BIOLOGICAL CONTROL OF *Marmara gulosa* GUILLÉN AND DAVIS IN THE SAN
JOAQUIN VALLEY

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by
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ABSTRACT

Biological control of *Marmara gulosa* Guillén and Davis in the San Joaquin Valley

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Peelminer, *Marmara gulosa* Davis and Guillén, has been reported as a sporadic pest in California and Arizona since 1998. *Marmara gulosa* has been a persistent pest in the San Joaquin Valley of California (USA) since 1998. Prior to 2000 the only reports of high populations of citrus peelminer were in the Coachella Valley. The larval stages of *M. gulosa* create serpentine mines scarring the upper epidermal layers of citrus rind, rendering it unacceptable for fresh market sale.

Chemicals have failed to provide adequate control of *M. gulosa*; thus, the use of natural enemies is considered the best long-term option. *Cirrospilus coachellae* Gates (Eulophidae: Eulophinae) is an effective gregarious parasite of peelminer in the Coachella Valley; however, attempts to establish this species in the San Joaquin Valley have so far been unsuccessful. Other natural enemies may be necessary to control peelminer in this region. The discovery of populations of the tetrastichine eulophid *Hadrotrichodes waukheon* LaSalle parasitizing *M. gulosa* in the San Joaquin Valley indicates a possible option for biological control of this pest.

Hadrotrichodes waukheon (Hymenoptera: Eulophidae: Tetrastichinae) is a parasite of *M. gulosa*. Newly discovered morphological variations within the species are reported, including the first description of the male. New biological information including preferred life stage of host for parasitism, clutch sizes, male to female ratios and meconial positioning are included. Field studies demonstrated that one to four adult *H. waukheon* could emerge from a single *M. gulosa* larva, and later instar *M. gulosa* larvae were preferred. *Hadrotrichodes waukheon* is a gregarious, primary parasitoid and may be a candidate agent for biological control of *M. gulosa*.

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Introduction

Importance of *Marmara gulosa* as a Pest

Peelminer, *Marmara gulosa* Davis and Guillén, (Lepidoptera: Gracillariidae) was first reported on citrus in California in 1917 (Vinal 1917) and has been reported as a sporadic pest in California and Arizona in 1933 (Lockwood), 1948 (Wolgum), 1955 (Atkins 1961), 1960 (Anonymous), and 1969-70 (Atkins 1971). In 1999 peelminer was found in the southern San Joaquin Valley, Kern Co., CA (Fig. 1) (Jutzi 1998) and reached high population levels in 2000 (Neff 2002). Infestations were reported as far north as Fresno Co., CA (Kris Godfrey, entomologist, CDFA, pers. comm. 2002). Prior to 2000 the only reports of high populations of citrus peelminer were in the Coachella Valley (Fig. 1) in 1984-85 and 1994-95 (Guillén et al. 2001 and Reeves 1995).

Figure 1. Valley locations in California

Peelminer damage has resulted in considerable economic losses to growers. Two or more mines render the fruit unacceptable for fresh market sale (Grafton-Cardwell, UCKAC, pers. comm. 2002; K. Godfrey, entomologist, CDFA, pers. comm. 2002; J. Stewart, Pest Management & Associates, pers. comm. 2002; J. Stewart-Leslie, Pest Management & Associates, pers. comm. 2002). Another commodity of concern is grapes. Mining damage on the fruit of grape vines can lead to secondary infections such as bunch rot, *Botrytis cineria* (James Stewart, Pest Management Associates, Exeter, Ca. pers. comm. 2001). Excessive mining on new vegetative growth can form open wounds leading to sap secretion and possibly secondary infection at the site of injury (Dennis Haines 2001 pers. comm.). Prior to 2001 it was thought that *Marmara salictella* Clemens was the species causing damage to citrus, but in 2001 the pest populations on citrus were identified and described as a new species, *Marmara gulosa* (Guillén 1999 and Guillén et al. 2001). Since 2001 verification that *M. gulosa* is the species of *Marmara* causing damage in California, Arizona, and Mexico has been confirmed (Guillén et al. 2001; Grafton-Cardwell, pers. comm. 2002; Headrick and Finch, unpublished data).

The species name *gulosa* stems from the Latin word for glutton, which is appropriate since *M. gulosa* has a host list of over twenty-eight different families of plants (Grafton-Cardwell, pers. comm. 2002; Neff 2002; Spiedel 2004). Some host plant species include: grapefruit (*Citrus paradisi* Macfadyen), lemon (*Citrus limon* Burmann), tangerine (*Citrus reticulata* Blanco), lime (*Citrus aurantifolia* Tanaka), orange (*Citrus sinensis* Osbeck), nectarine (*Prunus persica* var. *nucipersica* L.), grape (*Vitis vinifera* L.), olive (*Olea europaea* L.), walnut (*Juglans* spp. L.), cotton (*Gossypium hirsutum* L.), oleander (*Nerium* spp. L.), willow (*Salix* spp. L.), avocado (*Persea americana* Mill),

some squash (Family *Cucurbitaceae* Juss), and some peppers (*Capsicum annum* L.) (Atkins 1961; Atkins 1971; Guillén 1999; Guillén et al. 2001; Grafton-Cardwell, pers. comm. 2002; Neff 2002). Many citrus varieties have been observed to be hosts for *M. gulosa*, but *M. gulosa* is especially active on pummelos, grapefruit, and certain varieties of navels (Reeves 1995; Guillén 1999; Guillén et al. 2001; Grafton-Cardwell pers. comm. 2002). Navel varieties that appear preferred by *M. gulosa* include Fukumoto, Thompson Improved, Powell, Atwood, Barnfield, and Lane Late (Grafton-Cardwell pers. comm. 2002).

Taxonomy and Pest History of *Marmara gulosa*

Marmara salictella was described by J. B. Clemens in 1863. Clemens (1863) found the miner feeding on new growth of yellow willow (*Salix lutea* Nuttall) in the eastern United States. The first record of mining by a similar species to *M. salictella* on citrus in southern California was reported by Vinal (1917). From 1917 to the present, peelminer, assumed to be *M. gulosa*, has been recorded on citrus (Vinal 1917; Lockwood 1933; Wolgum 1948; Anonymous 1960; Atkins 1961, 1971; Reeves 1995; Gibson et al. 1997). The miner in these reports was listed as *M. salictella* and is currently believed to be misidentified following Guillén's findings in 1999. Guillén (2001) found that external features between *Marmara salictella* and the newly described species were relatively similar; however, inspection of the male genitalia provided characteristics for separation of *M. gulosa* from *M. salictella*.

Historical accounts consider *M. gulosa* damage to be extensive in many citrus groves in southern California and Arizona. In 1960, a 0.2 km² grove of grapefruit in Indio had 20-36% of trees with *M. gulosa* damage on the fruit (Atkins 1961 and

Anonymous 1960). Grapefruit groves totaling 0.4 km² in the Coachella Valley had *M. gulosa* damage on the fruit in 1960. Ruby Red grapefruit (*Citrus paradisi* Macfayden) trees sustained the worst infestations, but also had a 4.6-7.6 m oleander hedge on both sides of the grove. Oleander serves as an alternate host for *M. gulosa*. Even with high infestations of *M. gulosa* on grapefruit, the Cooperative Economic Insect Report determined *M. salictella*, probably *M. gulosa*, actually preferred oleander to grapefruit as a host plant (Atkins 1961 and Anonymous 1960). In Blythe, Riverside Co., CA 1.2 km² of Marsh grapefruit, 0.1 km² of Valencia oranges, 0.1 km² of tangerines, and a few newly planted lemons had heavy mining in 1969 and 1970. These lemons had peelminer damage on the new shoots, and the other citrus varieties had mining on the fruit and the shoots (Atkins 1971). In 1969 and 1970 Imperial Co. had reports of peelminer on lemon shoots and fruit as well as on cotton bolls. The Coachella Valley had 0.8 km² of Ruby Red grapefruit infested with peelminer on the fruit and the shoots in 1969 and 1970 (Atkins 1971). Yuma and Phoenix, AZ had over 4.1 km² of reported infestations in 1969 and 1970 (Atkins 1971).

The only report of parasitism was by Atkins (1961), who observed a single primary parasite and a single hyperparasite attacking a *Marmara* larva in Indio, Riverside Co., CA. The primary parasite, found in the fall, was determined to be an ectoparasite and a member of the superfamily Chalcidoidea (Hymenoptera). From the single observation, Atkins (1961) determined that primary parasites parasitized fifth instar larvae. The hyperparasite was reported as parasitizing the pupae of the primary parasite. The identity of the two parasites was not determined.

Marmara gulosa in the San Joaquin Valley (SJV) 1999 to present

In 1998, *M. gulosa* was discovered attacking citrus in Kern Co., CA (Jutzi 1998) and Tulare Co., CA (D. Haines 2002 personal communication) of the San Joaquin Valley and has since been consistently aggressive in feeding on citrus and other commodities in these areas (Godfrey et al. 2003). During the 2000 field season, citrus peelminer was found on all citrus varieties throughout the San Joaquin Valley and some orchards had infestations as high as 70% of the fruit (Grafton-Cardwell et al. 2003). This thesis is not engaging the causes associated with the change in *M. gulosa* pest status in the San Joaquin Valley in 1999/2000; some ideas regarding the causes included a series of events related to the CA freeze event of 1998 (Gudgel 1999). In response to a fruit shortage, shipments of citrus fruit were brought from two locations in northern Mexico, La Ciudad de Constitucion, Baja, Mexico (MX) and Hermosillo, Sonora, MX, into Tulare Co. and perhaps Kern Co., CA packinghouses to maintain processing. The following year *M. gulosa* infestations in nearby citrus were noted in a Pest Damage Report (PDR) logged for Tulare Co., Dec 1999 oranges. There is no definitive cause and effect, but the correlation was readily accepted by both the research and grower communities.

Marmara gulosa infestations were clearly documented as appearing to spread rapidly in the San Joaquin Valley, being reported as far as Fresno Co. by the end of 2000 (D. Haines 2002 personal communication). An increase in the number of host plants used for development by citrus peelminer also was noted (Godfrey et al. 2003). In the fall of 2000, citrus peelminer was found on walnut husks, *Juglans* spp. (Juglandaceae). In the spring of 2001, it was observed on table grapes (*Vitis vinifera* L., ‘Thomson

seedless' and 'Flame'), mining the berries, petioles and canes, and occasionally in dark, firm plums, *Prunus domestica* L., (Rosaceae) (D. Haines 2002 personal communication).

Attributing pesticide upset, especially the use of insect growth regulators, as the cause of recent, sustained, economically damaging levels of *M. gulosa* in the San Joaquin Valley has been shown to be unlikely (Grafton-Cardwell et al. 2006). The differential reduction in natural enemy activity that could lead to increases in pest species densities was demonstrated with *Rodolia cardinalis* (Mulsant) (Coleoptera: Coccinellidae), the predator of cottony cushion scale, *Icerya purchasi* Maskell (Homoptera: Margarodidae), but not with parasitoid wasps of other pest species in citrus (Ishaaya et al. 1992, Mendel et al. 1994, Grafton-Cardwell et al. 2003, Grafton-Cardwell et al. 2006). There remains no clear evidence however, to pinpoint a cause for the change in pest status of *M. gulosa* throughout its recorded history in southern California and the San Joaquin Valley.

Management Research

Chemical. - Pesticide trials have been conducted in California and Arizona for chemical control of *Marmara* populations in citrus. Pesticide trials were conducted in 1969 and 1970 by Atkins in two blocks of grapefruit in Blythe, Riverside Co., CA (Atkins 1971). "Block B" was sprayed 30 days after "Block A," and both were sprayed with the same organophosphate. The grapefruit inspected in Block A had 15.4% of the fruit with *Marmara* damage and block B had 37.5% of the fruit with *M. salictella*, probably *M. gulosa*, damage. The results were interpreted as indicating early season spraying to be more effective. The same two blocks of grapefruit were used for pesticide trials in 1970. Trials using several organophosphates and carbamates were conducted.

All treatments had no significant difference although the early treatments were interpreted as being more effective than the late treatments (Atkins 1971).

Pesticide efficacy trials were conducted between 2001 and 2007 in the San Joaquin Valley. Registered and experimental-use toxins were used, including organophosphates, neonicotinoids, pyrethroids, insect growth regulators, and other insecticides (Grafton-Cardwell and Reagan 2001, 2004, 2006, Grafton-Cardwell et al. 2003, Grafton-Cardwell 2005, Grafton-Cardwell et al. 2007). Most insecticide classes provided good larval control in the laboratory. However, control was much less effective in field trials; poor application coverage was deemed a likely factor as most *M. gulosa* were mining on the trunk-side of fruit, inside the canopy low to the ground (Grafton-Cardwell et al. 2003).

Field trials using diflubenzuron, a chitinase inhibitor that sterilizes insect eggs (Amalin et al. 2004), in the Micromite 80WG formulation, in 2005 indicated that multiple applications reduced the overall percentage of mined fruit (Grafton-Cardwell et al. 2005). Reduction in mining was correlated with an increased number of applications.

Biological Control Program. - *Marmara gulosa* is considered native to the southwestern United States (Guillén et al. 2001), but the original species description did not include Mexico in its distribution. A biological control program was initiated for *M. gulosa* in the San Joaquin Valley with the intention of moving candidate natural enemy species from southern CA and while simultaneously prospecting in Sonora, MX for natural enemies. Sonora was chosen for foreign exploration due to the purported importation of infested fruit from that area.

Biology

Marmara gulosa larvae feed in the upper epidermal layers of the rinds of citrus fruit and sucker growth causing silvery white serpentine surface mines (Fig. 2) (Atkins 1961; Atkins 1971; Guillén 1999; Guillén et al. 2001).

Figure 2. *Marmara gulosa* damage on citrus fruit and shoots.

The damage is purely aesthetic, but two or more mines will usually render the fruit unacceptable for fresh market (Guillén 1999). Since fresh market fruit usually attains a higher market price, this damage represents a significant economic loss to the grower. Mining creates a thin layer of epidermis that provides a protective barrier for the developing larva. Feeding on suckers of citrus trees has no known economic impact (Atkins 1971; Guillén 1999; Guillén et al. 2001).

Marmara gulosa produces five to seven generations per year (Guillén 1999 and Guillén et al. 2001). A female lays one to eight eggs on the fruit surface, and a single female can lay ten to fifty eggs in her lifetime (Guillén 1999 and Guillén et al. 2001). Larvae emerge from the egg, burrow into the fruit's epidermis, and feed under the protection of the epidermis. Growth and development trials in the laboratory show one larva can go through five to seven instars, and the development time from egg to adult is about two to four weeks depending on temperature (Guillén 1999; Guillén et al. 2001; Neff 2002). In the penultimate instar, the larva ceases feeding. The larval integument becomes pink and the feeding mouthparts are shed. The feeding mouthparts are replaced by mouthparts used for spinning silk (Guillén 1999 and Guillén et al. 2001). The larva then finds a protected area on the fruit, in the fold of a leaf, or in the soil, and spins a cocoon for pupation (Guillén 1999 and Guillén et al. 2001). The larva additionally creates small silken balls, cuts a small hole in the cocoon, pushes the balls out, attaching them to the outside, and closes up the hole (Guillén 1999 and Guillén et al. 2001). The larva will attach ten to eighteen balls in this fashion (Grafton-Cardwell et al. 2008). The reason for attachment of the silk balls is unknown (Grafton-Cardwell et al. 2008). The adult moth is approximately two millimeters long (Guillén 1999 and Guillén et al. 2001). *M. gulosa* adults are dark gray in color with a few light gray bands running across the wings (Fig. 3) (Guillén 1999 and Guillén et al. 2001).

Figure 3. *Marmara gulosa* adult (photo courtesy of Dr. Beth Grafton-Cardwell)

Distribution

The genus *Marmara* is endemic to the New World (Guillen et al. 2001). *Marmara gulosa* and 21 other *Marmara* species have been described, seventeen of which are found in North America (Clemens 1860, 1863; Chambers 1875; Busck 1906, 1909; Braun 1909; Vinal 1917; Forbes 1923; DeGryse 1943; Fitzgerald 1973, 1975; Davis 1983; Guillen et al. 2001).

Host Plants

Marmara gulosa has a host plant list of 69 species in 31 families (Godfrey et al. 2003; Grafton-Cardwell et al. 2008). Some common crop plant species attacked include:

grapefruit (*Citrus paradisi* Macfadyen), lemon (*Citrus limon* Burmann), tangerine (*Citrus reticulata* Blanco), lime (*Citrus aurantifolia* Tanaka), orange (*Citrus sinensis* Osbeck), nectarine (*Prunus persica* var. *nucipersica* L.), grape (*Vitis vinifera* L.), olive (*Olea europaea* L.), walnut (*Juglans* spp. L.), cotton (*Gossypium hirsutum* L.), oleander (*Nerium* spp. L.), willow (*Salix* spp. L.), avocado (*Persea americana* Mill), some squash (Family *Cucurbitaceae* Juss), and some peppers (*Capsicum annum* L.) (Atkins 1961; Atkins 1971; Guillén 1999; Guillén et al. 2001; Godfrey et al. 2003; Grafton-Cardwell et al. 2008). Many citrus varieties have been observed to be hosts for *M. gulosa*, but *M. gulosa* is especially active on pummelos, grapefruit, and certain varieties of navels (Reeves 1995; Guillén 1999; Guillén et al. 2001; Grafton-Cardwell et al. 2008). Navel varieties that appear preferred by *M. gulosa* include Fukumoto, Thompson Improved, Powell, Atwood, Barnfield, and Lane Late (Grafton-Cardwell et al. 2008).

The diverse and expanding host plant list of *M. gulosa* is not usual among insects because most phytophagous insects exhibit some degree of specialization on their host plants and only include novel host plants that are chemically and taxonomically similar to the original host plants (Jaenike 1990 and Vanbergen et al. 2003). The host list for *M. gulosa* has been expanding to taxonomically and chemically different host plants in the San Joaquin Valley since 1999 (Neff 2002). Host range expansion onto plants from many taxonomically and chemically different families is associated with insects that 1) have a larger body size 2) have silk assisted feeding or have exposed larval feeding 3) overwinter as eggs 4) usually feed on woody shrubs or trees 5) and usually occur in grasslands or upland habitats (Fraser et al. 1994 and Vanbergen et al. 2003). *Marmara gulosa* does not have a large body size, does not have silk assisted feeding or exposed

larval feeding, is not known to overwinter as ova nor do they occur in grasslands.

However, *M. gulosa* does feed on woody shrubs and trees. Insects that incorporate novel host plants will also usually move onto host plants chemically similar to the original host (Jaenike 1990). This also is not the case with *M. gulosa*.

There are two factors that are recognized as important influences on polyphagous feeding. First is the production of chemical defenses by the plant, and second is the availability of the plant as a predictable food source (Cates et al. 1975; Feeny 1976; Rhoades et al. 1976; Cates et al. 1977; Cates 1980). Resources preferred by polyphagous herbivores that are predictable food sources, such as abundant woody perennials, mature leaves, and plants with bark, contain defenses that reduce digestibility (Cates 1980). Resources preferred by monophagous and oligophagous herbivores that are not always predictable food sources, such as rare annual plants, leaves that are rapidly flushing, and flowering plants, contain defenses that disrupt herbivore digestion (Cates 1980). Oligophagous and monophagous herbivores are specialized on one or few plants and have resistance to the toxins that disrupt digestion, whereas polyphagous feeders do not have this adaptation (Feeny 1976; Rhoades et al. 1976; Cates et al. 1977; Scriber et al. 1979; Cates 1980). The mature plant tissue is harder to digest but lower in toxins than young tissue and flowers (Cates 1980); for this reason it is believed polyphagous feeders prefer mature tissue. Based on leaf tissue preferences of 35 Lepidoptera and Coleoptera, on 46 different plant species, nine of eleven polyphagous lepidopteran species preferred mature leaves on the herbaceous and woody perennials (Cates 1980). The polyphagous species that do prefer younger tissues all feed upon rare unpredictable annual and herbaceous perennial plant species (Cates 1980). Cates (1980) believes the rare plants

escape herbivory in space and time rather than by chemical toxins. Based on oviposition observations *M. gulosa* seems to prefer host plants with rapidly expanding tissue, such as young growing leaves, suckers, or expanding fruit with a lot of moisture. The chemical composition of the new host plant does not seem to influence *M. gulosa* except when on citrus. *Marmara gulosa* larvae on citrus have exhibited mortality particularly on Fukumoto navels. The reason for the mortality in larvae ranging from second to fourth instars is unknown. Samples of deceased larvae were sent to Dr. Brian Federici at the University of California, Riverside, but no conclusive results were determined. Dr. Kris Godfrey from the CDFA collected deceased larvae from the San Joaquin Valley and sent them to pathologist Michael McGuire USDA, ARS, Shafter, CA. Michael McGuire also had no conclusive results as well. Mortality could be due to the lack of adaptation on citrus.

Studies of Microlepidoptera show a variety of host range expansions onto different host plants within any given moth family (Thompson et al. 1991). Thompson et al. (1991) and Powell (1980) found microlepidopteran families Gelechiidae, Gracillariidae, and Tortricidae to have some species expand onto over 70 new families of plants. Polyphagous feeding is not well documented because the herbivores are generally studied when they are at epidemic levels when their original host plants are under some environmental stress (Cates 1980). *M. gulosa* populations have increased since 1999 and the host range has expanded (Neff 2002). Cates' (1980) theory regarding environmental stresses on original host plants may be applicable to *M. gulosa* host plant species.

Host range expansion is more likely to occur when the insect performs as well on the new host plant as it does on the ancestral host plant, willow in the case of *M. gulosa*

(Powell 1993 and Pilson 1999). New host plants may allow the insect to escape from predators, parasites, and pathogens providing even more incentive to switch onto novel host plants (Powell 1993 and Pilson 1999). Several steps must occur before a novel host plant can be included in the diet of a phytophagous insect. The five steps hypothesized to occur are: 1) a female must be able to find the host plant, 2) a female must accept the host plant as a suitable place to oviposit, 3) the larvae must accept the host plant as suitable, 4) the larvae must be able to find and recognize the host plant, and 5) the larvae must be able to grow and survive on the host plant (Rauscher 1982, 1983; Thomas et al. 1987; Thompson 1988; Bowers et al. 1992). According to the definition above, *M. gulosa* has incorporated novel host plants with verified rearings on avocado, citrus, cotton, grapes, oleander, peppers, tree tobacco, walnuts, and zucchini (Neff 2002 & Finch 2003).

Sex Ratios of Parasitic Hymenoptera

Parasitic Hymenoptera have a form of reproduction called haplodiploidy. Variable and unpredictable sex ratios are typically characteristic of parasitic Hymenoptera exhibiting haplodiploidy (Doutt 1964). Haplodiploidy indicates the number of chromosomes the organism has following embryogenesis (Wrensch et al. 1993). Organisms exhibiting haplodiploid reproduction reproduce parthenogenetically and sexually (Daly et al. 1998). A fertilized egg is diploid and female. An unfertilized egg is haploid and male. The female has the ability to control offspring gender by allowing fertilization or not. Ratios of male to female in these populations vary depending upon environmental stimuli (Wrensch et al. 1993). Typically, there are more females than males in these populations, but many exceptions exist due to the diversity of organisms exhibiting haplodiploidy.

Haplodiploid reproduction can be beneficial when a new population is being established. At first, an unfertilized foundress of a colony or population can only produce male offspring (Otto et al. 2001). There is a biological process that does not allow the female's egg to be fertilized even if gamete exchange has occurred (Wrensch et al. 1993). An example of this is with the solitary ichneumonid parasitoid *Diadromus pulchellus* (Kalmès et al. 2001). A mated female *D. pulchellus* only laid fertilized eggs half of the time she oviposited (Kalmès et al. 2001). This is beneficial because a female can produce all sons that she can mate with at a later time, if she survives long enough. As time progresses, the number of females increases and grows significantly larger than the number of males in a stable environment. The evolutionary reasoning for producing a population with a large number of females and a smaller proportion of males is to produce more progeny in the long run. The overproduction of males is biologically wasteful if the purpose of reproduction is to pass on genes from an individual. If a male dies without mating, the energy costs to produce him are lost and his genes will not be passed on. A larger proportion of females in a population allows for a greater number of offspring because population growth rates are determined by the number of females per female, also known as the intrinsic rate of natural increase (R_0) (Varley et al. 1973).

Populations that occur in areas where conditions are atypical or resources are changing, the number of males increases to the proportion of females (Wrensch et al. 1993). This is thought to occur because males provide greater genetic diversity. In a study of haplodiploid mites, their sex ratios changed with different conditions (Wrensch et al. 1993). The original population of mites was maintained for five years at a temperature of 22° C and had more females than males. The mites were then subjected to

a 32° C environment. Under the new temperature condition more males were produced. The reproductive strategy of the mites switched from maximizing R_0 to survival by attempting to increase genetic variation.

Looking at sex ratios of parasitic Hymenoptera may allow us to determine if a colony is new, changing, or established. If more females than males are present in the population, the population may be established and have existed long enough to reach this ratio. If there are more males than females present in the population the population may be new and just starting to establish or there has been a change in the environment that requires genotypic plasticity to cope with the stress. If there are an equal number of females to males then there are two possible explanations. One, the population could be in the middle of the process of establishing so the reproductive strategy has switched from male producing to female producing. Two, there has recently been an environmental change that requires genotypic plasticity and the reproductive strategy has switched from female producing to male producing.

Materials and Methods

Pre-release Surveys

Pre-release surveys for *M. gulosa* activity on host plants and parasitoid activity on *M. gulosa* were conducted by Dr. Beth Grafton-Cardwell, UCCE and her staff, Dr. Kris Godfrey, CDFA, Pest Management Associates Inc., and Dr. David Headrick and his graduate students Dan Neff and Keith Speidel. Plants on which *M. gulosa* were feeding were noted. Any parasitoids found on *M. gulosa* were recorded and noted as being solitary or gregarious based on the presence of single or multiple emergence holes.

Field Site Locations

1. The Peterson Ranch- Located in Exeter, Tulare Co., CA on Road 180 just south of Ave 264 (Appendix A Map1). The east side of Road 180 just south of Ave 264 has a 0.081 km² block of Fukumoto navel oranges and to the south a vacant field. The west side of Road 180 across from the Fukumotos has a block of oranges with a residence on the northern end, a farm shop with pink and white flowering oleander bushes surrounding the south eastern end, and grapes south of the oleander.
2. The Stutsman Ranch – Located in Exeter, Tulare Co., CA at Road 212, just north of Ave 256 (Appendix A Map2). This is a 0.02 km² block of grapefruit inter planted with navel orange trees. This block is surrounded by several other citrus varieties.
3. BFE in Exeter, CA is on Avenue 288 or east Marinette 1.21 kilometers east of Highway 65 (Appendix A Map 3). BFE has oleander bushes in a row flanking the sides of a brick path. The pathway is surrounded by Washington navel oranges.

4. Stewart's Residence in Exeter, CA is on the western most end of Ave 277 or Chestnut Street, 0.2 kilometers north on the gravel road (Appendix A Map 4).
Stewart's Residence has two white flowering oleander bushes approximately 13 feet in diameter close to a residence that had been pruned within the last year. A residential garden including plants such as Mellow Gold grapefruit trees, non-watered oleander, roses, and figs are in the immediate vicinity of the oleander bushes used for sampling. There are plum orchards east and west of the oleander site. Ten branches on ten different bushes were inspected each week.
5. The Kaweah River site is located in Woodlake, Tulare Co., CA (Appendix A Map 5) at the intersection of highway 245 and Cottage P.O. The citrus planting is comprised of navel trees to the south of the intersection, willow along the western side of highway 245, cotton just north of the citrus, and a river north of the cotton.
6. The Quezada orchard is located at Ave 188, Rd. 212 Lindsay, Tulare Co., CA (Appendix A Map 6). This is a 0.02 km² block that consists of navel orange trees with Oro Blanco grapefruit trees in row 1 at tree 5, row 1 tree 10, and row 10 tree 8. There is a residence to the north and a navel orange orchard to the south.
Navel oranges also serve as borders to the west and east.
7. The Lewis Creek site is located in Lindsay, Tulare Co., CA at the south western intersection of Ave 220 and Rd 258 on Rd 258 along the creek.
8. The Muller walnut site is located in Visalia, Tulare Co., CA at the south east of the intersection of Caldwell Ave and Santa Fe Road (Appendix A Map 7).

Cirrospilus coachellae Releases

A gregarious, non-hyperparasitic parasitoid, *Cirrospilus coachella* Gates (Fig. 4), was found providing population regulation of *M. gulosa* in the Coachella Valley (Guillén et al. 2001).

Figure 4. *Cirrospilus coachellae* Gates.

Cirrospilus coachellae was not observed in pre-release studies in the San Joaquin Valley, therefore it was chosen as the best candidate for introduction. *Cirrospilus coachella* releases were performed in the attempt to provide more biological control of *M. gulosa* in the San Joaquin Valley beginning 2001.

Free releases: Summer of 2002

The Peterson Ranch and the Stutsman Ranch were locations where free releases were conducted. *Cirrospilus coachellae* was released into Peterson's oranges on September 19, 2002. All specimens were field collected by Neil Smart in Riverside, Riverside Co., CA and put into a four dram glass vials. The vials were sent via overnight delivery in a cooler with ice packs from UC Riverside to California Polytechnic State

University, San Luis Obispo. The day the package arrived the glass vials were immediately put into a refrigerator where they remained until the following day. The vials containing the parasitoids were then transported in a cooler with an ice pack to the release location. The glass vials were removed from the cooler, parasitoids were counted but not sexed, and the vials were taped to selected branches and opened (Fig. 5).

Figure 5. Glass vial taped to a branch for the release of *Cirrospilus coachellae*.

Rows were counted successively from one starting in the southern end of the block going to the northern end, and trees were counted successively from one starting in the west moving east. Twenty-three parasitoids were released in row 14 tree 9. Twenty-two parasitoids were released in row 25 tree 9. Nineteen parasitoids were released in row 20 tree number 20. All the releases were made in areas where there were high concentrations of live *M. gulosa*. The areas of high concentration were on the

northeastern side of the trees from ground level up. A second release of 20 parasitoids in row 14 tree number 9 was made into Peterson's oranges on September 27, 2002 as described above.

Cirrospilus coachellae releases were made into Stutsman's grapefruits on September 19, 2002; all releases were conducted as above. Rows were counted successively from one beginning at the southern end of the block moving to the northern end, and trees were counted successively from one beginning at the west moving eastward. Twenty parasitoids were released in row number 15 tree number 8, and 16 parasitoids were released in row number 20 tree number 18. A second release of 14 parasitoids in row 15 tree number 8 was made into Stutsman's grapefruits on September 27, 2002.

Oleander, *Nerium* spp, studies

Weekly inspections of oleander, *Nerium* spp, were made at the Peterson Ranch in Exeter, Tulare Co., CA. The Peterson Ranch was monitored weekly from 8/6/03 through 12/9/03. The end date of the oleander inspection was due to removal of the shrubs by the owner. Ten branches from ten different plants were inspected on a weekly basis from 8/6/03 through 12/9/03. Twenty-one bushes were included in the survey. Life status and life stage of *M. gulosa*, the number of old mines present, and parasitism, if present, were all recorded.

Weekly inspections of oleander, *Nerium* spp, were made at Badger Farming Exeter (BFE) and the Stewart Residence in Tulare Co. At BFE ten branches from ten different oleander bushes were inspected weekly from 3/31/04-7/21/04. A total of fifteen oleander bushes were included in this study. The bush number, life stage and life status

of *M. gulosa*, occurrence of old mining on the branch, and parasitism, if present, were recorded weekly. Branches with parasitized *M. gulosa* were cut to fit into 0.1 liter plastic soufflé cups. Individual branches were put in the soufflé cups with a strip of paper towel and a clear plastic lid was placed on top. Cups were labeled with the location and the date collected. All cups were placed in a growth chamber with a photoperiod 14:10 (l:d) at 30° C until emergence. Each newly emerged parasitoid was then placed in 95 to 100% EtOH for storage.

At the Stewart Residence 25 branches on two different bushes were inspected each week. The branch number, life stage and life status of the *M. gulosa*, occurrence of old mining on the branch, and parasitism were recorded weekly from 5/5/04 through 7/21/04. Branches with parasitized *M. gulosa* were treated as described above.

September 8, 2005 BFE and the Stewart Residence were checked for evidence of parasitism. BFE oleander was inspected for one hour by two people. The oleander at the Stewart Residence was inspected by two people for ca. 20 minutes.

Monitoring Citrus

Citrus was monitored at the Kaweah River site (Appendix A Map 5), the Stutsman Ranch (Appendix A Map 2), Bert Quezada's Ranch (Appendix A Map 6), and the Peterson Ranch (Appendix A Map 1). The Kaweah River site was monitored weekly from April through December from 2002 through 2004. The Stutsman Ranch was monitored weekly from April through December from 2002 through 2003 and once a month from April through December in 2004. The Bert Quezada Ranch was monitored weekly from April through December from 2002 through 2003 and once every two months in 2004. The Peterson Ranch was monitored weekly from May to December from

2002 through 2003 and twice in 2004. When found at any of the above locations, parasitized *M. gulosa* larvae were collected. The fruit was brought to the laboratory and placed into Bugdorms®. Bugdorms® are collapsible 300cm cube plastic cages. The top and bottom of the Bugdorm® are composed of nearly transparent plastic, three sides are composed of 0.4 x 0.6 m plastic mesh screen, and the fourth side provides access through a 0.2 m diameter opening with a nylon sleeve. Bugdorms® were placed into a growth chamber at 30° C with a photoperiod of 14:10 (l:d). Relative humidity was maintained at approximately 75% using a NaCl and water solution (Winston and Bates 1960). Insects were checked daily for emergence.

Reared adults were put into 95 to 100% EtOH in individual two dram glass screw cap vials. After at least 24 hours in 100% EtOH insects were curated, see methods below.

Search for natural enemies on host plants other than citrus and oleander

Inspection for evidence of parasitism of *M. gulosa* was conducted on the following peelminer host plants: *Juglans* sp. (walnuts), *Gossypium* sp. (cotton), *Salix* sp. (willow), or *Nicotiana glauca* (tree tobacco). Walnuts were examined for approximately 15 minutes by two to three people each week or bimonthly from March to June from 2002 through 2004. Cotton was monitored at the Kaweah River site. Cotton was examined for approximately 15 minutes on a weekly basis from time of emergence to plow down from 2002 through 2004. Willow was examined for approximately 30 minutes by two to three people, weekly, from February through November from 2002 through 2004 at the Kaweah River site. Willow was examined for approximately 30 minutes by two to three people twice a year from 2002 through 2004 at the Lewis Creek

site. Tree tobacco was monitored at the Kaweah River site. Tree tobacco was examined for approximately 15 minutes by two to three people on a monthly basis from February through November from 2002 through 2004. Willow was checked at the Kaweah River site and the Lewis Creek site. Tree tobacco and cotton were checked at the Kaweah River site.

Curation of Natural Enemies

Adult parasitoids were killed and stored in 100% EtOH for at least 24 hours after they were recovered from individual containers in growth chambers. Fine woven copper mesh was cut into 2 cm diameter circles and molded to fit in a 4 cm diameter glass dish. The insects were placed individually onto the mesh circles in the glass plates that were then placed under a fume hood where several drops of hexamethyldisilazane ($[(CH_3)_3Si]_2NH$), HMDS, were placed into the dish on top of the insect. The HMDS was allowed to evaporate off under the fume hood and the process was repeated until the insect was clean. Insects were mounted using a dissecting microscope with water-diluted white glue onto cardboard mounting cards. Insects were then identified using the Annotated Keys to the Nearctic Chalcidoidea (Hymenoptera) by G. Gibson, J. Huber, and J. Woolley.

Sex ratios, clutch sizes, and frequency of parasitism on oleander

Branches with parasitized *M. gulosa* were cut to fit into individual 0.1 L plastic soufflé cups. Individual branches were put in the soufflé cups with a strip of paper towel and fitted with a clear, plastic lid. Cups were labeled with the location and collection date, and treated as above until emergence. Clutch sizes were recorded in each plastic soufflé cup. After the parasitoids were mounted on cards (see details in Curation of

Natural Enemies) a dissecting microscope was used to determine the sex of each parasitoid reared from oleander at BFE and the Stewart Residence. All information was entered into an Excel™ spreadsheet and put in chronological order with the oldest dates listed first.

Results

Pre-release survey

Parasitic Hymenoptera were recorded attacking *M. gulosa* in the San Joaquin Valley on citrus and other host plants, but currently do not provide sufficient control in commercial citrus plantings (Godfrey and Mayhew, Grafton-Cardwell, Headrick, unpublished data). Five different genera of eulophids have been identified attacking *M. gulosa* in the San Joaquin Valley: *Phygadeuon*, *Closterocerus*, *Baryscapus*, *Nechrysocharoides*, and *Hemiptarsenus*.

Cirrospilus coachellae releases

Successful establishment has not yet been observed in the San Joaquin Valley following annual releases from 2001 to 2004. Recoveries have been made in the same season, but there have been no recoveries of adults following the previous season's releases. Releases may become more effective when large quantities of *C. coachellae* can be released reliably throughout the year.

Oleander, *Nerium* spp. Monitoring

Seventy-one parasitoids were reared from peelminer infested oleander branches in 2004. All of the parasitoids collected from oleander at the Stewart Residence and BFE were determined to be *Hadrotrichodes waukheon* La Salle (Fig. 6).

Figure 6. *Hadrotrichodes wauckhoni* male

All identifications were verified by Dr. John Heraty and Mr. Roger Burks, UC Riverside.

No *H. wauckhoni* were observed at BFE or the Stewart Residence in 2005 and only one *H. wauckhoni* was found at the Stewart Residence in 2006. Active and old mines of *M. gulosa* were present, but only one parasitoid was found at the Stewart Residence.

Parasitism on Oleander

Of the 538 live *M. gulosa* larvae examined on *Nerium* sp. (oleander) from 3/31/2004 through 7/21/2004, 36 (6.65%) were parasitized at BFE (Fig. 7 and Fig. 8). Percent parasitism was calculated by collection date at BFE. Parasitism ranged from 5.1% to 18.2% (Fig. 9). Of the 242 *M. gulosa* larvae examined at Jim Stewart's residence from 5/5/2004 through 7/21/2004, 27 (11.16%) were parasitized (Fig. 10 and Fig. 11). Percent parasitism was calculated by collection date at the Stewart's residence. Parasitism ranged from 9.1% to 45% (Fig. 12).

Figure 7. Growth and development of *M. gulosa* on BFE oleander in 2004.

Figure 8. Stages of *M. gulosa* parasitized on BFE oleander in 2004.

Figure 9. Percent parasitism of *M. gulosa* by *H. waukheon* by collection date at BFE in 2004.

Figure 10. Growth and development of *M. gulosa* on Stewart's oleander in 2004.

***M. gulosa* Stages Parasitized at Stewart's Oleander 2004**

Figure 11. Stages of *M. gulosa* parasitized on Stewart's oleander in 2004.

Fig. 12. Percent parasitism of *M. gulosa* by *H. waukheon* by collection date at Stewart's oleander in 2004.

Monitoring Citrus

Collection of parasitized *M. gulosa* larvae from 2002 to 2004 from monitoring at the Kaweah River site, the Stutsman Ranch, the Peterson Ranch, the Quezada Ranch, and specimens collected by Yuling Ouyang in Parlier yielded a total of 15 parasitoids reared from citrus. Eight parasitoids were reared from navel oranges and seven were reared from grapefruit. Of the eight reared from navels, seven were reared from the Quezada Ranch while one was reared from the Kaweah River site. Of the seven reared from grapefruit, four were reared from the Stutsman ranch and three were reared from Parlier. Those reared from navels at the Quezada Ranch were identified as follows: four *Closterocerus diastatae* Westwood, one *Closterocerus utahensis* Crawford and two *Hemiptarsenus* sp. Westwood. The parasite from the Kaweah River site reared from a navel was identified as *Pnigalio coloni* Shrank. Those reared from grapefruit at the Stutsman Ranch were identified to be from the family Encyrtidae and in the genus *Comperiella* Howard. Those reared from grapefruit at Parlier were identified to be *Closterocerus* sp.

Search for Natural Enemies on Host Plants Other Than Citrus and Oleander

One parasitoid larva was found on a cotton stem at the Kaweah River site. The parasitoid was not visible under the epidermis. Only because *M. gulosa* larvae were being dissected from cotton for genetic studies was the parasitoid discovered. The parasitoid was unfortunately destroyed upon dissection and could not be identified. No other host plants inspected, except cotton, citrus and oleander, had evidence of *M. gulosa* parasitism.

Curation

Dead, dried parasitoid specimens did not regain their external structural shape by treating them with HMDS. Specimens remained collapsed and dirty. A different method was obtained from Dr. John Heraty, UC Riverside, see Improved Methods for Rearing and Curation below.

Sex Ratios, Clutch Sizes, and Frequency of Parasitism on Oleander

The following tables associate the parasitoids found in the surveys conducted in 2004 at Badger Farming Exeter (BFE) and the Stewart Residence to the parasitoids reared from oleander plants at these locations. This analysis was conducted to determine if there were any observable patterns in sex ratios, clutch sizes, or preferences in host locations. Sex ratios may provide a measure of the establishment process for these natural enemies as demonstrated by Wrensch et al. (1993) and Otto et al. (2001).

At BFE no sex ratio pattern (Fig. 13 and Fig. 14), clutch size pattern, or apparent host location preferences were identified (Table 1). The ratio of females to males, respectively, was 29:25 as shown in Tables 1 and 2. Parasitoids were found on the new growth of the oleander where there was a higher concentration of *M. gulosa* larvae. The oleander bushes had more parasitism on the south to southwest sides between 0.3 m from the ground to 1.2 m from the ground. The number of *M. gulosa* larvae parasitized on each bush was counted at BFE. All the bushes surveyed with the exception of bush 2 had parasitism. Between 0 and 5 larvae were parasitized on each bush and between 7 and 60 *M. gulosa* larvae were found on each bush throughout the survey (Table 2).

In the data from the Stewart Residence a pattern in the ratio of males to females was apparent (Fig. 13, Fig. 14, and Table 3).

Figure 13. Quantities of male and female *Hadrotrichodes waukheon* reared from oleander by emergence date at BFE in 2004.

Figure 14. Quantities of male and female *Hadrotrichodes waukheon* reared from oleander by collection date at BFE in 2004.

