

Synopsis of species of the genus *Metaphycus* Mercet, 1917 of Mexico (Hymenoptera: Encyrtidae) with description of new species

Краткий обзор видов рода *Metaphycus* Mercet, 1917 Мексики (Hymenoptera: Encyrtidae) с описанием нового вида

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KEY WORDS: *Metaphycus*, *M. victoriensis* sp.n., soft scale insects, whiteflies, Mexico.

КЛЮЧЕВЫЕ СЛОВА: *Metaphycus*, *M. victoriensis* sp.n., кокциды, алейродиды, Мексика.

ABSTRACT: Twenty one species of the genus *Metaphycus* Mercet, 1917 from the family Encyrtidae are recorded from Mexico as parasitoids of soft scale insects and whiteflies, including eight recently described species and a new species which is described here. Synopsis of the species, with data on their hosts, distribution, references and collected materials is given. An illustrated key for the identification of Mexican species is provided.

РЕЗЮМЕ: В Мексике известен 21 вид рода *Metaphycus* Mercet, 1917 из семейства Encyrtidae, паразитоиды кокцид и алейродид, включая 8 видов, описанных недавно и один новый вид, который описывается в данной статье. Обзор видов включает данные об их хозяевах, распространении, публикациях и собранных материалах. Дается иллюстрированная таблица для определения мексиканских видов.

Introduction

Taxonomy of the genus *Metaphycus* always has been studied very intensively because of importance of its species for biological control of scale insects. During the last 30 years there were published revisions of European [Guerrieri & Noyes, 2000], Indian [Zeya & Hayat, 1993] and South African species [Annecke & Mynhardt, 1971, 1972, 1981] as well as the records of *Metaphycus* species for many countries, new data on taxonomy of the genus [Noyes & Woolley, 1994], biology of important taxa and descriptions of new species.

The world fauna of the genus *Metaphycus* now contains more than 230 described species, including important natural enemies of coccids, which are used in biological control of soft scales [Trjapitzin, 1989; Kennett et al., 1999; Guerrieri & Noyes, 2000]. Most of the species are known from Palaearctic (80) and Afrotropical (80) zoogeographical regions. 23 species are known from Neotropical region and 48 species — from Nearctic region [Guerrieri & Noyes, 2000].

All species within the genus are divided into three separate groups on the basis of the number of segments of maxillary and labial palpi. Guerrieri & Noyes [2000] prefer to define these species groups basing only on the number of segments of maxillary palpi. Species of the *zebratus* group have four-segmented maxillary palpi and three-segmented labial palpi, their general hosts are Coccidae, Kermesidae and Kerriidae. Species of the *insidiosus* group have three-segmented maxillary and labial palpi, their hosts are mainly Coccidae. Species of the *alberti* group have two-segmented maxillary and labial palpi, their hosts are mostly Diaspididae.

Nine identified species of *Metaphycus* were known from Mexico [Trjapitzin & Ruíz-Cancino, 1996; González-Hernández, 2000; Noyes, 2002]. In 1998–2002 years the senior author collected and reared 13 species from soft scale insects and whiteflies; 8 of them were described as new for the science and 2 are new for the Mexican fauna [Myartseva & Ruíz-Cancino, 2002, 2003]. At present, 20 identified species of the genus *Metaphycus* are recorded from Mexico. *M. victoriensis* sp.n. (reared from *Saissetia miranda*) is described in the present paper. We include *M. lounsburyi* Howard into the Mexican record and the key, because it could be introduced into Mexico by ecesis similarly to some other *Metaphycus* species. In this article we give data for all species, with a key for their identification and illustrations. Only references containing information for Mexico are given in the synopsis; hosts of each species are listed completely.

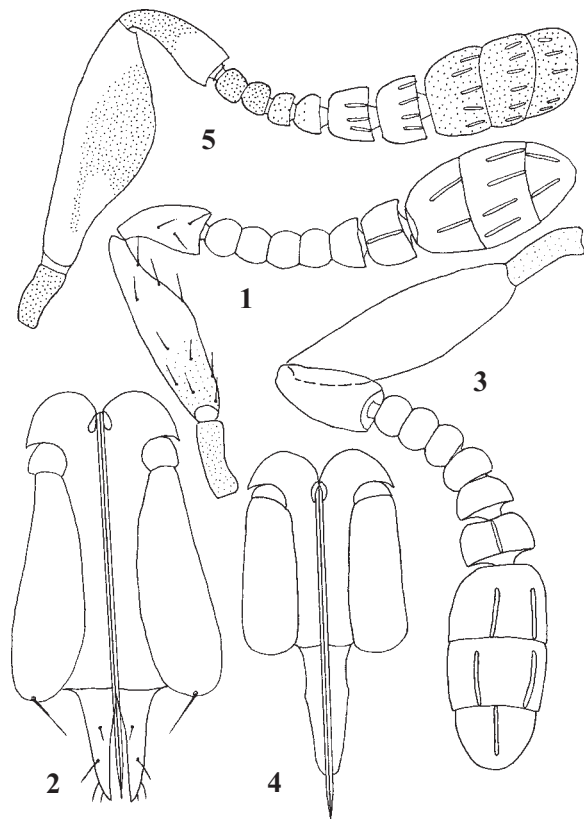
***Metaphycus* species in biological control.** It is well known that various species of *Metaphycus* were introduced to control soft scale pests of subtropical and tropical crops. Approximately 30 species have been used in various parts of the world for controlling about 20 pest species — soft scales (Coccidae) and armoured scales (Diaspididae) [Noyes & Hanson, 1996]. Citrus and olive as well as some ornamentals also have worldwide commercial importance, and the history of biological control efforts of their pests is the longest one [Clausen, 1978; Kennett et al., 1999]. *Saissetia oleae*

