

ANNOTATED CHECKLIST OF THE ENTEDONINAE (CHALCIDOIDEA: EULOPHIDAE) OF MEXICO

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ABSTRACT. An annotated checklist of Mexican fauna of Entedoninae is presented. One hundred and twenty species in 15 genera are recorded. Valid names, state records within México, geographical distribution, host families and references for each genus and species are given.

KEY WORDS: Eulophidae, Entedoninae, parasitoids, México.

RESUMEN. Se presenta una lista comentada de la fauna mexicana de Entedoninae. Ciento veinte especies de 15 géneros han sido registradas. Se anotan los nombres válidos, registros estatales en México, distribución geográfica, familias hospederas y referencias para cada género y especie.

PALABRAS CLAVE: Eulophidae, Entedoninae, parasitoides, México.

Eulophidae is one of the largest families of Chalcidoidea. The family is cosmopolitan in distribution, and includes about 3400 described species in about 280 genera. In the Nearctic region about 600 species in 110 genera are known (Schauff *et al.*, 1997). The family is comprised of 4 subfamilies: Entedoninae, Euderinae, Eulophinae and Tetrastichinae. The Entedoninae is very rich in number and diversity of species and has economic importance in biological control of pests. Some authors have referred to it as Entedontinae (e.g. Yoshimoto, 1973a, 1973b, 1977, 1978; Burks, 1979; Subba Rao & Hayat, 1985; Hansson, 1985, 1990); and others as Entedoninae (Boucek, 1988; Schauff, 1991; La Salle & Parrella, 1991; Triapitsyn & Headrick, 1995; Hansson, 1995 a, 1995b, 1996 a, 1996 b, 1997 b; Schauff *et al.* 1998). We follow Boucek (1988), Schauff (1991), Gibson *et al.* (1997) and use the name Entedoninae.

The species of Entedoninae are egg and larval endoparasitoids of Coleoptera, Diptera, Lepidoptera, Thysanoptera and Homoptera (Aleyrodidae), and hyperparasitoids in Hymenoptera. The small size of these chalcidoid wasps make their identification very difficult. Taxonomic knowledge of Entedoninae, as in other Eulophidae subfamilies, is insufficient. Many genera need fundamental taxonomic study and revisions, and numerous undescribed species exist. Primarily, Yoshimoto (1973a, 1973b, 1978, 1979) and later Hansson (1995a, 1995b, 1996a, 1996b,

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1997a, 1997b), revised the concept of some Nearctic genera and species. Schauff (1991) keyed the Holarctic genera of Entedoninae. Schauff *et al.* (1997) recorded about 280 species in 30 genera in the Nearctic region.

Fragmentary data on Mexican Entedoninae is presented in scientific literature. González and Gordh (1987) mentioned 7 genera of Entedoninae found in México. The first Symposium on Parasitic Hymenoptera of México was held in 1989 and 6 genera of Entedoninae were recorded (González Hernández, 1989; Martínez *et al.*, 1989). The Symposium on Taxonomy of Hymenoptera of México was held in 1991, and published data on 3 genera of Entedoninae (Perales-Gutiérrez and Flores-Dávila, 1991).

The fauna of México is taxonomically interesting, since this country represents two large zoogeographical regions- the Nearctic and Neotropics. The Mexican genera of Entedoninae include both members of these regions and many local species. For example, Hansson (1996a) described a new genus of Entedoninae -*Perditorulus* with 33 species from México. Prior to Hansson's study in 1997, only one species of the genus *Omphale* Haliday was recorded from México; he increased the list of Mexican *Omphale* to 44 species and described 30 new species.

The rich biodiversity of Mexican Eulophidae including Entedoninae may be a good source of beneficial parasitoids for using in biological control programs. Therefore, the authors elaborated the first annotated checklist of Mexican eulophid parasitoids of the subfamily Entedoninae and hope this work will stimulate fundamental taxonomic and biological studies of this group of parasitic insects.

Genera and species are listed alphabetically. For each genus and species is given the following information: valid name, state record within México, geographical distribution (states, listed from North to South), host orders and families, and recent literature.

I. *Callifrons* Schauff, Yoshimoto & Hansson, 1994

This genus is the most closely related to *Closterocerus* Westwood and *Omphale* Haliday. It includes one species.

Distribution: México, USA (Florida, Missouri), Costa Rica.

Biology and hosts: Unknown.

1. *C. maculata* Schauff, Yoshimoto & Hansson, 1994

Schauff *et al.*, 1994: 610-611 (Michoacán, Chiapas).

Distribution: México; USA, Costa Rica.