Parasitoid collection data BFE 2004				Growth and development data BFE 2004			
Date Collected	Date Emerged	Sex	Clutch	Date	Bush #	Instar Parasitized	# of Larvae per Branch
6/2/2004	6/11/2004	M					
6/2/2004	6/11/2004	M					
6/8/2004	6/11/2004	M	A				
6/8/2004	6/11/2004	F	A				
6/15/2004	6/20/2004	F					
6/15/2004	6/20/2004	F	B				
6/15/2004	6/20/2004	M	B				
6/15/2004	6/27/2004	F					
6/15/2004	6/20/2004	M	C				
6/15/2004	6/20/2004	F	C				
6/23/2004	6/29/2004	F	D	6/23/2004	3	3rd	1
6/23/2004	6/29/2004	M	D				
6/23/2004	6/29/2004	M	D				
6/23/2004	6/29/2004	M		6/23/2004	11	3rd	1
6/23/2004	6/30/2004	M	E				
6/23/2004	6/30/2004	M	E				
7/1/2004	7/12/2004	M	F	7/1/2004	4	pinkie	1
7/1/2004	7/12/2004	F	F				
7/1/2004	7/12/2004	F		7/1/2004	5	4th	1
				7/1/2004	8	4th	1
				7/1/2004	10	4th	1
				7/1/2004	14	5th	1
7/7/2004	7/11/2004	M	G	7/7/2004	3	4th	1
7/7/2004	7/11/2004	F	G				
7/7/2004	7/11/2004	F	G				
7/7/2004	7/11/2004	M	G				
7/7/2004	7/12/2004	F	H	7/7/2004	6	5th	1
7/7/2004	7/12/2004	F	H				
7/7/2004	7/12/2004	M	H				
7/7/2004	7/14/2004	M	I	7/7/2004	8	3rd	1
7/7/2004	7/14/2004	F	I				
7/7/2004	7/14/2004	F	I				
7/7/2004	7/14/2004	M	I				
7/7/2004	7/16/2004	M	J	7/7/2004	9	4th	1
7/7/2004	7/16/2004	F	J				
7/7/2004	7/16/2004	F	J				
				7/7/2004	15	3rd	3
7/14/2004	7/16/2004	M	K	7/14/2004	3	3rd	1
7/14/2004	7/16/2004	F	K				
7/14/2004	7/16/2004	F	K				
7/14/2004	7/18/2004	F		7/14/2004	7	3rd	1
7/14/2004	7/20/2004	F		7/14/2004	7	4th	1
7/14/2004	7/22/2004	F		7/14/2004	8	4th	1
7/14/2004	7/16/2004	M	L	7/14/2004	8	5th	1
7/14/2004	7/16/2004	M	L				
7/14/2004	7/16/2004	M	L				

Parasitoid collection data at BFE 2004				Growth and development data BFE 2004			
Date Collected	Date Emerged	Sex	Clutch	Date	Bush #	Instar Parasitized	# of Larvae per Branch
7/14/2004	7/20/2004	F	M	7/14/2004	9	5th	1
7/14/2004	7/20/2004	F	M				
7/14/2004	7/20/2004	F	M				
				7/14/2004	10	4th	1
				7/14/2004	12	4th	1
				7/14/2004	13	4th	1
				7/14/2004	13	3rd	1
				7/14/2004	14	5th	1
				7/14/2004	14	5th	2
				7/14/2004	14	4th	1
				7/21/2004*	1	4th	1
				7/21/2004*	3	5th	1
				7/21/2004*	5	3rd	1
				7/21/2004*	15	5th	1
9/15/2004	9/19/2004	M					
9/15/2004	9/21/2004	M					
9/15/2004	9/24/2004	F	N				
9/15/2004	9/24/2004	F	N				
9/15/2004	9/24/2004	M	N				
9/29/2004	10/11/2004	M	O				
9/29/2004	10/11/2004	F	O				
9/29/2004	10/12/2004	F	P				
9/29/2004	10/12/2004	F	P				
9/29/2004	10/11/2004	F					

* half the number of samples taken from each bush

Table 1. Parasitoid collection data compared to rearing data: Parasitoid collection data includes collection date, emergence date, sex of the parasitoid found and clutches from BFE associated with parasitoid information from the growth and development survey conducted at BFE in 2004 including collection date, bush number sampled, the larval stage parasitized and the number of larvae on each branch.

Bush #	# Parasitized	# of <i>M. gulosa</i> larvae on each bush
1	1	33
2	0	25
3	4	32
4	1	60
5	2	42
6	1	33
7	2	44
8	4	47
9	2	49
10	2	47
11	1	38
12	1	35
13	2	33
14	5	34
15	4	7

Table 2. Total number of parasitoids found and total number of *M. gulosa* larvae found on each bush on all the combined sample dates during the growth and development survey at BFE in 2004.

Figure 15. Quantities of male and female *Hadrotrichodes waukheon* reared from oleander by emergence date at Stewart's in 2004.

Figure 16. Quantities of male and female *Hadrotrichodes waukheon* reared from oleander by collection date at Stewart's in 2004.

A change in sex ratio patterns was observed over time at the Stewart's Residence. Six out of seven parasitoids were female in the first eight sample days that parasitoids were collected. Five of six parasitoids were male in the following 21 days. Thus, females were predominant the first eight sample days and in the remaining 21 sample days more males were produced. The ratio of females to males for the entire season, respectively, was 1:0.86. The growth and development survey began before parasitism was observed, so sample dates show the first week of *H. waukheon* activity on *M. gulosa* on oleander, but sampling was terminated before all evidence of *H. waukheon* had disappeared. A decline in *H. waukheon* populations was occurring. See Discussion for more information on the sex ratio patterns.

Parasitoid collection data at Stewart's in 2004

Growth and development study at Stewart's 2004

Date Collected	Date Emerged	Sex	Clutch	Date	Bush #	Instar parasitized
6/15/2004	6/20/2004	F	Q			
6/15/2004	6/20/2004	F	Q			
6/15/2004	6/20/2004	F	Q			
6/23/2004	7/23/2004	F		6/23/2004	1	3rd
6/23/2004	7/4/2004	F		6/23/2004	2	4th
6/23/2004	7/5/2004	F		6/23/2004	2	3rd
6/23/2004	7/11/2004	M		6/23/2004	2	4th
				6/23/2004	2	5th
7/1/2004	7/4/2004	?	R	7/1/2004	1	3rd
7/1/2004	7/4/2004	?	R			
7/1/2004	7/6/2004	M		7/1/2004	1	4th
7/1/2004	7/9/2004	F		7/1/2004	2	4th
				7/1/2004	2	5th
				7/1/2004	2	4th
7/7/2004	7/14/2004	M		7/7/2004	1	3rd
7/7/2004	7/16/2004	M		7/7/2004	2	4th
7/7/2004	7/16/2004	M		7/7/2004	2	3rd
				7/14/2004	1	5th
				7/14/2004	1	4th
				7/14/2004	1	5th
				7/14/2004	2	4th
				7/14/2004	2	5th
7/21/2004	7/26/2004	M		7/21/2004	1	4th
				7/21/2004	1	4th
				7/21/2004	1	3rd
				7/21/2004	2	4th
				7/21/2004	2	3rd
				7/21/2004	2	4th
				7/21/2004	2	4th
				7/21/2004	2	4th

Table 3. Parasitoids reared from Stewart's associated with parasitoids found in the survey conducted at Stewart's in 2004: Parasitoid collection data includes collection date, emergence date, sex of the parasitoid found and clutches from the Stewart's Residence associated with parasitoid information from the growth and development survey conducted at the Stewart's in 2004 including collection date, the bush number sampled, the larval stage parasitized and the number of larvae on each branch.

Sex ratios within clutches were examined at BFE and the Stewart Residence. No apparent sex ratio patterns or changes over time were observed in the clutches (Table 4). The total number of reared females and males of *Hadrotrichodes waukheon* from BFE and the Stewart Residence and the total number of parasitoids emerging singly or gregariously are summarized in Table 5. Predominantly, a single *H. waukheon* adult emerged from one *M. gulosa* host larva. *Hadrotrichodes waukheon* can have up to four parasitoids emerge from one *M. gulosa* larva.

Branch	Location	Host Plant	Clutch Size	Date Collected	Date Emerged	F	M
2	B.F.E.	oleander	Double	6/8/2004	6/20/2004	1	1
3	B.F.E.	oleander	Double	6/15/2004	6/20/2004	1	1
4	B.F.E.	oleander	Double	6/15/2004	6/20/2004	1	1
14	J. Stewart	oleander	Triple	6/15/2004	6/20/2004	3	0
5	B.F.E.	oleander	Double	6/23/2004	6/30/2004	0	2
1	B.F.E.	oleander	Triple	6/23/2004	6/29/2004	1	2
6	B.F.E.	oleander	Double	7/1/2004	7/12/2004	1	1
7	B.F.E.	oleander	Quadruple	7/7/2004	7/11/2004	2	2
8	B.F.E.	oleander	Triple	7/7/2004	7/12/2004	2	1
9	B.F.E.	oleander	Quadruple	7/7/2004	7/14/2004	2	2
10	B.F.E.	oleander	Triple	7/7/2004	7/16/2004	2	1
11	B.F.E.	oleander	Triple	7/14/2004	7/16/2004	2	1
12	B.F.E.	oleander	Triple	7/14/2004	7/16/2004	0	3
13	B.F.E.	oleander	Triple	7/14/2004	7/20/2004	3	0
19	B.F.E.	oleander	Triple	9/15/2004	9/24/2004	2	1
Totals			42			23	19

Table 4. Clutch sizes and sexes within clutches of *Hadrotrichodes waukheon* at BFE and Stewart's on oleander in 2004.

Total number of *Hadrotrichodes waukheon*

71 specimens total

# Females	# Males	# Singles	# Doubles	# Triples	# Quadruples
39	32	29	5	8	2

Table 5. Total number of male and female *Hadrotrichodes waukheon* and quantity in each specific clutch size from BFE and Stewart's oleander in 2004.

Discussion

Pre-release survey

The seven parasitoids found in the six genera of Eulophidae, *Pnigalio*, *Closterocerus*, *Baryscapus*, *Nechrysocharoides*, *Hemiptarsenus* and *Hadrotrichodes*, and one genera of Encyrtidae, *Comperiella*, have not provided sufficient control of *M. gulosa* to date; however, they can give us insights into which biological control agents may work effectively in the system. All of the parasitoids, except one, are in the family Eulophidae making it essential to investigate this family for other possible natural enemies.

A taxonomic database of the family Eulophidae was searched to find other potential natural enemies or see patterns of host use within the family. A digital catalog titled Taxapad (Noyes 2002) was used to compile genera and subfamily names of potential natural enemies. Taxapad (Noyes 2002) contains 20 different families in the hymenopteran superfamily Chalcidoidea with a total of 21,502 species. A total of 4,288 species are in the family Eulophidae. Each species of eulophid was checked to determine if it had leafminers or peelminers recorded as hosts. This list was compiled to determine potential *M. gulosa* and *Phyllocnistis citrella* Stainton natural enemies. *Phyllocnistis citrella*, citrus leafminer, is a microlepidoptera with similar feeding habits to *M. gulosa*. *Phyllocnistis citrella* was first detected in the United States in 1993 in Florida (Heppner 1993; Knapp et al. 1995; Gates et al. 2002) and later detected in the Imperial Valley in 2000 (Guillén et al. 2001). A survey of native parasitoids attacking *P. citrella* in the United States conducted by Gates et al. completed in 2002 showed native parasitoids to be comprised predominantly of eulophids. Since chalcidoid parasitoids of leafmining insects are often generalists, (Askew et al. 1974 and Gates et al. 2002) the parasitoids for *P. citrella* are likely to be similar to the natural enemies for *M. gulosa*. *Marmara gulosa*

has no natural enemies in the San Joaquin Valley that provide population regulation in agroecosystems, making it likely for a new natural enemy to be introduced. This list (Appendix B) of parasitoids shows known host associations, and where these natural enemies might be found. The list is organized according to subfamily and location of the natural enemy. The genus name of the parasitoid is italicized and in bold. Under each genus are the scientific names of the host insect(s), followed by, if possible, its order and family and common name, see Appendix B for complete list.

Several tables have been formed to determine if there are any host use patterns using a hierarchical analysis of the taxonomic data. Eulophids were grouped according to location and host preferences. The eulophids found in California were grouped (Table 6). The biological control agents found native in California may be more adapted to climates such as those in the San Joaquin Valley. Environmental matching is an important consideration in natural enemy releases (Van den Bosch et al. 1973).

The eulophids found in states other than California were grouped (Table 7). Seventeen of the 22 described *Marmara* species are found in the United States (Clemens 1860, 1863; Chambers 1875; Busck 1906, 1909; Bruan 1909; Vinal 1917; Forbes 1923; DeGryse 1943; Fitzgerald 1973, 1975; Davis 1983; Guillén et al. 2001). Other than California, *Marmara gulosa* has only been reported in Arizona (Vinal 1917; Lockwood 1933; Wolgum 1948; Atkins 1961; Atkins 1971; Reeves 1995; Guillén 1999). All of the above factors can be included when considering releases of a new biological control agent.

<i>Achrysocharella</i>	<i>Cirrospilus</i>	<i>Elachertus</i>	<i>Neochrysocharis</i>
<i>Achrysocharis</i>	<i>Closterocerus</i>	<i>Euderus</i>	<i>Pnigalio</i>
<i>Astichus</i>	<i>Diaulinopsis</i>	<i>Hadrotrichodes</i>	<i>Sympiesis</i>
<i>Aulogymnus</i>	<i>Diglyphus</i>	<i>Hyssopus</i>	<i>Zagrammosoma</i>
<i>Chrysocharis</i>			

Table 6. Eulophid genera occurring in California.

<i>Achrysocharoides</i>	<i>Chryptastichus</i>	<i>Hemiptarsenus</i>
<i>Apleurotropis</i>	<i>Citrostichus</i>	<i>Minotetrastichus</i>
<i>Ascotolinx</i>	<i>Colpoclypeus</i>	

Table 7. Eulophids found in states other than California.

Eulophids that only have lepidopteran leafminers and *M. gulosa* as hosts were grouped in Table 8. The eulophids in Table 8 are only known to parasitize leafmining Lepidoptera. Since *M. gulosa* and *P. citrella* are leafmining Lepidoptera, the eulophids in Table 8 may be better adapted to use the two miners as hosts.

Eulophids that have additional hosts to lepidopteran leafminers and *M. gulosa* larvae were grouped (Table 9). The parasitoids in Table 9 are not specialized on *M. gulosa*; the lack of specialization should be considered before releases into new environments are made as the parasitoids may not focus on *M. gulosa* as a host and provide population regulation. *Marmara gulosa* is not found on certain host plant species during certain times of the year. Parasitoids that can use alternate insect hosts and host plants may be able to keep parasitoid populations high enough until *M. gulosa* is available, but using this characteristic alone may not be a good approach.

Table 10 includes the genera of leafmining or peelmining parasitoids, the order of their host(s), and how many different species are in each genus. Table 10 can be used to determine if there are multiple species within a genus that are potential parasitoids of *M. gulosa*, what other hosts may be used, and which genera may parasitize *M. gulosa* or *P. citrella*.

A study of native parasitoid establishment, in Spain, on newly invaded citrus leafminer, *Phyllocnistis citrella*, Vercher et al. (2005) stated all leafminers found on herbaceous plants are dipteran leafminers and all miners found on woody perennials are lepidopteran leafminers. Vercher et al. (2005) says that the majority of parasitoids of *P. citrella* came from leafminers on woody perennials whereas the parasitoids of leafminers from herbaceous plants did not transfer to *P. citrella*. *Marmara gulosa* has hosts of both

woody perennial and herbaceous plant species. The Taxapad database was examined to find which parasitoid species had both lepidopteran and dipteran hosts (Table 11).

Parasitoids that have both lepidopteran and dipteran hosts may be looked at further to see if they can be used as biological control agents of *M. gulosa*.

Several genera of eulophids were chosen for more careful examination to determine if they contain potential biological control agents for use in the San Joaquin Valley. *Hadrotrichodes* is one genus that warrants further research as it is already present in the San Joaquin Valley and is known to attack low density populations of *M. gulosa*. One problem with *Hadrotrichodes* is its apparently sporadic occurrence; following the 2004 observation only one specimen was found in 2006. The next most desirable genera include the following: *Achrysocharella*, *Achrysocharis*, *Chrysocharis*, *Cirrospilus*, *Closterocerus*, *Diaulinopsis*, *Elachertus*, *Hyssopus*, *Pnigalio*, *Sympiesis*, and *Zagrammosoma*. The aforementioned genera are known to be in California and are known to use leaf mining Lepidoptera as hosts. Genera that are already in California may be better adapted to the San Joaquin Valley and increase the possibility the insect will survive as a biological control agent. Parasitoids that are already known to use leaf mining Lepidoptera as hosts may be more adapted to the life habits of *M. gulosa* and therefore be more effective biological control agents. The third most desirable group of genera includes *Mestocharella* and *Proacrias*. These two genera are known to parasitize leaf mining Lepidoptera in the United States in states other than California.

One species in the genus *Citrostichus* Boucek is being considered as a biological control agent for importation from Spain to California. This genus contains only two species. The host list for this genus includes *Phyllocnistis citrella* and *Trioza obsoleta*

(Hemiptera, Triozidae: Jumping plantlice). The distribution is in areas of Asia, India, the Afrotropics, and the Middle East. *Citrostichus phyllocnistoides* Narayanan has been introduced as a biological control agent into Australia, Greece, India, Spain and Florida in 1995, 1997, 1996, 1996 and 1994 respectively (La Salle et al. 1997; Noyes 2002; Vercher et al. 2005).

Genus	Host(s)	# of parasitoid species
<i>Ascotolinx</i>	<i>Phyllocnistis citrella</i> (Lepidoptera:Gracillariidae)	2
<i>Cryptastichus</i>	<i>Phyllocnistis citrella</i> (Lepidoptera:Gracillariidae)	1
<i>Hadrotrichodes</i>	<i>Marmara gulosa</i> (Lepidoptera: Gracillariidae)	1
<i>Mohaniella</i>	Lepidopteran leaf miner	1
<i>Ryhonos</i>	<i>Acrocercops chionosema</i> and <i>Phyllonorycter messaniella</i> (leaf mining Gracillariidae)	1
<i>Sarasvatia</i>	<i>Stigmella ipomoella</i> (Lepidoptera:Nepticulidae)	1
<i>Semielacher</i>	<i>Phyllocnistis citrella</i> (Lepidoptera:Gracillariidae)	2
<i>Zaommomentedon</i>	<i>Phyllocnistis citrella</i> (Lepidoptera:Gracillariidae)	3

Table 8. Eulophids with only Lepidopteran leafminers as a host.

<i>Achrysocharella</i>	<i>Citrostichus</i>	<i>Elachertus</i>	<i>Mestocharella</i>	<i>Quadrastichus</i>
<i>Achrysocharis</i>	<i>Closterocerus</i>	<i>Elasmus</i>	<i>Minotetrastichus</i>	<i>Ratzeburgiola</i>
<i>Achrysocharoides</i>	<i>Colpoclypeus</i>	<i>Galeopsomyia</i>	<i>Neochrysocharis</i>	<i>Shardiella</i>
<i>Apleurotropis</i>	<i>Demmockia</i>	<i>Hemiptarsenus</i>	<i>Proacrias</i>	<i>Stenomesus</i>
<i>Astichus</i>	<i>Diaulinopsis</i>	<i>Horismenus</i>	<i>Omphale</i>	<i>Sympiesis</i>
<i>Aulogymnus</i>	<i>Diglyphus</i>	<i>Hyssopus</i>	<i>Pediobus</i>	<i>Tetrastichomyia</i>
<i>Chrysocharis</i>	<i>Dicladocerus</i>	<i>Kraytoysma</i>	<i>Pleurotroppopis</i>	<i>Tetrastichus</i>
<i>Cirrospilus</i>	<i>Euderus</i>	<i>Meruana</i>	<i>Pnigalio</i>	<i>Trisecodes</i>
				<i>Zagrammosoma</i>

Table 9. Eulophids with additional hosts to Lepidopteran leafminers.

Genus	Host(s)	# of parasitoid species
<i>Achrysocharella</i>	leaf mining Coleoptera, Diptera, Lepidoptera, & Hymenoptera	45
<i>Achrysocharis</i>	leaf mining Coleoptera, Diptera, and Lepidoptera	63
<i>Achrysocharoides</i>	larva of Lepidoptera in concealed situations and a Diptera (Tachinidae)	59
<i>Chrysocharis</i>	leaf mining Diptera, Lepidoptera, & Hymenoptera	63
<i>Cirrospilus</i>	hosts hidden in plant tissue (miners, rollers, and galls)	24
<i>Closterocerus</i>	leaf mining Diptera, Lepidoptera, & Hymenoptera	125
<i>Diaulinopsis</i>	leaf mining Diptera and Lepidoptera	5
<i>Diglyphus</i>	leaf mining Diptera	52
<i>Elachertus</i>	larva of Lepidoptera in concealed situations	186
<i>Hemiptarsenus</i>	leafminers, mostly Diptera	67
<i>Hyssopus</i>	larva of Lepidoptera in concealed situations	18
<i>Meruana</i>	leaf mining Diptera	4
<i>Mestocharella</i>	leaf mining Coleoptera, Diptera, and Lepidoptera	11
<i>Minotetrastichus</i>	leaf mining Coleoptera and Hymenoptera	16
<i>Pnigalio</i>	leaf mining Coleoptera, Diptera, and Lepidoptera	99
<i>Proacrias</i>	leaf mining Coleoptera, Diptera, and Lepidoptera	7
<i>Shardiella</i>	Agromyzid miners	1
<i>Sympiesis</i>	leaf mining Coleoptera and Lepidoptera	195
<i>Zagrammosoma</i>	leaf mining Diptera and Lepidoptera	26

Table 10. The genus of parasitoids with mining hosts in addition to Lepidoptera, the hosts they are found on, and the number of species within each genus.

<i>Pnigalio flavipes</i>	<i>Sympiesis sericeicornis</i>	<i>Closterocerus lyonetiae</i>
<i>Pnigalio maculipes</i>	<i>Sympiesis xanthostoma</i>	<i>Closterocerus tekensis</i>
<i>Pnigalio minio</i>	<i>Hemiptarsenus ornatus</i>	<i>Closterocerus trifasciatus</i>
<i>Pnigalio crassinervis</i>	<i>Hemiptarsenus unguicellus</i>	<i>Closterocerus utahensis</i>
<i>Diglyphus isaea</i>	<i>Hemiptarsenus zilahisebessi</i>	<i>Closterocerus violaceus</i>
<i>Diglyphus minoeus</i>	<i>Closterocerus cinctipennis</i>	
<i>Sympiesis acalle</i>	<i>Closterocerus germanicus</i>	

Table 11. The genus and species of parasitoids with both dipteran and lepidopteran hosts.

Cirrospilus coachellae releases

Cirrospilus coachellae appears to be an excellent disperser, as all recoveries have been observed away from release points (Speidel 2004). The larger the release group of *C. coachellae*, the more likely there will be observable parasitism (Speidel 2004). Efforts to conduct releases of *C. coachellae* have been hindered by *M. gulosa* colony problems and the limited numbers of *C. coachellae* produced for releases. *Marmara gulosa* has been difficult to rear on citrus fruit due to the lack of suitable fruit for oviposition throughout the year as well as citrus fruit becoming desiccated to the point where *M. gulosa* cannot survive (B. Grafton-Cardwell and Y. Ouyang, pers. comm. 2004). *Marmara gulosa* has been successfully reared on zucchini throughout the year, but *C. coachellae* only does well for two generations and then the number of parasitoids drops significantly until the colony dies out (B. Grafton-Cardwell and Y. Ouyang, pers. comm. 2005). The reason for the decline in *C. coachellae* numbers is unknown. Due to the lack of parasitoids being reared, release numbers were small and have not been as wide spread as was hoped for the past five field seasons. There is a possibility that other species from the family Eulophidae were in the vials of field collected parasitoids from Neil Smart. The other species released was most likely *Closterocerus utahensis* Crawford.

Cirrospilus coachellae may not be able to establish in the San Joaquin Valley due to its relatively high lower developmental threshold. Guillén et al. (2003) showed the lower developmental threshold for *C. coachellae* to be at 14.1°C and the upper developmental threshold to be at 36.7°C. The average high during summer in the San Joaquin Valley is 35.9°C while the average low for the winter is 2°C. After two field seasons of monitoring, 2002-2004, there have been no recoveries of *C. coachellae* after

the winter season. The average low in the San Joaquin Valley is lower than the lower developmental threshold of *C. coachellae* and may be why the parasitoid has not been able to establish. *Cirrospilus coachellae* however; may be a good parasitoid for augmentative biological control.

A pheromone lure for *M. gulosa* has been developed by Dr. Jocelyn Millar at the University of California, Riverside. Pheromone lures have been field tested in the San Joaquin Valley by Beth Grafton-Cardwell and her staff as well as by David Headrick and his graduate students from the end of 2003 to the present. Effective pheromone trapping of *M. gulosa* will allow growers and PCA's to know when adult flights occur and therefore make releases of *C. coachellae* more effective.

Oleander, *Nerium* spp. Monitoring

The oleander studies conducted at BFE and the Stewart Residence show larval development relative to parasitism and general population dynamics of *M. gulosa*. The growth and development graph from BFE oleander (Fig. 7) shows the first instar larvae increasing from week four until a decline began at week eight, extending to week ten. On July 1, 2004 (week 11) the numbers of first instar larvae increased for a second time. The second increase of first instar larvae on July 1, 2004 may indicate a second flight generation. *Marmara gulosa* is multivoltine, meaning it produces more than one generation in a year. Each generation requires a certain amount of accumulated degree days to complete a lifecycle from egg to adult. A second flight would indicate a second generation of *M. gulosa* larvae becoming adults that are able to reproduce and lay eggs. The third instar larvae showed a relatively large increase in number on July 7, 2004 (week 12). However, the oleander branches were heavily mined at this point in time

making distinction between mines and mine sizes difficult. Thus, the number of third instar larvae may be high due to lumping with fourth instar larvae. On July 1, 2004 the first observation of parasitoid pupae was recorded. The increase in the number of individual parasitoid pupae correlated with the increase of the number of individual fourth instar *M. gulosa* larvae. *Hadrotrichodes waukheon* adults parasitized fourth instar *M. gulosa* larvae most frequently (Fig.8), and the way the population curves of *H. waukheon* and *M. gulosa* relate to each other supports this evidence.

At the Stewart's Residence (Fig. 10) trends in larval development were observed. The first week, May 5, 2004, the number of first instar larvae was at the highest level during the study and decreased gradually to zero by week five, June 2, 2004. On June 15, 2004, week six, the number of individual first instar larvae increased from zero to two. The small number of samples prevents making any definitive conclusions, but may indicate another generation as the timing is similar to BFE. Parasitoid pupae were first observed on June 23, 2004, week seven. An increase in third instar larvae occurred on July 1, 2004, week eight. Oleander branches were heavily mined at this time making it difficult to distinguish between individual mines and mine size, which is used to estimate the larval instar. Thus, some third and fourth instars may have inadvertently been lumped together. The results indicated that the number of individual parasitoid pupae closely followed the number of individual fourth instar *M. gulosa* larvae observed (Fig. 8 & 11).

According to Guillén et al. (2003) the preliminary lower developmental threshold for *M. gulosa* is 14.1° C. Based on the lower developmental threshold and the 30 year historical averages for temperature, a degree day model was developed to predict adult flights and therefore generations. The adult flights occur at 580, 1160, 1740, 2320, 2900,

and 3480 degree days calculated in Fahrenheit degrees (B. Grafton-Cardwell 2005). A single sine degree day calculator in Fahrenheit was set up by Greg Montez, UCKAC, using 58° F for the lower developmental threshold with no upper developmental limit. Weather data was used from the Lindcove field station for 2004. According to the degree day information, parasitism occurred between the second and third *M. gulosa* flights in 2004. Parasitism activity between the second and third *M. gulosa* flights is logical for two reasons. First, because there is a greater abundance of late instar *M. gulosa* larvae. Secondly, it takes time for the parasitoids to find their hosts and build up numbers. Asynchronicity of pest/parasitoid complexes are common in SJV, for example California red scale and *Aphytis melinus*. *Hadrotrichodes waukheon* are idiobiont parasitoids, meaning they permanently paralyze or kill their host once the host has been parasitized. Personal observation of the host while rearing the parasitoids showed the *M. gulosa* larvae do not move once parasitized. The stage the larva is in when parasitized is the same stage when sampled.

Parasitism on Oleander

The gregarious parasitoid, *Hadrotrichodes waukheon*, was reared from *M. gulosa* larvae on oleander and on Melogold grapefruit. Curated *H. waukheon* specimens at UC Riverside were reared from *M. gulosa* larvae on grapefruit by Marta Guillén in 2003. In our studies, one to four adult *H. waukheon* were observed to emerge from one *M. gulosa* larva on oleander. The quantity of *H. waukheon* that emerged from *M. gulosa* larvae on grapefruit was not noted by Guillén. *Hadrotrichodes waukheon* can be distinguished from other parasitoid pupae by meconial position (Fig. 17). Meconial deposits are

formed into two, oval-shaped pellets, one on either side of the base of the pupa.

Hadrotrichodes waukheon appears to be an ectoparasite of *M. gulosa* larva. From our samples *H. waukheon* parasitized third through fifth instar peelminer larvae with fourth instar larvae being the most predominantly parasitized (Fig. 8 and Fig. 11). The possibility that *H. waukheon*, already present in the San Joaquin Valley, could be used as a biological control agent makes a complete description of this eulophid essential.

Figure 17. *Hadrotrichodes waukheon* meconial pellet arrangement.

There was an average of 6.65% parasitism of *M. gulosa* at BFE and an average of 12% parasitism of *M. gulosa* at the Stewart's residence in 2004. Percent parasitism in 2004 at BFE calculated weekly ranged from 5.1 to 18.2%. Parasitism began on June 26, 2004 and gradually increased until the end of the study. Parasitism levels steadily increased as the most desirable *M. gulosa* stages increased, third through fifth instars (Figs. 7 & 9). Percent parasitism calculated weekly at Stewart's Residence in 2004 ranged from 9.1 to 45%. Parasitism levels directly followed the *M. gulosa* population levels (Figs. 10 & 12) once parasitism began. Previous to 2004 no parasitoids had been recorded attacking *M. gulosa* on oleander. Possible reasons why *H. waukheon* was found parasitizing *M. gulosa* on oleander in 2004 include the following: *Hadrotrichodes waukheon* may be a generalist parasitoid in the San Joaquin Valley that found *M. gulosa* to be a suitable host in 2004. Members of the superfamily Chalcidoidea that parasitize leafminers are usually generalists with respect to the hosts they are associated with (Askew et al. 1974 and Gates et al. 2002). Parasitoids that permanently paralyze or kill their host during attack, idiobionts, are usually generalists as well (Askew and Shaw 1974 and Gates et al. 2002). *Hadrotrichodes waukheon* exhibits both these generalist traits.

In 2005 there was a rapid and sustained temperature increase in the the San Joaquin Valley during the second flight of *M. gulosa* moths. The high temperatures resulted in larval mortality of *M. gulosa* (Melissa O'Neal, pers. comm. 2005). The lack of suitable hosts for *H. waukheon* may have contributed to its localized disappearance. The September 8, 2005 search by two people for *H. waukheon* on oleander for ca. 20 minutes at both BFE and the Stewart Residence yielded no observations of *H. waukheon*. The reason for this may be due to high temperatures killing the larvae of *M. gulosa* when

H. waukheon may have begun to establish (Figure 18). According to the growth and development studies conducted on oleander in 2004 (Figs. 7 & 10), *H. waukheon* parasitized *M. gulosa* between the second and third flights of adult *M. gulosa* moths when many third and fourth instar larvae were present in 2004.

Figure 18. Average high temperatures from March through December for 2003, 2004 and 2005 at the Lindcove Field Station.

The Origin of *Marmara gulosa*

According to a literature review by Cornell and Hawkins (1993), parasitism is usually lower on introduced insect herbivores than native insect herbivores. Native parasitoids species can parasitize introduced herbivores, but the diversity of parasitoids is always greater in the native area of the introduced herbivore (Cornell et al. 1993 and Schönrogge et al. 1995). An example of parasitoid diversity being lower in areas not native to an insect herbivore is with *Phyllocnistis citrella* Stainton (Lepidoptera: Gracillariidae). *Phyllocnistis citrella* is a widespread herbivorous pest from southeast Asia (Heppner 1993 and La Salle et al. 1997) that has spread to areas of the Mediterranean, South and Central America and the United States (Cornell et al. 1993 and Schönrogge et al. 1995). None of the areas where *P. citrella* has been introduced has a greater diversity of parasitoids than its area of origin in Asia. However, the parasitoid information from Cornell et al. (1993) and Schönrogge et al. (1995) do not fit with the origin hypothesis of *M. gulosa* being aggressive on citrus in California. If the origin of *M. gulosa*, aggressive on citrus, is from Mexico, the parasitoid complex should be more diverse in Mexico than in the San Joaquin Valley. Dr. Headrick, Sage Finch, and Paul Semet have yet to observe this in four separate visits to Mexico over three years. When Dr. Headrick, Sage Finch, and Paul Semet went to Mexico, there was little evidence of parasitism and *M. gulosa* was hard to find on citrus. In November of 2002 a research trip inspecting 13 field sites in Mexico showed little *M. gulosa* damage in a Ruby Red grapefruit orchard, two citrus orchards, and a willow grove near an orchard. No mining damage was observed on tree tobacco and only a few parasitoids were found. In September of 2003 nine field sites were observed in Mexico. Overall *M. gulosa* damage

was low. One person observed four infested fruit in one hour at one orchard, and in two orchards with one person searching observed eight infested fruit in an hour. An empty solitary parasite pupa in an old *M. gulosa* larva was observed on grapefruit. On November 3, 2004 a Rio Red grapefruit orchard was examined in Mazocoba, Mexico. Only one in ten trees had mining activity on one to three fruit with no parasitism observed. On November 4, 2004 near La Ciudad de Obregon approximately 70 *M. gulosa* larvae were collected on oleander with no observations of parasitism. From observations in Mexico and the San Joaquin Valley, parasitoid complexes are greater in the San Joaquin Valley. Observations by graduate students and staff at UC Riverside show parasitoid complexes to be greater in the Coachella Valley (Guillén 2003, K. Godfrey and P. Semet, pers. comm. 2004) than the San Joaquin Valley. Based on parasitoid diversity alone the suggested center of origin for *M. gulosa* is in the Coachella Valley; however, additional information including genetic studies, will be necessary to fully determine the area of origin of *M. gulosa*.

Beth Grafton-Cardwell, her staff, Dr. Headrick, and his graduate students, and students and staff at UC Riverside collected *M. gulosa* from Mexico, the San Joaquin Valley, and the Coachella Valley on oleander, pepper, willow, grapefruit, cotton, Amaranthus, red globe grape, Fukumoto navels, Powell oranges, wisteria, and zucchini for genetic studies. The cytochrome oxidase (COI) ribosomal gene region codes for proteins and is highly conserved. For this reason it is used to discern differences in insects at the species level (D. Vickerman, unpublished data). According to the genetic studies conducted by Vickerman and Van Nort the COI gene region shows samples of *M.*

gulos from Mexico and the San Joaquin Valley to be the same, but different from *M. gulos* in the Coachella Valley.

Oleander is a host plant in the San Joaquin Valley and evidence of mining on the thick woody growth indicates mining activity was present for at least ten years if not longer based on scars observed on trunks 10.2-15.2 centimeters thick. Two PCA's, Jim Stewart and Jim Gorden (pers. comm. 2002) reported that *M. gulos* has been in the San Joaquin Valley for a long time and has been an occasional sporadic pest. Genetic studies showed *M. gulos* on oleander with old scarring to be identical to *M. gulos* on navels, grapes, peppers, and grapefruit (D. Vickerman, unpublished data 2005). The expectation is that there should be some distinction between strains of *M. gulos* on oleander and willow and the new host plants, like citrus or bell pepper, if *M. gulos*, aggressive on citrus, is truly an introduced pest population. Current genetic studies showed *M. gulos* to be identical on all host plants from the San Joaquin Valley and Mexico but different from *M. gulos* in the Coachella Valley (D. Vickerman, unpublished data 2006). A possible reason for *M. gulos* in the San Joaquin Valley to be the same as found in Mexico is the citrus aggressive *M. gulos* may have been able to out compete *M. gulos* populations native to the San Joaquin Valley. The lack of parasitoid diversity in Mexico confounds the idea that *M. gulos* aggressive on citrus was imported from Mexico. A greater degree of testing will be required to determine if the San Joaquin Valley *M. gulos* is a "native invasive," an insect native to the system that expands its host range and becomes a pest or an invasive strain from Mexico whose ultimate origin may be unknown. Powell (1980) did find that Microlepidoptera, including Gracillariidae, have expanded their host range onto at least 70 different plant families. Oviposition mistakes,

escape from natural enemies, and/or unsuitable conditions or locations of original host plants could lead to the host range expansion (Jaenike 1990; Thompson et al. 1991; Pilson 1999). Pilson (1999) says that if a novel host plant allows escape from parasitism, and the benefit of escaping parasitism outweighs any physiological difficulty, the insect may adapt to the novel host plant, then the escape from natural enemies will encourage host range expansion. *Marmara gulosa* has incorporated many new and chemically diverse host plants into its diet. Thus far *M. gulosa* has escaped a level of parasitism which has decreased population levels. Jaenike (1990) argues that there is little evidence which supports the theory that escape from natural enemies has an effect on increased diet breadth. While it seems *M. gulosa* has escaped natural enemies that are able to decrease their populations in the San Joaquin Valley, there is no conclusive evidence that escape from natural enemies is the reason *M. gulosa* expanded its host range.

Improved Methods for Rearing and Curation

A total of 14 parasitoids, other than *H. waukheon*, were reared from citrus. Approximately 40 parasitoids were collected, but many did not emerge or were lost. A better way to rear parasitoids from citrus would be to dissect the parasitoid out of the rind and put it into a small glass vial (Guillén 1999 and Speidel 2004). The vial should be closed with a piece of cotton and have a small line of honey put on the side of the vial as a food source (Guillén 1999 and Speidel 2004).

The reason for the poor preservation of the *H. waukheon* specimens from oleander was due to improper killing methods and improper use of HMDS. Parasitoids need to be killed in 70-80% EtOH (J. Heraty et al. 1998). Specimens then need to be dehydrated to 100% EtOH by transferring them into increasing concentrations of EtOH in 10%

increments for ½ hour each (D. Headrick, pers. comm. 2005). Once the specimens are dehydrated to 100% EtOH, the EtOH needs to be replaced by HMDS and soaked twice for ½ hour each time in a covered glass vial or dish (Heraty et al. 1998). After the second soak, the remaining HMDS is poured off and the specimen needs to be put under a fume hood until thoroughly dried (Heraty et al. 1998). A brass screen can be placed over the vial or dish to keep the specimen(s) in the container (Heraty et al. 1998). Safety precautions using HMDS should be followed according to the label. Specimens then need to be card mounted using diluted white glue or shellac gel (J. Heraty, pers. comm. 2004 and R. Burkes, pers. comm. 2004).

Search for Natural Enemies on Host Plants Other Than Citrus and Oleander

The single parasitoid collected from cotton was not externally visible; this may mean that there are other parasitoids in the system that have gone unnoticed. This discovery warrants further investigation of parasitoids on host plants other than oleander and citrus. A possible way to obtain parasitoids not visible externally is to carefully open mines of *M. gulosa* larvae on host plants and look for parasitoid pupae or collect plant material and wait for parasitoid emergence.

Sex Ratios, Clutch Sizes, and Frequency of Parasitism on Oleander

Sex ratios are extremely variable among insects exhibiting haplodiploidy (Doutt 1964). At the Stewart Residence the occurrence of more females than males at the beginning of the season followed later in the season by more males than females may be indicative of a pattern. Sex ratios may provide insight into how well established the natural enemies are in an area or if there is some sort of environmental change being

reflected in sex ratios (Wrench et al. 1993 and Otto et al. 2001). In laboratory studies Guillén et al. (2003) found *C. coachellae* to be female biased for 23 days and then male biased after that time. No explanation was provided as to why this occurred; there were no obvious environmental changes. Sex ratios of *H. waukheon* were unknown previous to 2004. *Hadrotrichodes waukheon* populations that are first observed to exploit a new host may start by producing predominantly females and switch to producing more males. The progression of the field season (changes in day length) could trigger a response in females to produce more males. Also, size and quality of the host may influence the number of males produced.

Cultural Control Methods

Cultural control methods may help, but probably can not control populations of *M. gulosa* alone. Since we know *M. gulosa* is attracted to certain varieties of navels, grapefruit, and pummelos, these susceptible citrus varieties should be avoided when planting a new grove. *M. gulosa* has many host plants (Guillén 1999; Guillén et al. 2001; Speidel 2002). A grower may be able to decrease *M. gulosa* populations by removing host plants around the area (Reeves 1995). Ornamental oleander bushes are a host for *M. gulosa*, but have just recently been discovered as a source for natural enemies. Removing oleander bushes may take away possible sources of infestations of *M. gulosa*, but may also remove an important source for natural enemies, like *H. waukheon*.

Marmara gulosa may overwinter or pupate on leaf litter in citrus. Removing the leaf litter underneath trees will take away a possible place for the *M. gulosa* to overwinter and/or pupate. Sucker growth on citrus trees provides a continuous resource upon which *M. gulosa* will feed. Removing all suckers on the tree would take away another resource

for *M. gulosa* to consume. Removing all fruit upon harvest is also a good way to prevent overwintering sites (Grafton-Cardwell, pers. comm. 2003).

Conclusions

Knowledge about the biology of a pest is essential to create an effective biological control plan. Lack of knowledge about generation times, host shifting, and migration make it very difficult to formulate an effective plan to control *M. gulosa*. The degree day models, currently being worked on by Melissa O'Neal, effective pheromone lures for trapping, and predictions on when and which host plants will be targeted will help formulate an integrated management plan. When flight times are determined with the use of pheromone lures, parasitoids such as *C. coachellae* can be augmentatively released. Knowledge of host plant preferences of *M. gulosa* throughout the season would allow parasitoids to be released into areas where they are most effective.

Natural enemies remain a viable option for control of *M. gulosa* populations. *Cirrospilus coachellae* has not been observed to overwinter in the San Joaquin Valley, but may be used in an augmentative biological control program. *Hadrotrichodes waukheon* may be a viable biological control agent for control of *M. gulosa* populations. *Hadrotrichodes waukheon* may be able to be reared on *M. gulosa* laboratory colonies and be released onto citrus. The lack of appearance of *H. waukheon* in 2005 prevented rearing efforts. Since *H. waukheon* may be a generalist parasitoid it might have problems in an augmentative biological control program. In a study of generalist parasitoids versus specialized parasitoids of the cassava mealybug, a generalist parasitoid was able to disperse and better search for the cassava mealy bug than a specialized parasitoid (Bertschy et al. 2001). A generalist parasitoid used in an augmentative biological control program is *Aphytis melinus* (Hymenoptera: Aphelinidae) (Flint et al. 1998). *Aphytis melinus* parasitizes several species of armored scales (Flint et al. 1998). *Aphytis melinus*

is used in commercial settings to control California Red Scale, *Aonidiella aurantii* (Maskell), (Homoptera: Diaspididae) (Flint et al. 1998). Despite the fact that *A. melinus* is a generalist, it is still an effective biological control agent against specific pests. A generalist can find different food sources throughout the year keeping population numbers up, and may provide control of other insect pests. The only way to determine the efficacy of *H. waukheon* would be to perform host specificity tests.

The study by Vercher et al. (2005) on the recruitment of native natural enemies from woody perennials for *P. citrella* concludes that the parasitoids from hosts on the woody perennials did not provide sufficient control of the newly invaded pest. Even though ten different native parasitoids were observed parasitizing *P. citrella* (Vercher et al. 2005), there was not sufficient control and a classical biological control program was thus implemented. In a contrasting study, La Salle et al. (1997) stated that areas in the New World invaded by *P. citrella* were controlled the same or better with native parasitoids than with the introduced parasitoid, *Ageniaspis citricola* Logvinovskaya (Hymenoptera: Encyrtidae). There have been ca. 80 parasitoid species that have been reared from *P. citrella* world wide and many of them have moved onto *P. citrella* as it has dispersed into new areas (Schauff et al. 1998). New parasitoids of *P. citrella* may transfer to *M. gulosa* since they are both graminivorous moths, share some of the same host plants and chalcidoid parasitoids of leafmining insects are often generalists (Askew et al. 1974 and Gates et al. 2002).

Appendix A. Maps of field locations in the San Joaquin Valley.

