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THE COCCINELLIDAE (COLEOPTERA) OF AMERICA NORTH OF MEXICO

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Plate 1.

*Adalia bipunctata* (L.)

*Axion tripustulatum* (Degeer)

*Paranaemia vittigera* (Mannerheim)

*Hippodamia parenthesis* (Say)

*Epilachna borealis* (F.)

*Chilocorus stigma* (Say)

*Cycloneda polita* Casey

*Coccinella trifasciata perplexa* Mulsant
Plate 2.

Didion punctatum (Melsheimer)

Diomus terminalis (Say)

Hyperaspis fastidiosa Casey

Psyllobora vigintimaculata (Say)

Hyperaspis levrati Mulsant

Brachiacantha uteella Casey

Nephaspis bioculatus (Blatchley)

Cephaloscymnus z. australis Gordon
THE COCCINELLIDAE (COLEOPTERA) OF AMERICA NORTH OF MEXICO

ROBERT D. GORDON
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Abstract.—The 57 genera and 475 species of Coccinellidae occurring in America north of Mexico are treated taxonomically. Keys to all taxa, descriptions of the higher taxa, species diagnoses, synonymies, and host records are included. Two new tribes, Cephaloscymnini and Selvadiini, are erected for the genera *Cephaloscymnus* Croft and *Selvadius* Casey. New species are described as follows: *Bachiaca cantha barberi; B. rotunda; B. schwarzi; B. soltau; B. stephani; Exopletra schaefferi; Gnathoweisea ferox; G. hageni; G. micula; G. texana; Hyperaspidius algodonus; H. Andrews; H. hardyi; H. nanellus; H. simulatus; Hyperaspis caseyi; H. deludens; H. dobzhanskyi; H. imitator; H. ornatella; H. schaefferi; H. uteana; Nephus (S.) timberlakei; Zagloba satana; Zilus horni. A chapter on biological control involving the family Coccinellidae includes discussions of the introduced species established in North America, and tables listing all the species that have been introduced whether established or not.
Ladybird beetles (Coccinellidae) have been favorites of collectors and objects of general popular interest for centuries because of the bright, contrasting red and black colors of many of the species. Also, species tend to seek shelter in winter, hence are commonly found in and around dwellings at a time of year when most insects are not in evidence. Popular interest in the Ladybird (which in Europe is *Coccinella septempunctata*) goes back at least to the fifteenth century and probably much farther. The Ladybird is usually dedicated to the Virgin Mary; in Scandinavia it is called Nyckelpiga, our Lady’s Key-maid, or Jung-fru Marias Gulhona, the Virgin Mary’s Golden-hen. In Germany it is Frauen or Marien-Käfer, Ladybeetles of the Virgin Mary, and in France it is known as Bêtes de la Vierge, Animals of the Virgin. Many rhymes or verses stem from beliefs in the supernatural powers of the Ladybird, a few of which are recited below (from Cowan, 1865).

From Vienna a superstition connected with the Ladybird’s ability to bring fine weather:

```
Little birdie, birdie
Fly to Marybrunn
and bring us a fine sun
```

From the marsh of the Elbe comes a similar request:

```
May-cat
Fly away
Hasten away
Bring me good weather with you tomorrow
```

Northern Germany (Ploen) gives us a request based on the belief that the Ladybird can foretell the harvest year; if the spots exceed 7, grain will be scarce, if there are fewer than 7, there will be an abundant harvest:

```
Maerspart, fly to heaven
Bring me a sack full of biscuits, one for me, one for thee,
for all the little angels one
```

In northern Europe it is thought to be lucky when a young girl sees the Ladybird in the spring, she lets it creep around her hand and says, “She measures me for wedding gloves.” When it flies away the direction it takes is important because it signifies from what direction her sweetheart will come. England provides us with this rhyme:

```
This Ladyfly I take from off the grass,
whose spotted back might scarlet red surpass.
Fly, Ladybird, north, south, or east or west,
Fly where the man is found that I love best.
He leaves my hand, see to the west he’s flown,
To call my true-love from the faithless town.
```
Also from England (Norfolk) comes a similar wish in verse:

    Bishop, Bishop Barnabee,
    Tell me when my wedding be:
    If it be tomorrow day,
    Take your wings and fly away!
    Fly to the east, fly to the west,
    Fly to him that I love best.

In Scotland the Ladybird is a great favorite, and we have still more rhymes concerning a sweetheart:

    Lady, Lady Lanners
    Lady, Lady Lanners,
    Tak’ up your clowk about your head,
    An’ flee awa’ to Flanners (Flanders)
    Flee ower firth and flee ower fell,
    Flee ower pule and rinnan’ well,
    Flee ower muir, and flee ower mead,
    Flee ower livan, flee ower dead,
    Flee ower corn, and flee ower lee,
    Flee ower river, flee ower sea,
    Flee ye east, or flee ye west,
    Flee till him that lo’es me best.

Or,—

    King, King collowa,
    Up your wings and flee awa’
    Over land and over sea;
    Tell me where my love can be!

The Ladybird rhyme best known to children in England and America follows with 2 English versions:

    Ladybird, ladybird, fly away home;
    Your house is on fire your children’s at home,
    All but one that ligs under the stone,—
    Ply thee home, ladybird, ere it be gone.

From Yorkshire and Lancashire,—

    Ladybird, ladybird, eigh thy way home;
    Thy house is on fire, thy children all roam,
    Except little Nan, who sits in her pan,
    weaving gold laces as fast as she can.

The seemingly obscure meaning of the latter 2 rhymes is explained by the presence of the Ladybird in large numbers among hop vines. The larvae feed on aphids of the hop vine and fire was formerly used as a means of killing the aphids, thus effectively killing the Ladybirds as well.

From “The Zoology of the English Poets” by Newell (1845) come 2 rather elegant
examples of verse concerning the Ladybird. First, from the tragedy of Sir Thomas Moore by Hurdis:

Sir John.

What d'ye look at?

Cecilia.

A little animal, that round my glove,
And up and down to every finger's tip,
Has travelled merrily, and travels still,
Tho' it has wings to fly: what its name is
With learned men I know not; simple folk
Call it the lady-bird.

Sir John.

Poor harmless thing!

Save it.

Cecilia.

I would not hurt it for the world;
Its prettiness says, Spare me; and it bears
Armour so beautiful upon his back,
I could not injure it to be a queen:
Look, sir, its coat is scarlet dropp'd with jet,
Its eyes pure ivory.

Sir John.

Child, I am blind
To objects so minute: I know it well;
'Tis the companion of the waning year,
And lives among the blossoms of the hop;
It has fine silken wings enfolded close
Under that coat of mail.

Cecilia.

I see them, sir,

For it unfurls them now—'tis up and gone.

And, from Southey's "The Burnie-Bee":

Back o'er thy shoulders throw thy ruby shards,
With many a tiny coal-black freckle deck'd;
My watchful eye thy loitering saunter guards,
My ready hand thy footsteps shall protect.

So shall the fairy train, by glowworm light,
With rainbow tints thy folding pennons fret,
Thy scaly breast in deeper azure sight,
Thy burnish'd armour deck with glossier jet.

Some superstitions have existed about the Ladybird that don't appear in verse, such as the Ladybird as a cure for measles and colic (Newell, 1845); or as a cure for the toothache when specimens are mashed and put into the hollow tooth. This latter use of the Ladybird comes to us from Jaeger (1859) who states “I tried this application in two instances, and the tooth-ache was immediately relieved; but whether the remedy, or the faith of the patient, acted therapeutically, or the tooth ceased aching of itself, I confess I do not pretend to know.”

Ladybird beetles are generally thought of as beneficial insects, predators of plant pests; this is true for the most part, particularly in temperate regions. In tropical regions, however, many are plant feeders, some economically significant. A few plant feeders occur in temperate regions, the Mexican bean beetle being the prime North American example.

Historically, the beneficial species have been classified as “Coccinellides Aphidi-phages” (Chapuis, 1876) (aphid predators), and the plant feeders as “Coccinellides phytophages” (Chapuis, 1876). This designation of beneficial species as aphid predators is accurate only in part. The beneficials actually divide into groups of species, each of which has a preferred group of host species; as examples, species of Chilocorinae prey on scale insects, species of Stethorini on mites, and most species of Coccinellinae are aphid predators. However, in the absence or scarcity of preferred food, many species will feed on other insects such as the immature stages of Coleoptera, Lepidoptera, and Hymenoptera. Members of the genus Coleomegilla (Coccinellinae) are able not only to survive on a variety of foods, but to complete development when restricted to an unusual diet such as mites. Plant pollen also qualifies as an essential food for Coleomegilla, and members of this genus are evidently the most euryphagous of the Coccinellidae. The preferred food of another genus of Coccinellinae, Neoharmonia, is evidently the larvae of a genus of Chrysomelidae. Among the phytophagous Coccinellidae, most are typical leaf feeders, such as Epilachna and Subcoccinella, but the Psylloborini have acquired the unusual habit of feeding exclusively on fungal hyphae and spores.

Ladybirds are thus of considerable interest to naturalists, agriculturists, etc.; therefore a need exists for a comprehensive faunal treatment. The present volume is an attempt to fill that need.

The purpose of this treatment is to provide the means to identify the species of Coccinellidae occurring in America north of Mexico. To this end, keys, illustrations, diagnoses, and synonymies are provided for all taxa known to occur in North America. A brief chapter on biological control importation efforts is included because of the significance of many species as actual or potential control agents against plant pests.

**Historical Resume**

Along with other animal groups, the classification of the Coccinellidae began with Linnaeus in the mid 1700's. Over the next 100 years it proceeded along the familiar paths of insect classification, attended to by Fabricius, Degeer, Thunberg, Herbst,
etc. In 1850, Mulsant produced a monograph of the Coccinellidae on a world basis that proved to be the foundation for modern classification and which still is an indispensable tool in any coccinellid specialist's shop. This treatment was so well done that large portions of it remain unaltered by subsequent research. In 1853 and 1866, Mulsant published additional information as supplements to the 1850 volume. The next major figure on the scene was George Robert Crotch, who again treated the world Coccinellidae (1874). He changed Mulsant's classification very little, but added several new genera and many new species. Crotch was followed by Julius Weise, who, although producing no single monumental work, succeeded in refining coccinellid classification in a series of papers from 1878 to 1930. Weise was a careful, observant worker whose contributions were highly significant. He was also the first coccinellid taxonomist to realize that male genitalia could be used to distinguish species, although he did not pursue this to any extent. Korscheffsky, a protege of Weise, was an amateur coccinellid taxonomist of considerable ability. When Weise died before writing the Coccinellidae portion of the Junk Catalogue, Korscheffsky proceeded to do the work which appeared in 1931 and 1932, and which remains the single most useful taxonomic publication for coccinellid specialists anywhere in the world. One of the most important contributions to coccinellid classification is relatively recent; Sasaji (1968) published the "Phylogeny of the family Coccinellidae (Coleoptera)," a thorough consideration of the relationships of the higher taxa of the family. This publication has served as the basis for subfamily and tribal assignments since 1968, and rightfully so; all morphological characteristics of adults and many larval characteristics have been incorporated in the scheme in a logical fashion. I regard this contribution as a landmark in coccinellid classification, to be compared in significance with Mulsant's classification of 1850.

