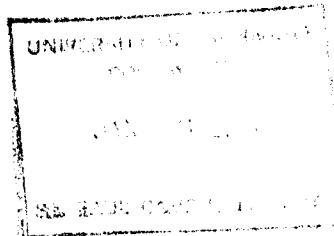


A Review of the Parasites and Predators of Tent Caterpillars (*Malacosoma* Spp.) in North America

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INTRODUCTION

The tent caterpillar, *Malacosoma* spp. (Lepidoptera: Lasiocampidae), represents an important genus of defoliators in North America. One species, forest tent caterpillar, *M. disstria* (Hübner), is especially serious in Minnesota, where large areas of aspen are frequently defoliated (Hodson, 1941). Recently there have been extensive literature reviews on the taxonomy of the genus (Stehr and Cook, 1968) and on microorganisms causing disease in the genus (Stairs, 1972), but other information remains obscured in the 500 or more papers published during the past 150 years. The purpose of our paper is to bring together all available information on the parasites and predators of tent caterpillars.

The species list was once the terminating point in many studies in community ecology, but now it forms the beginning of many ecosystem studies (MacFadyen, 1963). Compiling an accurate listing of parasites and predators attacking tent caterpillars is difficult because of (1) the paucity of biological control studies for some species of tent caterpillars, (2) the taxonomic uncertainty of some hosts and parasites, (3) the difficulty of finding records of parasitism and predation in the vast literature on tent caterpillars, and (4) the inadequacy of predation studies.

This list includes published records and unpublished records obtained through correspondence with current workers. We made a concerted effort to cover all published literature but realize that we probably have missed some obscure sources.

All of the reports of natural enemies of tent caterpillars are listed along with a statement relative to (1) the status of natural control agents as parasites, predators, hyperparasites, associated insects of unknown status, etc., (2) the tent caterpillar species or subspecies involved, (3) the status of the paper as an original study where insects were reared or observed, or as a review of other work, (4) the literature reference, and (5) the geographic location of the work. A brief discussion of papers giving evaluations of parasites and predators along with other information that did not lend itself to tabular form precedes the list.

THE GENUS MALACOSOMA IN NORTH AMERICA

Stehr and Cook (1968) revised the genus *Malacosoma* (Hübner) in North America to include the six species and eight subspecies listed below.

1. *Malacosoma americanum* (Fabricius)—throughout the United States east of the Great Plains and in the southern part of eastern Canada.

2. *Malacosoma californicum ambisimile* (Dyar)—California.
3. *Malacosoma californicum californicum* (Packard)—California.
4. *Malacosoma californicum fragile* (Stretch)—California, Nevada, Utah, and Arizona.
5. *Malacosoma californicum lutescens* (Neumoegen and Dyar)—Great Plains area of the United States east of the Rockies and to the northern edge of the prairies in Canada.
6. *Malacosoma californicum pluviale* (Dyar)—Washington, Oregon, Idaho, Montana, and from east to west in Canada with the southern boundary closely following the prairie-boreal forest ecotone including all border states from Minnesota to Maine.
7. *Malacosoma californicum recenseo* Dyar—California and Nevada.
8. *Malacosoma constrictum austrinum* Stehr—southern California.
9. *Malacosoma constrictum constrictum* (Henry Edwards)—Washington, Oregon, and California.
10. *Malacosoma disstria* (Hübner)—throughout the United States and adjacent Canada but most common east of the Mississippi River.
11. *Malacosoma incurvum aztecum* (Neumoegen)—Mexico.
12. *Malacosoma incurvum discoloratum* (Neumoegen)—Nevada, Arizona, Utah, and Colorado.
13. *Malacosoma incurvum incurvum* (Henry Edwards)—Arizona and New Mexico.
14. *Malacosoma tigris* (Dyar)—Utah, Colorado, Arizona, New Mexico, and Mexico.

SEASONAL HISTORY OF TENT CATERPILLARS

The life cycles of all tent caterpillars are similar. See Stehr and Cook (1968) for individual differences for each species, especially in relation to egg laying differences, appearance of egg mass and cocoon, tent construction, and preferred food hosts.

The female moth usually lays a single egg mass that contains about 200 eggs but varies from a few to 500. The egg masses are laid in bands around small twigs, or in a flat mass on larger branches, or on the trunk of small trees. All species except *M. tigris* cover the eggs with a frothy material called spumaline. Embryo development begins immediately, and the young caterpillars (pharate larvae) are fully formed within the egg in 3 weeks. They remain as pharate larvae for the remainder of the summer and overwinter in this stage.

In spring, the larvae chew their way out of the eggs at about the same time the buds of the host plant are expanding. The caterpillars feed gregariously on the newly formed leaves and expanding buds. Most species of hardwood trees are attacked, but the caterpillars generally prefer Salicaceae, Fagaceae, and Rosaceae.

Soon after hatching, the tent-making species construct a silk shelter at the crotch of twigs. The forest tent caterpillar, *M. disstria*, does not make a tent, whereas *M. constrictum* and *M. tigris* make loose tents for molting purposes only. These three species cluster in groups on the bole or branches during resting periods.

The tent caterpillar spends 4-8 weeks in the larval stage. The number of instars varies, but five or six are common. The caterpillars lose their gregarious habit in the last instar and often travel considerable distances searching for food. Cocoons are constructed in rolled leaves, old tents, hollow logs, etc. The adult emerges from the cocoon in about 2 weeks. Mating and egg laying occur soon after adult emergence.

ECONOMIC IMPORTANCE OF TENT CATERPILLARS

The forest tent caterpillar, *M. disstria*, has caused complete defoliation of aspen in the Lake States and adjacent Canadian provinces, of oaks in Illinois, of maples and aspen in the northeastern United States, and of tupelo, gum, and cottonwood in Alabama and Mississippi. See Kulman (1971) for a thorough review on the effect of defoliation by *M. disstria* on the growth and mortality of trees. *Malacosoma californicum* often defoliates aspen forests in the Rocky Mountains. The other western species are primarily defoliators of shrubs that are important as browse plants and for watershed protection. The eastern tent caterpillar, *M. americanum*, feeds primarily on wild black cherry and orchard trees. Many tent caterpillars feed on fruit trees, but this is rarely important because control is obtained during the regular spray program for other pests.

Resort owners, land owners, and tourists complain about the aesthetic damage caused by tent caterpillar larvae, defoliation, and tents.

EGG PARASITES

An annotated list of the natural enemies of tent caterpillar eggs, including biological information and literature references, is presented in table 1.

In summation from table 1, there are 14 valid hymenopterous egg parasites of *Malacosoma* spp. in North America. The egg parasites belong to six families: Encyrtidae, Eulophidae, Eupelmidae, Scelionidae, Torymidae, and Trichogrammatidae. Quantitative information on egg parasites that did not lend itself to table presentation is given below.

Liu (1926) stated that inspections of early records showed that 13 species of hymenopterous insects have been considered egg parasites of the eastern tent caterpillar. As shown in the list, some of these records are incorrect. Liu (1926, 1928) reared four egg parasites from *M. americanum* during his 2-year study. They were, in order of abundance: *Tetrastichus malacosomae* Girault, *Teleonomus clisiocampae* Ashmead, *Oöencyrtus clisiocampae* Ashmead, and *Ablerus clisiocampae* Ashmead. *Cocco-*

phagus fletcheri Howard was reared from an egg mass, but its status as an egg parasite is uncertain. This species normally infests scales, but Liu suggested that in this case it is a hyperparasite of one of the egg parasites.

Hodson (1941) reported 2, 7, and 8 percent parasitization of *M. disstria* eggs in 1936, 1937, and 1938. The three most common egg parasites in 1936 and 1937, in order of abundance, were: *O. clisiocampae*, *T. clisiocampae*, and *T. sylvaticus* (Hodson, 1939c). He concluded that the three parasite species were well-adapted to the life cycle of the host, but factors associated with oviposition and egg mass construction were responsible for the low rate of parasitism. Eggs located around the periphery of the egg mass, where the spumaline covering is the thinnest, were the most susceptible to parasitism.

McLeod and Ayre (1956) reported 2, 3, and 5 percent parasitization of *M. disstria* and *M. californicum* *pluviale* eggs in 1951, 1952, and 1953.

Langston (1957), in his California studies, reported egg parasitization of less than 1 percent per egg mass. *Tetrastichus malacosomae* was the most abundant of the six parasites collected during his studies.

Stehr (1968) collected seven species of egg parasites of tent caterpillars during his 2-year study.

Stelzer (1968) reported the number of parasitized *M. californicum fragile* eggs per egg mass as 8.3, 13.9, 12.7, 10.4, and 9.6 percent for 1959-63. Only *Tetrastichus malacosomae* and *T. clisiocampae* Riley were found in his study. The former species was the most abundant.

Witter and Kulman (1973) reported 7.7, 7.4, 9.6, 9.2, and 4.2 percent parasitization of *M. disstria* eggs during 1967-71. The three most common egg parasites were *T. sylvaticus*, *O. clisiocampae*, and *T. clisiocampae*.

LARVAL AND PUPAL PARASITES

An annotated list of the natural enemies of tent caterpillar larvae and pupae, including biological information and literature references, is presented in table 2.

In summation from table 2, there appear to be at least 52 valid dipterous parasites and 61 valid hymenopterous primary parasites of tent caterpillar larvae and pupae in North America. Parasitic species found in the various dipterous families were: Tachinidae, 41; Sarcophagidae, 5; Muscidae, 5; and Calliphoridae, 1. Species of primary parasites found in the various hymenopterous families were: Ichneumonidae, 41; Braconidae, 11; Eulophidae, 3; Pteromalidae, 3; Torymidae, 2; and Chalcididae, 1. Quantitative information on larval and pupal parasites that did not lend itself to tabular form is presented below.

Lowe (1898) reported 80 percent parasitization of *M. americanum* cocoons collected in 1897 in New York. He reared five species of primary hymenopterous parasites. In 1898, Lowe (1899) obtained only 12.5 percent parasitization in cocoons of *M. disstria* and reared five species of hymenopterous parasites. Ninety-two percent of this parasitization was by *Itoplectis conquisitor* (Say).

Fiske (1903) estimated that total parasitization of *M. americanum* larva varied yearly from 15-20 percent during 1896-1900 in New Hampshire. *Itoplectis conquisitor* and *Rogas* sp. were the two most abundant parasites. He reared 23 species of hymenopterous parasites consisting of 11 primary parasites, 10 secondary parasites, and 2 that act both ways. Even though percentage parasitization was about the same each year, he found that the abundance of

different parasite species varied greatly by years due largely to hyperparasitism. Eastern tent caterpillar populations fluctuated greatly by seasons during his studies, but the fluctuation was due to factors other than parasites.

Liu (1926) presented a thorough review of the literature on natural control agents of *M. americanum*. During 1924 and 1925, Liu (1926, 1928) reared 15 species of parasites from larvae and pupae of the eastern tent caterpillar consisting of four dipterous parasites, seven primary hymenopterous parasites, three hymenopterous hyperparasites, and one nematode. The nematode, *Hexameris microamphidis* Steiner, caused 25 percent parasitization in 1924 and was the most abundant, but dropped to less than 1 percent parasitization in 1925. *Itopectis conquisitor* caused 14.8 and 14.6 percent parasitization in 1924 and 1925.

Schaffner and Griswold (1934) reported on collecting and rearing tent caterpillars and their parasites in the northeastern United States during 1915-29. The most abundant parasites of *M. americanum*, in order of abundance, were: *Carcelia protuberans* (Aldrich and Webber), *Leschenaultia exul* (Townsend), *Lespesia frenchii* (Williston), *Trichonotus analis* (Say), and a nematode belonging to the family Mermithidae. The most abundant parasites of *M. disstria*, in order of abundance, were: *C. protuberans*, *L. frenchii*, *L. exul*, *Cartocometes* io Aldrich, *Compsilura concinnata* (Meigen), and *T. analis*.

Bess (1936) presented a thorough coverage on the biology of *L. exul*, a tachinid parasite of *M. americanum* and *M. disstria*. *L. exul* is very specific in its host relationship; it is found only on these two tent caterpillars. Percentage parasitization by *L. exul* on *M. americanum* in 1933, 1934, and 1935 was 2, 3, and 23 percent. Bess also reared 12 dipterous parasites and 3 hymenopterous parasites from *M. americanum* and *M. disstria*.

Hodson (1939c) reported on the biology of *Sarcophaga aldrichi* Parker, a parasite of *M. disstria*. He showed that this parasite attacks normal prepupae and pupae of *M. disstria* and is not limited to just parasitized or diseased hosts.

Hodson (1941) reported that no single natural control factor was entirely responsible for reducing the populations of the forest tent caterpillar during the 1936-38 outbreak in Minnesota. The studies showed that the outbreak was terminated by a combination of many factors, with late frost and parasites playing the dominant role. He reported that parasitization by *S. aldrichi* increased with the age of the infestation and approached 90 percent during the 3rd year of heavy defoliation.

McLeod and Ayre (1956) studied parasitism of *M. disstria* and *M. californicum pluviale* as the caterpillar populations increased during 1950-53. They reared 20 species of primary and secondary parasites from the larvae and pupae of these two hosts during their 4-year study. Larval parasitization was 19, 38, 21, and 16 percent in 1950-53. Pupal parasitization was 70, 65, 26, and 23 percent in 1950-53. Dipterous parasites were much more abundant (91 percent) than hymenopterous parasites (9 percent) in 1950. By 1953, hymenopterous parasites had increased but still were less abundant than dipterous parasites (39:61). There was a large increase in the percentage of early larval hymenopterous parasites and a decrease in hymenopterous late larval and pupal parasites. *Euexorista futilis* (Osten Sacken) dropped from an 11.7 relative percentage equivalent of parasites attacking *Mala-*

cosoma in 1952 to an 0.7 relative percentage equivalent in 1953. This reduction was apparently related to the scarcity of alternate hosts for the bivoltine tachinid after the tent caterpillar had completely defoliated the trees.

Langston (1957) reported 15 hymenopterous parasites of tent caterpillars either with a distribution in California or occurring on the western species of tent caterpillars where their range includes other states or provinces. The most widespread parasites in California in 1955 were *Rogas* sp. and *Hyposoter fugitivus pacificus* Cushman. Parasitization never exceeded 5 percent except in one locality where parasitization by *H. fugitivus pacificus* was between 15-20 percent. Langston (1957) speculated that tent caterpillars generally were kept in check in California by a combination of hymenopterous and dipterous parasites, predators, and a virus disease.

Sippell (1957) listed 45 species as members of the parasite complex of *M. disstria*. He reared 34 species of parasites from the forest tent caterpillar in Ontario during 1950-55. *Rogas* sp. was the only species that attacked young caterpillars. The most abundant parasites, along with numbers reared during the 7-year study, were: *S. aldrichi*, 14,374; *Patelloa pachypyga* (Aldrich and Webber), 4,530; *L. exul*, 2,114; *L. frenchii*, 434; *Rogas* sp., 409; and *T. analis*, 304.

Sippell (1957) stated that *S. aldrichi* was intrinsically superior to all late larval and cocoon parasites of *M. disstria* except *Pseudosarcophaga affinis* (Fallen). Percentage parasitization by *S. aldrichi* on forest tent caterpillar prepupae and pupae during 1950-55 was 24, 36, 48, 75, and 78.

Sippell recognized three patterns of parasitism during his 5-year study: (1) ichneumonids tended to decrease each year, (2) *S. aldrichi* increased regardless of major changes in host population density, and (3) other parasites increased, then decreased (*P. pachypyga*) or vice versa (*L. exul*). These changes can be frequently explained by the biological knowledge of the parasites and their hosts. Two weaknesses showed up in the complex: (1) a sequence of many parasites in different stages of host development was missing, and (2) *S. aldrichi* was so dominating that other parasites became scarce. This simplified the ecosystem and caused greater population fluctuations in the host.

Turnock (1961) found that the degree of parasitization of the forest tent caterpillar pupae varied with the location of the cocooning sites. This may have been due to plant-host preferences of the various parasites. He found that percentage parasitization of cocoons collected from ground vegetation, aspen, and balsam fir was 22.4, 18.5, and 11.2 percent. *Sarcophaga aldrichi* was the most abundant pupal parasite. Percentage parasitization by *S. aldrichi* of cocoons collected from ground vegetation, aspen, and balsam fir was 14.7, 8.0, and 0.7.

Kulman (1965) reported on 32 species of insects that were predators, parasites, and tent inhabitants of *M. americanum* in West Virginia. *Itopectis conquisitor* and *Theronia atalantae fulvescens* (Cresson) were the two most important primary parasites. The latter was frequently a parasite of the former. *Gelis tenellus* (Say) was an important hyperparasite attacking the larval parasites *Hyposoter fugitivus fugitivus* (Say) and *Phobocampae clisio-campae* (Weed). The study showed that the relative abundance of the various pupal parasites varied with time of collection. In a later paper (Kulman, 1970), community

effect of biological control in a mixed forest stand with four insect populations was discussed. The eastern tent caterpillar was an important host for several polyphagous parasites in the study.

Stehr and Cook (1968) listed the larval and pupal parasites reared from *Malacosoma* spp. collected in the western United States and Canada. Eleven parasite species belonged to the family Ichneumonidae, with *Hyposoter fugitivus* (Say) and *Pimpla sanguinipes erythropus* (Viereck) being the most common. The braconid *Rogas* sp. was very common; it was reared from 52 out of 500 larval collections. *Lespesia archippivora* (Riley), a tachinid, was the most abundant of the 12 dipterous species.

Stelzer (1968) reared 17 dipterous and 15 hymenopterous species as primary parasites of *M. californicum fragile*. Two additional species of diptera and two hymenoptera were primary parasites of *M. incurvum incurvum*. *Rogas* sp. was the most widespread larval parasite of *M. californicum fragile*. It accounted for 7.5 and 9.2 percent parasitization in 1962 and 1964. *P. affinis* and *S. aldrichi* were the two major dipterous parasites, accounting for 81 and 74 percent of the parasitization by dipterous species for 1961 and 1962. *Bracon xanthonotus* (Ashmead) was the most abundant hymenopterous parasite on the two tent caterpillars.

Witter and Kulman (1973) reared 40 species of parasites from larvae and pupae of the forest tent caterpillar. There were 13 dipterous parasites, 21 primary hymenopterous parasites, 5 hyperparasites, and 1 nematode. *Rogas* sp. was the only early larval parasite present. The most abundant late larval parasites, in order of abundance, were: *P. pachypyga*, *L. exul*, *A. frenchii*, and *Trichonotus analis* (Say). Cocoon parasitization varied by stratum, with parasitism higher on cocoons collected from the ground level than on cocoons collected from the shrub or crown level. *Sarcophaga aldrichi* was the most common pupal parasite. The study presented data on fluctuations in percentage parasitization by years for the various parasites and included discussion of possible explanations for fluctuations.

HYPERPARASITES

A list of the hyperparasites associated with tent caterpillars, including their hosts and literature references, is presented in table 3. There are 33 species of hyperparasites reported in the literature and three primary parasites that sometimes act as hyperparasites. Additional information on hyperparasites can be found under the discussion section on their hosts.

INSECT PREDATORS

Ants, *Calosoma* beetles, lady bird beetles, elaterid beetles, and pentatomid bugs have been observed as predators of tent caterpillar larvae and earwigs, and *Calosoma* beetles have been observed as predators of tent caterpillar pupae (table 2). Predation by *Calosoma* beetles and pentatomids appears to be more common. Hodson (1941) reported that under insectary conditions *Calosoma frigidum* Kirby ate or destroyed an average of 2.7 caterpillars per day and fed at this rate for more than 2 weeks. Burgess and Collins (1917) reported on the seasonal histories, habits, and economic importance of several ground beetles, primarily as predators of the gypsy moth. There

are no quantitative studies on the effect of insect predators on tent caterpillar populations.

In summation, table 2 shows that nine species of hymenopterous insects are recorded as predators of tent caterpillars in North America. Seven belong to the family Formicidae, and one each to the families Sphecidae and Vespidae. There are also 18, 9, and 1 species of tent caterpillar predators that belong to the orders Hemiptera, Coleoptera, and Dermaptera. Predatory species of tent caterpillars found in the various hemipterous families were: Pentatomidae, 15; Reduviidae, 2; and Miridae, 1. Documented predatory species found in the various coleopterous families were: Carabidae, 5; Staphylinidae, 2; and Coccinellidae, 2.

BIRDS

There are 60 species of birds that have been recorded as predators of tent caterpillars (table 2). Many species eat large numbers of small larvae, but few birds consume large larvae.

Lowe (1898) reported that the yellow-billed and black-billed cuckoos and the black-capped chickadee appeared to be the most important of the birds that feed on *M. americanum*. The cuckoos feed on the caterpillars, whereas the black-capped chickadee feeds on the eggs and young caterpillars.

Weed (1899) observed chickadees and nuthatches tearing open tent caterpillar cocoons and feeding on the pupae. Moths were also eaten in great numbers by robins, chipping sparrows, yellow birds, and English sparrows.

Black-billed and yellow-billed cuckoos appear to be better adapted than other birds to feeding on hairy caterpillars. Cuckoos tend to follow caterpillar outbreaks, and the size of their brood appears to increase when food is abundant (Forbush, 1927). Unlike most birds, cuckoos feed on all sizes of tent caterpillar larvae. The cuckoo can shed its entire stomach lining and grow a new one when it becomes felted with masses of hairs and spines that obstruct digestion (Forbush, 1927). Forbush also reported that S. A. Forbes found that 95 percent of the food of this species consisted of caterpillars. Forbush (1907) reported an average of 21 caterpillars per stomach for the black-billed cuckoo.

McAtee (1927) reported that 45 species of birds were known to feed on *M. americanum* larvae or eggs. Titmice and chickadees eat eggs more often than other birds, but stomachs of blue jays have yielded over 800 eggs in two instances. Cuckoos take a larger number of caterpillars than any other birds, often feeding on 200 for one meal. McAtee reported that birds have often exterminated populations of eastern tent caterpillars in localized areas. He also reported that 36 species of birds were known to feed on *M. disstria* eggs and larvae.

Fashingbauer (1951) reported that 19 species of birds fed on forest tent caterpillar larvae. Stomach analysis data showed that most birds sought out larvae that were still small, even though most caterpillars in the area were fourth and fifth instar larvae when the analysis was made.

MAMMALS AND AMPHIBIANS

Wood frogs, deer mice, skunks, and toads all appear to be predators of tent caterpillar larvae (table 2). The effect of these animals on the population dynamics of tent caterpillars probably is small, but there are no quanti-

tative data available on these organisms. Kulman (1965) reported a mouse nest in a tent of *M. americanum*.