II. *Ceranisis* Walker, 1841

Schauff (1991) reported 5 species from the Nearctic Region. González-Hernández (1989) and Perales-Gutiérrez & Flores-Dávila (1991) reported this genus from México.

Distribution : Worldwide.

Biology and hosts: Endoparasitoids of thrips larvae from Thripidae and Phlaeothripidae (Thysanoptera).

2. *Ceranisis* sp.

González-Hernández, 1989:31 (Coahuila); Perales-Gutiérrez & Flores-Dávila, 1991:39 (Coahuila).

Hosts: Unknown.

III. *Chrysocharis* Foerster, 1856

This is one of the largest genera of Entedoninae. In the Nearctic region, 63 species are known (Schauff *et al.* 1997), and 17 are known from México (Hansson, 1997b). Several species have been imported from one country to another for the biological control of leafmining pests.

Distribution: Probably cosmopolitan (Schauff, 1991).

Biology and hosts: Primary parasitoids in the larvae and prepupae of leafminers-Diptera (Agromyzidae-the most common hosts), Lepidoptera and Hymenoptera.

Subgenus *Chrysocharis* Foerster

3. *C. (C.) absentia* Hansson, 1997

Hansson 1997b: 83 (Puebla, Guerrero, Oaxaca).

Distribution: México.

Hosts: Unknown.

4. *C. (C.) ainslie* Crawford, 1912

Hansson, 1997b: 83 (Michoacán, Puebla).

Distribution: México; USA, Canada (Yoshimoto, 1973), Europe, Cuba, Guam, Hawaii (La Salle & Parrella, 1991), Puerto Rico (De Santis & Fidalgo, 1994).

Hosts: Agromyzidae (Diptera), Coleophoridae (Lepidoptera).

5. *C. (C.) clarkae* Yoshimoto, 1973

De Santis & Fidalgo, 1994:87 (México); Hansson, 1997b:83 (Baja California)

Distribution: México; USA, Canada (Yoshimoto, 1973).

Hosts: Agromyzidae (Diptera).

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6. *C. (C.) crassiscapus* (Thomson, 1878)
De Santis & Fidalgo, 1994:87 (México); Hansson, 1997b:83 (Michoacán).
Distribution: México; USA, Canada, Alaska, Europe (La Salle & Parrella, 1991).
Hosts: Agromyzidae (Diptera).
7. *C. (C.) flacilla* (Walker, 1839)
De Santis & Fidalgo, 1994:87 (México); Hansson, 1997b:83,85 (Tamaulipas, Michoacán, México, D.F., Puebla, Guerrero, Oaxaca, Chiapas).
Distribution: México; El Salvador, Colombia, Ecuador, Uruguay (De Santis & Fidalgo, 1994).
Hosts: Agromyzidae (Diptera).
8. *C. (C.) ignota* Hansson, 1987
De Santis & Fidalgo, 1994:87 (México); Hansson, 1997b:85 (Veracruz, Michoacán, México, Morelos, Oaxaca).
Distribution: México; USA, Canada, central and northern South America (La Salle & Parrella, 1991).
Hosts: Agromyzidae (Diptera).
9. *C. (C.) longinerva* Hansson, 1997
Hansson, 1997b:85 (Tamaulipas, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).
Distribution: México.
Hosts: Unknown.
10. *C. (C.) paradoxa* Hansson, 1987
Hansson, 1997b:86 (Michoacán, Oaxaca).
Distribution: México; USA.
Hosts: Unknown.
11. *C. (C.) parma* Hansson, 1997
Hansson, 1997b:86,88 (Guerrero).
Distribution: México.
Hosts: Unknown.
12. *C. (C.) perditor* Hansson, 1987
De Santis & Fidalgo, 1994:88 (México); Hansson, 1987 (México, D.F., Morelos).
Distribution: México.
Hosts: Unknown.

