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Insects and mites on alfalfa in Alberta

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Insects and mites on alfalfa in Alberta

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SUMMARY

Four hundred and thirty-seven species of insects and nine species of mites have been collected from alfalfa grown in Alberta. The species are in 10 orders and 88 families. A number of the insects are pests of alfalfa or potential pests and many are predators or parasites. The significance of many of the insects has not been determined, nor have their interrelationships within the alfalfa ecosystem.

RÉSUMÉ

Quatre cent trente-sept espèces d'insectes et neuf d'espèces d'acariens ont été prélevés de champs de luzerne cultivés en Alberta. Les espèces font partie de 10 ordres et de 88 familles. Un certain nombre des insectes sont des ravageurs de la luzerne ou pourraient l'être et beaucoup sont des prédateurs ou des parasites. Le degré d'infestation de bon nombre de ces insectes reste à être déterminer, de même leur rôle dans l'écosystème de la luzerne.

INTRODUCTION

There are 2.9 million hectares of alfalfa and alfalfa-grass hay grown in Canada, of which the province of Alberta produces about 25%. Although cultivated forage is produced on less than 25% of the forage land base, it accounts for 70% of the feed supply. Alfalfa is the most important and widely grown legume in Canada and is extremely important as an inexpensive plant protein source for beef and milk production. Losses due to insects could severely disrupt the forage-livestock system, especially in southern Alberta where alfalfa is produced on high-value irrigated land.

There is limited knowledge about alfalfa insects in Alberta. Studies have been conducted on *Adelphocoris* (Lilly and Hobbs 1956), aphids (Harper and Kaldy 1982, Harper and Lilly 1966), bumble bees (Hobbs 1950), chemical control (Harper 1978), insect transmission of disease (Huang et al. 1983, Harper and Huang 1984), lygus (Salt 1945) and leafcutter bees (Hobbs and Lilly 1954, Hobbs 1968). Craig (1973) and Harper (1981) published papers on alfalfa insect pests of the Canadian prairies. Information on the importance or relationships of some of the species has been obtained from Bierne (1971, 1972), Borrer and DeLong (1963), Essig (1947), Fluke (1929), Hodek (1973), Pimental and Wheeler (1973), and Stary (1974).

This paper lists insects that have been found on alfalfa in Alberta and indicates the significance of the species that appear important to the crop. The insects were collected by sweep net, suction sampler, or by pitfall traps in the interior of alfalfa fields.

INSECTS IN ALFALFA

Collembola - Springtails

Poduridae

Hypogastrura manubrialis (Tullberg)

Sminthuridae

Bourletiella hortensis (Fitch)

Deuterosminthurus repandus (Agren.)

Sminthurinus elegans (Fitch)

Sminthurinus medialis (Mills)

The Collembola appear to be of little importance in alfalfa. Species in the family Poduridae, and the garden springtail, *B. hortensis*, may feed on seedlings of a wide variety of crops. *D. repandus* feeds on pollen.

Orthoptera - Grasshoppers and crickets

Acrididae

Camnula pellucida (Scudder)

Melanoplus bivittatus (Say)

Melanoplus femurrubrum (DeGeer)

Melanoplus packardii Scudder

Melanoplus sanguinipes (Fabricius)

Tettigoniidae

Anabrus simplex Haldeman

The grasshoppers are sometimes of considerable importance as pests of alfalfa. They can chew off the flowers and pods, greatly lower seed yields and severely reduce hay yields. Grasshoppers most often cause serious damage to irrigated alfalfa where the fields of alfalfa border a dryland area. As the dryland grain or grass matures and becomes undesirable for food, the grasshoppers may move in large numbers to the green alfalfa.

The mormon cricket, *A. simplex*, feeds on plants but has not caused any serious damage to alfalfa in Alberta.

Thysanoptera - Thrips

Aeolothripidae

Aeolothrips fasciatus (Linnaeus)

Chirothripidae

Chirothrips manicatus Haliday

Chirothrips nr *productus*

Phleothripidae

Halothrips malifloris complex

Thripidae

Frankliniella occidentalis (Pergande)
Frankliniella tritici (Fitch) (*mountonii* Hood)
Limothrips denticornis Haliday
Odontothrips loti (Haliday)
Thrips tabaci Lindeman

A. fasciatus is a very common and important predator in alfalfa and feeds mainly on pest thrips and mites. *F. occidentalis* has been reported to be a predator of alfalfa weevil eggs. *T. tabaci* feeds mainly on onions and *L. denticornis* feeds mainly on grasses and small grains. They do not appear to be important in alfalfa. *O. loti*, *F. occidentalis* and *F. tritici* are the common pest thrips found on alfalfa.

Hemiptera - True bugs

Anthocoridae

Anthocoris antevolens White
Orius tristicolor (White)
Xylocoris umbrinus Van Duzee

Miridae

Adelphocoris lineolatus (Goeze)
Adelphocoris rapidus (Say)
Adelphocoris superbus (Uhler)
Atomoscelis modestus (Van Duzee)
Capsus simulans (Stal)
Chlamydatus pulicarius (Fallen)
Chlamydatus pullus (Reuter)
Corizus sp.
Deraeocoris brevis (Uhler)
Deraeocoris histrio (Reuter)
Hadronema militaris Uhler
Ilnacora nr albifrons Knight
Labops hesperus Uhler
Labops simulans Stal
Litomeris debilis (Uhler)
Lopidea dakota Knight
Lopus sp.
Lygidea sp.
Lygus borealis (Kelton)
Lygus desertinus Knight
Lygus elisus Van Duzee
Lygus lineolaris (Palisot de Beauvois)
Lygus rufidorsus (Kelton)
Lygus shulli (Knight)
Lygus unctuosus Kelton
Melanotrichus coagulatus (Uhler)
Melanotrichus flavosparsus (Sahlberg)
Mimoceps insignis Uhler
Orectoderus obliquus Uhler
Orthotylus fusicornis Knight

Phytocoris pallidicornis Reuter
Plagiognathus obscurus Uhler
Plagniognathus sp.
Polymerus prob. *rufipes* Knight
Slaterocoris prob. *stygicus* Say
Stenodema trispinosa (Reuter)
Stenodema vicinum (Provancher)
Stenodema virens Linnaeus
Trigonotylus coelestialium (Kirkaldy)
Trigonotylus ruficornis (Geoffroy)
Xylocoris umbrinus (Van Duzee)

Phymatidae

Phymata pennsylvania Handl.

Reduviidae

Sinea diadema Fabricius

Nabidae

Dolichonabis propinguus (Reuter)
Nabis alternatus Parshley
Nabis limbatus Dahlbom
Nabis subcoleoptratus (Kirby)
Nabis van duzee Kirk

Tingidae

Acalypta nyctalis Drake
Corythucha coryli O. and D.

Piesmidae

Piesma cinerea Say

Lygaeidae

Cymus luridis Stal
Emblethis vicarius Horvath
Geocoris atricolor Mont.
Geocoris bullatus Say
Geocoris discopterus (Stal)
Geocoris nr pallens
Geocoris uliginosis Say
Ligyrocoris sylvestris (Linnaeus)
Lygaeus kalmii Stal
Nysius ericae Schilling
Nysius minutus Uhler
Peritrichus saskatchewanensis Barb.
Slaterobius insignis (Uhler)
Sphragisticus nebulosus (Fall.)
Zeridoneus costalis Van Duzee

Coreidae

Alydus conspersus (Montandon)
Alydus eurinus Say
Coriomerus humulis Uhler
Megalotamus quinquespinosus Say
Rhopalus crassicornis (Linnaeus)
Stictopleuris punctiventris (Dallas)
Stictopleuris viridicatus (Uhler)

Corizidae

Coriza sp.

Saldidae

Saldula palustris (Douglas)

Cydnidae

Corimelaena pulicaria (Germ)
Sehirus cinctus (Palisot de Beauvois)

Scutelleridae

Holcostethus limbolarius Stal
Homaemus aeneifrons consors Uhler

Pentatomidae

Carpocoris remotus Horvath
Codophila remotus (How.)
Coenus delius (Say)
Cosmopepla bimaculata Thomas
Neottiglossa undata Say
Podisus placidus Uhler
Sciocoris microphthalmus Flor.
Thyanta punctiventris Van Duzee

The anthorcorid, *O. tristicolor*, is the most common predator in alfalfa. It feeds on aphids, mites, thrips, and small lepidoptera. *A. antevolens* feeds on similar prey but is only important in localized areas near trees. It is one of the important predators of *Pemphigus* gall aphids on *Populus* sp.

The mirids *D. histrio*, *D. brevis*, and *P. pallidicornis* are predators but are not very common in alfalfa so are probably of limited importance. Kelton (1980) also indicated that *O. obliquus* was probably predaceous. Most of the other species appear to be plant feeders. *A. lineolatus* and the *Lygus* spp. are major pests of alfalfa, especially seed alfalfa. Lilly (1958) showed that *Lygus* spp. can be predatory on aphids.

Chlamydatus, *Labops*, *Stenodema* and *Trigonotylus* species are commonly found in alfalfa but appear to prefer grasses and small grains.

The phymatid *P. pennsylvania* and the reduviid *S. diadema* are both general predators of pests as well as honeybees and other beneficial insects.

The nabids are all predators of aphids, leafhoppers, and other small insects, and lepidopterean eggs and larvae. *N. alternatus* is the most common nabid predator as it can be found in nearly every alfalfa field and is important as a control agent of the pea aphid, *A. pisum*.

The tingids, piesmids and coreids are plant feeders but are not common in alfalfa.

The lygaeid *N. ericae*, the false chinch bug, is commonly found on alfalfa. It is of little importance on that crop but can be important on small grains. *P. saskatchewanensis* feeds on alfalfa and can be readily found in most fields but only occasionally causes much damage to the crop.

All the species of geocorids listed are predatory. *G. bullatus* is the most common geocorid found in alfalfa.