(Olivier) is a pest of both olive and citrus trees. This black scale of African origin is a highly polyphagous and cosmopolitan species. It is a very important pest in California (USA), Chile, Australia and Southern Europe. Starting from 1901, many species of parasitoids and predators were introduced into several countries from South Africa. Among 9 parasitoid species that became permanently established in California, three species belong to the genus *Metaphycus*: *M. helvolus* (Compere), *M. lounsburyi* (Howard) and *M. anneckei* Guerrieri & Noyes. Prior to the 1950's, most efforts were centered in California, Chile, Peru and Argentina to control *S. oleae* by *M. anneckei* (as *lounsburyi*). *M. helvolus* (Compere) and *M. stanleyi* Compere were used most frequently [Kennett et al., 1999]. Now they have been collected also in Mexico. Because we are unaware of any introduction of these species to Mexico, their appearance in Mexico can be explained by possible ecesis from California. In the opinion of Trjapitzin & Ruíz-Cancino [1996], *Metaphycus flavus* (Howard) and *M. anneckei* (as *lounsburyi*) could be introduced to Mexico together with their hosts (soft scales) also by ecesis. *M. anneckei* appeared in Chile by ecesis from Peru, where it had been introduced to control *Saissetia oleae* on olive [Duran, 1944].

Introduced parasitoid species also attack several other coccids of ornamental and fruit crops. For example, *M. stanleyi* was reared from *Parasaissetia nigra* in Mexico, whereas *M. flavus* was reared from *Protopulvinaria pyriformis* and *Philephedra lutea*. Usually coccid species rarely have high enough population density to damage ornamental trees and shrubs, because they are controlled by local parasitoids and predators. It is therefore important to maintain reservoirs of various soft scales on the natural vegetation and ornamental crops to establish sources of natural enemies for their subsequent migration to orchards and vineyards. Thus it is also important to study faunistics and taxonomy of natural enemies of coccids on non-target plants (both native and agricultural) to found new and effective species of parasitoids.

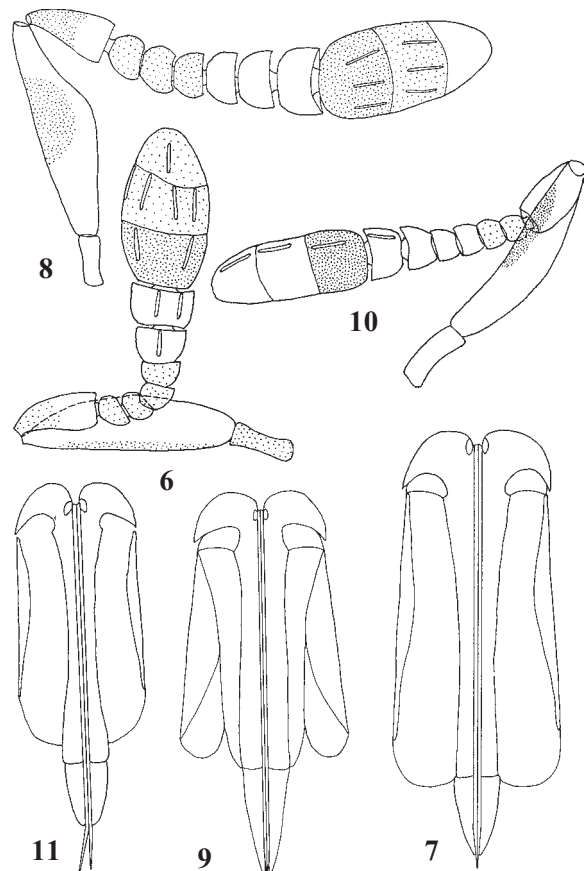
KEY TO MEXICAN SPECIES OF *METAPHYCUS* MERCET, 1917 (FEMALES)

1. Maxillary palpi 2-segmented, labial palpi 1- or 2-segmented. 2
 - Maxillary palpi 4- or 3-segmented, labial palpi 3-segmented 4
2. Scape with a large brown median area which does not reach dorsal margin and is 2.3 times as long as wide (Fig. 13) 8. *helvolus* (Compere)
 - Scape without a large brown median area which is more than 3 times as long as wide 3
3. Scutellum with 4 pairs of setae. Scape weakly infuscate at base, 4 times or slightly more as long as wide (Fig. 1). Ovipositor 3.6 times as long as third valvula (Fig. 2) ...
 - 1. *acapulcus* Myartseva et Ruíz-Cancino
 - Scutellum with 3 pairs of setae. Scape yellow, slightly more than 3 times as long as wide (Fig. 3). Ovipositor 2.3 times as long as third valvula (Fig. 4)
 - 2. *aleyrodis* Myartseva et Ruíz-Cancino
4. Maxillary palpi 4-segmented 5
 - Maxillary palpi 3-segmented 6
5. Fore wings hyaline. Head without white bands across face. Scape with white base and apex. Pedicel about 2.5 times as long as wide, black only basally
 - 3. *anneckei* Guerrieri et Noyes
 - Fore wings (Fig. 28) strongly infuscate in basal half. Head with white bands across face. Scape with black base and apex. Pedicel fully black, about 1.5 times as long as wide (Fig. 29) 19. *superbus* Myartseva
6. Fore wings with bands of dark cilia 7
 - Fore wings uniformly ciliated and immaculate 8
7. Head and mesonotum orange yellow; base of metasoma whitish; femora yellowish white. Frontovortex more than twice as long as wide. Pedicel as long as the first three funicle segments combined; club black (Fig. 16). Ovipositor 4.6 times as long as third valvula (Fig. 17)
 - 10. *lecanii* Howard
 - Head and mesonotum brown to black; metasoma black; femora dark brown. Frontovortex less than twice as long as wide. Pedicel as long as the first four funicle segments combined; club yellowish white (Fig. 12)
 - 7. *giraulti* Noyes et Woolley
8. Scape strongly expanded, less than 3 times as long as wide 9
 - Scape not or only moderately expanded, more than 3 times as long as wide 12
9. Pedicel brown with longitudinal white streak on upper side (Fig. 20) 13. *maculipes* Howard
 - Pedicel brown to black at base, with white to yellowish apex, or with dark spot of variable size and shape. ... 10
10. Scape with a blackish rhomboidal area on ventral margin (Fig. 18) 11. *lounsburyi* Howard
 - Scape black, with its base, apex and narrow line on dorsal margin white (Figs 22, 26) 11
11. Ovipositor slightly exerted, longer than middle tibia; third valvula 0.2 times as long as second valvifer (Fig. 23)
 - 16. *pulvinariae* Howard
 - Ovipositor not exerted, shorter than middle tibia; third valvula 0.4 times as long as second valvifer (Fig. 27) ..
 - 18. *stanleyi* Compere
12. Ovipositor protruded by about 1/5–1/4 abdomen length. 13
 - Ovipositor not or only slightly protruded 14
13. Frontovortex as wide as long. Face with dark transverse band on its upper part. Tibiae with two dark rings. Scape black, with whitish apex and base. 15. *oaxacae* Howard
 - Frontovortex about 2.5 times as long as wide. Upper part of face lemon yellow. Tibiae immaculate. Scape yellow on inner side, black on upper margin and outer surface (except base and apex), with median longitudinal yellowish streak (Fig. 21) 14. *mexicanus* Howard
14. Head and mesosoma brownish to black; antennae whitish yellow, except fuscous basal segment of club. Scape 5 times as long as wide (Fig. 30). Ovipositor 1.3 times as long as middle tibia; third valvula 0.3 times as long as second valvifer and 1.1 times as long as midtibial spur (Fig. 31) 20. *tuxpan* Myartseva
 - Head and mesosoma yellow to orange 15
15. Tibiae with two dark bands 16
 - Tibiae immaculate or with subbasal infuscation 17
16. Scape 3 times as long as wide, its dorsal margin not infuscate (Fig. 32). Ovipositor shorter than middle tibia; third valvula 0.3 times as long as second valvifer (Fig. 33)
 - 21. *victoriensis* sp.n.
 - Scape more than 4 times as long as wide, its dorsal margin infuscate at middle (Fig. 24). Ovipositor longer than



