Parasitoids (Hymenoptera: Chalcidoidea) of *Saissetia* spp. (Homoptera: Coccidae) in Mexico

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Abstract — Introduction. The genus *Saissetia* has 47 described species in the world, four of them in Mexico (*S. oleae, S. miranda, S. neglecta* and *S. tolucana*). These species attack different crops, including citrus, olives and ornamentals. Most introductions of natural enemies against *S. oleae* have been undertaken in North and South America, Australia and the Mediterranean countries. However, no natural enemy species have been purposedly introduced into Mexico against *Saissetia* spp. **Materials and methods**. During 1998–2003, samples of *Saissetia* spp. were collected in the States of Tamaulipas, Veracruz, Oaxaca and Guanajuato; all the emerged parasitoids were determined. Appropriate scientific publications were consulted to find out about any other *Saissetia* parasitoids recorded from Mexico. **Results and discussion**. Seventeen parasitoid species from five families of Chalcidoidea (Aphelinidae, Encyrtidae, Eupelmidae, Pteromalidae and Signiphoridae) were reared from *Saissetia* spp. in Mexico. **Conclusions**. In Mexico, the species of *Saissetia* prefer ornamental plants and are usually heavily parasitized by several chalcidoids. Native biological control of *Saissetia* spp. by different parasitoids has been effective for many years in Mexico. As a result, the species of *Saissetia* are not considered as primary or secondary pests of citrus and ornamentals.

Mexico / *Saissetia* / parasitoids / Hymenoptera / Chalcidoidea / inventories

Parasitoïdes (Hymenoptères : Chalcidoidea) de *Saissetia* spp. (Homoptera : Coccidae) au Mexique.

Résumé — Introduction. Le genre *Saissetia* a 47 espèces décrites de par le monde, quatre d'entre elles sont présentes au Mexique (*S. oleae, S. miranda, S. neglecta* et *S. tolucana*). Ces espèces attaquent différentes cultures, dont les agrumes, oliviers et plantes ornamentales. La plupart des introductions d'ennemis naturels de *S. oleae*. ont été effectuées en Amérique du Nord et du Sud, Australie et dans les pays méditerranéens. Cependant, aucune de ces espèces n'a été intentionnellement introduite au Mexique pour lutter contre *Saissetia* spp. **Matériel et méthodes**. De1998 à 2003, des échantillons de *Saissetia* spp. ont été collectés dans les états de Tamaulipas, Veracruz, Oaxaca et Guanajuato ; tous les parasitoïdes ayant émergé ont été identifiés. Des publications scientifiques appropriées ont été consultées pour lister tous les autres parasitoïdes de *Saissetia* déjà trouvés au Mexique. **Résultats et discussion**. Dix-sept espèces de parasitoïdes, réparties dans cinq familles de Chalcidoidea (Aphelinidae, Encyrtidae, Eupelmidae, Pteromalidae et Signiphoridae), ont été récupérées à partir des échantillons prélevés sur *Saissetia* spp. au Mexique. **Conclusions**. Au Mexique, les espèces de *Saissetia* préfèrent les plantes ornementales et sont habituellement parasitées par plus d'un chalcidé. Le control biologique indigène de *Saissetia* spp. par différents parasitoïdes y est efficace depuis de nombreuses années. En conséquence, les espèces de *Saissetia* ne sont pas considérées comme des parasites primaires ou secondaires des agrumes et des plantes ornamentales.

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1. Introduction

The soft scale genus *Saissetia* Deplanche, 1859, has 47 described species in the world fauna. Most of the species occur in the Ethiopian region (18) and the Neotropical region (14); 4 species are nearly cosmopolitan. Four species occur in Mexico: two nearly cosmopolitan [*S. oleae* (Olivier, 1791) and *S. miranda* (Cockerell and Parrot, 1899)], one mesoamerican species (*S. neglecta* De Lotto, 1969), and *S. tolucana* (Parrott and Cockerell, 1899), known only in Mexico [1, 2].