The saldid *S. palustris* is reported to be a predator of aquatic and semi-aquatic mites and insects.

Some species of the pentatomid genus *Podisus* are predators of hairless lepidoptera.

Homoptera

Membracidae

Campylenchia latipes Say
Stictocephala basalis (Walker)
Stictocephala bisonia (Kopp and Yke)

Cicadellidae

Aceratagallia arida Oman
Aceratagallia sanguinolenta (Provancher)
Acinopterus viridis Ball
Agallia quadripunctata (Provancher)
Agalliopsis ancistra Oman
Ambysellus grex (Oman)
Amplicephalus (Endria) *inimica* (Say)
Aphrodes bicinctus (Schrank)
Athysanella sp.
Auridius auratus (Gillette and Baker)
Chlorotettix unicolor (Fitch)
Colladonus geminatus (Van Duzee)
Colladonus montanus (Van Duzee)
Deltocephalus lineatifrons Oman
Diplocelenus (Verdanus) *evansi* (Ashmead)
Dorycephalus platyrhynchus Osb.
Draeculacephala novaeboracensis (Fitch)
Empoasca (Kyboasca) *bipunctata* (Osb.)
Euscelidius maculipennis (DeL. and Dav.) (= *schenki* Kirsch)
Extrusanus extrusus (Van Duzee)
Gyponana quebecensis (Provancher)
Hecalus major (Osb.)
Helocharis communis Fitch

Macrosteles fascifrons (Stal)
Prairiana cinerea (Uhler)
Psammotettix lividellus (Zett.)
Sorhoanus uhleri (Oman)
Streptanus deceptus (Sd. and DeLong)

Cercopidae

Philaenarcys bilineata (Say)
Philaenus spumarius (Linnaeus)

Delphacidae

Laccocera vittipennis Van Duzee
Liburna oculusa Van Duzee
Liburna pellucida Fabricius
Liburna sp.

Aphididae

Acyrtosiphon pisum (Harris)
Nearctaphis bakeri (Cowen)
Therioaphis maculata (Buckton)

Psyllidae

Aphalara sp.
Livia sp.
Psylla sp.

The membracids, cicadellids, cercopids, and delphacids are readily found in alfalfa but do not appear to cause any serious damage to the crop. The cicadellids *A. sanguinolenta*, *C. montanus* and *M. fascifrons* are often present in alfalfa in very large numbers.

The pea aphid, *A. pisum*, has been a major pest of alfalfa, especially in the irrigated areas. It is generally kept under control by early cutting of the crop and by predators and parasites. Populations of both *N. bakeri* and *T. maculata*, the spotted alfalfa aphid, have remained low. *T. maculata* was found for the first time in Alberta in 1981 and may not have had time to become well established. However, it has been a major pest of alfalfa in the southern United States, Australia and New Zealand and could become a serious pest in Alberta as it injects a toxin into the alfalfa as well as damages the plant by its feeding.

Neuroptera

Chrysopidae

Chrysopa carnea Stephens (= *plorobunda* Fitch)
Chrysopa oculata Say

Chrysopa sp. are predaceous on aphids, mites, leafhoppers, psyllids and small lepidoptera. In alfalfa both the above species are common predators of the pea aphid.

Lepidoptera

Noctuidae

Agrotis orthogonia Morrison
Anagrapha (=Autographa) falcifera (Kirby)
Autographa californica (Speyer)
Discestra (=Scotogramma) trifolii (Hufnagel)
Euxoa auxiliaris (Grote)
Euxoa ochrogaster (Guenee)

Pieridae

Colias eurytheme Boisduval

Pyralidae

Loxostege cerealis (Zeller)
Loxostege sticticalis (Linnaeus)

The alfalfa looper, *A. californica*, and the alfalfa caterpillar, *C. eurytheme*, are found regularly in alfalfa but have as yet not caused serious problems. Larvae often have a high incidence of disease or parasitism. However, *A. californica* has at times seriously damaged canola in the province. The cutworms *A. orthogonia*, *E. auxiliaris*, *E. ochrogaster* and *D. trifolii* sometimes damage alfalfa but can only be considered to be minor pests. Established alfalfa sometimes harbors high populations of cutworms with no apparent effect. However, seedling alfalfa is sometimes severely affected. *L. sticticalis*, the sugarbeet webworm, is a major pest of sugarbeets in Alberta. Although it and *L. cerealis*, the alfalfa webworm, are commonly present in alfalfa they do not appear to have caused any serious damage.

Coleoptera

Carabidae

Agonum corvus (LeConte)
Agonum placidum (Say)
Amara apricaria (Paykull)
Amara carinata (LeConte)
Amara farcta LeConte
Amara lacustris LeConte
Amara littoralis Mannerheim
Amara obesa (Say)
Amara quenseli (Schonherr)
Amara torrida (Panzer)
Axinopalpus biplagiatus (Dejean)
Bembidion bimaculatum (Kirby)
Bembidion coloradense Hayward
Bembidion mutatum Gemminger and Harold
Bembidion nitidum (Kirby)
Bembidion obscurellum (Motschulsky)
Bembidion praecinctum LeConte
Bembidion quadrimaculatum (Linnaeus)

Bembidion rupicola (Kirby)
Bembidion nr versicolor (LeConte)
Bradycellus congener (LeConte)
Bradycellus nigerrimus Lindroth
Calosoma osoletum Say
Harpalellus basilaris (Kirby)
Harpalus amputatus Say
Harpalus fumerarius Csiki
Harpalus nr uteanus Casey
Harpalus sp.
Loricera pilicornis (Fabricius)
Metabletus americanus (Dejean)
Microlestes linearis (LeConte)
Notiophilus aquaticus (Linneaus)
Poecilus lucublandus (Say)
Pterostichus melanarius (Illiger)
Stenolophus comma (Fabricius)
Stenolophus conjunctus (Say)

Hydrophilidae

Helophorus orientalis Motsch.

Staphylinidae

Aleochara nr bimaculata (Grav.)
Anotylus sobrinus (LeConte)
Gabrius picipennis (Mannh.)
Gnypeta sp.
Leptacinus intermedius Don
Neohypnus hamatus (Say)
Neohypnus obscurus (Er.)
Philonthus concinnus (Grav.)
Philonthus fuscipennis Mannh.
Philonthus lautus Csy.
Philonthus occidentalis Horn
Philonthus sordidus (Grav.)
Philonthus varius (Gyllenhal)
Platystethus americanus Er.
Stenus (Hypostenus) reconditus brevisculus Puthz
Stenus (s.st.) morio Grav.
Stenus (s.st.) occidentalis Csy ?
Stenus vicinoides Puthz
Tachyporus inornatus Campbell
Tachyporus mexicanus Sharp
Tachyporus nitidulus (Fabricius)

Silphidae

Aclypea bituberosa (LeConte)

Histeridae

Euspilotus insertus (LeConte)

Scarabaeidae

Aphodius (?) *albertanus* Brown
Aphodius alternatus Horn
Aphodius granarius (Linnaeus)
Aphodius pinguis Hald.
Onthophagus nuchicornis Linnaeus

Eucinetidae

Eucinetus terminalis LeConte

Elateridae

Aeolus mellillus (Say)
Agriotes criddelei Van Dyke
Ctenicera pudica (Brown)
Dalopius pallidus Brown
Hemicrepidius memnonius (Hbst.)
Hypolithus bicolor Esch.
Oedostethus femoralis LeConte

Cantharidae

Cantharis oregonus LeConte
Cantharis sp.

Lampyridae

Ellychnia corrusca (Linnaeus)
Ellychnia lacustris LeConte

Dermestidae

Dermestes sp.

Anobiidae

Caenocara scymnoides LeConte
Xylentinus fucatus LeConte

Cleridae

Phyllobaenus sp.
Trichodes nutalli Kirby

Melyridae

Collops bipunctatus Say
Collops hirtellus LeConte
Collops vittatus Say
Malachius aeneus (Linnaeus)

Meloidae

Epicauta ferruginea (Say)
Epicauta maculata (Say)
Epicauta normalis Werner

Epicauta oregona Horn
Epicauta pensylvanica (DeGeer)
Epicauta puncticollis Mann
Epicauta subglabra (Fall.)
Lytta nuttali Say

Mordellidae

Mordellistena sp.

Tenebrionidae

Blastinus sp.

Anthicidae

Anthicus flavicans LeConte
Anthicus hastatus Casey
Anthicus lutulentus Casey
Anthicus punctulatus LeConte
Notoxus anchora Hentz

Nitulidae

Epuraea sp.

Helodidae

Cyphon variabilis Thunb.

Cryptophagidae

Anchicera sp.
Cryptophagus acutangulus Gyllenhal

Coccinillidae

Adalia bipunctata (Linnaeus)
Adalia frigida (Schneider)
Brumoides septentrionis Weise
Coccinella novemnottata Herbst
Coccinella transversoguttata richardsoni Brown
Coccinella trifasciata perplexa Mulsant
Hippodamia caseyi Johnson
Hippodamia convergens Guerin
Hippodamia glacialis (Fabricius)
Hippodamia parenthesis (Say)
Hippodamia quinquesignata (Kirby)
Hippodamia sinuata crotchi Casey
Hippodamia tredecimpunctata tibialis (Say)
Hyperaspidius vittigerus (LeConte)
Hyperaspis inflexa Casey
Hyperaspis lateralis Mulsant
Hyperaspis quadrivittata LeConte
Hyperaspis undulata (Say)
Scymnus (Pullus) caudalis LeConte

Scymnus (Pullus) postpictus Casey
Scymnus (Pullus) puncticollis LeConte
Scymnus sp.

Phalacridae

Phalacrus sp.
Stillbus apicalis Melsheimer
Stillbus sp.

Lathridiidae

Corticarina sp.
Enicmus mimus Fall.
Melanophthalma sp.