Figs. 1–5. Mexican *Metaphycus* species, ♀♀: 1–2 — *M. acapulcus* Myartseva & Ruiz-Cancino; 3–4 — *M. aleyrodis* Myartseva & Ruiz-Cancino; 5 — *M. anneckeii* Guerrieri & Noyes [after Guerrieri & Noyes, 2000]; 1, 3, 5 — antenna; 2, 4 — ovipositor.

Рис. 1–5. Мексиканские виды *Metaphycus*, ♀♀: 1–2 — *M. acapulcus* Myartseva & Ruiz-Cancino; 3–4 — *M. aleyrodis* Myartseva & Ruiz-Cancino; 5 — *M. anneckeii* Guerrieri & Noyes [по Guerrieri & Noyes, 2000]; 1, 3, 5 — усик; 2, 4 — яйцеклад.



Figs. 6–11. Mexican *Metaphycus* species, ♀♀: 6–7 — *M. celticola* Myartseva; 8–9 — *M. farfani* Myartseva; 10–11 — *M. flavus* (Howard); 6, 8, 10 — antenna; 7, 9, 11 — ovipositor.

Рис. 6–11. Мексиканские виды *Metaphycus*, ♀♀: 6–7 — *M. celticola* Myartseva; 8–9 — *M. farfani* Myartseva; 10–11 — *M. flavus* (Howard); 6, 8, 10 — усик; 7, 9, 11 — яйцеклад.

- middle tibia; third valvula 0.2 times as long as second valvifer (Fig. 25) 17. *sergueii* Myartseva
17. Tibiae immaculate 18
- Tibiae with subbasal infuscation. Scape about 4 times as long as wide; basal segment of club brown (Fig. 6). Ovipositor 1.3 times as long as middle tibia (Fig. 7)
- 4. *celticola* Myartseva
18. Mesosomal sutures of notum with blackish borders. Both sides of scape with black spots. Scape about 5 times as long as wide; basal half of club blackish (Fig. 19)
- 12. *luteolus* (Timberlake)
- Mesosomal sutures of notum without blackish borders. 19
19. Scape without brown spot, 3.5 times as long as wide (Fig. 14). Head 2.6 times as wide as frontovertex. Ovipositor about 9.3 times as long as third valvula (Fig. 15) ...
- 9. *karwinskiae* Myartseva
- Scape with an elongate brown spot along dorsal margin and 4 times or more as long as wide. Head about 3.5 times as wide as frontovertex 20
20. Scape 5 times as long as wide, not enlarged at middle; 6th funicular segment with sensillum (Fig. 10). Fore wing 2.4 times as long as wide, without distinct bare basal area. Ovipositor about 5.5 times as long as third valvula (Fig. 11)
- 6. *flavus* (Howard)

- Scape 4 times as long as wide, enlarged at middle; 6th funicular segment without sensillum (Fig. 8). Fore wing 2.2 times as long as wide, with distinct bare basal area. Ovipositor about 3.5 times as long as third valvula (Fig. 9)
- 5. *farfani* Myartseva

Description of new species

Metaphycus victoriensis sp.n.

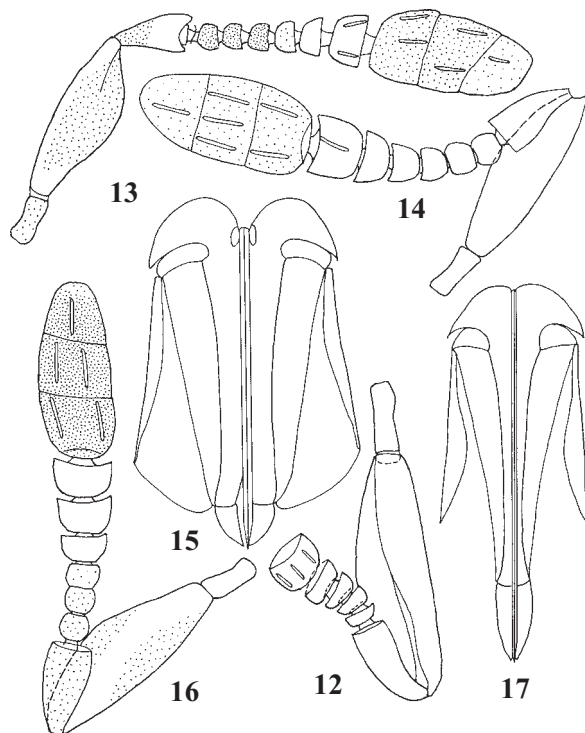
Figs. 32–37.