Map 1. Peterson Ranch

Map 2. Stutsman Ranch

Map 4. Stewart Residence

Jim Stewart's residence

Map 5. Kaweah River site

Map 6. Burt Quezada Ranch

Burt Quesada Ranch

Map 7. Muller Walnut Ranch

Muller Walnuts, Visalia

Appendix B. Compiled List of Natural Enemies

Subfamily Eulophinae in CA

Cirrospilus

Compared with: *Aulogymnus*; *Diaulinopsis*; *Diglyphus*; *Zagrammosoma*

Hosts:

Achrysocharoides splendens – Hymenoptera, Eulophidae
Acrocercops bifasciatus – Lepidoptera, Gracillariidae
Ageniaspis citricola – Hymenoptera, Encyrtidae
Agromyza albipennis – Diptera, Agromyzidae
Agromyza alnivora – Diptera, Agromyzidae
Agromyza demeijerei – Diptera, Agromyzidae
Agromyza frontella – Diptera, Agromyzidae: Alfalfa blotch leafminer
Agromyza nana – Diptera, Agromyzidae
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Argyresthia freyella – Lepidoptera, Argyresthiidae: Arborvitae leafminer
Argyresthia thuiella – Lepidoptera, Argyresthiidae: Arborvitae leafminer
Aleiodes pallidator – Hymenoptera, Braconidae
Amauromyza populicola – Diptera, Agromyzidae
Andricus nudus – Hymenoptera, Cynipidae: Malpighi's gall causer
Aprostocetus leucopterae – Hymenoptera, Eulophidae
Archips argyrospila – Lepidoptera, Tortricidae: Fruittree leafroller
Archips semiferanus – Lepidoptera, Tortricidae: Oak leafroller
Arge berberidis – Hymenoptera, Argidae: Barberry sawfly
Arge pectoralis – Hymenoptera, Argidae: Birch sawfly
Arge similes – Hymenoptera, Argidae
Aspilapteryx limosella – Lepidoptera, Gracillariidae
Aulagromyza hendeliana – Diptera, Agromyzidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Aylax papaveris – Hymenoptera, Cynipidae
Aylax rhoeadis – Hymenoptera, Cynipidae
Bactrocera oleae – Diptera, Tephritidae: Olive fruit fly
Bedellia somnulentella – Lepidoptera, Lyonetiidae: Sweet potato leaf miner
Bucculatrix ainsliella – Lepidoptera, Bucculatricidae: Oak skeletonizer
Bucculatrix canadensisella – Lepidoptera, Bucculatricidae: Birch skeletonizer
Bucculatrix cantabricella – Lepidoptera, Bucculatricidae
Bucculatrix crataegi – Lepidoptera, Bucculatricidae
Bucculatrix pomifoliella – Lepidoptera, Bucculatricidae: Ribbed cocoon maker
Bucculatrix thurberiella – Lepidoptera, Bucculatricidae: Cotton leaf perforator
Caliroa cerasi – Hymenoptera, Tenthredinidae: Pear sawfly
Callisto denticulella – Lepidoptera, Gracillariidae
Caloptilia elongella – Lepidoptera, Gracillariidae
Caloptilia mongolicae – Lepidoptera, Gracillariidae
Calycomyza humeralis – Diptera, Agromyzidae: Aster leafminer
Cameraria cincinnatiella – Lepidoptera, Gracillariidae: Gregarious oak leafminer
Cedestis subfasciella – Lepidoptera, Yponomeutidae
Cephaloglypta murinanae – Hymenoptera, Ichneumonidae

Cerodontha dorsalis – Diptera, Agromyzidae: Grass sheathminer
Cerodontha fulvipes – Diptera, Agromyzidae
Ceutorhynchus contractus – Coleoptera, Curculionidae: Cabbage leaf weevil
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm
Choristoneura pinus – Lepidoptera, Tortricidae: Pitch pine budworm or Jack pine budworm
Chromatomyia fuscula – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia lonicerae – Diptera, Agromyzidae
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia periclymeni – Diptera, Agromyzidae
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Chrysocharis nautia – Hymenoptera, Eulophidae
Chrysoesthia bosae – Lepidoptera, Gelechiidae
Chrysoesthia sexguttella – Lepidoptera, Gelechiidae
Coccidiphaga scitula – Lepidoptera, Noctuidae
Coleophora binderella – Lepidoptera, Coleophoridae
Coleophora ibipennella – Lepidoptera, Coleophoridae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol case bearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora serratella – Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Copidosoma deceptor – Hymenoptera, Encyrtidae
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Cosmopterix attenuatella – Lepidoptera, Cosmopterigidae
Cosmopterix pulchrimella – Lepidoptera, Cosmopterigidae
Cotesia euchaetis – Hymenoptera, Braconidae
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia melanoscela – Hymenoptera, Braconidae
Dolichogenidea californica – Hymenoptera, Braconidae
Ectoedemia albifasciella – Lepidoptera, Nepticulidae
Ectoedemia heringella – Lepidoptera, Nepticulidae
Ectoedemia occultella – Lepidoptera, Nepticulidae
Elachista argentella – Lepidoptera, Elachistidae
Elachista cerusella – Lepidoptera, Elachistidae
Emmetia angusticolella – Lepidoptera, Tischeriidae
Eriocrania sparrmannella – Lepidoptera, Eriocraniidae
Eriophyes caulobius – Acari, Eriophyidae
Euleia heraclei – Diptera, Tephritidae: Celery fly
Euproctis phaeorrhoea – Lepidoptera, Lymantriidae: Browntail or brown-tail moth
Exoteleia dodecella – Lepidoptera, Gelechiidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer

Gambrus extrematis – Hymenoptera, Ichneumonidae
Glyptapanteles liparidis – Hymenoptera, Braconidae
Gonipterus scutellatus – Coleoptera, Curculionidae: Eucalptus weevil
Gracillaria limosella – Lepidoptera, Gracillariidae
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Gregopimpla kuwanae – Hymenoptera, Ichneumonidae
Heterarthrus aceris – Hymenoptera, Tenthredinidae
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Holocacista rivillei – Lepidoptera, Heliozelidae
Hyalophora cecropia – Lepidoptera, Saturniidae: Cecropia moth
Laothoe populi – Lepidoptera, Sphingidae: Poplar hawk-moth
Leucoptera coffeina – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coronillae – Lepidoptera, Lyonetiidae
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Leucoptera spartifoliella – Lepidoptera, Lyonetiidae: Broom twimoth or twig-mining moth
Liriomyza pseudopygmina – Diptera, Agromyzidae
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy moth
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Lyonetia prunifoliella – Lepidoptera, Lyonetiidae
Marmara gulosa – Lepidoptera, Gracillariidae: Citrus peelminer
Massalongia betulifolia – Diptera, Cecidomyiidae
Messa hortulana – Hymenoptera, Tenthredinidae
Metallus gei – Hymenoptera: Tenthredinidae
Meteorus versicolor – Hymenoptera, Braconidae
Metopomyza scutellata – Diptera, Agromyzidae
Metriochroa inferior – Lepidoptera, Gracillariidae
Metriochroa latifoliella – Lepidoptera, Gracillariidae: Small olive leafminer
Metriochroa neglecta – Lepidoptera, Gracillariidae
Misumenops tricuspidatus – Aranea, Thomisidae: Crab spider
Napomyza xylostei – Diptera, Agromyzidae
Nematus desantisi – Hymenoptera, Tenthredinidae
Nematus salicis – Hymenoptera, Tenthredinidae: Large willow sawfly or willow sawfly
Neuroterus numismalis – Hymenoptera, Cynipidae
Neuroterus quercusbaccaru – Hymenoptera, Cynipidae
Ocnerostoma friesei – Lepidoptera, Yponomeutidae
Ocnerostoma pinariellum – Lepidoptera, Yponomeutidae: Ermine moth
Onchocephala montivaga – Coleoptera, Chrysomelidae

Parafomoria helianthemella – Lepidoptera, Nepticulidae
Parornix anguliferella – Lepidoptera, Gracillariidae
Parornix devoniella – Lepidoptera, Gracillariidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parornix persicella – Lepidoptera, Gracillariidae
Parornix petiolella – Lepidoptera, Gracillariidae
Pectinophora gossypiella – Lepidoptera, Gelechiidae: Pink bollworm
Pholetesor circumscriptus – Hymenoptera, Braconidae
Phylacteophaga eucalypti froggatti – Hymenoptera, Pergidae: Leafblister sawfly, leaf-
 blister sawfly, or eucalyptus leafmining sawfly
Phyllocnistis citrella – Lepidoptera, Gracillariidae: citrus leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or
 Aspen leafminer
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllocnistis unipunctella – Lepidoptera, Gracillariidae: Poplar leafminer
Phyllonorycter abrasella – Lepidoptera, Gracillariidae
Phyllonorycter acerifoliella – Lepidoptera, Gracillariidae
Phyllonorycter agilella – Lepidoptera, Gracillariidae
Phyllonorycter anderidae – Lepidoptera, Gracillariidae
Phyllonorycter bicinctella – Lepidoptera, Gracillariidae
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter comparella – Lepidoptera, Gracillariidae
Phyllonorycter connexella – Lepidoptera, Gracillariidae
Phyllonorycter coryli – Lepidoptera, Gracillariidae: Nut leaf blister moth
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella – Lepidoptera, Gracillariidae: Apple blotch leafminer
Phyllonorycter cytisella – Lepidoptera, Gracillariidae
Phyllonorycter cytisifoliae – Lepidoptera, Gracillariidae
Phyllonorycter delitella – Lepidoptera, Gracillariidae
Phyllonorycter distentella – Lepidoptera, Gracillariidae
Phyllonorycter dubitella – Lepidoptera, Gracillariidae
Phyllonorycter fagifolia – Lepidoptera, Gracillariidae
Phyllonorycter hancola – Lepidoptera, Gracillariidae
Phyllonorycter helianthemella – Lepidoptera, Gracillariidae
Phyllonorycter kleemannella – Lepidoptera, Gracillariidae
Phyllonorycter lantanella – Lepidoptera, Gracillariidae
Phyllonorycter leucocorona – Lepidoptera, Gracillariidae
Phyllonorycter longispinata – Lepidoptera, Gracillariidae
Phyllonorycter maestingella – Lepidoptera, Gracillariidae
Phyllonorycter malella – Lepidoptera, Gracillariidae: Apple tentiform leafminer or
 spotted tentiform leafminer
Phyllonorycter manni – Lepidoptera, Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter nicellii – Lepidoptera, Gracillariidae

Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter pastorella – Lepidoptera, Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter platanoidella – Lepidoptera, Gracillariidae
Phyllonorycter pomifoliella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter propinquella – Lepidoptera, Gracillariidae: Cherry blotchminer
Phyllonorycter pyrifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter rajella – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter sagitella – Lepidoptera, Gracillariidae
Phyllonorycter salicifoliella – Lepidoptera, Gracillariidae: Aspen blotch leaf miner
Phyllonorycter saliciphaga – Lepidoptera, Gracillariidae
Phyllonorycter salictella – Lepidoptera, Gracillariidae
Phyllonorycter saportella – Lepidoptera, Gracillariidae
Phyllonorycter schreberella – Lepidoptera, Gracillariidae
Phyllonorycter similis – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter sorbicola – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter spinolella – Lepidoptera, Gracillariidae
Phyllonorycter strigulatella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tremulae – Lepidoptera, Gracillariidae
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter tristrigella – Lepidoptera, Gracillariidae
Phyllonorycter turanica – Lepidoptera, Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phytoliriomyza jacarandae – Diptera, Agromyzidae: Jacaranda leafminer
Phytoliriomyza variegata – Diptera, Agromyzidae
Phytomyza angelicae – Diptera, Agromyzidae
Phytomyza artemisivora – Diptera, Agromyzidae
Phytomyza chaerophylli – Diptera, Agromyzidae
Phytomyza citisi – Diptera, Agromyzidae
Phytomyza heringiana – Diptera, Agromyzidae
Phytomyza obscurella – Diptera, Agromyzidae
Phytomyza orobanchia – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Psigalis soemius – Hymenoptera, Eulophidae
Poecilocapsus lineatus – Hemiptera, Miridae: Yellow or orange leaf bug
Polyconia spinicornis – Coleoptera, Chrysomelidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Profenusa pygmaea – Hymenoptera, Tenthredinidae
Psacaphora raschkiella – Lepidoptera, Momphidae

Recurvaria leucatella – Lepidoptera, Gelechiidae: Lesser budmoth
Rhamphus oxyacanthae – Coleoptera, Curculionidae
Rhamphus pulicarius – Coleoptera, Curculionidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus fagi – Coleoptera, Curculionidae
Rynchaenus galloisi – Coleoptera, Curculionidae
Rynchaenus japonicus – Coleoptera, Curculionidae
Rynchaenus populi – Coleoptera, Curculionidae
Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Rynchaenus rusci – Coleoptera, Curculionidae
Rynchaenus salicis – Coleoptera, Curculionidae
Rynchaenus testaceus – Coleoptera, Curculionidae
Saissetia coffeae – Hemiptera, Coccidae: Hemispherical scale
Scolioneura betuleti – Hymenoptera, Tenthredinidae
Shawiana phyllotomae – Hymenoptera, Braconidae
Silliana hommei – Hymenoptera, Tenthredinidae
Stigmella betulicola – Lepidoptera, Nepticulidae
Stigmella catharticella – Lepidoptera, Nepticulidae
Stigmella centifoliella – Lepidoptera, Nepticulidae
Stigmella floslactella – Lepidoptera, Nepticulidae
Stigmella hemargyrella – Lepidoptera, Nepticulidae
Stigmella hybnerella – Lepidoptera, Nepticulidae
Stigmella incognitella – Lepidoptera, Nepticulidae
Stigmella juglandifoliella – Lepidoptera, Nepticulidae: Pecan serpentine leafminer
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stigmella mespilicola – Lepidoptera, Nepticulidae
Stigmella microtheriella – Lepidoptera, Nepticulidae
Stigmella myrtillella – Lepidoptera, Nepticulidae
Stigmella oxyacanthella – Lepidoptera, Nepticulidae
Stigmella paradoxa – Lepidoptera, Nepticulidae
Stigmella pyri – Lepidoptera, Nepticulidae
Stigmella roborella – Lepidoptera, Nepticulidae
Stigmella ruficapitella – Lepidoptera, Nepticulidae
Stigmella salicis – Lepidoptera, Nepticulidae
Stigmella samiatella – Lepidoptera, Nepticulidae
Stigmella sorbi – Lepidoptera, Nepticulidae
Stigmella tityrella – Lepidoptera, Nepticulidae
Stigmella trimaculella – Lepidoptera, Nepticulidae
Stigmella ulmivora – Lepidoptera, Nepticulidae
Tischeria dodonaea – Lepidoptera, Tischeriidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Vanessa atalanta – Lepidoptera, Nymphalidae: Red admiral
Zeiraphera griseana – Lepidoptera: Tortricidae: Dingy larch bell

Pnigalio

host:

- Achrysocharoides splendens* – Hymenoptera, Eulophidae
Acidia cognata – Diptera, Tephritidae
Agromyza albipennis – Diptera, Agromyzidae
Agromyza alnibetulae – Diptera, Agromyzidae
Agromyza alnivora – Diptera, Agromyzidae
Agromyza aristata – Diptera, Agromyzidae: Elm agromyzid leafminer
Agromyza demeijerei – Diptera, Agromyzidae
Agromyza flaviceps – Diptera, Agromyzidae
Agromyza frontella – Diptera, Agromyzidae: Alfalfa blotch leafminer
Agromyza mobilis – Diptera, Agromyzidae
Agromyza nana – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner, Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Agromyza potentillae – Diptera, Agromyzidae
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Anthonomus morulus – Coleoptera, Curculionidae
Antispila isabella – Lepidoptera, Heliozelidae
Alsophila pometaria – Lepidoptera, Geometridae: Fall cankerworm
Amauromyza morionella – Diptera, Agromyzidae
Amphipyra pyramidoides – Lepidoptera, Noctuidae: American copper underwing or pyramidal green fruitworm
Anthonomus pomorum – Coleoptera, Curculionidae: Apple blossom weevil
Argyresthia aureoargentella – Lepidoptera, Argyresthiidae: Canadian arborative leafminer
Argyresthia thuiella – Lepidoptera, Argyresthiidae: arborvitae leafminer
Aulagromyza hendeliana – Diptera, Agromyzidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Bactrocera oleae – Diptera, Tephritidae: Olive fruit fly
Baliosus rubber – Coleoptera, Chrysomelidae: Basswood leafminer
Bedellia orchilella – Lepidoptera, Lyonetiidae: Sweetpotato leafminer
Brachys tessellates – Coleoptera, Buprestidae
Bucculatrix ainsliella – Lepidoptera, Bucculatricidae: Oak skeletonizer
Bucculatrix packardella – Lepidoptera, Bucculatricidae
Calycomyza artemisiae – Diptera, Agromyzidae
Caliroa cerasi – Hymenoptera, Tenthredinidae: Pear sawfly
Caloptilia hemidactylella – Lepidoptera, Gracillariidae
Calybites auroguttellus – Lepidoptera, Gracillariidae
Cameraria aceriella – Lepidoptera, Gracillariidae: Maple leafblotch miner
Cameraria caryaefoliella – Lepidoptera, Gracillariidae
Cameraria cincinnatiella – Lepidoptera, Gracillariidae: Gregarious oak leafminer
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer

Cameraria hamameliella – Lepidoptera, Gracillariidae
Cameraria ohridella – Lepidoptera, Gracillariidae: Horse chestnut leafminer
Cameraria picturatella – Lepidoptera, Gracillariidae
Caulocampus acericaulis – Hymenoptera, Tenthredinidae: Maple petiole borer
Cerodontha phragmitidis – Diptera, Agromyzidae
Ceutorhynchus contractus – Coleoptera, Curculionidae: Cabbage leaf weevil
Chalepus suturalis – Coleoptera, Chrysomelidae
Chirosia parvicornis – Diptera, Anthomyiidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia periclymeni – Diptera, Agromyzidae
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Chrysaster ostensackenella – Lepidoptera, Gracillariidae
Chrysoesthia sexguttella – Lepidoptera, Gelechiidae
Chrysocharis nautia – Hymenoptera, Eulophidae
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora serratella – Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coptodisca kalmiella – Lepidoptera, Heliozelidae
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Curculio salicivorus – Coleoptera, Curculionidae
Cydia pomonella – Lepidoptera, Tortricidae: Codling moth
Diacopia nyssaefoliella – Lepidoptera, Heliozelidae
Dyseriocrania subpurpurella – Lepidoptera, Eriocraniidae
Ectoedemia agrimoniae – Lepidoptera, Nepticulidae
Ectoedemia atricollis – Lepidoptera, Nepticulidae
Ectoedemia occultella – Lepidoptera, Nepticulidae
Ectoedemia septembrella – Lepidoptera, Nepticulidae
Elachista cerusella – Lepidoptera, Elachistidae
Elachista humilis – Lepidoptera, Elachistidae
Emmetia heinemanni – Lepidoptera, Tischeriidae
Emmetia angusticolella – Lepidoptera, Tischeriidae
Eriocrania sparrmannella – Lepidoptera, Eriocraniidae
Eupelmus martellii – Hymenoptera, Euplemidae
Eupelmus urozonus – Hymenoptera, Euplemidae
Euura mucronata – Hymenoptera, Tenthredinidae: Willow bud galler
Fenella arenariae – Hymenoptera, Tenthredinidae
Fenusa dohrnii – Hymenoptera, Tenthredinidae: European alder leafminer
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Heterarthrus ochropoda – Hymenoptera, Tenthredinidae
Heterarthrus wuestneii – Hymenoptera, Tenthredinidae
Heterocampa guttivitta – Lepidoptera, Notodontidae: Maple prominent or saddled prominent
Holocacista rivillei – Lepidoptera, Heliozelidae

Hypera arator – Coleoptera, Curculionidae
Hypurus bertrandi – Coleoptera, Curculionidae: Portulaca leafmining weevil
Kessleria saxifragae – Lepidoptera, Yponomeutidae
Lacanobia oleracea – Lepidoptera, Noctuidae: Bright-line Brown-eye
Liriomyza dopygmina – Diptera, Agromyzidae
Liriomyza eupatorii – Diptera, Agromyzidae
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer
Liriomyza pseudopygmina – Diptera, Agromyzidae
Leucanthiza amphicarpeaefoliella – Lepidoptera, Gracillariidae
Leucanthiza dircella – Lepidoptera, Gracillariidae
Leucoptera aceris – Lepidoptera, Lyonetiidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera lotella – Lepidoptera, Lyonetiidae
Leucoptera lustratella – Lepidoptera, Lyonetiidae
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Leucospilapteryx omissella – Lepidoptera, Gracillariidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Lyonetia saliciella – Lepidoptera, Lyonetiidae: Birch leafminer
Mamestra brassicae – Lepidoptera, Noctuidae: Cabbage moth
Mantura floridana – Coleoptera; Chrysomelidae
Messa hortulana – Hymenoptera, Tenthredinidae
Messa nana – Hymenoptera, Tenthredinidae: Early birch leaf edgeminer
Metallus gei – Hymenoptera, Tenthredinidae
Metallus rohweri – Hymenoptera, Tenthredinidae
Metriochroa latifoliella – Lepidoptera, Gracillariidae: Small olive leafminer
Metriochroa neglecta – Lepidoptera, Gracillariidae
Microrhopala vittata – Coleoptera, Chrysomelidae
Mompha epilobiella – Lepidoptera, Momphidae
Neuroterus numismalis – Hymenoptera, Cynipidae
Neurobathra strigifinitella – Lepidoptera, Gracillariidae
Nycteola revayana – Lepidoptera, Noctuidae: Oak Nycteoline
Octotoma plicatula – Coleoptera, Chrysomelidae
Odontota dorsalis – Coleoptera, Chrysomelidae: Locust leafminer
Pamphilius stramineipes – Hymenoptera, Pamphiliidae
Paonias excaecata – Lepidoptera, Sphingidae: Blinded sphinx
Paraclemensia acerifoliella – Lepidoptera, Incurvariidae: Maple leafcutter moth
Parectopa robiniella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parornix kalmiella – Lepidoptera, Gracillariidae
Perittia weberella – Lepidoptera, Elachistidae
Pexicopia malvella – Lepidoptera, Gelechiidae: Hollyhock seed moth
Pholetesor circumscriptus – Hymenoptera, Braconidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer

Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or Aspen leafminer
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllonorycter acerifoliella – Lepidoptera, Gracillariidae
Phyllonorycter anderidae – Lepidoptera, Gracillariidae
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter celtisella – Lepidoptera, Gracillariidae
Phyllonorycter comperella – Lepidoptera, Gracillariidae
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella – Lepidoptera Gracillariidae: Apple blotch leafminer
Phyllonorycter cydoniella – Lepidoptera Gracillariidae
Phyllonorycter elmaella – Lepidoptera Gracillariidae: Western tentiform leafminer
Phyllonorycter emberizaepennella – Lepidoptera Gracillariidae
Phyllonorycter froelichiella – Lepidoptera Gracillariidae
Phyllonorycter gaultheriella – Lepidoptera Gracillariidae
Phyllonorycter heegeriella – Lepidoptera Gracillariidae
Phyllonorycter junoniella – Lepidoptera Gracillariidae
Phyllonorycter kleemannella – Lepidoptera Gracillariidae
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter malimalifoliella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter mespilella – Lepidoptera, Gracillariidae: Tentiform leafminer
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter nicellii – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae
Phyllonorycter ostryaefoliella – Lepidoptera, Gracillariidae
Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter platanoidella – Lepidoptera, Gracillariidae
Phyllonorycter pomifoliella – Lepidoptera, Gracillariidae
Phyllonorycter populiella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter propinquinella- Lepidoptera, Gracillariidae: Cherry blotchminer
Phyllonorycter pyrifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quinnata – Lepidoptera, Gracillariidae
Phyllonorycter quinqueguttella – Lepidoptera, Gracillariidae
Phyllonorycter rajella – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter salicifoliella – Lepidoptera, Gracillariidae: Aspen blotch leaf miner
Phyllonorycter saliciphaga – Lepidoptera, Gracillariidae
Phyllonorycter salictella viminiella – Lepidoptera, Gracillariidae
Phyllonorycter schreberella – Lepidoptera, Gracillariidae

Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter spinolella – Lepidoptera, Gracillariidae
Phyllonorycter stettinensis – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter tristrigella – Lepidoptera, Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phytoliriomyza melampyga – Diptera, Agromyzidae
Phytoliriomyza variegata – Diptera, Agromyzidae
Phytomyza angelicae – Diptera, Agromyzidae
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza artemisivora – Diptera, Agromyzidae
Phytomyza heringiana – Diptera, Agromyzidae
Phytomyza ilicicola – Diptera, Agromyzidae: Native holly leafminer
Phytomyza ilicis – Diptera, Agromyzidae: Holly leafminer
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza obscurella – Diptera, Agromyzidae
Phytomyza plantaginis – Diptera, Agromyzidae
Phytomyza pubicornis – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Phytomyza solidaginis – Diptera, Agromyzidae
Phytomyza spondylii – Diptera, Agromyzidae
Pontania proxima – Hymenoptera, Tenthredinidae
Pontania resinicola – Hymenoptera, Tenthredinidae
Pontania s-desmodioides – Hymenoptera, Tenthredinidae
Pontania triandrae – Hymenoptera, Tenthredinidae
Pontania viminalis – Hymenoptera, Tenthredinidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Pristiphora alnivora – Hymenoptera, Tenthredinidae: olumbine sawfly
Pristiphora rufipes – Hymenoptera, Tenthredinidae
Profenusa lucifex – Hymenoptera, Tenthredinidae
Profenusa pygmaea – Hymenoptera, Tenthredinidae
Protolithocolletis lathyri – Lepidoptera, Gracillariidae
Pycnoglossa histricina – Diptera, Anthomyiidae
Recurvaria leucateella – Lepidoptera, Gelechiidae: Lesser budmoth
Rhamphus oxyacanthae – Coleoptera, Curculionidae
Rhamphus pulicarius – Coleoptera, Curculionidae
Rhopalomyia ptarmicae – Diptera, Cecidomyiidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus ermischi – Coleoptera, Curculionidae
Rynchaenus fagi – Coleoptera, Curculionidae
Rynchaenus pallicornis – Coleoptera, Curculionidae
Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Rynchaenus rusci – Coleoptera, Curculionidae
Rynchaenus salicis – Coleoptera, Curculionidae

Rynchaenus testaceus – Coleoptera, Curculionidae
Sharliphora ambigua – Hymenoptera, Tenthredinidae
Sharliphora amphibole – Hymenoptera, Tenthredinidae
Shawiana phyllotomae – Hymenoptera, Braconidae
Scolioneura betuleti – Hymenoptera, Tenthredinidae
Sphaeroderma rubidum – Coleoptera, Chrysomelidae
Stegobium paniceum – Coleoptera, Anobiidae: Drugstore or bisquit beetle
Stigmella aceris – Lepidoptera, Nepticulidae
Stigmella atricapitella – Lepidoptera, Nepticulidae
Stigmella belfragrella – Lepidoptera, Nepticulidae
Stigmella catharticella – Lepidoptera, Nepticulidae
Stigmella crataegella – Lepidoptera, Nepticulidae
Stigmella floslactella – Lepidoptera, Nepticulidae
Stigmella hemargyrella – Lepidoptera, Nepticulidae
Stigmella hybnerella – Lepidoptera, Nepticulidae
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stigmella myrtillella – Lepidoptera, Nepticulidae
Stigmella nylandriella – Lepidoptera, Nepticulidae
Stigmella oxyacanthella – Lepidoptera, Nepticulidae
Stigmella ruficapitella – Lepidoptera, Nepticulidae
Stigmella salicis – Lepidoptera, Nepticulidae
Stigmella sorbi – Lepidoptera, Nepticulidae
Stigmella tityrella – Lepidoptera, Nepticulidae
Tischeria ambrosiaeella – Lepidoptera, Tischeriidae
Tischeria castaneaeella – Lepidoptera, Tischeriidae
Tischeria deciduas – Lepidoptera, Tischeriidae
Tischeria dodonaea – Lepidoptera, Tischeriidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria immaculate – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Trypeta artemisiae – Diptera, Tephritidae
Urophora stylata – Diptera, Tephritidae: Spear thistle seed fly or bull thistle seed fly
Zeugophora flavicollis – Coleoptera, Megalopodidae

Hyssopus

Host:

Argyrotaenia citrana – Lepidoptera, Tortricidae: Orange tortrix
Barbara colfaxiana – Lepidoptera, Tortricidae: Douglas-fir cone moth
Cnephasia chrysanthæana – Lepidoptera, Tortricidae
Coleophora concolorella – Lepidoptera, Coleophoridae
Coleophora cratipennella – Lepidoptera, Coleophoridae
Coleophora alticolella – Lepidoptera, Coleophoridae
Coleophora glaucicolella – Lepidoptera, Coleophoridae
Coleophora juncicolella – Lepidoptera, Coleophoridae
Coleophora valesianella – Lepidoptera, Coleophoridae
Cydia funebrana – Lepidoptera, Tortricidae: Plum fruit moth

Cydia injective – Lepidoptera, Tortricidae
Cydia latiferreana – Lepidoptera, Tortricidae: Filbertworm moth
Cydia miscitata – Lepidoptera, Tortricidae
Cydia piperana – Lepidoptera, Tortricidae: Seed worm or Ponderosa pine seed worm
Cydia pomonella – Lepidoptera, Tortricidae: Codling moth
Cydia strobilella – Lepidoptera, Tortricidae: Spruce seed moth
Dioryctria abietella – Lepidoptera, Pyralidae: Spruce coneworm or Fir coneworm
Dioryctria abietivorella – Lepidoptera, Pyralidae: Fir coneworm
Dioryctria amatella – Lepidoptera, Pyralidae: Southern pine coneworm
Dioryctria auranticella – Lepidoptera, Pyralidae: Ponderosa pine coneworm
Dioryctria cambiicola – Lepidoptera, Pyralidae: Douglas-fir pitch moth
Dioryctria pineae – Lepidoptera, Pyralidae
Dioryctria ponderosae – Lepidoptera, Pyralidae: Ponderosa twig moth
Dioryctria splendidella – Lepidoptera, Pyralidae: Pine stem borer or Maritime pine stem borer
Dioryctria sylvestrella – Lepidoptera, Pyralidae
Dioryctria tumicolella – Lepidoptera, Pyralidae: Pine pitch moth or pitch moth
Dioryctria zimmermani – Lepidoptera, Pyralidae: Zimmerman pine moth
Endothenia albolineana – Lepidoptera, Tortricidae: Spruce needleminer
Endothenia montanana – Lepidoptera, Tortricidae
Eupoecilia roseana – Lepidoptera, Tortricidae
Exoteleia dodecella – Lepidoptera, Gelechiidae
Galleria mellonella – Lepidoptera, Pyralidae: Greater wax moth
Grapholita molesta – Lepidoptera, Tortricidae: Oriental fruit moth
Ips bidentatus – Coleoptera, Scolytidae
Limnaecia phragmitella – Lepidoptera, Cosmopterigidae
Metzneria lapella – Lepidoptera, Gelechiidae:
Paranthrene tabaniformis – Lepidoptera, Sesiidae: Dusky clearwing
Parectopa robiniella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Petrova albicapitana – Lepidoptera, Tortricidae: Northern pitch twig moth
Petrova comstockiana – Lepidoptera, Tortricidae: Pitch twig moth
Petrova houseri – Lepidoptera, Tortricidae
Petrova metallica – Lepidoptera, Tortricidae: Ponderosa pine caterpillar
Petrova wenzeli – Lepidoptera, Tortricidae
Pityogenes chalcographus – Coleoptera, Scolytidae: Six-spined spruce bark beetle
Pseudococcyx tessulatana – Lepidoptera, Tortricidae: Cone tortricid
Rhyacionia buoliana – Lepidoptera, Tortricidae: European pine shoot moth
Rhyacionia frustrana – Lepidoptera, Tortricidae: Nantucket pine tip moth
Rhyacionia neomexicana – Lepidoptera, Tortricidae: Southwestern pine tip moth
Rhyacionia resinella – Lepidoptera, Tortricidae
Rhyacionia rigidana – Lepidoptera, Tortricidae: Pitch pine tip moth
Synanthedon exitiosa – Lepidoptera, Aegeriidae: Peachtree borer
Synanthedon pictipes – Lepidoptera, Sesiidae: Lesser peachtree borer
Synanthedon pini – Lepidoptera, Sesiidae
Synanthedon scitula – Lepidoptera, Sesiidae: Dogwood borer

Thecodiplosis brachyntera – Diptera, Cecidiomyiidae: Needle-shortening pine gall midge
Trupanea amoena – Diptera, Tephritidae

Aulogymnus

Host:

Adleria coriaria – Hymenoptera, Cynipidae
Adleria coronata – Hymenoptera, Cynipidae
Adleria glutinosa – Hymenoptera, Cynipidae
Adleria kollari – Hymenoptera, Marble gall wasp
Andricus aestivalis – Hymenoptera, Cynipidae: oak gall wasp
Andricus albopunctatus – Hymenoptera, Cynipidae
Andricus amenti – Hymenoptera, Cynipidae
Andricus callidoma – Hymenoptera, Cynipidae
Andricus caputmedusae – Hymenoptera, Cynipidae
Andricus clementinae – Hymenoptera, Cynipidae
Andricus coronaries – Hymenoptera, Cynipidae
Andricus crispator – Hymenoptera, Cynipidae
Andricus curvator – Hymenoptera, Cynipidae
Andricus fecundatrix – Hymenoptera, Cynipidae
Andricus gemmeus – Hymenoptera, Cynipidae
Andricus grossulariae – Hymenoptera, Cynipidae
Andricus hungaricus – Hymenoptera, Cynipidae
Andricus inflator – Hymenoptera, Cynipidae
Andricus lignicola – Hymenoptera, Cynipidae
Andricus lucidus – Hymenoptera, Cynipidae
Andricus nudus – Hymenoptera, Cynipidae
Andricus ostreus – Hymenoptera, Cynipidae
Andricus quadrilineatus – Hymenoptera, Cynipidae
Andricus quercuscalicis – Hymenoptera, Cynipidae
Andricus quercusradicis – Hymenoptera, Cynipidae
Andricus quercusramuli – Hymenoptera, Cynipidae
Andricus solitarius – Hymenoptera, Cynipidae
Andricus testaceipes – Hymenoptera, Cynipidae
Biorhiza pallida – Hymenoptera, Cynipidae: Oak apple gall wasp
Callirhytis flora – Hymenoptera, Cynipidae
Callirhytis glandium – Hymenoptera, Cynipidae
Cynips quercusfolii – Hymenoptera, Cynipidae
Hylesinus fraxini – Coleoptera, Scolytidae: bark and ambrosia beetle
Neuroterus albipes – Hymenoptera, Cynipidae: Smooth spangle gall wasp
Neuroterus glandiformis – Hymenoptera, Cynipidae
Neuroterus numismalis – Hymenoptera, Cynipidae
Neuroterus quercusbaccaru – Hymenoptera, Cynipidae
Neuroterus saliens – Hymenoptera, Cynipidae
Pediaspis aceris – Hymenoptera, Cynipidae
Phyllonorycter – Lepidoptera, Gracillariidae
Synergus gallaepomiformis – Hymenoptera, Cynipidae

Synergus pallicornis – Hymenoptera, Cynipidae
Trigonaspis megaptera – Hymenoptera, Cynipidae

Dicladocerus

Host:

Agromyza ambigua – Diptera, Agromyzidae
Archips oporana – Lepidoptera, Tortricidae
Argyresthia conjugella – Lepidoptera, Argyresthiidae: Apple fruit moth
Argyresthia franciscella – Lepidoptera, Argyresthiidae
Argyresthia freyella – Lepidoptera, Argyresthiidae: Arborvitae leafminer
Argyresthia thuiella – Lepidoptera, Argyresthiidae: Arborvitae leafminer
Callimorpha dominula – Lepidoptera, Arctiidae: Scarlet tiger moth
Calycomyza humeralis – Diptera, Agromyzidae: Aster leafminer
Carposina scirrhosella – Lepidoptera, Carposinidae
Cedestis gysseleniella – Lepidoptera, Yponomeutidae
Cedestis subfasciella – Lepidoptera, Yponomeutidae
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Coleophora caespititiella – Lepidoptera, Coleophoridae
Coleophora comptoniella – Lepidoptera, Coleophoridae
Coleophora dahurica – Lepidoptera, Coleophoridae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora longisignella – Lepidoptera, Coleophoridae
Coleophora obscenella – Lepidoptera, Coleophoridae
Coleophora taeniipennella – Lepidoptera, Coleophoridae
Coleotechnites apictripunctellus – Lepidoptera, Gelechiidae
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites piceaella – Lepidoptera, Gelechiidae
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Croesia bergmanniana – Lepidoptera, Tortricidae
Cydia tenebrosana – Lepidoptera, Tortricidae
Epinotia transmissana – Lepidoptera, Tortricidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Gypsonoma aceriana – Lepidoptera, Tortricidae: Poplar shoot borer
Gypsonoma sociana – Lepidoptera, Tortricidae
Hydrellia griseola – Diptera, Ephydriidae
Liriomyza compositella – Diptera, Agromyzidae
Liriomyza flaveola – Diptera, Agromyzidae
Ocnerostoma piniariellum – Lepidoptera, Yponomeutidae: Ermine moth
Phytomyza geniculata – Diptera, Agromyzidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Psyche casta – Lepidoptera, Psychidae: Bagworm moth
Recurvaria nanella – Lepidoptera, Gelechiidae: Lesser budmoth
Scythris temperatella – Lepidoptera, Scythrididae
Thaumetopoea pityocampa – Lepidoptera, Thaumetopoeidae: Pine procession moth
Tortrix viridana – Lepidoptera, Tortricidae: European oak leafroller

Tropicomyia vigneae – Diptera, Agromyzidae
Zeiraphera griseana – Lepidoptera: Tortricidae: Dingy larch bell

Elasmus

Host:

Acanthopsyche atra – Lepidoptera, Psychidae
Acrobasis comptoniella – Lepidoptera, Pyralidae: Sweetfern leaf casebearer
Acrobasis rubrifasciella – Lepidoptera, Pyralidae
Acrocercops helicometra – Lepidoptera, Gracillariidae
Aleiodes hyphantriae – Hymenoptera, Braconidae
Aleiodes stigmator – Hymenoptera, Braconidae
Anania verbascalis – Lepidoptera, Pyralidae
Anarsia lineatella – Lepidoptera, Gelechiidae: Peach twig borer
Anomalococcus indicus – Hemiptera, Coccidae
Anomis flava – Lepidoptera, Noctuidae: Cotton looper
Antigastra catalaunalis – Lepidoptera, Pyralidae: Sesame podborer or sesame webworm
Antispila anna – Lepidoptera, Gracillariidae: Jamun leaf miner
Apanteles canarsiae – Hymenoptera, Braconidae
Apanteles diparopsidis – Hymenoptera, Braconidae
Apanteles galleriae – Hymenoptera, Braconidae
Apanteles importunus – Hymenoptera, Braconidae
Apanteles langerburgensis – Hymenoptera, Braconidae
Apanteles leucostigmus – Hymenoptera, Braconidae
Apanteles machaeralis – Hymenoptera, Braconidae
Apanteles malevolus – Hymenoptera, Braconidae
Apanteles pelops – Hymenoptera, Braconidae
Apanteles risbeci – Hymenoptera, Braconidae
Apanteles syleptae – Hymenoptera, Braconidae
Apanteles taragamae – Hymenoptera, Braconidae
Aproaerema modicella – Lepidoptera, Gelechiidae: Groundnut leafminer
Apterona crenulella – Lepidoptera, Psychidae
Archips rosana – Lepidoptera, Tortricidae: European leafroller or rose tortrix moth
Bracon brevicornis – Hymenoptera, Braconidae
Bilobata subsecivella – Lepidoptera, Gelechiidae
Bissetia steniella – Lepidoptera, Pyralidae: Gurdaspur borer
Cameraria guttifinitella – Lepidoptera, Gracillariidae
Canephora hirsuta – Lepidoptera, Psychidae
Ceroplastes rusci – Hemiptera, Coccidae: Fig wax scale
Chilo infuscatellus – Lepidoptera, Pyralidae: Sugarcane stem borer
Chilo phaeosema – Lepidoptera, Pyralidae
Choreutis pariana – Lepidoptera, Choreutidae: Apple leaf skeletonizer
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm
Chrysodeixeis eriosoma – Lepidoptera, Noctuidae
Cnaphalocrocis grisealis – Lepidoptera, Pyralidae
Cnaphalocrocis medinalis – Lepidoptera, Pyralidae: Rice leaf roller
Cnaphalocrocis suspicalis – Lepidoptera, Pyralidae

Cnaphalocrocis trapezalis – Lepidoptera, Pyralidae
Coccidiphaga scitula – Lepidoptera, Noctuidae
Coleophora caespititiella – Lepidoptera, Coleophoridae
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol casebearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora serratella – Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coleophora vibicella – Lepidoptera, Coleophoridae
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Cotesia americana – Hymenoptera, Braconidae
Cotesia delicate – Hymenoptera, Braconidae
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia hyphantriae – Hymenoptera, Braconidae
Cotesia marginiventris – Hymenoptera, Braconidae
Cudonigera houstonana – Lepidoptera, Tortricidae: Juniper budworm
Cydia critica – Lepidoptera, Tortricidae: Leaf webber
Cydia leucostoma – Lepidoptera, Tortricidae: Flushworm
Cydia pomonella – Lepidoptera, Tortricidae: Codling moth
Cydia pseudonectis – Lepidoptera, Tortricidae
Cydia tricentra – Lepidoptera, Tortricidae: Top shoot borer
Deuterohyalina albida – Lepidoptera, Psychidae
Diadegma armillatum – Hymenoptera, Ichneumonidae
Diadegma fenestrale – Hymenoptera, Ichneumonidae
Diaphania indica – Lepidoptera, Pyralidae: Cotton caterpillar, cucumber moth, pumpkin caterpillar, or melon moth
Dichocrocis megillalis – Lepidoptera, Pyralidae
Dioryctria disclusa – Lepidoptera, Pyralidae: Webbing coneworm
Dolichogenidea aethiopica – Hymenoptera, Braconidae
Earias biplaga – Lepidoptera, Noctuidae: Spiny bollworm
Earias cupreoviridis – Lepidoptera, Noctuidae: Diamond bollworm or spiny bollworm
Earias insulana – Lepidoptera, Noctuidae: Spiny bollworm
Earias vittella – Lepidoptera, Noctuidae: Spotted bollworm
Eccopsis wahlbergiana – Lepidoptera, Tortricidae
Elasmus senegalensis – Hymenoptera, Eulophidae
Ephestia kuehniella – Lepidoptera, Pyralidae: Mediterranean Flour or Mill Moth
Epinotia nigricana – Lepidoptera, Tortricidae: Bud-borer tortricid
Erionota thrax – Lepidoptera, Hesperiiidae: Banana leafroller, banana skipper, palm redeye
Erionota torus – Lepidoptera, Hesperiiidae: Banana skipper
Etiella zinckenella – Lepidoptera, Pyralidae: Lima bean pod borer
Eublemma amabilis – Lepidoptera, Noctuida
Eudarcia abchasicum – Lepidoptera, Tineidae
Eudarcia leopoldella – Lepidoptera, Tineidae
Eupoecilia ambiguella – Lepidoptera, Tortricidae: European grape berry moth
Euproctis chrysorrhoea – Lepidoptera, Lymantriidae: browntail moth
Exenterus amictorius – Hymenoptera, Ichneumonidae
Exoteleia dodecella – Lepidoptera: Gelechiidae