Cerambycidae

Crossidius pullchelus LeConte
Tetraopes femoratus LeConte

Chrysomelidae

Altica sp.
Calligrapha californica coreopsivora Brown
Chaetocnema protensa LeConte
Chaetocnema sp.
Chrysolina sp.
Crepidodera nana (Say)
Disonycha latifrons Schaeffer
Disonycha triangularis (Say)
Entomoscelis americana Brown
Galeruca browni Blake ?
Gastrophysa cyanea Melsheimer
Gastrophysa polygona (Linnaeus)
Leptinotarsa decemlineata (Say)
Longitarsus sp.
Macrohaltica sp.
Microrhophala vittata (Fabricius)
Monoxia prob. *angularis* (LeConte)
Monoxia puncticollis (Say)
Pachybrachis sp.
Phyllotreta albionica LeConte
Phyllotreta cruciferae (Goeze)
Phyllotreta striolata (Fabricius)
Psylloides convexior LeConte
Psylloides punctulata Melsheimer
Trirhabda attenuata (Say)
Trirhabda nr *borealis* Blake
Trirhabda virgata LeConte

Bruchidae (=Mylabridae)

Acanthoscelides perforatus (Horn)
Bruchus fraterculus Horn
Bruchus seminulum Horn

Curculionidae

Amalus haemorrhous (Hbst.)
Anthonomus sp.
Apion sp.
Ceutorhynchus americanus Buch.
Ceutorhynchus punctiger Gyllenhal
Ceutorhynchus sp.
Euhrychiopsis albertana (Brown)
Grypus equiseti (Fabricius)
Hypera postica (Gyllenhal)
Hypera punctata (Fabricius)
Lepesoma alternata (Horn)
Listronotus sp.
Nanodes canadensis (Brown)
Notaris bimaculata (Fabricius)
Otiorhynchus ovatus (Linnaeus)
Panscopus aequalis (Horn)
Pseudothonomus sp.
Sitona cylindricollis Fahraeus
Sitona hispidulus (Fabricius)
Sitona lepidus Gyllenhal
Sitona scissifrons Say
Tychius picirostris (Fabricius)

Many species of carabids are carnivorous, nocturnal, and typically hunters. They feed on almost any living animal that they can overcome. Some probably feed on aphids that fall off alfalfa plants. Some species of *Amara*, *Harpalus*, and *Pterostichus* are known to destroy seeds, berries, and plants. The ground beetles in alfalfa have not been well studied. Thirty-seven species have been found in alfalfa in Alberta and Vas'kin (1985) reported 53 species on alfalfa in Russia. He reported that the ratio of predatory ground beetles to those with mixed feeding habits was 100:1. The carabid complex appears to be one of the most promising groups of predators for integrated control of insect pests in alfalfa.

Some species of hydrophilids of the genus *Helophorus* feed on roots and leaves of young plants but others are scavengers or predaceous. The family is uncommon in alfalfa.

The staphylinids are mainly carnivorous or saprophagous and are often found around decaying organic matter and dung. Some are predatory on diptera and others are associated with ants. Staphylinids, especially some species of *Tachyporus*, may also feed on aphids that fall off alfalfa plants.

The silphid, *A. bituberosa*, although commonly found in alfalfa does not appear to cause any damage to the crop. It is mainly a pest of sugar beets.

The histerids are associated with carrion or dung but many are saprophagous or predaceous. Their significance in alfalfa is not known.

The scarabaeids are mainly leaf chafers, scavengers and dung feeders. There are over 100 species of dung-feeding *Aphodius* in the prairie and grassland areas of north America.

The elaterids or wireworms are mainly subterranean feeders on seeds and plants in the larval stage. They can cause significant damage in alfalfa that is seeded into newly broken sod.

The cantharids and lampyrids are mainly predaceous families of beetles. The cantharids feed mainly on aphids, mealy bugs, and other small insects and are often found in flowers. The lampyrids are predaceous on caterpillars and other insect larvae.

The dermestids and the anobiids generally feed on dead animals and dried plant material.

The clerids and the melyrids are predatory families. *T. nutalli* catches insects such as bees at alfalfa flowers. *C. bipunctatus* and *C. vittatus* feed on aphids.

The meloids are plant feeders as adults but have not been of economic importance on alfalfa in Alberta. The larvae feed on eggs of grasshoppers or brood chambers of ground nesting bees. Adults yield cantharidin which is used medicinally as an aphrodisiac, a vesicator, and a diuretic, and is known as "Spanish Fly". Some species of *Epicauta* are known to cause death to horses when eaten with infested alfalfa hay.

The mordellid larvae live in decaying wood but some species are predatory.

The tenebrionids feed mainly on dead and decaying organic matter. The nitulids are mainly saprophagous in both the adult and larval stages. The cyrtophagids live on fungi and decaying organic matter.

The coccinellids feed mainly on soft-bodied insects such as aphids and coccids and are important predators in alfalfa. Five species important as predators of the pea aphid and readily found in alfalfa fields are *C. transversoguttata richardsoni*, *H. parenthesis*, *H. quinquesignata*, *H. sinuata disjuncta*, and *H. tredecimpunctata*. Two other pea aphid predators that can be found in most fields are *C. trifasciata perplexa* and *C. novemnotata*.

The phalacrids and the latridiids are predatory. *S. apicalis* is a pea aphid predator.

The cerambycid genera *Crossidius* and *Tetraopes* attack roots and stems of small plants.

The chrysomelids are all plant feeders and include: the red turnip beetle, *E. americana*; the Colorado potato beetle, *L. decemlineata*; the three spotted flea beetle, *D. triangularis*; the cabbage flea beetle, *P. albionica*; the crucifera flea beetle, *P. cruciferae*; the striped flea beetle, *P. striolata*, and the hop flea beetle, *P. punctula*. None of these chrysomelids is causing damage to alfalfa in Alberta.

The bruchids are the seed weevils.

The curculionids are the weevils which include: the blue turnip weevil, *C. americanus*; the alfalfa weevil, *H. postica*; the clover weevil, *H. punctata*; the strawberry root weevil, *O. ovatus*; the sweetclover weevil, *S. cylindricollis*; the clover root weevil, *S. hispidulus*; the alfalfa curculio, *S. scissifrons*, and the clover seed weevil. The alfalfa weevil has caused damage to alfalfa on numerous occasions in Alberta. Although the alfalfa curculio is very common in alfalfa fields and can cause seedling damage it does not appear to be of economic importance. The insect has caused damage to sainfoin in Montana.

Diptera

Bibionidae

Bibio sp.

Tabanidae

Chrysops mitis Osten Sacken

Stratiomyiidae

Sargus coprarius (Linnaeus)

Sargus viridis Say

Stratiomys normula Loew

Therevidae

Psilocephala aldrichi Coquillett

Thereva duplicis Coquillett

Asilidae

Asilus sp.

Stenopogon inquinatus Loew

Bombyliidae

Systoechus vulgaris Loew

Dolichopodidae

Dolichopus bifractus Loew

Dolichopus brevipennis Loew

Dolichopus conspectus Van Duzee

Dolichopus jugalis Tucker

Dolichopus plumipes (Scopoli)

Dolichopus ramifer Loew

Dolichopus renidescens M. and B.

Dolichopus sp.

Raphium campestre Cn.

Scellus monstrosus Osten. Sacken

Lonchopteridae

Lonchoptera furcata Fallen

Phoridae

Megaselia sp.

Syrphidae

Eupoedes volucris Osten Sacken
Helophilus latifrons Loew
Metasyrphus lapponicus (Zetterstedt)
Metasyrphus sp.
Scaeva pyrastris (Linnaeus)
Sphaerophoria philanthus (Meigen) (=robusta Cn.)
Sphaerophoria sp.
Syritta pipiens (Linnaeus)
Syrphus torvus Osten Sacken
Syrphus vitripennis Meigen

Otitidae

Ceroxys latiusculus (Loew)
Tetanops myopaeformis (Roder)

Tephrididae

Paroxyna pygmaea Novak
Tephritis sp.

Agromyzidae

Liriomya sp.

Lauxanidae

Camptoprosopella borealis Shewell

Heleomyzidae

Pseudoleria sp.

Chloropidae

Thaumatomyia bistrinata (Walker)
Thaumatomyia glabra Meigen

Scathophagidae

Scathophaga stercoraria Linnaeus

Anthomyiidae

Hylemya (Delia) extremitata Malloch
Hylemya (Delia) platura (Meigen)
Hylemya (Pegohylemya) fugax (Meigen)
Pegomyia sp.

Muscidae

Helina duplicata (Meigen)
Limosia cilicauda (Malloch)

Musca domestica Linnaeus
Myospila meditabunda (Fabricius)
Ophyra leucostoma (Wiedemann)
Quadrularia laetifica (Rob.-Des.)

Calliphoridae

BufoLucilia silvarum (Meigen)
Pollenia rudis (Fabricius)

Sarcophagidae

Blaesoxipha atlanis (Aldrich)
Blaesoxipha kellyi (Aldrich)
Blaesoxipha sp.
Ravinia querula (Walker)
Sarcophaga harpax (Pandelle)
Sarcophaga sinuata Meigen

Tachinidae

Dinera grisescens (Fallen)
Leucostoma simplex (Fallen)
Peleteria iterans (Walker)

The asilid *S. inquinatus* was reported by Hobbs (1956) to kill honey bees.

The bombyliids of the genus *Systoechus* are reported to be ectoparasites on beetle larvae living in the soil, especially scarabaeids (Askew 1971).

The dolichopodid are all predatory and the phorid genus *Megaselia* is parasitic, probably on millipeds.

The syrphids are generally predators of aphids. *E. volucris*, *S. pyrastris*, *S. philanthus* and *S. torvus* are all important predators of the pea aphid.

The otitid, *T. mypaeformis*, the sugarbeet root maggot, is frequently found in alfalfa fields in the irrigated areas where sugarbeets are grown.

The chloropid genus *Thaumatomyia* is known to be predatory on aphids. *T. glabra* is the most important predator of the sugarbeet root aphid in Alberta and Montana.