NEMATODES

Liu (1926, 1928) reported that the nematode *Hexameris microamphidis* Steiner was the most important parasite of the eastern tent caterpillar in 1924. Parasitization by nematodes fluctuates tremendously from year to year. Liu found 24.7 percent parasitization in 1924, but parasitization by nematodes dropped to less than 0.1 percent in 1925.

Schaffner (1934) reported that 104 specimens of a nematode belonging to the family Mermithidae were reared from *M. americanum* during 4 of the 14 years in which collections were made. Morris (personal correspondence) reared nematodes from forest tent caterpillar larvae collected near Stoneville, Mississippi. Witter and Kulman (1972) reared nematodes in small numbers each year from the forest tent caterpillar larvae and pupae during their 1967-71 collections.

DISEASES

What follows is not a complete review, but a general discussion on the most important aspects of the disease complex affecting tent caterpillars. Stairs (1972) presented a thorough review on microorganisms affecting tent caterpillars. Bird (1971) discussed the diseases affecting *M. disstria* populations.

Tent caterpillar populations are susceptible to viral, protozoan, fungal, and bacterial diseases that may occur singly or in combinations.

All species of tent caterpillars are susceptible to a nuclear polyhedrosis virus which, under natural conditions, can reach epidemic proportions 4-6 years after the beginning of a tent caterpillar outbreak (see Stairs, 1972, for examples). All individuals infected by the virus early in their development die. The later instars are much more resistant to virus, and it takes many particles to kill them. However, there is a wide range of susceptibility to infection. Clark (1956) demonstrated that the host plant can serve as an overwintering site of virus polyhedra, and Stairs (1965) mentions that caterpillars moving to small branches before dying create a source of accidental contamination for new egg masses. Stairs (1966) believes that the sarcophagid fly *S. aldrichi* is a very efficient transmitter of the virus. However, it is generally accepted that ovarian transmission is the most important factor in generation-to-generation transmission. Gridsdale (1968) and Raheja (1970) have shown that the virus particle is most likely on the external surface of the egg, since it can be inactivated by washing with sodium hypochlorate.

A protozoan belonging to the genus *Glugea* often affects tent caterpillars (Thomson, 1959). Smirnoff (1968) showed that up to 90 percent of the larvae can be infected with the disease near the end of an outbreak. Raheja (1970) could not attribute mortality of caterpillars to *Glugea* infections. However, such infections have a pronounced effect on the insect by: (1) retarding larval development, (2) reducing pupal and adult weights, (3) reducing fecundity, and (4) possibly affecting the vigor of the progeny. Quantitative knowledge about the effect of this disease on tent caterpillar populations is lacking.

Fungi belonging to the following genera have been isolated from tent caterpillars: *Aspergillus*, *Beauveria*, *Isaria*, and *Entomophthora* (*Empusa*). McLeod (1951) and Stairs (1972) have observed the fungus *Entomophthora* in epizootic proportions. Stairs (1972) reports that this fungus is present in all habitats but appears to be best suited to humid areas.

Bacteria belonging to the following genera have been isolated from tent caterpillars: *Bacillus*, *Clostridium*, and *Serratia* (Angus, 1951; Smirnoff, 1968). Under natural conditions, the bacteria appear to be of very little importance as a natural control agent.

EXPLANATION OF TABLES

The following abbreviations and symbols are used throughout the tables: Pred (predator), Para (parasite), Scav (scavenger), Hyp (hyperparasite), Unk (unknown), Assoc (associated), RS (reared in study), M (only mentioned by investigator), O (observed by investigator), Not Stated (represented by —). Where no subspecies is designated, an X is used; where a subspecies is recognized, it is designated by its first letter.

america. X=*Malacosoma americanum* (Fabricius)
califor. X=*Malacosoma californicum* (Packard)
califor. A=*Malacosoma californicum ambisimile* (Dyar)
califor. C=*Malacosoma californicum californicum* (Packard)
califor. F=*Malacosoma californicum fragile* (Stretch)
califor. L=*Malacosoma californicum lutescens* (Neumogen and Dyar)
califor. R=*Malacosoma californicum recenseo* (Dyar)
califor. P=*Malacosoma californicum pluviale* (Dyar)
constri. C=*Malacosoma constrictum constrictum* (Henry Edwards)
constri. A=*Malacosoma constrictum austrinum* Stehr
disstria X=*Malacosoma disstria* Hübner
incurvum A=*Malacosoma incurvum aztecum* (Neumogen)
incurvum D=*Malacosoma incurvum discoloratum* (Neumogen)
incurvum I=*Malacosoma incurvum incurvum* (Henry Edwards)
tigris X=*Malacosoma tigris* (Dyar)

LOCATION ABBREVIATIONS

Ala	Alabama	Maine	Maine
Alas	Alaska	Md	Maryland
Ariz	Arizona	Mass	Massachusetts
Ark	Arkansas	Mich	Michigan
Cal	California	Mo	Missouri
Col	Colorado	Mont	Montana
Conn	Connecticut	Neb	Nebraska
Del	Delaware	Nev	Nevada
DC	District of Columbia	NH	New Hampshire
Fla	Florida	NI	New Jersey
Ga	Georgia	N Mex	New Mexico
Idaho	Idaho	NY	New York
Ill	Illinois	NC	North Carolina
Iowa	Iowa	N Dak	North Dakota
Kans	Kansas	Ohio	Ohio
Ky	Kentucky	Okla	Oklahoma
La	Louisiana	Oreg	Oregon
		Pa	Pennsylvania

RI	Rhode Island	E USA	Eastern
SC	South Carolina		United States
Tenn	Tennessee		of America
Tex	Texas	W USA	Western
Utah	Utah		United States
Vt	Vermont		of America
Va	Virginia	NE	New England
Wash	Washington	Can	Canada
W Va	West Virginia	Alta	Alberta
Wis	Wisconsin	BC	British Columbia
Wyo	Wyoming	Man	Manitoba
N Amer	North America	NB	New Brunswick
USA	United States	N Sc	Nova Scotia
	of America	Nfld	Newfoundland
NE USA	Northeastern	Ont	Ontario
	United States	Que	Quebec
	of America	Sask	Saskatchewan

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TABLE 1. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR EGGS (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum	tigris			
<i>(Tetrastichus malacosomae, continued)</i>										
	Para		P					RS	Stehr 1968	Wash,Oreg, Alta
	Para		L					RS	Stehr 1968	Alta,Mont
	Para		F					RS	Stehr 1968	Cal,Ariz, Nev
	Para					I		RS	Stehr 1968	Ariz
	Para					D		RS	Stehr 1968	Nev,Utah
	Para		x					RS	Stelzer 1968	N Mex
	Para					I		RS	Stelzer 1968	Ariz
	Para		F					RS	Schmid(letter 1970)	Col
	Para		x					RS	Weaver(letter 1970)	W Va
	Para		x					RS	Stelzer 1971	WUSA
<i>Tetrastichus silvaticus</i> Gahan	Para				x			RS	Gahan 1937	Minn
	Para		x		x			RS	Hodson 1939c	Minn
	Para				x			M	Burks 1943	Minn,NB,Ver
	Para		P		x			RS	McLeod 1956	BC
	Para				x			RS	Connola 1957	NY
	Para				x			M	Langston 1957	NB,Ver,Conn, Minn
	Para				x			RS	Sippell 1957	Ont
	Para							M	Kulman 1970	Va
	Para				x			RS	Ramse 1972	N Dak
	Para				x			RS	Witter 1973	Minn
<i>Tetrastichus</i> sp.	Para		x					RS	Williams 1916	Mass
	Para		x					M	Liu 1926	--
	Para				x			RS	Nagel 1939	Minn
	Para							RS	Stehr 1968	Cal
	Para		P					RS	Stehr 1968	Mont
	Para		x					RS	Stehr 1968	Utah
ENCYRTIDAE										
<i>Aphycoideus io</i> Williams	Para		x					RS	Williams 1916	Mass
	Para		x					M	Liu 1926	--
	Para		x					M	Thompson 1946	USA
	Para		x					M	Muesebeck 1951	Mass
	Para		x					M	Peck 1963	Mass
<i>Ooencyrtus clisiocampae</i> (Ashmead)	Para				x			M	DallaTorrel1898	Ohio
	Para				x			M	Ashmead 1900	Ohio
	Para				x			M	Girault 1911	Ill
	Para		x					RS	Williams 1916	Mass
	Para		x					RS	Liu 1926, 1928	NY
	Para				x			RS	Hodson 1939c	Minn
	Para				x			RS	Nagel 1939	Minn
	Para		x					M	Thompson 1946	USA
	Para		x		x			M	Muesebeck 1951	NE USA, Ohio,Ind,Ill, Minn
	Para			P	x			RS	McLeod 1956	BC
	Para				x			RS	Connola 1957	NY
	Para				x			M	Langston 1957	Minn
	Para		x					M	Langston 1957	Mass
	Para				x			RS	Sippell 1957	Ont
	Para		x		x			M	Peck 1963	Ind,Ohio,NJ, Ill,NE USA, Minn
	Para		x					RS	Leius 1967	Ont
	Para							M	Krombein 1967	--
	Para					D		RS	Stehr 1968	Col,Utah
	Para					I		RS	Stehr 1968	Ariz
	Para							RS	Stehr 1968	Tex
	Para		L					RS	Stehr 1968	Oreg,BC
	Para		P					RS	Stehr 1968	Cal
	Para		AC					RS	Stehr 1968	Cal,Ariz, Utah
	Para		x					RS	Stehr 1968	

TABLE 1. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR EGGS (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum	tigris			
<i>(Ooencyrtus clisiocampae, continued)</i>										
	Para							RS	Stelzer 1968	Ariz
	Para				x			RS	Morris(letter 1970)	Ala
	Para	x						RS	Weaver(letter 1970)	W Va
	Para				x			RS	Ramse 1972	N Dak
	Para				x			RS	Witter 1973	Minn
Syn. <i>Encyrtus clisiocampae</i> Ashmead										
	Para				x			M	Dalla Torre 1898	Ohio
	Para				x			M	Viereck 1916	Conn
<i>Ooencyrtus</i> sp., apparently a new species	Para		x, A					RS	Langston 1957	Cal
<i>Ooencyrtus</i> sp.	Para	x						RS	Porter 1917	Mass
	Para	x						M	Liu 1926	--
EUPHELMIDAE										
<i>Eupelmus spongipartus</i> Foerster	Para	x						RS	Leius 1967	Ont
<i>Anastatus redivii</i> (Howard)	Para				x			RS	Morris(letter 1970)	Ala
<i>Anastatus</i> sp., ? <i>redivii</i> (Howard)	Para		R					RS	Langston 1957	Cal
<i>Anastatus</i> sp., possibly <i>pearsalli</i> Ashmead	Para				x			RS	Morris(letter 1970)	Ala
<i>Anastatus</i> sp.	Para		F					RS	Stehr 1968	Cal
	Para		A					RS	Stehr 1968	Cal
	Para		C					RS	Stehr 1968	Cal
	Para		x					RS	Stehr 1968	Cal, Ariz, Utah
TORYMIDAE										
<i>Microdontomerus fumipennis</i> Crawford	Para		x					M	Langston 1957	N Mex
PTEROMALIDAE										
<i>Pteromalus</i> sp.	Para	x						M	Packard 1889	--
Girault (1907) doubted the generic position of the unidentified species recorded by Packard.	Para	x						M	Girault 1907	--
	Para	x						M	Quaintance 1908	--
	Para	x						M	Britton 1913	--
	Para	x						M	Quaintance 1915	--
	Para	x						M	Liu 1926	--
	Para	x						M	Britton 1935	--
CERAPHRONIDAE										
<i>Lygocerus</i> sp.	Para(?)				x			RS	Witter 1973	Minn
SCELIONIDAE										
<i>Telenomus clisiocampae</i> Riley	Para	x						RS	Riley 1892	Nebr
	Para	x						RS	Ashmead 1893a	Nebr
	Para	x						M	Lowe 1898	--
	Para	x			x			M	Girault 1907	--
	Para	x						M	Quaintance 1908	--
	Para	x						M	Britton 1913	--
	Para	x						M	Quaintance 1915	--
	Para	x						M	Viereck 1916	Conn
	Para	x						RS	Williams 1916	Mass
	Para	x						RS	Liu 1926, 1928	NY
	Para	x						M	Britton 1935	--
	Para				x			RS	Nagel 1939	Minn
	Para				x			RS	Hodson 1939c	Minn
	Para				x			RS	Hodson 1945	Minn
	Para	x						M	Thompson 1946	USA
	Para							RS	Prentice 1953	Man, Sask
	Para		P		x			RS	McLeod 1956	BC
	Para				x			RS	Connola 1957	NY
	Para	x						M	Langston 1957	Neb, Mass, E USA

TABLE 1. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR EGGS (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum	tigris			
(Telenomus clisiocampae, continued)										
Para			x					M	Langston 1957	--
Para			R					RS	Langston 1957	Cal
Para					x			M	Langston 1957	Minn
Para					x			RS	Sippell 1957	Ont
Para			x					RS	Stehr 1968	Cal,Col, Nev,Oreg, Wyo
Para								RS	Stehr 1968	Cal
Para			CAR					RS	Stehr 1968	Oreg, Alta,BC
Para			P					RS	Stehr 1968	Mont
Para			L					RS	Stehr 1968	Cal,Ariz
Para			F					RS	Stelzer 1968	N Mex
Para			x					RS	Schmid(letter 1970)	Col
Para			x					RS	Weaver(letter 1970)	W Va
Para					x			RS	White(letter 1970)	Ill
Para					x			RS	Ramse 1972	N Dak
Para					x			RS	Witter 1973	Minn
<u>Telenomus coloradensis</u> Crawford			x					RS	Porter 1917	Mass
			x					M	Liu 1926	--
<u>Telenomus dalmani</u> Ratzeburg								RS	Wellington 1965	BC
<u>Telenomus sp.</u>								M	Gibson 1912	Que
			x		x			RS	Langston 1957	Cal
			x					RS	Leius 1967	Ont
PLATYGASTERIDAE										
<u>Platygaster sp.</u>	Para		x					RS	Packard 1865	NE
Henshaw(1896) regarded the undetermined species of <u>Platygaster</u> reared by Packard as <u>Telenomus clisiocampae</u> . Girault(1907) also questioned this entry.										
	Para		x					M	Girault 1907	--
	Para		x					M	Quaintance 1908	--
	Para		x					M	Britton 1913	--
	Para		x					M	Quaintance 1915	--
	Para		x					M	Liu 1926	--
	Para		x					M	Britton 1935	--
ACARINA										
GAMASIDAE										
(no additional information)										
Assoc			x					O	Liu 1926	NY
TROMBIDIIDAE										
<u>Trombidium sp.</u>	Pred		x					O	Saunders 1878a	Ont
	Pred		x					O	Saunders 1878b	Ont
	Pred		x					M	Saunders 1889	Ont
	Pred		x					M	Lowe 1899	--
	Pred		x					M	Liu 1926	--
	Pred		x					M	Hodson 1941	--
<u>Atomus sp.</u>	Assoc		x					O	Liu 1926	NY
Mites (no additional information)										
	Pred		x					M	Swaine 1918	--
	Assoc				x			O	Hodson 1941	Minn
BIRD PREDATORS										
Chickadee, black capped	Pred				x			O	Weed 1998	NH
	Pred				x			O	Lowe 1899	NY
Jay, blue	Pred							O	McAtee 1927	NY
Woodpecker, downy	Pred							O	McAtee 1927	NY
MAMMAL PREDATOR										
Mice or Shrews	Pred							O	Atwood 1943	Ont,Que

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum			
DERMAPTERA FORFICULIDAE									
<u>Forficula auricularia</u> Linnaeus	Pred		P				O	Wellington 1957, 1960	BC
LEPIDOPTERA GELECHIIDAE									
<u>Chionodes mediofuscella</u> (Clemens)	Unk	x					O	Kulman 1965	W Va
COLEOPTERA CARABIDAE									
Generic nomenclature for the order Coleoptera was taken from Arnett (1968). Nomenclature for species names for certain families were taken from: Carabidae, Gidaspow(1959); Staphylinidae, Casey (1915); Elateridae, Brown (1936); Becker (1956); Cantharidae, Fall (1928); Coccinellidae, McKenzie (1936).									
<u>Calosoma calidum</u> Fabricius	Pred			x			M	Saunders 1889	Ont
	Pred	x					M	Bruner 1890	Neb
	Pred			x			M	Felt 1898a,c	--
	Pred	x					O	Lowe 1898	NY
	Pred			x			M	Lowe 1899	NY
	Pred			x			M	Perkins 1900	Vt
	Pred	x					M	Liu 1926	--
	Pred			x			M	Herrick 1935	--
	Pred			x			O	Hodson 1941	Minn
<u>Calosoma frigidum</u> Kirby	Pred	x		x			O	Burgess 1897	Mass
	Pred			x			M	Lugger 1898	--
	Pred	x					M	Liu 1926	--
	Pred			x			O	Hodson 1941	Minn
	Pred			x			M	Elliott 1964	Man,Sask
	Pred			x			O	Witter 1973	Minn
<u>Calosoma scrutator</u> Fabricius	Pred			x			O	Riley 1870	Mo
	Pred			x			M	Saunders 1889	Ont
	Pred	x		x			M	Bruner 1890	Neb
	Pred	x		x			M	Burgess 1898	Mass.
	Pred	x					M	Felt 1898b	--
	Pred			x			M	Felt 1898c	--
	Pred	x					O	Lowe 1898	NY
	Pred			x			M	Lowe 1899	NY
	Pred	x					M	Quaintance 1908	--
	Pred	x					M	Quaintance 1915	--
	Pred			x			M	Burgess 1917	NE USA
	Pred						O	Cosens 1921	Ont
	Pred	x					M	Liu 1926	--
	Pred			x			M	Herrick 1935	--
	Pred	x					O	Kulman 1965	W Va
<u>Calosoma sycophanta</u> Linnaeus	Pred	x		x			M	Burgess 1915, 1917	NE
	Pred	x					M	Liu 1926	--
<u>Calosoma wilcoxi</u> Le Conte	Pred			x			O	Burgess 1898	Mass
	Pred			x			M	Lowe 1899	--
<u>Calosoma</u> sp.	Pred			x			M	Bruner 1890	Neb
	Pred			x			M	Britton 1913	Conn
	Pred		x		x		M	Baird 1920	BC

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum	tigris			
<u>(Calosoma sp., continued)</u>										
	Pred	x						M	Britton 1935	--
	Pred				x			O	Hodson 1941	Minn
	Pred		x					O	Clark 1954	Cal
	Pred							O	Langston 1957	Cal
	Pred	x			x			M	Gidaspow 1959	NY
CURCULIONIDAE										
<u>Brachyrhinus ovatus</u> Linnaeus	Assoc				x			O	Ramse 1972	N Dak
STAPHYLINIDAE										
<u>Belonuchus comosus</u> Gravenhorst	Assoc	x						O	Liu 1926	NY
(no generic determination)	Pred				x			O	Ramse 1972	N Dak
ELATERIDAE										
<u>Ctenicera hieroglyphicus</u> Say	Assoc				x			O	Witter 1973	Minn
<u>Agriotes fucosus</u> (Le Conte)	Assoc				x			O	Witter 1973	Minn
<u>Ampedus pedalis</u> Germar	Assoc				x			O	Witter 1973	Minn
<u>Dalopius</u> sp.	Assoc				x			O	Witter 1973	Minn
<u>Melanotus</u> sp.	Assoc	x						O	Liu 1926	NY
(no generic determination)	Pred		P					O	Wellington(letter 1970)	BC
CANTHARIDAE										
<u>Cantharis</u> sp.	Unk				x			O	Witter 1973	Minn
<u>Podabrus diadema</u> Fabricius	Unk				x			O	Witter 1973	Minn
TENEBRIONIDAE										
<u>Paratenetus punctatus</u> Spinola	Scav	x						O	Felt 1905	NY
	Scav	x						O	Liu 1926	--
	Scav	x						O	Kulman 1965	W Va
LAGRIIDAE										
<u>Arthromacra aenea</u> Say	Assoc	x						O	Liu 1926	NY
COCCINELLIDAE										
<u>Hippodamia convergens</u> Guier	Assoc, Pred?				x			O	Witter 1973	Minn
<u>Coccinella transversoguttata</u> Falderman	Assoc, Pred?				x			O	Witter 1973	Minn
<u>Anatis quindecimpunctata</u> Say	Unk	x						O	Liu 1926	NY
	Pred				x			O	Witter 1973	Minn
<u>Anatis ocellata mali</u> (Say)	Assoc, Pred?				x			O	Witter 1973	Minn
<u>Chilocorus fraternus</u> Le Conte	Pred				x			O	Witter 1973	Minn
ORTHOPERIDAE										
<u>Orthoperus glaber</u> Le Conte	Scav	x						O	Kulman 1965	W Va
LATHRIDIIDAE										
<u>Melanophthalma distinguenda</u> (Compolti)	Scav	x						O	Kulman 1965	W Va
<u>Melanophthalma pumila</u> (Le Conte)	Scav	x						O	Kulman 1965	W Va
HEMIPTERA										
PENTATOMIDAE										
Hemiptera nomenclature was taken from Froeschner (1941,1944), Knight(1941), and Van Duzee (1917).										