Casey (1899) treated the Coccinellidae of the United States in their entirety, providing the foundation for taxonomic research in North America. The chief workers in North American Coccinellidae since 1899 are Leng (1903–1920), Dobzhansky (1931–1941), Chapin (1930–1966), Brown and de Ruette (1962), Brown (1962), and Gordon (1970–present). In addition, regional studies of Coccinellidae have been made by Stehr (1930), Minnesota; Wingo (1952), Upper Mississippi Basin; Hatch (1961), Pacific Northwest; J. Chapin (1974), Louisiana; and Belicek (1976), Western Canada and Alaska.

Comprehensive publications on the biology, ecology, nutrition, metabolism, etc., are few. Some sources that contain literature reviews are Hagen (1962), Hodek (1966), and Hodek (1967). Most recently Hodek (1973) has compiled much of this information in a single source. Hodek's book contains a short chapter on the taxonomy and morphology of adults and an excellent chapter on the taxonomy and morphology of the larvae. The bulk of the book is devoted to discussion of such biological relationships as natural enemies, food sources, variability, and habitat.

**METHODS**

In keeping with the primary purpose of this publication, to serve as an identification manual, the systematics portion is kept as simple as possible. Thus, taxa above the species level are fully described, but, except for new taxa, species are briefly diagnosed
rather than described. Illustrations are provided to facilitate identifications, and these should be considered an essential part of the work and used accordingly.

Primary types. An effort has been made to locate and examine type material of all authors included except the older European workers such as Linnaeus, Fabricius, etc. When a species has been described from more than one specimen without designation of a holotype, a lectotype is designated and, where possible, the remaining specimens of the type series are designated as paralectotypes. The major type depositories for North American Coccinellidae are the California Academy of Sciences, Museum of Comparative Zoology, and U.S. National Museum; other institutions in North America that are type repositories are the Canadian National Collection and Purdue University. In several instances the type specimens have not been located and are either known to be lost or are presumed to be. An example of the former is the Say collection; examples of the latter are the Randall types and some of the Crotch and Melsheimer types. When the type specimens are lost, not located, or not examined, the traditional concept of the species has been accepted.

Locality records. Nearly all of the locality records listed in the text were taken from specimens actually examined; published records were accepted only when the source was unquestionably authoritative. Under “Distribution” only the specified locality is given, plus county if stated on the label. Distribution data are given exactly as they appear on the label except that obvious misspellings are corrected. For new species, all information is given exactly as it appears on the label. Distributions are presented on maps with either symbols, shaded areas, or both. Shading is used when a species is commonly collected; symbols are used when a species is rarely collected or when the distribution pattern needs to be accurately defined. When a state record only is available, “S” with the appropriate symbol appears in that state on the map.

Host data. Host data for members of each genus are listed in the generic discussion. This is not intended to be a complete listing of all published host records; an exhaustive literature search has not been conducted, but all major sources of host information have been consulted, additional records have been discovered in the course of the study, and specimen label data have been included.

Terms

Most of the morphological terms used are germane to beetles in general, but some are unique to ladybird beetles. To facilitate the use of the keys and descriptions, a brief glossary follows (see Figs. 1, 2).

accessory gland, thin walled, saclike structure attached in basal ½ of spermathecal capsule of female genitalia.
basal lobe, median apical projection of phallobase of male genitalia serving as a guide for siphone.
basal piece, basal portion of phallobase of male genitalia to which the basal lobe, paramere, and trabes attach.
bursa copulatrix, thin walled, saclike structure between infundibulum or sperm duct and abdominal apex.
cornu, apical curved portion of spermathecal capsule of female genitalia.
cryptotetramerous (tarsus), tarsus composed of 4 segments, appearing 3 seg- mented because 3rd segment minute, concealed between lobes of 2nd segment.
genital plates, sclerotized plates which are the divided 9th abdominal sternum in the female.

infundibulum, sclerotized, funnel-like structure between sperm duct and bursa copulatrix of female genitalia.

nodulus, basal part of spermathecal capsule of female genitalia.

paramere, paired lateral apical projection of phallobase of male genitalia serving to position and hold basal lobe in position during copulation.

phallobase, includes the basal piece, basal lobe, and paramere of male genitalia.

postcoxal line, the line on the 1st abdominal sternum posterior to hind coxa.

ramus, swelling or projection usually between cornu and nodulus of spermathecal capsule of female genitalia.

sipho, sclerotized, curved rod which is inserted through the basal lobe and into the female bursa copulatrix during copulation, corresponds to aedeagus or penis.

spermathecal capsule, part of the female genitalia composed of the cornu, ramus, and nodulus (one or both of the latter may be absent).
Fig. 2. Male and female genitalia and postcoxal lines of Coccinellidae. a, b. Male genitalia. c. Female. d–g. Postcoxal lines.
sperm duct, tube connecting spermathecal capsule to infundibulum or bursa copulatrix of female genitalia.

trabes, strut posterior to basal piece of male genitalia, connected by muscular attachment to basal piece.

trimmerous (tarsus), tarsus composed of 3 segments.

The postcoxal line on the 1st abdominal sternum is a useful character for generic discrimination. This line takes 4 major forms in the Coccinellidae; I refer to these as the Pullus, Scymnus, Diomus, or Nephus types in the text without further explanation. These types are illustrated in Figure 2, and are characterized as follows: Pullus type-line complete, curved from base medially to base of sternum laterally; Scymnus type-line incomplete, curved from base medially and forward toward base of sternum laterally; Diomus type - line incomplete, extending down from base, joining apical margin of sternum; and Nephus type - line incomplete, extending down from base nearly to apical margin of sternum, extending parallel to apical margin toward lateral margin.

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BIOLGICAL CONTROL AND COCCINELLIDAE IN NORTH AMERICA

The history of biological control in North America has been well documented beginning with Essig (1931). In addition to Essig, there have been several comprehensive reports on the subject which should be consulted for detailed information and bibliographies. Chief among these are DeBach (1964), Hagen and Franz (1973), and the articles in Huffaker and Messenger (1976). Clausen (1956b) discusses the status of successfully established beneficial introductions prior to that date. Clausen et al. (1978) present a broad view of the subject on a world wide basis.

The cottoncushion scale, a serious pest of citrus in California, precipitated the first attempts at introducing foreign parasites and predators into North America. In 1888, Albert Koebele was sent to Australia to obtain natural enemies and sent back to California several species of ladybird beetles, among which was the now famous “vedalia” beetle, Rodolia cardinalis. This species proved to be an immediate and spectacular success, and this success precipitated a wave of coccinellid introductions which included 46 species between 1891 and 1892, all brought or sent from Australia by Koebele (Hagen, 1974). Very few of these became established, and the interest in predaceous coccinellids waned in favor of parasitic Hymenoptera and, later, pesticides. In the 1960’s and 1970’s coccinellids were again introduced in significant numbers with several useful establishments resulting. Table 1 gives a summary of the species introduced into Canada and the United States, and is an attempt to list all coccinellid species that have been introduced, whether established or not. This attempt has not been completely successful because of ineffective record keeping during much of the last 80 years, but is nearly complete for 1950–1983. Available records show that 179 species have been intentionally imported into North America; 8 species have become established through accidental introductions, 5 of these had been intentionally introduced but did not become established where released. A total of 26 species of foreign Coccinellidae are now definitely or possibly established in North America, 16 of these resulting from intentional releases. Following are summaries of those species of Coccinellidae known to be established in North America as a result of intentional or accidental introductions, Clausen (1956b), and Clausen et al. (1978), and Tables 1 and 2 should be consulted for additional details.
Aphidecta obliterata (L.)

*Aphidecta obliterata* has been imported from Austria, Czechoslovakia, Germany, Norway, and Sweden and released in Canada, the Pacific Northwest, and North Carolina for control of the balsam woolly adelgid. The only release resulting in establishment was from Germany into North Carolina in 1960–1963. It now occurs in the Mt. Mitchell area only.

Azya orbiger a orbiger a Mulsant

There are no records of attempts made to introduce *A. orbiger a* into Florida. However, it is now definitely established in the Miami, Florida, area (1975 to date); providing yet another example of an apparent accidental introduction. Woodruff and Satler (1977) reviewed the history of the genus regarding biocontrol efforts in Florida.

Chilocorus bipustulatus (L.)

Attempts to establish *Chilocorus bipustulatus* in California were made in 1905, 1915, and 1927 from Israel and Italy for control of the black scale, citrus scale, California red scale, etc. These attempts failed, but in 1951, *C. bipustulatus* was imported from Israel and released for control of the olive scale, this time with successful establishment. At present this species occurs in Fresno, Merced, and Madera counties, California, but the establishment may be tenuous.

Chilocorus kuwanae Silvestri

Introduced into the United States from Japan and China a number of times since 1895 (as *Chilocorus similis* or *kuwanae*). Establishment resulted from an introduction made in 1924–1925. White peach scale, California red scale, and San Jose scale were the primary target hosts. At present *C. kuwanae* is known to occur in the vicinity of Santa Barbara, California.

Coccinella septempunctata L.

Attempts to establish *C. septempunctata* in the United States began in 1956 and continued through 1971. Material was obtained from France, India, Italy, Norway, and Sweden and released in several of the northeastern states, with an accompanying rearing program that produced material sent to several other states as far west as Arizona. All of these attempts apparently failed; however, specimens were collected in Bergen County, New Jersey, in 1973 and 1974. The species is now known to be established in several eastern states, but the origin of the New Jersey establishment is unknown. Subsequent laboratory rearing and shipments of specimens have resulted in establishment of *C. septempunctata* in Connecticut, Delaware, Georgia, Maine, New York, Oklahoma, and Pennsylvania. *Coccinella septempunctata* was released in New Brunswick in 1959–1960 without ensuing establishment; however, it is now established in Quebec due either to an accidental introduction or spread northward from Maine (Larochelle, 1979). New Jersey stock was also released in California, but apparently did not become established there (K. Hagen, pers. comm.).
Table 1. Species of Coccinellidae intentionally introduced into North America.