The Mediterranean black scale, *S. oleae*, a highly polyphagous species of African origin [3], is of economical importance mainly on olives and citrus trees. It is rarely a pest of citrus in East Africa and Mexico, but has been a very serious pest in southern California and Florida (USA), Chile, Australia and the Mediterranean region [4]. In Mexico, this species is known in San Luis Potosí [2]. The Mexican black scale, *S. miranda*, is very common on ornamental plants; however, serious damage has not been observed in Florida, USA [5] or in Mexico. In southern Texas (USA), it was regarded as a potential pest of citrus [6]. This species is widely distributed in Mexico, occurring in the States of Chihuahua, Coahuila, Durango, Guerrero, Jalisco, D.F., Michoacán, Morelos, Nayarit, Puebla, San Luis Potosí, Sinaloa, Sonora, Veracruz, Zacatecas [2] and Tamaulipas [7]. The Caribbean black scale, *S. neglecta*, is the main species infesting citrus in Florida. In Mexico, this species was registered in Colima, Guerrero, Jalisco, Nayarit, Sinaloa and Sonora. *Saissetia tolucana* was recorded as being from Estado de México [2].

Soft scale insects of the genus *Saissetia* are pests that feed on many of the world's agriculturally important crops, trees and ornamental plants. Many species, generally *S. oleae* and *S. coffeae* (Walker, 1852), have been targets for biological control by introduction of their natural enemies. In the literature, there are many data on parasitoids and predators of these and other *Saissetia* species, and on the introduction programs of natural enemies against *Saissetia* in several countries [4, 8–21].

Most introductions of natural enemies against *S. oleae* were undertaken in North and South America, Australia and the Mediterranean countries. A very long campaign against *S. oleae* was undertaken in California, USA, where more than 30 species of natural enemies, collected worldwide, were introduced against this pest. Beginning in the 1950s, several species of parasitoids from the families Encyrtidae, Aphelinidae and Pteromalidae were introduced from Mexico into California [4, 10, 18].

According to the published data, no natural enemy species of *Saissetia* spp. has ever been introduced into Mexico [19, 20–23]. However, there are data on parasitoid species reared from *S. oleae* in Mexico [4, 10, 24–31] and also from a *Saissetia* sp. [32].

2. Materials and methods

In the period 1998–2003, samples of *Saissetia* spp. were collected in the States of Tamaulipas, Veracruz, Oaxaca and Guanajuato; they were taken to the Biocontrol Laboratory at UAT and placed in containers. The emerged parasitoids were mounted in Canadian Balsam or on points. The first author used keys already published for determining the species: *Coccophagus* spp. [33], the Mexican species to *Marietta* [34], and the European *Metaphycus* [21]. The species from Encyrtidae, Pteromalidae and Eupelmidae were mounted on cards and identified using the annotated key to the genera of Nearctic Chalcidoidea [35]. The specimens are deposited at the UAT Insect Museum in Cd. Victoria, Tamaulipas, Mexico. Moreover, the literature was consulted to find out about parasitoids of *Saissetia* registered for Mexico. Lists of host species and distribution of parasitoids were taken from Noyes [36].

3. Results and discussion

Seventeen parasitoid species from five families of Chalcidoidea (Aphelinidae, Encyrtidae, Eupelmidae, Pteromalidae and Signiphoridae) were recorded (*table I*). In our list, we also

Table I.
Parasitoids of *Saissetia* spp. and their distribution in Mexico.