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum			
(PENTATOMIDAE, continued)									
<u>Euschistus euschistoides</u> (Vollenhoven)	Pred	x					M	Liu 1926	--
Syn. <u>Euschistus fissilis</u> Uhler	Pred	x					O	Kirkland 1897a	Mass
<u>Euschistus ictericus</u> (Linnaeus)	Pred	x					O	Kirkland 1897a	Mass
	Pred	x					M	Liu 1926	--
<u>Euschistus politus</u> Uhler	Pred	x					O	Kirkland 1897a	Mass
	Pred	x					M	Liu 1926	--
<u>Euschistus tristigmus</u> (Say)	Pred	x					O	Kirkland 1897a	Mass
	Pred	x					M	Liu 1926	--
	Pred				x		O	Witter 1973	Minn
<u>Mencles insertus</u> (Say)	Pred	x					O	Kirkland 1897a	Mass
	Pred	x					M	Liu 1926	--
<u>Banasa dimidiata</u> (Say)	Pred				x		O	Ramse 1972	N Dak
<u>Dendrocoris humeralis</u> (Uhler)	Pred	x					O	Kirkland 1897a	Mass
	Pred	x					M	Liu 1926	--
	Pred						M	McPherson 1970	--
<u>Elasmucha lateralis</u> (Say)	Assoc,								
	Pred?						O	Witter 1973	Minn
<u>Elasmostethus cruiatus</u> (Say)	Assoc,								
	Pred?						O	Witter 1973	Minn
<u>Brochymena quadripustulata</u> (Fabricius)	Pred				x		O	Ramse 1972	N Dak
<u>Perillus bioculatus</u> (Fabricius)	Pred	x					M	Liu 1926	--
Syn. <u>Perillus claudus</u> Say	Pred	x					M	Bruner 1890	Neb
	Pred	x					M	Felt 1898b	--
	Pred	x					M	Quaintance 1908	--
	Pred	x					M	Britton 1913	--
	Pred	x					M	Quaintance 1915	--
	Pred	x					M	Britton 1935	--
<u>Apateticus crocatus</u> (Uhler)	Pred	x					O	Downes 1920	BC
	Pred	x					M	Liu 1926	--
<u>Apateticus cynicus</u> (Say)	Pred				x		O	Witter 1973	Minn
<u>Podisus maculiventris</u> (Say)	Pred	x					O	Snodgrass 1924	DC
	Pred	x					M	Liu 1926	--
Syn. <u>Podisus spinosus</u> Dallas	Pred	x					M	Bruner 1890	Neb
	Pred	x					M	Felt 1898b	--
	Pred	x					O	Lowe 1898	NY
	Pred	x					M	Quaintance 1908	--
	Pred	x					M	Quaintance 1915	--
<u>Podisus modestus</u> (Dallas)	Pred	x					O	Kirkland 1897a	Mass
*Froeschner, U.S.N.M., identified Witter's specimens as <u>P. modestus</u> (?).	Pred	x					M	Felt 1898b	--
	Pred	x					M	Kirkland 1898	Mass
	Pred	x					M	Quaintance 1908	--
	Pred	x					M	Quaintance 1915	--
	Pred	x					M	Liu 1926	--
	Pred	x					M	Torre-Bueno 1939	USA
	Pred	x					O	Sullivan 1950	Ont
	Pred	x					M	McPherson 1970	--
	*Pred				x		O	Witter 1973	Minn
<u>Podisus placidus</u> Uhler	Pred	x					O	Kirkland 1897a,c	Mass
	Pred	x			x		M	Felt 1898b,c	--
	Pred	x			x		M	Kirkland 1898	Mass
	Pred				x		M	Lowe 1899	--
	Pred	x					O	Felt 1905	NY
	Pred	x					M	Quaintance 1908	--
	Pred	x					O	Quaintance 1915	--
	Pred	x					M	Liu 1926	--
	Pred				x		M	Herrick 1935	--
	Pred				x		O	Hodson 1941	Minn
	Pred	x					O	Sullivan 1950	Ont
	Pred	x					O	Warren 1963	Ark
	Pred						M	McPherson 1970	--
<u>Podisus serievventris</u> Uhler	Pred	x			x		O	Kirkland 1896	Mass
	Pred	x					O	Kirkland 1897a,c	Mass
	Pred	x			x		M	Felt 1898b,c	--
	Pred	x			x		M	Kirkland 1898	Mass
	Pred				x		M	Lowe 1899	--
	Pred	x					M	Quaintance 1908	--

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum			
(Podisus serieventris, continued)									
	Pred	x					M	Quaintance 1915	--
	Pred	x					O	Hart 1919	--
	Pred	x			x		M	Liu 1926	--
	Pred				x		M	Herrick 1935	--
	Pred	x			x		M	McPherson 1970	--
<u>Podisus</u> sp.	Pred	x					M	Britton 1913	--
	Pred	x					M	Snodgrass 1924	DC
	Pred	x					M	Britton 1935	--
REDUVIIDAE									
<u>Apiomerus</u> sp.	Pred		x				O	Stelzer 1968	N Mex
<u>Zelus exsanguis</u> (Stal)	Pred	x					M	Liu 1926	--
Syn. <u>Diploodus luridus</u> Stal	Pred	x					O	Kirkland 1897a,c	Mass
	Pred	x					M	Felt 1898b	--
	Pred	x					M	Quaintance 1908	--
	Pred	x					M	Britton 1913	--
	Pred	x					M	Quaintance 1915	--
	Pred	x					M	Britton 1935	--
MIRIDAE									
<u>Paracalocoris hawleyi</u> Knight	Pred	x					O	Hawley 1917	NY
DIPTERA Nomenclature was taken from Stone (1965).									
SCATOPIIDAE									
<u>Scatopse fuscipes</u> Meigen									
Syn. <u>Rhegmoclema atrata</u> Say	Scav				x		RS	Sippell 1957	Ont
PHORIDAE									
<u>Megaselia</u> near <u>rufipes</u> (Meigen)	Unk				x		RS	Connola 1957	NY
<u>Megaselia</u> sp.	Scav				x		RS	Sippell 1957	Ont
	Unk	P?			?		RS	Raske (letter 1970)	Alta
(no additional description)	Scav	x					RS	Liu 1926	NY
	Scav				x		RS	Witter 1973	Minn
CHLOROPIDAE									
<u>Pseudogaurax anchora</u> (Loew)	Scav	x					O	Kulman 1965	W Va
<u>Conioscinella hinkleyi</u> (Malloch)	Scav	x					O	Kulman 1965	W Va
ANTHOMYIIDAE									
<u>Anthomyia</u> sp.	Assoc	x					O	Kulman 1965	W Va
OTTIDAE									
<u>Seioptera vibrans</u> (Linnaeus)	Assoc				x		O	Ramse 1972	N Dak
MUSCIDAE									
<u>Fannia canicularis</u> (Linnaeus)	Para				x		RS	Witter 1973	Minn
<u>Fannia</u> sp.	Unk				x		RS	Morris (letter 1970)	Ala
<u>Phaonia curvipes</u> (Stein)	Para				x		RS	Witter 1973	Minn
<u>Muscina stabulans</u> (Fallen)	Unk				x		RS	Morris (letter 1970)	Ala
	Para	P?			?		RS	Raske (letter 1970)	Alta
	Para				x		RS	Witter 1973	Minn
<u>Morellia micans</u> (Macquart)	Para				x		RS	Witter 1973	Minn
<u>Musca domestica</u> Linnaeus	Unk				x		RS	Morris 1970	Ala
	Para				x		RS	Witter 1973	Minn

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum			
CALLIPHORIDAE									
<i>Phaenicia sericata</i> (Meigen)	Para				x		RS	Witter 1973	Minn
<i>Calliphora vicina</i> Robineau-Desvoidy Syn. <i>Calliphora erythrocephala</i> Meigen	Scav				x		RS	Lowe 1899	NY
SARCOPHAGIDAE									
<i>Agria housei</i> Shewell*	Para		P		x		M	Shewell 1971	--
Syn. <i>Agria affinis</i> (Fallen) *Nomenclature for <i>A. housei</i> was taken from Shewell (1971).	Para				x		RS	Sippell 1960,1961	Ont
Syn. <i>Pseudosarcophaga affinis</i> (Fallen)	Para		P		x		RS	Raske (letter 1970)	Alta
	Para				x		RS	Wong 1952	Man,Sask
	Para		P		x		RS	Ross 1953	BC
	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Turnock 1961	Man
	Para		x				RS	Stelzer 1968	N Mex
	Para		P				RS	Iwao 1970a	BC
<i>Helicobia rapax</i> (Walker) Syn. <i>Sarcophaga rapax</i> Walker	Para				x		RS	Nagel 1939	Minn
	Para				x		RS	Morris (letter 1970)	Ala
<i>Sarcophaga aldrichi</i> Parker	Para				x		M	Aldrich 1916	Ind
	Para				x		M	Brown 1938	Que
	Para				x		RS	Hodson 1939a,b	Minn
	Para				x		RS	Felt 1941	NY
	Para				x		RS	Hodson 1941	Minn
	Para		P		x		M	Atwood 1943	Ont
	Para				x		RS	Hodson 1943	Minn
	Para				x		O	Reeks 1946	NB,NSc
	Para				x		M	Thompson 1946	Can
	Para				x		M	Reeks 1947	NB,NSc
	Para				x		M	Reeks 1950	NB,NSc
	Para				x		RS	McGugan 1951	Ont
	Para				x		M	McGugan 1952	Ont
	Para				x		RS	Wong 1952	Man,Sask
	Para				x		M	Arthur 1953	Minn
	Para				x		M	Brown 1953	Man,Sask, Alta
	Para				x		M	Martineau 1953	Que
	Para		P		x		RS	Ross 1953	BC
	Para				x		RS	Cumming 1954	Alta
	Para				x		M	Martineau 1954	Que
	Para				x		RS	Batzer 1955	Minn
	Para				x		RS	Blais 1955	Ont,Que Man
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Connola 1957	NY
	Para				x		RS	Sippell 1957	Ont
	Para				x		M	Sweetman 1958	--
	Para				x		RS	Anderson 1959	Minn
	Para				x		RS	Sippell 1960	Ont
	Para				x		M	Elliott 1961	Man,Sask
	Para				x		RS	Sippell 1961	Ont
	Para				x		RS	Turnock 1961	Man
	Para				x		M	Elliott 1964	Man,Sask
	Para				x		M	Bird 1965	Ont
	Para				x		M	Elliott 1965	Man,Sask
	Para				x		O	Martineau 1965	Que
	Para				x		O	Sippell 1965	Ont
	Para				x		M	Stairs 1965	Ont
	Para		x		x		M	Stairs 1966	Ont
	Para				x		M	Brown 1966	--
	Para				x		RS	Campbell 1966	Ont
	Para				x		RS	Martineau 1966	Que
	Para		x		x		RS	Stelzer 1968	N Mex

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum			
(<i>Sarcophaga aldrichi</i> , continued)	Para				x		RS	White (letter 1970)	Ill
	Para		P?	?			RS	Raske (letter 1970)	Alta
	Para				x		M	Batzer 1971	USA
	Para				x		M	Stairs 1972	--
	Para				x		RS	Witter 1972,1973	Minn
<i>Sarcophaga houghi</i> Aldrich	Para		P		x		RS	Ross 1953	BC
	Para		P		x		RS	McLeod 1956	BC
	Para	x					RS	Kulman 1965	W Va
	Para				x		RS	Morris (letter 1970)	Ala
	Para				x		M	Batzer 1971	USA
<i>Sarcophaga sarracenioides</i> Aldrich	Para				x		RS	Morris (letter 1970)	Ala
<i>Sarcophaga</i> sp.	Para				x		RS	Oliver 1964	La
TACHINIDAE									
<i>Euclytia flava</i> (Townsend)					x		RS	Witter 1973	Minn
<i>Archytas analis</i> Fabricius*	Para		x				M	Coquillett 1897	--
*Misidentifications, see Stone (1965). *	Para		x				M	Cockerell 1901	Col
*	Para		x				M	Aldrich 1915	Ohio
*	Para		x				M	Liu 1926	--
*	Para		x,F				M	Thompson 1946	USA
<i>Archytas lateralis</i> (Macquart)	Para					I	RS	Stelzer 1967	Ariz
	Para		F			I	RS	Stehr 1968	Ariz
	Para			C			RS	Stehr 1968	Cal
	Para		L				RS	Stehr 1968	Alta, Mont
	Para		x				RS	Stehr 1968	Ariz, Wyo
	Para		x			I	RS	Stelzer 1968	N Mex, Ariz
	Para		F				RS	Schmid (letter 1970)	N Mex
Syn. <i>Nemochaeta lateralis</i> (Macquart)	Para		P		x		RS	Ross 1953	BC
<i>Mericia ampelus</i> (Walker)									
Syn. <i>Ernestia ampelus</i> (Walker)	Para	x					M	Liu 1926	BC
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x			x		RS	Bess 1936	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para	x			x		M	Sippell 1957	Ont
	Para	x?					RS	Hine 1904	BC
Syn. <i>Panzeria ampelus</i> (Walker)	Para					I	RS	Stehr 1968	Ariz
<i>Xanthophyto labis</i> (Coquillett)	Para		x				RS	Stelzer 1968	N Mex
<i>Xanthophyto</i> n. sp.	Para	x			x		M	Culver 1919	NE USA
<i>Compsilura concinnata</i> (Meigen)	Para	x					M	Liu 1926	--
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x					M	Schaffner 1934b	Mass
	Para	x			x		RS	Bess 1936	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para		P		x		RS	Ross 1953	BC
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
	Para				x		M	Sippell 1961	Ont
<i>Diplostichus lophyri</i> (Townsend)									
Syn. <i>Neophorocera hamata</i> (Aldrich & Webber)	Para	x					RS	Raizenne 1952	Ont
<i>Euphorocera claripennis</i> (Macquart)	Para				x		RS	Coquillett 1897	Mass
Identifications of <i>E. claripennis</i> and <i>E. edwardsii</i> often confused (Sippell, 1957).	Para				x		M	Felt 1898c	--
	Para				x		M	Lowe 1899	--
	Para		x				RS	Stelzer 1968	N Mex
Syn. <i>Phorocera claripennis</i> Macquart	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x			x		RS	Bess 1936	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para		P		x		RS	Ross 1953	BC
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
	Para				x		M	Sippell 1961	Ont
<i>Euphorocera edwardsii</i> (Williston)									
See above note.									
Syn. <i>Phorocera edwardsii</i> Williston	Para	x					RS	Kulman 1965	W Va
Syn. <i>Neophorocera edwardsii</i> (Williston)	Para				x		RS	Raizenne 1952	Ont

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america	califor.	constr.	disstris	incurvum	tigris			
(Syn. <u>Neophorocera edwardsii</u> , continued)	Para				x			RS	Sippell 1957	Ont
	Para				x			RS	Sippell 1961	Ont
<u>Euphorocera</u> sp. (<u>claripennis</u> complex)	Para				x			RS	Morris (letter 1970)	Ala
<u>Euphorocera tachinomoides</u> Townsend	Para						I	RS	Stelzer 1967	Ariz
	Para						D	RS	Stehr 1968	Nev,Utah
	Para						I	RS	Stehr 1968	Ariz
	Para		F					RS	Stehr 1968	Cal,Utah
	Para		x					RS	Stehr 1968	N Mex,
	Para	x						RS	Stehr 1968	Ariz
	Para			x				RS	Stehr 1968	Tex
	Para					I		RS	Stelzer 1968	N Mex,
	Para				x			RS	Schmid (letter 1970)	Ariz
Syn. <u>Phoracera tachinomoides</u> (Townsend)	Para	x						RS	Aldrich 1924	Col
	Para	x						M	Liu 1926	Ariz
	Para	x						M	Thompson 1946	USA
<u>Exorista larvarum</u> (Linnaeus)	Para	x						RS	Liu 1926, 1928	NE USA
	Para	x			x			M	Thompson 1946	USA
	Para		F					RS	Schmid (letter 1970)	N Mex
<u>Exorista mella</u> (Walker)	Para	x		x				RS	Schaffner 1934a	NE USA
	Para	x		x				RS	Bess 1936	NE USA
	Para			x				RS	Raizenne 1952	Ont
	Para		P	x				RS	Ross 1953	BC
	Para			x				RS	Sippell 1957	Ont
	Para			x				RS	Sippell 1961	Ont
	Para			x				RS	Turnock 1961	Man
	Para	x						RS	Stehr 1968	Wis, Tex
	Para		x					RS	Stehr 1968	Ore, Idaho
	Para							RS	Stehr 1968	Wyo, Wash,
	Para						x	RS	Stehr 1968	Col
	Para		P					RS	Stehr 1968	Ariz
	Para							RS	Stehr 1968	Alta, BC
	Para		L					RS	Stehr 1968	Mont
	Para		x					RS	Stelzer 1968	Alta
	Para							RS	Raske (letter 1970)	N Mex
	Para				x			RS	Witter 1973	Alta
Syn. <u>Tachina mella</u> Walker	Para				x			RS	Coquillett 1897	Minn
	Para				x			RS	Coquillett 1897	--
	Para		C					RS	Coquillett 1897	Cal
	Para			x				M	Felt 1898c	--
	Para			x				RS	Low 1899	NY
	Para			x				RS	Weed 1900a	NH
	Para		F					M	Cockereil 1901	Col
	Para	x		x				RS	Johannsen 1913	Maine
	Para	x						M	Liu 1926	--
	Para			x				M	Herrick 1935	--
Syn. <u>Tachina clisiocampae</u> Townsend	Para	x						RS	Townsend 1891	Maine
<u>Exorista</u> sp.	Para				x			M	Tothill 1923	--
	Para				x			RS	Wong 1952	Man, Sask
	Para	x						RS	Warren 1963	Ark
	Para		x				I	RS	Stelzer 1968	N Mex,
	Para				x			RS	Sippell 1957	Ariz
<u>Tachinomyia nigricans</u> Webber	Para				x			RS	Sippell 1957	Ont
	Para				x			M	Sippell 1961	Ont
<u>Tachinomyia panaeticus</u> (Walker)	Para							RS	Coquillett 1897	--
Syn. <u>Tachina robusta</u> Townsend	Para		P		x			RS	Ross 1953	BC
<u>Tachinomyia similis</u> (Williston)	Para		P		x			RS	McLeod 1956	BC
	Para		P					RS	Wellington 1957	BC
	Para		P					RS	Iwao 1970a	BC
<u>Tachinomyia</u> sp.	Para				x			RS	Schaffner 1934a	NE USA
	Para				x			M	Bess 1936	NE USA

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum	tigris			
(<i>Tachinomyia</i> sp., continued)										
	Para				x			RS	Nagel 1939	Minn
	Para				x			M	Thompson 1946	USA
<i>Cartocometes io</i> Aldrich	Para	x			x			RS	Schaffner 1934a	NE USA
	Para	x			x			RS	Bess 1936	NE USA
	Para	x			x			M	Thompson 1946	USA
	Para				x			RS	Raizenne 1952	Ont
	Para				x			RS	Sippell 1957	Ont
	Para				x			RS	Sippell 1961	Ont
<i>Chaetogaedia monticola</i> (Bigot)	Para					I		RS	Stelzer 1967	Ariz
	Para	x				I		RS	Stelzer 1968	N Mex
										Ariz
<i>Chaetogaedia</i> sp. near <i>monticola</i> (Bigot)	Para			A				RS	Stehr 1968	Cal
	Para		F					RS	Stehr 1968	Cal, Ariz
	Para					D		RS	Stehr 1968	Nev
<i>Leschenaultia adusta</i> (Loew)	Para				x			M	Thompson 1946	Can
	Para					I		RS	Stelzer 1968	Ariz
Syn. <i>Blepharipeza adusta</i> Loew	Para		C	A				RS	Coquillett 1897	Cal
<i>Leschenaultia americana</i> (Brauer & Bergenstamm)	Para		P?	?				RS	Raske (letter 1970)	Alta
Syn. <i>Rileymyia trisetata</i> Brooks	Para		P		x			RS	McLeod 1956	BC
Syn. <i>Rileymyia americana</i> (Brauer & Bergenstamm)			P		x			RS	Ross 1953	BC
	Para		P					RS	Iwao 1970a,b	BC
<i>Leschenaultia exul</i> (Townsend)	Para	x			x			RS	Bess 1936	NE USA
	Para	x			x			M	Thompson 1946	USA
	Para				x			RS	McGugan 1951	Ont
	Para				x			RS	McGugan 1952	Ont
	Para				x			RS	Wong 1952	Man, Sask
	Para				x			RS	Sippell 1957	Ont
	Para	x			x			M	Sweetman 1958	--
	Para				x			RS	Sippell 1961	Ont
	Para				x			RS	Turnock 1961	Man
	Para	x						M	Warren 1963	NE USA
	Para				x			RS	Witter 1972, 1973	Minn
Syn. <i>Blepharipeza exul</i> Townsend	Para	x			x			RS	Schaffner 1934a	NE USA
<i>Leschenaultia fulvipes</i> (Bigot)	Para					I		RS	Stelzer 1967	Ariz
	Para					I		RS	Stehr 1968	Ariz
	Para	x						RS	Stehr 1968	N Mex
	Para	x						RS	Stehr 1968	Mont
	Para	F						RS	Stehr 1968	Cal
	Para	x				I		RS	Stelzer 1968	N Mex, Ariz
	Para		F					RS	Schmid (letter 1970)	Col
<i>Leschenaultia</i> sp.	Para				x			M	Thompson 1946	Can
Syn. <i>Blepharipeza</i> sp.	Para				x			M	Tothill 1923	--
<i>Blepharipa scutellata</i> (Robineau-Desvoidy)	Para				x			M	Thompson 1946	USA
Syn. <i>Sturmia scutellata</i> (Robineau-Desvoidy)	Para	x						M	Liu 1926	--
Syn. <i>Sturmia scutellata</i> Desvoidy	Para				x			RS	Schaffner 1934a,b	NE USA
	Para	x						RS	Bess 1936	NE USA
	Para				x			M	Sippell 1957	Ont
	Para				x			RS	Sippell 1957, 1961	Ont
<i>Winthemia datanae</i> Townsend	Para	x			x			RS	Sellers 1943	NE USA
<i>Carcelia laxifrons</i> Villeneuve	Para	x			x			RS	Sellers 1943	NE USA
<i>Carcelia malacosomae</i> Sellers	Para				x			RS	Raizenne 1952	Ont
*Ramse's specimens were identified as	Para				x			RS	Raizenne 1952	Ont
<i>C. malacosomae</i> Sellers (?) by Sabrosky, U.S.N.M.	Para				x			M	Brown 1953	Alta
	Para		P		x			RS	Ross 1953	BC
	Para				x			RS	Cumming 1954	Alta
	Para		P		x			RS	McLeod 1956	BC
	Para				x			RS	Sippell 1957	Ont
	Para				x			RS	Turnock 1961	Man
	Para				x			RS	Sippell 1961	Ont
	Para	x						RS	Stelzer 1968	N Mex
	Para	P						RS	Iwao 1970a	BC
	Para	P?			?			RS	Raske (letter 1970)	Alta