M. domestica is the common house fly. Some of the flies in the genus *Ophrya* cause myiasis (Askew 1971).

The calliphorid fly *P. rudis* is a parasite of earthworms.

Some sarcophagids in the genus *Blaesoxipha* are parasites of grasshoppers (Askew 1971).

Some species in the genus *Sarcophaga* are parasites of grasshoppers (Askew 1971).

Many of the tachinids parasitize hymenoptera, coleoptera, diptera, lepidoptera and orthoptera (Askew 1971). *L. simplex* is a parasite of the predator *N. alternatus*.

Hymenoptera

Ichneumonidae

Bathyplectes curculionis (Thomson)
Hyposoter sp.

Braconidae

Meteorus proximus Cress.
Dinocampus (=Perlitus) *coccinellae* Schrank
Wesmalia pendula Foester

Aphidiidae

Aphidius ervi Haliday
Aphidius pulcher Baker
Aphidius smithi Sharma and Subbo Roa
Praon (prob.) *exoletum palitans* Muesbeck
Praon pequodorum Vierck

Pteromalidae

Asaphes suspensus (Nees)
Asaphes vulgaris (Walker)
Pachyneuron sp.

Megachilidae

Megachile brevis Say
Megachile dentitarsus Sladen
Megachile frigida Sm.
Megachile melanophae Sm.
Megachile perhirta Ckll.
Megachile rotundata Fabricius

Apidae

Apis mellifera Linnaeus
Bombus borealis Kirby
Bombus fervidus Fabricius
Bombus huntii Greene
Bombus nevadensis Cress.
Bombus occidentalis Greene
Bombus rufocinctus Cress.
Bombus ternarius Say
Bombus terricola Kirby

Alloxystidae

Alloxysta sp.

Ceraphronidae

Attritomellus (= *Dendrocerus*) *niger* (Howard)

Many hymenoptera are parasites, hyperparasites, or pollinators.

The ichneumonid *B. curculionis* is an important parasite of the alfalfa weevil, *H. postica*.

The braconid *M. proximus* is a parasite of the alfalfa caterpillar, *C. eurytheme*. *D. coccinellae* is a parasite of coccinellids which are predators of the pea aphid. *W. pendula* is a parasite of the western damsel bug, *N. alternatus*, which is a predator of the pea aphid and other small insects in alfalfa. Neither *D. coccinellae* nor *W. pendula* appear to severely limit predator populations at present as coccinellids and *N. alternatus* are present in all alfalfa fields in Alberta.

The aphidiid parasites in the genera *Aphidius* and *Praon* are parasites of aphids. They are important in the control of the pea aphid, *A. pisum*. A few specimens of *A. smithi* were found in southern Alberta in 1970. These were augmented by rearing large numbers in the laboratory and in field cages and releasing them throughout the irrigated areas. The parasite is now well established and has become one of the most important control agents for the pea aphid in the province.

A. suspensus is a hyperparasite of *D. coccinellae* and may be one of the reasons that the parasite of coccinellids is not more important. *A. vulgaris* is a hyperparasite of *Aphidius* spp. and *Charips* spp. It does not appear to seriously reduce populations of *A. smithi*, the most important parasite of *A. pisum* in Alberta.

The megachilids are pollinators of alfalfa. The first five species are native pollinators that nest in sod, while *M. rotundata* is the alfalfa leafcutter bee that has been domesticated for pollination of alfalfa.

A. mellifera, the honey bee, is found in all alfalfa fields but is not an important pollinator of alfalfa.

Bombus species are pollinators but many of them prefer red or sweet clover rather than alfalfa.

Charips spp. are hyperparasites of hymenopterous parasites.

A. niger is a hyperparasite of *D. coccinellidae* and may be quite important in keeping this parasite of coccinellids under control.

Acari

Ameroseiidae

Ameroseius corbicula (Sowerby)

Bdellidae

Biscirus silvaticus (Kramer)

Cunaxidae

Cunaxoides biscutum (Nesbitt)

Erythraeidae

Abrolophus sp.

Oribatulidae

Oribatula tibialis (Nicolet)

Phytoseiidae

Amblyseius iroquois Chant and Hansell

Tetranychidae

Petrobia latens (Muller)

Tetranychus urticae (Koch)

Trombiidae

Trombidium sp.

Mites generally are not serious problems in alfalfa in the field. In greenhouses, however, where there are no predators, mites must be frequently controlled by miticides. The tetranychid mites found in alfalfa are of considerable importance; *T. urticae*, the two spotted mite, is often a problem in greenhouses, and *P. latens*, the brown wheat mite, has been a problem on wheat and barley in southern Alberta. Mites in the genus *Amblyseius* are predators on other mites.

INSECT PESTS AND PREDATORS

In alfalfa in Alberta there are a number of insects that are pests or potential pests. These include: the pea aphid, *A. pisum*; the spotted alfalfa aphid, *T. maculata*; the alfalfa weevil, *H. postica*; the alfalfa curculio, *S. scissifrons*; the adelphocorids *A. lineolatus*, *A. superbus* and *A. rapidus*; several *Lygus* spp.; several grasshoppers, *Melanoplus* spp.; the alfalfa caterpillar, *C. eurytheme*; the alfalfa looper, *A. californica*; cutworms, *Euoxa* spp.; the alfalfa webworm, *L. cereralis*; wireworms; the thrips *O. loti*, *F. occidentalis* and *F. tritici*; the lygaeid *P. saskatchewanensis*, and the blister beetles *Epicauta* spp. and *L. nuttali*. The mite genus *Amblysius* is also predatory.

There are also a number of predators and parasites in alfalfa. Predators include: the thrip *A. fasciatus*; anthocorids *A. antevolens*, and *O. tristicolor*; mirids *D. histro*, *D. brevis*, *P. pallidicornis* and *O. obliquus*; the phymatid *P. pennsylvania*; the reduviid *S. diadema*; several nabid species; several geocorids; many carabids; many staphalinids; the cantharid *C. oregonus*; the lampyrids *E. corrusca* and *L. lacustris*; the clerid *T. nutalli*; melyrids *Collops* spp.; several meloids; many coccinellids in the genera *Adalia*, *Brumus*, *Coccinella*, *Hippodamia*, *Hyperaspidius*, *Hyperaspis* and *Scymnus*; the phalacrid *S. apicalis*; several lathridiids; the bombyliid *S. vulgaris*; several dolichopodids, and the chloropids *Thaumatomyia* spp. The parasites include: the sarcophagids *Blaesoxipha* spp.; several tachnids; the ichneumonds *B. curculionis* and *Hyposoter* sp.; the braconids *M. proximus*, *D. coccinellae* and *W. pendula*; the aphidiids *Aphidius* spp. and *Praon* spp.; and the Pteromalids *A. suspensus*, *A. vulgaris* and *Pachyneuron*.

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Appendix I. List of Species of Insects in Alfalfa in Alberta

| | | |
|---|--------------|----------------|
| <i>Acalypta nyctalis</i> Drake | Hemiptera | Tingidae |
| <i>Acanthoscelides perforatus</i> (Horn) | Coleoptera | Bruchidae |
| <i>Aceratagallia arida</i> Oman | Homoptera | Cicadellidae |
| <i>Aceratagallia sanguinolenta</i> (Provancher) | Homoptera | Cicadellidae |
| <i>Acinopterus viridis</i> Ball | Homoptera | Cicadellidae |
| <i>Aclypea bituberosa</i> (LeConte) | Coleoptera | Silphidae |
| <i>Acyrtosiphon pisum</i> (Harris) | Homoptera | Aphididae |
| <i>Adalia bipunctata</i> (Linnaeus) | Coleoptera | Coccinellidae |
| <i>Adalia frigida</i> (Schneider) | Coleoptera | Coccinellidae |
| <i>Adelphocoris lineolatus</i> (Goeze) | Hemiptera | Miridae |
| <i>Adelphocoris rapidus</i> (Say) | Hemiptera | Miridae |
| <i>Adelphocoris superbus</i> (Uhler) | Hemiptera | Miridae |
| <i>Aeolothrips fasciatus</i> (Linnaeus) | Thysanoptera | Aeolothripidae |
| <i>Aeolus mellillus</i> (Say) | Coleoptera | Elateridae |
| <i>Agallia quadripunctata</i> (Provancher) | Homoptera | Cicadellidae |
| <i>Agalliopsis ancistra</i> Oman | Homoptera | Cicadellidae |
| <i>Agonum corvus</i> (LeConte) | Coleoptera | Carabidae |
| <i>Agonum placidum</i> (Say) | Coleoptera | Carabidae |
| <i>Agriotes criddelei</i> Van Dyke | Coleoptera | Elateridae |
| <i>Agrotis orthogonia</i> Morrison | Lepidoptera | Noctuidae |
| <i>Aleochara nr bimaculata</i> (Grav.) | Coleoptera | Staphylinidae |
| <i>Alloxysta</i> sp. | Hymenoptera | Alloxystidae |
| <i>Altica</i> sp. | Coleoptera | Chrysomelidae |
| <i>Alydus conspersus</i> (Montandon) | Hemiptera | Coreidae |
| <i>Alydus eurinus</i> Say | Hemiptera | Coreidae |
| <i>Amalus haemorrhous</i> (Hbst.) | Coleoptera | Curculionidae |
| <i>Amara apricara</i> (Paykull) | Coleoptera | Carabidae |
| <i>Amara carinata</i> (LeConte) | Coleoptera | Carabidae |
| <i>Amara farcta</i> LeConte | Coleoptera | Carabidae |
| <i>Amara lacustris</i> LeConte | Coleoptera | Carabidae |
| <i>Amara littoralis</i> Mannerheim | Coleoptera | Carabidae |
| <i>Amara obesa</i> (Say) | Coleoptera | Carabidae |
| <i>Amara quenseli</i> (Schonherr) | Coleoptera | Carabidae |
| <i>Amara torrida</i> (Panzer) | Coleoptera | Carabidae |