13. *C. (C.) prodice* (Walker, 1839)
Hansson, 1987 (Guerrero, Oaxaca, Chiapas); 1987b:88 (Tamaulipas, Puebla, Guerrero, Oaxaca, Chiapas); De Santis & Fidalgo, 1994:88 (México).
Distribution: México.
Hosts: Unknown.
14. *C. (C.) purpurascens* Hansson, 1997
Hansson, 1997b:88 (Michoacán).
Distribution: México.
Hosts: Unknown.
15. *C. (C.) tristis* Hansson, 1987
Hansson, 1987 (Michoacán, México, Guerrero, Morelos); 1997b:89 (Tamaulipas, Michoacán, México, D.F., Guerrero, Morelos, Oaxaca); De Santis & Fidalgo, 1994:88 (México).
Distribution: México; Guatemala, Honduras, El Salvador, Costa Rica, Panamá, Ecuador, Brazil (De Santis & Fidalgo, 1994).
Hosts: Agromyzidae (Diptera)
16. *C. (C.) walleyi* Yoshimoto, 1973
De Santis & Fidalgo, 1994:88 (México); Hansson, 1987 (Chihuahua, Veracruz, Michoacán, Puebla, Guerrero, Morelos, Oaxaca).
Distribution: México; Canada (Yoshimoto, 1973), Guatemala, El Salvador, Ecuador, Perú (De Santis & Fidalgo, 1994).
Hosts: Agromyzidae (Diptera), Lithocolletidae (Lepidoptera).

Subgenus *Zaommomyia* Ashmead

17. *C. (Z.) beckeri* (Yoshimoto, 1973)
Hansson, 1997b:89 (Veracruz, Oaxaca, Chiapas, Quintana Roo).
Distribution: México; USA, Canada (Yoshimoto, 1973).
Hosts: Unknown.
18. *C. (Z.) maya* Hansson, 1997
Hansson, 1997b:89-90 (Tamaulipas, Veracruz, Puebla, Guerrero, Oaxaca, Chiapas, Quintana Roo).
Distribution: México.
Hosts: Unknown.

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19. *C. (Z.) vonones* (Walker, 1839)

Hansson, 1997b:90-91 (Tamaulipas, Jalisco, Guerrero).

Distribution: México; USA, Brazil, West Indies (Hansson, 1986).

Hosts: Agromyzidae (Diptera).

20. *Chrysocharis* sp.

González-Hernández, 1989:31 (Coahuila, Nuevo León); Martínez *et al.*, 1989:41 (Tamaulipas); Perales-Gutiérrez & Flores-Dávila, 1991:39 (Coahuila).

Hosts: Unknown.

IV. *Chrysocharodes* Ashmead, 1894

This genus is closely related to *Pediobius* Walker, but this placement remains uncertain (La Salle & Schauff, 1992). One described species is known.

Distribution: West Indies, México.

Biology and hosts: In México, undetermined species was reared from Gracillariidae (Lepidoptera) (Schauff *et al.*, 1998).

21. *Chrysocharodes* sp.

Schauff *et al.*, 1998:1038 (México, ex *Phyllocnistis citrella* Stainton).

Hosts: Gracillariidae (Lepidoptera).

V. *Chrysonotomyia* Ashmead, 1904

The taxonomy of this genus has a very long and complicated history. Following Hansson's classification (1995b), only one species is present in the Nearctic region. In México, this genus has been recorded by González-Hernández (1989) and Martínez *et al.* (1989).

Distribution: Holarctic.

Biology and hosts: Primary parasitoids of Cecidomyiidae (Diptera).

22. *Chrysonotomyia* sp.

González-Hernández, 1989:31 (Nuevo León, Tamaulipas); Martínez *et al.*, 1989: 41 (Tamaulipas).

Hosts: Unknown.

VI. *Closterocerus* Westwood, 1833

This genus is the most closely related to *Chrysonotomyia* Ashmead. In the Nearctic

region, 21 species are known (Schauff *et al.*, 1997).

Distribution: Worldwide, quite common in North America.

Biology and hosts: Generally primary endoparasitoids of Coleoptera, Diptera, Lepidoptera and Hymenoptera leafmining larvae (occasionally hyperparasitoids of Braconidae and Chalcidoidea).

23. *C. utahensis* Crawford, 1912

De Santis, 1979:281 (México).

Distribution: México; USA (Burks, 1979), Canada (Hansson, 1994).

Hosts: Bucculatricidae (Lepidoptera).

24. *Closterocerus* sp.

Perales *et al.*, 1996a:93 (Colima, *ex Phyllocnistis citrella*), 1996b:349-350 (Colima, *ex P. citrella*); Schauff *et al.*, 1998:1041 (México, *ex P. citrella*).

Hosts: Gracillariidae (Lepidoptera).

VII. *Derostenus* Westwood, 1833

This genus is the most similar to *Chrysocharis* Foerster. In the Nearctic region, 3 species are present (Schauff *et al.*, 1997). For México, this genus has been recorded by González and Gordh (1987).

Distribution: Holarctic.

Biology and hosts: solitary endoparasitoids of Lepidoptera larvae.

25. *Derostenus* sp.

González & Gordh, 1987:65 (México).

Hosts: Unknown.

VIII. *Edovum* Grissell, 1981

This genus is more closely related to *Horismenus* Walker and *Emersoniella* Girault. Only one species is known.