TYPE MATERIAL. Holotype ♀ (slide mounted): Mexico, Tamaulipas, Ciudad Victoria, University Campus, ex *Saissetia miranda* (Cockerell & Parrott) on *Nerium oleander*, 18-I-1999 (S. Myartseva). Paratypes: 2 ♀♀ — same data as holotype.

The holotype of the new species is deposited in the UCR Entomological Museum, University of California, Riverside, USA. Paratypes are deposited in the Entomological Museum, Autonomous University of Tamaulipas, Ciudad Victoria, Tamaulipas, México.

DESCRIPTION. **Female.** Length: 0.95–1.10 mm.

Head slightly wider than high, wider than mesosoma. Frontovertex twice as long as wide and 0.2 times as wide as head width. Ocelli in small acute triangle; hind ocelli situated closer to eyes. Maxillary and labial palpi 3-segmented (Figs. 34, 35). Eyes slightly more than 1.5 times as long as malar



Figs. 12–17. Mexican *Metaphycus* species, ♀♀: 12 — *M. giraulti* Noyes & Woolley [after Trjapitzin & Gordh, 1982]; 13 — *M. helvolus* (Compere) [after Guerrieri & Noyes, 2000]; 14–15 — *M. karwinskiæ* Myartseva; 16–17 — *M. lecanii* Howard; 12, 13, 14, 16 — antenna, 15, 17 — ovipositor.

Рис. 12–17. Мексиканские виды *Metaphycus*, ♀♀: 12 — *M. giraulti* Noyes & Woolley [по Trjapitzin & Gordh, 1982]; 13 — *M. helvolus* (Compere) [по Guerrieri & Noyes, 2000]; 14–15 — *M. karwinskiæ* Myartseva; 16–17 — *M. lecanii* Howard; 12, 13, 14, 16 — усик, 15, 17 — яйцеклад.

space. Antennae (Fig. 32) inserted below the lower eye margin. Antennal radicle about 2.5 times as long as wide; scape slightly widened, about 3 times as long as wide; pedicel slightly more than twice as long as wide and subequal in length to 1st to 3rd funicular segments combined; 1st–4th funicular segments slightly wider than long, 5th–6th about 1.5 times as wide as long; 1st–3rd segments subequal, 4th–5th segments slightly longer and subequal in length, 6th segment about 1.5 times longer than 5th segment; club about 2.5 times as long as wide and slightly shorter than funicle. Sixth funicular segment with 2–3 sensilla, 1st–3rd club segments with 3, 2 and one sensilla, respectively. Mesoscutum slightly more than 1.5 times as wide as long; notaular lines incomplete and do not reach halfway across mesoscutum. Scutellum shorter than mesoscutum, about 1.5 times as wide as long. Sculpture of mesoscutum and scutellum finely reticulate. Fore wings 2.3 times as long as wide, with short marginal fringe; setation and venation as on Fig. 36. Midtibial spur (Fig. 37) 0.8 times as long as basitarsus. Ovipositor (Fig. 33) not exerted, shorter than middle tibia; third valvula 0.3 times as long as second valvifer.

Head with whitish yellow face, orange frontovertex, occiput (above foramen) and upper edges of mouth corners slightly infuscate; malar space light. Antennae brownish black with whitish: narrow dorsal margin, narrow basal half of ventral margin, longitudinal stripe (more or less infuscate) from middle of ventral margin to apex of scape, apical half of pedicel and 4–6th funicular segments; top of club light brown.

Mesosoma orange yellow, tegulae white with infuscate apices, mesopleuron whitish, metanotum and propodeum strongly infuscate. Legs whitish, all tibiae with two dark bands and dark knees. Wings hyaline, venation slightly infuscate. Metasoma whitish basally (except for infuscate first gastral tergite) and dorsally yellow and infuscate in its apical half; outer plates of ovipositor slightly infuscate, inner plates and sheaths whitish.

Male. Unknown.

ETHYMOLOGY. The name of the new species comes from Ciudad Victoria, type locality in the State of Tamaulipas, Mexico.

COMMENTS. *Metaphycus victoriensis* sp.n. is very closely related to *M. stanleyi* Compere, 1940 and is also similar to some other species from the *insidiosus* group, particularly in the general coloration of head and body, and the presence of two brownish black bands on the middle and hind tibiae. Characters distinguishing *M. victoriensis* sp.n. from this species are given below.

In *M. stanleyi*: scape not more than 2.5 times as long as wide; valvula 0.4 times as long as second valvifer; 5th funicular segment with linear sensilla; scape with small dorsally connected white areas at base and apex; radicle light. In *M. victoriensis* sp.n.: scape 3 times as long as wide; valvula 0.3 times as long as second valvifer; 5th funicular segment without linear sensilla; white areas of dorsal margin of scape wider at the apex, on basal half of ventral margin and as longitudinal stripe on ventral margin from middle to apex; radicle dark.

Metaphycus victoriensis sp.n. is also similar to *M. aneckei* Guerrieri & Noyes, 2000, which is widely distributed in the world through its introduction to control *S. oleae* and is also known in Mexico. It generally differs from this species by the 3-segmented maxillary palpi (4-segmented in *anneckeii*), short antennal pedicel — subequal in length to 1st to 3rd funicle segments combined (to 1st to 4th funicle segments in *anneckeii*), long club — only slightly shorter than funicle (not longer than the four preceding funicle segments combined in *anneckeii*).

Synopsis of species

1. *Metaphycus acapulcus* Myartseva et Ruíz-Cancino, 2003

Figs. 1–2.

REFERENCES: Myartseva & Ruíz-Cancino, 2003: 752–754.

HOSTS: Aleurodicinae.