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|--|-------------|----------------|
| <i>Ambysellus grex</i> (Oman) | Homoptera | Cicadellidae |
| <i>Amplicephalus</i> (Endria) <i>inimica</i> (Say) | Homoptera | Cicadellidae |
| <i>Anabrus simplex</i> Haldeman | Orthoptera | Tettigoniidae |
| <i>Anagrapha falcifera</i> (Kirby) | Lepidoptera | Noctuidae |
| <i>Anchicera</i> sp. | Coleoptera | Cryptophagidae |
| <i>Anotylus sobrinus</i> (LeConte) | Coleoptera | Staphylinidae |
| <i>Anthicus flavicans</i> LeConte | Coleoptera | Anthicidae |
| <i>Anthicus hastatus</i> Casey | Coleoptera | Anthicidae |
| <i>Anthicus lutulentus</i> Casey | Coleoptera | Anthicidae |
| <i>Anthicus punctulatus</i> LeConte | Coleoptera | Anthicidae |
| <i>Anthocoris antevolens</i> White | Hemiptera | Anthocoridae |
| <i>Anthonomus</i> sp. | Coleoptera | Curculionidae |
| <i>Aphalara</i> sp. | Homoptera | Psyllidae |
| <i>Aphidius ervi</i> Haliday | Hymenoptera | Aphidiidae |
| <i>Aphidius pulcher</i> Baker | Hymenoptera | Aphidiidae |
| <i>Aphidius smithi</i> Sharma and Subbo Roa | Hymenoptera | Aphidiidae |
| <i>Aphodius</i> (?) <i>albertanus</i> Brown | Coleoptera | Scarabaeidae |
| <i>Aphodius alternatus</i> Horn | Coleoptera | Scarabaeidae |
| <i>Aphodius granarius</i> (Linnaeus) | Coleoptera | Scarabaeidae |
| <i>Aphodius pinguis</i> Hald. | Coleoptera | Scarabaeidae |
| <i>Aphrodes bicinctus</i> (Schrank) | Homoptera | Cicadellidae |
| <i>Apion</i> sp. | Coleoptera | Cnidae |
| <i>Apis mellifera</i> Linnaeus | Hymenoptera | Apidae |
| <i>Asaphes suspensus</i> (Nees) | Hymenoptera | Pteromalidae |
| <i>Asaphes vulgaris</i> (Walker) | Hymenoptera | Pteromalidae |
| <i>Asilus</i> sp. | Diptera | Asilidae |
| <i>Athysanella</i> sp. | Homoptera | Cicadellidae |
| <i>Atomoscelis modestus</i> (Van Duzee) | Hemiptera | Miridae |
| <i>Attritomellus niger</i> (Howard) | Hymenoptera | Ceraphonidae |
| <i>Auridius auratus</i> (Gillette and Baker) | Homoptera | Cicadellidae |
| <i>Autographa californica</i> (Speyer) | Lepidoptera | Noctuidae |
| <i>Axinopalpus biplagiatus</i> Dejean | Coleoptera | Carabidae |
| <i>Bathyplectes curculionis</i> (Thomson) | Hymenoptera | Ichneumonidae |
| <i>Bembidion bimaculatum</i> (Kirby) | Coleoptera | Carabidae |
| <i>Bembidion coloradense</i> Hayward | Coleoptera | Carabidae |

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|---|-------------|---------------|
| <i>Bembidion mutatum</i> Gemminger and Harold | Coleoptera | Carabidae |
| <i>Bembidion nitidum</i> (Kirby) | Coleoptera | Carabidae |
| <i>Bembidion obscurellum</i> (Motschulsky) | Coleoptera | Carabidae |
| <i>Bembidion praecinctum</i> LeConte | Coleoptera | Carabidae |
| <i>Bembidion quadrimaculatum</i> (Linnaeus) | Coleoptera | Carabidae |
| <i>Bembidion rupicola</i> (Kirby) | Coleoptera | Carabidae |
| <i>Bembidion nr versicolor</i> (LeConte) | Coleoptera | Carabidae |
| <i>Bibio</i> sp. | Diptera | Bibionidae |
| <i>Blaesoxipha atlantis</i> (Aldrich) | Diptera | Sarcophagidae |
| <i>Blaesoxipha kellyi</i> (Aldrich) | Diptera | Sarcophagidae |
| <i>Blaesoxipha</i> sp. | Diptera | Sarcophagidae |
| <i>Blastinus</i> sp. | Coleoptera | Tenebrionidae |
| <i>Bombus borealis</i> Kirby | Hymenoptera | Apidae |
| <i>Bombus fervidus</i> Fabricius | Hymenoptera | Apidae |
| <i>Bombus huntii</i> Greene | Hymenoptera | Apidae |
| <i>Bombus nevadensis</i> Cress. | Hymenoptera | Apidae |
| <i>Bombus occidentalis</i> Greene | Hymenoptera | Apidae |
| <i>Bombus rufocinctus</i> Cress. | Hymenoptera | Apidae |
| <i>Bombus ternarius</i> Say | Hymenoptera | Apidae |
| <i>Bombus terricola</i> Kirby | Hymenoptera | Apidae |
| <i>Bourletiella hortensis</i> (Fitch) | Collembola | Sminthuridae |
| <i>Bradycellus congener</i> (LeConte) | Coleoptera | Carabidae |
| <i>Bradycellus nigerrimus</i> Lindroth | Coleoptera | Carabidae |
| <i>Bruchus fraterculus</i> Horn | Coleoptera | Bruchidae |
| <i>Bruchus seminulum</i> Horn | Coleoptera | Bruchidae |
| <i>Brumoides septentrionis</i> Weise | Coleoptera | Coccinellidae |
| <i>Bufolucilia silvarum</i> (Meigen) | Diptera | Calliphoridae |
| <i>Caenocara scymnoides</i> LeConte | Coleoptera | Anobiidae |
| <i>Calligrapha californica</i> | | |
| <i>coreopsivora</i> Brown | Coleoptera | Chrysomelidae |
| <i>Calosoma osoletum</i> Say | Coleoptera | Carabidae |
| <i>Camnula pellucida</i> (Scudder) | Orthoptera | Acrididae |
| <i>Camptoprosopella borealis</i> Shewell | Diptera | Lauxanidae |
| <i>Campylenchia latipes</i> Say | Homoptera | Membracidae |
| <i>Cantharis oregonus</i> LeConte | Coleoptera | Cantharidae |

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| <i>Cantharis</i> sp. | Coleoptera | Cantharidae |
| <i>Capsus simulans</i> (Stal) | Hemiptera | Miridae |
| <i>Carpocoris remotus</i> Horvath | Hemiptera | Pentatomidae |
| <i>Ceroxys latiusculus</i> (Loew) | Diptera | Otitidae |
| <i>Ceutorhynchus americanus</i> Buch. | Coleoptera | Curculionidae |
| <i>Ceutorhynchus punctiger</i> Gyllenhal | Coleoptera | Curculionidae |
| <i>Ceutorhynchus</i> sp. | Coleoptera | Curculionidae |
| <i>Chaetocnema protensa</i> LeConte | Coleoptera | Chrysomelidae |
| <i>Chaetocnema</i> sp. | Coleoptera | Chrysomelidae |
| <i>Chirothrips manicatus</i> Haliday | Thysanoptera | Chirothripidae |
| <i>Chirothrips</i> nr <i>productus</i> | Thysanoptera | Chirothripidae |
| <i>Chlamydatus pulicarius</i> (Fallen) | Hemiptera | Miridae |
| <i>Chlamydatus pullus</i> (Reuter) | Hemiptera | Miridae |
| <i>Chlorotettix unicolor</i> (Fitch) | Homoptera | Cicadellidae |
| <i>Chryptophagus acutangulus</i> Gyllenhal | Coleoptera | Cryptophagidae |
| <i>Chrysolina</i> sp. | Coleoptera | Chrysomelidae |
| <i>Chrysopa carnea</i> Stephens | Neuroptera | Chrysopidae |
| <i>Chrysopa oculata</i> Say | Neuroptera | Chrysopidae |
| <i>Chrysopa plorobunda</i> see <i>C. Carnea</i> | Neuroptera | Chrysopidae |
| <i>Chrysops mitis</i> Osten Sacken | Diptera | Tabinida |
| <i>Coccinella novemnottata</i> Herbst | Coleoptera | Coccinellidae |
| <i>Coccinella transversoguttata richardsoni</i> Brown | Coleoptera | Coccinellidae |
| <i>Coccinella trifasciata</i> <i>perplexa</i> Mulsant | Coleoptera | Coccinellidae |
| <i>Codophila remotus</i> (How.) | Hemiptera | Pentatomidae |
| <i>Coenus delius</i> (Say) | Hemiptera | Pentatomidae |
| <i>Colias eurytheme</i> Boisduval | Lepidoptera | Pieridae |
| <i>Colladonus geminatus</i> (Van Duzee) | Homoptera | Cicadellidae |
| <i>Colladonus montanus</i> (Van Duzee) | Homoptera | Cicadellidae |
| <i>Collops bipunctatus</i> Say | Coleoptera | Melyridae |
| <i>Collops hirtellus</i> LeConte | Coleoptera | Melyridae |
| <i>Collops vittatus</i> Say | Coleoptera | Melyridae |
| <i>Corimelaena pulicaria</i> (Germ) | Hemiptera | Cydnidae |
| <i>Coriomerus humulis</i> Uhler | Hemiptera | Coreidae |
| <i>Coriza</i> sp. | Hemiptera | Corizidae |

