheiloneurus longisetaceus* De Santis, 1939]

Howard, 1897: 148–149 (*Chiloneurus*); De Santis, 1939: 334–338 (*Cheiloneurus longisetaceus*); 1956: 71 (*C. longisetaceus*); 1964: 347–351 (*C. longisetaceus*); 1979: 223; 1980: 196 (*C. longisetaceus*); Noyes, 1979: 151–152; 1980: 185.

MATERIAL EXAMINED. BRAZIL: Sro Paulo, Araras, from *Aclerdox* sp., No. E. 1414, F.D. Bennett, det. J.S. Noyes (USNM).

DISTRIBUTION. Grenada, Trinidad, Brazil (Alagoas, São Paulo), Argentina (Buenos Aires).

HOSTS. *Aclerda takahashii* Kuwana (= *campinensis*); *Aclerdox* sp.; *Coccus hesperidum* Linnaeus; *Rhinoleucophenga* sp. (Diptera: Drosophilidae).

REMARKS. Noyes [1979] synonymized *C. longisetaceus* with *C. nigrescens*.

22. *Cheiloneurus noxius* Compere 1925

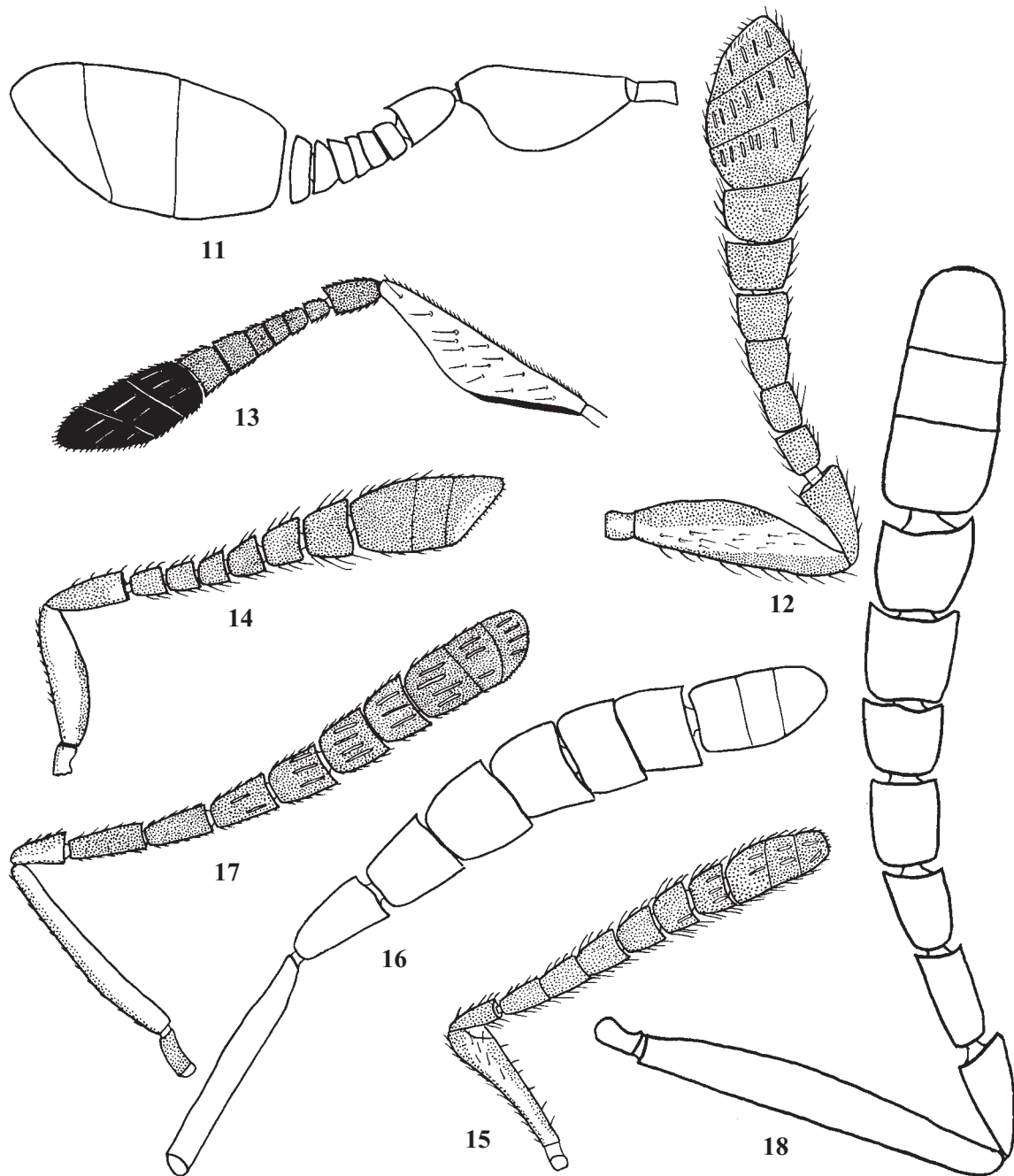
Fig. 12.