Family and species	Mexican States	References
Aphelinidae		
Coccophagus mexicensis (Girault, 1917)	Aguascalientes, Chihuahua, D.F., San Luis Potosí	30, 31, 33, 37–40
C. ochraceus (Howard, 1895)	Aguascalientes, Chihuahua, D.F., Morelos	29, 31, 38–40
C. quaestor (Girault, 1917)	D.F., Morelos, Nuevo León, Tamaulipas	28, 30, 31, 33, 37, 39–42
C. rusti (Compere, 1928)	Oaxaca[1], Tamaulipas[1], Veracruz[1]	32, 45
Marietta mexicana (Howard, 1895)	D.F., Jalisco, Morelos, San Luis Potosí	28–31, 34, 40, 41, 47, 48
Marietta pulchella (Howard, 1881)	Tamaulipas[1]	34, 38, 40, 42, 48
Encyrtidae		
*Diversinervus elegans (*Silvestri, 1915)	D.F., Morelos	29, 38, 39, 49–51
Metaphycus anneckei (Guerrieri and Noyes, 2000)	Mexico	21, 26, 29, 30, 39, 49, 51, 52
Metaphycus flavus (Howard, 1881)	Morelos	21, 39, 49, 51, 54
Metaphycus helvolus (Compere, 1926)	Baja California Sur	39
Metaphycus luteolus (Timberlake, 1916)	Baja California Sur, Coahuila, D.F., Sonora, Tamaulipas	18, 21, 25, 27, 28, 30, 39, 42, 49, 51, 52, 56
Metaphycus sp. n.	Tamaulipas[1]	–
Microterys tricoloricornis (De Stefani, 1886)	Mexico	4, 10, 18, 30
Eupelmidae		
Lecaniobius sp. (prob. *capitatus* Gahan, 1924)	Colima, D.F., Guanajuato[1], Morelos, Nuevo León, Tamaulipas[1]	39, 42, 57–59
Pteromalidae		
Mesopeltita truncatipennis (Waterston, 1917)	Guanajuato[1], Tamaulipas[1]	32, 60
Scutellista caerulea (Fonscolombe, 1832)	D.F., Guanajuato[1], Morelos, Tamaulipas[1]	28, 29, 39
Signiphoridae		
Signiphora sp.	Guanajuato[1]	–

[1]UAT material; D.F. = Distrito Federal (Mexico City).

included *Metaphycus helvolus* (Compere, 1926) [33], because this species was found in Mexico and is known as an effective parasitoid of *S. oleae* throughout the world. *M. helvolus* supposedly penetrated into Mexico by ecesis from the southern USA.

3.1. Aphelinidae

Six species of parasitoid were recorded in the Aphelinidae family, four species for the genus *Coccophagus* and two species for the genus *Marietta*.

In Mexico City (D.F.), *Coccophagus mexicensis* Girault, 1917, was reared from *S. oleae,* but *Coccus viridis* (Green), Coccidae, is another known host. The pest is distributed in the USA (California), Mexico and Brazil. In 1956, *C. mexicensis* was introduced into California against *S. oleae*, but was not established [4].

In Mexico City (D.F.), *C. ochraceus* Howard, 1895, was reared from *S. oleae*. Other hosts of this species are *Coccus viridis, Parasaissetia nigra* (Nietner), *Parthenolecanium corni* (Bouché) and *S. coffeae* (Coccidae). *C. ochraceus* is found in Africa, the USA, Mexico, Bermuda, Chile and Hawaii. It is of African origin. In the 1930s, it was introduced into California and Chile. In California, *C. ochraceus* prefers to attack soft scales on ornamentals [4].

In Mexico, *C. quaestor* Girault, 1917, was reared from *Saissetia* sp. and *Toumeyella numismatica* Pettit & McDaniel. Other known hosts are *Coccus hesperidum* Linnaeus (Coccidae), *S. coffeae*, *S. oleae* and *Toumeyella parvicornis* (Cockerell). *C. quaestor* is distributed in Canada, the USA, Mexico, El Salvador and Perú.

In Mexico (Oaxaca, Tamaulipas and Veracruz), *C. rusti* Compere, 1928, was reared from *S. miranda, S. oleae* and *Parasaissetia nigra*. Other known hosts are *Coccus hesperidum, Pulvinaria aethiopica* (De Lotto) and *S. coffeae* (Coccidae). Its distribution is Africa, the USA (California), Mexico and Perú. *C. rusti* is of African origin. It was introduced into California in 1937 and later to Perú, where it achieved substantial control of *S. oleae* [43] as well as *S. coffeae* in olives [44]. Now, *C. rusti* is a common species in California and in Mexico too, where it penetrated by ecesis, developing predominantly in soft scales on ornamental plants [45]. In 1998, it was estimated that a profit of almost 1.5 million USD per agricultural campaign results from the biological control of *S. coffeae* in Perú using *C. rusti* and *M. helvolus* [46].