Galleria mellonella – Lepidoptera, Pyralidae: Greater wax moth
Geina periscelidactyla – Lepidoptera, Pterophoridae: Plume moth
Glyphodes pyloalis – Lepidoptera, Pyralidae: Mulberry pyralid
Goniozus claripennis – Hymenoptera, Bethyridae
Haritalodes derogata – Lepidoptera, Pyralidae: Cotton leaf roller
Herpetogramma stultale – Lepidoptera, Pyralidae
Holocacista rivillei – Lepidoptera, Heliozelidae
Homadaula anisocentra – Lepidoptera, Plutellidae: Mimosa webworm
Homona coffearia – Lepidoptera, Tortricidae: Coffee tortrix
Hormius moniliatus – Hymenoptera, Braconidae
Hyblaea pueria – Lepidoptera, Hyblaeidae: Teak defoliator
Hyphantria cunea – Lepidoptera, Arctiidae: Fall webworm moth
Hyposoter fugitivus – Hymenoptera, Ichneumonidae
Hyposoter rivalis – Hymenoptera, Ichneumonidae
Janus compressus – Hymenoptera, Cephidae: Pear impulse wasp
Laccifer lacca – Hemiptera, Kerriidae: Lac scale
Leucoma salicis – Lepidoptera, Lyonetiidae: Satin Moth
Leucoptera coffeina – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coma – Lepidoptera, Lyonetiidae
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Lobesia botrana – Lepidoptera, Tortricidae: Grapevine moth
Lobesia semblidis – Lepidoptera, Tortricidae
Luffia lapidella – Lepidoptera, Psychidae
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy moth
Macrocentrus linearis – Hymenoptera: Braconidae
Malacosoma americanum – Lepidoptera, Lasiocampidae: Eastern tent caterpillar
Manatha albipes – Lepidoptera, Psychidae: Bag worm
Manduca sexta – Lepidoptera, Sphingidae: Tobacco horn worm
Megalophanes turatii – Lepidoptera, Psychidae
Meteorus hyphantriae – Hymenoptera, Braconidae
Meteorus laphygmae – Hymenoptera, Braconidae
Meteorus rubens – Hymenoptera, Braconidae
Meteorus trachynotus – Hymenoptera, Braconidae
Nausinoe geometralis – Lepidoptera, Pyralidae: Jasmine leaf webworm
Neaspilota alba – Diptera, Tephritidae
Nephantis serinopa – Lepidoptera, Xylorictidae: Coconut leaf-eating caterpillar
Nephoterix rhodobasalis – Lepidoptera, Pyralidae
Noorda moringae – Lepidoptera, Pyralidae
Notarcha obrinusalis – Lepidoptera, Pyralidae
Notarcha quaternalis – Lepidoptera, Pyralidae
Nyereria mlanje – Hymenoptera: Braconidae
Odites artigena – Lepidoptera, Lecithoceridae
Omiodes diemenalis – Lepidoptera, Pyralidae: Bean leafroller
Omiodes indicata – Lepidoptera, Pyralidae
Opisina arenosella – Lepidoptera, Oecophoridae: Coconut black-headed caterpillar

Oreopsyche tabanivicinella – Lepidoptera, Psychidae
Oreopsyche vesubiella – Lepidoptera, Psychidae
Orgyia leucostigma – Lepidoptera, Lymantriidae: White-marked Tussock moth
Ostrinia nubilalis – Lepidoptera, Pyralidae: European corn borer
Palpita machaeralis – Lepidoptera, Pyralidae: Teak leaf eating caterpillar
Parametriotes theae – Lepidoptera, Agonoxenidae
Paramictoides febretta – Lepidoptera, Psychidae
Parotis marinata – Lepidoptera, Pyralidae
Pectinophora gossypiella – Lepidoptera, Gelechiidae: Pink bollworm
Pelopidas mathias – Lepidoptera, Hesperidae: Small branded swift
Petrova cristata – Lepidoptera, Tortricidae: Japanese pine shoot borer
Pexicopia malvella – Lepidoptera, Gelechiidae: Hollyhock seed moth
Phalacropterix apiformis – Lepidoptera, Psychidae
Phanerotoma hendecasisella – Hymenoptera, Braconidae
Phlyctaenia coronata – Lepidoptera, Pyralidae: Webworm moth
Phobocampe clisiocampae – Hymenoptera, Ichneumonidae
Phobocampe pallipes – Hymenoptera, Ichneumonidae
Phthorimaea operculella – Lepidoptera: Gelechiidae: Potato tuberworm or potato tuber moth
Phylacteophaga eucalypti froggatti – Hymenoptera, Tenthredinidae: Leafblister sawfly or eucalyptus leaf mining sawfly
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter crataegella – Lepidoptera Gracillariidae: Apple blotch leafminer
Phyllonorycter malella – Lepidoptera, Gracillariidae: Apple tentiform leafminer or spotted tentiform leafminer
Polistes canadensis annularis – Hymenoptera, Vespidae
Polistes crinitus – Hymenoptera, Vespidae
Polistes dorsalis – Hymenoptera, Vespidae
Polistes exclamans – Hymenoptera, Vespidae
Polistes fuscatus – Hymenoptera, Vespidae: Golden paper wasp
Polistes gallicus – Hymenoptera, Vespidae
Polistes hebraeus – Hymenoptera, Vespidae
Polistes instabilis – Hymenoptera, Vespidae: Neotropic eusocial wasp
Polistes major – Hymenoptera, Vespidae
Polistes opinabilis – Hymenoptera, Vespidae
Polistes snelleni – Hymenoptera, Vespidae
Porphyrosela desmodiella – Lepidoptera, Gracillariidae
Prays acmonias – Lepidoptera, Plutellidae
Prays citri – Lepidoptera, Plutellidae: Citrus flower moth
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Procerata sacchariphaga – Lepidoptera, Brachodidae
Promecotheca reichei – Coleoptera: Chrysomelidae: Coconut leaf mining beetle or palm leaf mining beetle
Pseudohypatopa pulvereana – Lepidoptera, Blastobasidae
Psorosina hammondi – Lepidoptera, Pyralidae: Appleleaf skeletonizer
Psyche albipes – Lepidoptera, Psychidae

Psyche constancella – Lepidoptera, Psychidae
Pyrausta aurata – Lepidoptera, Pyralidae
Rhyacionia frustrana – Lepidoptera, Tortricidae: Nantucket pine tip moth
Saucrobotys futilalis – Lepidoptera, Pyralidae: Panic moth
Schoenobius bipunctifer – Lepidoptera, Pyralidae: Rice stem borer
Scirpophaga excerptalis – Lepidoptera, Pyralidae: Sugarcane top borer
Scirpophaga nivella – Lepidoptera, Pyralidae: White rice borer
Scutellista caerulea – Hymenoptera, Pteromalidae
Scythropia crataegella – Lepidoptera, Yponomeutidae: Hawthorn moth
Sinophorus validus – Hymenoptera, Ichneumonidae
Sparganothis pilleriana – Lepidoptera, Tortricidae: Long palped tortrix
Spodoptera frugiperda – Lepidoptera, Noctuidae: Fall armyworm
Stomphastis thraustica – Lepidoptera, Gracillariidae
Syngamia abruptalis – Lepidoptera, Pyralidae: Leaf webber
Tebenna bjerkandrella – Lepidoptera, Choreutidae
Thyridopteryx ephemeraeformis – Lepidoptera, Psychidae: Bagworm moth
Tirathaba mundella – Lepidoptera, Pyralidae: Oil palm bunch moth
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Tischeria solidagonifoliella – Lepidoptera, Tischeriidae
Tropobracon antennatus – Hymenoptera: Braconidae
Urbanus proteus – Lepidoptera, Hesperidae: Long-tailed skipper
Yponomeuta malinella – Lepidoptera, Yponomeutidae: Apple ermine moth
Yponomeuta padella – Lepidoptera, Yponomeutidae: Small ermine moth
Zeuzera pyrina – Lepidoptera, Cossidae: Leopard moth

Diglyphus

Host:

Acidia cognata – Diptera, Tephritidae
Agromyza albipennis – Diptera, Agromyzidae
Agromyza alnivora – Diptera, Agromyzidae
Agromyza demeijerei – Diptera, Agromyzidae
Agromyza frontella – Diptera, Agromyzidae: alfalfa blotch leafminer
Agromyza nana – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner, Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Agromyza rufipes – Diptera, Agromyzidae
Agromyza salicifolii – Diptera, Agromyzidae
Aulagromyza hendeliana – Diptera, Agromyzidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Calycomyza artemisiae – Diptera, Agromyzidae
Calycomyza humeralis – Diptera, Agromyzidae: Aster leafminer
Calycomyza jucunda – Diptera, Agromyzidae
Cerodontha dorsalis – Diptera, Agromyzidae: Grass sheathminer
Cerodontha fulvipes – Diptera, Agromyzidae

Chromatomyia aprilina – Diptera, Agromyzidae
Chromatomyia fuscata – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia lonicerae – Diptera, Agromyzidae
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia periclymeni – Diptera, Agromyzidae
Chromatomyia suikazurae – Diptera, Agromyzidae
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Dizygomyza crucifericola – Diptera, Agromyzidae
Hydrellia griseola – Diptera, Ephydriidae
Japanagromyza inaequalis – Diptera, Agromyzidae
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Liriomyza ativae – Diptera, Agromyzidae
Liriomyza bryoniae – Diptera, Agromyzidae: Celery miner
Liriomyza chilensis – Diptera, Agromyzidae
Liriomyza cicerinae – Diptera, Agromyzidae
Liriomyza congesta – Diptera, Agromyzidae: Bean leafminer
Liriomyza flaveola – Diptera, Agromyzidae
Liriomyza helianthi – Diptera, Agromyzidae
Liriomyza huidobrensis – Diptera, Agromyzidae: pea leafminer
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza pusio – Diptera, Agromyzidae
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza strigata – Diptera, Agromyzidae
Liriomyza taraia – Diptera, Agromyzidae
Liriomyza trifoliarum – Diptera, Agromyzidae
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Melanagromyza obtuse – Diptera, Agromyzidae
Melanagromyza virens – Diptera, Agromyzidae
Meoneura obscurella – Diptera, Carnidae
Metopomyza scutellata – Diptera, Agromyzidae
Nanophyes niger – Coleoptera, Curculionidae
Napomyza xylostei – Diptera, Agromyzidae
Nemorimyza posticata – Diptera, Agromyzidae
Pedicellina lucens – Diptera, Stratiomyidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phytomyza dianthicola – Diptera, Agromyzidae
Phytomyza jannonei – Diptera, Agromyzidae
Phytoliriomyza jacarandae – Diptera, Agromyzidae: Jacaranda leafminer
Phytoliriomyza melampyga – Diptera, Agromyzidae
Phytoliriomyza variegata – Diptera, Agromyzidae
Phytomyza affinis – Diptera, Agromyzidae

Phytomyza albiceps – Diptera, Agromyzidae
Phytomyza angelicae – Diptera, Agromyzidae
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza chaerophylli – Diptera, Agromyzidae
Phytomyza citisi – Diptera, Agromyzidae
Phytomyza cytisi – Diptera, Agromyzidae
Phytomyza echinopis – Diptera, Agromyzidae
Phytomyza jucunda – Diptera, Agromyzidae
Phytomyza lanati – Diptera, Agromyzidae
Phytomyza lappina – Diptera, Agromyzidae
Phytomyza marginella – Diptera, Agromyzidae
Phytomyza melana – Diptera, Agromyzidae
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza mylini – Diptera, Agromyzidae
Phytomyza obscurella – Diptera, Agromyzidae
Phytomyza orobanchia – Diptera, Agromyzidae
Phytomyza paniculatae – Diptera, Agromyzidae
Phytomyza plantaginis – Diptera, Agromyzidae
Phytomyza pubicornis – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Phytomyza rapunculi caulinaris – Diptera, Agromyzidae
Phytomyza solidaginis – Diptera, Agromyzidae
Phytomyza spondylii – Diptera, Agromyzidae
Phytomyza vitalbae – Diptera, Agromyzidae
Phytomyza vomitoriae – Diptera, Agromyzidae
Poemyza lateralis – Diptera, Agromyzidae
Pseudonapomyza asiatica – Diptera, Agromyzidae
Stigmella juglandifoliella – Lepidoptera, Nepticulidae: Pecan serpentine leafminer
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Trypeta artemisiae – Diptera, Tephritidae

Zagrammosoma

Host:

Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Bireta goddriga
Brachys tessellates – Coleoptera, Buprestidae
Bucculatrix thurberiella – Lepidoptera, Bucculatricidae: Cotton leaf perforator
Caloptilia alnivorella – Lepidoptera, Gracillariidae
Cameraria cincinnatiella – Lepidoptera, Gracillariidae: Gregarious oak leafminer
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer
Cameraria mediodorsella – Lepidoptera, Gracillariidae
Cameraria nemoris – Lepidoptera, Gracillariidae
Chrysaster ostensackenella – Lepidoptera, Gracillariidae
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol case bearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer

Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Keiferia lycopersicella – Lepidoptera, Gelechiidae: Tomato pinworm
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Liriomyza archboldi – Diptera, Agromyzidae
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Metopomyza scutellata – Diptera, Agromyzidae
Microrhopala xerene – Coleoptera, Chrysomelidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Phthorimaea operculella – Lepidoptera: Gelechiidae: Potato tuberworm or potato tuber moth
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis magnoliella – Lepidoptera, Gracillariidae: Magnolia serpentine leafminer
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter crataegella – Lepidoptera, Gracillariidae: apple blotch leafminer
Phyllonorycter elmaella – Lepidoptera Gracillariidae: Western tentiform leafminer
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza vomitoriae – Diptera, Agromyzidae
Scolioneura betuleti – Hymenoptera, Tenthredinidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner

Diaulinopsis

Host:

Calycomyza artemisiae – Diptera, Agromyzidae
Calycomyza jucunda – Diptera, Agromyzidae
Cerodontha dorsalis – Diptera, Agromyzidae: Grass sheathminer
Cerodontha fulvipes – Diptera, Agromyzidae
Liriomyza brassicae – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Metopomyza scutellata – Diptera, Agromyzidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer

Sympiesis

Host:

Achrysocharoides splendens – Hymenoptera, Eulophidae
Acleris chalybeana – Lepidoptera, Tortricidae: Lesser maple leafroller
Acleris lipsiana – Lepidoptera, Tortricidae
Acleris minuta – Lepidoptera, Tortricidae: Yellowheaded fireworm
Actia pilipennis – Diptera, Tachinidae
Acrobasis caryivorella – Lepidoptera, Pyralidae
Acrobasis indigenella – Lepidoptera, Pyralidae: Leaf crumpler moth

Acrobasis juglandis – Lepidoptera, Pyralidae: Pecan leaf casebearer
Acrocercops brongniardella – Lepidoptera, Gracillariidae
Acrocercops syngamma – Lepidoptera, Gracillariidae
Adoxophyes orana – Lepidoptera, Tortricidae: Summerfruit tortrix
Agonopterix posticella – Lepidoptera, Oecophoridae
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Aleiodes gastritor – Hymenoptera, Braconidae
Anacampsis populella – Lepidoptera, Gelechiidae
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Ancylis divisana – Lepidoptera, Tortricidae
Ancylis mitterbacheriana – Lepidoptera, Tortricidae
Andricus curvator – Hymenoptera, Cynipidae
Aproaerema modicella – Lepidoptera, Gelechiidae: Groundnut leafminer
Apotomis lutoscana – Lepidoptera, Tortricidae
Archips argyrospila – Lepidoptera, Tortricidae: Fruittree leafroller
Archips rosana – Lepidoptera, Tortricidae: European leafroller or rose tortrix moth
Archips xylosteana – Lepidoptera, Tortricidae: Brown oak tortrix or variegated golden tortrix
Argyrotaenia amatana – Lepidoptera, Tortricidae
Argyrotaenia citrana – Lepidoptera, Tortricidae: Orange tortrix
Argyrotaenia velutinana – Lepidoptera, Tortricidae: Red-banded leaf roller
Aristotelia zygophylliforella – Lepidoptera, Gelechiidae
Aspilapteryx limosella – Lepidoptera, Gracillariidae
Bedellia somnulentella – Lepidoptera, Lyonetiidae: Sweet potato leafminer
Blastobasis aurantiaca – Lepidoptera, Blastobasidae
Blastotere thuiella – Lepidoptera, Agyresthiidae
Brachys tessellates – Coleoptera, Buprestidae
Callisto multimaculta – Lepidoptera, Gracillariidae
Caloptilia alchimiella – Lepidoptera, Gracillariidae
Caloptilia alnivorella – Lepidoptera, Gracillariidae
Caloptilia azaleella – Lepidoptera, Gracillariidae: Azalea leaf miner
Caloptilia betulicola – Lepidoptera, Gracillariidae
Caloptilia cuculipennella – Lepidoptera, Gracillariidae
Caloptilia elongella – Lepidoptera, Gracillariidae
Caloptilia fidella – Lepidoptera, Gracillariidae
Caloptilia fraxinella – Lepidoptera, Gracillariidae: Ash leaf cone roller
Caloptilia fribergensis – Lepidoptera, Gracillariidae
Caloptilia hemidactylella – Lepidoptera, Gracillariidae
Caloptilia monticola – Lepidoptera, Gracillariidae
Caloptilia negundella – Lepidoptera, Gracillariidae: Boxelder leafroller
Caloptilia perseae – Lepidoptera, Gracillariidae: Avocado leafminer
Caloptilia rhombifoliella – Lepidoptera, Gracillariidae
Caloptilia roscipennella – Lepidoptera, Gracillariidae
Caloptilia sassafraella – Lepidoptera, Gracillariidae
Caloptilia soyella – Lepidoptera, Gracillariidae
Caloptilia stigmatella – Lepidoptera, Gracillariidae

Caloptilia theivora – Lepidoptera, Gracillariidae
Calybites auroguttellus – Lepidoptera, Gracillariidae
Calybites phasianipennellus – Lepidoptera, Gracillariidae
Cameraria affinis – Lepidoptera, Gracillariidae
Cameraria caryaefoliella – Lepidoptera, Gracillariidae
Cameraria cincinnatiella – Lepidoptera, Gracillariidae: Gregarious oak leafminer
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer
Cameraria ostryarella – Lepidoptera, Gracillariidae
Celpha lacunana – Lepidoptera, Tortricidae
Choreutis pariana – Lepidoptera, Choreutidae: Apple leaf skeletonizer
Choristoneura conflictana – Lepidoptera, Tortricidae: Large aspen tortrix
Choristoneura herbenstreitella – Lepidoptera, Tortricidae
Choristoneura rosaceana – Lepidoptera, Tortricidae: Obliquebanded leafroller
Chrysoesthia sexguttella – Lepidoptera, Gelechiidae
Cimbex americana – Hymenoptera, Cimbicidae: Elm sawfly
Clania crameri – Lepidoptera, Psychidae
Cnaphalocrocis medinalis – Lepidoptera, Pyralidae
Cnephasia asseclana – Lepidoptera, Tortricidae: Flax tortrix
Cochylis posterana – Lepidoptera, Tortricidae
Coelaenomenodera elaeidis – Coleoptera, Chrysomelidae: Oil palm leafminer
Coelaenomenodera perrieri – Coleoptera, Chrysomelidae
Coleophora elaeagnisella – Lepidoptera, Coleophoridae: Speckled case-bearer moth
Coleophora filaginella – Lepidoptera, Coleophoridae
Coleophora flavaginella – Lepidoptera, Coleophoridae
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol case bearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora santolinella – Lepidoptera, Coleophoridae
Coleotechnites apicitripunctellus – Lepidoptera, Gelechiidae
Coleotechnites gibsonellus – Lepidoptera, Gelechiidae
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Coleotechnites thujaella – Lepidoptera, Gelechiidae: Brown arborvitae leafminer
Cornicacoecia lafauryana – Lepidoptera, Tortricidae
Cotesia melanoscela – Hymenoptera, Braconidae
Cremastobombycia solidaginis – Lepidoptera, Gracillariidae
Crobylophora daricella – Lepidoptera, Lyonetiidae
Cryptoblabes bistriga – Lepidoptera, Pyralidae
Cydia leucostoma – Lepidoptera, Tortricidae: Flushworm
Cydia pomonella – Lepidoptera, Tortricidae: Codling moth
Desmia funeralis – Lepidoptera, Pyralidae: Grape leaf folder
Dialectica scariella – Lepidoptera, Gracillariidae
Diadegma fenestrale – Hymenoptera, Ichneumonidae
Dolichogenidea albipennis – Hymenoptera, Braconidae
Dolichogenidea lactea – Hymenoptera, Braconidae
Dolichogenidea murinanae – Hymenoptera, Braconidae
Ectoedemia argyropeza – Lepidoptera, Nepticulidae

Ectoedemia septembrella – Lepidoptera, Nepticulidae
Enargia decolor – Lepidoptera, Noctuidae: Aspen twoleaf tier
Epichorista emphanes – Lepidoptera, Tortricidae: Beech leafroller
Epinotia celtisana – Lepidoptera, Tortricidae
Epinotia sordidana – Lepidoptera, Tortricidae
Epinotia thapsiana – Lepidoptera, Tortricidae
Episimus argutanus – Lepidoptera, Tortricidae
Eulophus abdominalis – Hymenoptera, Eulophidae
Euscrobipalpa suasella – Lepidoptera, Gelechiidae
Exoteleia dodecella – Lepidoptera, Gelechiidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer
Gibbovalva quadrifasciata – Lepidoptera, Gracillariidae
Glyphodes pyloalis – Lepidoptera, Pyralidae: Mulberry pyralid
Gortyna flavago – Lepidoptera, Noctuidae: Frosted orange
Gracillaria limosella – Lepidoptera, Gracillariidae
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Gynaephora alpherakii – Lepidoptera, Lymantriidae
Haritalodes derogata – Lepidoptera, Pyralidae: Cotton leaf roller
Herpetogramma bipunctale – Lepidoptera, Pyralidae
Heterarthrus aceris – Hymenoptera, Tenthredinidae
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Heterarthrus wuesteneii – Hymenoptera, Tenthredinidae
Hyblaea puera – Lepidoptera, Hyblaeidae: Teak defoliator
Hydrellia griseola – Diptera, Ephydriidae
Hydrellia valida – Diptera, Ephydriidae
Hydriomena renunciata – Lepidoptera, Geometridae: Renounced hydriomena
Hypera adspersa – Coleoptera, Curculionidae
Keiferia lycopersicella – Lepidoptera, Gelechiidae: Tomato pinworm
Lethata anophthalma – Lepidoptera, Oecophoridae
Leucoma salicis – Lepidoptera, Lyonetiidae: Satin Moth
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf
miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy moth
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Mahasena corbetti – Lepidoptera, Psychidae: Coconut case caterpillar, Coconut
bagworm, or oilpalm bagworm
Metriochroa latifoliella – Lepidoptera, Gracillariidae: Small olive leafminer
Microgaster subcompleta – Hymenoptera, Braconidae
Mirificarma mulinella – Lepidoptera, Gelechiidae
Ocnerostoma pinariellum – Lepidoptera, Yponomeutidae: Ermine moth
Odites artigena – Lepidoptera, Lecithoceridae

Omiodes indicata – Lepidoptera, Pyralidae
Onchocephala senegalensis – Coleoptera, Chrysomelidae
Ostrinia nubilalis – Lepidoptera, Pyralidae: European corn borer
Ostrinia obumbratalis – Lepidoptera, Pyralidae: Smartweed borer
Ostrinia penitalis – Lepidoptera, Pyralidae: American lotus borer
Oxicesta geographica – Lepidoptera, Noctuidae: Defoliator moth
Pandemis cerasana – Lepidoptera, Tortricidae: Barred fruit tree tortrix
Pandemis corylana – Lepidoptera, Tortricidae: Chequered fruit tree tortrix
Pandemis dumetana – Lepidoptera, Tortricidae
Parapandemis chondrillana – Lepidoptera, Tortricidae
Papaipema nebris – Lepidoptera, Noctuidae: Stalk borer or common stalk borer
Parectopa robiniella– Lepidoptera, Gracillariidae: Locust digitate leafminer
Parornix anguliferella – Lepidoptera, Gracillariidae
Parornix devoniella – Lepidoptera, Gracillariidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parornix kalmiella – Lepidoptera, Gracillariidae
Parornix persicella – Lepidoptera, Gracillariidae
Parornix petiolella – Lepidoptera, Gracillariidae
Parornix scoticella – Lepidoptera, Gracillariidae
Parnara guttata – Lepidoptera, Hesperidae: Common straight swift
Pholetesor bicolor – Hymenoptera, Braconidae
Pholetesor circumscriptus – Hymenoptera, Braconidae
Pholetesor ornigis – Hymenoptera, Braconidae
Phthorimaea operculella – Lepidoptera: Gelechiidae: Potato tuberworm or potato tuber moth
Phyllocnistis citrella– Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or Aspen leafminer
Phyllocnistis sorghageniella – Lepidoptera, Gracillariidae
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllocnistis unipunctella - Lepidoptera, Gracillariidae: Poplar leafminer
Phyllonorycter acerifoliella – Lepidoptera Gracillariidae
Phyllonorycter acernella – Lepidoptera Gracillariidae
Phyllonorycter aeriferella – Lepidoptera Gracillariidae
Phyllonorycter agilella – Lepidoptera Gracillariidae
Phyllonorycter albanotella – Lepidoptera Gracillariidae
Phyllonorycter alnicolella – Lepidoptera Gracillariidae
Phyllonorycter alpine – Lepidoptera Gracillariidae
Phyllonorycter anderidae – Lepidoptera Gracillariidae
Phyllonorycter argentifimbriella – Lepidoptera Gracillariidae
Phyllonorycter argentinotella – Lepidoptera Gracillariidae
Phyllonorycter auronitens – Lepidoptera Gracillariidae
Phyllonorycter basistrigella – Lepidoptera Gracillariidae
Phyllonorycter bicinctella – Lepidoptera Gracillariidae
Phyllonorycter blancardella– Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter cavella – Lepidoptera, Gracillariidae

Phyllonorycter celtisella – Lepidoptera Gracillariidae
Phyllonorycter comparella – Lepidoptera Gracillariidae
Phyllonorycter comptoniella – Lepidoptera Gracillariidae
Phyllonorycter connexella – Lepidoptera Gracillariidae
Phyllonorycter coryli – Lepidoptera, Gracillariidae: Nut leaf blister moth
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella – Lepidoptera Gracillariidae: Apple blotch leafminer
Phyllonorycter cretata – Lepidoptera Gracillariidae
Phyllonorycter cydoniella – Lepidoptera Gracillariidae
Phyllonorycter cytisella – Lepidoptera Gracillariidae
Phyllonorycter diversella – Lepidoptera Gracillariidae
Phyllonorycter dubitella – Lepidoptera Gracillariidae
Phyllonorycter elmaella – Lepidoptera Gracillariidae: Western tentiform leafminer
Phyllonorycter emberizaepennella – Lepidoptera Gracillariidae
Phyllonorycter endryella – Lepidoptera Gracillariidae
Phyllonorycter ermani – Lepidoptera Gracillariidae
Phyllonorycter felinelle – Lepidoptera Gracillariidae
Phyllonorycter fitchella – Lepidoptera Gracillariidae
Phyllonorycter fragilella – Lepidoptera Gracillariidae
Phyllonorycter froelichiella – Lepidoptera Gracillariidae
Phyllonorycter hancola – Lepidoptera Gracillariidae
Phyllonorycter harrisella – Lepidoptera Gracillariidae
Phyllonorycter heegeriella – Lepidoptera Gracillariidae
Phyllonorycter helianthemella – Lepidoptera Gracillariidae
Phyllonorycter insignitella – Lepidoptera Gracillariidae
Phyllonorycter intermixtus – Lepidoptera Gracillariidae
Phyllonorycter issikii – Lepidoptera Gracillariidae
Phyllonorycter juglandis – Lepidoptera Gracillariidae
Phyllonorycter kearfottella – Lepidoptera Gracillariidae
Phyllonorycter kleemannella – Lepidoptera Gracillariidae
Phyllonorycter lantanella – Lepidoptera Gracillariidae
Phyllonorycter linifoliella – Lepidoptera Gracillariidae
Phyllonorycter lucetiella – Lepidoptera Gracillariidae: Basswood squareblotch miner
Phyllonorycter lucidicostella – Lepidoptera Gracillariidae: Lesser maple leafblotch miner
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter malella – Lepidoptera, Gracillariidae: Apple tentiform leafminer or spotted tentiform leafminer
Phyllonorycter malimalifoliella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter manni – Lepidoptera Gracillariidae
Phyllonorycter mespilella – Lepidoptera, Gracillariidae: Tentiform leafminer
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter millierella – Lepidoptera Gracillariidae
Phyllonorycter morrisella – Lepidoptera Gracillariidae
Phyllonorycter nicellii – Lepidoptera Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera Gracillariidae

Phyllonorycter nipponicella – Lepidoptera Gracillariidae
Phyllonorycter obscuricostella – Lepidoptera Gracillariidae
Phyllonorycter oxyacanthae – Lepidoptera Gracillariidae
Phyllonorycter pastorella – Lepidoptera Gracillariidae
Phyllonorycter platani – Lepidoptera Gracillariidae
Phyllonorycter platanoidella – Lepidoptera Gracillariidae
Phyllonorycter pomifoliella – Lepidoptera Gracillariidae
Phyllonorycter populifoliella – Lepidoptera Gracillariidae
Phyllonorycter propinquinella – Lepidoptera, Gracillariidae: cherry blotchminer
Phyllonorycter pseudolautella – Lepidoptera Gracillariidae
Phyllonorycter pygmaea – Lepidoptera Gracillariidae
Phyllonorycter pyrifoliella – Lepidoptera Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera Gracillariidae
Phyllonorycter quinnata – Lepidoptera Gracillariidae
Phyllonorycter quinqueguttella – Lepidoptera Gracillariidae
Phyllonorycter rajella – Lepidoptera Gracillariidae
Phyllonorycter restrictella – Lepidoptera Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter robiniella – Lepidoptera, Gracillariidae: Horse-chesnut leafminer
Phyllonorycter roboris – Lepidoptera Gracillariidae
Phyllonorycter sagitella – Lepidoptera Gracillariidae
Phyllonorycter salicifoliella – Lepidoptera, Gracillariidae: Aspen blotch leaf miner
Phyllonorycter salictella – Lepidoptera Gracillariidae
Phyllonorycter saportella – Lepidoptera Gracillariidae
Phyllonorycter schreberella – Lepidoptera Gracillariidae
Phyllonorycter scitulella – Lepidoptera Gracillariidae
Phyllonorycter scudderella – Lepidoptera Gracillariidae
Phyllonorycter sorbi – Lepidoptera Gracillariidae
Phyllonorycter sorbicola – Lepidoptera Gracillariidae
Phyllonorycter spinicolella – Lepidoptera Gracillariidae
Phyllonorycter spinolella – Lepidoptera Gracillariidae
Phyllonorycter stettinensis – Lepidoptera Gracillariidae
Phyllonorycter strigulatella – Lepidoptera Gracillariidae
Phyllonorycter tangerensis – Lepidoptera Gracillariidae
Phyllonorycter tenerella – Lepidoptera Gracillariidae
Phyllonorycter tiliacella – Lepidoptera Gracillariidae: Basswood roundblotch miner
Phyllonorycter tremulae – Lepidoptera Gracillariidae
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter triacha – Lepidoptera Gracillariidae
Phyllonorycter trifasciella – Lepidoptera Gracillariidae
Phyllonorycter trinotella – Lepidoptera Gracillariidae
Phyllonorycter tristrigella – Lepidoptera Gracillariidae
Phyllonorycter tritaenianella – Lepidoptera Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera Gracillariidae
Phyllonorycter viminetorum – Lepidoptera Gracillariidae
Phytoliriomyza variegata – Diptera, Agromyzidae

Platynota rostrana – Lepidoptera, Tortricidae
Pococera robustella – Lepidoptera, Pyralidae: Pine webworm
Polyconia spinicornis – Coleoptera, Chrysomelidae
Polyhymno luteostrigella – Lepidoptera, Gelechiidae
Povolnya leucapennella – Lepidoptera Gracillariidae
Prays acmonias – Lepidoptera, Plutellidae
Promecotheca cumingii – Coleoptera, Chrysomelidae: coconut leafminer
Promecotheca nuciferae – Coleoptera, Chrysomelidae: Coconut leafminer
Psilocorsis quercicella – Lepidoptera, Oechophoridae
Recurvaria leucatella – Lepidoptera, Gelechiidae: Lesser budmoth
Recurvaria syriactis – Lepidoptera, Gelechiidae
Rhopobota myrtillana – Lepidoptera, Tortricidae
Rhopobota naevana – Lepidoptera, Tortricidae: Holll tortrix
Rhodoneura vitulla – Lepidoptera, Thyrididae
Rhyacionia frustrana – Lepidoptera, Tortricidae: Nantucket pine tip moth
Rondotia menciiana – Lepidoptera, Bombycidae: Mulberry white caterpillar
Rynchaenus pallicornis – Coleoptera, Curculionidae
Rynchaenus salicis – Coleoptera, Curculionidae
Scythropia crataegella – Lepidoptera, Yponomeutidae: Hawthorn moth
Sesamia cretica – Lepidoptera, Noctuidae: Durra stem borer
Shawiana phyllotomae – Hymenoptera, Braconidae
Sparganothis sulfureana – Lepidoptera, Tortricidae: Spragnothis fruitworm
Spilonota lariciiana – Lepidoptera, Tortricidae
Spilonota ocellana – Lepidoptera, Tortricidae: Eye-spotted budmoth
Stegobium paniceum – Coleoptera, Anobiidae: Drugstore or bisquit beetle
Stigmella belfragrella – Lepidoptera, Nepticulidae
Stigmella incognitella – Lepidoptera, Nepticulidae
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stomopteryx nerteria – Lepidoptera, Gelechiidae
Syndemis musculana – Lepidoptera, Tortricidae: Autumn leafroller
Tebenna chodjaevi – Lepidoptera, Choreutidae
Tethea or – Lepidoptera, Thyatiridae: Poplar lutestring
Thyridopteryx ephameraeformis – Lepidoptera, Psychidae
Tischeria decidua – Lepidoptera, Tischeriidae
Tischeria dodonaea – Lepidoptera, Tischeriidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Tischeria omissa – Lepidoptera, Tischeriidae
Tortrix viridana – Lepidoptera, Tortricidae: European oak leafroller
Trachys dasi – Coleoptera, Buprestidae
Trachys minuta – Coleoptera, Buprestidae
Zeiraphera griseana – Lepidoptera: Tortricidae: Dingy larch bell
Zenillia roseanae – Diptera, Tachinidae

Subfamily Eulophinae not in CA or AZ

Elachertus

Host:

- Acleris variana* – Lepidoptera, Tortricidae: Blackheaded budworm or Eastern blackheaded budworm
Acrobasis caryivorella – Lepidoptera, Pyralidae
Acrocercops dives – Lepidoptera, Gracillariidae
Acrionicta megacephala – Lepidoptera, Noctuidae: Poplar grey
Adleria glutinosa – Hymenoptera, Cynipidae
Adoxophyes orana – Lepidoptera, Tortricidae: Summerfruit tortrix
Agonoxena argaula – Lepidoptera, Agonoxenidae: Coconut leafminer
Agonopterix heracliata – Lepidoptera, Depressariidae
Agonopterix hypericella – Lepidoptera, Depressariidae
Agonoxena pyrogramma – Lepidoptera, Agonoxenidae: Coconut flat moth
Amorbia cuneana – Lepidoptera, Tortricidae: Western avocado leafroller
Anacampsis populella – Lepidoptera, Gelechiidae
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Ancylis mitterbacheriana – Lepidoptera, Tortricidae
Ancyloxypha numitor – Lepidoptera, Hesperidae: Least skipper
Antaeotricha leucillana – Lepidoptera, Oecophoridae: Well-marked fruit worm
Antichloris viridis – Lepidoptera, Arctiidae
Archips argyrospila – Lepidoptera, Tortricidae: Fruittree leafroller
Archips crataegana – Lepidoptera, Tortricidae: Brown oak tortrix
Archips rosana – Lepidoptera, Tortricidae: European leafroller or rose tortrix moth
Archips xylosteana – Lepidoptera, Tortricidae: Brown oak tortrix or variegated golden tortrix
Argyresthia oreasella – Lepidoptera, Yponomeutidae
Argyrotaenia pinatubana – Lepidoptera, Tortricidae: Pine tube moth
Argyrotaenia velutinana – Lepidoptera, Tortricidae: Red-banded leaf roller
Asterocampa clyton – Lepidoptera, Nymphalidae: Tawney Emperor
Barbara colfaxiana – Lepidoptera, Tortricidae: Douglas-fir cone moth
Bedellia somnulentella – Lepidoptera, Lyonetiidae: Sweet potato leafminer
Bena prasinana – Lepidoptera, Noctuidae: Scarce silver-lines
Blastobasis glandulella – Lepidoptera, Coleophoridae
Blastodacna atra – Lepidoptera, Cosmopterigidae: Apple pith moth
Byctiscus betulae – Coleoptera, Rhynchitidae
Cacoecimorpha pronubana – Lepidoptera, Tortricidae: Carnation tortrix
Caloptilia cuculipennella – Lepidoptera, Gracillariidae
Caloptilia packardella – Lepidoptera, Gracillariidae
Caloptilia theivora – Lepidoptera, Gracillariidae
Calpodes ethlius – Lepidoptera, Hesperidae: Brazilian skipper, canna skipper or larger canna leafroller
Calybites auroguttellus – Lepidoptera, Gracillariidae
Chirosia betuleti – Diptera, Anthomyiidae
Choreutis pariana – Lepidoptera, Choreutidae: Apple leaf skeletonizer
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm

Choristoneura murinana – Lepidoptera, Tortricidae: European fir budworm
Choristoneura rosaceana – Lepidoptera, Tortricidae: Obliquebanded leafroller
Clostera curtula – Lepidoptera, Notodontidae: Chocolate-tip
Cnephasia chrysanthæana – Lepidoptera, Tortricidae
Coleophora follicularis – Lepidoptera, Coleophoridae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora limosipennella – Lepidoptera, Coleophoridae
Coleophora pruniella – Lepidoptera, Coleophoridae
Cydia caryana – Lepidoptera, Tortricidae: Hickory shuckworm
Cydia latiferreana – Lepidoptera, Tortricidae: Filbertworm moth
Cydia nigricana – Lepidoptera, Tortricidae: Pea moth
Dasychira plagiata – Lepidoptera, Lymantriidae: Pine tussock moth
Dioryctria abietella – Lepidoptera, Pyralidae: Spruce coneworm or Fir coneworm
Dioryctria zimmermani – Lepidoptera, Pyralidae: Zimmerman pine moth
Dolichogenidea tasmanica – Hymenoptera, Braconidae
Epermenia illigerella – Lepidoptera, Epermeniidae
Epinotia celtisana – Lepidoptera, Tortricidae
Epinotia fraternana – Lepidoptera, Tortricidae
Eublemma gayneri – Lepidoptera, Noctuidae
Eucosma recissoriana – Lepidoptera, Tortricidae: Lodgepole pine cone borer
Eulithis diversilineata – Lepidoptera, Geometridae: Lesser grapevine looper
Eulophus orgyiae – Hymenoptera, Eulophidae
Eupithecia spermaphaga – Lepidoptera, Geometridae: Fir cone looper
Eupoecilia ambiguella – Lepidoptera, Tortricidae: European grape berry moth
Exoteleia dodecella – Lepidoptera, Gelechiidae
Glena bisulca – Lepidoptera, Geometridae
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Haritalodes derogata – Lepidoptera, Pyralidae: Cotton leaf roller
Harrisina americana – Lepidoptera, Zygaenidae: Grapeleaf skeletonizer
Heterocampa guttivitta – Lepidoptera, Notodontidae: Maple prominent or saddled prominent
Homoeocerus pallens – Hemiptera, Coreidae
Lathronympha strigana – Lepidoptera, Tortricidae
Lethata anophthalma – Lepidoptera, Oecophoridae
Lerema accius – Lepidoptera, Hesperidae: Clouded skipper
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Luffia lapidella – Lepidoptera, Psychidae
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy Moth
Lymantria monacha – Lepidoptera, Lymantriidae: Black arches
Mamestra brassicae – Lepidoptera, Noctuidae: Cabbage moth
Marmara fasciella – Lepidoptera, Gracillariidae: White pine bark miner
Neaspilota alba – Diptera, Tephritidae
Notocelia roborana – Lepidoptera, Tortricidae
Oidaematophorus paleaceus – Lepidoptera, Pterophoridae
Omiodes indicata – Lepidoptera, Pyralidae

Orgyia definite – Lepidoptera, Lymantriidae: Definite-marked tussock moth
Orgyia leucostigma – Lepidoptera, Lymantriidae: White-marked tussock moth
Orgyia pseudotsugata – Lepidoptera, Lymantriidae: Douglas-fir tussock moth
Palthis angulalis – Lepidoptera, Noctuidae: Dark-spotted palthis or Spruce harlequin
Pandemis cinnamomeana – Lepidoptera, Tortricidae
Panoquina ethlius – Lepidoptera, Hesperidae
Panoquina nero – Lepidoptera, Hesperidae
Panoquina sylvicola – Lepidoptera, Hesperidae: Purple-washed skipper
Parectopa robiniella– Lepidoptera, Gracillariidae: Locust digitate leafminer
Parornix devoniella – Lepidoptera, Gracillariidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Perichares philetus – Lepidoptera, Hesperidae: Green-backed ruby-eye
Perittia obscurepunctella –Lepidoptera, Elachistidae
Phthorimaea operculella – Lepidoptera: Gelechiidae: Potato tuberworm or potato tuber moth
Phyllocnistis citrella– Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter acernella – Lepidoptera Gracillariidae
Phyllonorycter anderidae – Lepidoptera, Gracillariidae
Phyllonorycter blancardella- Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter coryli – Lepidoptera, Gracillariidae: Nut leaf blister moth
Phyllonorycter emberizaepennella – Lepidoptera Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter nicellii – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae
Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter platanoidella – Lepidoptera, Gracillariidae
Phyllonorycter pomonella – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter stettinensis – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Platynota idaeusalis – Lepidoptera, Tortricidae: Tufted apple budmoth
Platynota rostrana – Lepidoptera, Tortricidae
Platynota stultana – Lepidoptera, Tortricidae: Omnivorous leafroller
Polychrosis botrana – Lepidoptera, Tortricidae: European grape berry moth or European grapevine moth
Polychrosis viteana – Lepidoptera, Tortricidae: Grape berry moth
Prays acmonias – Lepidoptera, Plutellidae
Proteoteras aesculana – Lepidoptera, Tortricidae: Maple twig borer
Rhopobota myrtillana – Lepidoptera, Tortricidae
Rhyacionia buoliana – Lepidoptera, Tortricidae: European pine shoot moth
Rhyacionia duplana – Lepidoptera, Tortricidae: Pine tip moth
Rhyacionia frustrana – Lepidoptera, Tortricidae: Nantucket pine tip moth
Schizura ipomaeae – Lepidoptera, Notodontidae
Schizura unicornis – Lepidoptera, Notodontidae: Unicorn caterpillar or prominent moth caterpillar

Scobicia pustulata – Coleoptera, Bostrichidae
Sparganothis pettitana – Lepidoptera, Tortricidae
Sparganothis pilleriana – Lepidoptera, Tortricidae: Long palped tortrix
Sparganothis sulfureana – Lepidoptera, Tortricidae: Spragnothis fruitworm
Sphaeroderma rubidium – Coleoptera, Chrysomelidae
Spilonota ocellana – Lepidoptera, Tortricidae: Eye-spotted budmoth
Spilosoma virginicum – Lepidoptera, Arctiidae
Strepsicrates smithiana – Lepidoptera, Tortricidae
Synanthedon pictipes – Lepidoptera, Sesiidae: Lesse peachtree borer
Tortrix viridana – Lepidoptera, Tortricidae: European oak leafroller
Urbanus proteus – Lepidoptera, Hesperidae: Long-tailed skipper
Utetheisa pulchella – Lepidoptera, Arctiidae: Crimson speckled moth
Zeiraphera griseana – Lepidoptera: Tortricidae: Dingy larch bell

Dimmockia

Host:

Acrobasis caryae – Lepidoptera, Pyralidae: Hickory shoot borer
Anacampsis innocuella – Lepidoptera, Gelechiidae: Darkheaded aspen leafroller
Caloptilia sapporensis – Lepidoptera, Gracillariidae
Caloptilia stigmatella – Lepidoptera, Gracillariidae
Chirosia betuleti – Diptera, Anthomyiidae
Cortesia clisiocampae
Cortesia congregata
Cortesia melanoscela – Gypsy Moth parasite
Croesia semipurpurana – Lepidoptera, Tortricidae: Oak leaf-tier
Dolichogenidea lacteicolor – Hymenoptera, Braconidae
Dolichovespula maculate – Hymenoptera, Vespidae: Bald-faced hornet
Elasmus japonicus – Hymenoptera, Elasmidae
Episimus argutatus – Lepidoptera, Tortricidae
Exorista larvarum – Diptera, Tachinidae
Gelis tenellus – Hymenoptera, Ichneumonidae
Glyptapanteles lipardis – Hymenoptera, Braconidae
Hyalophora cecropia – Lepidoptera, Saturniidae: Cecropia moth
Hyposoter takagii – Hymenoptera, Ichneumonidae
Itopectis conquisitor – Hymenoptera, Ichneumonidae: White-banded pimpline
 Lanugo
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy Moth
Mastrus annulatus – Hymenoptera, Ichneumonidae
Meteorus trachynotus – Hymenoptera, Braconidae
Onchocephala montivaga – Coleoptera, Chrysomelidae
Parnara guttata – Lepidoptera, Hesperidae: Common straight swift
Phyllonorycter – Lepidoptera, Gracillariidae
Pimpla aethiops – Hymenoptera, Ichneumonidae
Promecotheca cumingii – Coleoptera, Chrysomelidae: Coconut leafminer
Psychophagus omnivorus – Hymenoptera, Pteromalidae
Sparganothis pettitana – Lepidoptera, Tortricidae