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| <i>Corizus</i> sp. | Hemiptera | Miridae |
| <i>Corticarina</i> sp. | Coleoptera | Lathridiidae |
| <i>Corythucha coryli</i> O. and D. | Hemiptera | Tingidae |
| <i>Cosmopepla bimaculata</i> Thomas | Hemiptera | Pentatomidae |
| <i>Crepidodera nana</i> (Say) | Coleoptera | Chrysomelidae |
| <i>Crossidius pullchelus</i> LeConte | Coleoptera | Cerambycidae |
| <i>Cryptophagus acutangulus</i> Gyllenhal | Coleoptera | Cryptophagidae |
| <i>Ctenicera pudica</i> (Brown) | Coleoptera | Elateridae |
| <i>Cymus luridis</i> Stal | Hemiptera | Lygaeidae |
| <i>Cyphon variabilis</i> Thunb. | Coleoptera | Helodidae |
| <i>Dalopius pallidus</i> Brown | Coleoptera | Elateridae |
| <i>Deltocephalus lineatifrons</i> Oman | Homoptera | Cicadellidae |
| <i>Dendrocerus</i> see <i>Attritomellus</i> | Hymenoptera | Ceraphonidae |
| <i>Deraeocoris brevis</i> (Uhler) | Hemiptera | Miridae |
| <i>Deraeocoris histrio</i> (Reuter) | Hemiptera | Miridae |
| <i>Dermestes</i> sp. | Coleoptera | Dermestidae |
| <i>Deuterostminthurus repandus</i> (Agren.) | Collembola | Sminthuridae |
| <i>Dinera grisescens</i> (Fallen) | Diptera | Tachinidae |
| <i>Dinocampus coccinellae</i> Schrank | Hymenoptera | Braconidae |
| <i>Diplocelenus</i> (Verdanus) <i>evansi</i> (Ashmead) | Homoptera | Cicadellidae |
| <i>Discestra trifolii</i> (Hufnagel) | Lepidoptera | Noctuidae |
| <i>Disonycha latifrons</i> Schaeffer | Coleoptera | Chrysomelidae |
| <i>Disonycha triangularis</i> (Say) | Coleoptera | Chrysomelidae |
| <i>Dolichonabis propinquus</i> (Reuter) | Hemiptera | Nabidae |
| <i>Dolichopus bifractus</i> Loew | Diptera | Dolichopodidae |
| <i>Dolichopus brevipennis</i> Loew | Diptera | Dolichopodidae |
| <i>Dolichopus conspectus</i> Van Duzee | Diptera | Dolichopodidae |
| <i>Dolichopus jugalis</i> Tucker | Diptera | Dolichopodidae |
| <i>Dolichopus plumipes</i> (Scopoli) | Diptera | Dolichopodidae |
| <i>Dolichopus ramifer</i> Loew | Diptera | Dolichopodidae |
| <i>Dolichopus renidescens</i> M. and B. | Diptera | Dolichopodidae |
| <i>Dolichopus</i> sp. | Diptera | Dolichopodidae |
| <i>Dorycephalus platyrhynchus</i> Osb. | Homoptera | Cicadellidae |
| <i>Draeculacephala novaeboracensis</i> (Fitch) | Homoptera | Cicadellidae |
| <i>Ellychnia corrusca</i> (Linnaeus) | Coleoptera | Lampyridae |

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| <i>Ellychnia lacustris</i> LeConte | Coleoptera | Lampyridae |
| <i>Emblethis vicarius</i> Horvath | Hemiptera | Lygaeidae |
| <i>Empoasca</i> (<i>Kyboasca</i>) <i>bipunctata</i> (Osb.) | Homoptera | Cicadellidae |
| <i>Enicmus mimus</i> Fall. | Coleoptera | Lathridiidae |
| <i>Entomoscelis americana</i> Brown | Coleoptera | Chrysomelidae |
| <i>Epicauta ferruginea</i> (Say) | Coleoptera | Meloidae |
| <i>Epicauta maculata</i> (Say) | Coleoptera | Meloidae |
| <i>Epicauta normalis</i> Werner | Coleoptera | Meloidae |
| <i>Epicauta oregona</i> Horn | Coleoptera | Meloidae |
| <i>Epicauta pensylvanica</i> (DeGeer) | Coleoptera | Meloidae |
| <i>Epicauta puncticollis</i> Mann | Coleoptera | Meloidae |
| <i>Epicauta subglabra</i> (Fall.) | Coleoptera | Meloidae |
| <i>Epuraea</i> sp. | Coleoptera | Nitulidae |
| <i>Eucinetus terminalis</i> LeConte | Coleoptera | Eucinetidae |
| <i>Euhrychiopsis albertana</i> (Brown) | Coleoptera | Curculionidae |
| <i>Eupoedes volucris</i> Osten Sacken | Diptera | Syrphidae |
| <i>Euscelidius maculipennis</i> (DeL. and Dav.) | Homoptera | Cicadellidae |
| <i>Euspilotus insertus</i> (LeConte) | Coleoptera | Histeridae |
| <i>Euxoa auxiliaris</i> (Grote) | Lepidoptera | Noctuidae |
| <i>Euxoa ochrogaster</i> (Guenee) | Lepidoptera | Noctuidae |
| <i>Extrusanus extrusus</i> (Van Duzee) | Homoptera | Cicadellidae |
| <i>Frankliniella occidentalis</i> (Pergarde) | Thysanoptera | Thripidae |
| <i>Frankliniella tritici</i> (Fitch) | Thysanoptera | Thripidae |
| <i>Gabrius picipennis</i> (Mannh.) | Coleoptera | Staphylinidae |
| <i>Galeruca browni</i> Blake ? | Coleoptera | Chrysomelidae |
| <i>Gastrophysa cyanea</i> Melsheimer | Coleoptera | Chrysomelidae |
| <i>Gastrophysa polygoni</i> (Linnaeus) | Coleoptera | Chrysomelidae |
| <i>Geocoris atricolor</i> Mont. | Hemiptera | Lygaeidae |
| <i>Geocoris bullatus</i> Say | Hemiptera | Lygaeidae |
| <i>Geocoris discopterus</i> (Stal) | Hemiptera | Lygaeidae |
| <i>Geocoris nr pallens</i> | Hemiptera | Lygaeidae |
| <i>Geocoris uliginosis</i> Say | Hemiptera | Lygaeidae |
| <i>Gnypeta</i> sp. | Coleoptera | Staphylinidae |
| <i>Grypus equiseti</i> (Fabricius) | Coleoptera | Curculionidae |
| <i>Gyponana quebecensis</i> (Provancher) | Homoptera | Cicadallidae |
| <i>Hadronema militaris</i> Uhler | Hemiptera | Miridae |

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| <i>Halothrips malifloris</i> complex | Thysanoptera | Phleothripidae |
| <i>Harpalellus basilaris</i> (Kirby) | Coleoptera | Carabidae |
| <i>Harpalus amputatus</i> Say | Coleoptera | Carabidae |
| <i>Harpalus fumerarius</i> Csiki | Coleoptera | Carabidae |
| <i>Harpalus</i> nr <i>uteanus</i> Casey | Coleoptera | Carabidae |
| <i>Harpalus</i> sp. | Coleoptera | Carabidae |
| <i>Hecalus major</i> (Osborne) | Homoptera | Cicadellidae |
| <i>Helina duplicata</i> (Meigen) | Diptera | Muscidae |
| <i>Helocharis communis</i> Fitch | Homoptera | Cicadellidae |
| <i>Helophilus latrifrons</i> Loew | Diptera | Syrphidae |
| <i>Helophorus orientalis</i> Motsch. | Coleoptera | Hydrophilidae |
| <i>Hemicrepidius memmonius</i> (Hbst.) | Coleoptera | Elateridae |
| <i>Hippodamia caseyi</i> Johnson | Coleoptera | Coccinellidae |
| <i>Hippodamia convergens</i> Guerin | Coleoptera | Coccinellidae |
| <i>Hippodamia glacialis</i> (Fabricius) | Coleoptera | Coccinellidae |
| <i>Hippodamia parenthesis</i> (Say) | Coleoptera | Coccinellidae |
| <i>Hippodamia quinquesignata</i> (Kirby) | Coleoptera | Coccinellidae |
| <i>Hippodamia sinuata crotchi</i> Casey | Coleoptera | Coccinellidae |
| <i>Hippodamia tredecimpunctata</i> <i>tibialis</i> (Say) | Coleoptera | Coccinellidae |
| <i>Holcostethus limbolaris</i> Stal | Hemiptera | Scutelleridae |
| <i>Homaemus aeneifrons consors</i> Uhler | Hemiptera | Scutelleridae |
| <i>Hylemya (Delia) extremitata</i> Malloch | Diptera | Anthomyiidae |
| <i>Hylemya (Delia) platura</i> (Meigen) | Diptera | Anthomyiidae |
| <i>Hylemya (Pegohylemya) fugax</i> (Meigen) | Diptera | Anthomyiidae |
| <i>Hypera postica</i> (Gyllenhal) | Coleoptera | Curculionidae |
| <i>Hypera punctata</i> (Fabricius) | Coleoptera | Curculionidae |
| <i>Hyperaspidium vittigerus</i> (LeConte) | Coleoptera | Coccinellidae |
| <i>Hyperaspis inflexa</i> Casey | Coleoptera | Coccinellidae |
| <i>Hyperaspis lateralis</i> Mulsant | Coleoptera | Coccinellidae |
| <i>Hyperaspis quadrivittata</i> LeConte | Coleoptera | Coccinellidae |
| <i>Hyperaspis undulata</i> (Say) | Coleoptera | Coccinellidae |
| <i>Hypogastrura manubrialis</i> (Tullberg) | Collembola | Poduridae |
| <i>Hypolithus bicolor</i> Esch. | Coleoptera | Elateridae |
| <i>Hyposoter</i> sp. | Hymenoptera | Ichneumonidae |
| <i>Ilnacora</i> nr <i>albifrons</i> Knight | Hemiptera | Miridae |