Distribution: México; Colombia, introduced into USA (Schauff, 1998).

Biology and hosts: Endoparasitoid in the beetle *Leptinotarsa undecemlineata* (Chrysomelidae) eggs.

26. *E. putleri* Grissell, 1981

Grissell, 1981:791 (México); Schauff, 1991:48 (México); De Santis & Fidalgo, 1994:85 (México).

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Distribution: México; Colombia, USA (introduced).

Hosts : Chrysomelidae (Coleoptera).

IX. *Entedononecremnus* Girault, 1915

This genus has been included in the tribe Euderomphalini-parasitoids of whiteflies only (La Salle & Schauff, 1994). There are two described species in this genus (one from Nearctic, by Zolnerowich & Rose, 1996), and several undescribed species in México and the Caribbean (Schauff *et al.*, 1997).

Distribution: New World tropics, from the Caribbean and México South to Brazil; USA.

Biology and hosts: Aleyrodidae (Homoptera).

27. *Entedononecremnus* sp.

Schauff *et al.*, 1997:364 (México).

Hosts: Aleyrodidae (Homoptera).

X. *Horismenus* Walker, 1843

This genus is most closely related to *Alachua* Schauff and Boucek and *Paracrias* Ashmead. In the Nearctic region, 16 species are recorded (Schauff *et al.*, 1997), with possibly 4 species from México.

Distribution: New World.

Biology and hosts: Mainly primary parasitoids of Coleoptera but also in Diptera and Lepidoptera; some species are hyperparasitoids through other Hymenoptera.

28. *H. mexicanus* (Burks, 1968)

De Santis, 1979:273 (México-as *Psephenivorus*).

Distribution: México.

Hosts: Psephenidae (Coleoptera).

29. *H. urichi* Crawford, 1912

De Santis, 1979:273 (México).

Distribution: México.

Hosts: *Cirphis latiuscula* (M.-S.).

30. *Horismenus* sp.1

Martínez & Ruíz, 1996:89 (Tamaulipas, *ex P. citrella*); Perales *et al.*, 1996a:93 (Colima, *ex P. citrella*), 1996b:349-350 (Colima, *ex P. citrella*); Ruíz & Mateos

1996:96 (Veracruz, ex *P. citrella*); Schauff *et al.*, 1998:1032 (México, ex *P. citrella*).
Hosts: Gracillariidae (Lepidoptera).

31. *Horismenus* sp. 2

González-Hernández, 1989:32 (Coahuila, Nuevo León); Martínez *et al.*, 1989:41 (Tamaulipas); Perales-Gutiérrez & Flores-Dávila, 1991:39 (Coahuila).
Hosts: Unknown.

XI. *Neochrysocharis* Kurdjumov, 1912

Neochrysocharis is a somewhat weakly defined genus; in the Nearctic region, 18 species are recorded (Schauff *et al.*, 1997), in México 8 species (Hansson, 1997b).
Distribution: Probably cosmopolitan.

Biology and hosts: Coleoptera, Diptera, Lepidoptera, Hymenoptera. They are primary parasitoids, but some species possibly are hyperparasitoids.

32. *N. arizonensis* (Crawford, 1913)

De Santis, 1979:279 (México-as *Achrysocharella*); Hansson, 1997b:91 (Oaxaca, Chiapas).
Distribution: México; USA, Canada (Hansson, 1995b).
Hosts: Unknown.

33. *N. aversiflexa* Hansson, 1997

Hansson, 1997b:91-92 (Guerrero, Oaxaca).
Distribution: México.
Hosts: Unknown.

34. *N. convexa* Hansson, 1997

Hansson, 1997b:92 (Michoacán, Oaxaca).
Distribution: México.
Hosts: Unknown.

35. *N. diastatae* (Howard, 1881)

Hansson, 1995b:38 (Chihuahua), 1997b:92 (Chihuahua, Guanajuato, México, D.F., Oaxaca).
Distribution: México; USA, Canada (Yoshimoto, 1978), Honduras (Hansson, 1995b).
Hosts: Diptera, Lepidoptera.

36. *N. epimeralis* Hansson, 1995

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Hansson, 1997b:92 (San Luis Potosí).
Distribution: México; USA (Hansson, 1995b).
Hosts: Unknown.