DISTRIBUTION: México — Guerrero.

MATERIAL: 2 ♀♀, 8 ♂♂ — México, Guerrero, Acapulco, ex Aleurodicinae on *Pithecellobium* sp. 12-VI-2000 (S. Myartseva).

2. *Metaphycus aleyrodidis* (Myartseva et Ruíz-Cancino, 2002)

Figs. 3–4.

REFERENCES: Myartseva & Ruíz-Cancino, 2002: 175–177 (as *Ooencyrtus*); 2003: 751, **comb.n.**

HOSTS: Aleyrodinae.

DISTRIBUTION: México — Tamaulipas.

MATERIAL: 5 ♀♀, 6 ♂♂ — México, Tamaulipas, 5 km S. Gómez Fariás, Ejido La Azteca, ex Aleyrodinae on *Adelia barbinervis* 23-I-2002 (S. Myartseva).

3. *Metaphycus aneckei* Guerrieri et Noyes, 2000

Fig. 5.

REFERENCES: Guerrieri & Noyes, 2000: 207–208.

HOSTS: *Saissetia oleae*, *Coccus hesperidum*, *S. miranda*, *Ceroplastes mimosae*.

DISTRIBUTION: This species of African origin has been introduced into Europe, Australia and the New World (as *lounsburyi*) and is found now in South Africa, Southern Europe, Iran, Israel, Australia, New Zealand, USA (California), Mexico (D.F.), South America and Hawaii [Guerreri & Noyes, 2000].

COMMENTS. Guerreri and Noyes [2000] discovered that many authors followed Timberlake [1916] in misidentifying specimens reared from *Saissetia oleae* as *M. lounsburyi* (Howard). They found that one of the two misidentified species has been found so far only in Europe and named *hageni* [Daane & Caltagirone, 1999] and the other was described under the name of *anneckeii* Guerreri et Noyes.

4. *Metaphycus celticola* Myartseva, 2003
Figs 6–7.

REFERENCES: Myartseva, 2003: 125–127.

HOSTS: *Differococcus argentinus* on *Celtis pallida*.

DISTRIBUTION: México — Tamaulipas.

MATERIAL: 5 ♀♀ — México, Tamaulipas, San Carlos, ex *Differococcus argentinus* on *Celtis pallida* 12-II-2000 (S. Myartseva).

5. *Metaphycus farfani* Myartseva, 2003
Figs 8–9.

REFERENCES: Myartseva, 2003: 127–128.

HOSTS: *Ceroplastes* sp.

DISTRIBUTION: México — San Luis Potosí.

MATERIAL: 7 ♀♀, 3 ♂♂ — México, San Luis Potosí, ex *Ceroplastes* sp. 11-XI-1999 (S. Myartseva).

6. *Metaphycus flavus* (Howard, 1881)
Figs 10–11.

SYNONYMS: *Aphycus hesperidum* Mercet, 1916; *Metaphycus mauritanicus* Compere, 1940.

REFERENCES: De Santis, 1989: 40; Trjapitzin & Ruíz-Cancino, 1996: 17; 2000: 22; González-Hernández, 2000: 658; Guerreri & Noyes, 2000: 183–185.

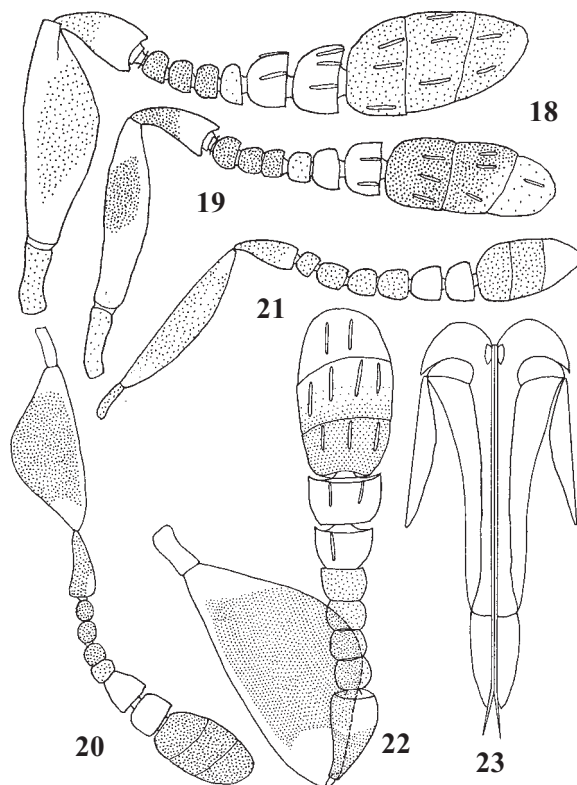
HOSTS: *Ceroplastes floridensis*, *Coccus capparidis*, *C. hesperidum*, *C. perlatus*, *C. pseudomagnoliarum*, *C. viridis*, *Eulecanium cunoensis*, *E. perinflatum*, *Filippia follicularis*, *Parthenolecanium corni*, *P. persicae*, *Mesolecanium deltae*, *Melviscutulus mangiferae*, *Protopulvinaria pyriformis*, *Pulvinaria acericola*, *P. convexa*, *P. elongata*, *P. flavescens*, *P. floccifera*, *P. iceryi*, *P. maxima*, *P. minuta*, *P. platensis*, *P. psidii*, *Pulvinariella mesembryanthemi*, *Parasaissetia nigra*, *Saissetia coffeae*, *S. oleae*, *Stictolecanium* sp., *Toumeyella liriodendri*, *Philephedra tuberculosa* [Guerreri & Noyes, 2000], *Ph. lutea* (new record).

DISTRIBUTION: México — Morelos, San Luis Potosí, Tamaulipas; USA, Central and South America, Europe, Mediterranean, Southeast Asia, Oceania, Australia.