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constr.	disstris	incurvum			
(<i>Carcelia malacosomae</i> , continued)									
<i>Carcelia protuberans</i> (Aldrich & Webber)	*Para				x		RS	Ramse 1972	N Dak
	Para				x		RS	Sellers 1943	NE USA
	Para	x			x		M	Thompson 1946	USA
Syn. <i>Zenillia protuberans</i> Aldrich & Webber	Para				x		RS	Aldrich 1924	Vt
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para				x		M	Bess 1936	NE USA
	Para	x					RS	Bess 1936	NE USA
	Para				x		RS	Hodson 1941	Minn
<i>Carcelia cheloniae</i> (Rondani)*	Para	x			x		M	Thompson 1946	USA
Syn. <i>Zenillia cheloniae</i> Rondani*	Para				x		RS	Aldrich 1924	NB, Que
*Misidentifications, see Stone (1965). *	Para	x					M	Liu 1926	--
<i>Eusisyropha boarmiae</i> (Coquillett)	Para				x		RS	Morris (letter 1970)	Ala
<i>Hyphantrophaga euchaetiae</i> (Sellers)	Para				x		RS	Morris (letter 1970)	Ala
<i>Hyphantrophaga hyphantriae</i> (Townsend)	Para					D	RS	Stehr 1968	NeV, Utah
	Para	x					RS	Stehr 1968	Tex
	Para		x			I	RS	Stehr 1968	Ariz
<i>Hyphantrophaga</i> spp. prob. <i>euchaetiae</i> (Sellers)	Para					I	RS	Stelzer 1968	Ariz
<i>Hyphantrophaga</i> sp.	Para					I	RS	Stelzer 1967	Ariz
<i>Catagoniopsis specularis</i> (Aldrich & Webber)	Para		x				RS	Stelzer 1968	N Mex
<i>Euxorista futilis</i> (Osten Sacken)	Para				x		RS	McGugan 1951	Ont
	Para				x		RS	McGugan 1952	Ont
	Para				x		RS	Raizenne 1952	Ont
	Para		P		x		RS	Ross 1953	BC
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Sippell 1961	Ont
	Para				x		RS	Turnock 1961	Man
	Para	x					RS	Kulman 1965	W Va
	Para		P				RS	Stehr 1968	Oreg, Wash
	Para				x		RS	Witter 1973	Minn
Syn. <i>Zenilla futilis</i> (Osten Sacken)	Para				x		M	Aldrich 1924	NY
	Para		C				M	Aldrich 1924	Cal
	Para	x					RS	Liu 1926, 1928	NE USA
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x			x		RS	Bess 1936	NE USA
	Para	x			x		M	Sellers 1943	--
	Para	x			x		M	Thompson 1946	USA
Syn. <i>Exorista futilis</i> (Osten Sacken)	Para		C				M	Coquillett 1897	Cal
	Para				x		RS	Weed 1900a	NH
<i>Lespesia aletiae</i> (Riley)	Para	x					M	Beneway 1963	--
Syn. <i>Achaetoneura aletiae</i> (Riley)	Para	x					M	Thompson 1946	N Amer
<i>Lespesia archippivora</i> (Riley)	Para	x	P	C	x		M	Beneway 1963	--
	Para				x		RS	Ramse 1972	N Dak
Syn. <i>Lespesia archippivora</i> (Williston)	Para					I	RS	Stehr 1968	Ariz
	Para		F				RS	Stehr 1968	Cal, Utah
	Para		P				RS	Stehr 1968	Ariz, Nev
	Para						RS	Stehr 1968	Wash, Mont
	Para	x					RS	Stehr 1968	Tex
	Para		x				RS	Stehr 1968	Cal, Col
	Para					D	RS	Stehr 1968	Nev
	Para		A, C				RS	Stehr 1968	Cal
	Para		R			I	RS	Stelzer 1968	N Mex, Ariz
Syn. <i>Achaetoneura archippivora</i> (Riley)	Para				x		RS	Sippell 1957	Ont
Syn. <i>Achaetoneura archippivora</i> (Williston)	Para	x					RS	Schaffner 1934a	NE USA
	Para	x					RS	Bess 1936	NE USA
	Para	x					M	Thompson 1946	N Amer
	Para				x		RS	Sippell 1961	Ont
Syn. <i>Ypochaemyia malacosomae</i> (Townsend)	Para	x					RS	Townsend 1916	NC
	Para	x					M	Liu 1926	--
Syn. <i>Frontina archippivora</i> (Williston)	Para			C			RS	Coquillett 1897	Cal
	Para		P				RS	Coquillett 1897	Wash

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum			
(Syn. <u>Frontina archippivora</u> , continued)	Para	x					RS	Liu 1926, 1928	NE USA
Syn. <u>Phorocera promiscua</u> (Townsend)	Para	x					RS	Townsend 1891	Maine
<u>Lespesia ciliata</u> (Macquart)	Para		L				RS	Stehr 1968	Ariz
	Para		x			I	RS	Stehr 1968	Alta
	Para						RS	Stehr 1968	Ariz, N Mex
	Para		x				RS	Stelzer 1968	N Mex
Syn. <u>Achaetoneura samiae</u> (Webber)	Para	x					RS	Schaffner 1934a	NE USA
	Para	x					RS	Bess 1936	NE USA
	Para	x					M	Thompson 1946	USA
<u>Lespesia frenchii</u> (Williston)	Para	x	x		x		M	Beneway 1963	--
	Para	x					RS	Kulman 1965	W Va
	Para		x				RS	Stehr 1968	Cal, Utah
	Para								Oreg, Wyo
	Para		F				RS	Stehr 1968	Wash
	Para		P				RS	Stehr 1968	Oreg, BC
	Para	x					RS	Stehr 1968	Alta, Mont, Wash
	Para		L		x		RS	Stehr 1968	Minn
	Para		x			I	RS	Stehr 1968	Alta
	Para						RS	Stelzer 1968	N Mex, Ariz
	Para				x		RS	Morris (letter 1970)	Ala
	Para		P?		?		RS	Raske (letter 1970)	Alta
	Para		F				RS	Schmid (letter 1970)	Ariz
	Para				x		RS	Ramse 1972	N Dak
	Para				x		RS	Witter 1973	Minn
Syn. <u>Achaetoneura frenchii</u> (Williston)	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x			x		RS	Bess 1936	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para	x			x		RS	Raizenne 1952	Ont
	Para		P		x		RS	Ross 1953	BC
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Sippell 1961	Ont
	Para				x		RS	Turnock 1961	Man
Syn. <u>Frontina frenchii</u> Williston	Para		C	C			RS	Coquillett 1897	Cal
	Para	x					RS	Coquillett 1897	Mass
	Para	x			x		M	Coquillett 1897	--
	Para	x					M	Lowe 1898	--
	Para	x			x		M	Felt 1898b,c	--
	Para				x		M	Lowe 1899	--
	Para				x		RS	Weed 1900	NH
	Para	x					RS	Riley 1902	W Va
	Para	x					M	Quaintance 1908	--
	Para	x					M	Britton 1913	--
	Para	x					M	Quaintance 1915	--
	Para	x					M	Liu 1926	--
	Para	x					M	Britton 1935	--
<u>Lespesia</u> (prob.) <u>frenchii</u> (Williston)	Para				x		RS	Morris (letter 1970)	Ala
Syn. <u>Achaetoneura</u> (prob.) <u>frenchii</u> (Williston)	Para								--
<u>Lespesia melalophae</u> (Allen)	Para				x		M	Beneway 1963	Ont
Syn. <u>Achaetoneura melalophae</u> Allen	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Sippell 1961	Ont
<u>Lespesia</u> sp.	Para					I	RS	Stelzer 1967	Ariz
	Para		x			I	RS	Stelzer 1968	N Mex, Ariz
	Para						RS	Schmid (letter 1970)	Col
Syn. <u>Achaetoneura</u> sp.	Para	x					RS	Warren 1963	Ark
	Para				x		RS	Morris (letter 1970)	Ala

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america	califor.	constri.	disstris	incurvum	tigris			
<u>Madremyia saundersii</u> (Williston)	Para				x			RS	Schaffner 1934a	NE USA
	Para				x			M	Bess 1936	NE USA
	Para				x			M	Thompson 1946	USA
	Para				x			M	Sippell 1957	--
	Para		x					RS	Stelzer 1968	N Mex
<u>Patelloa leucaniae</u> (Coquillett)	Para				x			RS	Morris (letter 1970)	Ala
	Para							RS	Ross 1953	BC
<u>Patelloa pachypyga</u> (Aldrich & Webber)	Para		P		x			RS	Sippell 1957	Ont
	Para				x			RS	Sippell 1961	Ont
	Para				x			RS	Turnock 1961	Man
	Para		P?		?			RS	Raske (letter 1970)	Alta
	Para				x			RS	Witter 1972,1973	Minn
Syn. <u>Phorocera pachypyga</u> Aldrich & Webber	Para				x			RS	Schaffner 1934a	NE USA
	Para				x			RS	Bess 1936	NE USA
	Para				x			M	Thompson 1946	USA
	Para		P					RS	McLeod 1956	EC
<u>Patelloa</u> sp.	Para				x			RS	Ramse 1972	N Dak
	Para				x			RS	Morris (letter 1970)	Ala
Syn. <u>Phorocera</u> sp.	Para				x			RS	Morris (letter 1970)	Ala
<u>Pilatea arator</u> (Aldrich)										
Syn. <u>Masicera arator</u> Aldrich	Para	x						RS	Liu 1926,1928	NE USA
<u>Phorocera halisidotae</u> Aldrich & Webber	Para				x			RS	Nagel 1939	Minn
Unplaced species which falls in genus known at present only from Palaearctic Region. (Stone 1965).										
HYMENOPTERA										
BRACONIDAE										
Nomenclature was taken from Krombein (1958, 1967), Muesebeck (1951), Peck (1963), and Townes (1960, 1962).										
<u>Aphidius pterocommae</u> Ashmead										
Syn. <u>Aphidius lachni</u> Ashmead	Hyp		x					RS	Stelzer 1968	N Mex
<u>Meteorus acronyctae</u> Muesebeck	Para							RS	Schmid (letter 1970)	Col
<u>Meteorus communis</u> (Cresson)	Para	x						M	Muesebeck 1923	--
	Para	x						M	Liu 1926	--
	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Bess 1936	NE USA
	Para	x						M	Thompson 1946	USA
	Para	x						M	Muesebeck 1951	USA,Can
	Para				x			RS	Schaffner 1934a	NE USA
<u>Meteorus datanae</u> Muesebeck	Para				x			M	Bess 1936	NE USA
	Para				x			M	Thompson 1946	USA
	Para				x			M	Langston 1957	NE USA
	Para				x			M	Sippell 1957	--
	Para	x			x			M	Muesebeck 1923	--
	Para	x						M	Liu 1926	--
	Para	x			x			RS	Schaffner 1934a	NE USA
<u>Meteorus hyphantriae</u> Riley	Para	x			x			M	Bess 1936	NE USA
	Para	x			x			M	Thompson 1946	N Amer
	Para	x			x			M	Muesebeck 1951	USA,Can
	Para	x			x			M	Langston 1957	USA,Can
	Para				x			M	Sippell 1957	--
	Para	x						RS	Warren 1963	Ark
	Para	x						RS	Kulman 1965	W Va
	Para				x			RS	Schaffner 1934a	NE USA
	Para				x			M	Bess 1936	NE USA
	Para				x			M	Thompson 1946	USA
<u>Meteorus</u> sp.	Para				x			M	Langston 1957	NE USA
	Para				x			RS	Witter 1973	Minn
	Para				x			RS	Witter 1973	Minn
	Para				x			RS	Witter 1973	Minn
	Para				x			RS	Fiske 1903	NH
<u>Macrocentrus</u> sp.										
<u>Agathis annulipes</u> (Cresson)	Para				x			RS	Quaintance 1908	--
<u>Apanteles clisiocampae</u> Ashmead	Para	x						M		
Para		x						M		

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum			
(Apanteles clisiocampae, continued)									
	Para	x					M	Quaintance 1915	--
	Para	x					RS	Liu 1926	NY
	Para	x					RS	Schaffner 1934a	NE USA
	Para	x					M	Britton 1935	NH
	Para	x					M	Bess 1936	NE USA
	Para	x					M	Thompson 1946	USA
	Para	x					M	Muesebeck 1951	NE USA
<u>Apanteles longicornis</u> (Provancher)	Para				x		RS	Treherne 1916	Que
	Para				x		M	Thompson 1946	Can
	Para				x		M	Langston 1957	Ill,NH, NY,Va, Que,Oh, Alas
<u>Apanteles melanoscelus</u> (Ratzeburg)	Para				x		M	Sippell 1957	--
	Para	x			x		RS	Schaffner 1934b	Mass
	Para	x			x		M	Thompson 1946	USA
	Para				x		M	Sippell 1957	--
	Para	x			x		M	Langston 1957	NE USA
<u>Apanteles rufocoxalis</u> Riley	Para	x					M	Linter 1893	NY
	Para	x					M	Liu 1926	--
	Para	x					M	Britton 1935	--
	Para	x					M	Thompson 1946	N Amer
Syn. <u>Apanteles congregatus</u> var. <u>rufocoxalis</u> Riley	Para	x					M	Felt 1898b	--
	Para	x					M	Lowe 1898	--
	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
<u>Apanteles</u> sp.	Para	x					M	Thompson 1946	USA
<u>Aphaereta pallipes</u> (Say)	Hyp	x					RS	Kulman 1965	W Va
	Hyp				x		RS	Morris (letter 1970)	Ala
	Hyp				x		RS	White (letter 1970)	Ill
	Hyp				x		RS	Witter 1973	Minn
<u>Bracon xanthonotus</u> Ashmead	Para		PF	C			M	Muesebeck 1951	Minn, Wash- Cal,E- Col, N Mex
	Para		P		x		RS	McLeod 1956	BC
	Para		R				RS	Langston 1957	Cal
	Para		xP	C			M	Langston 1957	Wash, Minn, Cal,Va, E-Col, NH, Nfld
	Para		R		x		M	Krombein 1967	--
	Para		x				RS	Stehr 1968	Ariz
	Para		x				RS	Stelzer 1968	N Mex
	Para		P				RS	Schmid (letter 1970)	Oreg
	Para		P				M	Stelzer 1971	N Mex
Syn. <u>Habrobracon hopkinsi</u> Viereck	Para*	x					RS	Fiske 1903	NH
Misidentification, identified as <u>Bracon</u>	Para*	x					M	Quaintance 1908	--
<u>gelechia</u> Ashmead in these papers, but later	Para*	x					M	Quaintance 1915	--
identified correctly as <u>Habrobracon hopkinsi</u>	Para*	x					M	Viereck 1916	Conn
Viereck.	Para*	x					M	Liu 1926	--
	Para*	x					M	Britton 1935	NH
<u>Bracon</u> sp.	Para					C	RS	Riley 1890a	Cal
<u>Rogas stigmator</u> (Say)	Para	x					M	Muesebeck 1951	USA,Can
	Para	x					M	Langston 1957	--
	Para	x					M	Viereck 1916	Conn
Syn. <u>Aleoides intermedius</u> Cresson	Para	x					RS	Fiske 1903	NH
Syn. <u>Rogas intermedius</u> Cresson	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
	Para	x					M	Britton 1935	NH

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america	califor.	constri.	disstris	incurvum	tigris			
<u>Rogas</u> sp. probably <u>stigmator</u> (Say)	Para	x						M	Liu 1926	--
<u>Rogas</u> sp.	Para		P		x			RS	Baird 1920	BC
	Para				x			RS	Tothill 1923	--
	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Bess 1936	NE USA
	Para		x					RS	Swain 1939	Col
	Para	x			x			M	Thompson 1946	USA, Can
	Para	x			x			RS	Raizenne 1952	Que
	Para		P		x			RS	McLeod 1956	BC
	Para				x			M	Langston 1957	NB
	Para	x, P		C				RS	Langston 1957	Cal
	Para	A, R						RS	Langston 1957	Cal
	Para	P						M	Langston 1957	BC, Wash
	Para				x			RS	Sippell 1957	Ont
	Para	x						RS	Stehr 1968	Cal, Nev Ariz, Ore, Col, Idaho, Wyo, Utah
	Para		A, R					RS	Stehr 1968	Cal
	Para		P					RS	Stehr 1968	Mont, Ore, Wash Idaho
	Para		L					RS	Stehr 1968	Mont
	Para		F					RS	Stehr 1968	Cal, Utah Nev
	Para					I		RS	Stehr 1968	Ariz
	Para				x			RS	Stelzer 1968	N Mex
	Para	x	P					RS	Stehr (letter 1970)	Mich
	Para		P					RS	Iwao 1970a, b	BC
	Para		P			x		RS	Witter 1972, 1973	Minn
ICHNEUMONIDAE										
<u>Scambus</u> <u>hirticauda</u> (Provancher)	Para		P					M	Townes 1960	BC
	Para		P					M	Krombein 1967	--
<u>Scambus</u> <u>hispa</u> (Harris)	Para				x			RS	Sippell 1957	Ont
	Para				x			M	Townes 1960	--
	Para	x						RS, M	Kulman 1965, 1970	W Va
	Para	x						RS	Leius 1967	Ont
	Para				x			M	Krombein 1967	--
	Para				x			RS	Witter 1973	Minn
<u>Scambus</u> <u>nigrifrons</u> (Viereck)	Para				x			RS	Witter 1973	Minn
<u>Scambus</u> <u>tecumseh</u> Viereck	Para		P					RS	Townes 1960	--
	Para		P					M	Krombein 1967	--
	Para		P?		?			RS	Raske (letter 1970)	Alta
<u>Scambus</u> sp.	Para				x			RS	Sippell 1957	Ont
<u>Acrompimpla</u> <u>alboricta</u> (Cresson)	Para				x			M	Townes 1960	--
<u>Iseropus</u> <u>californiensis</u> Cushman	Para	x		C				RS	Cushman 1940	Cal
	Para	x		C				M	Townes 1945	Cal
	Para	x		x				M	Muesebeck 1951	Cal, Ariz
	Para		x	C				M	Langston 1957	Cal, Ariz
	Para		PF					M	Townes 1960	Cal, Ariz, Wash
	Para		F					M	Krombein 1967	Wash, Col
	Para							RS	Stelzer 1968	Ariz
	Para							M	Cushman 1926	--
<u>Iseropus</u> <u>coelebs</u> (Walsh)	Hyp	x						M	Liu 1926	--
	Para	x						RS	Cushman 1940	Mass
	Para			C				M	Townes 1945	Cal
	Para	x						M	Muesebeck 1951	USA, Can
	Para				x			RS	Raizenne 1952	Ont

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum tigris			
(Iseropus coelebs, continued)									
	Hyp	x					M	Langston 1957	E USA
	Para				x		RS	Sippell 1957	Ont
	Para	x			x		M	Townes 1960	--
	Para				x		M	Krombein 1967	--
	Para				x		RS	Morris (letter 1970)	Ala
Syn. <u>Scambus coelebs</u> (Walsh)	Para	x					RS	Britton 1935	Conn
Syn. <u>Scambus inquisitoriellus</u> (Dalla Torre)	Para	x					M	Viereck 1916	Conn
Syn. <u>Iseropus inquisitoriella</u> (Dalla Torre)	Para	x					M	Quaintance 1915	--
Syn. <u>Pimpla inquistor</u> (Say)	Para	x			x		RS	Weed 1896	NH
	Para	x					M	Britton 1902	Conn
	Para-								
	Hyp	x					RS	Fiske 1903	NH
	Para	x					M	Quaintance 1908	--
	Para				x		M	Herrick 1935	--
Syn. <u>Scambus inquisitoriellus</u> (Dalla Torre)(sic)	Para	x					M	Britton 1935	NH
Syn. <u>Pimpla coelebs</u> (Walsh)	Para	x					M	Thompson 1946	USA
<u>Iseropus stercorator orgyiae</u> (Ashmead)	Para				x		M	Townes 1960	--
	Para		P?		?		RS	Raske (letter 1970)	Alta
	Para				x		RS	Witter 1973	Minn
Syn. <u>Iseropus stercorator brunneifrons</u> (Say)	Para				x		RS	Sippell 1957	Ont
Syn. <u>Iseropus brunneifrons septentrionalis</u> Cushman	Para				x		RS	Cushman 1940	Minn
<u>Clistopyga canadensis</u> Provancher	Para				x		M	Townes 1960	Que
Townes(1960) questions this record because the genus <u>Clistopyga</u> is presumed to parasitize spider egg masses.									
<u>Pimpla aequalis</u> Provancher									
Syn. <u>Ephialtes aequalis</u> (Provancher)	Para	x					M	Liu 1926	--
Townes (1960) lists no rearings from tent caterpillars and these specimens could be misidentified.	Para	x					M	Britton 1935	--
<u>Pimpla annulipes</u> Brulle	Para	x					M	Bruner 1890	Neb
Townes (1960) lists no rearings from tent caterpillars but mentioned that for many years the Nearctic <u>Coccygomimus equalis</u> and other Nearctic species resembling <u>aequalis</u> were frequently determined as <u>annulipes</u> Brulle. This record is probably a misidentification.	Para	x					M	Felt 1898b	--
	Para	x					M	Lowe 1898	--
	Para	x					M	Davis 1903	NE USA
	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
<u>Pimpla maura</u> Cresson	Para	x					RS	Riley 1902	W Va
	Para	x					M	Liu 1926	--
	Para	x					RS	Townes 1940	W Va
Syn. <u>Coccygomimus maurus</u> Cresson	Para	x					M	Townes 1945	W Va
<u>Pimpla pedalis</u> Cresson	Para						M	Packard 1889	NY
	Para						M	Saunders 1889	Ont
	Para				x		M	Bruner 1890	Neb
	Para				x		M	Harrington 1890	Ont
	Para	x					RS	Fernald 1896	Mass
	Para	x			x		M	Felt 1898b,c	--
	Para	x					RS	Lowe 1898	NY
	Para				x		M	Lowe 1899	--
	Para				x		RS	Weed 1900a	NH
	Para	x					M	Davis 1903	NE USA
	Para	x					RS	Fiske 1903	NH
	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
	Para				x		M	Treherne 1916	Ont
	Para	x					M	Britton 1935	NY,NH
	Para	x			x		M	Townes 1940	USA,Can
	Para	x	F		x		M	Thompson 1946	USA,Can
	Para		P		x		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
	Para	x					M	Sippell 1957	Ont
	Para		P				M	Krombein 1958	--
	Para				x		RS	Turnock 1961	Man