37. *N. formosa* (Westwood, 1833)

De Santis, 1979:279(México-as *Achrysocharella fullawayi* Crawford); Burks, 1979:1013 (México-as *Derostenus fullawayi* Crawford); Hansson, 1997b:92 (Oaxaca).
Distribution: México; Jamaica (De Santis, 1979), USA, Canada, Europe, Hawaii (Hansson, 1995b), Africa (La Salle & Parrella, 1991, as *Chrysonotomyia*).
Hosts: Coleoptera, Diptera, Lepidoptera, Hymenoptera.

38. *N. hyphantriae* (Yoshimoto, 1978)

Hansson, 1997b:92 (Tamaulipas).
Distribution: México; USA (Yoshimoto, 1978; Hansson, 1995b).
Hosts: Braconidae (Hymenoptera).

39. *N. tumidiscapus* Hansson, 1997

Hansson, 1997b:94 (Chiapas).
Distribution: México.
Hosts: Unknown.

XII. *Omphale* Haliday, 1833

Omphale is one of the largest genera of Eulophidae, but the basic taxonomic knowledge remains poor. In the Nearctic region, 57 described species have been recorded (Schauff *et al.*, 1997), in México 44 species (Hansson, 1997a).

Distribution: Probably cosmopolitan.

Biology and hosts: Endoparasitoids of Cecidomyiidae larvae (Diptera). These *Omphale* hosts are known mainly from European species. Only two records of reared material from the same host family have been found among Nearctic *Omphale*, *O. marylandensis* Girault and *O. vulgaris* Hansson.

40. *O. acuminaticornis* (Girault, 1916)

Hansson, 1997a:112 (Veracruz, Oaxaca, Campeche).
Distribution: México; USA, Canada (Yoshimoto, 1978; Hansson, 1996b).

41. *O. acuminativentris* (Girault, 1917)

Hansson, 1997a:132 (Tamaulipas, Jalisco, Colima, Veracruz, Michoacán, Guerrero, Oaxaca).

Distribution: México; USA (Yoshimoto, 1978), Canada (Hansson, 1996b).

42. *O. angusticornis* Hansson, 1997

Hansson, 1997a:136-138 (Tamaulipas, Jalisco, Michoacán, Oaxaca, Chiapas, Quintana Roo).

Distribution: México.

43. *O. australis* Hansson, 1996

Hansson, 1996b:34 (Colima, Jalisco, Michoacán, Guerrero, Oaxaca, Chiapas), 1997a:126 (Colima, Jalisco, Michoacán, Guerrero, Oaxaca, Chiapas).

Distribution: México; USA (Hansson, 1996b).

44. *O. carinata* Hansson, 1997

Hansson, 1997a:126 (Colima, Guerrero).

Distribution: México.

45. *O. cherana* Hansson, 1997

Hansson, 1997a:123 (Michoacán, Guerrero).

Distribution: México.

46. *O. cumbrensis* Hansson, 1997

Hansson, 1997a:138 (Oaxaca).

Distribution: México.

47. *O. dentata* Hansson, 1997

Hansson, 1997a:142 (Tamaulipas, Oaxaca, Chiapas).

Distribution: México.

48. *O. divina* (Girault, 1917)

Hansson, 1997a:126-127 (Zacatecas, Tamaulipas, Colima, Jalisco, Guanajuato, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).

Distribution: México; USA (Yoshimoto, 1980), Canada (Hansson, 1996b).

49. *O. elevata* Hansson, 1996

Hansson, 1997a:112 (Tamaulipas, Colima, Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca).

Distribution: México; USA, Canada (Hansson, 1996b).

50. *O. erginnus* (Walker, 1839)

Hansson, 1997a:142,145 (Michoacán, Puebla, Oaxaca, Chiapas).

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Distribution: México; USA, Canada, England (Hansson, 1996b).

51. *O. flaviscutellum* Hansson, 1997

Hansson, 1997a:123-124 (Tamaulipas, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas, Campeche, Quintana Roo).

Distribution: México; Costa Rica.

52. *O. fossata* Hansson, 1997

Hansson, 1997a:140 (Michoacán, Oaxaca).

Distribution: México.

53. *O. foveolata* Hansson, 1997

Hansson, 1997a:130-131 (Oaxaca).

Distribution: México; Costa Rica, Ecuador.

54. *O. fulgida* Hansson, 1997

Hansson, 1997a:132-134 (Michoacán, Chiapas).

Distribution: México.

55. *O. gracilis* Hansson, 1997

Hansson, 1997a:134 (Jalisco).

Distribution: México.

56. *O. indistincta* Hansson, 1997

Hansson, 1997a:145 (Jalisco, Oaxaca).

Distribution: México.

57. *O. lanceolata* Hansson, 1997

Hansson, 1997a:112-113 (Tamaulipas).

Distribution: México.