MATERIAL: 1 ♀ — México, San Luis Potosí, ex Coccidae on *Hedera* sp. 11-VII-1998 (S. Myartseva); 3 ♀♀ — ex *Ceroplastes* sp. 11-XI-1999 (S. Myartseva); 1 ♀ — Tamaulipas, “El Cielo” Biospherical Reserve, ex *Protopulvinaria pyriformis* on *Psidium guajava* 21-VIII-1998 (S. Myartseva); 1 ♀ — Ciudad Victoria, ex *Philephedra lutea* on *Codiaeum variegatum* 18-II-1999, 1 ♂ — same locality, 16-VI-2002 (J.M. Coronado-Blanco).

7. *Metaphycus giraulti* Noyes et Woolley, 1994
Fig. 12.

REFERENCES: Girault, 1920: 189–190 (as *Tyndarichoides mexicanus*); De Santis, 1979: 240 (as *T. mexicanus*); Noyes, 1980: 234 (as *T. mexicanus*); Trjapitzin & Gordh, 1982: 1759–1762; Noyes & Woolley, 1994: 1329–1332; Trjapitzin & Ruíz-Cancino, 1996: 17–18.



Figs. 18–23. Mexican *Metaphycus* species, ♀♀: 18 — *M. lounsburyi* Howard [after Guerreri & Noyes, 2000]; 19 — *M. luteolus* (Timberlake) [after Guerreri & Noyes, 2000]; 20 — *M. maculipes* Howard [after Timberlake, 1916]; 21 — *M. mexicanus* Howard [after Timberlake, 1916]; 22–23 — *M. pulvinariae* Howard; 18–22 — antenna, 23 — ovipositor.

Рис. 18–23. Мексиканские виды *Metaphycus*, ♀♀: 18 — *M. lounsburyi* Howard [по Guerreri & Noyes, 2000]; 19 — *M. luteolus* (Timberlake) [по Guerreri & Noyes, 2000]; 20 — *M. maculipes* Howard [по Timberlake, 1916]; 21 — *M. mexicanus* Howard [по Timberlake, 1916]; 22–23 — *M. pulvinariae* Howard; 18–22 — усик, 23 — яйцеклад.

HOSTS: Kerriidae.

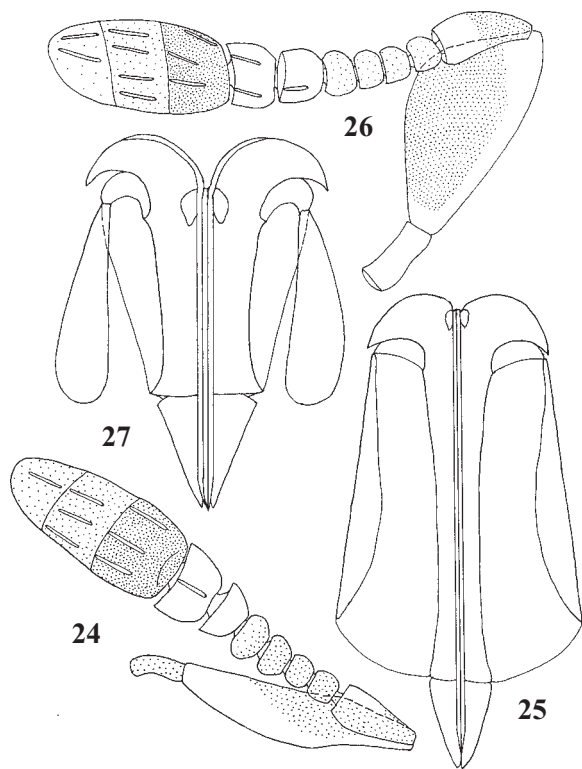
DISTRIBUTION: México — Oaxaca.

COMMENTS. In 1920 Girault has described the genus *Tyndarichoides* with the type species *T. mexicanus*. Trjapitzin & Gordh [1982] redescribed this genus, but supposed synonymization of *Tyndarichoides* with *Metaphycus* Mercet. Noyes & Woolley [1994] studied the type material and synonymized the genus *Tyndarichoides* Girault, 1920 with *Metaphycus* Mercet, 1917. They also proposed a new combination for *T. mexicanus* (*M. mexicanus*) (Girault, 1920). As a result of these changes, Noyes & Woolley [1994] proposed a new name for this secondary homonym: *Metaphycus giraulti* nom.n. nec (Howard, 1898).

8. *Metaphycus helvolus* (Compere, 1928)
Fig. 13.

REFERENCES: González-Hernández, 2000: 658.

HOSTS: *Aonidiella aurantii*, *Coccus hesperidum*, *C. proctae*, *C. pseudomagnoliarum*, *C. viridis*, *Ceroplastes helichrysi*, *C. destructor*, *Pulvinaria psidii*, *Eucalymnatus tessellatus*, *Parasaissetia litorea*, *P. nigra*, *Parthenolecanium corni*, *P. persicae*, *Protopulvinaria pyriformis*, *Pulvinaria aethiopia*, *P. urticae*, *Pulvinariella mesembryanthemi*,



Figs. 24–27. Mexican *Metaphycus* species, ♀♀: 24–25 — *M. sergueii* Myartseva; 26–27 — *M. stanleyi* Compere; 24, 26 — antenna, 25, 27 — ovipositor.

Рис. 24–27. Мексиканские виды *Metaphycus*, ♀♀: 24–25 — *M. sergueii* Myartseva; 26–27 — *M. stanleyi* Compere; 24, 26 — усик, 25, 27 — яйцеклад.

Saissetia oleae, *S. coffeae*, *S. nigrella* and many other soft scales.

DISTRIBUTION: México — Baja California; USA, Central and South America, Europe, Africa, Mediterranean, South-east Asia, Oceania, Australia.

9. *Metaphycus karwinskiae* Myartseva, 2003

Figs 14–15.

REFERENCES: Myartseva, 2003: 129.

HOSTS: Coccidae.

DISTRIBUTION: México — Tamaulipas.

MATERIAL: 1 ♀, 1 ♂ — Mexico, Tamaulipas, San Carlos, ex Coccidae on *Karwinskia humboldtiana* 11-II-2000 (S. Myartseva).

10. *Metaphycus lecanii* (Howard, 1898)

Figs 16–17.