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location	
		america.	califor.	constr.	disstria	incurvum				tigris
(<u>Pimpla pedalis</u> , continued)	Para		x					RS	Stelzer 1968	N Mex
	Para		P?		?			RS	Raske (letter 1970)	Alta
Syn. <u>Coccygomimus pedalis</u> (Cresson)	Para	x			x			M	Townes 1945	Sask, Conn, Utah, NH, NY
	Para	x	P		x			M	Muesebeck 1951	Can, USA
	Para	x	x		x			M	Langston 1957	Cal, Col N Mex, Wash, BC, Man, Ore, Utah
	Para		xFP					M	Townes 1960	--
	Para		P		x			RS	Stehr 1968	Alta
	Para				x			RS	Ramse 1972	N Dak
	Para				x			RS	Witter 1973	Minn
Syn. <u>Ephialtes pedalis</u> (Cresson)	Para		x		x			RS	Cushman 1920	Wash
	Para		x		x			RS	Criddle 1924	Sask
	Para	x						M	Liu 1926	--
	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Britton 1935	NH
	Para	x						RS	Bess 1936	NE USA
Syn. <u>Scambus pedalis</u> (Cresson)	Para	x			x			M	Viereck 1916	Conn
<u>Pimpla sanguinipes erythropus</u> Viereck	Para					I		RS	Stelzer 1968	Ariz
Syn. <u>Coccygomimus sanguinipes erythropus</u> (Viereck)	Para		F					M	Townes 1960	--
	Para		F					M	Krombein 1967	--
	Para		x					RS	Stehr 1968	Cal
	Para			A				RS	Stehr 1968	Cal
	Para			C				RS	Stehr 1968	Cal
	Para		F					RS	Stehr 1968	Nev, Cal
	Para					D		RS	Stehr 1968	Nev
	Para		P					RS	Stehr 1968	Wash
<u>Pimpla sanguinipes sanguinipes</u> Cresson	Para	x						RS	Cushman 1920	N Mex
Syn. <u>Ephialtes sanguinipes</u> (Cresson)	Para	x						M	Townes 1945	--
Syn. <u>Coccygomimus sanguinipes</u> (Cresson)	Para	x						M	Langston 1957	N Mex
	Para		F					M	Thompson 1946	N Amer
Syn. <u>Pimpla sanguinipes</u> Cresson	Para		F					M	Muesebeck 1951	--
	Para		P		x			RS	McLeod 1956	BC
	Para		P					M	Muesebeck 1958	--
	Para		x					RS	Stelzer 1968	N Mex
<u>Pimpla</u> sp.	Para				x			RS	Felt 1915	NY
	Para				x			M	Thompson 1946	USA
	Para				x			M	Langston 1957	NY
<u>Pimpla</u> sp (may be new)	Para				x			RS	Morris (letter 1970)	Ala
<u>Itopectis conquisitor</u> (Say)	Para	x						M	Quaintance 1915	--
	Para		x		x			RS	Criddle 1924	Sask
	Para,									
Hyp	x	x		x				M	Townes 1940	--
Para				x				RS	Hodson 1941	Minn
Para	x	x		x				M	Townes 1945	NE USA
Para	x	F		x				M	Muesebeck 1951	USA, Can
Para				x				RS	Connola 1957	NY
Para	x	x		x				M	Langston 1957	USA, Can
Para				x				RS	Sippell 1957, 1960	Ont
Para	x			x				M	Sippell 1957	Ont
Para	x	x		x				M	Townes 1960	USA, Can
Para				x				RS	Turnock 1961	Man
Hyp	x			x				M	Allen 1962	NH
Para,										
Hyp	x							RS, M	Kulman 1965, 1970	W Va
Para	x	F		x				M	Krombein 1967	--
Para	x							RS	Leius 1967	Ont
Para		x						RS	Stelzer 1968	N Mex
Para				x				RS	Morris (letter 1970)	Ala, La

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstria	incurvum			
(<u>Itopectis conquisitor</u> , continued)	Para		P?		?		RS	Raske (letter 1970)	Alta
	Para				x		RS	White (letter 1970)	Ill
	Para				x		M	Batzer 1971	USA
	Para				x		RS	Ramse 1972	N Dak
	Para				x		RS	Witter 1973	Minn
Syn. <u>Ephialtes conquisitor</u> (Say)	Para,								
	Hyp	x					M	Cushman 1920	Wash
	Para,								
	Hyp	x					RS	Liu 1926	NY
	Para,								
	Hyp	x					M	Muesebeck 1927	--
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x					M	Britton 1935	NH
	Para	x			x		M	Bess 1936	NE USA
	Para	x			x		RS	Nagel 1939	Minn
Syn. <u>Scambus conquisitor</u> (Say)	Para	x			x		M	Viereck 1916	Conn
Syn. <u>Pimpla conquisitor</u> Say	Para	x					RS	Riley 1888	--
	Para	x			x		M	Bruner 1890	Neb
	Para				x		M	Harrington 1890	Ont
	Para				x		M	Felt 1898a	--
	Para	x					M	Felt 1898b	USA, Can
	Para				x		RS	Felt 1898c	NY
	Para	x					RS	Lowe 1898	NY
	Para				x		RS	Lowe 1899	NE USA
	Para	x			x		M	Perkins 1900	Vt
	Para				x		RS	Weed 1900a	NH
	Para	x					RS	Weed 1900b	NH
	Para	x					M	Davis 1903	NE USA
	Hyp	x			x		RS	Fiske 1903	NH
	Para	x					M	Titus 1904	DC
	Para	x					M	Quaintance 1908	--
	Para	x					RS	Britton 1913	Conn
	Para				x		M	Treherne 1916	Ont
	Para	x					M	Britton 1935	NY
	Para				x		M	Herrick 1935	--
	Para	x	F		x		M	Thompson 1946	USA
<u>Itopectis quadricingulatus</u> (Provancher)	Para				x		M	Townes 1960	--
	Para				x		M	Krombein 1967	--
	Para		P				RS	Stehr 1968	Idaho
	Para	x					RS	Stelzer 1968	N Mex
<u>Itopectis viduata</u> (Gravenhorst)	Para		F		x		M	Muesebeck 1951	--
	Para		P		x		RS	McLeod 1956	BC
	Para		Rx				RS	Langston 1957	Cal
	Para		P		x		M	Muesebeck 1958	--
	Para		F				M	Townes 1960	--
	Para				x		M	Krombein 1967	--
	Para		F				RS	Stehr 1968	Cal
	Para	x					RS	Stelzer 1968	N Mex
	Para		P?		?		RS	Raske (letter 1970)	Alta
	Para		P				RS	Honing (letter 1972)	Mont
Syn. <u>Itopectis atrocoxalis</u> (Cresson)	Para	x					M	Townes 1945	N Mex, BC
	Para				F		M	Thompson 1946	N Amer
Syn. <u>Pimpla atrocoxalis</u> Cresson	Para	x					RS	Cockerell 1901	N Mex
<u>Theronia atalantae fulvescens</u> (Cresson)	Para,								
	Hyp	x					M	Viereck 1916	Conn
	Para	x	x	F			M	Townes 1960	--
	Para,								
	Hyp	x					RS	Kulman 1965	W Va
	Para		P				RS	Stehr 1968	Alta
	Para	x					RS	Stelzer 1968	N Mex
	Para		P?		?		RS	Raske (letter 1970)	Alta

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum			
(<u>Theronia atalantae fulvescens</u> , continued)	Para				x		RS	Ramse 1972	N Dak
	Para				x		RS	Witter 1973	Minn
Syn. <u>Theronia atalantae</u> (Poda)	Para,								
	Hyp	x		x			M	Townes 1940	--
	Para	x		x			M	Townes 1945	NY,NH, Utah
	Para,	x	F		x		M	Muesebeck 1951	--
	Para		P		x		RS	McLeod 1956	BC
	Para,				x		RS	Connola 1957	NY
	Hyp	x	x		x		M	Langston 1957	Can
	Para	x					M	Sippell 1957	Ont
	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Turnock 1961	Man
Syn. <u>Theronia fulvescens</u> (Cresson)	Para	x					M	Harrington 1890	BC
	Para	x					RS	Lowe 1898	NY
	Para				x		RS	Lowe 1899	--
	Hyp	x					RS	Weed 1900b	NH
	Hyp	x					RS	Fiske 1903	NH
	Para,								
	Hyp	x					RS	Liu 1926	NY
	Para	x					M	Britton 1935	NY
	Para				x		M	Nagel 1939	Minn
	Para	x					M	Thompson 1946	USA
<u>Theronia hilaris</u> (Say)	Para	x					M	Townes 1940	E USA, Ont.,Que
Syn. <u>Theronia melanocephala</u> (Brulle)	Para	x					RS	Fernald 1896	Mass
	Para						M	Felt 1898b	--
	Para						M	Lowe 1898	--
	Para	x					M	Davis 1903	NE USA
	Para	x					M	Fiske 1903	NH
	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
	Para	x					M	Liu 1926	--
	Para	x					M	Britton 1935	--
	Para	x					M	Thompson 1946	USA
<u>Phytodietus burgessi</u> (Cresson)	Para				x		RS	Connola 1957	NY
Syn. <u>Phytodectus burgessi</u> (Cresson)(sic)	Para						RS	Stelzer 1968	N Mex
<u>Phytodietus</u> sp.	Para		x				RS	Morris (letter	
<u>Bathythrix meteori</u> Howard	Para				x		RS	1970)	Ala
<u>Mastrus</u> sp.	Hyp				x		RS	Sippell 1957	Ont
<u>Phobetres thyridopteryx</u> (Riley)	Hyp						M	Langston 1957	W USA
<u>Gelis tenellus</u> (Say)	Hyp						M	Langston 1957	USA,Can
	Hyp		x				RS	Langston 1957	Cal
	Hyp				x		RS	Sippell 1957	Ont
	Hyp	x					RS	Kulman 1965	W Va
	Para	x					RS	Stehr 1968	Wis
	Hyp				x		RS	Ramse 1972	N Dak
	Hyp				x		RS	Witter 1973	Minn
Syn. <u>Hemiteles tenellus</u> Say	Hyp	x					RS	Liu 1926	NY
Syn. <u>Otacustes periliti</u> Ashmead	Hyp	x					RS	Felt 1918	NY
<u>Gelis</u> sp.	Hyp	x					RS	Fiske 1903	NH
Syn. <u>Otacustes</u> sp.	Hyp	x					M	Liu 1926	NY
<u>Atractodes</u> sp.	Hyp		P?		?		RS	McLeod 1956	BC
	Para				x		RS	Sippell 1957	Ont
<u>Cryptus</u> genus (Pratt)	Para		F		x		M	Muesebeck 1951	--
Syn. <u>Trachysphyrus</u> genus (Pratt)	Para		F		x		M	Townes 1962	N Mex, Sask
<u>Cryptus laborator altonii</u> Dalla Torre	Para				x		M	Muesebeck 1951	--
Syn. <u>Trachysphyrus altonii</u> Dalla Torre									

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum	tigris			
<u>Mesostenus</u> sp.	Para	x						RS	Lowe 1898	NY
	Para	x						M	Liu 1926	--
	Para	x						M	Britton 1935	NY
<u>Gambrus canadensis burkei</u> (Viereck)	Para		x					M	Townes 1962	Cal
	Para		x					M	Krombein 1967	Cal
<u>Gambrus canadensis canadensis</u> (Provancher)	Para	x		x				M	Townes 1962	--
	Para	x		x				M	Krombein 1967	--
	Para		x					RS	Stehr 1968	Nev
	Para				x			RS	Witter 1973	Minn
Syn. <u>Gambrus canadensis</u> (Provancher)	Para	x						M	Muesebeck 1951	--
	Para				x			RS	Sippell 1957	Ont
	Para		P?		?			RS	Raske (letter 1970)	Alta Ariz, Col
<u>Gambrus canadensis exareolatus</u> (Viereck)	Para		x					RS	Townes 1962	Alta Ariz, Col
	Para		x					M	Krombein 1967	--
	Para		x					RS	Stelzer 1968	N Mex
<u>Gambrus extrematis</u> (Cresson)	Para	x						M	Townes 1945	NY
Syn. <u>Spilocryptus extrematis</u> (Cresson)	Para	x						RS	Lowe 1898	NY
	Para	x						RS	Fiske 1903	NH
	Para	x						M	Quaintance 1908	--
	Para	x						M	Quaintance 1915	--
	Para	x						M	Liu 1926	--
	Para	x						M	Britton 1935	NY, NH
<u>Gambrus ultimus</u> (Cresson)	Para	x						M	Allen 1962	--
<u>Ichneumon laetus</u> Bruelle	Para	x						M	Titus 1904	NY
Syn. <u>Amblyteles laetus</u> Bruelle	Para	x						M	Liu 1926	NY
This species is not listed in Muesebeck's catalog (1951).										
<u>Glypta simplicipes</u> Cresson	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Bess 1936	NE USA
	Para	x						M	Townes 1945	NE USA
	Para	x						M	Thompson 1946	USA
	Para	x						M	Muesebeck 1951	--
	Para				x			RS	Sippell 1957	Ont
	Para	x						RS	Leius 1967	Ont
<u>Glypta</u> sp.	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Thompson 1946	USA
	Para				x			RS	Sippell 1957	Ont
<u>Syrphoctonus flavolineatus</u> (Gravenhorst)	Hyp				x			RS	White (letter 1970)	Ill
<u>Exochus mitratus atrocoxalis</u> Cresson										
Syn. <u>Ephialtes atrocoxalis</u> (Cresson)	Para		x					M	Cushman 1920	N Mex
<u>Campoplex validus</u> (Cresson)	Para		P		x			RS	Baird 1920	BC
	Para	x						RS	Tothill 1922	Que
	Para	x			x			M	Townes 1945	NE USA
	Para		P					M	Thompson 1946	Can
	Para	x			x			M	Muesebeck 1951	USA, Can
	Para		P		x			M	Langston 1957	USA, Can
Syn. <u>Eulimneria valida</u> Cresson	Para	x						M	Liu 1926	--
	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Bess 1936	NE USA
	Para	x						M	Thompson 1946	USA
Syn. <u>Limnerium validus</u> Cresson	Para	x						RS	Timberlake 1912	Mass
<u>Casinarina forcipata</u> Walley	Assoc				x			O	Witter 1973	Minn
<u>Casinarina limenitidis</u> (Howard)	Para	x						M	Muesebeck 1951	--
Syn. <u>Charops limenitidis</u> (Howard)	Para	x						M	Townes 1945	NY
Syn. <u>Amorphota orgyiae</u> Howard	Para	x						RS	Felt 1918	NY
	Para	x						M	Liu 1926	--
<u>Campoletis</u> sp.	Para				x			RS	Witter 1973	Minn
<u>Dusona vitticollis vitticollis</u> (Norton)	Para				x			M	Muesebeck 1951	--
	Para				x			M	Langston 1957	Mass, NJ, NY
	Para				x			M	Sippell 1957	Ont
Syn. <u>Campoplegidea vitticollis</u> Norton	Para				x			RS	Schaffner 1934a	NE USA
	Para				x			M	Bess 1936	NE USA

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location	
		america.	califor.	constri.	disstris	incurvum				tigris
(Syn. <u>Campoplegidea vitticollis</u> , continued)	Para				x			M	Townes 1945	NE USA
	Para				x			M	Thompson 1946	USA
<u>Phobocampe clisiocampae</u> (Weed)	Para	x			x			M	Townes 1945	NE USA
	Para	x			x			M	Muesebeck 1951	NE USA
	Para	x			x			M	McLeod 1956	--
	Para	x			x			M	Langston 1957	NE USA
	Para				x			M	Sippell 1957	--
	Para	x						RS	Warren 1963	Ark
	Para	x						RS	Kulman 1965	W Va
	Para				x			RS	Witter 1973	Minn
Syn. <u>Hyposoter clisiocampae</u> (Weed)	Para	x						RS	Liu 1926	NY
	Para	x			x			RS	Schaffner 1934a	NE USA
	Para	x						M	Britton 1935	NH
	Para	x						RS	Bess 1936	NE USA
	Para				x			M	Bess 1936	NE USA
	Para				x			RS	Nagel 1939	Minn
	Para	x			x			M	Thompson 1946	USA
Syn. <u>Campoplex clisiocampae</u> (Weed)	Para	x						M	Viereck 1916	Conn
Syn. <u>Ameloctonus clisiocampae</u> Weed	Para	x						RS	Fiske 1903	NH
	Para	x						M	Quaintance 1908	--
	Para	x						M	Quaintance 1915	--
<u>Phobocampe</u> sp.	Para		P		x			RS	McLeod 1956	BC
<u>Hyposoter annulipes</u> (Cresson)	Para				x			RS	Witter 1973	Minn
<u>Hyposoter fugitivus fugitivus</u> (Say)	Para	x						M	Townes 1945	Que
	Para		x					M	Townes 1945	Cal
	Para	x			x			M	Muesebeck 1951	--
	Para	x			x			M	Langston 1957	USA, Can
	Para				x			RS	Sippell 1957	Ont
	Para	x						RS	Kulman 1965	W Va
	Para		x					RS	Stehr 1968	Ariz
	Para	x						RS	Stehr 1968	Tex
	Para	x						RS	Ramse 1972	N Dak
	Para				x			RS	Witter 1973	Minn
Syn. <u>Hyposoter fugitivus</u> (Say)	Para	x						RS	Liu 1926	NY
	Para	x						RS	Schaffner 1934a	NE USA
	Para	x						M	Britton 1935	NH
	Para	x						M	Bess 1936	NE USA
	Para	x			x			RS	Raizenne 1952	Ont
	Para	x						RS	Warren 1963	Ark
Syn. <u>Campoplex fugitivus</u> Say	Para	x			x			M	Viereck 1916	Conn
Syn. <u>Limneria fugitivus</u> Say	Para	x						RS	Riley 1890b	Mo
	Para				x			M	Felt 1898c	--
	Para				x			M	Lowe 1899	NY
	Para	x						RS	Weed 1900b	NH
	Para	x						RS	Fiske 1903	NH
	Para	x						M	Quaintance 1908, 1915	--
<u>Hyposoter fugitivus pacificus</u> Cushman	Para		AP					RS	Cushman 1919	Cal, Wash
	Para		P					M	Townes 1945	Cal
	Para		A					M	Townes 1945	Col
	Para				x			M	Townes 1945	Col, Utah
	Para		AP		x			M	Muesebeck 1951	--
	Para		P		x			RS	McLeod 1956	BC
	Para		AC	C	x			RS	Langston 1957	Cal
	Para		PR							
	Para	x	P					M	Thompson 1946	USA
	Para		x					RS	Stehr 1968	Cal, Wyo
										Oreg, Idaho, Utah, Mont, Idaho
	Para		P					RS	Stehr 1968	Mont, Idaho
	Para		xL					RS	Stehr 1968	Mont
	Para		R					RS	Stehr 1968	Cal
	Para			C				RS	Stehr 1968	Oreg

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum			
(<i>Hyposoter fugitivus pacificus</i> , continued)	Para		P				RS	Iwao 1970a	BC
<i>Hyposoter fuscitarsus</i> (Viereck)	Para				x		RS	Witter 1973	Minn
<i>Trichonotus analis</i> (Say)	Para*				x		RS	White (letter 1970)	Ill
*Miss Walkley, formerly of the U.S.N.M. noted that the specimens collected by White differed from the typical form and had fuscous tarsi.	Para				x		RS	Witter 1973	Minn
Syn. <i>Labrorychus analis</i> (Say)	Para	x					RS	Liu 1926	NY
	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x					M	Britton 1935	NH
	Para	x			x		RS	Bess 1936	NE USA
	Para	x	x		x		M	Townes 1945	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para	x			x		M	Muesebeck 1951	--
	Para	x					RS	Raizenne 1952	Ont
	Para		P		x		RS	McLeod 1956	BC
	Para	x			x		RS	Connola 1957	NY
	Para	x			x		M	Langston 1957	NE USA
	Para	x					M	Sippell 1957	Ont
	Para				x		RS	Sippell 1957	Ont
	Para				x		RS	Turnock 1961	Man
	Para	x					RS	Kulman 1965	W Va
	Para	x					RS	Stehr 1968	Minn, Wis
Syn. <i>Anomalon anale</i> Say	Para	x					RS	Fiske 1903	NH
	Para	x					M	Quaintance 1908	--
	Para	x					M	Quaintance 1915	--
<i>Trichonotus</i> sp. near <i>analis</i> (Say)	Para						RS	Langston 1957	Cal
Syn. <i>Labrorychus</i> sp. near <i>analis</i> (Say)	Para						RS	Stehr 1968	Wyo, Nev
<i>Trichonotus</i> sp.	Para		x				RS	Stehr 1968	BC
<i>Therion</i> sp.	Para	x					RS	Warren 1963	Ark
<i>Anomalon exile</i> Provancher	Para	x					RS	Fiske 1903	NH
	Para	x					M	Quaintance 1908,	
	Para	x					M	Quaintance 1915	--
	Para						M	Townes 1945	Mass, NH
Syn. <i>Paranomalon exile</i> Provancher	Para	x					M	Britton 1935	NH
Syn. <i>Labrorychus exilis</i> Provancher (sic)	Para	x					M	Liu 1926	--
<i>Ophion</i> sp. near <i>tityri</i> Packard	Para		xR				RS	Langston 1957	Cal
<i>Enicospilus</i> sp.	Para				x		RS	Sippell 1957	Ont
Syn. <i>Eremotylus</i> sp.	Para	x			x		RS	Schaffner 1934a	NE USA
	Para	x			x		M	Bess 1936	NE USA
	Para	x			x		M	Thompson 1946	USA
	Para	x			x		M	Langston 1957	NE USA
<i>Mesochorus</i> sp.	Para		x				RS	Stehr 1968	Wyo
	Hyp				x		RS	Witter 1973	Minn
<i>Pteromalus clisiocampae</i> Harris	Para						M	Packard 1889	--
This species name is not listed in Muesebeck's catalog (1951).	Para	x					M	Liu 1926	--
EULOPHIDAE									
<i>Sympiesis</i> sp.	Para				x		RS	Witter 1973	Minn
<i>Dimmockia uncongrua</i> (Ashmead)	Hyp	x					RS	Liu 1926	NY
	Hyp	x					RS	Kulman 1965	W Va
<i>Melittobia</i> sp.	Hyp		x				RS	Stehr 1968	Oreg
<i>Pediobius tarsalis</i> (Ashmead)	Hyp	x					M	Peck 1963	NH, Conn
Syn. <i>Pleurotropis tarsalis</i> (Ashmead)	Hyp	x					M	Viereck 1916	Conn
	Hyp	x					M	Liu 1926	--
	Hyp						M	Langston 1957	EUSA, Oreg, Cal, Wash
Syn. <i>Asecodes albitarsis</i> Ashmead	Hyp	x					RS	Fiske 1903	NH
<i>Syntomosphyrum clisiocampae</i> (Ashmead)	Para	x					RS	Kulman 1965	W Va
Syn. <i>Miotropis clisiocampae</i> Ashmead	Para	x					RS	Ashmead 1894	W Va