58. *O. marylandensis* (Girault, 1916)

Hansson, 1997a:113 (Michoacán, Guerrero).

Distribution: México; USA, Canada (Hansson, 1996b).

Hosts: Cecidomyiidae (Diptera).

59. *O. masneri* Hansson, 1996

Hansson, 1997a:134 (Oaxaca).

Distribution: México; USA (Hansson, 1996b).

60. *O. metallica* Hansson, 1997

Hansson, 1997a:113,116-117 (Tamaulipas, Colima, Jalisco, Veracruz, Puebla, Guerrero, Oaxaca, Chiapas, Campeche).

Distribution: México.

61. *O. nita* Hansson, 1997

Hansson, 1997a:145,147-148 (Puebla).

Distribution: México.

62. *O. notaula* Hansson, 1997

Hansson, 1997a:131-132 (Tamaulipas, Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).

Distribution: México.

63. *O. obscura* Hansson, 1997

Hansson, 1997a:127 (Chiapas).

Distribution: México.

64. *O. obscurinotata* (Girault, 1916)

Hansson, 1997a:134 (Jalisco, Guanajuato, Michoacán, Guerrero, Oaxaca).

Distribution: México; USA (Yoshimoto, 1978), Canada (Hansson, 1996b).

65. *O. oriampa* Hansson, 1997

Hansson, 1997a:138-139 (Colima, Jalisco, Michoacán, Guerrero).

Distribution: México.

66. *O. pallida* Hansson, 1997

Hansson, 1997a:134-136 (Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).

Distribution: México.

67. *O. petatlana* Hansson, 1997

Hansson, 1997a:127-128 (Michoacán, Guerrero, Oaxaca, Chiapas).

Distribution: México.

68. *O. petiolata* Hansson, 1997

Hansson, 1997a:117-119 (Guerrero, Oaxaca, Chiapas).

Distribution: México.

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69. *O. poeta* (Girault, 1920)
Hansson, 1997a:128 (Jalisco, Guerrero).
Distribution: México; USA (Hansson,1996b).
70. *O. scutellata* (Girault, 1916)
Hansson, 1997a:139 (Colima, Jalisco, Guanajuato, Michoacán, Puebla, Guerrero, Morelos, Oaxaca).
Distribution. México; USA, Canada (Hansson, 1996b).
71. *O. semiglobosa* Hansson, 1996
Hansson, 1997a:140 (Tamaulipas, Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas, Campeche, Quintana Roo).
Distribution: México; USA, Canada (Hansson, 1996b).
72. *O. sola* Hansson, 1997
Hansson, 1997:148-150 (Colima, Jalisco, Michoacán, Guerrero, Oaxaca, Chiapas).
Distribution: México.
73. *O. stigmalis* Hansson, 1997
Hansson, 1997a:119-120 (Oaxaca).
Distribution: México.
74. *O. tempora* Hansson, 1997
Hansson, 1997a:150 (Jalisco, Michoacán).
Distribution: México.
75. *O. tria* Hansson, 1997
Hansson, 1997a:128-129 (Zacatecas, Michoacán, Guerrero, Oaxaca).
Distribution: México.
76. *O. triangulata* Hansson, 1997
Hansson, 1997a:129 (Guerrero).
Distribution: México.
77. *O. uruapana* Hansson, 1997
Hansson, 1997a:140-141 (Jalisco, Michoacán, Guerrero, Oaxaca).
Distribution: México.
78. *O. valida* Hansson, 1997

Hansson, 1997:141 (Guerrero).

Distribution: México.

79. *O. vinacea* Hansson, 1996

Hansson, 1997a:129-130 (Tamaulipas, Colima, Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).

Distribution: México; USA, Canada (Hansson, 1996b).

80. *O. vulgaris* Hansson, 1996

Hansson, 1997a:139 (Jalisco, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).

Distribution: México; USA, Canada (Hansson, 1996 b).

Hosts: Cecidomyiidae (Diptera).

81. *O. whartoni* Hansson, 1997

Hansson, 1997a:120 (Jalisco, Michoacán, Guerrero).

Distribution: México.

82. *O. woolleyi* Hansson, 1997

Hansson, 1997a:121(Jalisco, Michoacán, Guerrero, Oaxaca).

Distribution: México.

83. *O. zolnerowichi* Hansson, 1997

Hansson, 1997a:139-140 (Michoacán, Oaxaca, Chiapas).

Distribution: México; Costa Rica.

XIII. *Paracrias* Ashmead, 1904

This genus is closely related to *Alachua* Schauff and Boucek and *Horismenus* Walker. In the Nearctic region, two species are known (Schauff *et al.*, 1997), and two species from México.