Sphecodina abbotti – Lepidoptera, Sphingidae: Abbot's sphinx moth
Sphecophaga vesparum – Hymenoptera, Ichneuemonidae
Sphecophaga vesparum burra – Hymenoptera, Ichneuemonidae
Winthemia datanae – Diptera, Tachinidae

Hemiptarsenus

Host:

Agromyza mobilis – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner or Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Bucculatrix cantabricella – Lepidoptera, Bucculatricidae
Cerodontha angulata – Diptera, Agromyzidae
Cerodontha iraeos – Diptera, Agromyzidae
Cerodontha iridis – Diptera, Agromyzidae
Cerodontha pygmaea – Diptera, Agromyzidae
Ceutorhynchus assimilis – Coleoptera, Curculionidae: Cabbage seed weevil
Chromatomyia fuscata – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia nigra – Diptera, Agromyzidae
Chromatomyia primulae – Diptera, Agromyzidae
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Ectoedemia agrimoniae – Lepidoptera, Nepticulidae
Elachista cerusella – Lepidoptera, Elachistidae
Elachista megerlella – Lepidoptera, Elachistidae
Elachista poae – Lepidoptera, Elachistidae
Gortyna flavago – Lepidoptera, Noctuidae: Frosted orange
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Hydrellia griseola – Diptera, Ephydriidae
Hypurus bertrandi – Coleoptera, Curculionidae: Portulaca leafmining weevil
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Levarchama cryptella – Lepidoptera, Nepticulidae
Levarchama eurema – Lepidoptera, Nepticulidae
Liriomyza bryoniae – Diptera, Agromyzidae: Celery miner
Liriomyza congesta – Diptera, Agromyzidae: Bean leafminer
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza strigata – Diptera, Agromyzidae
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Mompha miscella – Lepidoptera, Momphidae
Meromyza americana – Diptera, Chloropidae: Wheat stem maggot
Ophiomyia phaseoli – Diptera, Agromyzidae: Bean fly
Ostrinia nubilalis – Lepidoptera, Pyralidae: European corn borer
Parafomoria helianthemella – Lepidoptera, Nepticulidae

Phyllonorycter anderidae – Lepidoptera, Gracillariidae
Phyllonorycter fraxinella – Lepidoptera, Gracillariidae
Phyllonorycter helianthemella – Lepidoptera, Gracillariidae
Phyllonorycter insignitella – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phytoliriomyza variegata – Diptera, Agromyzidae
Phytomyza hendeli – Diptera, Agromyzidae
Phytomyza melana – Diptera, Agromyzidae
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza plantaginis – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Pseudonapomyza spicata – Diptera, Agromyzidae: Maize leafminer
Rhamphus oxyacanthae – Coleoptera, Curculionidae
Stagmatophora naviella – Lepidoptera, Cosmopterigidae
Stigmella aeneofasciella – Lepidoptera, Nepticulidae
Stigmella betulicola – Lepidoptera, Nepticulidae
Tomicus piniperda – Coleoptera, Curculionidae: Pine shoot beetle

Colpoclypeus

Host:

Acleris lipsiana – Lepidoptera, Tortricidae
Acleris maccana – Lepidoptera, Tortricidae
Acleris schalleriana – Lepidoptera, Tortricidae
Adoxophyes orana – Lepidoptera, Tortricidae: Summerfruit tortrix
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Ancylis myrtillana – Lepidoptera, Tortricidae
Archips crataegana – Lepidoptera, Tortricidae: Brown oak tortrix
Archips oporana – Lepidoptera, Tortricidae
Archips rosana – Lepidoptera, Tortricidae: European leafroller or rose tortrix moth
Archips xylosteana – Lepidoptera, Tortricidae: Brown oak tortrix or variegated golden tortrix
Argyrotaenia ljugiana – Lepidoptera, Tortricidae: Grape tortrix
Argyrotaenia velutinana – Lepidoptera, Tortricidae: Red-banded leaf roller
Athalia cordata – Hymenoptera, Tenthredinidae
Cacoecimorpha pronubana – Lepidoptera, Tortricidae: Carnation tortrix
Celypha lacunana – Lepidoptera, Tortricidae: Dark strawberry tortrix moth
Choristoneura rosaceana – Lepidoptera, Tortricidae: Obliquebanded leafroller
Cnephasia chrysanthæana – Lepidoptera, Tortricidae
Cornicacoecia lafauryana – Lepidoptera, Tortricidae
Eulia ministrana – Lepidoptera, Tortricidae
Eupoecilia ambiguella – Lepidoptera, Tortricidae: European grape berry moth
Gypsonoma minutana – Lepidoptera, Tortricidae
Hedya nubiferana – Lepidoptera, Tortricidae: Green budmoth
Jordanita budensis – Lepidoptera, Zygaenidae

Lobesia botrana – Lepidoptera, Tortricidae: Grapevine moth
Lozotaenia forsterana – Lepidoptera, Tortricidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Notocelia cynosbatella – Lepidoptera, Tortricidae
Pandemis cerasana – Lepidoptera, Tortricidae: Barred fruit tree tortrix
Pandemis corylana – Lepidoptera, Tortricidae: Chequered fruit tree tortrix
Pandemis dumetana – Lepidoptera, Tortricidae
Pandemis heparana – Lepidoptera, Tortricidae: Dark fruit-tree tortrix
Pandemis pyrusana – Lepidoptera, Tortricidae
Philedonides lunana – Lepidoptera, Tortricidae
Rhopobota myrtillana – Lepidoptera, Tortricidae
Rhopobota naevana – Lepidoptera, Tortricidae: Holll tortrix
Spilonota ocellana – Lepidoptera, Tortricidae: Eye-spotted budmoth
Triedris paleana – Lepidoptera, Tortricidae

Stenomesus

Host:

Agrotis criniger – Lepidoptera, Noctuidae: Poko noctuid moth
Anania verbascalis – Lepidoptera, Pyralidae
Antichloris viridis – Lepidoptera, Arctiidae
Aproaerema modicella – Lepidoptera, Gelechiidae: Groundnut leafminer
Australephesiodes stictella – Lepidoptera, Pyralidae
Bilobata subsecivella – Lepidoptera, Gelechiidae
Brachmia – Lepidoptera, Gelechiidae
Caloptilia azaleella – Lepidoptera, Gracillariidae: Azalea leaf miner
Caloptilia theivora – Lepidoptera, Gracillariidae
Ceramidia butleri – Lepidoptera, Arctiidae
Chilo suppressalis – Lepidoptera, Syntomidae
Choreutis nemorana – Lepidoptera, Choreutidae
Cnaphalocrocis medinalis – Lepidoptera, Pyralidae
Cnephasia longana – Lepidoptera, Tortricidae
Cyphosticha coerulea – Lepidoptera, Gracillariidae
Dialectica scariella – Lepidoptera, Gracillariidae
Ectoedemia agyropeza – Lepidoptera, Nepticulidae
Gegenes niso – Lepidoptera, Hesperidae
Helicoverpa armigera – Lepidoptera, Noctuidae: Corn ear worm, tomato grub, tobacco
 bidworm or cotton bollworm
Hellula – Lepidoptera, Pyralidae
Leucospilapteryx omissella – Lepidoptera, Gracillariidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Macrosiphum euphorbiae – Hemiptera, Aphididae: Potato aphid
Mompha ludwigiae – Lepidoptera, Momphidae
Naranga aeneas – Lepidoptera, Noctuidae: Green semilooper
Pelopidas mathias – Lepidoptera, Hesperidae: Small branded swift, lesser millet skipper,
 black branded swift
Phloeotribus scarabaeoides – Coleoptera, Scolytidae: olive bark beetle

Phodoryctis caerulea – Lepidoptera, Gracillariidae
Phyllocnistis citrella- Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter lyoniae – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Polythlipta macralis – Lepidoptera, Crambidae
Rhyzopertha dominica – Coleoptera, Bostrichidae: Lesser grain borer
Scirpophaga innotata – Lepidoptera, Pyralidae: White rice stemborer
Stenomesus japonicus – Hymenoptera, Eulophidae
Stigmella aurella – Lepidoptera, Nepticulidae
Stomopteryx nerteria – Lepidoptera, Gelechiidae

Subfamily of Eulophinae not in USA

Ascotolinx

Host:

Phyllocnistis citrella- Lepidoptera, Gracillariidae: Citrus leafminer

Meruana

Host:

Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia syngenesiae – Diptera, Agromyzidae: chrysanthemum leafminer
Liriomyza brassicae – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer

***Mohaniella* (India only)**

Host:

Lepidoptera (lepidopteran leafminers)

Ratzeburgiola

Host:

Cosmia trapezina – Lepidoptera, Noctuidae: Dun-bar
Cosmopterix pulchrimella – Lepidoptera, Cosmopterigidae
Holocacista rivillei – Lepidoptera, Heliozelidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae

***Ryhonos* (Australia only)**

Host:

Acrocercops chionosema – Lepidoptera, Gracillariidae: Macadamia leafminer
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midge

Semielacher

Host:

Phyllocnistis citrella- Lepidoptera, Gracillariidae: Citrus leafminer

Subfamily Entedoninae in CA

Closterocerus

Host:

- Acalyptris loranthella* – Lepidoptera, Nepticulidae
Acrocercops breyeri – Lepidoptera, Gracillariidae
Acrocercops dives – Lepidoptera, Gracillariidae
Ageniaspis citricola – Hymenoptera, Encyrtidae
Agromyza nana – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner, Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Agromyza rufipes – Diptera, Agromyzidae
Andricus quercusflocci – Hymenoptera, Cynipidae
Antispila nysaefoliella – Lepidoptera, Heliozelidae: Tupelo leafminer
Aonidiella orientalis – Hemiptera, Diaspididae: Oriental scale
Aprostocetus leucopterae – Hymenoptera, Eulophidae
Arge pectoralis – Hymenoptera, Argidae: Birch sawfly
Asamangulia cuspidata – Coleoptera, Chrysomelidae
Asteromyia euthamiae – Diptera, Cecidomyiidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Baliosus ruber – Coleoptera, Chrysomelidae: Basswood leafminer
Blastotere thuiella – Lepidoptera, Agyresthiidae
Brachys aerosus – Coleoptera, Buprestidae
Brachys ovatus – Coleoptera, Buprestidae
Brachys tessellates – Coleoptera, Buprestidae
Bucculatrix canadensisella – Lepidoptera, Bucculatricidae: Birch skeletonizer
Bucculatrix thurberiella – Lepidoptera, Bucculatricidae: Cotton leaf perforator
Caligo ilcoxiens – Lepidoptera, Nymphalidae: Owl butterfly
Caliroa cerasi – Hymenoptera, Tenthredinidae: Pear sawfly
Caloptilia ostryaeella – Lepidoptera, Gracillariidae
Calycomyza solidaginis – Diptera, Agromyzidae
Cameraria caryaefoliella – Lepidoptera, Gracillariidae
Cameraria guttifinitella – Lepidoptera, Gracillariidae
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer
Cameraria hamameliella – Lepidoptera, Gracillariidae
Cameraria ulmella – Lepidoptera, Gracillariidae
Chlorops theae – Diptera, Chloropidae
Chromatomyia aprilina – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Chrysocharis lepelleyi – Hymenoptera, Eulophidae
Chrysocharis nepharea – Hymenoptera, Eulophidae
Cirrospilus argei – Hymenoptera, Eulophidae
Cirrospilus cinctiventris – Hymenoptera, Eulophidae
Cirrospilus variegates – Hymenoptera, Eulophidae

Closterocerus ritchiei – Hymenoptera, Eulophidae
Coelaenomenodera elaeidis – Coleoptera, Chrysomelidae: Oil palm leafminer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora prunifoliae – Lepidoptera, Coleophoridae
Coleophora serratella – Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coleotechnites thujaella – Lepidoptera, Gelechiidae: Brown arborvitae leafminer
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Diprion pini – Hymenoptera, Diprionidae
Diprion simile – Hymenoptera, Diprionidae: Pine sawfly
Donacivola saccharella – Lepidoptera, Elachistidae
Elasmus leucopterae – Hymenoptera, Eulophidae
Eriocrania sparrmannella – Lepidoptera, Eriocraniidae
Exoteleia nepheos – Lepidoptera, Gelechiidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer
Gilpinia hercyniae – Hymenoptera, Diprionidae: European spruce sawfly
Gilpinia pallida – Hymenoptera, Diprionidae
Gilpinia polytoma – Hymenoptera, Diprionidae
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Heterospilus coffeicola – Hymenoptera, Braconidae
Hydrellia griseola – Diptera, Ephydriidae
Leucanthiza dircella – Lepidoptera, Gracillariidae
Leucoptera coffeina – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coma – Lepidoptera, Lyonetiidae
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf
miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Leucoptera sphenograpta – Lepidoptera, Lyonetiidae
Liocrobyla lobata – Lepidoptera, Gracillariidae
Liriomyza flaveola – Diptera, Agromyzidae
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza pseudopygmina – Diptera, Agromyzidae
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza strigata – Diptera, Agromyzidae
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Massalongia rubra – Diptera, Cecidomyiidae
Melanagromyza theae – Diptera, Agromyzidae
Meoneura obscurella – Diptera, Carnidae
Messa hortulana – Hymenoptera, Tenthredinidae

Metallus rohweri – Hymenoptera, Tenthredinidae
Metopomyza scutellata – Diptera, Agromyzidae
Microrhopala xerene – Coleoptera, Chrysomelidae
Nematus pallipes – Hymenoptera, Tenthredinidae
Neodiprion abbotii – Hymenoptera, Diprionidae: Pine sawfly
Neodiprion excitans – Hymenoptera, Diprionidae: Blackheaded pine sawfly
Neodiprion lecontei – Hymenoptera, Diprionidae: Redheaded pine sawfly
Neodiprion pinetum – Hymenoptera, Diprionidae: White pine sawfly
Neodiprion pratti – Hymenoptera, Diprionidae: Jack pine sawfly or Virginia pine sawfly
Neodiprion rugifrons – Hymenoptera, Diprionidae: Redheaded jack pine sawfly
Neodiprion sertifer – Hymenoptera, Diprionidae: European pine sawfly
Neodiprion swainei – Hymenoptera, Diprionidae: Swaine pine sawfly
Neodiprion virginiana – Hymenoptera, Diprionidae
Neosymydobius chrysolepis – Hemiptera, Aphididae
Ocnerostoma piniariellum – Lepidoptera, Yponomeutidae: Ermine moth
Pachypsylla celtidisgemma – Hemiptera, Psyllidae: Hackberry bud gall psyllid
Pachypsylla celtidisvesiculum – Hemiptera, Psyllidae: Hackberry blistergall psyllid
Paraclemensia acerifoliella – Lepidoptera, Incurvariidae: Maple leafcutter moth
Parectopa robiniella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parornix persicella – Lepidoptera, Gracillariidae
Phenacaspis pinifoliae – Hemiptera, Diaspididae: Pine needle scale
Pholetesor circumscriptus – Hymenoptera, Braconidae
Pholetesor ornigis – Hymenoptera, Braconidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis insignis – Lepidoptera, Gracillariidae
Phyllocnistis magnoliella – Lepidoptera, Gracillariidae: Magnolia serpentine leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or
Aspen leafminer
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllocnistis unipunctella – Lepidoptera, Gracillariidae: Poplar leafminer
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter celtidis – Lepidoptera, Gracillariidae
Phyllonorycter celtisella – Lepidoptera, Gracillariidae
Phyllonorycter crataegella – Lepidoptera, Gracillariidae: apple blotch leafminer
Phyllonorycter distentella – Lepidoptera, Gracillariidae
Phyllonorycter froelichiella – Lepidoptera, Gracillariidae
Phyllonorycter lucetiella – Lepidoptera, Gracillariidae: Basswood squareblotch miner
Phyllonorycter maestingella – Lepidoptera, Gracillariidae
Phyllonorycter malimalifoliella – Lepidoptera, Gracillariidae: Spotted tentiform
leafminer
Phyllonorycter manni – Lepidoptera, Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter populiella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae

Phyllonorycter propinquella – Lepidoptera, Gracillariidae: cherry blotchminer
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter salicifoliella – Lepidoptera, Gracillariidae: Aspen blotch leaf miner
Phyllonorycter saliciphaga – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter tristrigella – Lepidoptera, Gracillariidae
Phytoliriomyza clara – Diptera, Agromyzidae
Phytoliriomyza melampyga – Diptera, Agromyzidae
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza heringiana – Diptera, Agromyzidae
Phytomyza ilicicola – Diptera, Agromyzidae: Native holly leafminer
Phytomyza ilicis – Diptera, Agromyzidae: Holly leafminer
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza obscurella – Diptera, Agromyzidae
Phytomyza phillyreae – Diptera, Agromyzidae
Plagiodera versicolora – Coleoptera, Chrysomelidae
Plesio nipa – Coleoptera, Hispidae
Pligalis agraules – Hymenoptera, Eulophidae
Polyconia spinicornis – Coleoptera, Chrysomelidae
Procontarinia matteianna – Diptera, Cecidomyiidae
Profenusa lucifex – Hymenoptera, Tenthredinidae
Profenusa pygmaea – Hymenoptera, Tenthredinidae
Promecotheca cumingii – Coleoptera, Chrysomelidae: Coconut leafminer
Promecotheca nuciferae – Coleoptera, Chrysomelidae: Coconut leafminer
Promecotheca opacicollis – Coleoptera, Hispidae
Promecotheca papuana – Coleoptera, Hispidae
Promecotheca reichei – Coleoptera, Chrysomelidae: Coconut leaf mining beetle or palm
leaf mining beetle
Pseudonapomyza spicata – Diptera, Agromyzidae: Maize leafminer
Pygostolus falcatus – Hymenoptera, Braconidae
Rhopalomyia florum – Diptera, Cecidomyiidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus populi – Coleoptera, Curculionidae
Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Rynchaenus rufipes – Coleoptera, Curculionidae
Stigmella carpinella – Lepidoptera, Nepticulidae
Stigmella gossypii – Lepidoptera, Nepticulidae: Cotton leafminer
Stigmella juglandifoliella – Lepidoptera, Nepticulidae: Pecan serpentine leafminer
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stilbosis ostryaella – Lepidoptera, Cosmopterigidae: Ironwood leafminer
Targionia vitis – Hemiptera, Diaspididae
Tischeria deciduas – Lepidoptera, Tischeriidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner

Trachys virescens – Coleoptera, Buprestidae
Tropicomyia flacourthiae – Diptera, Agromyzidae
Tropicomyia theae – Diptera, Agromyzidae: Tea leaf miner

Achrysocharella (subgenus of *Closterocerus*)

Host:

Chromatomyia aprilina – Diptera, Agromyzidae
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Parectopa robinella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Trachys virescens – Coleoptera, Buprestidae

Chrysocharis

Host:

Acalyptis loranthella – Lepidoptera, Nepticulidae
Acidia cognata – Diptera, Tephritidae
Acrocercops brongniardella – Lepidoptera, Gracillariidae
Aethecerus pinifolii – Hymenoptera, Ichneumonidae
Agromyza abiens – Diptera, Agromyzidae
Agromyza albipennis – Diptera, Agromyzidae
Agromyza alnibetulae – Diptera, Agromyzidae
Agromyza aristata – Diptera, Agromyzidae: Elm agromyzid leafminer
Agromyza bicophaga – Diptera, Agromyzidae
Agromyza demeijerei – Diptera, Agromyzidae
Agromyza dipsaci – Diptera, Agromyzidae
Agromyza ferruginosa – Diptera, Agromyzidae
Agromyza flaviceps – Diptera, Agromyzidae
Agromyza frontella – Diptera, Agromyzidae
Agromyza lathyri – Diptera, Agromyzidae
Agromyza myosotidis – Diptera, Agromyzidae
Agromyza nana – Diptera, Agromyzidae
Agromyza nigrescens – Diptera, Agromyzidae
Agromyza nigripes – Diptera, Agromyzidae
Agromyza orobi – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner, Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Agromyza potentillae – Diptera, Agromyzidae
Agromyza pseudorufipes – Diptera, Agromyzidae
Agromyza reptans – Diptera, Agromyzidae
Agromyza rufipes – Diptera, Agromyzidae
Agromyza spiraeoidearum – Diptera, Agromyzidae
Agromyza viciae – Diptera, Agromyzidae
Agromyza yanonensis – Diptera, Agromyzidae
Amauromyza flavifrons – Diptera, Agromyzidae
Amauromyza gyrans – Diptera, Agromyzidae

Amauromyza labiatarum – Diptera, Agromyzidae
Amauromyza maculosa – Diptera, Agromyzidae: Chrysanthemum leaf miner
Amauromyza morionella – Diptera, Agromyzidae
Amauromyza verbasci – Diptera, Agromyzidae
Anacampsis populella – Lepidoptera, Gelechiidae
Archips argyrospila – Lepidoptera, Tortricidae: Fruittree leafroller
Argyresthia aureoargentella – Lepidoptera, Argyresthiidae: Canadian arborative
leafminer
Aulagromyza cornigera – Diptera, Agromyzidae
Aulagromyza fulvicornis – Diptera, Agromyzidae
Aulagromyza hendeliana – Diptera, Agromyzidae
Aulagromyza heringi – Diptera, Agromyzidae
Aulagromyza lucens – Diptera, Agromyzidae
Aulagromyza orbitalis – Diptera, Agromyzidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Aulagromyza spenceri – Diptera, Agromyzidae
Aulagromyza tremulae – Diptera, Agromyzidae
Aylax flavicornis – Hymenoptera, Cynipidae
Blastotere laevigatella – Lepidoptera, Yponomeutidae: Larch shoot moth
Bohemannia pulverosella – Lepidoptera, Nepticulidae
Brachys tessellates – Coleoptera, Buprestidae
Bucculatrix ainsliella – Lepidoptera, Bucculatricidae: Oak skeletonizer
Bucculatrix canadensisella – Lepidoptera, Bucculatricidae: Birch skeletonizer
Cameraria aceriella – Lepidoptera, Gracillariidae: Maple leafblotch miner
Cameraria agrifoliella – Lepidoptera, Gracillariidae: Live oak leaf blotchminer
Cameraria bethunella – Lepidoptera, Gracillariidae: Bethune leafblotch miner or
Bethune's leafminer
Cameraria caryaefoliella – Lepidoptera, Gracillariidae
Cameraria corylisella – Lepidoptera, Gracillariidae
Cameraria guttifinitella – Lepidoptera, Gracillariidae
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer
Cameraria hikosanensis – Lepidoptera, Gracillariidae
Cameraria jacintoensis – Lepidoptera, Gracillariidae
Cameraria nemoris – Lepidoptera, Gracillariidae
Cameraria niphonica – Lepidoptera, Gracillariidae
Cameraria picturatella – Lepidoptera, Gracillariidae
Callisto denticulella – Lepidoptera, Gracillariidae
Caloptilia ostryaeella – Lepidoptera, Gracillariidae
Caloptilia ulmi – Lepidoptera, Gracillariidae
Calycomyza artemisiae – Diptera, Agromyzidae
Calycomyza eupatorivora – Diptera, Agromyzidae
Calycomyza humeralis – Diptera, Agromyzidae: Aster leafminer
Calycomyza jucunda – Diptera, Agromyzidae
Calycomyza lantanae – Diptera, Agromyzidae
Calycomyza majuscula – Diptera, Agromyzidae

Calycomyza malvae – Diptera, Agromyzidae
Calycomyza menthae – Diptera, Agromyzidae
Calycomyza promissa – Diptera, Agromyzidae
Calycomyza solidaginis – Diptera, Agromyzidae
Calycomyza sonchi – Diptera, Agromyzidae
Calycomyza verbenivora – Diptera, Agromyzidae
Cerodontha angulata – Diptera, Agromyzidae
Cerodontha atra – Diptera, Agromyzidae
Cerodontha bimaculata – Diptera, Agromyzidae
Cerodontha bisetiorbita – Diptera, Agromyzidae
Cerodontha caricicola – Diptera, Agromyzidae
Cerodontha caricivora – Diptera, Agromyzidae
Cerodontha dorsalis – Diptera, Agromyzidae: Grass sheathminer
Cerodontha fulvipes – Diptera, Agromyzidae
Cerodontha incise – Diptera, Agromyzidae
Cerodontha iraeos – Diptera, Agromyzidae
Cerodontha iridis – Diptera, Agromyzidae
Cerodontha morose – Diptera, Agromyzidae
Cerodontha okazakii – Diptera, Agromyzidae
Cerodontha pygmaea – Diptera, Agromyzidae
Cerodontha sasakawai – Diptera, Agromyzidae
Ceutorhynchus contractus – Coleoptera, Curculionidae: Cabbage leaf weevil
Chlorops novakii – Diptera, Chloropidae
Choristoneura murinana – Lepidoptera, Tortricidae: European fir budworm
Chromatomyia aprilina – Diptera, Agromyzidae
Chromatomyia chamaemetabola – Diptera, Agromyzidae
Chromatomyia cinnae – Diptera, Agromyzidae
Chromatomyia fuscula – Diptera, Agromyzidae
Chromatomyia gregaria – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia ixeridopsis – Diptera, Agromyzidae
Chromatomyia kluanensis – Diptera, Agromyzidae
Chromatomyia lactuca – Diptera, Agromyzidae
Chromatomyia linnaeae – Diptera, Agromyzidae
Chromatomyia loniceriae – Diptera, Agromyzidae
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia nigra – Diptera, Agromyzidae
Chromatomyia nigrilineata – Diptera, Agromyzidae
Chromatomyia periclymeni – Diptera, Agromyzidae
Chromatomyia poae – Diptera, Agromyzidae
Chromatomyia primulae – Diptera, Agromyzidae
Chromatomyia pseudomilii – Diptera, Agromyzidae
Chromatomyia ramosa – Diptera, Agromyzidae
Chromatomyia scabiosae – Diptera, Agromyzidae
Chromatomyia shepherdiana – Diptera, Agromyzidae
Chromatomyia suikazuriae – Diptera, Agromyzidae

Chromatomyia symphoricarpi – Diptera, Agromyzidae
Chromatomyia syngenesiae- Diptera, Agromyzidae: Chrysanthemum leafminer
Chromatomyia thermarum – Diptera, Agromyzidae
Chromatomyia tiarellae – Diptera, Agromyzidae
Chromatomyia torrentium – Diptera, Agromyzidae
Chrysoesthia drurella – Lepidoptera, Gelechiidae
Chrysoesthia sexguttella – Lepidoptera, Gelechiidae
Cimbex americana – Hymenoptera, Cimbicidae: Elm sawfly
Coccinella vigintiquatuorpunctata – Coleoptera, Coccinellidae
Colastes braconius – Hymenoptera, Braconidae
Coleophora alticolella – Lepidoptera, Coleophoridae
Coleophora flavipennella – Lepidoptera, Coleophoridae
Coleophora ibipennella – Lepidoptera, Coleophoridae
Coleophora laricella- Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora luscinaepennella – Lepidoptera, Coleophoridae
Coleophora lutipennella – Lepidoptera, Coleophoridae: Oak case-bearer
Coleophora ostryae – Lepidoptera, Coleophoridae
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora serratella– Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites thujaella – Lepidoptera, Gelechiidae: Brown arborvitae leafminer
Copidosoma deceptor – Hymenoptera, Encyrtidae
Coptodisca arbutiella – Lepidoptera, Heliozelidae
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Cordilurina albipes – Diptera, Anthomyiidae
Crinopteryx familiella – Lepidoptera, Crinopterygidae
Dibolia borealis – Coleoptera, Chrysomelidae
Diplolepis lens – Hymenoptera, Cynipidae
Diplolepis rosaefolii – Hymenoptera, Cynipidae
Dolichogenidea californica – Hymenoptera, Braconidae
Donacivola saccharella – Lepidoptera, Elachistidae
Ectoedemia albifasciella – Lepidoptera, Nepticulidae
Ectoedemia argyropeza – Lepidoptera, Nepticulidae
Ectoedemia heringella – Lepidoptera, Nepticulidae
Ectoedemia minimella – Lepidoptera, Nepticulidae
Ectoedemia occultella – Lepidoptera, Nepticulidae
Ectoedemia platanella – Lepidoptera, Nepticulidae: Sycamore leafblotch miner
Ectoedemia rubivora – Lepidoptera, Nepticulidae
Ectoedemia spinosella – Lepidoptera, Nepticulidae
Ectoedemia subbimaculella – Lepidoptera, Nepticulidae
Elachista cerusella – Lepidoptera, Elachistidae
Elachista pomerana – Lepidoptera, Elachistidae
Emmetia angusticolella – Lepidoptera, Tischeriidae
Emmetia heinemanni – Lepidoptera, Tischeriidae
Emmetia marginea – Lepidoptera, Tischeriidae
Enteucha acetosae – Lepidoptera, Nepticulidae

Epinotia meritana – Lepidoptera, Tortricidae: White fir needleminer
Epinotia thapsiana – Lepidoptera, Tortricidae
Eriocrania sparrmannella – Lepidoptera, Eriocraniidae
Euleia heraclei – Diptera, Tephritidae: Celery fly
Fenusa dohrnii – Hymenoptera, Tenthredinidae: European alder leafminer
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer
Fomoria septembrella – Lepidoptera, Nepticulidae
Galiomyza galiivora – Diptera, Agromyzidae
Galiomyza morio – Diptera, Agromyzidae
Gilpinia hercyniae – Hymenoptera, Diprionidae: spruce sawfly
Gracillaria japonica – Lepidoptera, Gracillariidae
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Haplodiplosis marginata – Lepidoptera, Cecidomyiidae: Saddle gall midge
Haritalodes derogata – Lepidoptera, Pyralidae: Cotton leaf roller
Henosepilachna vigintioctopunctata – Coleoptera, Coccinellidae: Twentysix-spotted potato ladybird
Heterarthrus aceris – Hymenoptera, Tenthredinidae
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Heterarthrus vegans – Hymenoptera, Tenthredinidae
Hispoleptis subfasciata – Coleoptera, Chrysomelidae
Holocacista rivillei – Lepidoptera, Heliozelidae
Hydrellia griseola – Diptera, Ephydriidae
Japanagromyza inaequalis – Diptera, Agromyzidae
Japanagromyza polygoni – Diptera, Agromyzidae
Keiferia lycopersicella – Lepidoptera, Gelechiidae: Tomato pinworm
Leucanthiza dircella – Lepidoptera, Gracillariidae
Leucoptera albella – Lepidoptera, Lyonetiidae
Leucoptera coffeina – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera lathyrioliella – Lepidoptera, Lyonetiidae
Leucoptera lotella – Lepidoptera, Lyonetiidae
Leucoptera lustratella – Lepidoptera, Lyonetiidae
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Liriomyza amoena – Diptera, Agromyzidae
Liriomyza artemisicola – Diptera, Agromyzidae
Liriomyza asterivora – Diptera, Agromyzidae
Liriomyza bahamondesi – Diptera, Agromyzidae
Liriomyza borealis – Diptera, Agromyzidae
Liriomyza brassicae – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza bryoniae – Diptera, Agromyzidae: Celery miner
Liriomyza commelinae – Diptera, Agromyzidae

Liriomyza congesta – Diptera, Agromyzidae: Bean leafminer
Liriomyza eupatorii – Diptera, Agromyzidae
Liriomyza flaveola – Diptera, Agromyzidae
Liriomyza fricki – Diptera, Agromyzidae
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer
Liriomyza imurai – Diptera, Agromyzidae
Liriomyza katoi – Diptera, Agromyzidae
Liriomyza lathyri – Diptera, Agromyzidae
Liriomyza occipitalis – Diptera, Agromyzidae
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza ptarmicae – Diptera, Agromyzidae
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza quadrata – Diptera, Agromyzidae
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza schmidtii – Diptera, Agromyzidae
Liriomyza smilacinae – Diptera, Agromyzidae
Liriomyza sonchi – Diptera, Agromyzidae
Liriomyza sorosis – Diptera, Agromyzidae
Liriomyza strigata – Diptera, Agromyzidae
Liriomyza takakoe – Diptera, Agromyzidae
Liriomyza tanacetii – Diptera, Agromyzidae
Liriomyza taraxaci – Diptera, Agromyzidae
Liriomyza trifoliarum – Diptera, Agromyzidae
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Liriomyza virgo – Diptera, Agromyzidae
Lochmaea caprea – Lepidoptera, Chrysomelidae: Willow leaf beetle
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Lyonetia prunifoliella – Lepidoptera, Lyonetiidae
Masakimyia pustulae – Diptera, Cecidomyiidae: Euonymus gall midge
Mayetiola destructor – Diptera, Cecidomyiidae: Hessian fly
Melanagromyza cunctans – Diptera, Agromyzidae
Melanagromyza haba – Diptera, Agromyzidae
Melanagromyza virens – Diptera, Agromyzidae
Melanagromyza viridis – Diptera, Agromyzidae
Messa glaucopis – Hymenoptera, Tenthredinidae
Messa hortulana – Hymenoptera, Tenthredinidae
Messa nana – Hymenoptera, Tenthredinidae: Early birch leaf edgeminer
Messa populifoliella – Hymenoptera, Tenthredinidae
Metopomyza scutellata – Diptera, Agromyzidae
Metriochroa latifoliella – Lepidoptera, Gracillariidae: Small olive leafminer
Microgaster globate – Hymenoptera, Braconidae
Microterys masii – Hymenoptera, Encyrtidae
Napomyza lateralis – Diptera, Agromyzidae
Napomyza xylostei – Diptera, Agromyzidae
Nemorimyza posticata – Diptera, Agromyzidae
Neolithocolletis hikomonticola – Lepidoptera, Gracillariidae

Neuroterus quercusminutissimus – Hymenoptera, Cynipidae
Omiodes indicata – Lepidoptera, Pyralidae
Ophiomyia camarae – Diptera, Agromyzidae: Herringbone leaf-mining fly
Ophiomyia cunctata – Diptera, Agromyzidae
Ophiomyia curvipalpis – Diptera, Agromyzidae
Ophiomyia maura – Diptera, Agromyzidae
Ophiomyia spencerella – Diptera, Agromyzidae: Bean-stem maggot or beanfly
Ophiomyia texana – Diptera, Agromyzidae
Opius caesus – Hymenoptera, Braconidae
Palaeocimbex quadrimaculata – Hymenoptera, Cimbicidae
Pammene tsugae – Lepidoptera, Tortricidae
Parallelomma medium – Diptera, Anthomyiidae
Parectopa geometropis – Lepidoptera, Gracillariidae
Parectopa robiniella – Lepidoptera Gracillariidae: Locust digitate leafminer
Parornix alni – Lepidoptera Gracillariidae
Parornix devoniella – Lepidoptera, Gracillariidae
Pholetesor circumscriptus – Hymenoptera, Braconidae
Pholetesor ornigis – Hymenoptera, Braconidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or
Aspen leafminer
Phyllocnistis saligna – Lepidoptera, Gracillariidae
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllocnistis unipunctella - Lepidoptera, Gracillariidae: Poplar leafminer
Phyllocnistis xenia – Lepidoptera, Gracillariidae
Phyllocolpa leucosticte – Hymenoptera, Tenthredinidae
Phyllonorycter aceracerarum – Lepidoptera, Gracillariidae
Phyllonorycter acerifoliella – Lepidoptera, Gracillariidae
Phyllonorycter acernella – Lepidoptera Gracillariidae
Phyllonorycter alnicolella – Lepidoptera, Gracillariidae
Phyllonorycter alpine – Lepidoptera, Gracillariidae
Phyllonorycter anderidae – Lepidoptera, Gracillariidae
Phyllonorycter bicinctella – Lepidoptera, Gracillariidae
Phyllonorycter blancardella- Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter carpini – Lepidoptera, Gracillariidae
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter celtisella – Lepidoptera, Gracillariidae
Phyllonorycter comparella – Lepidoptera, Gracillariidae
Phyllonorycter connexella – Lepidoptera, Gracillariidae
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella- Lepidoptera Gracillariidae: Apple blotch leafminer
Phyllonorycter cydoniella – Lepidoptera Gracillariidae
Phyllonorycter dubitella – Lepidoptera, Gracillariidae
Phyllonorycter elmaella – Lepidoptera Gracillariidae: Western tentiform leafminer
Phyllonorycter emberizaepennella – Lepidoptera Gracillariidae
Phyllonorycter FAGIFOLIA – Lepidoptera, Gracillariidae

Phyllonorycter froelichiella – Lepidoptera Gracillariidae
Phyllonorycter hancola – Lepidoptera, Gracillariidae
Phyllonorycter harrisella – Lepidoptera, Gracillariidae
Phyllonorycter heegeriella – Lepidoptera Gracillariidae
Phyllonorycter helianthemella – Lepidoptera, Gracillariidae
Phyllonorycter insignitella – Lepidoptera Gracillariidae
Phyllonorycter issikii – Lepidoptera Gracillariidae
Phyllonorycter jezoniella – Lepidoptera Gracillariidae
Phyllonorycter joannisi – Lepidoptera Gracillariidae
Phyllonorycter jozanae – Lepidoptera Gracillariidae
Phyllonorycter kleemannella – Lepidoptera Gracillariidae
Phyllonorycter laciniatae – Lepidoptera Gracillariidae
Phyllonorycter lantanella – Lepidoptera Gracillariidae
Phyllonorycter lautella – Lepidoptera Gracillariidae
Phyllonorycter leucocorona – Lepidoptera Gracillariidae
Phyllonorycter lucetiella – Lepidoptera Gracillariidae: Basswood squareblotch miner
Phyllonorycter lyoniae – Lepidoptera Gracillariidae
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter malimalifoliella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter manni – Lepidoptera, Gracillariidae
Phyllonorycter mespilella – Lepidoptera, Gracillariidae: Tentiform leafminer
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter nicellii – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae
Phyllonorycter nipponicella – Lepidoptera Gracillariidae
Phyllonorycter orientalis – Lepidoptera Gracillariidae: Apple leaf mining moth
Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter padella – Lepidoptera Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter platanoidella – Lepidoptera, Gracillariidae
Phyllonorycter pomifoliella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter propinquinella – Lepidoptera, Gracillariidae: cherry blotchminer
Phyllonorycter pyrifoliella – Lepidoptera Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quinnata – Lepidoptera, Gracillariidae
Phyllonorycter rajella – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter salicicolella – Lepidoptera Gracillariidae
Phyllonorycter salicifoliella – Lepidoptera, Gracillariidae: Aspen blotch leaf miner
Phyllonorycter salictella – Lepidoptera Gracillariidae
Phyllonorycter salictella viminiella – Lepidoptera, Gracillariidae
Phyllonorycter saportella – Lepidoptera Gracillariidae
Phyllonorycter schreberella – Lepidoptera Gracillariidae

Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter sorbicola – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter spinolella – Lepidoptera, Gracillariidae
Phyllonorycter stettinensis – Lepidoptera, Gracillariidae
Phyllonorycter strigulatella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter tristrigella – Lepidoptera, Gracillariidae
Phyllonorycter turugisana – Lepidoptera, Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phyllonorycter viburni – Lepidoptera, Gracillariidae
Phyllonorycter viminetorum – Lepidoptera, Gracillariidae
Phyllonorycter watanabei – Lepidoptera, Gracillariidae
Phytobia sonderupi – Diptera, Agromyzidae
Phytoliriomyza clara – Diptera, Agromyzidae
Phytoliriomyza felti – Diptera, Agromyzidae
Phytoliriomyza hilairella – Diptera, Agromyzidae
Phytoliriomyza melampyga – Diptera, Agromyzidae
Phytoliriomyza variegata – Diptera, Agromyzidae
Phytomyza aconite – Diptera, Agromyzidae
Phytomyza aegopodii – Diptera, Agromyzidae
Phytomyza affinis – Diptera, Agromyzidae
Phytomyza agromyzina – Diptera, Agromyzidae
Phytomyza albiceps – Diptera, Agromyzidae
Phytomyza albimargo – Diptera, Agromyzidae
Phytomyza alpine – Diptera, Agromyzidae
Phytomyza angelicae – Diptera, Agromyzidae
Phytomyza angelicastris – Diptera, Agromyzidae
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza aquilegiana – Diptera, Agromyzidae: Columbine leafminer
Phytomyza aquilegiovora – Diptera, Agromyzidae: Columbine leafminer
Phytomyza aralivora – Diptera, Agromyzidae
Phytomyza archangelicae – Diptera, Agromyzidae
Phytomyza artemisivora – Diptera, Agromyzidae
Phytomyza brunnipes – Diptera, Agromyzidae
Phytomyza calthivora – Diptera, Agromyzidae
Phytomyza calthophila – Diptera, Agromyzidae
Phytomyza chaerophylli – Diptera, Agromyzidae
Phytomyza cicutae – Diptera, Agromyzidae
Phytomyza ciliolate – Diptera, Agromyzidae
Phytomyza cirsii – Diptera, Agromyzidae
Phytomyza citisi – Diptera, Agromyzidae
Phytomyza columbiana – Diptera, Agromyzidae
Phytomyza conyzae – Diptera, Agromyzidae
Phytomyza crassiseta – Diptera, Agromyzidae

Phytomyza decida – Diptera, Agromyzidae
Phytomyza delphinivora – Diptera, Agromyzidae: Larkspur leafminer
Phytomyza dryoptericola – Diptera, Agromyzidae
Phytomyza eupatorii – Diptera, Agromyzidae
Phytomyza fulgens – Diptera, Agromyzidae
Phytomyza geniculata – Diptera, Agromyzidae
Phytomyza gentianae – Diptera, Agromyzidae
Phytomyza glechomae – Diptera, Agromyzidae
Phytomyza heringiana – Diptera, Agromyzidae
Phytomyza hypophylla – Diptera, Agromyzidae
Phytomyza ilicicola – Diptera, Agromyzidae: Native holly leafminer
Phytomyza ilicis – Diptera, Agromyzidae: Holly leafminer
Phytomyza japonica – Diptera, Agromyzidae
Phytomyza jucunda – Diptera, Agromyzidae
Phytomyza krygeri – Diptera, Agromyzidae
Phytomyza lappina – Diptera, Agromyzidae
Phytomyza lycopi – Diptera, Agromyzidae
Phytomyza marginella – Diptera, Agromyzidae
Phytomyza melana – Diptera, Agromyzidae
Phytomyza merula – Diptera, Agromyzidae
Phytomyza messaniella – Diptera, Agromyzidae
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza mitellae – Diptera, Agromyzidae
Phytomyza mylini – Diptera, Agromyzidae
Phytomyza myosotica – Diptera, Agromyzidae
Phytomyza nigrifella – Diptera, Agromyzidae
Phytomyza notata – Diptera, Agromyzidae
Phytomyza obscura – Diptera, Agromyzidae
Phytomyza obscurella – Diptera, Agromyzidae
Phytomyza oreas – Diptera, Agromyzidae
Phytomyza origami – Diptera, Agromyzidae
Phytomyza ovalis – Diptera, Agromyzidae
Phytomyza paniculatae – Diptera, Agromyzidae
Phytomyza pastinacae – Diptera, Agromyzidae
Phytomyza pauliloewii – Diptera, Agromyzidae
Phytomyza penstemonis – Diptera, Agromyzidae
Phytomyza peregrine – Diptera, Agromyzidae
Phytomyza persicae – Diptera, Agromyzidae
Phytomyza petoei – Diptera, Agromyzidae
Phytomyza plantaginis – Diptera, Agromyzidae
Phytomyza platensis – Diptera, Agromyzidae
Phytomyza plumiseta – Diptera, Agromyzidae
Phytomyza podagrariae – Diptera, Agromyzidae
Phytomyza prava – Diptera, Agromyzidae
Phytomyza pubicornis – Diptera, Agromyzidae
Phytomyza pullula – Diptera, Agromyzidae