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum			
(Syn. <u>Miotropis clisiocampae</u> , continued)									
	Para	x			x		M	Dalla Torre 1898	--
	Para				x		RS	Lowe 1899	NE USA
	Para	x					RS	Riley 1902	W Va
	Para	x					M	Quaintance 1915	--
	Para	x					M	Viereck 1916	Conn
	Hyp (?)	x					M	Liu 1926	--
	Para	x					M	Muesebeck 1951	--
	Para	x					M	Peck 1963	W Va, NJ
<u>Syntomosphyrum esurus</u> (Riley)	Para				x		RS	Nagel 1939	Minn
	Para				x		RS	Sippell 1957	Ont
	Para	x					RS	Kulman 1965	W Va
	Para				x		RS	Witter 1973	Minn
<u>Tetrastichus aeneoviridis</u> (Girault)	Para	?					M	Muesebeck 1951	Ill
	Para	?					M	Peck 1963	Ill
Syn. <u>Trichaporus aeneoviridis</u> Girault	Para	?					RS	Girault 1912	Ill
Burks (1943) reports that this species was originally said to be a primary parasite of <u>M. americanum</u> , but the insectory records in the Illinois Natural History Survey show that the specimens came from syrphid puparia.	Para	?					M	Liu 1926	--
	Para	?					M	Frison 1927	Ill
<u>Tetrastichus coerulecens</u> Ashmead	Hyp		L,P				RS	Stehr 1968	Mont
	Hyp		x				RS	Stehr 1968	Oreg Nev
	Para		x				RS	Stelzer 1968	N Mex
<u>Tetrastichus</u> sp.	Hyp		x				RS	Swain 1939	Col
ELASMIDAE									
<u>Elasmus varius</u> Howard	Hyp	x					RS	Fiske 1903	NH
	Hyp	x					M	Liu 1926	--
	Hyp	x					M	Langston 1957	Mo, NH
	Hyp	x					M	Peck 1963	NH
<u>Elasmus</u> sp.	Hyp	x					M	Liu 1926	--
EUPELMIDAE									
<u>Eupelmus cyaniceps cyaniceps</u> Ashmead	Hyp	x					RS, M	Kulman 1965, 1970	W Va
Syn. <u>Eupelmus cyaniceps</u> Ashmead	Hyp	x					RS	Fiske 1903	NH
<u>Eupelmus</u> sp.	Hyp	x					M	Liu 1926	--
PERILAMPIDAE									
<u>Perilampus hyalinus</u> Say	Hyp						M	Langston 1957	USA
This is an incorrect host listing. Peck's catalogue (1963) mentioned that Fiske in 1903 reported <u>M. americanum</u> as a host of <u>P. hyalinus</u> .	Hyp	x					M	Peck 1963	NH
Fiske (1903) reared the above insect from <u>Hyphantria</u> .	Hyp				x		RS	Morris (letter 1970)	Ala
TORYMIDAE									
<u>Microdontomerus fumipennis</u> Crawford	Para		F				M	Thompson 1946	USA
	Para		F				M	Muesebeck 1951	--
	Para		x				M	Langston 1957	N Mex, Utah
	Para		x				M	Krombein 1967	--
	Para, Hyp					I	RS	Stelzer 1967	Ariz
	Para		x				RS	Stehr 1968	Wyo
	Hyp					I	RS	Stelzer 1968	Ariz
<u>Monodontomerus aereus</u> Walker	Para	x					M	Muesebeck 1931	Mass
	Para	x					M	Schedl 1936	Mass
	Para	x					M	Thompson 1951	USA
	Para	x					M	Muesebeck 1951	N Eng
	Para	x					M	Peck 1963	N Eng
<u>Monodontomerus minor</u> (Ratzeburg)	Para	x					RS, M	Kulman 1965, 1970	W Va
(probably also a hyp attacking <u>Itopectis conquisitor</u> . Kulman (letter 1972)									

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum	tigris			
Syn. <u>Monodontomerus subobsoletus</u> Gahan	Para	x						RS	Gahan 1941	Del
	Para	x						M	Muesebeck 1951	--
	Para	x						M	Allen 1962	Del
	Para	x						M	Peck 1963	--
PTEROMALIDAE										
<u>Spalangia drosophilae</u> Ashmead										
This species was a parasite of <u>Pseudogaurax anchora</u> (Chloropidae), a scavenger found in tents of <u>M. americanum</u> . It is also a parasite of <u>Anthonyia</u> sp. which lives in the frass found in tents of <u>M. americanum</u> .	Assoc	x						RS	Kulman 1965	W Va
<u>Amblymerus ruskini</u> (Girault)	Para		x					RS	Stelzer 1968	N Mex
<u>Amblymerus verditer</u> (Norton)	Para				x			RS	Witter 1973	Minn
<u>Coelopisthia suborbicularis</u> (Provancher)	Hyp		x					M	Peck 1963	NH,Md, Ill
	Hyp							M	Langston 1957	Ill,Md, NH
Syn. <u>Semiotellus suborbicularis</u> Provancher	Hyp		x					M	Liu 1926	NY
Syn. <u>Coelopisthus suborbicularis</u> (Provancher)	Hyp		x					RS	Fiske 1903	NH
<u>Tritneptis scutellata</u> (Muesebeck)	Hyp		x					RS	Stelzer 1968	N Mex
<u>Tritneptis</u> sp.	Para,									
	Hyp		P		x			RS	McLeod 1956	BC
	Para				x			M	Thompson 1946	USA
	Para		x	x	x			M	Muesebeck 1951	--
<u>Dibrachys cavus</u> (Walker)	Hyp		x	x	C	x		M	Langston 1957	USA,Can
	Hyp					x		RS	Sippell 1957	Ont
	Hyp		x	x	x	x		M	Peck 1963	USA,Can
	Hyp		x					RS, M	Kulman 1965, 1970	W Va
	Hyp						I	RS	Stelzer 1967	Ariz
	Hyp		x					RS	Stehr 1968	Wyo
	Hyp						DI	RS	Stelzer 1968	Ariz
	Hyp				x			RS	Ramse 1972	N Dak
	Hyp				x			RS	Witter 1973	Minn
Syn. <u>Semiotellus clisiocampae</u> Fitch	Para		x					M	Liu 1926	--
Syn. <u>Dibrachys clisiocampae</u> (Fitch)	Para				x			M	Graham 1918	--
Syn. <u>Pteromalus boucheanus</u> Ratzeburg	Hyp		x					M	Viereck 1916	Conn
Syn. <u>Dibrachys boucheanus</u> (Ratzeburg)	Hyp		x					RS	Lowe 1898	NY
	Para		x					RS	Riley 1902	W Va
	Hyp		x					RS	Fiske 1903	NH
	Hyp		x					RS	Liu 1926	NY
Syn. <u>Cleonymus clisiocampae</u> Fitch	Para		x					M	Felt 1898b	--
<u>Psychophagus omnivorus</u> (Walker)	Para		x					RS	Liu 1926	NY
	Para		x					M	Britton 1935	NH
	Para		x		x			M	Muesebeck 1951	--
	Para		x					RS	Raizenne 1952	Ont
	Para		x		x			M	Peck 1963	NH,Conn, NY,Ont
Syn. <u>Diglochis omnivorus</u> (Walker)	Para				x			RS	Lowe 1899	NE USA
	Para				x			RS	Weed 1900a	NH
	Para		x		x			RS	Fiske 1903	NH
	Para		x					M	Quaintance 1908	--
	Para		x					M	Quaintance 1915	--
<u>Catolaccus aeneoviridis</u> (Girault)	Hyp		x					RS	Stehr 1968	Oreg,Nev
	Hyp		F					RS	Stehr 1968	Utah
<u>Catolaccus victoria</u> Burks	Hyp		x					RS	Stelzer 1968	N Mex
<u>Pteromalus puparum</u> (Linnaeus)	Hyp							M	Langston 1957	USA
	Hyp		x					M	Peck 1963	NH
	Para		x					RS	Stelzer 1968	N Mex
Syn. <u>Pteromalus puparium</u> (Linnaeus) (sic)	Hyp		x					RS	Fiske 1903	NH
	Hyp		x					M	Liu 1926	--
<u>Pteromalus</u> sp.	Hyp		x					RS	Fiske 1903	NH
	Para		x					M	Quaintance 1915	--
	Hyp		x					M	Liu 1926	NY
<u>Habrocytus phycidis</u> Ashmead	Hyp							M	Langston 1957	BC,Ont

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma					Type reference	Investigator	Location
		x america.	califor.	constri.	disstria	incurvum			
Syn. <u>Habrocytus dux</u> Girault	Hyp	x					RS	Liu 1926	NY
<u>Habrocytus thyridopterigis</u> Howard	Hyp						M	Langston 1957	NE USA, NC Va, Mo, Wis Ill
*This is an incorrect host listing, Peck's catalogue (1963) mentioned that Fiske in 1903 reported <u>M. americanum</u> as a host of <u>H. thyridopterigis</u> . Fiske (1903) reared the above insect from <u>Hyphantria</u> .	Hyp						RS	Sippell 1957	Ont
<u>Habrocytus</u> sp.	Hyp	x					M	Peck 1963	NH
	Hyp	x					RS, M	Kulman 1965, 1970	W Va
	Hyp		x	C			RS	Langston 1957	Cal
	Para		R				RS	Langston 1957	Cal
	Hyp				C	I	RS	Stehr 1968	Ariz
	Hyp						RS	Stehr 1968	Oreg
	Hyp		F, P				RS	Stehr 1968	Mont
	Hyp		x				RS	Stelzer 1968	N Mex
	Hyp				x		RS	Witter 1973	Minn
	Hyp				x		RS	Witter 1973	Minn
<u>Hypoteromalus inimicus</u> Muesebeck									
<u>Hypoteromalus percussor</u> Girault									
Syn. <u>Hypoteromalus percussor</u> Girault (sic)	Hyp		x				RS	Stelzer 1968	N Mex
<u>Hypoteromalus tabacum</u> (Fitch)									
Syn. <u>Hypoteromalus tabacum</u> (Fitch) (sic)	Para		x				RS	Stelzer 1968	N Mex
<u>Hypoteromalus</u> sp.									
Syn. <u>Hypoteromalus</u> sp. (sic)	Para		x				RS	Stelzer 1968	N Mex
CHALCIDIDAE									
<u>Brachymeria compsiluræ</u> (Crawford)	Hyp				x		RS	Morris (letter 1970)	Ala
<u>Brachymeria ovata ovata</u> (Say)									
Syn. <u>Brachymeria ovata</u> (Say)	Hyp					I	RS	Stelzer 1967, 1968	Ariz
	Para					I	RS	Stehr 1968	Ariz
	Para	x					RS	Stehr 1968	Tex
	Para				x		RS	Morris (letter 1970)	Ala
	Para				x		RS	White (letter 1970)	Ill
<u>Spilochalcis albifrons</u> (Walsh)	Hyp		P				RS	Stehr 1968	Idaho
	Hyp		x				RS	Stehr 1968	Oreg
<u>Spilochalcis leptis</u> Burks	Hyp		x				RS	Stehr 1968	Mont
<u>Spilochalcis side</u> (Walker)	Hyp				x		RS	Sippell 1957	Ont
<u>Ceratosmicra paya</u> Burks	Hyp		x				RS	Stehr 1968	Nev
FIGITIDAE									
<u>Neralsia</u> sp.	Hyp				x		RS	Morris (letter 1970)	Ala
CYNIPIDAE									
<u>Trybliographa</u> sp.									
This insect is a parasite of <u>Anthomyia</u> sp. which lives in the frass found in <u>M. americanum</u> 's tents.	Assoc	x					RS	Kulman 1965	W Va
FORMICIDAE									
<u>Myrmica sabuleti americana</u> Weber									
Syn. <u>Myrmica americana</u> Weber	Pred	x			x		O	Ayre 1968	Ont
<u>Tapinoma sessile</u> (Say)	Assoc, Pred?				x		O	Kulman 1965	W Va
	Assoc				x		O	Ramse 1972	N Dak
<u>Camponotus nearcticus</u> Emery									
<u>Camponotus noveboracensis</u> (Fitch)									
Syn. <u>Camponotus herculeanus ligniperdus</u> var. <u>noveboracensis</u> (Fitch)									
Syn. <u>Camponotus herculeanus ligniperdus</u> (Latreille)	Pred				x		O	Green 1950	Ont
<u>Formica lasioides</u> Emery	Pred	x					M	Ayre 1968	Ont
<u>Formica fusca</u> Linnaeus	Pred				x		O	Green 1950	Ont
<u>Formica fusca subsericea</u> Say	Pred	x					O	Liu 1926	NY

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	distria	incurvum	tigris			
<u>Formica obscuripes obscuripes</u> Forel	Pred	x						O	Ayre 1968	Ont
Syn. <u>Formica obscuripes</u> Forel	Pred	x						O	Liu 1926	NY
<u>Formica truncoicola integra</u> Nylander										
This species name is not listed in Muesebeck's catalog (1951).										
Ants (no additional description)	Pred		P		x			M	Baird 1920	BC
	Pred		P					O	Wellington 1960	BC
VESPIDAE										
<u>Vespula</u> sp.	Pred		P					O	Wellington 1970	BC
<u>Ancistrocerus catskill albophaleratus</u> (Saussure)										
Syn. <u>Odynerus albophaleratus</u> Saussure	Pred							O	Packard 1889	--
SPHECIDAE										
<u>Podalonia occidentalis</u> Murray	Pred		x					O	Stelzer 1968	N Mex
ARACHNIDA										
PHALANGIIDAE										
<u>Leiobunum vittatum</u> (Say)										
Syn. <u>Liobunum vittatum dorsatum</u> (Say)	Assoc				x			O	Weed 1899	NH
GNAPHOSIDAE										
<u>Sergiolus decoratus</u> Kaston	Assoc				x			O	Ramse 1972	N Dak
CLUBIONIDAE										
<u>Clubiona excepta</u> L. Koch	Unk	x						O	Warren 1963	Ark
Syn. <u>Clubiona pallenus</u> Hentz	Assoc				x			O	Ramse 1972	N Dak
<u>Clubiona moesta</u> Banks										
ANYPHAENIDAE										
<u>Aysha gracilis</u> (Hentz)										
Syn. <u>Cysha gracilis</u> (Hentz)	Unk	x						O	Warren 1963	Ark
SALTICIDAE										
<u>Paraphidippus marginatus</u> Walck	Assoc	x						O	Ramse 1972	N Dak
ARGIOPIDAE										
<u>Araneus cornutus</u> McCook	Assoc	x						O	Ramse 1972	N Dak
<u>Araneus fondosus</u> Walck										
Syn. <u>Epeira strix</u> Hentz*	Assoc	x						O	Kirkland 1897a	Mass
<u>Phidippus clarus</u>	* Assoc	x						O	Kirkland 1897a	Mass
Syn. <u>Phidippus multiformis</u> Emerton										
*These spiders are common occupants of <u>M. americanum</u> tents and they prey on <u>Podisus placidus</u> Uhler (Kirkland 1897).										
MICRYPHANTIDAE										
(No additional description)	Assoc					x		O	Ramse 1972	N Dak
Spiders (no additional description)	Pred	x				x		M	Slingerland 1899	--
	Pred					x		M	Weed, 1899	NH
	Pred		6					O	Wellington 1957, 1960	BC
NEMATODA										
MERMITHIDAE										
<u>Hexameris microamphidis</u> Steiner	Para	x						RS	Liu 1926	NY
	Para	x						M	Liu 1926	DC

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Classification	Biol. status	Malacosoma						Type reference	Investigator	Location
		america.	califor.	constri.	disstris	incurvum	tigris			
(Mermithidae, continued)										
Genus - Undetermined	Para	x					RS	Schaffner 1934a	NE USA	
	Para				x		RS	Witter 1973	Minn	
Genus - possibly <u>Mermis</u>	Para	x					RS	Dorsey (letter 1960)	W Va	
BIRD PREDATORS										
Nomenclature was taken from American Ornithologist's Union (1957).										
Blackbird (no additional description)									Washburn 1894	
Blackbird, red-winged <u>Agelaius phoeniceus</u> (Linnaeus)									Britton 1935; Fashingbauer 1951, 1957a; Forbush 1896b, 1908, 1927; Liu 1926; McAtee 1927; Weed 1900a	
Bluebird, eastern <u>Sialia sialis</u>									Forbush 1929	
Catbird <u>Dumetella carolinensis</u> (Linnaeus)									Britton 1935; Fashingbauer 1951, 1957a; Felt 1898a; Forbush 1908; Liu 1926; Lowe 1899; McAtee 1927; Perkins 1900; Swaine 1918; Weed 1899, 1900a	
Chat, yellow-breasted <u>Icteria virens</u> (Linnaeus)									Liu 1926; Saunders 1920	
Chewink <u>Pipilo erythrophthalmus</u> (Linnaeus), Rufous-sided Towhee									Felt 1898a; Forbush 1908; Liu 1926; McAtee 1927; Swaine 1918	
Chickadee (no additional description)									Allen 1920; Britton 1902,1913,1935; Davis 1903; Felt 1898b; Forbush 1908; Liu 1926; Lowe 1899; Perkins 1900; Quaintance 1908,1915; Swaine 1918; Weed 1896,1899	
Chickadee, black-capped <u>Parus atricapillus</u> (Linnaeus)									Felt 1898a; Forbush 1896a; Lowe 1898,1899; McAtee 1927; Perkins 1900; Weed 1896	
Cowbird, brown-headed <u>Molothrus ates</u> (Boddaert)									Fashingbauer 1951,1957a	
Creepers, black (no additional description)									Felt 1898a; Swaine 1918	
Creepers, white (no additional description)									Felt 1898a; Swaine 1918	
Crossbill, red <u>Loxia curvirostra</u> Linnaeus									McAtee 1927	
Crow, common <u>Corvus brachyrhynchos</u> Brehm									Allen 1920; Britton 1902,1913,1935; Davis 1903; Fashingbauer 1951,1957a; Felt 1898a,b; Forbush 1896a; Kalmbach 1918; Liu 1926; Lowe 1898; McAtee 1927; Quaintance 1908,1915; Swaine 1918; Weed 1896	
Crow (no additional description)									Hodson 1941,1943	
Crow, florida <u>Corvus brachyrhynchos pascuus</u> Coves									Liu 1926	
Crow, southern <u>Corvus brachyrhynchos paulus</u> Howell									Liu 1926	
Crow, western <u>Corvus brachyrhynchos hesperis</u> Ridgway									Liu 1926	
Cuckoo (no additional description)									Allen 1920; Beal 1898; Britton 1902, 1913; Felt 1898a; Forbush 1896b; Luger 1898; McAtee 1927; Perkins 1900; Saunders 1920; Weed 1896,1899,1900a	
Cuckoo, American (no additional description)									Le Baron 1870	

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Cuckoo, black-billed <u>Coccyzus erythrophthalmus</u> (Wilson)	Beal 1898; Bent 1940; Britton 1935; Bruner 1890; Davis 1903; Fashingbauer 1951,1957a; Felt 1898a,b,c; Forbush 1896a,1908,1927,1939; Liu 1926; Lowe 1898; Luggner 1898; McAtee 1927; Quaintance 1908,1915; Ramse 1972; Root 1966; Saunders 1878b; Swaine 1918; Weed 1896
Cuckoo, yellow-billed <u>Coccyzus americanus</u> (Linnaeus)	Beal 1898; Bent 1940; Britton 1935; Bruner 1890; Davis 1903; Felt 1898a,b; Forbush 1896a,1908,1927; Liu 1926; Lowe 1898; Luggner 1898; McAtee 1922,1927; Quaintance 1908,1915; Root 1966; Swaine 1918; Weed 1896
Flicker, northern <u>Colaptes auratus luteus</u> Bangs	Forbush 1927
Flicker, yellow-chafted <u>Colaptes auratus</u> (Linnaeus)	Felt 1898a; Forbush 1908; Liu 1926; Swaine 1918
Flycatcher (no additional description)	Weed 1900a
Flycatcher, great crested <u>Myiarchus crinitus</u> (Linnaeus)	Fashingbauer 1951,1957a
Flycatcher, least <u>Empidonax minimus</u> (Baird & Baird)	Fashingbauer 1951,1957a; McAtee 1927
Grackle, common <u>Quiscalus quiscula</u> (Linnaeus)	Forbush 1927; Liu 1926; Swaine 1918
Grosbeak, rose-breasted <u>Pheuticus ludovicianus</u> (Linnaeus)	Britton 1935; Fashingbauer 1951,1957a; Forbush 1908,1929; Liu 1926; McAtee 1927; Weed 1900a
Grouse, ruffed <u>Bonasa umbellus</u> (Linnaeus)	Fashingbauer 1951,1957a
Jay, blue <u>Cyanocitta cristata</u> (Linnaeus)	Britton 1935; Fashingbauer 1951,1957a; Felt 1898a; Forbush 1908,1927; Liu 1926; McAtee 1922,1927; Quaintance 1908,1915; Swaine 1918
Kingbird, eastern <u>Tyrannus tyrannus</u> (Linnaeus)	Liu 1926
Martin, purple <u>Progne subis</u> (Linnaeus)	Weed 1900
Nuthatch (no additional description)	Felt 1898a; Lowe 1899; McAtee 1927; Perkins 1900; Weed 1899
Nuthatch, white-breasted <u>Sitta carolinensis</u> Latham	Allen 1920; Felt 1898a; Forbush 1908,1929; Liu 1926; Perkins 1900; Swaine 1918
Oriole (no additional description)	Allen 1920; Britton 1902,1913; Felt 1898a,b; Forbush 1896b,1908; McAtee 1927; Perkins 1900; Weed 1899,1900a
Oriole, baltimore <u>Icterus galbula</u> (Linnaeus)	Britton 1935; Bruner 1890; Davis 1903; Forbush 1896a,b, 1908,1927; Liu 1926; Lowe 1898,1899; McAtee 1922,1927; Quaintance 1908,1915; Ramse 1972; Swaine 1918; Weed 1896
Oriole, Bullock's <u>Icterus bullockii</u> (Swainson)	Root 1966
Oriole, orchard <u>Icterus spurius</u> (Linnaeus)	Liu 1926; McAtee 1922
Ovenbird <u>Seiurus aurocapillus</u> (Linnaeus)	Fashingbauer 1951,1957a