<table>
<thead>
<tr>
<th>Species</th>
<th>Country of origin</th>
<th>Date(s) of importation</th>
<th>Release data</th>
<th>Release area(s)</th>
<th>Establishment</th>
<th>Literature citation(s)</th>
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</thead>
<tbody>
<tr>
<td>Adalia tetraspilota (Hope)</td>
<td>Pakistan</td>
<td>X (1961)</td>
<td>North Carolina</td>
<td>0</td>
<td></td>
<td>Amman and Speers (1964)</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>X (1959) (1960)</td>
<td>Oregon</td>
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<td>Mitchell and Wright (1967); R. Dysart, pers. comm.</td>
</tr>
<tr>
<td>Astya luteipes Mulsant</td>
<td>Brazil</td>
<td>X (1934)</td>
<td>California</td>
<td>0</td>
<td></td>
<td>Clausen et al. (1978)</td>
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<tr>
<td>Astya orbignera Mulsant</td>
<td>Argentina</td>
<td>X (1935)</td>
<td>California</td>
<td>0</td>
<td></td>
<td>Clausen et al. (1978)</td>
</tr>
<tr>
<td>Brumoides suturalis (F.) (as Brumus suturalis)</td>
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<td>X (1955) (1973)</td>
<td>Southern California</td>
<td>0</td>
<td>Newell (1973); K. Hagen, pers. comm.</td>
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<tr>
<td></td>
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<td>Florida</td>
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<td>Selhime (1956); R. Dysart, pers. comm.</td>
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<td></td>
<td></td>
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<td>California, Texas (via Florida)</td>
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<td>Selhime (1956)</td>
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<td>Calvia quatuordecimguttata (L.)</td>
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<td>Texas</td>
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<td>R. Dysart, pers. comm.</td>
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<tr>
<td></td>
<td>Japan</td>
<td>X (1979)</td>
<td>Oklahoma</td>
<td>0</td>
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<td>R. Dysart, pers. comm.</td>
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<td>Species</td>
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<td>Catana chapini</td>
<td>India</td>
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<td>Catana parcesetosa (Sicard)</td>
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<td>Newell (1973)</td>
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<td>Catana perdistinctus Kapur</td>
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<td>Cheilomenes lunata (F.)</td>
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<td>?</td>
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<td>Chlorocorus angolensis Crotch</td>
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<td>1947</td>
<td>X (1948-1949)</td>
<td>California</td>
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<td>1905</td>
<td>X (1905)</td>
<td>California</td>
<td>0</td>
<td>Clausen et al. (1978)</td>
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<td></td>
<td>Italy</td>
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<td>X (1915) (1927)</td>
<td>California</td>
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<td>Essig (1931)</td>
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<td></td>
<td></td>
<td>T (1952-1956)</td>
<td>Clausen (1959); Fleschner (1961-1962); Huffaker and Doutt (1965); Clausen et al. (1978)</td>
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<td>Essig (1931)</td>
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<td>Fleschner (1959)</td>
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<td>Chilocorus circumdatum (Schoenherr)</td>
<td>China</td>
<td>1899, 1947</td>
<td>X (1899)</td>
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<td>Clausen (1959); Clausen et al. (1978)</td>
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<td></td>
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<td>Chilocorus discoides Crotch</td>
<td>Kenya</td>
<td>1956-1957</td>
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<tr>
<td>Chilocorus distigma Klug</td>
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<td>X (1946-1948)</td>
<td>California</td>
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<td>Chilocorus sp. near distigma Klug</td>
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<td>1953</td>
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<tr>
<td>Chilocorus kwianaes Silvestri (as Chilocorus similis (Rossi))</td>
<td>China, Japan</td>
<td>1895-1896 (1901-1902)</td>
<td>X (1896) (1902)</td>
<td>Eastern States, Georgia</td>
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<td>China</td>
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<td>Japan</td>
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<td>X (1957)</td>
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<td>Chilocorus rubidus tristis Falderman</td>
<td>(through Canada)</td>
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<td>Clausen et al. (1978)</td>
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Table 1. Continued.

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<th>Release area(s)</th>
<th>Establishment</th>
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<td><em>Chilocorus wahlbergi</em> Mulsant</td>
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<td>California</td>
<td>0</td>
<td>Clausen et al. (1978)</td>
</tr>
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<td><em>Chilocorus</em> sp.</td>
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<td></td>
<td>X (1957)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1957)</td>
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<tr>
<td><em>Chilocorus</em> sp.</td>
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<td>1971</td>
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<tr>
<td><em>Coccidophillus citricola</em> Bréthes</td>
<td>Brazil</td>
<td>1935</td>
<td>X (1935)</td>
<td>California</td>
<td>T (&quot;several years&quot;)</td>
<td>Clausen et al. (1978)</td>
</tr>
<tr>
<td><em>Coccinella intermedia</em> (Crotch)</td>
<td>Kenya</td>
<td>1956</td>
<td>0</td>
<td></td>
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<td>J. Hall, pers. comm.</td>
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<tr>
<td><em>Coccinella luteopicta</em> Mulsant (as <em>Adalia luteopicta</em>)</td>
<td>India</td>
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<td>X (1960)</td>
<td>Newfoundland</td>
<td>0</td>
<td>CIBC Tech. Comm. No. 4 (1971)</td>
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<td><em>Coccinella septempunctata</em> L.</td>
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<td>1955</td>
<td>X (1961)</td>
<td>Oregon</td>
<td>0</td>
<td>Clausen et al. (1978); Mitchell and Wright (1967)</td>
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<tr>
<td></td>
<td>Iraq</td>
<td>1955</td>
<td>X (1958)</td>
<td>Southern California</td>
<td>0</td>
<td>J. Hall, pers. comm.</td>
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<tr>
<td><em>Coccinella transversalis</em> F. (as <em>Coccinella repanda</em> Thunberg)</td>
<td>India</td>
<td></td>
<td>X (1958)</td>
<td>Arizona</td>
<td>0</td>
<td>R. Dysart, pers. comm.</td>
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<tr>
<td></td>
<td>New Jersey</td>
<td>1979</td>
<td>X (1979)</td>
<td>California</td>
<td>0</td>
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<tr>
<td><em>Coccinella undecimpunctata</em> (L.) (as <em>Coccinella novazealandica</em> Colenso)</td>
<td>Australia</td>
<td>1889</td>
<td>X (1889)</td>
<td>Alhambra, California</td>
<td>0</td>
<td>Essig (1931)</td>
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<tr>
<td>Species</td>
<td>Country of origin</td>
<td>Date(s) of importation</td>
<td>Release data</td>
<td>Release area(s)</td>
<td>Establishment</td>
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<tr>
<td><em>Coelophora inaequalis</em> (F.)</td>
<td>Puerto Rico</td>
<td>1939</td>
<td>X (1939)</td>
<td>Florida, Georgia, Louisiana</td>
<td>0</td>
<td>Clausen et al. (1978)</td>
</tr>
<tr>
<td><em>Cryptognatha gemellata</em> Mulsant (as <em>Cryptognatha simillima</em> Sicard)</td>
<td>Trinidad</td>
<td>1936</td>
<td>X (1936)</td>
<td>California, Florida</td>
<td>0</td>
<td>Dohanian (1937)</td>
</tr>
<tr>
<td><em>Cryptognatha nodiceps</em> Marshall</td>
<td>Puerto Rico, Trinidad</td>
<td>1936, 1938</td>
<td>X (1936) (1938)</td>
<td>Florida (Miami)</td>
<td>0</td>
<td>Clausen (1956); Collection data</td>
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<tr>
<td><em>Cryptolaemus affinis</em> Crotch</td>
<td>New Guinea</td>
<td>1973</td>
<td>X (1973)</td>
<td>California</td>
<td>0</td>
<td>Dohanian (1937)</td>
</tr>
<tr>
<td><em>Cryptolaemus monticoreus</em> Mulsant</td>
<td>Australia</td>
<td>1891, 1930</td>
<td>X (1891) (1930)</td>
<td>Northern and Southern California</td>
<td>X (1892)</td>
<td>Essig (1931); Clausen (1956b); Clausen et al. (1978)</td>
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<tr>
<td><em>Cryptolaemus wallacei</em> Crotch</td>
<td>California</td>
<td>1908</td>
<td>X (1908)</td>
<td>Louisiana</td>
<td>0</td>
<td>Garrett (1910)</td>
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<th>Country of origin</th>
<th>Date(s) of importation</th>
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<th>Establishment</th>
<th>Literature citation(s)</th>
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<tr>
<td><em>Diomus pumilio</em> Wiese (as <em>Scynmus (Scynn Nobius) pumilio)</em></td>
<td>Australia</td>
<td>X (1959) (1960)</td>
<td>Washington</td>
<td>0</td>
<td>Mitchell and Wright (1967); Clausen et al. (1978)</td>
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<tr>
<td><em>Diomus</em> sp., “black-face” (possibly <em>Diomus pumilio</em>)</td>
<td>Australia</td>
<td>X (1979)</td>
<td>Texas</td>
<td>?</td>
<td>R. Dysart, pers. comm.</td>
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<tr>
<td><em>Diomus</em> sp., “brown-face” (probably <em>Diomus pumilio</em>)</td>
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<td>1979</td>
<td>0</td>
<td>0</td>
<td>R. Dysart, pers. comm.</td>
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<tr>
<td><em>Egleis kingi</em> Maclean</td>
<td>Australia</td>
<td>X (1931)</td>
<td>Southern California</td>
<td>0</td>
<td>Essig (1931)</td>
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<tr>
<td><em>Erithionyx lanosus</em> Blackburn</td>
<td>Australia</td>
<td>X (1892)</td>
<td>Southern California</td>
<td>0</td>
<td>Essig (1931)</td>
</tr>
<tr>
<td><em>Exochomus floralis</em> (Motschulsky)</td>
<td>Morocco</td>
<td>1953</td>
<td>California</td>
<td>0</td>
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</tr>
<tr>
<td><em>Exochomus lituratus</em> Gorham</td>
<td>Pakistan</td>
<td>X (1960) (1961)</td>
<td>Oregon</td>
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<td>Clausen et al. (1978); Mitchell and Wright (1967)</td>
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<td><em>Exochomus metallicus</em> (Korschinsky)</td>
<td>South Africa</td>
<td>1924</td>
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### Table 1. Continued.