In Mexico, *Marietta mexicana* (Howard, 1895) was reared from Coccidae (*Ceroplastes* sp., *Coccus hesperidum, Parasaissetia nigra* and *S. oleae),* Diaspididae [*Quadraspidiotus perniciosus* (Comstock)], Lecanodiaspididae [*Lecanodiaspis rufescens* (Cockerell)], Pseudococcidae (*Pseudococcus agavis* MacGregor) and Hymenoptera: Aphelinidae (*Aphytis holoxanthus).* Other hosts are known: Coccidae [*Ceroplastes rubens* Maskell and *Mesolecanium nigrofasciatum* (Pergande)], Diaspididae [*Aonidiella citrina* (Coquillett)*, Lepidosaphes ulmi* (Linnaeus) and *Pseudaulacaspis pentagona* (Targioni – Tozzeti)], Pseudococcidae [*Puto yuccae* (Coquillett)] and Chalcidoidea [*Coccophagus lycimnia* (Walker), *Metaphycus lounsburyi* (Howard) and *Signiphora merceti* Malenotti]. *M. mexicana* is found in Canada, the USA, Mexico, Cuba and Japan. The species is a known hyperparasitoid associated with many species of Coccidae and Diaspididae, developing in their primary parasitoids belonging to Aphelinidae, Encyrtidae and Signiphoridae.

In Mexico (Tamaulipas), *M. pulchella* (Howard, 1881) was reared for the first time from *S. miranda*. Its other known hosts are Asterolecanidae *(Asterolecaniidae* sp.), Coccidae (*Ceroplastes cirripediformis* Comstock, *Eulecanium coryli* Linnaeus and *Prosopophora* sp.), Conchaspididae (*Conchaspis angraeci* Cockerell), Diaspididae [*Aspidiotus* sp., *Chionaspis americana* Johnson; *Chionaspis pinifoliae* (Fitch), *Furcaspis biformis* (Cockerell); *Pseudaulacaspis pentagona, Quadraspidiotus forbesi* (Johnson)*, Q. juglansregiae* (Comstock) and *Melanaspis obscura* (Comstock)], Lecanodiaspididae (*Lecanodiaspis* sp., *L. rugosa*) and Hymenoptera: Encyrtidae (*Coccidencyrtus ensifer* Howard). The species is found in Canada, the USA, Mexico, Puerto Rico, Brazil and Hawaii. *M. pulchella* is a hyperparasitoid associated with Coccidae and Diaspididae.

3.2. Encyrtidae

Seven species of parasitoid were recorded in the Encyrtidae family, of which five belong to the genus *Metaphycus*; the two other genera found were *Diversinervus* and *Microterys*.

In Mexico (D.F., Morelos), *Diversinervus elegans* Silvestri, 1915, was reared from *S. oleae*. Other known hosts are Coccidae [*Ceroplastes brevicauda* Hall*, C. chiton, C. destructor* Newstead*, C. floridensis* Comstock*, C. rusci* (L.)*, Coccus hesperidum, C. proteae, C. pseudomagnoliarum* (Kuwana)*, Eulecanium cunoense, Gascardia* sp., *Inglisia* sp., *Parasaissetia nigra, Parthenolecanium corni, Pulvinaria floccifera* (Westwood)*, P. psidii* Maskell*, P. urbicola* Cockerell*, S. coffeae, S. perseae* and *S. persimilis*]. *D. elegans* is almost cosmopolitan. It is a polyphagous species of African origin. Its common hosts are soft scales from the genera *Ceroplastes, Pulvinaria* and *Saissetia*. *D. elegans* was introduced in 1953 into California against *S. oleae* on citrus and olives, and established successfully. Introductions of this parasitoid were also carried out to control *S. oleae* in Argentina, some countries of southern Europe, Israel and Australia. Now, this species has a worldwide distribution. *D. elegans* entered Mexico by ecesis.