Phytomyza pulvinariae – Diptera, Agromyzidae
Phytomyza rajella – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Phytomyza rydeni – Diptera, Agromyzidae
Phytomyza saniculae – Diptera, Agromyzidae
Phytomyza saxifragae – Diptera, Agromyzidae
Phytomyza saximontana – Diptera, Agromyzidae
Phytomyza scopulina – Diptera, Agromyzidae
Phytomyza senecionella – Diptera, Agromyzidae
Phytomyza sii – Diptera, Agromyzidae
Phytomyza silai – Diptera, Agromyzidae
Phytomyza solidaginis – Diptera, Agromyzidae
Phytomyza sorbi – Diptera, Agromyzidae
Phytomyza spinaciae – Diptera, Agromyzidae
Phytomyza spondylii – Diptera, Agromyzidae
Phytomyza subtilis – Diptera, Agromyzidae
Phytomyza symphyti – Diptera, Agromyzidae
Phytomyza tamui – Diptera, Agromyzidae
Phytomyza tetrasticha – Diptera, Agromyzidae
Phytomyza thalictrivora – Diptera, Agromyzidae
Phytomyza thysselini – Diptera, Agromyzidae
Phytomyza thysselinivora – Diptera, Agromyzidae
Phytomyza tlingitia – Diptera, Agromyzidae
Phytomyza tordylii – Diptera, Agromyzidae
Phytomyza trollii – Diptera, Agromyzidae
Phytomyza tundrensis – Diptera, Agromyzidae
Phytomyza tussilaginis – Diptera, Agromyzidae
Phytomyza vitalbae – Diptera, Agromyzidae
Phytomyza vomitoriae – Diptera, Agromyzidae
Phytomyza williamsoni – Diptera, Agromyzidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Profenusa pygmaea – Hymenoptera, Tenthredinidae
Profenusa thomsoni – Hymenoptera, Tenthredinidae: Amber marked birch leafminer or
 amber marked leafminer
Protolithocolletis lathyri – Lepidoptera, Gracillariidae
Pseudonapomyza atra – Diptera, Agromyzidae
Pseudonapomyza spicata – Diptera, Agromyzidae: Maize leafminer
Rhamphus pulicarius – Coleoptera, Curculionidae
Rhopalomyia libocedri – Diptera, Cecidomyiidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus aterrhimus – Coleoptera, Curculionidae
Rynchaenus fagi – Coleoptera, Curculionidae
Rynchaenus japonicus – Coleoptera, Curculionidae
Rynchaenus mutabilis – Coleoptera, Curculionidae
Rynchaenus pallicornis – Coleoptera, Curculionidae
Rynchaenus populi – Coleoptera, Curculionidae

Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Rynchaenus rufipes – Coleoptera, Curculionidae
Rynchaenus rusci – Coleoptera, Curculionidae
Rynchaenus salicis – Coleoptera, Curculionidae
Rynchaenus sanguinipes – Coleoptera, Curculionidae
Rynchaenus subfasciatus – Coleoptera, Curculionidae
Rynchaenus takabayashii – Coleoptera, Curculionidae
Rynchaenus testaceus – Coleoptera, Curculionidae
Scaptomyza adusta – Diptera, Drosophilidae
Scaptomyza flava – Diptera, Drosophilidae
Scaptomyza graminum – Diptera, Drosophilidae
Scolioneura betuleti – Hymenoptera, Tenthredinidae
Silliana hommei – Hymenoptera, Tenthredinidae
Simplimorpha promissa – Lepidoptera, Nepticulidae
Spilonota ocellana – Lepidoptera, Tortricidae: Eye-spotted budmoth
Stigmella aceris – Lepidoptera, Nepticulidae
Stigmella aeneofasciella – Lepidoptera, Nepticulidae
Stigmella alnetella – Lepidoptera, Nepticulidae
Stigmella anomalella – Lepidoptera, Nepticulidae: Rose leafminer
Stigmella assimilella – Lepidoptera, Nepticulidae
Stigmella atricapitella – Lepidoptera, Nepticulidae
Stigmella aurella – Lepidoptera, Nepticulidae
Stigmella auromarginella – Lepidoptera, Nepticulidae
Stigmella betulicola – Lepidoptera, Nepticulidae
Stigmella caradjai – Lepidoptera, Nepticulidae
Stigmella catharticella – Lepidoptera, Nepticulidae
Stigmella centifoliella – Lepidoptera, Nepticulidae
Stigmella confusella – Lepidoptera, Nepticulidae
Stigmella crataegella – Lepidoptera, Nepticulidae
Stigmella floslactella – Lepidoptera, Nepticulidae
Stigmella freyella – Lepidoptera, Nepticulidae
Stigmella hemargyrella – Lepidoptera, Nepticulidae
Stigmella hybnerella – Lepidoptera, Nepticulidae
Stigmella incognitella – Lepidoptera, Nepticulidae
Stigmella lapponica – Lepidoptera, Nepticulidae
Stigmella latifasciella – Lepidoptera, Nepticulidae
Stigmella lemniscella – Lepidoptera, Nepticulidae
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stigmella mespilicola – Lepidoptera, Nepticulidae
Stigmella microtheriella – Lepidoptera, Nepticulidae
Stigmella minusculella – Lepidoptera, Nepticulidae
Stigmella myrtillella – Lepidoptera, Nepticulidae
Stigmella obliquella – Lepidoptera, Nepticulidae
Stigmella oxyacanthella – Lepidoptera, Nepticulidae
Stigmella paradoxa – Lepidoptera, Nepticulidae
Stigmella perpygmaeella – Lepidoptera, Nepticulidae

Stigmella plagiolella – Lepidoptera, Nepticulidae
Stigmella pomivorella – Lepidoptera, Nepticulidae
Stigmella pretiosa – Lepidoptera, Nepticulidae
Stigmella prunetorum – Lepidoptera, Nepticulidae
Stigmella regiella – Lepidoptera, Nepticulidae
Stigmella rhamnella – Lepidoptera, Nepticulidae
Stigmella ruficapitella – Lepidoptera, Nepticulidae
Stigmella salicis – Lepidoptera, Nepticulidae
Stigmella samiatella – Lepidoptera, Nepticulidae
Stigmella sanguisorbae – Lepidoptera, Nepticulidae
Stigmella slingerlandella – Lepidoptera, Nepticulidae
Stigmella sorbi – Lepidoptera, Nepticulidae
Stigmella speciosa – Lepidoptera, Nepticulidae
Stigmella splendidissimella – Lepidoptera, Nepticulidae
Stigmella suberivora – Lepidoptera, Nepticulidae
Stigmella tiliae – Lepidoptera, Nepticulidae
Stigmella tityrella – Lepidoptera, Nepticulidae
Stigmella trimaculella – Lepidoptera, Nepticulidae
Stigmella ulmarie – Lepidoptera, Nepticulidae
Stigmella ulmivora – Lepidoptera, Nepticulidae
Stigmella viminetcola – Lepidoptera, Nepticulidae
Sympiesis sericeicornis – Hymenoptera, Eulophidae
Taphrocerus schaefferi – Coleoptera, Buprestidae
Tischeria deciduas – Lepidoptera, Tischeriidae
Tischeria dodonaea – Lepidoptera, Tischeriidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Tischeria zelleriella – Lepidoptera, Tischeriidae
Tropicomyia styricicola – Diptera, Agromyzidae
Trypeta artemisiae – Diptera, Tephritidae
Zeiraphera griseana – Lepidoptera: Tortricidae: Dingy larch bell
Zeugophora flavicollis – Coleoptera, Megalopodidae

Neochrysocharis

Hosts:

Acalyptris loranthella – Lepidoptera, Nepticulidae
Acantholyda erythrocephala – Hymenoptera, Pamphiliidae: Pine false webworm
Acantholyda posticalis – Hymenoptera, Pamphiliidae
Agromyza lucida – Diptera, Agromyzidae
Agromyza oryzae – Diptera, Agromyzidae: Rice leafminer, Japanese leaf miner or Japanese rice leafminer
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Aleyrodes proletellus – Hemiptera, Aleyrodidae
Aporia crataegi – Lepidoptera, Pieridae: Black-veined white
Asphondylia conglomerate – Diptera, Cecidomyiidae
Atherigona naqvii – Diptera, Muscidae: Shoot fly

Aulagromyza hendeliana – Diptera, Agromyzidae
Bactocera oleae- Diptera, Tephritidae: Olive fruit fly
Bedellia orchilella – Lepidoptera, Lyonetiidae: Sweetpotato leafminer
Bemisia tabaci – Hemiptera, Aleyrodidae: Tobacco whitefly or sweetpotato whitefly
Blastotere thuiella – Lepidoptera, Agyresthiidae
Bucculatrix crataegi – Lepidoptera, Bucculatricidae
Bucculatrix thurberiella – Lepidoptera, Bucculatricidae: Cotton leaf perforator
Caliroa cerasi – Hymenoptera, Tenthredinidae: Pear sawfly
Calycomyza solidaginis – Diptera, Agromyzidae
Cerodontha angulata – Diptera, Agromyzidae
Chromatomyia aprilina – Diptera, Agromyzidae
Chromatomyia fuscata – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Coelaenomenodera elaeidis – Coleoptera, Chrysomelidae: Oil palm leafminer
Coelaenomenodera perrieri – Coleoptera, Chrysomelidae
Coleophora deauratella – Lepidoptera, Coleophoridae: Red clover pest
Coleophora gazelle – Lepidoptera, Coleophoridae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora microspinella – Lepidoptera, Coleophoridae
Coleophora santolinella – Lepidoptera, Coleophoridae
Coleotechnites apictripunctellus – Lepidoptera, Gelechiidae
Coleotechnites laricella – Lepidoptera, Gelechiidae
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites thujaella – Lepidoptera, Gelechiidae: Brown arborvitae leafminer
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia tibialis – Hymenoptera, Braconidae
Cotesia vestalis – Hymenoptera, Braconidae
Cystiphora schmidtii – Diptera, Cecidomyiidae: Skeleton weed gall midge
Diglyphus intermedius – Hymenoptera, Braconidae
Diprion pini – Hymenoptera, Diprionidae
Diprion simile- Hymenoptera, Diprionidae: pine sawfly
Donacivola fullawayi – Lepidoptera, Elachistidae
Donacivola saccharella – Lepidoptera, Elachistidae
Ectoedemia albifasciella – Lepidoptera, Nepticulidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Holocacista rivillei – Lepidoptera, Heliozelidae
Hydrellia griseola – Diptera, Ephydriidae
Iseropus stercorator – Hymenoptera, Ichneumonidae
Leiopus nebulosus – Coleoptera, Cerambycidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer

Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Liriomyza sorosis – Diptera, Agromyzidae
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Malacosoma disstria – Lepidoptera, Lasiocampidae: Forest tent caterpillar
Mantura floridana – Coleoptera; Chrysomelidae
Meromyza americana – Diptera, Chloropidae: Wheat stem maggot
Metopomyza scutellata – Diptera, Agromyzidae
Metriochroa latifoliella – Lepidoptera, Gracillariidae: Small olive leafminer
Neodiprion fulviceps – Hymenoptera, Diprionidae: Pine infesting sawflies
Neodiprion lecontei – Hymenoptera, Diprionidae: Redheaded pine sawfly
Neodiprion sertifer – Hymenoptera, Diprionidae: European pine sawfly

Greenhouse

Ophiomyia simplex – Diptera, Agromyzidae: Asparagus miner
Oscinella frit – Diptera, Chloropidae
Palaeocimbex quadrimaculata – Hymenoptera, Cimbicidae
Pamphilius signatus – Hymenoptera, Pamphiliidae
Parafomoria helianthemella – Lepidoptera, Nepticulidae
Pegomya hyoscyami – Diptera, Anthomyiidae: Spinach leafminer
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter celtisella – Lepidoptera, Gracillariidae
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter quinnata – Lepidoptera, Gracillariidae
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllotreta aeneicollis – Coleoptera, Chrysomelidae
Phytomyza dianthicola – Diptera, Agromyzidae
Phytomyza angelicastris – Diptera, Agromyzidae
Phytomyza aquilegiae – Diptera, Agromyzidae
Phytomyza heringiana – Diptera, Agromyzidae
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza pubicornis – Diptera, Agromyzidae
Pococera robustella – Lepidoptera, Pyralidae: Pine webworm
Poemyza lateralis – Diptera, Agromyzidae
Pseudonapomyza spicata – Diptera, Agromyzidae: Maize leafminer
Pulvinaria maxima – Hemiptera, Coccidae
Rynchaenus fagi – Coleoptera, Curculionidae

Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Taphrocerus gracilis – Coleoptera, Buprestidae
Tetralicia erianthi – Hemiptera, Aleyrodidae
Therioaphis trifolii – Hemiptera, Aphididae: Spotted alfalfa aphid
Tischeria ekebladella – Lepidoptera, Tischeriidae
Trichogramma embryophagum – Hymenoptera, Trichogrammatidae
Trichogramma evanescens – Hymenoptera, Trichogrammatidae
Trifurcula thymi – Lepidoptera, Nepticulidae
Schizocerella pilicornis – Hymenoptera, Argidae: Portulaca sawfly
Stigmella caradjai – Lepidoptera, Nepticulidae
Stigmella carpinella – Lepidoptera, Nepticulidae
Stigmella centifoliella – Lepidoptera, Nepticulidae
Stigmella crataegella – Lepidoptera, Nepticulidae
Stigmella hahniella – Lepidoptera, Nepticulidae
Stigmella hybnerella – Lepidoptera, Nepticulidae
Stigmella incognitella – Lepidoptera, Nepticulidae
Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Stigmella nylandriella – Lepidoptera, Nepticulidae
Stigmella oxyacanthella – Lepidoptera, Nepticulidae
Stigmella pyri – Lepidoptera, Nepticulidae
Stigmella roborella – Lepidoptera, Nepticulidae
Stigmella ruficapitella – Lepidoptera, Nepticulidae
Stigmella thuringiaca – Lepidoptera, Nepticulidae

Horismenus

Host:

Acanthoscelides floridae – Coleoptera, Bruchidae
Acanthoscelides obtectus – Coleoptera, Bruchidae: Dry bean weevil
Acanthoscelides pallidipennis – Coleoptera, Bruchidae
Acanthoscelides spinipes – Coleoptera, Chrysomelidae
Acanthoscelides submuticus – Coleoptera, Chrysomelidae
Acleris minuta – Lepidoptera, Tortricidae: Yellowheaded fireworm
Acrobasis caryivorella – Lepidoptera, Pyralidae
Acrobasis rubrifasciella – Lepidoptera, Pyralidae
Alabama argillacea – Lepidoptera, Noctuidae: Cotton leafworm
Algarobius prosopis – Coleoptera, Bruchidae
Alurnus humeralis – Coleoptera, Chrysomelidae
Amblycerus robiniae – Coleoptera, Chrysomelidae
Amblycerus submaculatus – Coleoptera, Chrysomelidae
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Ancylis nubeculana – Lepidoptera, Tortricidae
Andricus quercusflocci – Hymenoptera, Cynipidae
Apanteles diatraeae – Hymenoptera, Braconidae
Apanteles fumiferanae – Hymenoptera, Braconidae
Apanteles leucostigmus – Hymenoptera, Braconidae
Apanteles opsiphanis – Hymenoptera, Braconidae

Apechthis bazani – Hymenoptera, Ichneumonidae
Aphidius colemani – Hymenoptera, Braconidae
Apion decoloratum – Coleoptera, Brentidae
Apion seniculus – Coleoptera, Brentidae
Bedellia somnulentella – Lepidoptera, Lyonetiidae: Sweet potato leafminer
Bracon cajani – Hymenoptera, Braconidae
Bracon thurberiphagae – Hymenoptera, Braconidae
Cameraria caryaefoliella – Lepidoptera, Gracillariidae
Cameraria cincinnatiella – Lepidoptera, Gracillariidae: Gregarious oak leafminer
Catocephala amphinome – Lepidoptera, Saturniidae
Catolaccus aeneoviridis – Hymenoptera, Pteromalidae
Ceratomia catalpae – Lepidoptera, Sphingidae: Catalpa sphinx
Ceroplastes novaesi – Hemiptera, Coccidae
Choreutis pariana – Lepidoptera, Choreutidae: Apple leaf skeletonizer
Choristoneura rosaceana – Lepidoptera, Tortricidae: Obliquebanded leafroller
Chrysobothris femorata – Coleoptera, Buprestidae: Flatheaded appletree borer
Chrysopa alobana – Neuroptera, Chrysopidae
Chrysopa arioles – Neuroptera, Chrysopidae
Chrysopa claveri – Neuroptera, Chrysopidae
Chrysopa cubana – Neuroptera, Chrysopidae
Chrysopa iona – Neuroptera, Chrysopidae
Chrysopa lateralis – Neuroptera, Chrysopidae
Chrysopa sanchezi – Neuroptera, Chrysopidae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol case bearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Cotesia americana – Hymenoptera, Braconidae
Cotesia congregata – Hymenoptera, Braconidae
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia melanoscela – Hymenoptera, Braconidae
Cotesia pyraustae – Hymenoptera, Braconidae
Cotesia schizurae – Hymenoptera, Braconidae
Cryptothelea gloverii – Lepidoptera, Psychidae: Orange bagworm
Cylindrocopturus adspersus – Coleoptera, Curculionidae: Sunflower stem weevil
Diaprepes abbreviatus – Coleoptera, Curculionidae: Diaprepes root weevil
Diaprepes famelicus – Coleoptera, Curculionidae
Dichomeris marginella – Lepidoptera, Gelechiidae: Juniper webworm
Dolichogenidea paralechiae – Hymenoptera, Braconidae
Eacles imperialis – Lepidoptera, Saturniidae: Imperial moth
Elasmopalpus lignosellus – Lepidoptera, Pyralidae
Eulechriops manihoti – Coleoptera, Curculionidae
Eumetopiella rufipes – Diptera, Otitidae
Euplectrus comstockii – Hymenoptera, Eulophidae
Euplectrus platyhypenae – Hymenoptera, Eulophidae
Euplectrus puttleri – Hymenoptera, Eulophidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner

Geina periscelidactyla – Lepidoptera, Pterophoridae: Plume moth
Glyptapanteles concinnus – Hymenoptera, Braconidae
Hemisphaerota cyanea – Coleoptera, Chrysomelidae: Tortoise beetle or Florida tortoise beetle
Homaledra sabalella – Lepidoptera, Coleophoridae: Palm leaf skeletonizer
Iconella etiellae – Hymenoptera, Braconidae
Lethata anophthalma – Lepidoptera, Oecophoridae
Leucania latiuscula – Lepidoptera, Noctuidae
Leucochrysa varia – Neuroptera, Chrysopidae
Leucoma salicis – Lepidoptera, Lyonetiidae: Satin Moth
Leucoptera albelli – Lepidoptera, Lyonetiidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Lixus musculus – Coleoptera, Curculionidae
Lixus perforatus – Coleoptera, Curculionidae
Lixus scrobicollis – Coleoptera, Curculionidae
Macromphalia dedecora – Lepidoptera, Lasiocampidae
Mantispa decorata – Neuroptera, Mantispidae
Mayetiola destructor – Diptera, Cecidomyiidae: Hessian fly
Megalopyge urens – Lepidoptera, Megalopygidae
Meromyza americana – Diptera, Chloropidae: Wheat stem maggot
Metagonistylum minense – Diptera, Tachinidae
Meteorus deltae – Hymenoptera, Braconidae
Microplitis ceratoniae – Hymenoptera, Braconidae
Mimosestes amicus – Coleoptera, Bruchidae
Mimosestes nubigens – Coleoptera, Bruchidae: Bean weevil
Neocryptopteryx orientalis – Hymenoptera, Ichneumonidae
Nola sorghiella – Lepidoptera, Nolidae: Sorghum webworm
Oncideres singulata – Coleoptera, Cerambycidae
Oncophanes americanus – Hymenoptera, Braconidae
Opsiphanes cassiae – Lepidoptera, Nymphalidae
Orgyia leucostigma – Lepidoptera, Lymantriidae: White-marked tussock moth
Paratheresia brasiliensis – Diptera, Tachinidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parthenoleskia parkeri – Diptera, Tachinidae
Pectinophora gossypiella – Lepidoptera, Gelechiidae: Pink bollworm
Phobetrus hipparchia – Lepidoptera, Limacodidae
Phelomerus lineola – Coleoptera, Bruchidae
Pholetesor ornigis – Hymenoptera, Braconidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or Aspen leafminer
Phyllonorycter crataegella – Lepidoptera Gracillariidae: apple blotch leafminer
Phyllonorycter propinquella – Lepidoptera, Gracillariidae: cherry blotchminer
Physonota alutacea – Coleoptera, Chrysomelidae: Wild olive tortoise beetle
Pococera robustella – Lepidoptera, Pyralidae: Pine webworm
Pococera subcanalis – Lepidoptera, Pyralidae

Psephenus texanus – Coleoptera, Psephenidae
Pseudogaurax signatus – Diptera, Chloropidae
Quadrastichus haitiensis – Hymenoptera, Eulophidae
Saucrobotys futilalis – Lepidoptera, Pyralidae: Panic moth
Scrobipalpa absoluta – Lepidoptera, Gelechiidae
Sennius bondarus – Coleoptera, Chrysomelidae
Stator pruininus – Coleoptera, Bruchidae
Steirastoma breve – Coleoptera, Cerambycidae: Cocoa beetle
Steirastoma depressum – Coleoptera, Cerambycidae
Sympiesis marylandensis – Hymenoptera, Eulophidae
Sympiesis sericeicornis – Hymenoptera, Eulophidae
Tanaostigmodes haematoxyli – Hymenoptera, Tanaostigmatidae
Taphrocerus cocois – Coleoptera, Buprestidae
Tetramesa adrianae – Hymenoptera, Eurytomidae
Thyridopteryx ephemeraeformis – Lepidoptera, Psychidae: Bagworm moth
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Urbanus proteus – Lepidoptera, Hesperidae: Long-tailed skipper

Omphale

Host:

Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Contarinia lentis – Diptera, Cecidomyiidae
Contarinia medicaginis – Diptera, Cecidomyiidae: Lucerne flower midge
Cystiphora – Diptera, Cecidomyiidae
Dasineura brassicae – Diptera, Cecidomyiidae: Brassica pod midge
Dasineura oxycoccana – Diptera, Cecidomyiidae: Blueberry gall midge
Eulecanium coryli – Hemiptera, Coccidae
Geocrypta – Diptera, Cecidomyiidae: Gall midges
Henosepilachna vigintioctopunctata – Coleoptera, Coccinellidae: Twentysix-spotted potato ladybird
Lasioptera – Diptera, Cecidomyiidae
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Liriomyza sativae – Diptera, Agromyzidae: Vegetable leafminer
Macrolabis – Diptera, Cecidomyiidae: gall midges
Mikiola fagi – Diptera, Cecidomyiidae: gall midges
Mycodiplosis – Diptera, Cecidomyiidae: gall midges
Natada nararia – Lepidoptera, Limacodidae: Nettle grub, fringed nettle grub or slug caterpillar
Odontota dorsalis – Coleoptera, Chrysomelidae: Locust leafminer
Phyllonorycter messanella – Lepidoptera, Gracillariidae: Zellar's midget

Pediobius

Host:

Achrysocharoides albiscapus – Hymenoptera, Eulophidae
Achrysocharoides splendens – Hymenoptera, Eulophidae
Acracoma remipedalis – Lepidoptera, Pyralidae
Acrobasis comptoniella – Lepidoptera, Pyralidae: Sweetfern leaf casebearer
Acrocercops astaurota – Lepidoptera, Gracillariidae
Adleria coriaria – Hymenoptera, Cynipidae
Adoxophyes orana – Lepidoptera, Tortricidae: Summerfruit tortrix
Adoxophyes privatana – Lepidoptera, Tortricidae: Appleleaf-curling moth
Agasthenes varitarsus – Hymenoptera, Ichneumonidae
Ageniaspis testaceipes – Hymenoptera, Encyrtidae
Agonopterix nervosa – Lepidoptera, Oecophoridae: Gorse tip moth
Agrapha agnate – Lepidoptera, Noctuidae
Agrapha albostrata – Lepidoptera, Noctuidae
Agromyza nana – Diptera, Agromyzidae
Agromyza parvicornis – Diptera, Agromyzidae: Corn blotch leafminer
Agromyza salicifolii – Diptera, Agromyzidae
Aleiodes gastritor – Hymenoptera, Braconidae
Aleiodes pallidator – Hymenoptera, Braconidae
Aleiodes stigmator – Hymenoptera, Braconidae
Amauromyza flavifrons – Diptera, Agromyzidae
Amauromyza verbasci – Diptera, Agromyzidae
Amphibolips quercusinanis – Hymenoptera, Cynipidae
Amphibolips quercusspongifica – Hymenoptera, Cynipidae
Ancylis comptana – Lepidoptera, Tortricidae: Strawberry leafroller
Ancylis mitterbacheriana – Lepidoptera, Tortricidae
Ancylis upupana – Lepidoptera, Tortricidae
Ancyloxypha numitor – Lepidoptera, Hesperidae: Least skipper
Andricus burgundus – Hymenoptera, Cynipidae
Andricus curvator – Hymenoptera, Cynipidae
Andricus grossulariae – Hymenoptera, Cynipidae
Andricus testaceipes – Hymenoptera, Cynipidae
Anomis leona – Lepidoptera, Noctuidae
Antestia intricate – Hemiptera, Pentatomidae
Antestiopsis orbitalis – Hemiptera, Pentatomidae
Anthonomus nigrinus – Coleoptera, Curculionidae
Anthophora abrupta – Hymenoptera, Anthophoridae
Antispila anna – Lepidoptera, Gracillariidae: Jamun leaf miner
Apanteles agilis – Hymenoptera, Braconidae
Apanteles bordagei – Hymenoptera, Braconidae
Apanteles congoensis – Hymenoptera, Braconidae
Apanteles kuwayamai – Hymenoptera, Braconidae
Apanteles pelops – Hymenoptera, Braconidae
Apanteles sagax – Hymenoptera, Braconidae
Apanteles syleptae – Hymenoptera, Braconidae

Apanteles taragamae – Hymenoptera, Braconidae
Apanteles transvaalensis – Hymenoptera, Braconidae
Apechthis rufata – Hymenoptera, Ichneumonidae
Aporia crataegi – Lepidoptera, Pieridae: Black-veined white
Apotomis lutosana – Lepidoptera, Tortricidae
Archips crataegana – Lepidoptera, Tortricidae: Brown oak tortrix
Archips occidentalis – Lepidoptera, Tortricidae
Archips rosana – Lepidoptera, Tortricidae: European leafroller or rose tortrix moth
Archips xylosteana – Lepidoptera, Tortricidae: Brown oak tortrix or variegated golden tortrix
Artona catoxantha – Lepidoptera, Zygaenidae: Coconut leaf moth, coconut leaf skeletonizer, Malayan coconut zygaenid, or Malayan coconut moth
Aspidimorpha maculatissima – Coleoptera, Chrysomelidae
Aspidimorpha puncticostosa – Coleoptera, Chrysomelidae
Aspidimorpha quadrimaculata – Coleoptera, Chrysomelidae
Aulagromyza hendeliana – Diptera, Agromyzidae
Aulagromyza populi – Diptera, Agromyzidae
Aulagromyza populicola – Diptera, Agromyzidae
Aulagromyza tridentate – Diptera, Agromyzidae
Baryscapus evonymellae – Hymenoptera, Eulophidae
Belonogaster juncea – Hymenoptera, Vespidae
Bessa remota – Diptera, Tachinidae
Biorhiza pallida – Hymenoptera, Cynipidae: Oak apple gall wasp
Blastotere thuiella – Lepidoptera, Agyresthiidae
Blepharipa zebina – Diptera, Tachinidae: Uzi fly
Bombus americanorum – Hymenoptera, Apidae: American bumblebee
Bombus atratus – Hymenoptera, Apidae
Borbo gemella – Lepidoptera, Hesperidae
Brachymeria euploae – Hymenoptera, Chalcididae
Bracon brevicornis – Hymenoptera, Braconidae
Bracon gelechiae – Hymenoptera, Braconidae
Bracon pectoralis – Hymenoptera, Braconidae
Bracon politiventris – Hymenoptera, Braconidae
Bracon variegator – Hymenoptera, Braconidae
Bracon xanthonotus – Hymenoptera, Braconidae
Bucculatrix adelpha – Lepidoptera, Bucculatricidae
Bucculatrix canadensisella – Lepidoptera, Bucculatricidae: Birch skeletonizer
Bucculatrix crataegi – Lepidoptera, Bucculatricidae
Bucculatrix ulmella – Lepidoptera, Bucculatricidae
Busseola fusca – Lepidoptera, Noctuidae: African maize stalk borer
Busseola segeta – Lepidoptera, Noctuidae
Cacoecimorpha pronubana – Lepidoptera, Tortricidae: Carnation tortrix
Calopepla leayana – Coleoptera, Chrysomelidae
Caloptilia negundella – Lepidoptera, Gracillariidae: Boxelder leafroller
Caloptilia roscipennella – Lepidoptera, Gracillariidae
Caloptilia ulmi – Lepidoptera, Gracillariidae

Calycomyza jucunda – Diptera, Agromyzidae
Cameraria aceriella – Lepidoptera, Gracillariidae: Maple leafblotch miner
Cameraria corylisella – Lepidoptera, Gracillariidae
Cameraria guttifinitella – Lepidoptera, Gracillariidae
Cameraria hamadryadella – Lepidoptera, Gracillariidae: Solitary oak leafminer
Campoplex homonae – Hymenoptera, Ichneumonidae
Carcelia modicella – Diptera, Tachinidae
Casinarina limenitidis – Hymenoptera, Ichneumonidae
Cassida deflorata – Coleoptera, Chrysomelidae
Cassida viridis – Coleoptera, Chrysomelidae
Cedria paradoxa – Hymenoptera, Braconidae
Cerodontha angulata – Diptera, Agromyzidae
Cerodontha incise – Diptera, Agromyzidae
Cerodontha pygmaea – Diptera, Agromyzidae
Cephus cinctus – Hymenoptera, Cephidae: Wheat stem sawfly
Cephus infuscatus – Hymenoptera, Cephidae
Cephus pygmaeus – Hymenoptera, Cephidae: Corn sawfly
Chilaspis nitida – Hymenoptera, Cynipidae
Chilo indicus – Lepidoptera, Pyralidae: Sugarcane internode borer
Chilo orichalcociliellus – Lepidoptera, Pyralidae
Chilo partellus – Lepidoptera, Pyralidae: Sugarcane stalk borer
Choreutis nemorana – Lepidoptera, Choreutidae
Choristoneura diversana – Lepidoptera, Tortricidae
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm
Choristoneura hebenstreitella – Lepidoptera, Tortricidae
Choristoneura murinana – Lepidoptera, Tortricidae: European fir budworm
Choristoneura rosaceana – Lepidoptera, Tortricidae: Obliquebanded leafroller
Chromatomyia aprilina – Diptera, Agromyzidae
Chromatomyia fuscula – Diptera, Agromyzidae
Chromatomyia horticola – Diptera, Agromyzidae: Pea leafminer or garden pea leafminer
Chromatomyia milii – Diptera, Agromyzidae
Chromatomyia periclymeni – Diptera, Agromyzidae
Chromatomyia primulae – Diptera, Agromyzidae
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Chrysocharis nepherea – Hymenoptera, Eulophidae
Chrysocharis pubicornis – Hymenoptera, Eulophidae
Cirrospilus cinctiventris – Hymenoptera, Eulophidae
Cirrospilus variegates – Hymenoptera, Eulophidae
Clanoneurum menozzii – Diptera, Ephydriidae
Clostera anachoreta – Lepidoptera, Notodontidae: Scarce chocolate-tip
Clostera anastomosis – Lepidoptera, Notodontidae
Clostera cupreata – Lepidoptera, Notodontidae
Cnaphalocrocis medinalis – Lepidoptera, Pyralidae: Rice leaf roller
Cnaphalocrocis trapezalis – Lepidoptera, Pyralidae
Coccinella septempunctata – Coleoptera, Coccinellidae: Sevenpotted lady beetle
Coelaenomenodera elaeidis – Coleoptera, Chrysomelidae: Oil palm leafminer

Colpoclypeus florus – Hymenoptera, Eulophidae
Compsilura concinnata – Diptera, Tachinidae
Coniesta ignefusalis – Lepidoptera, Pyralidae: Millet stem borer
Contarinia sorghicola – Diptera, Cecidomyiidae: Sorghum midge
Conura meteori – Hymenoptera, Chalcididae
Cornicacoecia lafauryana – Lepidoptera, Tortricidae
Cotesia clisiocampae – Hymenoptera, Braconidae
Cotesia congregata – Hymenoptera, Braconidae
Cotesia erionotae – Hymenoptera, Braconidae
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia hyphantriae – Hymenoptera, Braconidae
Cotesia melanoscela – Hymenoptera, Braconidae
Cotesia ruficrus – Hymenoptera, Braconidae
Cotesia sesamiae – Hymenoptera, Braconidae
Cremastopsyche pendula – Lepidoptera, Psychidae: Coconut bagworm
Cricula trifenestrata – Lepidoptera, Saturniidae
Crioceris merdigera – Coleoptera, Chrysomelidae: European beetle
Crocidophora pustuliferalis – Lepidoptera, Pyralidae
Cyclogastrella simplex – Hymenoptera, Pteromalidae
Cydia critica – Lepidoptera, Tortricidae: Leaf webber
Cydia leucostoma – Lepidoptera, Tortricidae: Flushworm
Cynips longiventris – Hymenoptera, Cynipidae
Cyrtogaster vulgaris – Hymenoptera, Pteromalidae
Dactylispa melanaria – Coleoptera, Chrysomelidae
Dendroleon jezoensis – Neuroptera, Myrmeleontidae
Diacrisia punctulata – Lepidoptera, Arctiidae
Diadegma armillatum – Hymenoptera, Ichneumonidae
Diadegma trochanteratum – Hymenoptera, Ichneumonidae
Diatraea dyari – Lepidoptera, Pyralidae: Cane borer
Diatraea grandiosella – Lepidoptera, Pyralidae: Southwestern corn borer
Diatraea lineolata – Lepidoptera, Pyralidae: Neotropical corn borer
Diatraea rufescens – Lepidoptera, Pyralidae
Diatraea saccharalis – Lepidoptera, Pyralidae: Sugarcane borer
Dibrachoides dynastes – Hymenoptera, Pteromalidae
Dibrachys cavus – Hymenoptera, Pteromalidae
Dimmockia incongrua – Hymenoptera, Eulophidae
Dimmockia pallipes – Hymenoptera, Eulophidae
Dinotiscus colon – Hymenoptera, Pteromalidae
Diopsis ichneumonea – Diptera, Diopsidae: Telescope fly
Diopsis macrophthalma – Diptera, Diopsidae: Stalk-eyed fly
Dioryctria amatella – Lepidoptera, Pyralidae: Southern pine coneworm
Dioryctria splendidella – Lepidoptera, Pyralidae: Pine stem borer or Maritime pine stem borer
Cerodontha iraeos – Diptera, Agromyzidae
Cerodontha iridis – Diptera, Agromyzidae
Dolichogenidea aethiopica – Hymenoptera, Braconidae

Dolichogenidea albipennis – Hymenoptera, Braconidae
Dolichogenidea lacteicolor – Hymenoptera, Braconidae
Dolichogenidea metesae – Hymenoptera, Braconidae
Eccopsis wahlbergiana – Lepidoptera, Tortricidae
Elachista nigrella – Lepidoptera, Elachistidae
Elasmus brevicornis – Hymenoptera, Eulophidae
Elasmus flabellatus – Hymenoptera, Eulophidae
Elasmus leucopterae – Hymenoptera, Eulophidae
Elasmus philippinensis – Hymenoptera, Eulophidae
Ellipsidion australe – Blattodea, Blatellidae
Ellipsidion pellucidum – Blattodea, Blatellidae
Endelus bakeri – Coleoptera, Buprestidae
Endothenia gentianaeana – Lepidoptera, Tortricidae
Endromopoda arundinator – Hymenoptera, Ichneumonidae
Enteucha acetosae – Lepidoptera, Nepticulidae
Enytus apostate – Hymenoptera, Ichneumonidae
Eoreuma loftini – Lepidoptera, Pyralidae: Mexican rice borer
Epiblema strenuana – Lepidoptera, Tortricidae: Parthenium stemgalling moth
Epicephala chalybacma – Lepidoptera, Gracillariidae
Epilachna chrysomelina – Coleoptera, Coccinellidae: Twelve-spotted melon beetle
Epilachna dodecastigma – Coleoptera, Coccinellidae: Epilachna beetle
Epilachna mexicana – Coleoptera, Coccinellidae
Epilachna obscurella – Coleoptera, Coccinellidae
Epilachna ocellata – Coleoptera, Coccinellidae
Epilachna philippinensis – Coleoptera, Coccinellidae: 28 spotted ladybird beetle or
 Phillipine ladybird beetle
Epilachna similis – Coleoptera, Coccinellidae
Epilachna tredecimnotata – Coleoptera, Coccinellidae
Epilachna varivesis – Coleoptera, Coccinellidae
Epiphora bauhiniae – Lepidoptera, Saturniidae
Eriocrania sparrmannella – Lepidoptera, Eriocraniidae
Eriogaster lanestris – Lepidoptera, Lasiocampidae
Erionota thrax – Lepidoptera, Hesperidae: Banana leafroller, banana skipper, palm
 redeye
Eubazus minutus – Hymenoptera, Braconidae
Eublemma gayneri – Lepidoptera, Noctuidae
Eudocima fullonia – Lepidoptera, Noctuidae: Fruitpiercing moth
Eulophus basalis – Hymenoptera, Eulophidae
Eulophus brevicapitatus – Hymenoptera, Eulophidae
Eulophus larvarum – Hymenoptera, Eulophidae
Eupelmus annulatus – Hymenoptera, Eupelmidae
Eupelmus vesicularis – Hymenoptera, Eupelmidae
Eupithecia tripunctaria – Lepidoptera, Geometridae: White-spotted pug
Euplectromorpha bicarinata – Hymenoptera, Eulophidae
Euplectrus bicolor – Hymenoptera, Eulophidae
Euplectrus fukaii – Hymenoptera, Eulophidae

Euplectrus leonae – Hymenoptera, Eulophidae
Euproctis chrysorrhoea – Lepidoptera, Lymantriidae: Brown-tail moth
Euproctis phaeorrhoea – Lepidoptera, Lymantriidae
Eurytoma appendigaster – Hymenoptera, Eurytomidae
Eurytoma collaris – Hymenoptera, Eurytomidae
Eurytoma noxialis – Hymenoptera, Eurytomidae
Eurytoma phalaridis – Hymenoptera, Eurytomidae
Eurytoma pollux – Hymenoptera, Eurytomidae
Eurytoma verticillata – Hymenoptera, Eurytomidae
Exophthalmus vitticollis – Coleoptera, Curculionidae
Exorista fasciata – Diptera, Tachinidae
Exorista sorbillans – Diptera, Tachinidae
Galerucella grisescens – Coleoptera, Chrysomelidae
Galerucella nymphaeae – Coleoptera, Chrysomelidae: Water lily leaf beetle
Galleria mellonella – Lepidoptera, Pyralidae: Greater wax moth
Gambrus extrematis – Hymenoptera, Ichneumonidae
Geina periscelidactyla – Lepidoptera, Pterophoridae: Plume moth
Gelis tenellus – Hymenoptera, Ichneumonidae
Geshna cannalis – Lepidoptera, Pyralidae: Lesser canna leafroller
Glyptapanteles artonae – Hymenoptera, Braconidae
Glyptapanteles fulvipes – Hymenoptera, Braconidae
Glyptapanteles liparidis – Hymenoptera, Braconidae
Glyptapanteles porthetriae – Hymenoptera, Braconidae
Gnorimoschema gallaesolidaginis – Lepidoptera, Gelechiidae: Goldenrod elliptical-gall
moth or goldenrod gall moth
Gnorimoschema salinaris – Lepidoptera, Gelechiidae
Goniozus japonicus – Hymenoptera, Bethyridae
Gonophora taylori – Coleoptera, Chrysomelidae
Gonophora xanthomelana – Coleoptera, Chrysomelidae
Grapholita molesta – Lepidoptera, Tortricidae: Oriental fruit moth
Gynaikothrips ficorum – Thysanoptera, Phlaeothripidae: Cuban laurel thrips
Haritalodes derogata – Lepidoptera, Pyralidae: Cotton leaf roller
Helcystogramma macroscopum – Lepidoptera, Gelechiidae
Helicoverpa armigera – Lepidoptera, Noctuidae: Corn ear worm, tomato grub, tobacco
bidworm, cotton bollworm
Henosepilachna vigintioctomaculata – Coleoptera, Coccinellidae
Henosepilachna vigintioctopunctata – Coleoptera, Coccinellidae: Twentysix-spotted
potato ladybird
Heteronygmia dissimilis – Lepidoptera, Lymantriidae: African Mahogany-feeding
Caterpillar or Mahogany defoliator
Holocacista rivillei – Lepidoptera, Heliozelidae
Hyalophora cecropia – Lepidoptera, Saturniidae: Cecropia moth
Hydrellia griseola – Diptera, Ephydriidae
Hylesinus crenatus – Coleoptera, Scolytidae: Larch elm bark beetle
Hyphantria cunea – Lepidoptera, Arctiidae: Fall webworm moth
Hyposoter fugitives – Hymenoptera, Ichneumonidae

Illiberis pruni – Lepidoptera, Zygaenidae: Pear leaf worm or pear spotted caterpillar
Iseropus coelebs – Hymenoptera, Ichneumonidae
Itopectis alternans – Hymenoptera, Ichneumonidae
Itopectis conquisitor – Hymenoptera, Ichneumonidae
Itopectis cristatae – Hymenoptera, Ichneumonidae
Laothoe juglandis – Lepidoptera, Sphingidae: Walnut sphinx
Levarchama eurema – Lepidoptera, Nepticulidae
Leiopus nebulosus – Coleoptera, Cerambycidae
Lema honorata – Coleoptera, Chrysomelidae: Red thorax leaf bug
Leucoma salicis – Lepidoptera, Lyonetiidae: Satin Moth
Leucoptera coffeina – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera coma – Lepidoptera, Lyonetiidae
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Liriomyza bryoniae – Diptera, Agromyzidae: Celery miner
Liriomyza huidobrensis – Diptera, Agromyzidae: Pea leafminer
Liriomyza pusilla – Diptera, Agromyzidae: Serpentine leafminer
Liriomyza strigata – Diptera, Agromyzidae
Lissonota sapinea – Hymenoptera, Ichneumonidae
Lobesia cunninghamiacola – Lepidoptera, Tortricidae
Lochmaeus manteo – Lepidoptera, Notodontidae: Variable oak leaf caterpillar
Lonchaea cortices – Diptera, Lonchaeidae
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy Moth
Macrocentrus linearis – Hymenoptera, Braconidae
Macrocentrus resinellae – Hymenoptera, Braconidae
Macrosiphum euphorbiae – Hemiptera, Aphididae: Potato aphid
Mada polluta – Coleoptera, Coccinellidae
Magdalis aenescens – Coleoptera, Curculionidae: Bronze appletree weevil
Mahasena corbetti – Lepidoptera, Psychidae: Coconut case caterpillar, Coconut bagworm or oilpalm bagworm
Malacosoma americanum – Lepidoptera, Lasiocampidae: Eastern tent caterpillar
Malata delphinae – Coleoptera, Coccinellidae
Marmara fasciella – Lepidoptera, Gracillariidae: White pine bark miner
Mastrus annulatus – Hymenoptera, Ichneumonidae
Mastrus smithii – Hymenoptera, Ichneumonidae
Mayetiola destructor – Diptera, Cecidomyiidae: Hessian fly
Mayetiola phalaris – Diptera, Cecidomyiidae
Mayetiola poae – Diptera, Cecidomyiidae
Melanitis constantia – Lepidoptera, Nymphalidae
Melanitis leda – Lepidoptera, Nymphalidae
Menochilus sexmaculatus – Coleoptera, Coccinellidae
Meteorus ictericus – Hymenoptera, Braconidae