HOSTS: *Physokermes insignicola*, *Parthenolecanium corni*, *P. quercifex*, *Eulecanium pubescens*.

DISTRIBUTION: México — Tamaulipas; USA (California).

MATERIAL: 1 ♀ — México, Tamaulipas, Ciudad Victoria, ex Coccidae on Coqueta 2-IX-1998 (S. Myartseva); 1 ♂ — “El Cielo” Reserve, La Perra, ex Coccidae 24-X-1998 (S. Myartseva).

11. *Metaphycus lounsburyi* (Howard, 1898)

Fig. 18.

SYNONYM: *Metaphycus bartletti* Anneke & Mynhardt, 1972: 255.

REFERENCES: De Santis, 1979: 215 (misidentification, correct name: *anneckeii*); Trjapitzin, 1989: 239 (misidentification; correct name: *anneckeii*); Barzman & Daane, 2001: 237–247.

HOSTS: *Ceroplastes floridensis*, *Coccis capparidis*, *C. hesperidum*, *C. pseudomagnoliarum*, *Filippia viburni*, *Saissetia coffeae*, *S. oleae*.

DISTRIBUTION: México — Puebla, San Luis Potosí, Distrito Federal; USA (California, introduced), South Africa, Mediterranean.

COMMENTS: The two species — *M. hageni* Daane et Caltagirone and *M. anneckeii* Guerrieri et Noyes have been misidentified as *lounsburyi* [Guerrieri & Noyes, 2000]. *M. lounsburyi* is a species of African origin. It was introduced into many countries of Europe and USA (California) to control *Saissetia oleae*. We include *M. lounsburyi* into our paper, because it could be introduced into Mexico from California by ecesis, similarly to other *Metaphycus* species.

12. *Metaphycus luteolus* (Timberlake, 1916)

Fig. 19.

REFERENCES: Bartlett, 1960: 383–385; Annecke & Mynhardt, 1972: 271–272; Herting, 1972: 157–159; Garcia-Martell, 1973: 16; De Santis, 1979: 215–216; Trjapitzin, 1989: 243; Lampson & Morse, 1992: 376; Trjapitzin & Ruíz-Cancino, 1996: 18; González-Hernández, 2000: 658; Guerrieri & Noyes, 2000: 182–183; Ruíz-Cancino & Coronado Blanco, 2002: 193.

HOSTS: *Pulvinaria psidii*, *P. mesembryanthemi*, *Coccus hesperidum*, *C. pseudomagnoliarum*, *C. viridis*, *Parthenolecanium corni*, *Saissetia oleae*, *S. coffeae*.

DISTRIBUTION: México — Coahuila, Distrito Federal, Sonora, Tamaulipas; USA, Bermuda, Argentina, Peru, Europe, Australia, Russia (Caucasus), Guam and Hawaii.

MATERIAL: 1 ♂ — México, Tamaulipas, Ciudad Victoria, ex *Saissetia* sp. on *Bauhinia variegata* 24-II-2003 (S. Myartseva).

COMMENTS: *M. luteolus* and *M. flavus* are very similar species having very slight differences. Guerrieri and Noyes [2000] recognize that *luteolus* and *flavus* may actually be synonymous (both described from the USA).

13. *Metaphycus maculipes* (Howard, 1885)

Fig. 20.

SYNONYM: *Aphycus flaviceps* Howard, 1898.

REFERENCES: Timberlake, 1916: 621–622 (as *Aphycus*); Thompson, 1954: 237; Peck, 1963: 418; De Santis, 1979: 216; Trjapitzin & Ruíz-Cancino, 1996: 18; Ruíz Cancino & Coronado Blanco, 2002 :193.

HOSTS: *Coccus hesperidum*, *Eulecanium coryli*, *Pulvinaria vitis*, *Parthenolecanium corni*.

DISTRIBUTION: México — Tamaulipas; USA, Canada.

14. *Metaphycus mexicanus* (Howard, 1898)

Fig. 21.

REFERENCES: Howard, 1898: 241, 247 (as *Aphycus*); Ashmead, 1900: 387; Timberlake, 1916: 627–628 (as *Aphycus*); Peck, 1963: 418; De Santis, 1979: 216; Trjapitzin & Ruíz-Cancino, 1996: 18; González-Hernández, 2000: 658.

Host: *Ceroplastes cirripediformis*.

DISTRIBUTION: México — Distrito Federal; USA, Hawaii.

15. *Metaphycus oaxacae* (Howard, 1898)

REFERENCES: Howard, 1898: 241, 246 (as *Aphycus*); Timberlake, 1916: 624–624 (as *Aphycus*); 1918: 255 (as *Pseudococcobius*); De Santis, 1979: 216. Noyes, 1980: 212; Trjapitzin & Ruíz-Cancino, 1996: 18.

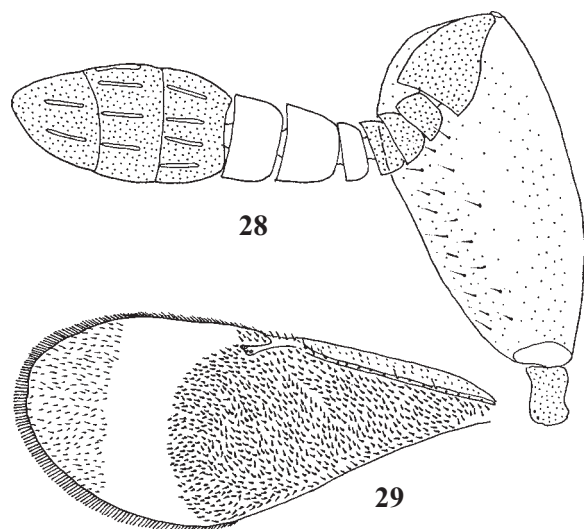
HOSTS: Unknown.

DISTRIBUTION: México — Oaxaca.

16. *Metaphycus pulvinariae* (Howard, 1881)

Figs 22–23.