In Mexico, *Metaphycus anneckei* Guerrieri and Noyes, 2000, was reared from *S. oleae*. Its other known hosts are Coccidae (*Ceroplastes mimosae* Karren, *Coccus hesperidum* and *S. miranda*). *M. anneckei* is found in South Africa, the USA (California), Mexico, South America, Hawaii, Australia, New Zealand, southern Europe, Iran and Israel. This species is of African origin. It was introduced into Europe, Australia and the New World against *S. oleae*. In 1916, this species was misidentified as *M. lounsburyi* by Timberlake [53], which was followed by many other authors. Based on specimens misidentified as *M. lounsburyi*, two new species were described recently: the European *M. hageni* Daane and Caltagirone, 1999, and *M. anneckei* Guerieri and Noyes, 2000, which had been introduced into many African countries under the name *M. lounsburyi*.

In Mexico (Morelos), *M. flavus* (Howard, 1881) was reared from an indeterminate soft scale species. The species is almost cosmopolitan. Its other known hosts are Cerococcidae (*Cerococcus parahybensis*), Coccidae [*Ceroplastes* sp., *C. floridensis, Coccus* sp., *C. capparidis* (Green), *C. hesperidum, C. perlatus, C. pseudomagnoliarum, C. viridis, Eulecanium kunoense, E. perinflatum, Filippia folicularis, Protopulvinaria mangiferae* (Green), *Laccifer* sp., *Lecanium* sp., *Mesolecanium deltae, Milviscutulus mangiferae* (Green), *Parasaissetia nigra, Parthenolecanium corni, P. persicae* (Fabricius), *Philephedra tuberculosa* Nakahara, *Pulvinaria* sp., *P. acericola* (Walsh & Riley), *P. convexa, P. elongata* Newstead, *P. flavescens, P. floccifera* (Westwood), *P. icereyi, P. maxima* Green, *P. mesembryathemi* (Vallot), *P. minuta, P. platensis, P. psidii* Maskell, *P. pyriformis* Cockerell, *Saissetia coffeae, S. oleae, Stictolecanium* sp. and *Toumeyella liriodendri* (Gmelin)], Diaspididae [*Chrysomphalus aonidum* (Linnaeus), *C. dictyospermi* (Morgan), *C. ficus* Ashmead, *C. pinnulifer, Lepidosaphes beckii* (Newman) and *L. gloverii* (Packard)] and Eriococcidae (*Eriococcus joergenseni*). *M. flavus* is a polyphagous species attacking soft scales, but preferring species from the genera *Coccus* and *Pulvinaria*. It was introduced into Australia, Bermuda, Chile, the USA (California and Texas), southern Europe, Israel, Morocco, and the Caucasus for biocontrol of soft scales, including *S. oleae*.

The species *M. helvolus* (Compere, 1926) is almost cosmopolitan. Its hosts are unknown in Mexico. In other countries, it was reared from Coccidae [*Ceroplastes* sp., *C. destructor* Newstead, *C. helichrysi, Coccus hesperidum, C. proteae, C. pseudomagnoliarum, C. viridis, Eucalymnatus tessellatus, Parasaissetia* sp., *P. litorea, P. nigra, Parthenolecanium corni, P. persicae, Pulvinaria* sp., *P. aethiopica* (De Lotto), *P. mesembryanthemum, P. psidii, P. pyriformis, P. urbicola, Saissetia* sp., *S. coffeae, S oleae, S. nigrella* and *S. somereni* (Newstead)] and Diaspididae (*Aonidiella aurantii* and *Aspidiotus* sp.). *M. helvolus* is a polyphagous species native to South Africa. It was introduced into many countries against soft scales, especially *Saissetia* species. In Chile and Peru, it caused substantial control of *S. oleae* and *S. coffeae* [19]. This species is an effective parasitoid of these soft scales in tropical and semitropical areas. Moreover, Beingolea [55] indicated that this species uses host feeding, destroying three or four additional individuals for each parasitized host, thus increasing its mortality.