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Pewee, Eastern wood <u>Contopus virens</u> (Linnaeus)	McAtee 1927
Pheasant, ring-necked <u>Phasianus colchicus torquatus</u> (Gmelin)	Liu 1926
Phoebe, Eastern <u>Sayornis phoebe</u> (Latham)	McAtee 1927
Redstart, American <u>Setophaga ruticilla</u> (Linnaeus)	Britton 1935; Fashingbauer 1951,1957a; Felt 1898a; Forbush 1908; Liu 1926; Lowe 1899; Perkins 1900; Swaine 1918
Robin <u>Turdus migratorius</u> Linnaeus	Britton 1935; Davis 1903; Felt 1898a; Forbush 1898b,1908,1929; Liu 1926; Lowe 1899; McAtee 1922,1927; Perkins 1900; Swaine 1918; Weed 1899,1900a
Sapsucker, yellow-bellied <u>Sphyrapicus vaius</u> (Linnaeus)	Liu 1926; Swaine 1918; McAtee 1927
Siskin, pine <u>Spinus pinus</u> (Wilson)	Grant 1959
Sparrow (no additional description)	Weed 1900a
Sparrow, chipping <u>Spizella passerina</u> (Bechstein)	Britton 1902,1913,1935; Felt 1898a,b; Forbush 1896a; Liu 1926; Lowe 1898,1899; McAtee 1927; Perkins 1900; Quaintance 1908,1915; Swaine 1918; Weed 1896,1899
Sparrow, English <u>Passer domesticus domesticus</u> (Linnaeus)	Felt 1898a; Liu 1926; Lowe 1899; McAtee 1922,1927; Perkins 1900; Swaine 1918; Weed 1899
Sparrow, field <u>Spizella pusilla</u> (Wilson)	Britton 1935; Forbush 1908; Liu 1926
Sparrow, white-throated <u>Zonotrichia albicollis</u> (Gmelin)	Britton 1935; Forbush 1908; Liu 1926
Starling <u>Sturnus vulgaris</u> Linnaeus	Kalmbach 1921; Liu 1926
Tanager, scarlet <u>Piranga olivacea</u> (Gmelin)	Felt 1898a; Forbush 1908,1929; Liu 1926; McAtee 1927; Swaine 1918; Weed 1900a
Thrasher, brown <u>Toxostoma rufum</u> (Linnaeus)	Britton 1935; Forbush 1908; Liu 1926
Thrush, olive-backed <u>Hylocichla ustulata</u> (Nuttall)	Fashingbauer 1951,1957a
Thrush, wood <u>Hylocichla mustelina</u> (Gmelin)	Felt 1898a; Forbush 1908,1929; Liu 1926; McAtee 1927; Swaine 1918
Titmice (no additional description)	McAtee 1927
Towhee (no additional description)	Swaine 1918
Veery <u>Hylocichla fusciscens</u> (Stephens)	Fashingbauer 1951,1957a
Vireo (no additional description)	Allen 1920; Davis 1903; Perkins 1900; Swaine 1918; Weed 1900a
Vireo, blue-headed <u>Vireo solitarius</u> (Wilson)	Fashingbauer 1951,1957a
Vireo, red-eyed <u>Vireo olivaceus</u> (Linnaeus)	Britton 1902,1913,1935; Fashingbauer 1951, 1957a; Felt 1898a,b; Forbush 1896a,1908,1929; Liu 1926; Lowe 1898,1899; McAtee 1927; Quaintance 1908,1915; Weed 1896,1899
Vireo, warbling <u>Vireo gilvus</u> (Vieillot)	Felt 1898a; Liu 1926; Lowe 1898; McAtee 1927; Weed 1899
Vireo, white-eyed <u>Vireo griseus</u> (Boddaert)	Felt 1898a; Lowe 1899; McAtee 1927; Weed 1899

TABLE 2. PARASITES, PREDATORS, AND ASSOCIATES OF TENT CATERPILLAR LARVAE AND PUPAE (CONT.)

Vireo, yellow-throated <u>Vireo flavifrons</u> Vieillot	Britton 1935; Forbush 1908; Liu 1926; McAtee 1927
Warbler (no additional description)	Allen 1920; Forbush 1896b
Warbler, black and white <u>Mniotilta varia</u> (Linnaeus)	Britton 1935; Forbush 1896b,1908,1929; Liu 1926, Ramse 1972
Warbler, chestnut-sided <u>Dendroica pensylvanica</u> (Linnaeus)	Fashingbauer 1951,1957a; Forbush 1929, 1939
Warbler, golden-winged <u>Vermivora chrysoptera</u> (Linnaeus)	Britton 1935; Forbush 1896b,1908; Liu 1926
Warbler, myrtle <u>Dendroica coronata</u> (Linnaeus)	Fashingbauer 1951,1957a
Warbler, Nashville <u>Vermivora ruficapilla</u> (Wilson)	Forbush 1896b,1908,1929; Liu 1926
Warbler, parula <u>Parula americana</u> (Linnaeus)	Forbush 1908,1929,1939; Liu 1926; Saunders 1920
Warbler, yellow <u>Dendroica petichia</u> (Linnaeus)	Britton 1902,1913,1935; Fashingbauer 1951,1957a; Felt 1898b; Forbush 1896a, 1908,1939; Liu 1926; Lowe 1898; McAtee 1922; Quaintance 1908,1915; Weed 1896
Waxwing, cedar <u>Bombycilla cedrorum</u> Vieillot	Britton 1935; Felt 1898a; Forbush 1908; Liu 1926; Lowe 1899; McAtee 1922,1927; Perkins 1900; Swaine 1918; Weed 1899,1900a
Wren (no additional description)	Allen 1920; Liu 1926; Lowe 1898
Wren, house <u>Troglodytes aedon</u> Vieillot	Britton 1935
Yellow bird (no additional description)	Felt 1898a; Lowe 1899; McAtee 1927; Weed 1899
MAMMAL PREDATORS	
Mice, deer <u>Peromyscus</u> sp.	Marsh 1970
Skunk (no additional description)	Lugger 1898
AMPHIBIAN PREDATORS	
Frog, wood <u>Rana sylvatica</u> LeConte	Fashingbauer 1951,1957b
Frog (no additional description)	Davis 1903
Toad, american <u>Rufo americanus</u> Holbrook	Kirkland 1897b; Lowe 1899; Schaffner 1936; Felt 1898b,c
Toad (no additional description)	Davis 1903; Porter 1958; Quaintance 1908, 1915; Schaffner 1936; Slingerland 1899; Weed 1899

TABLE 3. HYPERPARASITES OF TENT CATERPILLAR PARASITES AND PARASITES OF ASSOCIATED INSECTS

<u>Aphaereta pallipes</u> (Say)	<u>Sarcophaga aldrichi</u> Parker	White (letter 1970); Witter 1973
<u>Aphaereta pallipes</u> (Say)	<u>Sarcophaga houghi</u> Aldrich	Kulman 1965; Morris (letter 1970)
<u>Aphidius pterocommae</u> Ashmead	<u>Rogas</u> sp.	Stelzer 1968
<u>Atractodes</u> sp.	<u>Sarcophaga aldrichi</u> Parker	McLeod 1956
<u>Atractodes</u> sp.	<u>S. houghi</u> Aldrich	McLeod 1956
<u>Brachymeria compsilurae</u> (Crawford)	<u>S. houghi</u> Aldrich	Morris (letter 1970)
<u>Brachymeria ovata ovata</u> (Say)	<u>Archytas lateralis</u> (Macquart)	Stelzer 1967, 1968
<u>Catolaccus aeneoviridis</u> (Girault)	<u>Rogas</u> sp.	Stehr 1968
<u>Catolaccus victoria</u> Burks	--	Stelzer 1968
<u>CeratOMICRA paya</u> Burks	<u>Rogas</u> sp.	Stehr 1968
<u>Coelopisthia suborbicularis</u> (Provancher)	<u>Itoplectis conquisitor</u> (Say)	Fiske 1903
<u>Dibrachys cavus</u> (Walker)	<u>Rogas</u> sp.	Sippell 1957, Stehr 1968, Witter 1973
<u>Dibrachys cavus</u> (Walker)	<u>Apantles clisiocampe</u> Ashmead	Liu 1926
<u>Dibrachys cavus</u> (Walker)	<u>Euphorocera tachinomoides</u> Townsend	Stelzer 1967, 1968
<u>Dibrachys cavus</u> (Walker)	<u>Phobocampe clisiocampe</u> (Weed)	Kulman 1965
<u>Dibrachys cavus</u> (Walker)	--	Lowe 1898
<u>Dimmockia incongrua</u> (Ashmead)	<u>Phobocampe clisiocampe</u> (Weed)	Kulman 1965
<u>Dimmockia incongrua</u> (Ashmead)	<u>Apantles clisiocampae</u> Ashmead	Liu 1926
<u>Elasmus varius</u> Howard	<u>Rogas</u> sp., <u>Phobocampe</u> sp.	Fiske 1903
<u>Eupelmus cyaniiceps</u> Ashmead	<u>Hyposoter fugitivus fugitivus</u> (Say)	Kulman 1965
<u>Eupelmus</u> sp.	<u>Rogas</u> sp.	Fiske 1903
<u>Gelis tenellus</u> (Say)	<u>Apantles clisiocampae</u> (Weed)	Liu 1926
<u>Gelis tenellus</u> (Say)	<u>Casinarina limenitidis</u> (Howard)	Felt 1918
<u>Gelis tenellus</u> (Say)	<u>Hyposoter fugitivus fugitivus</u> (Say)	Kulman 1965, Ramse 1972
<u>Gelis tenellus</u> (Say)	<u>Hyposoter fugitivus pacificus</u> Cushman	Langston 1957
<u>Gelis tenellus</u> (Say)	<u>Phobocampe clisiocampe</u> (Weed)	Kulman 1965
<u>Gelis tenellus</u> (Say)	<u>Rogas</u> sp.	Sippell 1957, Witter 1973
<u>Gelis</u> sp.	<u>Hyposoter</u> sp., <u>Phobocampe</u> sp.	Fiske 1903
<u>Gelis</u> sp.	<u>Rogas</u> sp.	Fiske 1903
<u>Habrocytus phycidis</u> Ashmead	<u>Hyposoter fugitivus fugitivus</u> (Say)	Liu 1926
<u>Habrocytus thyridopterigis</u> Howard	<u>Hyposoter fugitivus fugitivus</u> (Say)	Kulman 1965
<u>Habrocytus thyridopterigis</u> Howard	<u>Phobocampe clisiocampe</u> (Weed)	Kulman 1965
<u>Habrocytus thyridopterigis</u> Howard	<u>Rogas</u> sp.	Sippell 1957
<u>Habrocytus</u> sp.	<u>Hyposoter fugitivus pacificus</u> Cushman	Langston 1957, Stehr 1968
<u>Habrocytus</u> sp.	<u>Rogas</u> sp.	Stehr 1968, Witter 1973
<u>Hypopteromalus inimicus</u> Muesebeck	<u>Rogas</u> sp.	Witter 1973
<u>Hypopteromalus percussor</u> Girault	--	Stelzer 1968
<u>Iseropus coelebs</u> (Walsh)	<u>Hyposoter fugitivus fugitivus</u> (Say)	Fiske 1903
<u>Itoplectis conquisitor</u> (Say)	<u>Hyposoter fugitivus fugitivus</u> (Say)	Fiske 1903, Kulman 1965
<u>Itoplectis conquisitor</u> (Say)	<u>Phobocampe</u> sp.	Fiske 1903
<u>Itoplectis conquisitor</u> (Say)	<u>Rogas</u> sp.	Fiske 1903
<u>Mastrus</u> sp.	<u>Rogas</u> sp.	Sippell 1957
<u>Melittobia</u> sp.	<u>Hyposoter fugitivus pacificus</u> Cushman	Stehr 1968
<u>Mesochorus</u> sp.	--	Witter 1973
<u>Microdontomerus fumipennis</u> Crawford	<u>Archytas lateralis</u> (Macquart)	Stelzer 1967, 1968
<u>Neralsia</u> sp.	<u>Sarcophaga houghi</u> Aldrich (?)	Morris (letter 1970)
<u>Pediobius tarsalis</u> (Ashmead)	<u>Dibrachys cavus</u> (Walker)	Fiske 1903
<u>Perilampus hyalinus</u> Say	<u>Sarcophaga houghi</u> Aldrich	Morris (letter 1970)
<u>Pteromalus puparum</u> (Linnaeus)	<u>Rogas</u> sp., <u>Phobocampe</u> sp., <u>Hyposoter</u> sp.	Fiske 1903
<u>Pteromalus</u> sp.	<u>Rogas</u> sp. and/or <u>Phobocampe</u> sp.	Fiske 1903
<u>Spalangia drosophilae</u> Ashmead	<u>Pseudogaurax anchora</u> (Loew) ¹	Kulman 1965
<u>Spalangia drosophilae</u> Ashmead	<u>Anthomyia</u> sp. ¹	Kulman 1965
<u>Spilochalcis albifrons</u> (Walsh)	<u>Hyposoter fugitivus pacificus</u> Cushman	Stehr 1968
<u>Spilochalcis leptis</u> Burks	<u>Hyposoter fugitivus pacificus</u> Cushman	Stehr 1968
<u>Spilochalcis side</u> (Walker)	<u>Rogas</u> sp.	Sippell 1957
<u>Syrphoctonus flavolineatus</u> (Gravenhorst)	<u>Sarcophaga aldrichi</u> Parker	White (letter 1970)
<u>Tetrastichus coerulescens</u> Ashmead	<u>Rogas</u> sp., <u>Hyposoter fugitivus pacificus</u> Cushman	Stehr 1968
<u>Tetrastichus</u> sp.	<u>Rogas</u> sp.	Swain 1939
<u>Theronia atalantae fulvescens</u> (Cresson)	<u>Itoplectis conquisitor</u> (Say)	Weed 1900b, Fiske 1903, Townes 1940, Kulman 1965
<u>Tritneptis scutellata</u> (Muesebeck)	<u>Rogas</u> sp.	Stelzer 1968
<u>Tritneptis</u> sp.	Dipterous larvae	McLeod 1956
<u>Trybliographa</u> sp.	<u>Anthomyia</u> sp. ¹	Kulman 1965

¹ See table 2 for biological status.

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<i>anale</i> Say, <i>Anomalon</i>	36	<i>Calasoma</i>	17, 18	<i>compsilurae</i> (Crawford), <i>Brachymeria</i>	39, 45
<i>analis</i> Fabricius, <i>Archytas</i>	22	<i>Campoletis</i>	34	<i>concinata</i> (Meigen), <i>Compsilura</i>	22
<i>analis</i> (Say), <i>Labrorychus</i>	36	<i>Camponotus</i>	39	<i>congregatus</i> var. <i>rufocoxalis</i> Riley, <i>Apanteles</i>	28
<i>analis</i> (Say), <i>Trichonotus</i>	36	<i>Campoplegidea</i>	34	<i>Conioscinella</i>	20
<i>Anastatus</i>	15	<i>Campoplex</i>	34, 35	<i>conquisitor</i> (Say), <i>Ephialtes</i>	32
<i>Anatis</i>	18	<i>canadensis</i> Provancher, <i>Clistopyga</i>	30	<i>conquisitor</i> (Say), <i>Itopectis</i>	31, 37, 45
<i>anchora</i> (Loew), <i>Pseudogaurax</i>	20, 45	<i>canadensis</i> (Provancher), <i>Gambrus</i>	34	<i>conquisitor</i> Say, <i>Pimpla</i>	32
<i>Ancistrocerus</i>	40	<i>canadensis burkei</i> (Viereck), <i>Gambrus</i>	34	<i>conquisitor</i> (Say), <i>Scambus</i>	32
<i>Anomalon</i>	36	<i>canadensis canadensis</i> (Provancher), <i>Gambrus</i>	34	<i>convergens</i> Guier, <i>Hippodamia</i>	18
<i>annulipes</i> Brulle, <i>Pimpla</i>	30	<i>canadensis exareolatus</i> (Viereck), <i>Gambrus</i>	34	<i>cornutus</i> Gravenhorst, <i>Belonuchus</i>	18
<i>annulipes</i> (Cresson), <i>Agathis</i>	27	<i>canicularis</i> (Linnaeus), <i>Fannia</i>	20	<i>cornutus</i> McCook, <i>Araneus</i>	40
<i>annulipes</i> (Cresson), <i>Hyposoter</i>	35	CANTHARIDAE	18	<i>crocatus</i> (Uhler), <i>Apateticus</i>	19
<i>Anthomyia</i>	20, 45	<i>Cantharis</i>	18	<i>cruiatus</i> (Say), <i>Elasmostethus</i>	19
ANTHOMYIIDAE	20	CARABIDAE	17	<i>Cryptus</i>	33
ANYPHAENIDAE	40	<i>Carcelia</i>	24, 25	<i>Ctenicera</i>	18
<i>Apanteles</i>	27-28, 45	<i>Cartocometes</i>	24	CURCULIONIDAE	18
<i>Apateticus</i>	19	<i>Casiniaria</i>	20	<i>curvipes</i> (Stein), <i>Phaonia</i>	20
<i>Aphaereta</i>	28, 45	<i>Catagoniopsis</i>	25	<i>cyaniceps</i> Ashmead, <i>Eupelmus</i>	37, 45
<i>Aphelininae</i>	13	<i>Catolaccus</i>	38, 45	<i>cyaniceps cyaniceps</i> Ashmead, <i>Eupelmus</i> <i>cynicus</i> (Say), <i>Apateticus</i>	37, 19
<i>Aphidius</i>	27, 45	<i>catskill albophaleratus</i> (Saussure), <i>Ancistrocerus</i>	40	CYNIPIIDAE	39
<i>Aphycoideus</i>	40	<i>cavus</i> (Walker), <i>Dibrachys</i>	38, 45	<i>Cysia</i>	40
<i>Apiomerus</i>	20	<i>Centrodora</i>	13	<i>dalmani</i> Ratzeburg, <i>Telenomus</i>	16
ARACHNIDA	40	CERAPHRONIDAE	14	<i>Dalopius</i>	18
<i>Araneus</i>	40	<i>Ceratostomicia</i>	39, 45	<i>datanae</i> Muesebeck, <i>Meteorus</i>	27
<i>arator</i> Aldrich, <i>Masicera</i>	27	<i>Chaetogaedia</i>	24	<i>datanae</i> Townsend, <i>Winthemia</i>	24
<i>arator</i> (Aldrich), <i>Pilatea</i>	27	CHALCIDIDAE	39	<i>decoratus</i> Kaston, <i>Sergiolus</i>	40
<i>archippivora</i> (Riley), <i>Achaetoneura</i>	25	<i>Charops</i>	34	<i>Dendrocoris</i>	19
<i>archippivora</i> (Riley), <i>Lespesia</i>	25	<i>cheloniae</i> (Rondani), <i>Carcelia</i>	25	DERMAPTERA	17
<i>archippivora</i> (Williston), <i>Achaetoneura</i>	25	<i>cheloniae</i> Rondani, <i>Zenillia</i>	25	<i>diadema</i> Fabricius, <i>Podabrus</i>	18
<i>archippivora</i> (Williston), <i>Frontina</i>	25	<i>Chilocorus</i>	18	<i>Dibrachys</i>	38, 45
<i>archippivora</i> (Williston), <i>Lespesia</i>	25	<i>Chionodes</i>	18	<i>Diglochis</i>	38
<i>Archytas</i>	22, 45	CHLOROPIDAE	17	<i>dimidiata</i> (Say), <i>Banasa</i>	19
		<i>ciliata</i> (Macquart), <i>Lespesia</i>	20	<i>Dimmockia</i>	36, 45
		<i>claripennis</i> (Macquart), <i>Euphorocera</i>	22	<i>Diplodus</i>	20
				<i>Diplostichus</i>	22