Meteorus indagator – Hymenoptera, Braconidae
Meteorus versicolor – Hymenoptera, Braconidae
Metopomyza scutellata – Diptera, Agromyzidae
Micraphe lateritia – Lepidoptera, Limacodidae
Microgaster meridiana – Hymenoptera, Braconidae
Micrurapteryx kollariella – Lepidoptera, Gracillariidae
Minotetrastichus frontalis – Hymenoptera, Eulophidae
Mniotype adustus – Lepidoptera, Noctuidae
Mompha epilobiella – Lepidoptera, Momphidae
Naranga aenescens – Lepidoptera, Noctuidae: Green semilooper
Nematus oligospilus – Hymenoptera, Tenthredinidae: Willow sawfly
Nemorilla floralis – Diptera, Tachinidae
Nephoterix leucophaeella – Lepidoptera, Pyralidae
Nephoterix rhodobasalis – Lepidoptera, Pyralidae
Neuroterus albipes – Hymenoptera, Cynipidae: Smooth spangle gall wasp
Neuroterus lanuginosus – Hymenoptera, Cynipidae
Neuroterus numismalis – Hymenoptera, Cynipidae
Neuroterus quercusbaccaru – Hymenoptera, Cynipidae
Neuroterus saliens – Hymenoptera, Cynipidae
Neuroterus saltans – Hymenoptera, Cynipidae
Niphadolepis alianta – Lepidoptera, Limacodidae
Notanisomorphella borborica – Hymenoptera, Eulophidae
Nyereria mlanje – Hymenoptera: Braconidae
Odites artigena – Lepidoptera, Lecithoceridae
Odontota dorsalis – Coleoptera, Chrysomelidae: Locust leafminer
Oecura goodie – Lepidoptera, Lymantriidae
Olethreutes ineptana – Lepidoptera, Tortricidae
Oncophanes americanus – Hymenoptera, Braconidae
Ophiomyia maura – Diptera, Agromyzidae
Ophiomyia simplex – Diptera, Agromyzidae: Asparagus miner
Opisina arenosella – Lepidoptera, Oecophoridae: Coconut black-headed caterpillar
Orgyia antique – Lepidoptera, Lymantriidae: Rusty tussock moth
Orgyia dubia – Lepidoptera, Lymantriidae
Orgyia leucostigma – Lepidoptera, Lymantriidae: White-marked tussock moth
Orgyia pseudotsugata – Lepidoptera, Lymantriidae: Douglas-fir tussock moth
Orgyia vetusta – Lepidoptera, Lymantriidae: Western tussock moth
Oscinella frit – Diptera, Chloropidae
Ostrinia nubilalis – Lepidoptera, Pyralidae: European corn borer
Pagodiella hekmeyeri – Lepidoptera, Psychidae
Palpita machaeralis – Lepidoptera, Pyralidae: Teak leaf eating caterpillar
Pandemis cerasana – Lepidoptera, Tortricidae: Barred fruit tree tortrix
Parafomoria helianthemella – Lepidoptera, Nepticulidae
Parapoynx stagnalis – Lepidoptera, Pyralidae: Rice caseworm
Parasa lepida – Lepidoptera, Limacodidae: Nettle caterpillar, blue-striped nettle grub, or green-striped nettle grub
Parnara guttata – Lepidoptera, Hesperidae: Common straight swift

Parornix anguliferella – Lepidoptera, Gracillariidae
Pectinophora gossypiella – Lepidoptera, Gelechiidae: Pink bollworm
Pediobius setigerus – Hymenoptera, Eulophidae
Pegomya tenera – Diptera, Anthomyiidae
Pelopidas mathias – Lepidoptera, Hesperidae: Small branded swift, lesser millet skipper,
 black branded swift
Perisierola nepantidis – Hymenoptera, Bethyidae
Petrova cristata – Lepidoptera, Tortricidae: Japanese pine shoot borer
Pexicopia malvella – Lepidoptera, Gelechiidae: Hollyhock seed moth
Phalaenoides glycine – Lepidoptera, Noctuidae: Grapevine moth
Phobocampe clisiocampae – Hymenoptera, Ichneumonidae
Pholetesor circumscriptus – Hymenoptera, Braconidae
Phycita diaphana – Lepidoptera, Pyralidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis populiella – Lepidoptera, Gracillariidae: Aspen serpentine leafminer or
 Aspen leafminer
Phyllocnistis saligna – Lepidoptera, Gracillariidae
Phyllocnistis xenia – Lepidoptera, Gracillariidae
Phyllonorycter acerifoliella – Lepidoptera, Gracillariidae
Phyllonorycter basistrigella – Lepidoptera, Gracillariidae
Phyllonorycter bicinctella – Lepidoptera, Gracillariidae
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter comparella – Lepidoptera, Gracillariidae
Phyllonorycter coryli – Lepidoptera, Gracillariidae: Nut leaf blister moth
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter delitella – Lepidoptera, Gracillariidae
Phyllonorycter distentella – Lepidoptera, Gracillariidae
Phyllonorycter issikii – Lepidoptera, Gracillariidae
Phyllonorycter kleemannella – Lepidoptera Gracillariidae
Phyllonorycter lautella – Lepidoptera, Gracillariidae
Phyllonorycter lucetiella – Lepidoptera Gracillariidae: Basswood squareblotch miner
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter malella – Lepidoptera, Gracillariidae: Apple tentiform leafminer or
 spotted tentiform leafminer
Phyllonorycter malimalifoliella – Lepidoptera, Gracillariidae: Spotted tentiform
 leafminer
Phyllonorycter manni – Lepidoptera, Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter nicellii – Lepidoptera, Gracillariidae
Phyllonorycter nipponicella – Lepidoptera, Gracillariidae
Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter pastorella – Lepidoptera, Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter platanoidella – Lepidoptera, Gracillariidae

Phyllonorycter pomifoliella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter pyrifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quinnata – Lepidoptera, Gracillariidae
Phyllonorycter rajella – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter robiniella – Lepidoptera, Gracillariidae: Horse-chesnut leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter sagitella – Lepidoptera, Gracillariidae
Phyllonorycter salicicolella – Lepidoptera, Gracillariidae
Phyllonorycter salictella – Lepidoptera, Gracillariidae
Phyllonorycter schreberella – Lepidoptera, Gracillariidae
Phyllonorycter scitulella – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter spinolella – Lepidoptera, Gracillariidae
Phyllonorycter stettinensis – Lepidoptera, Gracillariidae
Phyllonorycter strigulatella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tremulae – Lepidoptera, Gracillariidae
Phyllonorycter tritorrhecta – Lepidoptera, Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phyllonorycter viminetorum – Lepidoptera, Gracillariidae
Phyllotreta zimmermanni – Coleoptera, Chrysomelidae
Physocephala sagittaria – Diptera, Conopidae
Physocephala texana – Diptera, Conopidae
Phytodietus polyzonias – Hymenoptera, Ichneumonidae
Phytomyza ilicicola – Diptera, Agromyzidae: Native holly leafminer
Phytomyza ilicis – Diptera, Agromyzidae: Holly leafminer
Phytomyza minuscula – Diptera, Agromyzidae
Phytomyza obscura – Diptera, Agromyzidae
Phytomyza phillyreae – Diptera, Agromyzidae
Phytomyza ranunculi – Diptera, Agromyzidae
Phytomyza rufipes – Diptera, Agromyzidae
Phytomyza spondylii – Diptera, Agromyzidae
Pieris rapae – Lepidoptera, Pieridae: Cabbage white
Piezotrachelus varium – Coleoptera, Brentidae
Pigeria piger – Hymenoptera, Braconidae
Pimpla aquilonia – Hymenoptera, Ichneumonidae
Pissodes strobe – Coleoptera, Curculionidae
Plagioderma versicolora – Coleoptera, Chrysomelidae
Plagiotrochus coriceus – Hymenoptera, Cynipidae
Plagiotrochus fusifex – Hymenoptera, Cynipidae
Plagiotrochus kiefferianus – Hymenoptera, Cynipidae
Plesispa reichei – Coleoptera, Chrysomelidae: Two-colored coconut leaf beetle
Pleuroptya ruralis – Lepidoptera, Pyralidae: Mother of pearl

Pleurotropopsis podagrica – Hymenoptera, Eulophidae
Plutella xylostella – Lepidoptera, Plutellidae: Diamond back moth or cabbage moth
Pnigalio pectinicornis – Hymenoptera, Eulophidae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Procerata sacchariphaga – Lepidoptera, Brachodidae
Promecotheca cumingii – Coleoptera, Hispididae: coconut leafminer
Promecotheca nuciferae – Coleoptera, Chrysomelidae: Coconut leafminer
Promecotheca opacicollis – Coleoptera, Hispididae
Promecotheca papuana – Coleoptera, Hispididae
Promecotheca reichei – Coleoptera, Chrysomelidae: Coconut leaf mining beetle or palm leaf mining beetle
Pseudaletia unipuncta – Lepidoptera, Noctuidae: Armyworm moth
Pseudogaurax anchora – Diptera, Chloropidae
Pseudoplusia includens – Lepidoptera, Noctuidae: Soybean looper
Psyche casta – Lepidoptera, Psychidae: Bagworm moth
Psychophagus omnivorus – Hymenoptera, Pteromalidae
Pteromalus phycidis – Hymenoptera, Pteromalidae
Ptycholomoides aeriferanus – Lepidoptera, Tortricidae
Rabdophaga justini – Diptera, Cecidomyiidae
Rabdophaga purpureaperda – Diptera, Cecidomyiidae
Rabdophaga saliciperda – Diptera, Cecidomyiidae: Willow shot-hole midge
Rabdophaga salicis – Diptera, Cecidomyiidae
Recurvaria leucatella – Lepidoptera, Gelechiidae: Lesser budmoth
Rhamphus oxyacanthae – Coleoptera, Curculionidae
Rhyacionia duplana – Lepidoptera, Tortricidae: Pine tip moth
Ropalidia notatipennis – Hymenoptera, Vespidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus pallicornis – Coleoptera, Curculionidae
Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Scambus calobatus – Hymenoptera, Ichneumonidae
Scaptomyza flava – Diptera, Drosophilidae
Sceliodes laisalis – Lepidoptera, Pyralidae
Sculna forda – Lepidoptera, Saturniidae
Schizonotus latus – Hymenoptera, Pteromalidae
Scythris monochreella – Lepidoptera, Scythridae
Sesamia calamistis – Lepidoptera, Noctuidae: African pink borer
Sesamia cretica – Lepidoptera, Noctuidae: Durra stem borer
Sesamia inferens – Lepidoptera, Noctuidae: Pink stem borer
Sesamia nonagrioides – Lepidoptera, Noctuidae: Corn stalk borer
Sesamia penniseti – Lepidoptera, Noctuidae
Sesamia poephaga – Lepidoptera, Noctuidae
Silliana hommei – Hymenoptera, Tenthredinidae
Solygia sulcatifrons – Mantodea, Mantidae
Sparganothis pilleriana – Lepidoptera, Tortricidae: Long palped tortrix
Sphecodina abbotti – Lepidoptera, Sphingidae: Abbot's sphinx moth
Sphegigaster pallicornis – Hymenoptera, Pteromalidae

Sphodromantis gastrica – Mantodea, Mantidae
Sphodromantis viridis – Mantodea, Mantidae
Spodoptera exigua – Lepidoptera, Noctuidae: Beet armyworm
Spodoptera litura – Lepidoptera, Noctuidae: Tobacco cutworm or cluster caterpillar
Stictococcus sjostedti – Hemiptera, Coccidae
Stiropius bucculatricis – Hymenoptera, Braconidae
Symmerista albifrons – Lepidoptera, Notodontidae: White-headed prominent
Sympiesis aburiana – Hymenoptera, Eulophidae
Sympiesis sericeicornis – Hymenoptera, Eulophidae
Synagris cornuta – Hymenoptera, Vespidae
Telenomus gowdeyi – Hymenoptera, Scelionidae
Tetramesa angustipenne – Hymenoptera, Eurytomidae
Tetramesa brevicollis – Hymenoptera, Eurytomidae
Tetramesa calamagrostide – Hymenoptera, Eurytomidae
Tetramesa eximia – Hymenoptera, Eurytomidae
Tetramesa fulvicollis – Hymenoptera, Eurytomidae
Tetramesa hyalipennis – Hymenoptera, Eurytomidae
Tetramesa linearis – Hymenoptera, Eurytomidae
Tetramesa longula – Hymenoptera, Eurytomidae
Tetramesa petiolata – Hymenoptera, Eurytomidae
Tetramesa phleicola – Hymenoptera, Eurytomidae
Tetrastichus miser – Hymenoptera, Eulophidae
Thaumetopoea pityocampa – Lepidoptera, Thaumetopoeidae: Pine procession moth
Thymelicus lineola – Lepidoptera, Heperiidae: Essex skipper or European skipper
Tischeria dodonaea – Lepidoptera, Tischeriidae
Tischeria malifoliella – Lepidoptera, Tischeriidae: Apple leaf trumpet miner
Tortrix capensana – Lepidoptera, Tortricidae: Apple leaf roller
Tortrix viridana – Lepidoptera, Tortricidae: European oak leafroller
Trachelus tabidus – Hymenoptera, Cephidae: Black grain stem sawfly
Trachylepidia fructicassella – Lepidoptera, Pyralidae
Tranosema nigricans – Hymenoptera, Ichneumonidae
Tranosema rostrale – Hymenoptera, Ichneumonidae: Spruce budworm parasitoid or campoplegine wasp
Triaspis pallipes – Hymenoptera, Braconidae
Trichiocampus ulmi – Hymenoptera, Tenthredinidae: Nematine sawfly
Trichomalopsis hemiptera – Hymenoptera, Pteromalidae
Trichomalopsis peregrina – Hymenoptera, Pteromalidae
Trichoplusia ni – Lepidoptera, Noctuidae: Cabbage looper
Trifurcula headleyella – Lepidoptera, Nepticulidae
Trigonaspis megaptera – Hymenoptera, Cynipidae
Tromatobia oculatoria – Hymenoptera, Ichneumonidae
Tromatobia rufopectus – Hymenoptera, Ichneumonidae
Winthemia datanae – Diptera, Tachinidae
Yponomeuta cagnagella – Lepidoptera, Yponomeutidae: Spindle ermine
Yponomeuta evonymella – Lepidoptera, Yponomeutidae: Bird-cherry ermine
Yponomeuta malinella – Lepidoptera, Yponomeutidae: Apple ermine moth

Yponomeuta padella – Lepidoptera, Yponomeutidae: Small ermine moth
Yponomeuta rorrella – Lepidoptera, Yponomeutidae
Ypsolopha coriacella – Lepidoptera, Ypsolophidae
Zaglyptus iwatai – Hymenoptera, Ichneumonidae

Subfamily Entedoninae not in CA or AZ

Achrysocharoides

Host:

Antispila metallella – Lepidoptera, Heliozelidae
Antispila treitschkiella – Lepidoptera, Heliozelidae
Caloptilia alchimiella – Lepidoptera, Gracillariidae
Caloptilia ulmi – Lepidoptera, Gracillariidae
Chrysaster hagicola – Lepidoptera, Gracillariidae
Coleophora limosipennella – Lepidoptera, Coleophoridae
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Palaeocimbex quadrimaculata – Hymenoptera, Cimbicidae
Dichomeris marginella – Lepidoptera, Gelechiidae: Juniper webworm
Ectoedemia atricollis – Lepidoptera, Nepticulidae
Emmetia angusticoella – Lepidoptera, Tischeriidae
Emmetia heinemanni – Lepidoptera, Tischeriidae
Gracillaria japonica – Lepidoptera, Gracillariidae
Gracillaria rhoifoliella – Lepidoptera, Gracillariidae
Hylaconis puerariae – Lepidoptera, Gracillariidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Liocrobyla desmodiella – Lepidoptera, Gracillariidae
Liocrobyla lobata – Lepidoptera, Gracillariidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Neolithocolletis hikomonticola – Lepidoptera, Gracillariidae
Palexorista solennis – Diptera, Tachinidae
Parornix devoniella – Lepidoptera, Gracillariidae
Parornix petiolella – Lepidoptera, Gracillariidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter acerifoliella – Lepidoptera, Gracillariidae
Phyllonorycter acernella – Lepidoptera, Gracillariidae
Phyllonorycter bicinctella – Lepidoptera, Gracillariidae
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter carpini – Lepidoptera, Gracillariidae
Phyllonorycter cavella – Lepidoptera, Gracillariidae
Phyllonorycter celtidis – Lepidoptera, Gracillariidae
Phyllonorycter celtisella – Lepidoptera, Gracillariidae
Phyllonorycter comparella – Lepidoptera, Gracillariidae
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella – Lepidoptera, Gracillariidae: Apple blotch leafminer
Phyllonorycter distentella – Lepidoptera, Gracillariidae

Phyllonorycter elmaella – Lepidoptera Gracillariidae: Western tentiform leafminer
Phyllonorycter emberizaepennella – Lepidoptera Gracillariidae
Phyllonorycter froelichiella – Lepidoptera Gracillariidae
Phyllonorycter geniculella – Lepidoptera Gracillariidae
Phyllonorycter harrisella – Lepidoptera Gracillariidae
Phyllonorycter heegeriella – Lepidoptera Gracillariidae
Phyllonorycter insignitella – Lepidoptera Gracillariidae
Phyllonorycter joannisi – Lepidoptera Gracillariidae
Phyllonorycter kleemannella – Lepidoptera Gracillariidae
Phyllonorycter lucetiella – Lepidoptera Gracillariidae: Basswood squareblotch miner
Phyllonorycter lucidicostella – Lepidoptera Gracillariidae: Lesser maple leafblotch miner
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter manni – Lepidoptera, Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter nicellii – Lepidoptera, Gracillariidae
Phyllonorycter nigrescentella – Lepidoptera, Gracillariidae
Phyllonorycter ostryaefoliella – Lepidoptera, Gracillariidae
Phyllonorycter oxyacanthae – Lepidoptera, Gracillariidae
Phyllonorycter pomifoliella – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter propinquinella – Lepidoptera, Gracillariidae: Cherry blotchminer
Phyllonorycter pygmaea – Lepidoptera, Gracillariidae
Phyllonorycter pyrifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quinnata – Lepidoptera, Gracillariidae
Phyllonorycter quinqueguttella – Lepidoptera, Gracillariidae
Phyllonorycter rajella – Lepidoptera, Gracillariidae
Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter salicicolella – Lepidoptera, Gracillariidae
Phyllonorycter salictella – Lepidoptera Gracillariidae
Phyllonorycter schreberella – Lepidoptera, Gracillariidae
Phyllonorycter similes – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter sorbicola – Lepidoptera, Gracillariidae
Phyllonorycter strigulatella – Lepidoptera, Gracillariidae
Phyllonorycter tenerella – Lepidoptera, Gracillariidae
Phyllonorycter tiliacella – Lepidoptera Gracillariidae: Basswood roundblotch miner
Phyllonorycter tremuloidiella – Lepidoptera, Gracillariidae: Aspen blotchminer
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phyllonorycter viciae – Lepidoptera, Gracillariidae
Phyllonorycter watanabei – Lepidoptera, Gracillariidae
Porphyrosela desmodiella – Lepidoptera, Gracillariidae
Spulerina dissotoma – Lepidoptera, Gracillariidae
Stigmella betulicola – Lepidoptera, Nepticulidae
Stigmella floslactella – Lepidoptera, Nepticulidae

Stigmella hybnerella – Lepidoptera, Nepticulidae
Stigmella minusculella – Lepidoptera, Nepticulidae
Stigmella ruficapitella – Lepidoptera, Nepticulidae
Stigmella salicis – Lepidoptera, Nepticulidae
Tischeria ekebladella – Lepidoptera, Tischeriidae

Subfamily Entedoninae not in USA

Achrysocharis (subgenus of *Closterocerus*)

Host:

Acalyptis loranthella – Lepidoptera, Nepticulidae
Caligo ilcoxiens – Lepidoptera, Nymphalidae: Owl butterfly
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer
Exoteleia nepheos – Lepidoptera, Gelechiidae
Hydrellia griseola – Diptera, Ephydriidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf-miner
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Melanagromyza – Diptera, Agromyzidae
Ocnerostoma piniariellum – Lepidoptera, Yponomeutidae: Ermine moth
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Plesispa nipae – Coleoptera, Hispinae
Promecotheca reichei – Coleoptera: Chrysomelidae: Coconut leaf mining beetle or palm leaf mining beetle
Stigmella carpinella – Lepidoptera, Nepticulidae

Apleurotropis

Host:

Acrocercopus – Lepidoptera, Gracillariidae
Cerodontha bisetiorbita – Diptera, Agromyzidae
Cosmopterix – Lepidoptera, Cosmopterigidae
Crobylophora daricella – Lepidoptera, Lyonetiidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: coffee leafminer
Leucoptera meyricki – Lepidoptera, Lyonetiidae: Coffee leafminer
Ophiomyia solanicola – Diptera, Agromyzidae
Phylacteophaga eucalypti – Hymenoptera, Pergidae: Eucalyptus leaf-blister sawfly
Phyllonorycter – Lepidoptera, Gracillariidae
Promecotheca csiki – Coleoptera, Chrysomelidae: coconut leafminer
Promecotheca papuana – Coleoptera, Chrysomelidae: Coconut leafminer

Kratoysma

Host:

Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllocnistis citri – Lepidoptera, Gracillariidae: citrus leafminer
Phyllocnistis unipunctella – Lepidoptera, Gracillariidae: Poplar leafminer
Traumatocampa pinivora – Lepidoptera: Pine procession moth

Pleurotroppopsis**Host:**

Acrocercops diffluella – Lepidoptera, Gracillariidae

Aristaea asteris – Lepidoptera

Cerodontha bisetiorbita

Chrysaster hagicola – Lepidoptera, Gracillariidae

Coelaenomendera elaeidis

Cosmopterix phyllostachysea – Lepidoptera, Cosmopterigidae: Pubescent bamboo miner

Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leafminer

Napomyza xylostei – Diptera, Agromyzidae

Phyllonorycter issikii – Lepidoptera, Gracillariidae

Phyllonorycter leucocorona – Lepidoptera, Gracillariidae

Phyllonorycter lyoniae – Lepidoptera, Gracillariidae

Phyllonorycter ringoniella – Lepidoptera, Gracillariidae: Apple leafminer

Phyllonorycter similes – Lepidoptera, Gracillariidae

Promecotheca cumingii – Coleoptera, Hispididae: coconut leafminer

Proacrias**Host:**

Bedellia somnulentella – Lepidoptera, Lyonetiidae: Sweet potato leafminer

Hispa stygia – Coleoptera, Chrysomelidae:

Leucoptera coffeella – Lepidoptera, Lyonetiidae: coffee leafminer

Liriomyza – Diptera, Agromyzidae

Ophiomyia spencerella – Diptera, Agromyzidae: Bean-stem maggot or beanfly

Phytoliriomyza jacarandae – Diptera, Agromyzidae: Jacaranda leafminer

Sarasvatia**Host:**

Stigmella ipomoella – Lepidoptera, Nepticulidae

Shardiella**Host:**

Agromyzidae

Trisecodes**Host:**

Calycomyza sidae – Diptera, Agromyzidae

Liriomyza – Diptera, Agromyzidae

Melangromyza cassiae – Diptera, Agromyzidae

Zaommomentedon**Host:**

Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer

Subfamily Euderinae in CA

Euderus

Host:

Aciurina thoracica – Diptera, Tephritidae
Acrobasis caryae – Lepidoptera, Pyralidae: Hickory shoot borer
Acrobasis juglandis – Lepidoptera, Pyralidae: Pecan leaf casebearer
Acrocercops dives – Lepidoptera, Gracillariidae
Adaina microdactyla – Lepidoptera, Pterophoridae
Agrilus aurichalceus – Coleoptera, Buprestidae: Rose stem girdler
Agrilus criddlei – Coleoptera, Buprestidae
Agrilus suvorovi – Coleoptera, Buprestidae
Agrilus viridis – Coleoptera, Buprestidae: Beech splendour beetle
Alcides leeuweni – Coleoptera, Curculionidae
Anarsia lineatella – Lepidoptera, Chelariinae: Peach twig borer
Apanteles laricellae – Hymenoptera, Braconidae
Argyresthia alternatella – Lepidoptera, Agyresthiidae
Argyresthia laricella – Lepidoptera, Agyresthiidae: Larch shoot moth
Attelabus rhois – Coleoptera, Attelabidae
Bactrocera oleae – Diptera, Tephritidae: Olive fruit fly
Bedellia orchilella – Lepidoptera, Lyonetiidae: Sweetpotato leafminer
Blastotere thuiella – Lepidoptera, Agyresthiidae
Bracon variabilis – Hymenoptera, Braconidae
Carpomya vesuviana – Diptera, Tephritidae
Ceutorhynchus rapae – Coleoptera, Curculionidae
Coleophora alticolella – Lepidoptera, Coleophoridae
Coleophora caespitiella – Lepidoptera, Coleophoridae
Coleophora gallipennella – Lepidoptera, Coleophoridae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora parthenica – Lepidoptera, Coleophoridae: Russian thistle stem miner
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleophora serratella – Lepidoptera, Coleophoridae: Birch casebearer or cigar casebearer
Coleotechnites milleri – Lepidoptera, Gelechiidae: Lodgepole needleminer
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Cryptophlebia culpes – Lepidoptera, Tortricidae: False codling moth
Cydia pomonella – Lepidoptera, Tortricidae: Codling moth
Cylas formicarius – Coleoptera, Brentidae: Sweetpotato weevil
Cylindrocopturus furnissi – Coleoptera, Curculionidae: Douglas fir twig weevil
Desmia funeralis – Lepidoptera, Pyralidae: Grape leaf folder
Dioryctria zimmermani – Lepidoptera, Pyralidae: Zimmerman pine moth
Dryocosmus coxii – Hymenoptera, Cynipidae
Epiblema obfuscana – Lepidoptera, Tortricidae
Epiblema strenuana – Lepidoptera, Tortricidae: Parthenium stemgalling moth
Epinotia nanana – Lepidoptera, Tortricidae: European spruce needle miner
Etainia sericopeza – Lepidoptera, Nepticulidae
Eucosma recissoriana – Lepidoptera, Tortricidae: Lodgepole pine cone borer
Faustinus cubae – Coleoptera, Curculionidae

Gonipterus scutellatus- Coleoptera, Curculionidae: Eucalyptus snout beetle or Australian weevil
Gracillaria mabaella – Lepidoptera, Gracillariidae
Grapholita molesta – Lepidoptera, Tortricidae: Oriental fruit moth
Grapholita packardi – Lepidoptera, Tortricidae: Cherry fruitworm
Hartigia xanthostoma – Hymenoptera, Cephidae
Helotorus argyresthiae – Hymenoptera, Ichneumonidae
Heterocrossa inscripta – Lepidoptera, Carposinidae
Heterocrossa subumbrata – Lepidoptera, Carposinidae
Hylesinus oleiperda – Coleoptera, Scolytidae
Hypolixus truncatulus – Coleoptera, Curculionidae: Amaranth weevil
Hypsmocoma liturata – Lepidoptera, Cosmopterigidae
Lestodiplosis septemguttata – Diptera, Cecidomyiidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Lonchaea bruneri – Diptera, Lonchaeidae
Lophobaris piperis – Coleoptera, Curculionidae: Pepper weevil
Lymantria monacha – Lepidoptera, Lymantriidae: Black arches
Mehtheria hemidoxa – Lepidoptera, Tortricidae
Melanagromyza obtuse – Diptera, Agromyzidae
Monoptilota pergratialis – Lepidoptera, Pyralidae: Limabean vine borer
Natada nararia – Lepidoptera, Limacodidae: Nettle grub, fringed nettle grub or slug caterpillar
Oberea bimaculata – Coleoptera, Cerambycidae: Raspberry cane borer
Oberea tripunctata – Coleoptera, Cerambycidae: Dogwood twig borer
Parectopa epibathra – Lepidoptera, Gracillariidae
Parectopa marginestrigata – Lepidoptera, Gracillariidae
Parthenolecanium corni – Hemiptera, Coccidae: European fruit lecanium
Pempheres affinis – Coleoptera, Curculionidae: Cotton-stem weevil
Phyllonorycter harrisella – Lepidoptera Gracillariidae
Plagiotrochus suberi – Hymenoptera, Cynipidae
Polychrosis viteana – Lepidoptera, Tortricidae: Grape berry moth
Prays acmonias – Lepidoptera, Plutellidae
Prays citri – Lepidoptera, Plutellidae: Citrus flower moth
Prays endocarpa – Lepidoptera, Plutellidae: Citrus fruit moth
Proteoteras willingana – Lepidoptera, Tortricidae: Boxelder twig borer
Rhyacionia buoliana – Lepidoptera, Tortricidae: European pine shoot moth
Rhyacionia frustrana – Lepidoptera, Tortricidae: Nantucket pine tip moth
Saperda carcharias – Coleoptera, Cerambycidae: Poplar longhorned beetle, large poplar borer or poplar borer
Saperda inornata – Coleoptera, Cerambycidae: Poplar gall borer
Saperda populnea – Coleoptera, Cerambycidae: Small poplar borer
Sesioplex depressus – Hymenoptera, Ichneumonidae
Scolytus intricatus – Coleoptera, Scolytidae: European oak bark beetle
Scolytus kirschi – Coleoptera, Scolytidae: Kirsch bark beetle
Sphenoptera gossypii – Coleoptera, Buprestidae: Cotton stem borer
Spilonota ocellana – Lepidoptera, Tortricidae: Eye-spotted budmoth

Stigmella malella – Lepidoptera, Nepticulidae: Banded apple pigmy
Symmetrischema capsica – Lepidoptera, Gelechiidae: Pepper flower bud moth
Thopeutis forbesellus – Lepidoptera, Pyralidae
Zeuzera pyrina – Lepidoptera, Cossidae: Leopard moth
Zoophthorus laricellae – Hymenoptera, Ichneumonidae

Astichus

Host:

Bolitotherus cornutus – Coleoptera, Tenebrionidae: Forked fungus beetle
Brachycis breviolis – Coleoptera, Cisidae
Ceracis sallei – Coleoptera, Cisidae
Cis boleti – Coleoptera, Cisidae
Cis comptus – Coleoptera, Cisidae
Cis glabratus – Coleoptera, Ciidae
Cis hispidus – Coleoptera, Ciidae
Cis micans – Coleoptera, Ciidae
Cis seriatopilosus – Coleoptera, Ciidae
Dolichocis manitoba – Coleoptera, Ciidae
Ennearthron affine – Coleoptera, Ciidae
Ennearthron cornutum – Coleoptera, Ciidae
Liriomyza pictella – Diptera, Agromyzidae: Melon leafminer
Octotemnus glabriculus – Coleoptera, Ciidae
Octotemnus laminifrons – Coleoptera, Ciidae
Parectopa robiniella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Phyllonorycter robiniella – Lepidoptera, Gracillariidae: Horse-chestnut leafminer
Rhopalodontus fronticornis – Coleoptera, Ciidae
Shindus dubius
Xylographus – Coleoptera, Scolytidae

Subfamily Tetrastichinae in California

Galeopsomyia

Host:

Asphondylia borrichiae – Diptera, Cecidomyiidae
Asphondylia floccose – Diptera, Cecidomyiidae
Asphondylia globules – Diptera, Cecidomyiidae
Asphondylia helianthiglobula – Diptera, Cecidomyiidae
Asphondylia websteri – Diptera, Cecidomyiidae
Belonocnema treatae – Hymenoptera, Cynipidae
Chalcodermus inaequicollis – Coleoptera, Curculionidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Procecidochares utilis – Diptera, Tephritidae: Crofton weed gall fly
Rhopalomyia – Diptera, Cecidomyiidae
Rileyia cecidomyiae – Hymenoptera, Eurytomidae
Tenuipetiolus teredon – Hymenoptera, Eurytomidae
Torymus umbilicatus – Hymenoptera, Torymidae

Quadrastichus

Host:

- Ageniaspis citricola* – Hymenoptera, Encyrtidae
Agrilus viridis – Coleoptera, Buprestidae: Beech splendour beetle
Anisostephus betulinum – Diptera, Cecidomyiidae
Cimbex femorata – Hymenoptera, Cimbicidae: Button horn sheep wasp
Cylindrocopturus adspersus – Coleoptera, Curculionidae: Sunflower stem weevil
Dasineura balsamica – Diptera, Cecidomyiidae
Dasineura filicina – Diptera, Cecidomyiidae
Dasineura ulmariae – Diptera, Cecidomyiidae
Diaprepes abbreviatus – Coleoptera, Curculionidae: Diaprepes root weevil
Diaprepes famelicus – Coleoptera, Curculionidae
Diaprepes quadrivittatus – Coleoptera, Curculionidae
Eurosta solidaginis – Diptera, Tephritidae: Goldenrod gall fly
Harmandiola tremulae – Diptera, Cecidomyiidae
Iteomyia capreae – Diptera, Cecidomyiidae
Kermes corticalis – Hemiptera, Kermesidae
Kermes quercus – Hemiptera, Kermesidae
Kermes roboris – Hemiptera, Kermesidae
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Liriomyza trifolii – Diptera, Agromyzidae: American serpentine leafminer
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Massalongia betulifolia – Diptera, Cecidomyiidae
Massalongia rubra – Diptera, Cecidomyiidae
Mayetiola destructor – Diptera, Cecidomyiidae: Hessian fly
Monarthropalpus buxi – Diptera, Cecidomyiidae
Mordellistena pustulata – Coleoptera, Mordellidae: Tumbling flower beetle
Neuroterus quercusverrucarum – Hymenoptera, Cynipidae
Pachnaeus litus – Coleoptera, Curculionidae: Citrus root weevil or blue green citrus root weevil
Pachnaeus opalus – Coleoptera, Curculionidae: Citrus root weevil or blue green citrus root weevil
Paragaleopsomyia femorata – Hymenoptera, Eulophidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Physonota unipunctata – Coleoptera, Chrysomelidae: Green tortoise beetle
Prepodes similes – Coleoptera, Curculionidae
Prepodes vittatus – Coleoptera, Curculionidae
Quadrastichus brevinervis – Hymenoptera, Eulophidae
Quadrastichus ventricosus – Hymenoptera, Eulophidae
Rabdophaga pseudococcus – Diptera, Cecidomyiidae
Rhopalomyia chrysanthemi – Diptera, Cecidomyiidae: Chrysanthemum gall midge
Torymus chloromerus – Hymenoptera, Torymidae
Wachtliella persicariae – Diptera, Cecidomyiidae
Wachtliella rosarum – Diptera, Cecidomyiidae

Tetrastichus

Host:

- Achaea janata* – Lepidoptera, Nepticulidae: Croton caterpillar
Acrobasis nuxvorella – Lepidoptera, Pyralidae: Pecan nut casebearer
Acronicta americana – Lepidoptera, Noctuidae: American dagger moth
Adalia bipunctata – Coleoptera, Coccinellidae: Two-spot lady bird or two-spotted lady beetle
Adelencyrtus mayurai – Hymenoptera, Encyrtidae
Adelencyrtus moderatus – Hymenoptera, Encyrtidae
Aethognathus cavilabris – Hymenoptera, Encyrtidae
Ageniaspis citricola – Hymenoptera, Encyrtidae
Ageniella bombycina – Hymenoptera, Pompilidae
Agrilus arcuatus – Coleoptera, Buprestidae: Hickory spiral borer
Agrilus aurichalceus – Coleoptera, Buprestidae: Rose stem girdler
Agrilus integerrimus – Coleoptera, Buprestidae
Agrilus sinuatus – Coleoptera, Buprestidae: Hawthorn jewel beetle
Agrilus viridis – Coleoptera, Buprestidae: Beech splendour beetle
Alabama argillacea – Lepidoptera, Noctuidae: Cotton leafworm
Aleiodes circumscriptus – Hymenoptera, Braconidae
Aleurodicus destructor – Hemiptera, Aleyrodidae: Coconut whitefly
Allantus cinctus – Hymenoptera, Tenthredinidae: Curled rose sawfly
Alurnus humeralis – Coleoptera, Chrysomelidae
Anadevidia peponis – Lepidoptera, Noctuidae
Anagyrus lopezi – Hymenoptera, Encyrtidae
Anisostephus betulinum – Diptera, Cecidomyiidae
Anisota senatoria – Lepidoptera, Saturniidae: Orangestriped oakworm or orange-tipped oakworm
Anomalococcus crematogastris – Hemiptera, Asterolecaniidae
Anomis leona – Lepidoptera, Noctuidae
Anoplius nigerrimus – Hymenoptera, Pompilidae
Anthonomus consors – Coleoptera, Curculionidae: Cherry curclio
Antigastra catalaunalis – Lepidoptera, Pyralidae: Sesame podborer or sesame webworm
Apanteles laorae – Hymenoptera, Braconidae
Apanteles machaeralis – Hymenoptera, Braconidae
Apanteles syleptae – Hymenoptera, Braconidae
Apanteles taragamae – Hymenoptera, Braconidae
Apanteles venustus – Hymenoptera, Braconidae
Apion apricans – Coleoptera, Apionidae: Clover seed weevil
Apion flavofemoratum – Coleoptera, Apionidae
Apis mellifera – Hymenoptera, Apidae: Honey bee
Apriona germarii – Coleoptera, Cerambycidae
Apriona rugicollis – Coleoptera, Cerambycidae
Approaerema modicella – Lepidoptera, Gelechiidae: Groundnut leafminer
Aprostocetus asthenogmus – Hymenoptera, Eulophidae
Aprostocetus hagenowii – Hymenoptera, Eulophidae
Arge ochropa – Hymenoptera, Argidae

Arge pagana – Hymenoptera, Argidae: Rose sawfly
Arge pectoralis – Hymenoptera, Argidae: Birch sawfly
Arge rosae – Hymenoptera, Argidae: Rose sawfly
Arge scapularis – Hymenoptera, Argidae: Elm argid sawfly
Argopus ahrensi – Coleoptera, Chrysomelidae
Argyresthia freyella – Lepidoptera, Argyresthiidae: Arborvitae leafminer
Ariadne merione – Lepidoptera, Nymphalidae: Common castor
Arsenura xanthopus – Lepidoptera, Saturniidae
Artona catoxantha – Lepidoptera, Zygaenidae: Coconut leaf moth, coconut leaf skeletonizer, Malayan coconut zygaenid, or Malayan coconut moth
Arytaina bicolor – Hemiptera, Psyllidae
Ascia monuste – Lepidoptera, Pieridae: Great southern white
Asphondylia riveae – Diptera, Cecidomyiidae
Aspidimorpha miliaris – Coleoptera, Chrysomelidae
Asterolecanium ilicicola – Hemiptera, Asterolecaniidae
Asteromyia carbonifera – Diptera, Cecidomyiidae
Athalia cordata – Hymenoptera, Tenthredinidae
Atherigona naqvii – Diptera, Muscidae: Shoot fly
Atherigona soccata – Diptera, Muscidae: Sorghum shoot fly
Atherigona varia – Diptera, Muscidae: Sorghum shoot fly
Attacus atlas – Lepidoptera, Saturniidae: Atlas moth
Aulacaspis tegalensis – Hemiptera, Diaspididae: Sugarcane scale
Australephesiodes stictella – Lepidoptera, Pyralidae
Austrolauthia spgazzinii – Diptera, Cecidomyiidae
Bactrocera cucurbitae – Diptera, Tephritidae: Melon fly
Bactrocera dorsalis – Diptera, Tephritidae: Oriental fruit fly
Bactrocera latifrons – Diptera, Tephritidae: Malayasian fruit fly
Bactrocera passiflorae – Diptera, Tephritidae: Fijian fruit fly
Bactrocera oleae – Diptera, Tephritidae: Olive fruit fly
Bactrocera tryoni – Diptera, Tephritidae: Queensland fruit fly
Bactrocera xanthodes – Diptera, Tephritidae: Pacific fruit fly
Barbara herrichiana – Lepidoptera, Tortricidae
Bassus rufipes – Hymenoptera, Braconidae
Bathytricha truncate – Lepidoptera, Noctuidae: Sugarcane borer or maize stemborer
Blastothrix scenographica – Hymenoptera, Encyrtidae
Blepharida rhois – Coleoptera, Chrysomelidae: Sumac flea beetle
Brachmia modicella – Lepidoptera, Gelechiidae
Brachonyx pineti – Coleoptera, Curculionidae
Bracon brevicornis – Hymenoptera, Braconidae
Bracon pectoralis – Hymenoptera, Braconidae
Brenthia leptocosma – Lepidoptera, Choreutidae
Brontispa froggatti – Coleoptera, Chrysomelidae: Coconut leaf beetle
Brontispa longissima – Coleoptera, Chrysomelidae: Palm leaf beetle, coconut leaf beetle
Brontispa mariana – Coleoptera, Chrysomelidae: Mariana coconut leaf beetle
Brontispa palauensis – Coleoptera, Chrysomelidae: Palau coconut leaf beetle
Bruchus obscurus – Coleoptera, Chrysomelidae

Bucculatrix crataegi – Lepidoptera, Bucculatricidae
Busseola fusca – Lepidoptera, Noctuidae: African maize stalk borer
Byturus tomentosus – Coleoptera, Byturidae: Raspberry Beetle
Cactoblastis cactorum – Lepidoptera, Pyralidae: Prickly pear moth or cactus moth
Calopepla leayana – Coleoptera, Chrysomelidae
Caloptilia theivora – Lepidoptera, Gracillariidae
Campoletis chlorideae – Hymenoptera, Ichneumonidae
Camptoloma interiorata – Lepidoptera, Noctuidae
Carcelia illota – Diptera, Tachinidae
Carpomya incomplete – Diptera, Tephritidae
Carpophthoromyia tritea – Diptera, Tephritidae
Cassida deflorata – Coleoptera, Chrysomelidae
Cassida murraea – Coleoptera, Chrysomelidae: Fleabane tortoise beetle
Cassida rubiginosa – Coleoptera, Chrysomelidae: Thistle tortoise beetle
Cassida sanguinosa – Coleoptera, Chrysomelidae
Cassida viridis – Coleoptera, Chrysomelidae
Cephus pygmaeus – Hymenoptera, Cephidae: Corn sawfly
Ceratitis capitata – Diptera, Tephritidae: Mediterranean fruit fly
Cerococcus hibisci – Hemiptera, Cerococcidae
Ceroplastes floridensis – Hemiptera, Coccidae: Florida wax scale
Ceroplastes grandis – Hemiptera, Coccidae
Ceroplastes japonicus – Hemiptera, Coccidae: Japanese wax scale
Ceroplastes pseudoceriferus – Hemiptera, Coccidae
Ceroplastes rusci – Hemiptera, Coccidae: Fig wax scale
Ceutorhynchus assimilis – Coleoptera, Curculionidae: Cabbage seed weevil
Ceutorhynchus quadridens – Coleoptera, Curculionidae
Chaetoptelius vestitus – Coleoptera, Curculionidae
Chaliopsis junodi – Lepidoptera, Psychidae
Cheilomenes lunata – Coleoptera, Coccinellidae
Cheilomenes vicina – Coleoptera, Coccinellidae
Chilo auricilius – Lepidoptera, Pyralidae: Sugarcane stalk borer
Chilo indicus – Lepidoptera, Pyralidae: Sugarcane internode borer
Chilo infuscatellus – Lepidoptera, Pyralidae: Sugarcane stem borer
Chilo partellus – Lepidoptera, Pyralidae: Spotted stalk borer
Chilo polychrysa – Lepidoptera, Pyralidae: Dark headed stem borer
Chilo suppressalis – Lepidoptera, Pyralidae: Asiatic rice borer or striped stemborer
Chilocorus bijugus – Coleoptera, Coccinellidae
Chilocorus bipustulatus – Coleoptera, Coccinellidae: Heather ladybird
Chilocorus kuwanae – Coleoptera, Coccinellidae: Red-spotted black lady beetle
Chilocorus pilosus – Coleoptera, Coccinellidae
Chilocorus renipustulatus – Coleoptera, Coccinellidae: Kidney-spot ladybird
Chiotica bruchii – Hymenoptera, Ichneumonidae
Chlamisus spilota – Coleoptera, Chrysomelidae
Chlorops novakii – Diptera, Chloropidae
Choristoneura fumiferana – Lepidoptera, Tortricidae: Spruce budworm
Chromatomyia syngenesiae – Diptera, Agromyzidae: Chrysanthemum leafminer