HOSTS: *Coccus hesperidum*, *Pulvinaria hazeae*, *P. fletcheri*, *P. kuwakola*, *Parasaissetia nigra*, *Parthenolecanium*



Figs. 28–29. *Metaphycus superbus* Myartseva: 28 — ♀, antenna, 29 — fore wing.

Рис. 28–29. *Metaphycus superbus* Myartseva: 28 — усик ♀, 29 — переднее крыло.

corni, *Pulvinaria vitis*, *P. acericola*, *Mesolecanium nigro-fasciatum*, *Protopulvinaria pyriformis*, *Coccus viridis* (new record).

DISTRIBUTION: Almost cosmopolitan. México — Tamaulipas, Guanajuato.

MATERIAL: 1 ♀ — México, Guanajuato, Leyn, ex Coccidae 19-VII-1998 (S. Myartseva). 4 ♀♀, 3 ♂♂ — Tamaulipas, Reserve “El Cielo”, ex *Protopulvinaria pyriformis* on *Psidium guajava* 21-VIII-1998 (S. Myartseva); 3 ♀♀, 1 ♂ — Ciudad Victoria, ex *Coccus viridis* on *Citrus lemon* 10-II-1999 (S. Myartseva).

17. *Metaphycus sergueii* Myartseva, 2003

Figs 24–25.

REFERENCES: Myartseva, 2003: 129–130

HOSTS: Coccidae.

DISTRIBUTION: México — Guerrero.

MATERIAL: 3 ♀♀, 2 ♂♂ — México, Guerrero, Acapulco, ex Coccidae on *Leucaena* sp. 12-VI-2000 (S. Myartseva).

18. *Metaphycus stanleyi* Compere, 1940

Figs 26–27.

REFERENCES: González-Hernández, 2000: 658.

HOSTS: *Ceroplastes brevicauda*, *Coccus alpinus*, *C. celatus*, *C. elongatus*, *C. hesperidum*, *C. pseudomagnoliarum*, *C. subhaemisphaericus*, *Eucalymnatus tessellatus*, *Filippia chilianthi*, *Parasaissetia nigra*, *Protopulvinaria pyriformis*, *Pulvinaria psidii*, *Pulvinariella mesembryanthemi*, *Saissetia coffeae*, *S. nigrella*, *S. oleae*, *S. somereni* and many other species of soft scales.

DISTRIBUTION: México — Nuevo León, San Luis Potosí; USA (California), Canada, Bermuda, Peru, Chile, Hawaii, South Europe, Israel, Africa.

MATERIAL: 5 ♀♀, 3 ♂♂ — México, San Luis Potosí, ex *Parasaissetia nigra* on a shrub 13-XI-1999 (S. Myartseva).

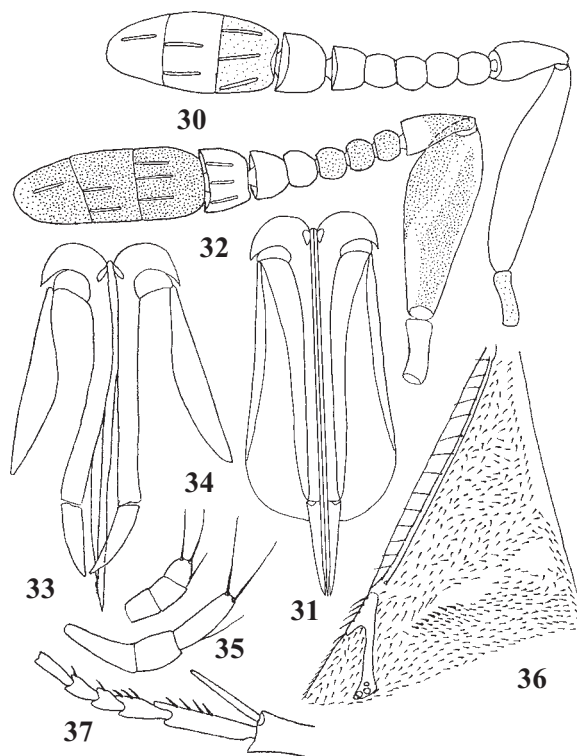
19. *Metaphycus superbus* Myartseva, 2003

Figs 28–29.

REFERENCES: Myartseva, 2003: 130–133.

HOST: Eriococcidae.

DISTRIBUTION: México — Tamaulipas.



Figs. 30–37. Mexican *Metaphycus* species, ♀: 30–31 — *M. tuxpan* Myartseva; 32–37 *M. victoriensis* sp. n.: 30, 32 — antenna, 31, 33 — ovipositor, 34 — labial palpus, 35 — maxillary palpus, 36 — base of fore wing, 37 — midtibial spur and middle tarsus.

Рис. 30–37. Мексиканские виды *Metaphycus*, ♀: 30–31 — *M. tuxpan* Myartseva; 32–37 — *M. victoriensis* sp. n.: 30, 32 — усик, 31, 33 — яйцеклад, 34 — нижнегубной щупик, 35 — верхнегубной щупик, 36 — основание переднего крыла, 37 — шпора средней голени и средняя лапка.

MATERIAL: 3 ♀♀, 1 ♂ — México, Tamaulipas, Miquihuana, ex Eriococcidae on a shrub 12-V-2000 (S. Myartseva).

20. *Metaphycus tuxpan* Myartseva et Trjapitzin, 2003

Figs 30–31.

REFERENCES: Myartseva, 2003: 133–134

HOST: *Parasaissetia nigra*.

DISTRIBUTION: Mexico — Veracruz.

MATERIAL: 1 ♀ — México, Veracruz, Tuxpan, Ojito, ex *Parasaissetia nigra* on *Palma* sp. 14-II-1999 (S. Myartseva).

21. *Metaphycus victoriensis* Myartseva et

Ruiz-Cancino, sp.n.

Figs. 32–37.

HOST: *Saissetia miranda*.

DISTRIBUTION: México — Tamaulipas.

MATERIAL: 3 ♀♀, — México, Tamaulipas, Ciudad Victoria, University Campus, ex *Saissetia miranda* on *Nerium oleander* 18-I-1999 (S. Myartseva).

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