DIPTERA	20	<i>fusca subsericea</i> Say, <i>Formica</i>	39	<i>lateralis</i> (Macquart), <i>Archytas</i>	22
<i>distinguenda</i> (Compolli),		<i>fuscipes</i> Meigen, <i>Scatopse</i>	20	<i>lateralis</i> (Macquart), <i>Nemochaeta</i>	22
<i>Melanophthalma</i>	18	<i>fuscitarsus</i> (Viereck), <i>Hyposoter</i>	36	<i>lateralis</i> (Say), <i>Elasmucha</i>	19
<i>domestica</i> Linnaeus, <i>Musca</i>	20	<i>futilis</i> (Osten Sacken), <i>Euexorista</i>	25	LATHRIDIIDAE	18
<i>drosophilae</i> Ashmead, <i>Spalangia</i>	38, 45	<i>futilis</i> (Osten Sacken), <i>Exorista</i>	25	<i>laxifrons</i> Villeneuve, <i>Carcelia</i>	24
<i>Dusona</i>	34	<i>futilis</i> (Osten Sacken), <i>Zenilla</i>	25	LEPIDOPTERA	17
<i>dux</i> Girault, <i>Habrocytus</i>	39	<i>Gambrus</i>	34	<i>leptis</i> Burks, <i>Spilochalcis</i>	39, 45
<i>edwardsii</i> (Williston), <i>Euphorocera</i>	22	GAMASIDAE	16	<i>Leschenaultia</i>	24
<i>edwardsii</i> (Williston), <i>Neophorocera</i>	22	<i>gelechiae</i> Ashmead, <i>Bracon</i>	28	<i>Lespesia</i>	25, 26
<i>edwardsii</i> Williston, <i>Phorocera</i>	22	GELECHIIDAE	17	<i>leucaniae</i> (Coquillett), <i>Patelloa</i>	27
ELASMIIDAE	37	<i>Gelis</i>	33, 45	<i>Liobunum</i>	40
<i>Elasmostethus</i>	19	<i>genatus</i> (Pratt), <i>Cryptus</i>	33	<i>limenitidis</i> (Howard), <i>Casitaria</i>	34
<i>Elasmucha</i>	19	<i>genatus</i> (Pratt), <i>Trachysphyrus</i>	33	<i>limenitidis</i> (Howard), <i>Charops</i>	34
<i>Elasmus</i>	37, 45	<i>glaber</i> Le Conte, <i>Orthoperus</i>	18	<i>Limneria</i>	35
ELATERIDAE	18	<i>Glugea</i>	7	<i>Limnerium</i>	34
ENCYRTIDAE	14	<i>Glypta</i>	34	<i>longicornis</i> (Provancher), <i>Apanteles</i>	28
<i>Encyrtus</i>	15	GNAPHOSIDAE	40	<i>lophyri</i> (Townsend), <i>Diplostichus</i>	22
<i>Encospilus</i>	36	<i>gracilis</i> (Hentz), <i>Aysha</i>	40	<i>luridus</i> Stal, <i>Dipodius</i>	20
<i>Entomophthora</i>	7	<i>gracilis</i> (Hentz), <i>Cysha</i>	40	<i>Lygocerus</i>	15
<i>Entomophthora</i> (<i>Empusa</i>)	7	<i>Habrobracon</i>	28	<i>Macrocentrus</i>	27
<i>Epeira</i>	40	<i>Habrocytus</i>	38, 39, 45	<i>maculiventris</i> (Say), <i>Podisus</i>	19
<i>Eremotylus</i>	36	<i>halisidotaе</i> Aldrich & Webber,		<i>Madremyia</i>	27
<i>Ernestia</i>	22	<i>Phorocera</i>	27	<i>malacosomae</i> Girault, <i>Tetrastichus</i>	13
<i>erythrocephala</i> Meigen, <i>Calliphora</i>	21	<i>hamata</i> (Aldrich & Webber),		<i>malacosomae</i> Sellers, <i>Carcelia</i>	24
<i>euchaetiae</i> (Sellers), <i>Hyphantrophaga</i>	25	<i>Neophorocera</i>	22	<i>malacosomae</i> (Townsend), <i>Ypophaeomyia</i>	25
<i>Euclytia</i>	22	<i>hawleyi</i> Knight, <i>Paracalocoris</i>	20	MAMMAL PREDATORS	6, 7, 16
<i>Euexorista</i>	25	<i>heiroglyphicus</i> Say, <i>Ctenicera</i>	18	<i>marginatus</i> Walck, <i>Paraphidippus</i>	40
EULOPHIDAE	13	<i>Helicobia</i>	21	<i>Masicera</i>	27
EUPELMIDAE	15	HEMIPTERA	18	<i>Mastrus</i>	33, 45
<i>Eupelmus</i>	15, 37, 45	<i>Hemiteles</i>	13, 33	<i>maurus</i> Cresson, <i>Coccygomimus</i>	30
<i>Ephialtes</i>	30-32, 34	<i>Heramermis</i>	7	<i>maura</i> Cresson, <i>Pimpla</i>	30
<i>esurus</i> (Riley), <i>Syntomosphyrum</i>	37	<i>herculeanus ligniperdus</i> (Latreille),		<i>mediofuscella</i> (Clemens), <i>Chionodes</i>	17
<i>Eulimneria</i>	34	<i>Camponotus</i>	39	<i>Megaselia</i>	20
EULOPHIDAE	36	<i>herculeanus ligniperdus</i> var. <i>noveboracensis</i> (Fitch) <i>Camponotus</i>	39	<i>melalophae</i> Allen, <i>Achaetoneura</i>	26
<i>Euphorocera</i>	22, 45	<i>Hexameris</i>	40	<i>melalophae</i> (Allen), <i>Lespesia</i>	26
<i>Euschistus</i>	19	<i>hilaris</i> (Say), <i>Theronia</i>	33	<i>melanocephala</i> (Brulle), <i>Theronia</i>	33
<i>euschistoides</i> (Vollenhoven),		<i>hinkleyi</i> (Malloch), <i>Conioscinella</i>	20	<i>Melanophthalma</i>	18
<i>Euschistus</i>	19	<i>Hippodamia</i>	18	<i>melanoscelus</i> (Ratzeburg), <i>Apanteles</i>	28
<i>Eusisyropha</i>	25	<i>hirticauda</i> (Provancher), <i>Scambus</i>	29	<i>Melanotus</i>	18
<i>evanescens</i> Westwood, <i>Trichogramma</i>	13	<i>hispaе</i> (Harris), <i>Scambus</i>	29	<i>Melittobia</i>	36, 45
<i>excepta</i> L. Koch, <i>Clubiona</i>	40	<i>hopkinsi</i> Viereck, <i>Habrobracon</i>	28	<i>mella</i> (Walker), <i>Exorista</i>	23
<i>exile</i> Provancher, <i>Anomalon</i>	36	<i>houghi</i> Aldrich, <i>Sarcophaga</i>	22, 45	<i>mella</i> Walker, <i>Tachina</i>	23
<i>exile</i> Provancher, <i>Paranomalon</i>	36	<i>housei</i> Shewell, <i>Agria</i>	21	<i>Mencles</i>	19
<i>exilis</i> Provancher (sic), <i>Labrorychus</i>	36	<i>humeralis</i> (Uhler), <i>Dendrocoris</i>	19	<i>Mercia</i>	22
<i>Exochus</i>	34	<i>hyalinus</i> Say, <i>Perilampus</i>	37, 45	<i>Mermis</i>	41
<i>Exorista</i>	23, 25	HYMENOPTERA	20	ERMITHIDAE	7, 40
<i>exsanguis</i> (Stal), <i>Zelus</i>	20	<i>hyphantriae</i> Riley, <i>Meteorus</i>	27	<i>Mesochorus</i>	36, 45
<i>extrematis</i> (Cresson), <i>Gambrus</i>	34	<i>hyphantriae</i> (Townsend),	27	<i>Mesostenus</i>	34
<i>extrematis</i> (Cresson), <i>Spilocryptus</i>	34	<i>Hyphantrophaga</i>	25	<i>meteori</i> Howard, <i>Bathythrix</i>	33
<i>exul</i> Townsend, <i>Blepharipeza</i>	24	<i>Hyphantrophaga</i>	25	<i>Meteorus</i>	27
<i>exul</i> (Townsend), <i>Leschenaultia</i>	24	<i>Hypoptermalus</i>	39, 45	<i>micans</i> (Macquart), <i>Morellia</i>	20
<i>Fannia</i>	20	<i>Hyposoter</i>	35, 36, 45	<i>microamphidis</i> Steiner, <i>Hexameris</i>	7, 40
FIGITIDAE	39	<i>Hypoteromalus</i> (sic)	39	<i>Microdontomerus</i>	15, 37, 45
<i>fissilis</i> Uhler, <i>Euschistus</i>	19	<i>Ichneumon</i>	34	<i>minor</i> (Ratzeburg), <i>Monodontomerus</i>	37
<i>flava</i> (Townsend), <i>Euclytia</i>	22	ICHNEUMONIDAE	13, 29	<i>minutum</i> Riley, <i>Trichogramma</i>	13
<i>flavolineatus</i> (Gravenhorst),		<i>ictericus</i> (Linnaeus), <i>Euschistus</i>	45	<i>Miotropis</i>	36
<i>Syrphoctonus</i>	34, 45	<i>incongrue</i> (Ashmead), <i>Dimmockia</i>	36	MIRIDAE	20
<i>fondosus</i> Walck, <i>Araneus</i>	40	<i>inimicus</i> Muesebeck, <i>Hypoptermalus</i>	39	<i>mitratus atrocaxalis</i> Cresson, <i>Exochus</i>	34
<i>forcipata</i> Walley, <i>Casitaria</i>	34	<i>inquisitoriella</i> (Dalla Torre), <i>Iseropus</i>	30	<i>modestus</i> (Dallas), <i>Podisus</i>	19
<i>Forficula</i>	17	<i>inquisitorius</i> (Dalla Torre) (sic),		<i>moesta</i> Banks, <i>Clubiona</i>	40
FORFICULIDAE	17	<i>Scambus</i>	30	<i>Monodontomerus</i>	37, 38
<i>Formica</i>	39, 40	<i>inquistor</i> (Say), <i>Pimpla</i>	30	<i>monticola</i> (Bigot), <i>Chaetogaedia</i>	24
FORMICIDAE	39	<i>insertus</i> (Say), <i>Mencles</i>	19	<i>Morellia</i>	20
<i>fraternus</i> Le Conte, <i>Chilocorus</i>	18	<i>intermedius</i> Cresson, <i>Aleoides</i>	28	<i>multiformis</i> Emerton, <i>Phidippus</i>	40
<i>frenchii</i> (Williston), <i>Achaetoneura</i>	26	<i>intermedius</i> Cresson, <i>Rhogas</i>	28	<i>Musca</i>	20
<i>frenchii</i> Williston, <i>Frontina</i>	26	<i>io</i> Aldrich, <i>Cartocometes</i>	24	MUSCIDAE	20
<i>frenchii</i> (Williston), <i>Lespesia</i>	26	<i>io</i> Williams, <i>Aphycoideus</i>	14	<i>Muscina</i>	20
<i>frigidum</i> Kirby, <i>Calosoma</i>	17	<i>Isaria</i>	7	<i>Myrmica</i>	39
<i>Frontina</i>	25, 26	<i>Iseropus</i>	29, 30	<i>nearcticus</i> Emery, <i>Camponotus</i>	39
<i>fucosus</i> (Le Conte), <i>Agriotes</i>	18	<i>Itoplectis</i>	31, 32, 37	NEMATODES	7, 40
<i>fugitivus</i> Say, <i>Campoplex</i>	35	<i>labis</i> (Coquillett), <i>Xanthophyto</i>	31, 32, 37	<i>Nemochaeta</i>	22
<i>fugitivus</i> (Say), <i>Hyposoter</i>	35	<i>laborator altonii</i> Dalla Torre,		<i>Neophorocera</i>	22, 23
<i>fugitivus</i> Say, <i>Limneria</i>	35	<i>Cryptus</i>	33	<i>Neralstia</i>	39, 45
<i>fugitivus fugitivus</i> (Say), <i>Hyposoter</i>	35, 45	<i>Labrorychus</i>	36	<i>nigrifrons</i> (Viereck), <i>Scambus</i>	29
<i>fugitivus pacificus</i> Cushman,		<i>lachni</i> Ashmead, <i>Aphidius</i>	27	<i>nigricans</i> Webber, <i>Tachinomyia</i>	23
<i>Hyposoter</i>	35, 45	<i>laetus</i> Brulle, <i>Amblyteles</i>	34	<i>noveboracensis</i> (Fitch), <i>Camponotus</i>	39
<i>fulvipes</i> (Cresson), <i>Theronia</i>	33	<i>laetus</i> Brulle, <i>Ichneumon</i>	34	<i>obscuripes</i> Forel, <i>Formica</i>	40
<i>fulvipes</i> (Bigot), <i>Leschenaultia</i>	24	<i>larvarum</i> (Linnaeus), <i>Exorista</i>	23	<i>obscuripes obscuripes</i> Forel, <i>Formica</i>	40
<i>fumipennis</i> Crawford,		LAGRIIDAE	18	<i>occidentalis</i> Murry, <i>Podalonia</i>	40
<i>Microdontomerus</i>	15, 37, 45	<i>lasioides</i> Emery, <i>Formica</i>	39	<i>ocellata mali</i> (Say), <i>Anatis</i>	18
<i>fusca</i> Linnaeus, <i>Formica</i>	39			<i>Odynerus</i>	40

<i>omnivorus</i> (Walker), <i>Diglochis</i>	38	PTEROMALIDAE	15, 38	<i>strix</i> Hentz, <i>Epeira</i>	40
<i>omnivorus</i> (Walker), <i>Psychophagus</i>	38	<i>Pteromalus</i>	15, 36, 38, 45	<i>Sturmia</i>	24
<i>Ooencyrtus</i>	14	<i>pumila</i> (Le Conte), <i>Melanophthalma</i>	18	<i>subbooleius</i> Gahan, <i>Monodontomerus</i>	38
<i>Ophion</i>	36	<i>punctatus</i> Spinola, <i>Paratenetus</i>	18	<i>suborbicularis</i> (Provancher),	
<i>orgyiae</i> Howard, <i>Amorphota</i>	34	<i>puparum</i> (Linnaeus) (sic),		<i>Coelopisthia</i>	38, 45
ORTHOPERIDAE	18	<i>Pteromalus</i>	38, 45	<i>suborbicularis</i> (Provancher),	
<i>Orthoperus</i>	18	<i>quadrilingulatus</i> (Provancher),		<i>Coelopisthus</i>	38
<i>Otiacustes</i>	33	<i>Itoplectis</i>	32	<i>suborbicularis</i> Provancher, <i>Semiotellus</i>	38
OTTIDAE	20	<i>quadripustulata</i> (Fabricius), <i>Brochymena</i>	19	<i>sycophanta</i> Linnaeus, <i>Calosoma</i>	24
<i>ovata</i> (Say), <i>Brachymeria</i>	39	<i>quindecimpunctata</i> Say, <i>Anatis</i>	18	<i>Sympiesis</i>	39
<i>ovata ovata</i> (Say), <i>Brachymeria</i>	39, 45	<i>rapax</i> (Walker), <i>Helicobia</i>	21	<i>Syntomosphyrum</i>	36, 37
<i>ovatus</i> Linnaeus, <i>Brachyrhinus</i>	18	<i>rapax</i> Walker, <i>Sarcophaga</i>	21	<i>Syrphoctonus</i>	34, 45
<i>pachygyga</i> Aldrich & Webber, <i>Patelloa</i>	27	<i>reduvii</i> (Howard), <i>Anastatus</i>	15	<i>tabacum</i> (Fitch) (sic), <i>Hypopteromalus</i>	39
<i>pachygyga</i> Aldrich & Webber, <i>Phorocera</i>	27	REDUVIIDAE	20	<i>Tachina</i>	23
<i>pallenus</i> Hentz, <i>Clubiona</i>	40	<i>Rhegmoclema</i>	20	TACHINIDAE	22
<i>pallipes</i> (Say), <i>Aphaereta</i>	28, 45	<i>Rhogas</i>	28	<i>tachinomoides</i> Townsend, <i>Euphorocera</i>	23
<i>panaeticus</i> (Walker), <i>Tachinomyia</i>	23	<i>Rileymyia</i>	24	<i>tachinomoides</i> (Townsend), <i>Phorocera</i>	23
<i>Panzeria</i>	22	<i>robusta</i> Townsend, <i>Tachina</i>	23	<i>Tachinomyia</i>	23
<i>Paracalocoris</i>	20	<i>Rogas</i>	28, 29, 45	<i>Tapinoma</i>	39
<i>Paraphidippus</i>	40	<i>rufipes</i> (Meigen), <i>Megaselia</i>	20	<i>tarsalis</i> (Ashmead), <i>Pediobius</i>	36, 45
<i>Paranomalon</i>	36	<i>rufocoxalis</i> Riley, <i>Apanteles</i>	38	<i>tarsalis</i> (Ashmead), <i>Pleurotropis</i>	36
<i>Paratenetus</i>	18	<i>ruskini</i> (Girault), <i>Amblymerus</i>	29	<i>tecumseh</i> Viereck, <i>Scambus</i>	29
<i>Patelloa</i>	27	<i>sabuleti</i> americana Weber, <i>Myrmica</i>	39	<i>Telenomus</i>	15
<i>paya</i> Burks, <i>Ceratostigma</i>	39, 45	SALTICIDAE	40	TENEBRIONIDAE	18
<i>paysalli</i> Ashmead, <i>Anastatus</i>	15	<i>samiae</i> (Webber), <i>Achaetoneura</i>	26	<i>tenellus</i> (Say), <i>Gelis</i>	33, 45
<i>pedalis</i> (Cresson), <i>Coccygomimus</i>	31	<i>sanguinipes</i> (Cresson), <i>Coccygomimus</i>	31	<i>tenellus</i> Say, <i>Hemiteles</i>	33
<i>pedalis</i> (Cresson), <i>Ephialtes</i>	31	<i>sanguinipes</i> (Cresson), <i>Ephialtes</i>	31	<i>Tetrastichus</i>	13, 37, 45
<i>pedalis</i> Cresson, <i>Pimpla</i>	30, 31	<i>sanguinipes</i> Cresson, <i>Pimpla</i>	31	<i>Therion</i>	36
<i>pedalis</i> (Cresson), <i>Scambus</i>	31	<i>sanguinipes erythropus</i> (Viereck),		<i>Therionia</i>	32, 45
<i>pedalis</i> Germar, <i>Ampedus</i>	18	<i>Coccygomimus</i>	31	<i>thyridopterigis</i> Howard, <i>Habrocytus</i>	39, 45
<i>Pediobius</i>	36, 45	<i>sanguinipes erythropus</i> Viereck, <i>Pimpla</i>	31	<i>thyridopteryx</i> (Riley), <i>Phobetis</i>	33
PENTATOMIDAE	18	<i>sanguinipes sanguinipes</i> Cresson, <i>Pimpla</i>	31	<i>titiryi</i> Packard, <i>Ophion</i>	36
<i>percussor</i> Girault (sic),		<i>Sarcophaga</i>	21, 45	TORYMIDAE	15, 37
<i>Hypopteromalus</i>	39, 45	SARCOPHAGIDAE	21	<i>Trachysphyrus</i>	33
<i>percussor</i> Girault, <i>Hypoteromalus</i>	39	<i>sarracenioides</i> Aldrich, <i>Sarcophaga</i>	22	<i>transversoguttata</i> Faldeman, <i>Coccinella</i>	18
PERILAMPEIDAE	37	<i>saundersii</i> (Williston), <i>Madremyia</i>	27	<i>Trichaporus</i>	37
<i>Perilampus</i>	37, 45	<i>Scambus</i>	29, 30, 31, 32	<i>Trichogramma</i>	13
<i>perillii</i> Ashmead, <i>Otiacustes</i>	33	<i>Scatopse</i>	20	TRICHOGRAMMATIDAE	13
<i>Perillus</i>	19	SCATOPSIDAE	20	<i>Trichonotus</i>	36
<i>Phaenicia</i>	21	<i>scrutator</i> Fabricius, <i>Calosoma</i>	17	<i>trisetata</i> Brooks, <i>Rileymyia</i>	24
PHALANGIIDAE	40	<i>scutellata</i> Desvoidy, <i>Sturmia</i>	24	<i>tristigmus</i> (Say), <i>Euschistus</i>	19
<i>Phaonia</i>	20	<i>scutellata</i> (Muesebeck), <i>Trineptis</i>	38, 45	<i>Trineptis</i>	38, 45
<i>Phidippus</i>	30	<i>scutellata</i> (Robineau-Desvoidy),		TROMBIDIIDAE	16
<i>Phobetis</i>	40	<i>Blepharipa</i>	24	<i>Trombidium</i>	16
<i>Phobocampe</i>	35, 45	<i>scutellata</i> (Robineau-Desvoidy), <i>Strumia</i>	24	<i>truncoleola</i> inteara Nylander, <i>Formica</i>	40
<i>Phorocera</i>	23	SCELIONIDAE	15	<i>Trybliographa</i>	39, 45
PHORIDAE	20	<i>Seioptera</i>	20	<i>ultimus</i> (Cresson), <i>Gambrus</i>	34
<i>Phorocera</i>	22, 26, 27	<i>Semiotellus</i>	38	<i>validus</i> (Cresson), <i>Campoplex</i>	34
<i>phycidis</i> Ashmead, <i>Habrocytus</i>	38, 45	<i>Sergiolus</i>	40	<i>valida</i> Cresson, <i>Eulimneria</i>	34
<i>Phytodectus</i>	33	<i>sericata</i> (Meigan), <i>Phaenicia</i>	21	<i>validus</i> Cresson, <i>Limnerium</i>	34
<i>Phytodictus</i>	33	<i>serixventris</i> Uhler, <i>Podisus</i>	19	<i>varius</i> Howard, <i>Elasmus</i>	37, 45
<i>Phytodictus</i>	33	<i>Serratia</i>	7	<i>verditer</i> (Norton), <i>Amblymerus</i>	38
<i>Pilatea</i>	27	<i>sessile</i> (Say), <i>Tapinoma</i>	39	VESPIDAE	40
<i>Pimpla</i>	30, 31, 32	<i>side</i> (Walker), <i>Spilochalcis</i>	39, 45	<i>Vespula</i>	40
<i>placidus</i> Uhler, <i>Podisus</i>	19, 40	<i>sylvaticus</i> Gahan, <i>Tetrastichus</i>	14	<i>vibrans</i> (Linnaeus), <i>Seioptera</i>	20
<i>Platygaster</i>	16	<i>similis</i> (Williston), <i>Tachinomyia</i>	23	<i>vicina</i> Robineau-Desvoidy, <i>Calliphora</i>	21
PLATYGASTERIDAE	16	<i>simplicipes</i> Cresson, <i>Glypta</i>	34	<i>victoria</i> Burks, <i>Catolaccus</i>	38, 45
<i>Pleurotropis</i>	36	<i>Spalangia</i>	38, 45	<i>viduata</i> (Gravenhorst), <i>Itoplectis</i>	32
<i>Podabrus</i>	18	<i>specularis</i> (Aldrich & Webber),		<i>vittatum</i> (Say), <i>Leiobunum</i>	40
<i>Podalonia</i>	40	<i>Catagoniopsis</i>	25	<i>vittatum dorsatum</i> (Say), <i>Liobunum</i>	40
<i>Podisus</i>	19, 20, 40	SPHECIDAE	40	<i>vitticollis</i> Norton, <i>Campoplegidea</i>	34
<i>politus</i> Uhler, <i>Euschistus</i>	19	<i>Spilochalcis</i>	39, 40	<i>vitticollis vitticollis</i> (Norton), <i>Dusona</i>	34
<i>promiscua</i> (Townsend), <i>Phorocera</i>	26	<i>Spilocryptus</i>	34	<i>wilcoxi</i> Le Conte, <i>Calosoma</i>	17
<i>protuberans</i> (Aldrich & Webber),		<i>spinosis</i> Dallas, <i>Podisus</i>	19	<i>Winthemia</i>	24
<i>Carcelia</i>	25	<i>spongipartus</i> Foerster, <i>Eupelmus</i>	15	<i>xanthonotus</i> Ashmead, <i>Bracon</i>	28
<i>protuberans</i> Aldrich & Webber,		<i>stabulans</i> (Fallen), <i>Muscina</i>	20	<i>Xanthophyto</i>	22
<i>Zenillia</i>	25	STAPHYLINIDAE	18	<i>Ypochaemyia</i>	25
<i>Pseudogaurax</i>	20, 38, 45	<i>stercorator</i> brunneifrons (Say), <i>Iseropus</i>	30	<i>Zelus</i>	20
<i>Pseudosarcophaga</i>	21	<i>stercorator orgyiae</i> (Ashmead), <i>Iseropus</i>	30	<i>Zenilla</i>	25
<i>Psychophagus</i>	38	<i>stigmator</i> (Say), <i>Rogas</i>	28		
<i>pteroommiae</i> Ashmead, <i>Aphidius</i>	27, 45				