Chrysobothris sexsignata – Coleoptera, Buprestidae
Chrysodeixis eriosoma – Lepidoptera, Noctuidae: Green looper
Chrysomela scripta – Coleoptera, Chrysomelidae: Cottonwood leaf beetle
Chrysomela vigintipunctata – Coleoptera, Chrysomelidae
Chrysopa boninensis – Neuroptera, Chrysopidae
Chrysopa carnea – Neuroptera, Chrysopidae: Goldeneye lacewing
Chrysoperla lacciperda – Neuroptera, Chrysopidae
Chunrocerus niveosparsus – Hemiptera, Cicadellidae
Cicadella spectra – Hemiptera, Cicadellidae
Cimbex femorata – Hymenoptera, Cimbicidae: Button horn sheep wasp
Cladius difformis – Hymenoptera, Tenthredinidae: Bristly roseslug or roseslug sawfly
Cladius pectinicornis – Hymenoptera, Tenthredinidae
Clostera pigra – Lepidoptera, Notodontidae: Small chocolate-tip
Cnaphalocrocis medinalis – Lepidoptera, Pyralidae: Rice leaf roller
Coccidohystrix insolita – Hemiptera, Pseudococcidae
Coccinella novemnotata – Coleoptera, Coccinellidae: Nine-spotted ladybird beetle
Coccinella repanda – Coleoptera, Coccinellidae
Coccinella septempunctata – Coleoptera, Coccinellidae: Seven-spotted lady beetle
Coccinella vigintiquatuorpunctata – Coleoptera, Coccinellidae
Coccobius seminotus – Hymenoptera, Aphelinidae
Coccophagus ceroplastae – Hymenoptera, Aphelinidae
Coccus hesperidum – Hemiptera, Coccidae: Soft brown scale
Coccus marsupialis – Hemiptera, Coccidae
Coccus perlatus – Hemiptera, Coccidae
Coccus viridis – Hemiptera, Coccidae: Green scale
Coelioxys octodentata – Hymenoptera, Megachilidae
Coeloides filiformis – Hymenoptera, Braconidae
Coeloides melanotus – Hymenoptera, Braconidae
Coelomera lanio – Coleoptera, Chrysomelidae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner
Coleophora malivorella – Lepidoptera, Coleophoridae: Pistol case bearer
Coleophora pruniella – Lepidoptera, Coleophoridae
Coleotechnites starki – Lepidoptera, Gelechiidae: Northern lodgepole needleminer
Colias lesbian – Lepidoptera, Pieridae
Coloradia pandora – Lepidoptera, Saturniidae: Pandora moth
Compsus auricephalus – Coleoptera, Curculionidae: Golden headed weevil
Conchyloctenia punctata – Coleoptera, Chrysomelidae: Spotted tortoise beetle
Coniesta ignefusalis – Lepidoptera, Pyralidae: Millet stem borer
Conopomorpha cramerella – Lepidoptera, Gracillariidae: Cocoa pod borer or cocoa moth
Conopomorpha sinensis – Lepidoptera, Gracillariidae: Lichii fruit borer
Contarinia bromicola – Diptera, Cecidomyiidae: Bromegrass seed midge
Contarinia inouyei – Diptera, Cecidomyiidae: Japanese cedar gall midge
Contarinia pseudotsugae – Diptera, Cecidomyiidae: Douglas-fir needle midge
Contarinia sorghicola – Diptera, Cecidomyiidae: Sorghum midge
Contarinia tritici – Diptera, Cecidomyiidae
Conura bergi – Hymenoptera, Chalcididae

Conura fortidens – Hymenoptera, Chalcididae
Copidosoma deceptor – Hymenoptera, Encyrtidae
Corcyra cephalonica – Lepidoptera, Pyralidae: Rice moth
Cotesia affinis – Hymenoptera, Braconidae
Cotesia ayerza – Hymenoptera, Braconidae
Cotesia deliadis – Hymenoptera, Braconidae
Cotesia glomerata – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cotesia kazak – Hymenoptera, Braconidae: Tomato fruit parasite
Cotesia melanoscela – Hymenoptera, Braconidae
Cotesia paphi – Hymenoptera, Braconidae
Cotesia plutellae – Hymenoptera, Braconidae: Diamondback moth parasite
Cotesia rubecula – Hymenoptera, Braconidae: Cabbage white butterfly parasite
Cribrolecanium andersoni – Hemiptera, Coccidae: White powdery scale
Crioceris asparagi – Coleoptera, Chrysomelidae: Asparagus beetle
Crioceris duodecimpunctata – Coleoptera, Chrysomelidae: Twelve-spotted asparagus beetle
Cryptocephalus pini – Coleoptera, Chrysomelidae: Leaf wood beetle
Cryptonevra flavitarsis – Diptera, Chloropidae
Cryptonevra tarsata – Diptera, Chloropidae
Cydia funebrana – Lepidoptera, Tortricidae: Plum fruit moth
Cydia leucostoma – Lepidoptera, Tortricidae: Flushworm
Cylindrocopturus eatoni – Coleoptera, Curculionidae: Pine reproductive weevil
Cylindrocopturus furnissi – Coleoptera, Curculionidae: Douglas fir twig weevil
Cynips divisa – Hymenoptera, Cynipidae
Cystiphora schmidtii – Diptera, Cecidomyiidae: Skeleton weed gall midge
Dacus bivittatus – Diptera, Tephritidae
Dacus ciliatus – Diptera, Tephritidae: Lesser pumpkin fly, Ethiopian fly or cucurbit fly
Dacus cucumarius – Diptera, Tephritidae
Dacus demmerezi – Diptera, Tephritidae
Dacus humeralis – Diptera, Tephritidae
Dacus punctatifrons – Diptera, Tephritidae: Tomato fruit fly
Dasineura affinis – Diptera, Cecidomyiidae: Violet leaf midge
Dasineura albobittata – Diptera, Cecidomyiidae
Dasineura amaramanjarai – Diptera, Cecidomyiidae
Dasineura balsamicola – Diptera, Cecidomyiidae: Balsalm gall midge
Dasineura brassicae – Diptera, Cecidomyiidae: Brassica pod midge
Dasineura gentneri – Diptera, Cecidomyiidae: White clover seed midge
Dasineura leguminicola – Diptera, Cecidomyiidae: Clover seed midge
Dasineura oxycoccana – Diptera, Cecidomyiidae: Blueberry gall midge or cranberry midge
Dasineura rozhkovi – Diptera, Cecidomyiidae
Dasineura urticae – Diptera, Cecidomyiidae
Datana integerrima – Lepidoptera, Notodontidae: Walnut caterpillar
Dendroctonus armandi – Coleoptera, Curculionidae
Desmia funeralis – Lepidoptera, Pyralidae: Grape leaf folder
Diacrisia scortilla – Lepidoptera, Arctiidae

Diadegma armillatum – Hymenoptera, Ichneumonidae
Diadegma fenestrale – Hymenoptera, Ichneumonidae
Diaphorina citri – Hemiptera, Psyllidae: Asiatic citrus psyllid
Diaphania indica – Lepidoptera, Pyralidae: Cotton caterpillar, cucumber moth, pumpkin caterpillar, or melon moth
Diaphorina kopetdaghi – Lepidoptera, Pyralidae
Diaspis senegalensis – Hemiptera, Diaspididae
Dichatomus acerinus – Hymenoptera, Eulophidae
Dichoptera hyalinata – Hemiptera, Dictypharidae
Dicladispa armigera – Coleoptera, Chrysomelidae: Rice hispid
Dicraeus ingrates – Diptera, Chlopropidae
Dicraeus tibialis – Diptera, Chlopropidae
Dicrodiplosis manihoti – Diptera, Cecidomyiidae
Diopsis servillei – Diptera, Diopsidae
Diplolepis centifoliae – Hymenoptera, Cynipidae
Diplolepis eglanteriae – Hymenoptera, Cynipidae: Rose pea gall wasp
Diplolepis mayri – Hymenoptera, Cynipidae
Diplolepis spinosa – Hymenoptera, Cynipidae: Rose galling wasp
Dipogon sayi – Hymenoptera, Pompilidae
Disholcaspis quercusvirens – Hymenoptera, Cynipidae
Dolichogenidea inquisitor – Hymenoptera, Braconidae
Dolichopeza americana – Diptera, Tipulidae
Dolichopeza obscura – Diptera, Tipulidae
Dolichopeza subalbipes – Diptera, Tipulidae
Dolichopeza walleyi – Diptera, Tipulidae
Donacula forficella – Lepidoptera, Pyralidae
Donacivola saccharella – Lepidoptera, Elachistidae
Doxocopa agathina – Lepidoptera, Nymphalidae
Drosophila flavohirta – Diptera, Drosophilidae
Dryocoetes hectographus – Coleoptera, Scolytidae
Dryocosmus kuriphilus – Hymenoptera, Cynipidae: Oriental chestnut gall wasp
Earias vittella – Lepidoptera, Noctuidae: Spotted bollworm
Ectoedemia occultella – Lepidoptera, Nepticulidae
Elasmus homonae – Hymenoptera, Eulophidae
Eldana saccharina – Lepidoptera, Pyralidae: sugarcane borer
Ensina sonchi – Diptera, Tephritidae: Sonchus fly
Epilachna argus – Coleoptera, Coccinellidae: Bryony ladybird
Epilachna chrysomelina – Coleoptera, Coccinellidae: Twelve-spotted melon beetle
Epilachna indica – Coleoptera, Coccinellidae
Epilachna similes – Coleoptera, Coccinellidae
Epilachna varivestis – Coleoptera, Coccinellidae: Mexican bean beetle
Episomus kwanhsiensis – Coleoptera, Curculionidae
Eriosoma lanigerum – Hemiptera, Aphididae: Woolly apple aphid
Eriborus argenteopilosus – Hymenoptera, Ichneumonidae
Eriborus molestae – Hymenoptera, Ichneumonidae
Erosomyia mangiferae – Diptera, Cecidomyiidae

Erynnia nitida – Diptera, Tachinidae
Etiella zinckenella – Lepidoptera, Pyralidae: Lima bean pod borer
Eueides Isabella – Lepidoptera, Nymphalidae: Isabella helioconian
Euglyptoneura robusta – Hemiptera, Psyllidae
Euphyllura phillyreae – Hemiptera, Psyllidae: Olive psyllid
Eulecanium caraganae – Hemiptera, Coccidae
Eulecanium coryli – Hemiptera, Coccidae
Eulecanium perinflatum – Hemiptera, Coccidae
Euplectrus laphygmae – Hymenoptera, Eulophidae
Euplectrus leonae – Hymenoptera, Eulophidae
Euplectrus platyhypenae – Hymenoptera, Eulophidae
Euproctis dewitzi – Lepidoptera, Lymantriidae
Eurybrachys tomentosa – Hemiptera, Eurybrachidae
Eutreta diana – Diptera, Tephritidae
Euura atra – Hymenoptera, Tenthredinidae
Evania splendidula – Hymenoptera, Evaniidae
Exochomus flavipes – Coleoptera, Coccinellidae
Exochomus quadripustulatus – Coleoptera, Coccinellidae: Pine ladybird
Exorista bombycis – Diptera, Tachinidae: Uzi fly
Exorista fasciata – Diptera, Tachinidae
Exorista sorbillans – Diptera, Tachinidae
Exoteleia pinifoliella – Lepidoptera, Gelechiidae: Pine needle miner
Ferrisia virgata – Hemiptera, Pseudococcidae: Striped mealybug
Fulgoraecia tomentosa – Lepidoptera, Epipyropidae
Galerucella maculicollis – Coleoptera, Chrysomelidae
Galerucella pruinella – Coleoptera, Chrysomelidae
Galerucella viburni – Coleoptera, Chrysomelidae
Galleria mellonella – Lepidoptera, Pyralidae: Greater wax moth
Gasteroclisus auriculatus – Coleoptera, Curculionidae
Gephyraulus diplotaxis – Diptera, Cecidomyiidae
Gestronella centrolina – Coleoptera, Chrysomelidae
Glyphodes pyloalis – Lepidoptera, Pyralidae: Mulberry pyralid
Gnorimoschema gallaesolidaginis – Lepidoptera, Gelechiidae: Goldenrod elliptical-gall
 moth or goldenrod gall moth
Gonioctena olivacea – Coleoptera, Chrysomelidae: Broom leaf beetle
Goniophthalmus halli – Diptera, Tachinidae
Goniozus claripennis – Hymenoptera, Bethyidae
Goniozus montanus – Hymenoptera, Bethyidae
Grandipalpa robusta – Lepidoptera, Gelechiidae
Grapholita molesta – Lepidoptera, Tortricidae: Oriental fruit moth
Gretchena bolliana – Lepidoptera, Tortricidae: Pecan budmoth
Gyranusoidea tebygi – Hymenoptera, Encyrtidae
Bracon brevicornis – Hymenoptera, Braconidae
Halticus bractatus – Hemiptera, Miridae: Garden fleahopper
Harmonia globata – Coleoptera, Coccinellidae

Helicoverpa armigera – Lepidoptera, Noctuidae: Corn ear worm, tomato grub, tobacco
 bidworm, cotton bollworm
Hemadas nubilipennis – Hymenoptera, Pteromalidae: Blueberry stem gall wasp
Hemiberlesia rapax – Hemiptera, Diaspididae: Greedy scale
Hemileuca oliviae – Lepidoptera, Saturniidae
Henosepilachna vigintioctomaculata – Coleoptera, Coccinellidae
Henosepilachna vigintioctopunctata – Coleoptera, Coccinellidae: Twentysix-spotted
 potato ladybird
Hippodamia variegata – Coleoptera, Coccinellidae: Adonis ladybird
Holocacista rivillei – Lepidoptera, Heliozelidae
Holocerina smilax – Lepidoptera, Saturniidae
Homoeocerus lucidus – Hemiptera, Coreidae
Homona coffearia – Lepidoptera, Tortricidae: Coffee tortrix
Hyblaea pueria – Lepidoptera, Hyblaeidae: Teak defoliator
Hybolasioptera cerealis – Diptera, Cecidomyiidae
Hydrellia prosternalis – Diptera, Ephydriidae
Hydrellia sasakii – Diptera, Ephydriidae: Paddy stem maggot
Hylesinus oleiperda – Coleoptera, Scolytidae
Hylesinus orni – Coleoptera, Scolytidae
Hypera murina – Coleoptera, Curculionidae
Hypera variabilis – Coleoptera, Curculionidae: Alfalfa weevil
Hyperaspis senegalensis – Coleoptera, Coccinellidae
Hyphantria cunea – Lepidoptera, Arctiidae: Fall webworm moth
Hypolixus truncatulus – Coleoptera, Curculionidae: Amaranth weevil
Hyposoter ebeninus – Hymenoptera, Ichneumonidae
Hypsipyla grandella – Lepidoptera, Pyralidae: Mahogany shoot borer
Hypsipyla robusta – Lepidoptera, Pyralidae: Cedar tip moth
Icerya aegyptiaca – Hemiptera, Margarodidae: Egyptian fluted scale
Icerya pattersoni – Hemiptera, Margarodidae
Iconella etiellae – Hymenoptera, Braconidae
Idioscopus clypealis – Hemiptera, Cicadellidae: Mango leafhopper
Isosandalum barbatum – Diptera, Cecidomyiidae
Isosandalum noxium – Diptera, Cecidomyiidae
Isosandalum provinciale – Diptera, Cecidomyiidae
Janetiella oenophila – Diptera, Cecidomyiidae
Janetiella siskiyoi – Diptera, Cecidomyiidae
Janseodes melanospila – Lepidoptera, Noctuidae
Janus abbreviatus – Hymenoptera, Cephidae: Willow shoot sawfly
Kaltenbachiola strobe – Diptera, Cecidomyiidae
Keiferia lycopersicella – Lepidoptera, Gelechiidae: Tomato pinworm
Laccifer albizziae – Hemiptera, Kerriidae
Laccifer lacca – Hemiptera, Kerriidae: Lac scale
Laelia exclamatoris – Lepidoptera, Lymantriidae
Larinus brevis – Coleoptera, Curculionidae
Larinus jaceae – Coleoptera, Curculionidae
Lasioptera falcata – Diptera, Cecidomyiidae

Lasioptera rubi – Diptera, Cecidomyiidae: Blackberry gall midge
Lasioptera vernoniae – Diptera, Cecidomyiidae
Latoia viridissima – Lepidoptera, Limacodidae
Ledra aurita – Hemiptera, Cicadelliade
Leiopus nebulosus – Coleoptera, Cerambycidae
Lema cyanella – Coleoptera, Chrysomelidae
Lema planifrons – Coleoptera, Chrysomelidae
Lepidosaphes ulmi – Hemiptera, Diaspididae: Apple mussel scale
Leptophobia aripa – Lepidoptera, Pieridae: Green-eyed white or mountain white
Lestes dryas – Odonata, Lestidae: Emerald spreadwing damselfly
Lestes unguiculata – Odonata, Lestidae
Leucania loreyi – Lepidoptera, Noctuidae: Nightfeeding sugarcane armyworm
Leucopomyia alticeps – Diptera, Chamaemyiidae
Leucoptera coffeella – Lepidoptera, Lyonetiidae: Coffee leafminer
Leucoptera malifoliella – Lepidoptera, Lyonetiidae: Pear leaf blister moth or pear leaf miner
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Leucoptera sphenograpta – Lepidoptera, Lyonetiidae
Liothrips floridensis – Thysanoptera, Phlaeothripidae
Liothrips setinodis – Thysanoptera, Phlaeothripidae
Lipara lucens – Diptera, Chloropidae
Lipara rufitarsis – Diptera, Chloropidae
Loboptera decipiens – Blattaria, Blatellidae
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy Moth
Lymantria obfuscate – Lepidoptera, Lymantriidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Macrocentrus homonae – Hymenoptera, Braconidae
Macrocentrus thoracicus – Hymenoptera, Braconidae
Magdalis aenescens – Coleoptera, Curculionidae: Bronze appletree weevil
Malacosoma americanum – Lepidoptera, Lasiocampidae: Eastern tent caterpillar
Malacosoma disstria – Lepidoptera, Lasiocampidae: Forest tent caterpillar
Malata mitis – Coleoptera, Coccinellidae
Mallochchia pyralidis – Hymenoptera, Ichneumonidae
Manduca sexta – Lepidoptera, Sphingidae: Tobacco horn worm
Maruca vitrata – Lepidoptera, Pyralidae: Bean podborer, soybean pod borer or legume pod borer
Masakimyia pustulae – Diptera, Cecidomyiidae: Euonymus gall midge
Massalongia betulifolia – Diptera, Cecidomyiidae
Massalongia rubra – Diptera, Cecidomyiidae
Mastrus molestae – Hymenoptera, Ichneumonidae
Mayetiola destructor – Diptera, Cecidomyiidae: Hessian fly
Mayetiola piceae – Diptera, Cecidomyiidae: Spruce gall midge
Mayetiola thujae – Diptera, Cecidomyiidae: Western red cedar cone midge or red cedar cone midge
Mayetiola tumidosae – Diptera, Cecidomyiidae
Megachile pacifica – Hymenoptera, Megachilidae: Alfalfa leafcutting bee

Megachile rotundata – Hymenoptera, Megachilidae: Alfalfa leafcutting bee
Megastigmus albifrons – Hymenoptera, Torymidae: Ponderosa pine seed chalcid or pine seed chalcid
Melanaspis glomerata – Hemiptera, Diaspididae
Melanophila decastigma – Coleoptera, Buprestidae
Melasoma lineatopunctatum – Coleoptera, Chrysomelidae
Menochilus sexmaculatus – Coleoptera, Coccinellidae
Menoetius coffeae – Coleoptera, Curculionidae
Meteorus versicolor – Hymenoptera, Braconidae
Methona confusa – Lepidoptera, Nymphalidae
Microterys nietneri – Hymenoptera, Encyrtidae
Mikomyia coryli – Diptera, Cecidomyiidae
Mimacraea krausei – Lepidoptera, Lycaenidae
Musca domestica – Diptera, Muscidae: House fly
Natada nararia – Lepidoptera, Limacodidae: Nettle grub, fringed nettle grub or slug caterpillar
Neaspilota alba – Diptera, Tephritidae
Nebrarctia oblique – Lepidoptera, Arctiidae
Neocryptopteryx orientalis – Hymenoptera, Ichneumonidae talis
Neodiprion lecontei – Hymenoptera, Diprionidae: Redheaded pine sawfly
Neodiprion pratti – Hymenoptera, Diprionidae: Jack pine sawfly or Virginia pine sawfly
Neodiprion sertifer – Hymenoptera, Diprionidae: European pine sawfly
Neodiprion swainei – Hymenoptera, Diprionidae: Swaine pine sawfly
Neodiprion virginiana – Hymenoptera, Diprionidae
Neolasioptera rostrata – Diptera, Cecidomyiidae
Nephantis serinopa – Lepidoptera, Cryptophasidae
Niditinea spretella – Lepidoptera, Tineidae
Nilaparvata lugens – Hemiptera, Delphacidae: Brown planthopper
Occidentalia comptulatalis – Lepidoptera, Pyralidae
Oecanthus nigricornis – Orthoptera, Gryllidae: Blackhorned tree cricket
Oecanthus pellucens – Orthoptera, Gryllidae
Oeneis melissa – Lepidoptera, Nymphalidae: Melissa arctic
Ogyris genoveva – Lepidoptera, Lycaenidae: Genoveva azure, purple azure or southern purple azure
Oiketicus geyeri – Lepidoptera, Psychidae
Oiketicus kirbyi – Lepidoptera, Psychidae
Oiketicus platensis – Lepidoptera, Psychidae
Omiodes indicate – Lepidoptera, Pyralidae
Oocassida pudibunda – Coleoptera, Chrysomelidae
Ooencyrtus pityocampae – Hymenoptera, Encyrtidae
Opisina arenosella – Lepidoptera, Oecophoridae: Coconut black-headed caterpillar
Orgyia australis postica – Lepidoptera, Lymantriidae
Orgyia pseudotsugata – Lepidoptera, Lymantriidae: Douglas-fir tussock moth
Orseolia oryzae – Diptera, Cecidomyiidae: Rice stem gall midge
Orseolia oryzivora – Diptera, Cecidomyiidae
Orthaga exvinacea – Lepidoptera, Pyralidae: Mango webworm

Ostrinia furnacalis – Lepidoptera, Pyralidae: Asian corn borer
Oulema gallaeciana – Coleoptera, Chrysomelidae
Oulema lichenis – Coleoptera, Chrysomelidae
Oulema melanopus – Coleoptera, Chrysomelidae: Cereal leaf beetle
Oulema oryzae – Coleoptera, Chrysomelidae: Rice leaf beetle
Pachyrhabda antinoma – Lepidoptera, Oecophoridae
Palaeocimbex quadrimaculata – Hymenoptera, Cimbicidae
Palectorista laxa – Diptera, Tachinidae
Pandemis cerasana – Lepidoptera, Tortricidae: Barred fruit tree tortrix
Palpita machaeralis – Lepidoptera, Pyralidae: Teak leaf eating caterpillar
Paradiplosis abietis – Diptera, Cecidomyiidae
Paradiplosis tumifex – Diptera, Cecidomyiidae: Balsam gall midge
Parafomoria helianthemella – Lepidoptera, Nepticulidae
Paralepidosaphes tubulorum – Hemiptera, Diaspididae
Paratheresia claripalpis – Diptera, Tachinidae
Paratrioza cockerelli – Hemiptera, Psyllidae: Tomato psyllid or potato psyllid
Paratrioza maculipennis – Hemiptera, Psyllidae
Pardalaspis breinii – Diptera, Tephritidae
Pardalaspis cyanescens – Diptera, Tephritidae
Pardalaspis giffardi – Diptera, Tephritidae
Pardalaspis punctata – Diptera, Tephritidae: Cocoa fruit fly
Pardalaspis stictica – Diptera, Tephritidae
Parornix geminatella – Lepidoptera, Gracillariidae: Unspotted tentiform leafminer
Parthenolecanium corni – Hemiptera, Coccidae: European fruit lecanium
Pauropsylla trichaeta – Hemiptera, Triozidae
Pectinophora gossypiella – Lepidoptera, Gelechiidae: Pink bollworm
Pediobius foveolatus – Hymenoptera, Eulophidae: Mexican bean beetle parasitoid
Pediobius pyrgo – Hymenoptera, Eulophidae
Pegomya rubivora – Diptera, Anthomyiidae: Raspberry cane maggot
Periplaneta americana – Blattodea, Blatellidae: American cockroach
Periplaneta australasiae – Blattodea, Blatellidae: Australian cockroach
Perittia weberella – Lepidoptera, Elachistidae
Perkinsiella saccharicida – Hemiptera, Delphacidae: Sugarcane planthopper
Phanerotoma hendecasisella – Hymenoptera, Braconidae
Phenacoccus iceryoides – Hemiptera, Pseudococcidae
Phloeosinus aubei – Coleoptera, Scolytidae: Juniper bark beetle
Phthorimaea operculella – Lepidoptera: Gelechiidae: Potato tuberworm or potato tuber moth
Phycodes radiata – Lepidoptera, Brachodidae
Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter connexella
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter saliciphaga – Lepidoptera, Gracillariidae
Phyllonorycter sorbi – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae

Physokermes piceae – Hemiptera, Coccidae: Spruce bud scale
Phytodietus fumiferanae – Hymenoptera, Ichneumonidae
Phytodietus spinipes – Hymenoptera, Ichneumonidae
Phytolyma lata – Hemiptera, Psyllidae
Phytomyza orobanchia – Diptera, Agromyzidae
Pieris rapae – Lepidoptera, Pieridae: Cabbage white
Pigeria piger – Hymenoptera, Braconidae
Pilemostoma fastuosum – Coleoptera, Chrysomelidae
Pinyonia edulicola – Diptera, Cecidomyiidae: Pinyon spindlegall midge
Pityophthorus polonicus – Coleoptera, Scolytidae
Placosternum dama – Hemiptera, Pentatomidae
Plagioderma versicolora – Coleoptera, Chrysomelidae
Planococcus citri – Hemiptera, Pseudococcidae: Citrus mealbug
Platyplectrus natadae – Hymenoptera, Eulophidae
Plecoptera reflexa – Lepidoptera, Noctuidae: Shisham defoliator
Plemeliella abietina – Diptera, Cecidomyiidae
Plesispa nipae – Coleoptera, Hispinae
Plutella xylostella – Lepidoptera, Plutellidae: Diamond back moth or cabbage moth
Poemyza incise – Diptera, Agromyzidae
Polynema needhami – Hymenoptera, Mymaridae
Prays oleae – Lepidoptera, Plutellidae: Olive kernel borer or olive moth
Pristomerus vulnerator – Hymenoptera, Ichneumonidae
Procecidochares alani – Diptera, Tephritidae: Mist flower gall fly
Procontarinia matteianna – Diptera, Cecidomyiidae
Procerata sacchariphaga – Lepidoptera, Brachodidae
Procerata venosata – Lepidoptera, Brachodidae
Prodiplosis platani – Diptera, Cecidomyiidae
Promecotheca bicolor – Coleoptera: Chrysomelidae
Promecotheca reichei – Coleoptera: Chrysomelidae: Coconut leaf mining beetle or palm
leaf mining beetle
Psectrosema indicum – Diptera, Cecidomyiidae
Psectrosema manii – Diptera, Cecidomyiidae
Psectrosema parvum – Diptera, Cecidomyiidae
Psectrosema reticulatum – Diptera, Cecidomyiidae
Pseudaletia separata – Lepidoptera, Noctuidae: Rice armyworm
Pseudanthonomus helvolus – Coleoptera, Curculionidae
Pseudococcus vastator – Hemiptera, Pseudococcidae
Psylla fatsiae – Hemiptera, Psyllidae
Psylla ilicina – Hemiptera, Psyllidae
Ptecticus tenebrifer – Diptera, Stratiomyiidae
Pterandrus anonae – Diptera, Tephritidae
Pterandrus colae – Diptera, Tephritidae
Pterandrus rosa fasciventris – Diptera, Tephritidae
Pteromalus cioni – Hymenoptera, Pteromalidae
Pulvinaria flavesceus – Hemiptera, Coccidae
Pulvinaria mangiferae – Hemiptera, Coccidae: Mango soft scale

Pulvinaria maxima – Hemiptera, Coccidae
Pulvinaria mesembryanthemi – Hemiptera, Coccidae: Ice plant scale
Pulvinaria minuta – Hemiptera, Coccidae
Pulvinaria platensis – Hemiptera, Coccidae
Pulvinaria pyriformis – Hemiptera, Coccidae *Pulvinaria jacksoni*
Pyralis farinalis – Lepidoptera, Pyralidae: Meal moth
Pyrilla perpusilla – Hemiptera, Lophopidae: Sugarcane planthopper
Pyrrhalta aenescens – Coleoptera, Chrysomelidae
Pyrrhalta luteola – Coleoptera, Chrysomelidae: Elm leaf beetle
Rabdophaga heterobia – Diptera, Cecidomyiidae
Rabdophaga salicisrhodoides – Diptera, Cecidomyiidae
Rabdophaga swaini – Diptera, Cecidomyiidae
Resseliella soya – Diptera, Cecidomyiidae
Resseliella theobaldi – Diptera, Cecidomyiidae: Raspberry cane midge
Rhagoletis completa – Diptera, Tephritidae: walnut husk fly
Rhagoletis fausta – Diptera, Tephritidae: Black cherry fruit fly
Rhagoletis pomonella – Diptera, Tephritidae: Apple maggot fly
Rhamphus oxyacanthae – Coleoptera, Curculionidae
Rhinocyllus conicus – Coleoptera, Curculionidae: Thistle head weevil
Rhodococcus spiraeae – Hemiptera, Coccidae
Rhodococcus turanicus – Hemiptera, Coccidae: Turanian scale
Rhopalomyia californica – Diptera, Cecidomyiidae: Groundsel bush gall fly
Rhopalomyia chrysanthemi – Diptera, Cecidomyiidae: Chrysanthemum gall midge
Rhyacionia buoliana – Lepidoptera, Tortricidae: European pine shoot moth
Rhyacionia rigidana – Lepidoptera, Tortricidae: Pitch pine tip moth
Rogas plecopterae – Hymenoptera, Braconidae
Rondotia menciaana – Lepidoptera, Bombycidae: Mulberry white caterpillar
Rothschildia orizaba – Lepidoptera, Saturniidae: Windowpane silkworm
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus fagi – Coleoptera, Curculionidae
Rynchaenus pilosus – Coleoptera, Curculionidae
Rynchaenus quercus – Coleoptera, Curculionidae: Oak flea weevil
Rynchaenus rufus – Coleoptera, Curculionidae
Rynchaenus salicis – Coleoptera, Curculionidae
Rhynocoris violentus – Hemiptera, Reduviidae
Ricania fenestrata – Hemiptera, Ricaniidae
Saccharosydne saccharivora – Hemiptera, Delphacidae
Saissetia oleae – Hemiptera, Coccidae: Black scale
Saperda inornata – Coleoptera, Cerambycidae: Poplar gall borer
Satyrus calanus falacer – Lepidoptera, Lycaenidae: Banded hairstreak
Sceliphron spirifex – Hymenoptera, Sphecidae
Schizomyia orientalis – Diptera, Cecidomyiidae
Schizonotus latus – Hymenoptera, Pteromalidae
Schematiza cordiae – Coleoptera, Chrysomelidae
Schoenobius bipunctifer – Lepidoptera, Pyralidae: Rice stem borer
Scirpophaga excerptalis – Lepidoptera, Pyralidae: White sugarcane borer

Scirpophaga incertulas – Lepidoptera, Pyralidae: Yellow stem borer
Scirpophaga innotata – Lepidoptera, Pyralidae: White rice stem borer
Scirpophaga nivella – Lepidoptera, Pyralidae: White rice borer
Scirpophaga praelata – Lepidoptera, Pyralidae
Scolytus butovitschi – Coleoptera, Scolytidae
Scolytus dahuricus – Coleoptera, Scolytidae
Scolytus ensifer – Coleoptera, Scolytidae
Scolytus rugulosus – Coleoptera, Scolytidae: Shothole borer or fruit bark beetle
Scolytus schevyrewi – Coleoptera, Scolytidae: Banded elm bark beetle
Scrobipalpa absoluta – Lepidoptera, Gelechiidae
Sculna forda – Lepidoptera, Saturniidae
Scutellista caerulea – Hymenoptera, Pteromalidae
Scymnus soudanensis – Coleoptera, Coccinellidae
Scymnus subvillosus – Coleoptera, Coccinellidae
Segestes decoratus – Orthoptera, Tettigonidae
Sesamia calamistis – Lepidoptera, Noctuidae: African pink borer
Sesamia cretica – Lepidoptera, Noctuidae: Durra stem borer
Sesamia inferens – Lepidoptera, Noctuidae: Pink stem borer
Sesamia nonagrioides – Lepidoptera, Noctuidae: Corn stalk borer
Simmondsius pakistanensis – Coleoptera, Coccinellidae
Simplicia extinctalis – Lepidoptera, Herminiidae
Simplicia robustalis – Lepidoptera, Herminiidae
Smaragdina weisei – Coleoptera, Chrysomelidae
Sogatella furcifera – Hemiptera, Delphacidae: White backed planthopper
Solierella similis – Hymenoptera, Sphecidae
Sphaerolecanium prunastri – Hemiptera, Coccidae: Frosted scale
Sphaerotrypes coimbatorensis – Coleoptera, Scolytidae
Spilonota holotephra – Lepidoptera, Tortricidae
Spodoptera exempta – Lepidoptera, Noctuidae: African armyworm
Spodoptera frugiperda – Lepidoptera, Noctuidae: Fall armyworm
Spodoptera littoralis – Lepidoptera, Noctuidae: Egyptian cotton leafworm
Spodoptera litura – Lepidoptera, Noctuidae: Tobacco cutworm or cluster caterpillar
Spodoptera mauritia – Lepidoptera, Noctuidae: Lawn armyworm
Stenopa affinis – Diptera, Tephritidae
Stictocephala inermis – Hemiptera, Membracidae
Strymon edwardsii – Lepidoptera, Lycaenidae
Synanthedon pyri – Lepidoptera, Sesiidae: Apple bark borer
Synonycha grandis – Coleoptera, Coccinellidae
Systole albipennis – Hymenoptera, Eurytomidae: Parsnip seed wasp
Systole coriandri – Hymenoptera, Eurytomidae
Taxodiomyia cupressiananassa – Diptera, Cecidomyiidae: Cypress gall midge
Tenebrio molitor – Coleoptera, Tenebrionidae: Yellow mealworms
Terellia serratulae – Diptera, Tephritidae
Tetramoera schistaceana – Lepidoptera, Tortricidae: Sugarcane shoot borer
Tetrops praeustus – Coleoptera, Cerambycidae: Plumb beetle
Thaumetopoea pityocampa – Lepidoptera, Thaumetopoeidae: Pine procession moth

Thaumetopoea wilkinsoni – Lepidoptera, Thaumetopoeidae
Thecodiplosis brachyntera – Diptera, Cecidiomyiidae: Needle-shortening pine gall midge
Thecla basilides – Lepidoptera, Lycaenidae: Pineapple borer
Thecla ericusa – Lepidoptera, Lycaenidae
Tischeria faunacella – Lepidoptera, Tischeriidae
Tischeria omissa – Lepidoptera, Tischeriidae
Tmolus echion – Lepidoptera, Lycaenidae: Larger lantan butterfly or red-spotted
 hairstreak
Tortrix viridana – Lepidoptera, Tortricidae: European oak leafroller
Trachelus tabidus – Hymenoptera, Cephidae: Black grain stem sawfly
Trathala hapaliae – Hymenoptera, Ichneumonidae
Trichoplusia ni – Lepidoptera, Noctuidae: Cabbage looper
Trioza bakeri – Hemiptera, Triozidae
Trioza erytreae – Hemiptera, Triozidae: Citrus psyllid
Trioza tremblayi – Hemiptera, Triozidae
Trioza viridula – Hemiptera, Triozidae
Trirhithrum coffeae – Diptera, Tephritidae
Trirhithrum nigrum – Diptera, Tephritidae
Tropicomyia atomella – Diptera, Agromyzidae
Trupanea dubautiae – Diptera, Tephritidae
Turanium scabrum – Coleoptera, Cerambycidae
Urophora jaceana – Diptera, Tephritidae
Vanessa carye – Lepidoptera, Nymphalidae: Western painted lady
Wachtliella rosarum – Diptera, Cecidomyiidae
Xanthopimpla stemmator – Hymenoptera, Ichneumonidae
Xyleborus morigerus – Coleoptera, Scolytidae: Dendrobium borer or black twig borer
Xyleborus morstatti – Coleoptera, Scolytidae
Xylomya cabrerai – Diptera, Xylomyidae
Xylosandrus compactus – Coleoptera, Curculionidae: Black twig borer
Xylotrechus pantherinus – Coleoptera, Cerambycidae
Yponomeuta malinella – Lepidoptera, Yponomeutidae: Apple ermine moth

Hadrotrichodes

Host:

Marmara gulosa – Lepidoptera, Gracillariidae: peelminer

Subfamily Tetrastichinae not in California or Arizona

Minotetrastichus

Host:

Achrysocharoides albiscapus – Hymenoptera, Eulophidae
Achrysocharoides splendens – Hymenoptera, Eulophidae
Caloptilia alchimiella – Lepidoptera, Gracillariidae
Chromatomyia aprilina – Diptera, Agromyzidae
Cimbex femorata – Hymenoptera, Cimbicidae: Button horn sheep wasp
Cirrospilus lyncus – Hymenoptera, Eulophidae
Coleophora laricella – Lepidoptera, Coleophoridae: Larch casebearer or larch leaf miner

Coleophora pruniella – Lepidoptera, Coleophoridae
Coptodisca splendoriferella – Lepidoptera, Heliozelidae
Cotesia spuria – Hymenoptera, Braconidae
Diplolepis rosae – Hymenoptera, Cynipidae: Mossyrose gall wasp
Donacivola saccharella – Lepidoptera, Elachistidae
Fenusa pusilla – Hymenoptera, Tenthredinidae: Birch leafminer
Fenusa ulmi – Hymenoptera, Tenthredinidae: Elm leafminer
Gracillaria syringella – Lepidoptera, Gracillariidae: Lilac leafminer
Heterarthrus nemoratus – Hymenoptera, Tenthredinidae: Late birch edgeminer
Holocacista rivillei – Lepidoptera, Heliozelidae
Leucoptera laburnella – Lepidoptera, Lyonetiidae: Laburnum leaf miner
Leucoptera sinuella – Lepidoptera, Lyonetiidae
Lyonetia clerkella – Lepidoptera, Lyonetiidae: Apple leaf miner
Parectopa robiniella – Lepidoptera, Gracillariidae: Locust digitate leafminer
Parornix petiolella – Lepidoptera, Gracillariidae
Pediobius saulius – Hymenoptera, Eulophidae
Pholetesor circumscriptus – Hymenoptera, Braconidae
Pholetesor ornigis – Hymenoptera, Braconidae
Phyllocnistis tremulella – Lepidoptera, Gracillariidae
Phyllonorycter blancardella – Lepidoptera, Gracillariidae: Spotted tentiform leafminer
Phyllonorycter corylifoliella – Lepidoptera, Gracillariidae: Hawthorn red midget moth
Phyllonorycter crataegella – Lepidoptera Gracillariidae: apple blotch leafminer
Phyllonorycter delitella – Lepidoptera, Gracillariidae
Phyllonorycter distentella – Lepidoptera, Gracillariidae
Phyllonorycter lautella – Lepidoptera Gracillariidae
Phyllonorycter maestingella – Lepidoptera Gracillariidae
Phyllonorycter messaniella – Lepidoptera, Gracillariidae: Zellar's midget
Phyllonorycter millierella – Lepidoptera, Gracillariidae
Phyllonorycter platani – Lepidoptera, Gracillariidae
Phyllonorycter populifoliella – Lepidoptera, Gracillariidae
Phyllonorycter propinquella – Lepidoptera, Gracillariidae: cherry blotchminer
Phyllonorycter pyrifoliella – Lepidoptera, Gracillariidae
Phyllonorycter quercifoliella – Lepidoptera, Gracillariidae
Phyllonorycter robiniella – Lepidoptera, Gracillariidae: Horse-chesnut leafminer
Phyllonorycter roboris – Lepidoptera, Gracillariidae
Phyllonorycter schreberella – Lepidoptera, Gracillariidae
Phyllonorycter spinicolella – Lepidoptera, Gracillariidae
Phyllonorycter tremulae – Lepidoptera, Gracillariidae
Phyllonorycter ulmifoliella – Lepidoptera, Gracillariidae
Phygadeuon pectinicornis – Hymenoptera, Eulophidae
Rynchaenus alni – Coleoptera, Curculionidae
Rynchaenus fagi – Coleoptera, Curculionidae
Rynchaenus pallicornis – Coleoptera, Curculionidae
Rynchaenus populi – Coleoptera, Curculionidae
Rynchaenus testaceus – Coleoptera, Curculionidae
Shawiana phyllotomae – Hymenoptera, Braconidae

Stigmella malella- Lepidoptera, Nepticulidae: Banded apple pigmy
Sympiesis sericeicornis – Hymenoptera, Eulophidae
Tischeria ekebladella – Lepidoptera, Tischeriidae
Tischeria longeciliata – Lepidoptera, Tischeriidae

Tetrastichomyia

Host:

Achatodes zeae – Lepidoptera, Noctuidae: Elder shoot borer
Acronicta megacephala – Lepidoptera, Noctuidae: Poplar grey
Compsilura concinnata – Diptera, Tachinidae
Diatraea crambidoides – Lepidoptera, Pyralidae
Epargyreus clarus – Lepidoptera, Hesperidae: Silver-spotted skipper
Grapholita molesta – Lepidoptera, Tortricidae: Oriental fruit moth
Hyphantria cunea – Lepidoptera, Arctiidae: Fall webworm moth
Lymantria dispar – Lepidoptera, Lymantriidae: Gypsy moth
Malacosoma americanum – Lepidoptera, Lasiocampidae: Eastern tent caterpillar
Maliarpha separatella – Lepidoptera, Pyralidae: African white stemborer
Microplitis gortynae – Hymenoptera, Braconidae
Orgyia leucostigma – Lepidoptera, Lymantriidae: White-marked tussock moth
Ostrinia nubilalis – Lepidoptera, Pyralidae: European corn borer
Synanthedon exitiosa – Lepidoptera, Aegeriidae: Peachtree borer
Tachinidae – Diptera, Tachinidae

Subfamily Tetrastichinae not in US

Citrostichus

Host:

Phyllocnistis citrella – Lepidoptera, Gracillariidae: Citrus leafminer
Trioza obsoleta – Hemiptera, Triozidae: Jumping plantlice

Cryptastichus

Host:

Phyllocnistis citrella- Lepidoptera, Gracillariidae: Citrus leafminer

Mestocharella

Host:

Acrocercops melanoplecta – Lepidoptera, Gracillariidae
Caloptilia javensis – Lepidoptera, Gracillariidae
Caloptilia kadsurae – Lepidoptera, Gracillariidae
Caloptilia prottiella – Lepidoptera, Gracillariidae
Caloptilia theivora – Lepidoptera, Gracillariidae
Sycanus collaris – Hemiptera, Reduviidae

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