In Mexico, *M. luteolus* (Timberlake, 1916) was reared from *S. oleae*. Other known hosts are Coccidae (*Coccus hesperidum, C. viridis, C. pseudomagnoliarum, Parthenolecanium corni, Pulvinaria mesembryanthemum* and *P. psidii)*. It is found in the USA, Mexico, Bermuda, Peru, Argentina, southern Europe, the Transcaucasus, Hawaii, Guam and Australia. *M. luteolus* is of New World origin. It was introduced for soft scale biocontrol into Australia, Guam, Hawaii, southern Europe and the Transcaucasus.

In Mexico (Tamaulipas), *Metaphycus* sp. n. was reared from *S. miranda* on *Nerium oleander* Linnaeus. It was not found elsewhere.

In Mexico, *Microterys tricoloricornis* (De Stefani, 1886) was reared from *S. oleae*. Other known hosts are Coccidae (*Coccus hesperidum, C. pseudomagnoliarum, Eulecanium ciliatum, E. diminutum* and *Pulvinaria mesembryanthemum*). The species is

distributed in the USA (California), Mexico and the Palaearctic region. It is a polyphagous species, primary parasitoid of soft scales, widely distributed mainly in the Palaearctics. The introduction of this species into California, USA, against *S. oleae* was unsuccessful [18].

3.3. Eupelmidae

Only one genus [*Lecaniobius* sp. (prob. *capitatus* Gahan, 1924)] of the Eupelmidae family was reared from *Saissetia* sp. in Mexico (Guanajuato and Tamaulipas). In the USA, Mexico, Panamá and Uruguay, its other known hosts are Coccidae (*Ceroplastes* sp. *Parasaissetia nigra, S. coffeae* and *S. oleae*). The species of *Lecaniobius* are egg predators of these genera through *Scutellista* [35]. We suppose that *L. capitatus* is present in our material, because only this species (among four known species of the genus) is known to occur in Mexico.

3.4. Pteromalidae

Two species of parasitoid were recorded in the Pteromalidae family: one belongs to the genus *Mesopeltita*, the second to the genus *Scutellista*.

In Mexico (Guanajuato and Tamaulipas), *Mesopeltita truncatipennis* (Waterston, 1917) was reared from *Saissetia* sp. The other known hosts are Coccidae (*Ceroplastes* sp., *S. oleae, S. somereni* and *Saissetia* sp.). *M. truncatipennis* is distributed in the USA (California and Texas), Mexico, Central America, Venezuela, West Africa and Oceania. The species is known as a parasitoid of *Saissetia* and *Ceroplastes*. It was introduced into the southern USA against *S. oleae* from Africa and Mexico.

In Mexico, the hosts of *Scutellista caerulea* (Fonscolombe, 1832) (synonym: *Scutellista cyanea* Motschulsky, 1859), are *S. miranda* and *Saissetia* sp. The other known hosts are Coccidae (*Cerococcus hibisci, Ceroplastes* sp., *C. actiniformis, C brevicauda, C. ceriferus, C. cirripediformis, C. destructor, C. floridensis, C. galeatus, C. japonicus, C. mimosae, C. rubens, C. rusci, C. sinensis, Coccus hesperidum, Filippia viburni, Lecanium* sp., *Parasaissetia nigra, Parthenolecanium corni, Phenacocus artemisiae, S. coffeae, S. oleae* and *S. neglecta*) and Diaspididae (*Quadraspiotus perniciosus). S. caerulea* is a cosmopolitan species. It is of African origin. The species is an egg-feeder of many soft scales. *Saissetia oleae* is its preferred host, and *S. caerulea* has been widely used in introductions against this pest. When host eggs are unavailable, the larva is able to develop as an external parasitoid of the female of its host. *S. caerulea* was one of the first species introduced into the USA in 1898 against *Ceroplastes,* and in 1901–1902 against *S. oleae*. Later, it was introduced into South America, Australia and many other countries, and now is a widespread species.