Compere, 1925: 296, 302–303; Smith & Compere, 1928: 242, 272–274; Le Pelley 1937: 181–183; Maple, 1947: 71; Peck, 1951: 498; 1963: 438–439; Weseloh, 1969: 299–305; 1971a: 580–586; 1971b: 1233–1236; 1972: 41–46; 1981: 79–95; Weseloh & Bartlett, 1971: 1259–1264; Beardsley, 1976: 206; Gordh, 1979: 934; Lampson & Morse, 1992: 379, 382, 384; Nishida, 1997: 133.

MATERIAL EXAMINED. 1 ♀ — USA, California, Los Angeles Co.: Los Angeles, Newton Orchard, 25 Sep 1944, H. Compere, *Saissetia oleae* on orange (#925-44) (EMEC); 20 ♀♀ — Riverside Co.: Riverside, Jan–May 1936, R. Le Pelley, ex *Metaphycus lounsburyi* on *Saissetia oleae* (EMEC).

DISTRIBUTION. USA (CA, HI).

HOSTS. Hyperparasitoid of *Saissetia oleae* via *Metaphycus lounsburyi*. In the lab, *C. noxius* will also successfully reproduce on *Diversinerverus elegans* Silvestri, *Metaphycus stanleyi* Compere, *M. luteolus* (Timberlake) and *Microterys nietneri* (Motschulsky).



Figs. 11–18. Female antennae of *Cheiloneurus* spp. 11 — *C. giraulti*; 12 — *C. noxius*; 13 — *C. gabani*; 14 — *C. loretanus*; 15 — *C. nigrescens*; 16 — *C. banksi*; 17 — *C. cupreicollis*; 18 — *Cheiloneurus marilandia*. 12 — after Compere, 1925, schematized; 13 — after Dozier, 1927; 14 — after De Santis, 1972, schematized; 15 — after De Santis, 1939, schematized; 17 — after De Santis, 1964, schematized.

Рис. 11–18. Усики самок *Cheiloneurus* spp. 11 — *C. giraulti*; 12 — *C. noxius*; 13 — *C. gabani*; 14 — *C. loretanus*; 15 — *C. nigrescens*; 16 — *C. banksi*; 17 — *C. cupreicollis*; 18 — *Cheiloneurus marilandia*. 12 — по Compere, 1925, схематизовано; 13 — по Dozier, 1927; 14 — по De Santis, 1972, схематизовано; 15 — по De Santis, 1939, схематизовано; 17 — по De Santis, 1964, схематизовано.

REMARKS. The eggs and larvae of *C. noxius* were studied by Le Pelley [1937] and Maple [1947]. Various aspects of the biology of *C. noxius* were documented by Weseloh [1969, 1971a, 1971b, 1972] and Weseloh & Bartlett [1971]. According to Beardsley [1976], this species was accidentally introduced into Hawaii.

23. *Cheiloneurus praenitens* Waterston, 1922

Fig. 3.

Waterston, 1922: 49–51; De Santis, 1979: 223; Noyes, 1980: 185.

DISTRIBUTION. Jamaica.

HOSTS. Reared from galls of a psyllid, ?*Trioza* sp. (Homoptera: Psylloidea).

REMARKS. Male unknown.

24. *Cheiloneurus pulvinariae* Dozier, 1925

Fig. 5.

Dozier, 1925: 363–365; Wolcott, 1936: 531; Burks, 1958: 71; Peck, 1963: 439; De Santis, 1979: 223; Gordh, 1979: 934; Noyes, 1980: 185.

MATERIAL EXAMINED. 2 ♀♀ (paratypes) — Puerto Rico, Arecibo, 31 May 1925, ex *Pulvinaria iceryi* on sugarcane, H.L. Dozier (USNM).

DISTRIBUTION. Puerto Rico, Cuba, USA (DC, NC, FL).

HOSTS. *Icerya montserratensis* Riley & Howard; *I. purchasi* Maskell; *Pulvinaria iceryi* (Signoret); *Metaphycus flavus* (Howard) on *Pulvinaria* sp.; *Microterys kotinskyi* (Fullaway).

25. *Cheiloneurus reate* (Walker, 1847)

Walker, 1847: 22 (*Encyrtus*); Ashmead, 1900: 354 (*Ectroma*); Peck, 1951: 594 (unplaced species); 1963: 897 (unplaced species); Burks, 1975: 148 (*Encyrtus*); Gordh, 1979: 943 (*Encyrtus*); Noyes & Woolley, 1994: 1131.

DISTRIBUTION. USA (FL).

HOSTS. Unknown.

REMARKS. Known only from the male, and the type material has been lost (Burks, 1975).

26. *Cheiloneurus swezeyi* Ashmead, 1903

Fig. 6.

Ashmead, 1903: 193; Swezey, 1903: 446–447; Perkins, 1906: 243, 260–261; Peck, 1951: 498; 1963: 439; Gordh, 1979: 935.

MATERIAL EXAMINED. 4 ♀♀ — USA, Ohio, Erie Co.: Sandusky, 8-1902, cotype 6767, syntypes (USNM).

DISTRIBUTION. USA (OH, CN).

HOSTS. Cicadellidae via *Neodryinus typhlocybae* (Ashmead); *Ormenis septentrionalis* (Spinola).

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