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<td>Massachusetts</td>
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<td>Clausen et al. (1978); Mitchell and Wright (1967)</td>
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<td>Australia</td>
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<td>X (1892)</td>
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<td>Essig (1931); Clausen (1956b)</td>
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<td>California</td>
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<td></td>
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<td>Georgia</td>
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<td><em>Harmonia octomaculata</em> (F.) (as Coccinella arcuata F.)</td>
<td>Australia, Fiji</td>
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<td>(Crotch)</td>
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<td>hortentiosa Mulsant</td>
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</tr>
<tr>
<td>vittatus Mulsant</td>
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<tr>
<td>*Scymnus sp. nr.</td>
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<td>X (1960)</td>
<td>X (1960)</td>
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<td>X (1892)</td>
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<td>0</td>
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</tr>
<tr>
<td>Blackburn</td>
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<tr>
<td>saturalis (Thunberg)</td>
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<td>Blackburn</td>
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<td>Species</td>
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<td>Date(s) of importation</td>
<td>Release data</td>
<td>Release area(s)</td>
<td>Establishment</td>
<td>Literature citation(s)</td>
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<tr>
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<td>Australia</td>
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<td>Southern California</td>
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</tr>
<tr>
<td>Blackburn</td>
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<td>Serangium maculigerum</td>
<td>Australia</td>
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<td>Southern California</td>
<td>0</td>
<td>Essig (1931)</td>
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<td>(Mulsani)</td>
<td>Guatemala</td>
<td>1955</td>
<td>X (1955)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen et al. (1978)</td>
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<tr>
<td>Stethorus granum</td>
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<tr>
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<td>1958</td>
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<td>J. Hall, pers. comm.</td>
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<td>Casey</td>
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<tr>
<td>Kapur (as Stethorus loxtoni)</td>
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<td></td>
<td>X (1978)</td>
<td>California</td>
<td>0</td>
<td>K. Hagen, pers. comm.</td>
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<td>Britton</td>
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<td>Stethorus punctillum</td>
<td>Turkey</td>
<td>1955</td>
<td>X (1955)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen et al. (1978)</td>
</tr>
<tr>
<td>Weise</td>
<td>Australia</td>
<td>1900, 1901</td>
<td>X (1901)</td>
<td>California</td>
<td>0</td>
<td>Essig (1931)</td>
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<td>Stethorus vagans</td>
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<td></td>
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<tr>
<td>(Blackburn)</td>
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<tr>
<td>Stethorus sp. &quot;D&quot;</td>
<td>India</td>
<td></td>
<td>X (1957)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1959)</td>
</tr>
<tr>
<td>Stethorus sp. &quot;D&quot;</td>
<td>Pakistan</td>
<td></td>
<td>X (1957)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1959)</td>
</tr>
<tr>
<td>Stethorus sp.</td>
<td>India</td>
<td></td>
<td>X (1957)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1957)</td>
</tr>
<tr>
<td>Stethorus sp.</td>
<td>Eritrea</td>
<td>X (1953)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1955)</td>
<td></td>
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<tr>
<td>Stethorus sp.</td>
<td>Morocco</td>
<td>X (1953)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1955)</td>
<td></td>
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<tr>
<td>Stethorus sp.</td>
<td>Pakistan</td>
<td>X (1957)</td>
<td>Southern California</td>
<td>0</td>
<td>Clausen (1957)</td>
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Table 1. Continued.

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<thead>
<tr>
<th>Species</th>
<th>Country of origin</th>
<th>Date(s) of importation</th>
<th>X—released (date)</th>
<th>0—not released</th>
<th>?—release status unknown</th>
<th>Release area(s)</th>
<th>X—yes (date confirmed)</th>
<th>0—no</th>
<th>T—temporary (inclusive dates)</th>
<th>Literature citation(s)</th>
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<td>Australia</td>
<td></td>
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<td></td>
<td>Southern California</td>
<td></td>
<td>0</td>
<td></td>
<td>Essig (1931)</td>
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<tr>
<td>(Blackburn) (as Gymnoscytus</td>
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<tr>
<td>quadrimaculatus)</td>
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<tr>
<td>Sukunahikona bicolor Kamiya</td>
<td>Taiwan</td>
<td>1951</td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>J. Hall, pers. comm.</td>
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<td>Telsimia emarginata Chapin</td>
<td>China</td>
<td>1924–1925 1947</td>
<td>X (1925) (1948)</td>
<td></td>
<td></td>
<td>California</td>
<td></td>
<td>0</td>
<td></td>
<td>Clausen et al. (1948);</td>
</tr>
<tr>
<td>Telsimia subviridis</td>
<td>Australia</td>
<td></td>
<td>X (1892)</td>
<td></td>
<td></td>
<td>Southern California</td>
<td></td>
<td>0</td>
<td></td>
<td>J. Hall, pers. comm.</td>
</tr>
<tr>
<td>(Blackburn) (as Lipernes subviridis)</td>
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<td></td>
<td></td>
<td></td>
<td>Essig (1931)</td>
</tr>
<tr>
<td>Telsimia tetrasticta Casey</td>
<td>Japan</td>
<td>1958</td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>J. Hall, pers. comm.</td>
</tr>
<tr>
<td>Zagloba aeneipennis (Sicard)</td>
<td>Trinidad</td>
<td>1936</td>
<td>X (1936)</td>
<td></td>
<td></td>
<td>California, Florida</td>
<td></td>
<td>0</td>
<td></td>
<td>Dohanian (1937)</td>
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<td>(Scynmus aeneipennis)</td>
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Table 2. Species of foreign Coccinellidae recorded from North America (not intentionally introduced).

<table>
<thead>
<tr>
<th>Species</th>
<th>Probable country of origin</th>
<th>Date(s) of discovery</th>
<th>Area(s) of discovery</th>
<th>Establishment</th>
<th>Host(s)</th>
<th>Literature citation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azya orbicera orbicera Mulsant</td>
<td>? South America</td>
<td></td>
<td>Florida</td>
<td>X (1975)</td>
<td>Scale insects</td>
<td>Woodruff and Sailer (1977); Gordon (1980)</td>
</tr>
<tr>
<td>Bulea lichatsochovi Hummel</td>
<td>?</td>
<td>1922</td>
<td>New Jersey</td>
<td>0</td>
<td>?</td>
<td>Schott (1933)</td>
</tr>
<tr>
<td>Coccinella septempunctata L.</td>
<td>?</td>
<td>1973</td>
<td>New Jersey</td>
<td>X</td>
<td>Aphids</td>
<td>Angalet and Jacques (1975); Angalet (1979); Larochelle (1979)</td>
</tr>
<tr>
<td>Coccinella undecimpunctata L.</td>
<td>Europe</td>
<td>1912</td>
<td>Massachusetts</td>
<td>X</td>
<td>Aphids</td>
<td>Schaeffer (1912); Brown (1962); Watson (1979); Wheeler and Hoebeke (1981)</td>
</tr>
<tr>
<td>Epilachna varivestis Mulsant</td>
<td>Mexico</td>
<td>1850</td>
<td>New Mexico</td>
<td>X</td>
<td>Legumes</td>
<td>Specimen data</td>
</tr>
<tr>
<td>Propylea quatuordecimpunctata (L.)</td>
<td>Europe</td>
<td>1968</td>
<td>Quebec</td>
<td>X</td>
<td>Aphids</td>
<td>Chittenden and Marsh (1920); Gordon (1976a); Chantal (1972)</td>
</tr>
<tr>
<td>Stethorus punctillum Weise</td>
<td>Europe</td>
<td>1950</td>
<td>Ontario, Massachusetts</td>
<td>X</td>
<td>Mites</td>
<td>Brown (1950)</td>
</tr>
</tbody>
</table>
Coccinella undecimpunctata L.

First discovered in 1912 in Massachusetts, C. undecimpunctata has been subsequently reported from the northeastern United States and southern Canada, in the vicinity of the St. Lawrence River and the Great Lakes, and as far north as Newfoundland; also from southern British Columbia. In 1965 it was discovered in the Seattle area of Washington. The native distribution is Eurasian; the North American populations are apparently the result of accidental introductions and subsequent spread.

Cryptognatha nodiceps Marshall

The introductions were made in 1936 and 1938 from Puerto Rico and Trinidad into south Florida (Miami) for use against the coconut scale. The species was recovered in 1940 and again in 1963. It is not certain whether it is actually established or not, but if so, then the population is evidently very low and cannot be considered as having any significant impact on pest populations at the present time. All available records are from the Miami area.

Cryptolaemus montrouzieri Mulsant

The introductions took place in 1891–1892 and 1930 from Australia into California, primarily for control of the citrus mealybug; but C. montrouzieri is also a predator of mealybugs of the genus Pseudococcus and will attack related genera such as Phenacoccus and Ferrisia as well as the coccid genus Pulvinaria. Insectary reared material from California was released in Florida where the species became established, but attempts failed in Virginia in 1940–1941. A similar attempt also failed in New Orleans, Louisiana, in 1908. C. montrouzieri is presently established in California and in central and southern Florida.

Diomus pumilio Weise

This Australian species has become established in California along the coast from the San Francisco Bay area to San Diego, apparently as a result of releases made in 1975 and 1978, although it was first imported and released in 1892. Attempts have been made to established it in eastern Canada (1958), North Carolina (1959), and Washington (1959–1960), all without success.

Epilachna varivestis Mulsant

The Mexican bean beetle is a native of Mexico that probably migrated north as a result of bean cultivation by Indians. It was first recorded in 1850 from the United States (New Mexico) and later the beetle was discovered at Birmingham, Alabama, in 1918. This latter introduction may have been a result of shipments of hay from the west. It now occurs from Quebec south to Florida, west to Idaho and to the Mexican border.

Exochomus flavipes (Thunberg)

Several attempts have been made to establish E. flavipes in California over the years, but only an introduction from South Africa in 1978 succeeded, although
tenuously. The beetle was introduced for control of *Pulvinariella mesembryanthemi* (Vallot) and *Pulvinaria delottoi* Gill, 2 species of scales on ice plant. *E. flavipes* now occurs in the San Francisco Bay area.

*Exochomus metallicus* (Korschensky)

This species is now established in Ventura County, California, from material introduced from Eritrea, Ethiopia, in 1954 for control of the citricola and black scales. Clausen et al. (1978) state that it is presently found in infestations of the citrus mealybug on host plants other than citrus.

*Exochomus quadripustulatus* (L.)

First introduced into Massachusetts from Europe in 1905–1906 for control of various lecaniine coccids; it was also imported into California from Italy in 1915, and 1927–1928. No establishment resulted from three Massachusetts releases, but it is now established in California where it feeds on several species of scale insects.

*Halmus chalybeus* (Boisduval)

This species was introduced into California as *Orcus chalybeus* from Australia in 1892 by Koebele and has been established in coastal southern California since. It was released on the black scale and will develop on both lecaniine and diaspine coccids. At present it is found mostly in infestations of the California red scale.