3.5. Signiphoridae

In Mexico (Guanajuato), *Signiphora* sp. was reared from *S. miranda*. Nine species of the genus *Signiphora* are known, and all of them are parasitoids of Coccidae, Diaspididae and Aleyrodidae. One species of this genus was reared from *Saissetia* for the first time.

4. Conclusions

We composed the first list of parasitoid species reared from the soft scales of the genus *Saissetia* in Mexico. It includes 17 chalcidoid species from five families and this list is based on our own specimens collected in 1998–2003, as well as literature data. Most of the species are primary parasitoids: *Coccophagus mexicensis, C. ochraceus, C. rusti* and *C. quaestor* (Aphelinidae), all the seven species of the family Encyrtidae (*Diversinervus elegans, Metaphycus anneckei, M. flavus, M. helvolus, M. luteolus, Metaphycus* sp. n. and *Microterys tricoloricornis*), and also *Mesopeltita truncatipennis* (Pteromalidae). Two species are egg predators: *Lecaniobius* sp. (Eupelmidae) and *Scutellista caerulea* (Pteromalidae). *Marietta mexicana* and *M. pulchella* (Aphelinidae) are hyperparasitoids. The parasitoid status of the *Signiphora* sp. is unknown.

According to published data, no parasitoids of *S. oleae* have ever been intentionally introduced into Mexico. *Coccophagus ochraceus, C. rusti, Diversinervus elegans, Metaphycus anneckei, M. helvolus* and *Scutellista caerulea* could have penetrated into Mexico by ecesis, i.e., with their hosts, and established there. In Mexico, the species of *Saissetia* prefer ornamental plants and are usually heavily parasitized by a few different chalcidoids. The parasitoids have effectively provided natural biocontrol of *Saissetia* in Mexico, where for many years the species of *Saissetia* have not been recorded as main or secondary pests on citrus and ornamentals.

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Parasitoides (Hymenoptera: Chalcidoidea) de *Saissetia* spp. (Homoptera: Coccidae) en México.

Resumen — Introducción. El género *Saissetia* cuenta con 47 especies descritas a nivel mundial, 4 de ellas en México (*S. oleae*, *S. miranda*, *S. neglecta* y *S. tolucana*). Estas especies atacan diferentes cultivos, incluyendo cítricos, olivos y ornamentales. La mayoría de las introducciones de enemigos naturales contra *S. oleae* fueron realizadas en Norte y Sudamérica, Australia y los países del Mediterráneo. Sin embargo, ninguna especie de enemigo natural fue introducida a México contra *Saissetia* spp. **Material y métodos**. En el período 1998–2003, muestras de *Saissetia* spp. fueron colectadas en los estados de Tamaulipas, Veracruz, Oaxaca y Guanajuato, los parasitoides emergidos fueron identificados por la autora principal. Además, se consultó literatura para conocer los otros parasitoides de *Saissetia* registrados para México. **Resultados y discusión**. Diecisiete especies de parasitoides de cinco familias de Chalcidoidea (Aphelinidae, Encyrtidae, Eupelmidae, Pteromalidae y Signiphoridae) han emergido de *Saissetia* spp. en México. **Conclusión**. En México, las especies de *Saissetia* prefieren plantas ornamentales y usualmente son altamente parasitadas por al menos unos pocos calcidoideos. Los parasitoides efectivamente han realizado el control biológico natural de *Saissetia* y durante muchos años en México, las especies de *Saissetia* no han sido registradas como plagas primarias o secundarias en cítricos ni en ornamentales.

México / *Saissetia* / parasitoides / Hymenoptera / Chalcidoidea / inventarios