Distribution: New World.

Biology and hosts: Curculionidae, Bruchidae (Coleoptera).

84. *P. anthonomi* Woolley and Schauff, 1987

Woolley & Schauff, 1987:771-775 (Chiapas, Campeche, Yucatán, Quintana Roo).

De Santis & Fidalgo, 1994:91 (México).

Distribution: México.

Hosts: Curculionidae (Coleoptera).

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85. *P. beus* Schauff, 1985

De Santis & Fidalgo, 1994:91 (México).

Distribution: México; Costa Rica, Venezuela, Ecuador, Brazil (Schauff, 1985).

Hosts: Unknown.

XIV. *Pediobius* Walker, 1846

This genus has an extensive nomenclatural history. In the Nearctic region, 32 species are recorded (Schauff *et al.*, 1997). In México, the genus *Pediobius* was recorded by González and Gordh (1987), González-Hernández (1989), and Martínez *et al.* (1989).

Distribution: Worldwide.

Biology and hosts: Primary or secondary parasitoids of a variety of hosts-Coleoptera, Diptera, Lepidoptera, Hymenoptera, also Araneae.

86. *P. foveolatus* (Crawford, 1912)

De Santis, 1979:274 (México).

Distribution: México.

Hosts: *Epilachna varivestis* Mulsant (Coleoptera, Coccinellidae).

87. *P. furvum* (Gahan, 1928)

De Santis, 1979:274 (México).

Distribution: Central and South America.

Hosts: *Diatraea* spp.

88. *Pediobius* sp.

González & Gordh, 1987:65 (México); González-Hernández, 1989:32 (Coahuila; Martínez *et al.*, 1989:41(Tamaulipas).

Hosts: Unknown.

XV. *Perditorulus* Hansson, 1996

This genus is closely related to *Omphale* Haliday and includes 33 species, unless otherwise stated from México.

Distribution: Nearctic and Neotropical regions.

Biology and hosts: Unknown.

89. *P. abruptus* Hansson, 1996

Hansson, 1996a:46 (Guerrero, Oaxaca).

Distribution: México.

90. *P. angustatus* Hansson, 1996
Hansson, 1996a:46 (Oaxaca, Guerrero).
Distribution: México.

91. *P. avirostris* Hansson, 1996
Hansson, 1996a:46 (Oaxaca).
Distribution: México.

92. *P. bidenticulatus* Hansson, 1996
Hansson, 1996a:49 (Oaxaca).
Distribution: México.

93. *P. bifidus* Hansson, 1996
Hansson, 1996a:49 (Colima, Oaxaca).
Distribution: México.

94. *P. bilobus* Hansson, 1996
Hansson 1996a:49 (Veracruz, Michoacán, Chiapas).
Distribution: México.

95. *P. calcaratus* Hansson, 1996
Hansson, 1996a:49 (Puebla, Guerrero, Oaxaca, Chiapas).
Distribution: México.

96. *P. crassiscapus* Hansson, 1996
Hansson, 1996a:49-51 (Oaxaca, Chiapas).
Distribution: México.

97. *P. evanescens* Hansson, 1996
Hansson, 1996a:49-51 (Oaxaca).
Distribution: México.

98. *P. falcispinus* Hansson, 1996
Hansson 1996a:51,54 (Michoacán, Oaxaca).
Distribution: México.

99. *P. farctus* Hansson, 1996

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Hansson, 1996a:54 (Oaxaca).

Distribution: México

100. *P. flexilis* Hansson, 1996

Hansson, 1996a:54 (Tamaulipas, Oaxaca).

Distribution: México.

101. *P. geniculatus* Hansson, 1996

Hansson, 1996a :54 (Oaxaca).

Distribution: México.

102. *P. grandiculus* Hansson, 1996

Hansson, 1996a:54,56 (Jalisco, Veracruz, Puebla, Oaxaca, Chiapas).

Distribution: México.

103. *P. hastatus* Hansson, 1996

Hansson, 1996a:56 (Tamaulipas, Chiapas).

Distribution: México.

104. *P. insternatus* Hansson, 1996

Hansson, 1996a:56 (Oaxaca).

Distribution: México.

105. *P. languidiscapus* Hansson, 1996

Hansson, 1996a:57 (Jalisco).

Distribution: México.

106. *P. longiparameratus* Hansson, 1996

Hansson, 1996a:57 (Oaxaca).

Distribution: México.

107. *P. magnicaulis* Hansson, 1996

Hansson, 1996a:57-58 (Tamaulipas).