*Harmonia dimidiata* (F.)

The initial introduction as *Leis dimidiata* was from south China into California in 1924. It was released in 1925 for aphid control, but did not become established. A shipment sent to Florida from California in 1925 was released in 1926 with establishment resulting. In 1959 it was introduced into Oregon from India for control of the balsam woolly adelgid but did not become established. At present *H. dimidiata* occurs only in Florida.

*Hyperaspis senegalensis hottentota* Mulsant

This species was introduced into California from South Africa in 1978 for control of scales on ice plant. It presently occurs in the San Francisco Bay area but “has only a tenuous foothold” (Tassan et al., 1982).

*Nephus (Sidis) binaevatus* (Mulsant)

This species was introduced into California from South Africa in 1921 for control of various mealybug species. It was released in 1922 and became established. At present it occurs only in coastal and southern California.

*Propylea quatuordecimpunctata* (L.)

In 1968 a population of this palearctic species was discovered in the vicinity of Montreal, Quebec, where it is apparently well established but still localized. Attempts to establish this species in the United States from 1971 to 1982 were unsuccessful.
Rhyzobius forestieri (Mulsant)

This species has been misidentified as *Rhyzobius ventralis* Erichson, but Pope (1981) corrected the long standing error. The true *R. ventralis* was among material sent from Australia to California by Koebele in 1889, but did not become established. In 1892, another shipment thought to be “*R. ventralis*” was sent to California by Koebele, this time the releases became established the same year. This second shipment was composed of *R. forestieri* (Pope, 1951), a predator of the black scale on various plants. The beetle is presently known only from California.

Rhyzobius lophanthae (Blaisdell)

*Rhyzobius lophanthae* (formerly *Lindorus lophanthae*) was first introduced from Australia and established in 1892 for use against the black scale in California. It preys on various species of Coccidae, but especially on diaspines. The present distribution throughout most of the southern United States may be a result of introductions from California stock or subsequent unrecorded releases. Cressman (1933) recorded *R. lophanthae* from New Orleans, Louisiana, as an effective predator of *Chrysomphalus dictyospermi* (Morgan); however, he gave no indication of introduction as being the population source. This species was also imported from South Africa in 1959 and released in Texas, but it may already have been established there.

Rodolia cardinalis (Mulsant)

The vedalia beetle, *Rodolia cardinalis*, is the most famous introduced beneficial insect in history. Koebele sent it from Australia to California in 1888–1889 for use against the cottony cushion scale. It immediately became established and achieved a startling success that led to the wholesale introduction of many other ladybird beetles from Australia in ensuing years. At present it is established in California, south Texas, Louisiana, and Florida.

Scymnus (Pullus) impexus Mulsant

*Scymnus impexus* has been introduced into Canada and the United States from Germany several times for control of the balsam woolly adelgid. It was released in New Brunswick, Newfoundland, and Nova Scotia each year between 1951 and 1960, and persisted in small numbers through 1959. Early releases in British Columbia apparently were unsuccessful, but success was achieved from releases in 1960 and 1961 in the Willamette Valley of Oregon. In North Carolina this beetle may have become marginally established from releases in the early 1960’s, but at present this cannot be documented.

Scymnus (Pullus) suturalis Thunberg

The first specimens reported from the United States were collected in Pennsylvania in 1972, but misidentified as *Scymnus (Pullus) coniferarum* Crotch (Gordon, 1976b). Subsequently the true identity was discovered (Gordon, 1982). The species is widely distributed in Pennsylvania with additional records from New York, Michigan, and Connecticut. The probable origin of this species is northern Europe possibly arriving
with imported nursery stock. *S. (P.) suturalis* was released in Michigan in 1961, but whether the present Michigan populations result from that release cannot be documented.

**Stethorus punctillum** Weise

*Stethorus punctillum*, a European species of this mite-feeding genus, was first reported in 1950 from Ontario and Massachusetts. It is now known to occur in eastern North America from Massachusetts west to Wisconsin. In the west it occurs in western Oregon, Washington, and Idaho.

**Subcoccinella vigintiquatuorpunctata** (L.)

This is one of 2 nonpredaceous (phytophagous) foreign coccinellids established in North America. In the Old World *S. 24-punctata* is a serious pest of alfalfa. In North America it apparently will not feed on alfalfa; instead it feeds primarily on bouncing bet, *Saponaria officinalis* L. (Caryophyllaceae). The initial discovery of this species was made in 1973, in Bergen Co., New Jersey. A subsequent survey in the eastern states showed that the beetle was much more widespread and must have been established long before 1973. It is now known from 7 states: Illinois, Maryland, New Jersey, New York, Ohio, Pennsylvania, and West Virginia.

The following tables list all known introductions of foreign Coccinellidae. Table 1 deals with those intentionally imported, whether released or not, and Table 2 lists those species accidentally introduced and established. The species are listed under the currently accepted name or combination, with the name it was introduced under in parentheses. The dates of importation and release are given if known with the areas of release listed in the next column. The literature citations are those from which the information presented for each species was gleaned. The tables were compiled from various literature sources beginning with Essig (1931). The major sources utilized for the period from 1931 to date were the California Biological Control Reports; Clausen (1956b); Canadian Insect Pest Review; Clausen et al. (1978). In addition, I am indebted to the following individuals for information and assistance: K. Hagen, University of California, Berkeley, Division of Biological Control, Albany; R. Dysart and P. Schaefer, USDA Beneficial Insects Research Laboratory, Newark, Delaware; J. Hall, Division of Biological Control, University of California, Riverside; J. Coulson, USDA, Beneficial Insect Introduction Laboratory, Beltsville, Maryland; R. Fye, USDA Yakima Agricultural Research Laboratory, Yakima, Washington; J. Kelleher, Pesticide Information Liaison Section, Research Branch, Agriculture Canada, Ottawa; R. Woodruff, Florida Department of Agriculture, Gainesville, Florida.

**Systematic Treatment**

Family Coccinellidae


Form usually oval to round, convex, sometimes elongate oval and weakly convex.
Antenna usually 11-segmented, often reduced to 10, 9, 8, or 7 segments, more or less clubbed. Apical segment of maxillary palpus triangular (securingm), or parallel sided, or conical. Elytron not truncate, not striate. Prosternal process distinctly separating transverse front coxae. Mesepimeron reaching middle coxal cavity. Abdomen with 5 or 6 visible sterna, 7th rarely visible. First sternum of abdomen nearly always with postcoxal line. Tarsus usually cryptotetramerous, often trimerous, rarely truly tetrmerous. Tibial spurs present or absent. Tarsal claw simple or toothed. Male genitalia with sclerotized siphon (aedeagus), trilobed phallobase.

The cryptotetramerous tarsi and presence of postcoxal lines on the first abdominal sterna will usually enable a coccinellid to be recognized as such. In those species which lack postcoxal lines, the maxillary palpi are strongly securingm and the tarsi are cryptotetramerous. The curved, sclerotized aedeagus (the sipho) is a certain character for family recognition.

**Key to subfamilies of Coccinellidae north of Mexico**

1. Clypeus expanded laterally, shelllike, partially dividing eye (Fig. 3a); dorsal surface not pubescent .................................................. Chilocorinae (p. 602)
   - Clypeus not expanded laterally, or if so, briefly and not shelllike; dorsal surface pubescent or not ............................................. 2
2(1). Mandible multidenticulate apically (Fig. 3c); antenna 11-segmented, inserted dorsally (Fig. 3b); dorsal surface pubescent; plant leaf feeders .......... Epilachninae (p. 862)
   - Mandible rarely multidenticulate apically, if so; then length less than 3.0 mm; antenna 11-segmented or not, insertion variable; dorsal surface pubescent or not; not plant leaf feeders .......................... 3
3(2). Apical segment of maxillary palpus conical or elongate oval (Fig. 3d); mentum narrowly articulated with submentum; length less than 3.0 mm; middle coxal cavities broadly separated by articulation of meso- and metasterna ...... Sticholotidinae (p. 34)
   - Apical segment of maxillary palpus divergent apically (securingm) or nearly parallel sided, rarely slightly convergent apically; mentum not narrowly articulated with submentum; length often more than 2.0 mm; middle coxal cavities narrowly separated except broadly separated in Scymninae ............................................. 4
4(3). Antenna short, ½ or less as long as head width; apical segment of maxillary palpus usually parallel sided or barrel shaped (Fig. 3d, e), rarely securingm; middle coxal cavities broadly separated .......................................................... Scymninae (p. 74)
   - Antenna long, usually more than ½ as long as head width; apical segment of maxillary palpus securingm (Fig. 30); middle coxal cavities narrowly separated ............................................. 5
5(4). Dorsal surface pubescent .............................................. Coccidulinae (p. 654)
   - Dorsal surface glabrous .................................................. Coccinellinae (p. 678)

Subfamily Sticholotidinae


Small to medium-sized Coccinellidae; form hemispherical or elliptical. Functional wings present or absent. Dorsally pubescent or not. Head with apical segment of maxillary palpus more or less tapered, conical, barrel shaped or elongate oval; men-
tum and submentum narrowly joined. Antenna usually inserted dorsally, with 7 to 11 segments, club with 1 to 5 segments. Pronotum sometimes with line or ridge separating anterior angle from disc. Anterior coxal cavities open behind. Middle coxal cavities broadly separated. Metendosternum with very broadly separated anterior tendons. Abdomen with 5 or 6 visible sterna; male 9th sternum flat. Tarsus trimerous or cryptotetramerous. Female genital plate elongate, triangular.

The subfamily is principally characterized by the form of the terminal segment of the maxillary palpus which is not securiform or distinctly broadened apically as is typical of the rest of the Coccinellidae. The form of the maxillary palpus is an excellent distinguishing character for members of the Serangiini, Microweisini, and Cephaloscymmini, but some members of tribes not occurring north of Mexico have that segment more or less enlarged, approaching the typical coccinellid type. Members of this subfamily are found throughout the tropical regions of the world with some genera and species occurring also in temperate regions. The New World members of Sticholotidinae were treated by Gordon (1977); see that paper for detailed discussion of taxonomy, phylogeny and zoogeography. The Cephaloscymmini, new tribe, was not recognized as belonging in this subfamily when that paper (1977) was prepared, and therefore they were not included. The detailed study of the morphology of the genus *Cephaloscymmnus* required for this study showed that *Cephaloscymmnus* and
related genera must be transferred to Sticholotidinae and a new tribe erected for them. With this addition the tribes representing the subfamily north of Mexico are Serangiini, Microweisini, and Cephaloscymnini.