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| <i>Labops hesperus</i> Uhler | Hemiptera | Miridae |
| <i>Labops simulans</i> Stal | Hemiptera | Miridae |
| <i>Laccocera vittipennis</i> Van Duzee | Homoptera | Delphacidae |
| <i>Lepesoma alteranata</i> (Horn) | Coleoptera | Curculionidae |
| <i>Leptacinus intermedius</i> Don | Coleoptera | Staphylinidae |
| <i>Leptinotarsa decemlineata</i> (Say) | Coleoptera | Chrysomelidae |
| <i>Leucostoma simplex</i> (Fallen) | Diptera | Tachinidae |
| <i>Liburna occulosa</i> Van Duzee | Homoptera | Delphacidae |
| <i>Liburna pellucida</i> (Fabricius) | Homoptera | Delphacidae |
| <i>Liburna</i> sp. | Homoptera | Delphacidae |
| <i>Ligyrocoris sylvestris</i> (Linnaeus) | Hemiptera | Lygaeidae |
| <i>Limosia cilicauda</i> (Malloch) | Diptera | Muscidae |
| <i>Limothrips denticornis</i> Haliday | Thysanoptera | Thripidae |
| <i>Liriomya</i> sp. | Diptera | Agromyzidae |
| <i>Listronotus</i> sp. | Coleoptera | Curculionidae |
| <i>Litomeris debilis</i> (Uhler) | Hemiptera | Miridae |
| <i>Livia</i> sp. | Homoptera | Psyllidae |
| <i>Lonchoptera furcata</i> Fallen | Diptera | Lonchopteridae |
| <i>Longitarsus</i> sp. | Coleoptera | Chrysomelidae |
| <i>Lopidea dakota</i> Knight | Hemiptera | Miridae |
| <i>Lopus</i> sp. | Hemiptera | Miridae |
| <i>Loricera pilicornis</i> (Fabricius) | Coleoptera | Carabidae |
| <i>Loxostege cereralis</i> (Zeller) | Lepidoptera | Pyralidae |
| <i>Loxostege sticticalis</i> (Linnaeus) | Lepidoptera | Pyralidae |
| <i>Lygaeus kalmii</i> Stal | Hemiptera | Lygaeidae |
| <i>Lygidea</i> sp. | Hemiptera | Miridae |
| <i>Lygus borealis</i> (Kelton) | Hemiptera | Miridae |
| <i>Lygus desertinus</i> Knight | Hemiptera | Miridae |
| <i>Lygus elisus</i> Van Duzee | Hemiptera | Miridae |
| <i>Lygus lineolaris</i> (Palisot de Beauvois) | Hemiptera | Miridae |
| <i>Lygus rufidorsus</i> (Kelton) | Hemiptera | Miridae |
| <i>Lygus shulli</i> (Knight) | Hemiptera | Miridae |
| <i>Lygus unctuosus</i> Kelton | Hemiptera | Miridae |
| <i>Lytta nuttali</i> Say | Coleoptera | Meloidae |
| <i>Macrohaltica</i> sp. | Coleoptera | Chrysomelidae |
| <i>Macrosteles fascifrons</i> (Stal) | Homoptera | Cicadellidae |

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| <i>Malachius aeneus</i> (Linnaeus) | Coleoptera | Melyridae |
| <i>Megachile brevis</i> Say | Hymenoptera | Megachilidae |
| <i>Megachile dentitarsus</i> Sladen | Hymenoptera | Megachilidae |
| <i>Megachile frigida</i> Sm. | Hymenoptera | Megachilidae |
| <i>Megachile melanophae</i> Sm. | Hymenoptera | Megachilidae |
| <i>Megachile perhirta</i> Ckll. | Hymenoptera | Megachilidae |
| <i>Megachile rotundata</i> Fabricius | Hymenoptera | Megachilidae |
| <i>Megalotamus quinquespinosus</i> Say | Hemiptera | Coreidae |
| <i>Megaselia</i> sp. | Diptera | Phoridae |
| <i>Melanophthalma</i> sp. | Coleoptera | Lathridiidae |
| <i>Melanoplus bivittatus</i> (Say) | Orthoptera | Acrididae |
| <i>Melanoplus femurrubrum</i> (DeGeer) | Orthoptera | Acrididae |
| <i>Melanoplus packardii</i> Scudder | Orthoptera | Acrididae |
| <i>Melanoplus sanguinipes</i> (Fabricius) | Orthoptera | Acrididae |
| <i>Melanotrichus coagulatus</i> (Uhler) | Hemiptera | Miridae |
| <i>Melanotrichus flavosparsus</i> (Sahlberg) | Hemiptera | Miridae |
| <i>Metabletus americanus</i> (Dejean) | Coleoptera | Carabidae |
| <i>Metasyrphus lapponicus</i> (Zetterstedt) | Diptera | Syrphidae |
| <i>Metasyrphus</i> sp. | Diptera | Syrphidae |
| <i>Meteorus proximus</i> Cress. | Hymenoptera | Braconidae |
| <i>Microlestes linearis</i> (LeConte) | Coleoptera | Carabidae |
| <i>Microrhophala vittata</i> (Fabricius) | Coleoptera | Chrysomelidae |
| <i>Mimoceps insignis</i> Uhler | Hemiptera | Miridae |
| <i>Monoxia prob. angularis</i> (LeConte) | Coleoptera | Chrysomelidae |
| <i>Monoxia puncticollis</i> (Say) | Coleoptera | Chrysomelidae |
| <i>Mordellistena</i> sp. | Coleoptera | Mordellidae |
| <i>Musca domestica</i> Linnaeus | Diptera | Muscidae |
| <i>Myospila meditabunda</i> (Fabricius) | Diptera | Muscidae |
| <i>Nabis alternatus</i> Parshley | Hemiptera | Nabidae |
| <i>Nabis limbatus</i> Dahlbom | Hemiptera | Nabidae |
| <i>Nabis subcoleoptratus</i> (Kirby) | Hemiptera | Nabidae |
| <i>Nabis van duzee</i> Kirk | Hemiptera | Nabidae |
| <i>Nanodes canadensis</i> (Brown) | Coleoptera | Curculionidae |
| <i>Nearctaphis bakeri</i> (Cowen) | Homoptera | Aphididae |
| <i>Neohypnus hamatus</i> (Say) | Coleoptera | Staphylinidae |
| <i>Neohypnus obscurus</i> (Er.) | Coleoptera | Staphylinidae |

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| <i>Neottiglossa undata</i> Say | Hemiptera | Pentatomidae |
| <i>Notaris bimaculata</i> (Fabricius) | Coleoptera | Curculionidae |
| <i>Notiophilus aquaticus</i> (Linnaeus) | Coleoptera | Carabidae |
| <i>Notoxus anchora</i> Hentz | Coleoptera | Anthicidae |
| <i>Nysius ericae</i> Schilling | Hemiptera | Lygaeidae |
| <i>Nysius minutus</i> Uhler | Hemiptera | Lygaeidae |
| <i>Odontothrips loti</i> (Haliday) | Thysanoptera | Thripidae |
| <i>Oedostethus femoralis</i> LeConte | Coleoptera | Elateridae |
| <i>Onthophagus nuchicornis</i> Linnaeus | Coleoptera | Scarabaeidae |
| <i>Ophyra leucostoma</i> (Wiedemann) | Diptera | Muscidae |
| <i>Orectoderus obliquus</i> Uhler | Hemiptera | Miridae |
| <i>Orius tristicolor</i> (White) | Hemiptera | Anthocoridae |
| <i>Orthotylus fusicornis</i> Knight | Hemiptera | Miridae |
| <i>Otiiorhynchus ovatus</i> (Linnaeus) | Coleoptera | Curculionidae |
| <i>Pachybrachis</i> sp. | Coleoptera | Chrysomelidae |
| <i>Pachyneuron</i> sp. | Hymenoptera | Pteromalidae |
| <i>Panscopus aequalis</i> (Horn) | Coleoptera | Curculionidae |
| <i>Paroxyna pygmaea</i> Novak | Diptera | Tephrididae |
| <i>Pegomyia</i> sp. | Diptera | Anthomyiidae |
| <i>Peleteria iterans</i> (Walker) | Diptera | Tachinidae |
| <i>Perilitus</i> see <i>Dinocampus</i> | Hymenoptera | Braconidae |
| <i>Peritrichus saskatchewanensis</i> Barb. | Hemiptera | Lygaeidae |
| <i>Phalacrus</i> sp. | Coleoptera | Phalacridae |
| <i>Philaenarcys bilineata</i> (Say) | Homoptera | Cercopidae |
| <i>Philaenus spumarius</i> (Linnaeus) | Homoptera | Cercopidae |
| <i>Philonthus concinnus</i> Grav. | Coleoptera | Staphylinidae |
| <i>Philonthus fuscipennis</i> Mannh. | Coleoptera | Staphylinidae |
| <i>Philonthus lautus</i> Csy. | Coleoptera | Staphylinidae |
| <i>Philonthus occidentalis</i> Horn | Coleoptera | Staphylinidae |
| <i>Philonthus sordidus</i> (Grav.) | Coleoptera | Staphylinidae |
| <i>Philonthus varius</i> (Gyllenhal) | Coleoptera | Staphylinidae |
| <i>Phyllobaenus</i> sp. | Coleoptera | Cleridae |
| <i>Phyllotreta albionica</i> LeConte | Coleoptera | Chrysomelidae |
| <i>Phyllotreta cruciferae</i> (Goeze) | Coleoptera | Chrysomelidae |
| <i>Phyllotreta striolata</i> (Fabricius) | Coleoptera | Chrysomelidae |
| <i>Phymata pennsylvania</i> Handl. | Hemiptera | Phymatidae |