Distribution: México.

108. *P. mucronatus* Hansson, 1996

Hansson, 1996a:58 (Puebla).

Distribution: México.

109. *P. parameratulus* Hansson, 1996
Hansson, 1996a:58 (Puebla).
Distribution: México.
110. *P. penicillatus* Hansson, 1996
Hansson, 1996a:58-59 (Colima, Jalisco, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas).
Distribution: México; USA, Canada.
111. *P. pilosus* Hansson, 1996
Hansson, 1996a:59 (Jalisco).
Distribution: México.
112. *P. planiscapus* Hansson, 1996
Hansson, 1996a:59 (Jalisco, Veracruz, Michoacán, Puebla, Guerrero, Oaxaca, Chiapas.)
Distribution: México.
113. *P. porcodon* Hansson, 1996
Hansson, 1996a:59-60 (Oaxaca, Chiapas).
Distribution: México.
114. *P. punctiscapus* Hansson, 1996
Hansson, 1996a:60 (Jalisco, Guerrero, Oaxaca, Chiapas).
Distribution: México.
115. *P. sinuiscapus* Hansson, 1996
Hansson, 1996a:60 (Guerrero, Chiapas).
Distribution: México.
116. *P. trispinus* Hansson, 1996
Hansson 1996:60 (Jalisco, Oaxaca).
Distribution: México.
117. *P. unispinus* Hansson, 1996
Hansson, 1996a:60 (Tamaulipas, Jalisco, Veracruz, Guerrero, Oaxaca, Chiapas).
Distribution: México.
118. *P. verticillatus* Hansson, 1996

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Hansson, 1996a:60-61 (Veracruz, Puebla, Guerrero, Oaxaca, Chiapas).
Distribution: México.

119. *P. woolleyi* Hansson, 1996
Hansson, 1996a:61 (Jalisco, Guerrero, Oaxaca).
Distribution: México; USA (Florida).

120. *P. zolnerowichi* Hansson, 1996
Hansson, 1996a:61 (Oaxaca).
Distribution: México.

CONCLUSION

This is the third checklist of Chalcidoidea of México. Previously, two were elaborated: the annotated checklist of Encyrtidae (Trjapitzin and Ruíz-Cancino, 1995) and the checklist of Aphelinidae (Myartseva and Ruíz-Cancino, 2000). As the analysis of the checklist of Mexican Entedoninae shows, the biological diversity of this eulophid subfamily is very rich. More than half of Entedoninae species identified (70 species or 63.6%) from the material collected in 21 states are known only from México. Twenty two species are distributed in the Nearctic region, and 14 in the Nearctic and Neotropical regions. Only two species have Holarctic distribution and two are cosmopolitan.

Some species are interesting for biological control of insect pests. For example, *Edovum puttleri* is a parasitoid of *Leptinotarsa undecemlineata* eggs, and was introduced into USA for biocontrol of Colorado potato beetle *L. decemlineata* (Schauff, 1991). Species of the genera *Horismenus*, *Chrysocharodes* and *Closterocerus* were reared from the citrus leafminer, *Phyllocnistis citrella* (Schauff *et al.*, 1998), an important pest of citrus.

Hosts of *Ceraninus* belong to the order Thysanoptera. *Entedononecremnus* attacks Homoptera (Aleyrodidae), *Edovum* and *Paracrias* attack Coleoptera pests, *Chrysonotomyia* and *Omphale* attack Diptera species, *Chrysocharodes* and *Derostenus* species attack Lepidoptera leafminers of agricultural crops. Hosts of polyphagous genera (*Chrysocharis*, *Closterocerus*, *Horismenus*, *Neochrysocharis*, *Pediobius*) belong to orders Coleoptera, Diptera and Lepidoptera. Some species of Entedoninae are hyperparasitoids of other Hymenoptera.

Because the majority of the species of Entedoninae were collected by trapping or sweeping, the hosts were not established (genera *Callifrons*, *Perditorulus*, and 98 species from 9 genera). Therefore, very little is known of the fauna and biology of Entedoninae (and other Eulophidae). For example, during the last three years one new

genus (*Perditorulus*) with 33 new species (Hansson, 1996a), and 30 new species of the genus *Omphale* (Hansson, 1997a), a few new species from the genera *Chrysocharis* and *Neochrysocharis* (Hansson, 1997b) were described from México. Many genera need revisionary studies, and many new species need to be described.

The authors hope this first checklist showing the great biological diversity of this large and economically important group of chalcidoid parasitoids, can help promote fundamental studies of fauna, taxonomy and biology of parasitic Chalcidoidea of México.

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