**KEY TO TRIBES OF STICHOLOTIDINAE**

1. Antennal club composed of a single knife-shaped or elongate-oval segment (Fig. 25b); femur broad, flat, fitting into depressions on ventral surface; pro sternum greatly expanded to conceal mouthparts (Fig. 25a) .................................................. Serangiini

   - Antennal club composed of more than a single segment or if only one, then segment not knife-shaped; femur not broad or flat, ventral surface without depressions for legs; pro sternum not greatly expanded, not concealing mouthparts .......... 2

2(1). Dorsal surface pubescent; head large, exposed, directed ventrally; eye large, narrow, elongate (Fig. 30a) ................................................................. Cephaloscymnini

   - Dorsal surface apparently glabrous; head small, at least slightly concealed under pronotum, usually directed forward; eye small, round or oval (Fig. 4a) .... Microweisini

**Tribe Microweisini**


Sticholotidinae with dorsal surface usually not pubescent; if so, then hairs of uniform length; size minute. Head capsule with prolonged frons and clypeus emarginate around antennal insertion (Fig. 4a); eye small, facets ranging from extremely coarse to fine. Mandible without apical or basal teeth. Apical segment of maxillary palpus slender, tapered at apex (Fig. 4b). Antenna 7 to 10-segmented. Pronotum with oblique anterolateral line inside anterolateral angle (Fig. 4c) (except *Gnathoweisea schwarzii*). Intercoxal process of pro sternum broad, with anterior lobe (Fig. 4d). Leg simple, tibia unmodified. Tarsus cryptotetrameros or trimerous. Functional wing present. Abdomen with 6 visible sterna; basal sternum with divided postcoxal line (Fig. 4g). Male genitalia asymmetrical, phallobase with unpaired, basal apodeme (Fig. 8a). Female spermathecal capsule bulbous (Fig. 8d).

This tribe is represented by 8 genera that occur from southern Canada to Chile and Argentina and is apparently restricted to the Western Hemisphere. Microweisini is a closely knit group of genera agreeing quite well in all essential characteristics. The small size, characteristic habitus, the almost universal presence of an anterolateral line on the pronotum, divided postcoxal line and broad T-shaped intercoxal process of the pro sternum serve to diagnose this tribe. See Gordon (1977) for a discussion of all Western Hemisphere genera.

**KEY TO GENERA OF MICROWEISINI**

1. Head entirely concealed beneath pronotum (Fig. 20d) ................. *Nipus* Casey

   - Head partially or not at all concealed ............................................. 2

2(1). Head deeply inserted in pro thorax, extremely elongate, slender (Fig. 13a) ....

   - Head not deeply inserted in pro thorax, not elongate (Fig. 4a) ............ 3
3(2). Antenna with 3-segmented club (Fig. 4e) .................................. *Microweisea* Cockerell
- Antenna with 2-segmented club (Fig. 12a) .................................. *Coccidophilus* Brethes

Genus *Microweisea* Cockerell

*Microweisea* Cockerell, 1903, p. 38 (new name for *Epismilia* Cockerell, 1900)—
*Smilia* Weise, 1891, p. 288 (not Germar, 1833)—Horn, 1895, p. 82—Blatchley,
1910, p. 524.
*Epismilia* Cockerell, 1900, p. 606 (not Fromental, 1861) (new name for *Smilia* Weise).
*Pseudoweisea* Schwarz, 1904, p. 118 (name made available by accident).

Microweisini with form elongate, oval; dorsum glabrous. Head slightly prolonged
anterior to antennal insertion (Fig. 4a); eyes separated by 4 times the width of an eye. Apical segment of maxillary palpus elongate, slender, conical. Antenna with 7-segmented scape, 3-segmented club (Fig. 4e). Prosternum with small anterior lobe. Tarsus trimerous (Fig. 4f). Male genitalia asymmetrical, paramere reduced (Fig. 5a).

There are 5 species of this genus described from north of Mexico, and I am aware of several undescribed species from Mexico and South America. Members of Microweisea are scale predators with available host records as follows: Lepidosaphes beckii (Newman), Lepidosaphes sp., Melanaspis obscura (Comstock), Chionaspis pinifoliae (Fitch), Pseudonididae duplex (Cockerell), and Quadraspidius perniciosus (Comstock). The North American species of Microweisea were taxonomically treated by Gordon (1970d).

**Key to Species of Microweisea**

1. Elytron with a transverse median yellow or yellowish red band (Fig. 10d) ..........
   - Elytron without a transverse median yellow band .......................... 2

2(1). Species occurring in California ............................................. 3
   - Species not occurring in California ......................................... 4

3(2). Elytron light yellowish brown, suture narrowly piceous; head and pronotum piceous; surface of pronotum dull, strongly alutaceous ........ suturalis (Schwarz)
   - Elytron usually dark brown or piceous; unicolorous with head and pronotum; surface of pronotum somewhat shiny, feebly alutaceous .......... misella (LeConte)

4(2). Form extremely elongate (Fig. 11d); pronotum brown or yellowish brown, paler on anterolateral angle than on disc; Florida ................................... ovalis (LeConte)
   - Form not extremely elongate; pronotum dark brown or piceous, anterolateral angle not paler than disc; not restricted to Florida ....................... 5

5(4). Pronotum distinctly punctured; head strongly alutaceous; distributed from southern Canada to Florida and Mexico ........................................... misella (LeConte)
   - Pronotum without apparent punctures; head shiny, not or very feebly alutaceous; Texas ............................................................... minutia (Casey)

**Microweisea suturalis** (Schwarz)

Fig. 5a–d; Map, Fig. 9

*Pseudoweisea suturalis* Schwarz, 1904, p. 118.


*Pentilia suturalis*: Korschefsky, 1932, p. 225.

**Diagnosis.** Length 1.0 to 1.10 mm, width 0.90 to 0.95 mm. Color piceous; elytron yellowish brown, elytral suture narrowly piceous (Fig. 5d), ventral surface brown. Male genitalia as in Figure 5a–c.

**Discussion.** *M. suturalis* occurs only in California. The only species with which it might be confused is *M. misella*, but *M. misella* usually has a uniformly dark dorsal surface and the pronotum is mostly shiny and alutaceous; the pronotum of *M. suturalis* is strongly alutaceous, dull. The holotype is a male specimen in the USNM collection.

**Type locality.** Long Beach, California.
Fig. 5. Microweisea suturalis.

Type depository. USNM (7936).

Distribution. Figure 9. CALIFORNIA: Long Beach; Los Angeles Co.

Microweisea minuta (Casey)
Fig. 6a–c; Map, Fig. 7

Smilia minuta Casey, 1899, p. 135.
Epismilia minuta: Cockerell, 1900, p. 606.
Pentilia caseyi Korschefsky, 1931, p. 223 (unnecessary replacement name for minuta Casey).

Diagnosis. Length 0.85 to 0.88 mm, width 0.55 to 0.60 mm. Color piceous, ventral surface dark brown. Male genitalia as in Figure 6a–c. The small size will usually distinguish this species; see remarks under M. misella. The type of M. minuta is a unique male in the Casey collection which must be considered the holotype.

Type locality. Austin, Texas, on the Colorado River above Columbus.
Type depository. USNM (35241).

Distribution. Figure 7. TEXAS: Austin; Brownsville; San Diego, Sinton.

**Microweisea misella** (LeConte)

Fig. 8a–d; Map, Fig. 9

*Pentilia misella* LeConte, 1878a, p. 400—Korschefsky, 1931, p. 224.


*Epismilia misella*: Cockerell, 1900, p. 606.


Diagnosis. Length 0.98 to 1.45 mm, width 0.70 to 1.05 mm. Color entirely piceous. Male genitalia as in Figure 8a–c. Female genitalia as in Figure 8d.

Discussion. This is the most widely distributed member of the genus, having been recorded from most areas of the United States and part of southern Canada. This species and *M. minuta* are similar in appearance, but *M. misella* has distinct pronotal punctures that are lacking in *M. minuta*, and nearly all specimens of *M. misella* are obviously larger than the largest specimens of *M. minuta*. The male genitalia afford a certain means of separating these 2 species. There are 8 specimens in the LeConte collection that I consider types, the first of these, a male labeled "D.C./Type 6702
Fig. 7. Distribution. *M. minuta* (dot); *M. coccidivora* (shaded); *M. ovalis* (star).

(red paper)pentilia misella Zim. ", I designate and label the lectotype. The remaining 7 specimens are designated as paralectotypes.

*Type locality.* Washington, D.C. (lectotype here designated).

*Type depository.* MCZ.
Fig. 8. Microweisea misella.

*Distribution.* Figure 9. Southeastern Canada to Florida and east Texas, west to British Columbia and northern California.

*Microweisea coccidivora* (Ashmead)
Fig. 10a–d; Map, Fig. 7

*Hyperaspidius coccidivora* Ashmead, 1880, p. 10.
*Smi lia coccidivora*: Horn, 1895, p. 82—Casey, 1899, p. 135.
*Epismilia coccidivora*: Cockerell, 1900, p. 606.
*Pentilia coccidivora*: Korschel'sky, 1931, p. 223.

*Diagnosis.* Length 0.80 to 1.0 mm, width 0.60 to 0.70 mm. Color yellowish red; elytral base and apex dark brown, transverse median area yellowish brown (Fig. 10d), ventral surface and leg yellowish brown. Male genitalia as in Figure 10a–b.
Discussion. This is the only described species of the genus possessing a distinctive dorsal color pattern which allows it to be easily recognized.

Type locality. Orlando, Florida (neotype designated by Gordon, 1970d).
Type depository. USNM (70409).
Distribution. Figure 7. Florida; Georgia; South Carolina.

Microweisea ovalis (LeConte)
Fig. 11a–d; Map, Fig. 7

Pentilia ovalis LeConte, 1878a, p. 400—Korschefsky, 1932, p. 225.
Smilia ovalis: Horn, 1895, p. 82.
Epismilia ovalis: Cockerell, 1900, p. 66.
Smilia felschei Weise, 1891, p. 288—Horn, 1895, p. 82.

Diagnosis. Length 0.95 to 1.05 mm, width 0.50 to 0.63 mm. Form extremely elongate (Fig. 11d). Color brown; elytral suture piceous, anterior pronotal angle, venter, and leg yellowish brown. Male genitalia as in Figure 11a–c.

Discussion. The elongate form and pale pronotum distinguish M. ovalis from M. suturalis which it most nearly resembles. LeConte had more than one type specimen, but only one remains in his collection. This male labeled “Haulover, Fla, II-10/977/Type 6699(red paper)/Pentilia ovalis Lec.” is designated and labeled the lectotype. Type specimen(s) of S. felschei have not been examined.
Type locality. Of ovalis, Haulover, Florida (lectotype here designated); of felschei, Florida.