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| <i>Phytocoris pallidicornis</i> Reuter | Hemiptera | Miridae |
| <i>Piesma cinerea</i> Say | Hemiptera | Piesmidae |
| <i>Plagiognathus obscurus</i> Uhler | Hemiptera | Miridae |
| <i>Plagiognathus</i> sp. | Hemiptera | Miridae |
| <i>Platystethus americanus</i> Er. | Coleoptera | Staphylinidae |
| <i>Podisus placidus</i> Uhler | Hemiptera | Pentatomidae |
| <i>Poecilus lucublandus</i> (Say) | Coleoptera | Carabidae |
| <i>Pollenia rudis</i> (Fabricius) | Diptera | Calliphoridae |
| <i>Polymerus</i> prob. <i>rufipes</i> Knight | Hemiptera | Miridae |
| <i>Prairiana cinerea</i> (Uhler) | Homoptera | Cicadellidae |
| <i>Praon</i> prob. <i>exoletum palitans</i> Muesbeck | Hymenoptera | Aphidiidae |
| <i>Praon pequodorum</i> Vierck | Hymenoptera | Aphidiidae |
| <i>Psammotettix lividellus</i> (Zett.) | Homoptera | Cicidellidae |
| <i>Pseudoleria</i> sp. | Diptera | Heleomyzidae |
| <i>Pseudothonomus</i> sp. | Coleoptera | Curculionidae |
| <i>Psilocephala aldrichi</i> Coquillett | Diptera | Therevidae |
| <i>Psylla</i> sp. | Homoptera | Psyllidae |
| <i>Psylloides convexior</i> LeConte | Coleoptera | Chrysomelidae |
| <i>Psylloides punctulata</i> Melsheimer | Coleoptera | Chrysomelidae |
| <i>Pterostichus melanarius</i> (Illiger) | Coleoptera | Carabidae |
| <i>Quadrularia laetifica</i> (Rob.-Des.) | Diptera | Muscidae |
| <i>Raphium campestre</i> Cn. | Diptera | Dolichopodidae |
| <i>Ravinia querula</i> (Walker) | Diptera | Sarcophagidae |
| <i>Rhopalus crassicornis</i> (Linnaeus) | Hemiptera | Coreidae |
| <i>Saldula palustris</i> (Douglas) | Hemiptera | Saldidae |
| <i>Sarcophaga harpax</i> (Pandelle) | Diptera | Sarcophagidae |
| <i>Sarcophaga sinuata</i> Meigen | Diptera | Sarcophagidae |
| <i>Sargus coprarius</i> (Linnaeus) | Diptera | Stratiomyidae |
| <i>Sargus viridis</i> Say | Diptera | Stratiomyidae |
| <i>Scaeva pyrastris</i> (Linnaeus) | Diptera | Syrphidae |
| <i>Scathophaga stercoraria</i> Linnaeus | Diptera | Scathophagidae |
| <i>Scellus monstrosus</i> Osten. Sacken | Diptera | Dolichopodidae |
| <i>Sciocoris microphthalmus</i> Flor. | Hemiptera | Pentatomidae |
| <i>Scotogramma</i> see <i>Discestra</i> | Lepidoptera | Noctuidae |
| <i>Scymnus</i> (Pullus) <i>caudalis</i> LeConte | Coleoptera | Coccinellidae |
| <i>Scymnus</i> (Pullus) <i>postpictus</i> Casey | Coleoptera | Coccinellidae |

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|---|------------|----------------|
| <i>Scymnus (Pullus) puncticollis</i> LeConte | Coleoptera | Coccinellidae |
| <i>Scymnus</i> sp. | Coleoptera | Coccinellidae |
| <i>Sehirus cinctus</i> (Palisot de Beauvois) | Hemiptera | Cydnidae |
| <i>Sinea diadema</i> Fabricius | Hemiptera | Reduviidae |
| <i>Sitona cylindricollis</i> Fahraeus | Coleoptera | Curculionidae |
| <i>Sitona hispidulus</i> (Fabricius) | Coleoptera | Curculionidae |
| <i>Sitona lepidus</i> Gyllenhal | Coleoptera | Curculionidae |
| <i>Sitona scissifrons</i> Say | Coleoptera | Curculionidae |
| <i>Slaterobius insignis</i> (Uhler) | Hemiptera | Lygaeidae |
| <i>Slaterocoris</i> prob. <i>stygius</i> Say | Hemiptera | Miridae |
| <i>Sminthurinus elegans</i> (Fitch) | Collembola | Sminthuridae |
| <i>Sminthurinus medialis</i> (Mills) | Collembola | Sminthuridae |
| <i>Sorhoanus uhleri</i> (Oman) | Homoptera | Cicidellidae |
| <i>Sphaerophoria philanthus</i> (Meigen) | Diptera | Syrphidae |
| <i>Sphaerophoria robusta</i> see <i>S. philanthus</i> | Diptera | Syrphidae |
| <i>Sphaerophoria</i> sp. | Diptera | Syrphidae |
| <i>Sphragisticus nebulosus</i> (Fall.) | Hemiptera | Lygaeidae |
| <i>Stenodema trispinosum</i> (Reuter) | Hemiptera | Miridae |
| <i>Stenodema vicinum</i> (Provancher) | Hemiptera | Miridae |
| <i>Stenodema virens</i> Linnaeus | Hemiptera | Miridae |
| <i>Stenolophus comma</i> (Fabricius) | Coleoptera | Carabidae |
| <i>Stenolophus conjunctus</i> (Say) | Coleoptera | Carabidae |
| <i>Stenopogon inquinatus</i> Loew | Diptera | Asilidae |
| <i>Stenus (Hypostenus) reconditus</i> | | |
| <i>breviusculus</i> Puthz | Coleoptera | Staphylinidae |
| <i>Stenus</i> (s.st.) <i>morio</i> Grav. | Coleoptera | Staphylinidae |
| <i>Stenus</i> (s.st.) <i>occidentalis</i> Csy ? | Coleoptera | Staphylinidae |
| <i>Stenus vicinoides</i> Puthz | Coleoptera | Staphylinidae |
| <i>Stictocephala basalis</i> (Walker) | Homoptera | Membracidae |
| <i>Stictocephala bisonia</i> (Kopp and Yke) | Homoptera | Membracidae |
| <i>Stictopleuris punctiventris</i> (Dallas) | Hemiptera | Coreidae |
| <i>Stictopleuris viridicatus</i> (Uhler) | Hemiptera | Coreidae |
| <i>Stillbus apicalis</i> Melsheimer | Coleoptera | Phalacridae |
| <i>Stillbus</i> sp. | Coleoptera | Phalacridae |
| <i>Stratiomys normula</i> Loew | Diptera | Stratiomyiidae |
| <i>Streptanus deceptus</i> (Sd. and DeLong) | Homoptera | Cicidellidae |

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| <i>Syrirta pipiens</i> (Linnaeus) | Diptera | Syrphidae |
| <i>Syrphus torvus</i> Osten Sacken | Diptera | Syrphidae |
| <i>Syrphus vitripennis</i> Meigen | Diptera | Syrphidae |
| <i>Systoechus vulgaris</i> Loew | Diptera | Bombyliidae |
| <i>Tachyporus inornatus</i> Campbell | Coleoptera | Staphylinidae |
| <i>Tachyporus mexicanus</i> Sharp | Coleoptera | Staphylinidae |
| <i>Tachyporus nitidulus</i> (Fabricius) | Coleoptera | Staphylinidae |
| <i>Tephritis</i> sp. | Diptera | Tephrididae |
| <i>Tetanops myopaeformis</i> (Roder) | Diptera | Otitidae |
| <i>Tetraopes femoratus</i> LeConte | Coleoptera | Cerambycidae |
| <i>Thaumatomyia bistriata</i> (Walker) | Diptera | Chloropidae |
| <i>Thaumatomyia glabra</i> Meigen | Diptera | Chloropidae |
| <i>Thereva duplicis</i> Coquillett | Diptera | Therevidae |
| <i>Therioaphis maculata</i> (Buckton) | Homoptera | Aphididae |
| <i>Thrips tabaci</i> Lindeman | Thysanoptera | Thripidae |
| <i>Thyanta punctiventris</i> Van Duzee | Hemiptera | Pentatomidae |
| <i>Trichodes nutalli</i> Kirby | Coleoptera | Cleridae |
| <i>Trigonotylus coelestialium</i> (Kirkaldy) | Hemiptera | Miridae |
| <i>Trigonotylus ruficornis</i> (Geoffroy) | Hemiptera | Miridae |
| <i>Trirhabda attenuata</i> (Say) | Coleoptera | Chrysomelidae |
| <i>Trirhabda nr borealis</i> Blake | Coleoptera | Chrysomelidae |
| <i>Trirhabda virgata</i> LeConte | Coleoptera | Chrysomeiidae |
| <i>Tychius picirostris</i> (Fabricius) | Coleoptera | Curculionidae |
| <i>Wesmalia pendula</i> Foester | Hymenoptera | Braconidae |
| <i>Xylentinus fucatus</i> LeConte | Coleoptera | Anobiidae |
| <i>Xylocoris umbrinus</i> (Van Duzee) | Hemiptera | Miridae |
| <i>Xylocoris umbrinus</i> Van Duzee | Hemiptera | Anthocoridae |
| <i>Zeridoneus costalis</i> Van Duzee | Hemiptera | Lygaeidae |

Appendix II. Species of Mites in Alfalfa

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|--|-------|---------------|
| <i>Abrolophus</i> sp. | Acari | Erythraeidae |
| <i>Amblyseius iroquois</i> Chant and Hansell | Acari | Phytoseiidae |
| <i>Ameroseius corbicula</i> (Sowerby) | Acari | Ameroseiidae |
| <i>Biscirus silvaticus</i> (Kramer) | Acari | Bdellidae |
| <i>Cunaxoides biscutum</i> (Nesbitt) | Acari | Cunaxidae |
| <i>Oribatula tibialis</i> (Nicolet) | Acari | Oritubulidae |
| <i>Petrobia latens</i> (Muller) | Acari | Tetranychidae |
| <i>Tetranychus urticae</i> (Koch) | Acari | Tetranychidae |
| <i>Trombidium</i> sp. | Acari | Trombiidae |

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