Type depository. Of ovalis, MCZ; of felschei, probably MNHUB (not examined).

Distribution. Figure 7. FLORIDA: Baldwin; Biscayne; Citrus City; Haulover; St. Lucie; Tallahassee; Tampa. GEORGIA: Sapelo Island.

Genus Coccidophilus Brethes


Diagnosis. Microweisini with form elongate, oval; dorsum apparently glabrous. Head slightly prolonged anterior to antennal insertion; eyes separated by 4 times the width of an eye; frons often with 2 interocular depressions. Apical segment of maxillary palpus elongate, conical (Fig. 12b). Antenna with 7-segmented scape and 2-segmented club (Fig. 12a). Prosternum with small anterior lobe (Fig. 12c). Tarsus trimerous. Male genitalia asymmetrical, paramere reduced (Fig. 12e).
Discussion. There are 4 described species in this genus and 2 of these occur north of Mexico. It is difficult to separate *Coccidophilus* from *Microweisea* without counting the antennal club segments, but species of *Coccidophilus* often have 2 depressions on the frons between the eyes. These depressions are quite apparent in *C. marginata*, but feeble and difficult to detect in *C. atronitens*. Members of *Coccidophilus* are scale predators with available host records as follows: *Chionaspis pinifoliae* (Fitch), *Lepidosaphes beckii* (Newman); *Aspidiotus* sp.; *Aonidiella aurantii* (Maskell); *Pseudaulacaspis pentagona* (Targioni-Tozzetti); *Chrysomphalus aonidum* (L.). The North American species of *Coccidophilus* were taxonomically treated by Gordon (1970d) under the generic name of *Cryptoweisea*.

**Key to species of *Coccidophilus***

1. Punctures on elytron coarse, dense, separated by the diameter of a puncture or less; form slender, elongate (Fig. 14d); northern and eastern U.S. and southeastern Canada
   - *marginata* (LeConte)
   - Punctures on elytron fine, separated by 2 or 3 times the diameter of puncture; form oval (Fig. 12d); western United States *atrontiens* (Casey)
Fig. 12. *Coccidophilus* sp. a. Antenna. b. Maxillary palpus. c. Prosternum. d–h. *Coccidophilus atronitens*.
Coccidophilus atronitens (Casey)

Fig. 12d–h; Map, Fig. 13

Smilia atronitens Casey, 1899, p. 135.
Epismilia atronitens: Cockerell, 1900, p. 606.
Microweisea atronitens: Cockerell, 1903, p. 38—Leng, 1920, p. 213.
Pentilia aeronitens: Korschefsky, 1931, p. 223.
Smilia reversa Fall, 1901, p. 231.
Microweisea reversa: Leng, 1920, p. 213.

Diagnosis. Length 1.10 to 1.20 mm, width 0.90 to 0.95 mm. Form oval (Fig. 12d). Color dark brown; epipleuron and leg yellowish brown. Male genitalia as in Figure 12e–g. Female genitalia as in figure 12h.

Discussion. This species is smoother, more polished in appearance than C. marginata, and the dorsal punctuation is very fine rather than coarse as in C. marginata. The 2 species are strongly allopatric. There are 6 types of S. aeronitens in the Casey collection, all from the same locality. The first of these, a female, is here designated and labeled the lectotype, the remainder are designated and labeled as paralectotypes. Type specimens of S. reversa are in the Fall collection in the MCZ.

Type locality. Of aeronitens Siskiyou Co., California (lectotype here designated); of reversa, Lake Tahoe, San Bernardino Mts., California (lectotype not designated).

Type depository. Of aeronitens USNM (35240); of reversa, MCZ.

Distribution. Figure 13. Colorado and Arizona to Oregon and California.
Fig. 14. *Coccidophilus marginata*.

*Coccidophilus marginata* (LeConte)  
Fig. 14a–d; Map, Fig. 13

*Pentilia marginata* LeConte, 1878a, p. 400—Korschefsky, 1931, p. 224.  
*Smilia marginata*: Horn, 1895, p. 82—Casey, 1899, p. 135.  
*Epismilia marginata*: Cockerell, 1903, p. 38.  

*Diagnosis.* Length 1.20 to 1.25 mm, width 0.70 to 1.00 mm. Form elongate (Fig. 14d). Color light brown; epipleuron yellowish brown. Male genitalia as in Figure 14a–b.

*Discussion.* The 2 interocular depressions on the frons are usually pronounced in
this species, feeble or absent in *C. atronitens*; and *C. marginata* is much more coarsely punctured dorsally than *C. atronitens* (see remarks under *C. atronitens*). LeConte apparently had one type specimen which must be considered the holotype. This male in his collection is labeled "Marquette, Mich., 29-6/Type 6701(red paper)/Pentila marginata LeC."

*Type locality:* Marquette, Michigan.
*Type depository:* MCZ.

*Distribution.* Figure 13. MAINE: Mt. Katahdin. MICHIGAN: Marquette. NEW JERSEY: Anglesea; Burlington Co. NEW YORK: Ithaca; Mt. Whiteface. PENNSYLVANIA: Blair Co., Duncansville; Indiana Co., Shelocta; Philadelphia.

**Genus Gnathoweisea** Gordon


Microweisini with form elongate, oval, pronotum partially covering head; dorsum nearly glabrous, short, sparse pubescence present. Head elongate anterior to antennal insertion, lateral border margined (Fig. 15a); eyes separated by 6 times the width of an eye, very coarsely faceted. Apical segment of maxillary palpus elongate, slender, conical. Antenna with 6-segmented scape, 3-segmented club (Fig. 15b). Prosternum with or without anterior lobe. Postcoxal line as in Figure 15d. Tarsus trimerous. Male genitalia asymmetrical, paramere somewhat reduced.

Two species have previously been placed in this genus, and four species are described here. The extremely elongate head is the most obvious characteristic of *Gnathoweisea*, but the 9-segmented antenna with a small, compact club is equally distinctive within this tribe. The head is deeply inserted within the prothorax, the intercoxal process is lobed anteriorly and protrudes ventrally except in *G. schwarzi*. No host data is available, but members of this genus are undoubtedly scale predators, probably on diaspine scales. The species of *Gnathoweisea* were reviewed by Gordon (1970a), and the genus was discussed again by Gordon (1977).

**Key to species of Gnathoweisea**

1. Pronotum without oblique line across anterolateral angle; prosternum not lobed anteriorly; anterior border of mesosternum raised (Fig. 15c) .................. *schwarzi* Gordon
   - Pronotum with oblique line across anterolateral angle; prosternum lobed anteriorly; anterior border of mesosternum flat .......................... 2

2(1). Length 1.20 mm or more .......................... *hageni*, n. sp.
   - Length 1.10 mm or less .................................. 3

3(2). Head extremely elongate, abruptly narrowed between hind margin of eye and antennal insertion; Nevada ............................................. *ferox*, n. sp.
   - Head shorter, not abruptly narrowed; not known from Nevada .......................... 4

4(3). Dorsal color light brown; elytral punctures fine, lightly impressed; pronotal surface feebly alutaceous .......................... *micula*, n. sp.
   - Dorsal color brown to black; elytral punctures coarse, distinctly impressed; pronotal surface strongly alutaceous .......................... 5

5(4). Elytral punctures separated by a diameter or less; Arizona, California .......................... *planiceps* (Casey)
   - Elytral punctures separated by more than a diameter; Texas .......................... *texana*, n. sp.
Fig. 15. *Gnathoweisea* sp. a. Head. b. Antenna. c. Metasternum. d. Postcoxal line. e, f. *Gnathoweisea schwarzi*.

*Gnathoweisea schwarzi* Gordon

Fig. 15c, e, f; Map, Fig. 17

*Gnathoweisea schwarzi* Gordon, 1970a, p. 50.

*Diagnosis.* Length 0.98 to 1.03 mm, width 0.70 to 0.75 mm. Color medium brown except pronotum often dark brown or piceous. Male genitalia as in Figure 15e, f.
Discussion. This species differs from the other members of the genus in having the prosternum not at all lobed in front and the apex of the mesosternum raised to form a ventrally directed ridge (Fig. 15c). The intercoxal process of the prosternum is also much narrower than in the other 2 species.

Type locality. Williams, Arizona.
Type depository. USNM (70406).
Distribution. Figure 17. ARIZONA: type locality.

Gnathoweisea planiceps (Casey)
Fig. 16a–c; Map, Fig. 17

Smilia planiceps Casey, 1899, p. 135.
Microweisea planiceps: Cockerell, 1903, p. 38—Leng, 1920, p. 213.
Pentilia planiceps: Korschefsky, 1932, p. 225.

**Diagnosis.** Length 0.85 to 1.10 mm, width 0.72 to 0.78 mm. Color dark brown or piceous. Male genitalia as in Figure 16a, b. Female genitalia as in Figure 16c.

**Discussion.** This species was previously known only from California, but I have seen several specimens from Arizona that are apparently *G. planiceps*. For comparative remarks see the discussion under *G. ferox*, n. sp. There are 2 type specimens of *S. planiceps* in the Casey collection. The first of these, a male, is here designated and labeled the lectotype; the other specimen is designated and labeled a paralectotype.

**Type locality.** Southern California (lectotype here designated).

**Type depository.** USNM (35242).

**Distribution.** Figure 17. ARIZONA: Bright Angel Camp; Huachucha Mts., Millers Canyon; Hot Springs; Pima Co., Santa Rita Exp. Range; Santa Rita Mts.; Madera Canyon. CALIFORNIA: Argus Mts.; Pomona; Riverside Co., Sage.

**Gnathoweisea texana**, new species

**Map, Fig. 17**

**Description.** Female, length 1.0 mm, width 0.72 mm. Form elongate, oval. Color dark brown, head and pronotum nearly black. Head alutaceous, feebly shiny, nearly impunctate; moderately prolonged anterior to eye, sides parallel. Pronotum dull, alutaceous, meshes small, punctures fine, indistinct, separated by one to 3 times a diameter. Elytron shiny, punctures coarse, separated by slightly more than a diameter. Ventral surface smooth medially, lateral portion of metasternum and entire abdomen alutaceous.


This species closely resembles *G. planiceps*, but the elytral punctures are less dense in *planiceps*. The only specimen examined is a female, therefore no genitalic comparisons are possible. The specific name refers to the state in which the holotype was collected.

**Gnathoweisea micula**, new species

**Map, Fig. 17**

**Description.** Female, length 1.05 mm, width 0.80 mm. Form elongate, oval. Color light brown; head, pronotum, and ventral surface slightly darker brown. Head shiny, feebly alutaceous, impunctate; short anterior to eye and slightly widened. Pronotum feebly alutaceous, somewhat shiny, punctures fine, indistinct, separated by less than to twice a diameter. Elytron shiny, punctures feebly impressed, separated by one to 3 times a diameter. Ventral surface smooth medially, lateral portion of metasternum and entire abdomen alutaceous.

**Holotype.** Female. NEW MEXICO: Deming, July 11–12, 4,300–4,400 ft., Wickham. USNM (101327).

**Paratypes.** Total 2 (females) (Fig. 17). ARIZONA: Adamana, 7-V-03, HS Barber collector; Walnut, Wickham. (USNM).
Fig. 17. Distribution. Gnathoweisea schwarzi (triangle); G. planiceps (dot); G. texana (open circle); G. micula (star); G. hageni (circled star); G. ferox (square).

The pale color of *G. micula* and the feeble alutaceous sculpture on the head and pronotum are diagnostic characters. The head anterior to the eye is very short, and the sides are not parallel but slightly widened. The only other known species with similar tendencies is *G. hageni*, n. sp. Only females of this species have been ex-
amined. The specific epithet is from the Latin *mica*, meaning crumb, or morsel, and refers to the small size.

**Gnathoweisea hageni**, new species

*Fig. 18; Map, Fig. 17*

*Description.* Female, length 1.50 mm, width, 1.0 mm. Form elongate, oval. Color brown; head and pronotum dark brown. Head alutaceous, slightly shiny, punctures fine, separated by 2 to 3 times a diameter; short anterior to eye and strongly widened. Pronotum feebly alutaceous, shiny, punctures distinct, separated by one to 3 times a diameter. Elytron shiny, punctures coarse, separated by 2 to 4 times a diameter. Ventral surface smooth medially, lateral portion of metasternum and entire abdomen alutaceous. Genitalia as in Figure 18.

*Variation.* Length 1.25 to 1.50 mm, width 0.90 to 1.0 mm.

**Paratypes.** Total 2 (females) (Fig. 17). CALIFORNIA: same data as holotype (KSH).

This is the largest species of *Gnathoweisea* known. The head is short as in *G. micula*, and the pronotal punctures are distinctly visible. All specimens examined are females. The species is named for Kenneth Hagen, the collector, and one who has contributed much to the biosystematics of Coccinellidae.

**Gnathoweisea ferox**, new species
Fig. 19a–c; Map, Fig. 17

**Description.** Male, length 1.0 mm, width 0.72 mm. Form elongate, oval. Color dark brown; head and pronotum black; leg piceous; epipleuron yellowish brown. Head dull, strongly alutaceous, nearly impunctate; extremely elongate, abruptly narrowed between hind margin of eye and antennal insertion. Pronotum dull, alutaceous, meshes very small, punctures very fine, indistinct, separated by one to 4 times a diameter. Elytron shiny, densely, coarsely punctured, punctures separated by a diameter or less. Ventral surface smooth medially, lateral portion of metasternum and entire abdomen alutaceous. Genitalia as in Figure 19a–c.


**Paratypes.** Total 9 (Fig. 17). Same data as holotype except 3 dated 22 Aug. 1972. (USNM).
*Gnathoweisea ferox* appears to have the head more strongly tapered (narrowed from the hind margin of the eyes to the antennal insertion) than the other members of the genus. The specific epithet is from the Latin meaning fierce, and refers to the forbidding appearance of the head and mouthparts.

**Genus *Nipus* Casey**


Microweisini with form oval; dorsum glabrous or partially pubescent; pronotum usually completely concealing head (Fig. 20d). Head strongly elongate anterior to antennal insertion but not as elongate as in *Gnathoweisea*; eyes separated by 3 times the width of an eye. Apical segment of maxillary palpus elongate, somewhat conical. Antenna with 7-segmented scape, 3-segmented club (Fig. 20a). Prosternum with anterior lobe pronounced, semicircular, nearly concealing mouthparts ventrally (Fig. 20b). Postcoxal line as in Figure 20c. Tarsus trimerous. Male genitalia asymmetrical, paramere reduced.

This genus contains 4 species occurring in the southwestern United States. *Nipus* is readily distinguished from other genera of Microweisini because the head is almost always completely concealed beneath the pronotum. The partially concealed head found in *Gnathoweisea* is the only remotely similar condition known. The species of *Nipus* were reviewed by Gordon (1970f), and the genus was discussed again by Gordon (1977). The only host record for this genus is that of *N. biplagiatus* preying upon *Ehrhornia cupressi* (Ehrhorn), but all members of the genus are undoubtedly scale predators.

**Key to Species of *Nipus***

1. Elytron with a pale red or yellow spot, or red or yellow band (Fig. 20d)  
   - Elytron without pale spot or band ........................................ 3

2(1). Form elongate, parallel sided (Fig. 20d); California  
   - Form elongate, oval, not parallel sided (Fig. 24); Arizona, Utah  

3(1). Form narrow, elongate (Fig. 21); pronotum dull, strongly alutaceous; punctures on elytron extremely coarse; California  
   - Form oval (Fig. 23); pronotum shiny, feebly alutaceous; punctures on elytron fine;  
     Arizona, Colorado .................................................. *planatus* Gordon

*Nipus biplagiatus* Casey

Fig. 20d–f; Map, Fig. 22


**Diagnosis.** Length 1.25 to 1.50 mm, width 0.75 to 0.82 mm. Form elongate, parallel-sided, abruptly narrowed posteriorly (Fig. 20d). Color piceous; large median area of elytron and anterior margin of pronotum yellow, ventral surface yellowish brown. Male genitalia as in Figure 20e, f.
Fig. 20. *Nipus biiagiatus*. a. Antenna. b. Prosternum. c. Postcoxal line. d. Habitus; e, f. male genitalia.

Discussion. This species is known only from California and resembles *N. occiduus* which apparently does not occur in California. In addition to the key characters, *N. occiduus* is smaller and not as coarsely punctured as *N. biliagiatus*. In the Casey collection is a unique female which must be considered the holotype of *N. biliagiatus*.

Type locality. Los Angeles, California.

Type depository. USNM (35224).
Distribution. Figure 22. CALIFORNIA: Contra Costa Co., Vine Hill; Los Angeles; Los Gatos; Orange Co., Costa Mesa; San Bernardino; Upland.

*Nipus niger* Casey

Fig. 21; Map, Fig. 22


Diagnosis. Length 1.05 to 1.10 mm, width 0.70 to 0.74 mm. Form elongate, oval, gradually narrowed posteriorly (Fig. 21). Color brownish piceous; anterior margin of pronotum yellowish brown, ventral surface brown.

Discussion. No males of this species were available for study. *Nipus niger* is most similar to *N. planatus*, but the key characters will readily separate the 2 species. A unique female in the Casey collection must be considered the holotype of *N. niger*.

Type locality. Sonoma Co., California.

Type depository. USNM (35225).

Distribution. Figure 22. CALIFORNIA: Humboldt Co.; Los Gatos; Sonoma Co.

*Nipus planatus* Gordon

Fig. 23; Map, Fig. 22


Diagnosis. Length 1.19 to 1.24 mm, width 0.81 to 0.84 mm. Form elongate, oval, evenly narrowed anteriorly and posteriorly (Fig. 23). Color brown; anterior and lateral borders of pronotum yellowish brown, mouthparts and leg yellowish brown.

Type locality. Salida, Colorado.

Type depository. USNM (70851).

Distribution. Figure 22. ARIZONA: Bright Angel Camp. COLORADO: Salida.

*Nipus occiduus* Gordon

Fig. 24; Map, Fig. 22

*Nipus occiduus* Gordon, 1970f, p. 75.

Diagnosis. Length 1.20 to 1.24 mm, width 0.75 to 0.78 mm. Form oval (Fig. 24). Color piceous; elytron with yellow spot occupying $\frac{1}{2}$ to $\frac{2}{3}$ of elytron, anterior margin of pronotum yellowish brown.

Discussion. See comparative remarks under *N. biplagiatus*.

Type locality. Wasatch, Utah.

Type depository. USNM (70852).

Distribution. Figure 22. ARIZONA: Chiricahua Mts.; Huachucha Mts., Millers Canyon; Oracle; Santa Rita Mts; Williams. UTAH: Wasatch.

Tribe Serangiini

Sticholotidinae with form compact; dorsally pubescent or not. Head slightly prolonged anterior to antennal insertion, emarginate around insertion; eye coarsely faceted (Fig. 25a). Apical segment of maxillary palpus either elongate and conical, or short and barrel shaped. Antenna 8 or 9-segmented, club composed of a single segment (Fig. 25b). Prosternum strongly lobed anteriorly, concealing mouthparts (Fig. 25a), notched on each side for reception of antenna. Epipleuron with fovea for reception of leg. Leg received in deep cavity on ventral surface; at least front femur broad, flat, concealing tibia when leg retracted; at least front tibia angulate externally. Tarsus cryptotetrmerous or trimerous. Abdomen with 5 visible sterna. Postcoxal line on first abdominal sternum complete (Fig. 25c). Male genitalia asymmetrical, paramere reduced. Female genitalia lacking infundibulum.

This tribe presently contains 6 genera, 5 of which are native to the Old World. Delphastus is the only native American representative of the tribe with 12 species occurring from Canada to Argentina. Catana clauseni Chapin occurs in Cuba, but was introduced from Indonesia in 1930 for biocontrol of the citrus blackfly, Aleurocanthus woglumi Ashby. Serangiini is a closely knit group of genera, highly distinctive in appearance. The strongly lobed prosternum that conceals the mouthparts and has a notch on each side for reception of the antenna is the most striking characteristic; in addition, the ventral surface is deeply foveate for reception of the legs, and at least the anterior leg is broad, flattened. See Gordon (1977) for further discussion of the genera occurring in the Western Hemisphere.
Fig. 22. Distribution. *Nipus bieplagiatius* (dot); *N. niger* (star); *N. planatus* (square); *N. occidentalis* (open circle).
Genus *Delphastus* Casey


Serangiini with form hemispherical, slightly elongate. Head with apical segment of maxillary palpus slender, somewhat conical. Antenna 9-segmented (Fig. 25b). Elytron without sutural line. Epipleuron not descending externally. Leg with femur broad; tibia angulate externally. Tarsus trimerous.

There are only 3 species of this genus described from the area north of Mexico; the remaining 9 described species occur from Mexico and the West Indies to Argentina. Members of *Delphastus* are known as predators on whiteflies (Aleyrodidae) with available host records as follows: *Aleurocanthus woglumi* Ashby; *Pelius kelloggi* (Be mis); *Trialeurodes floridensis* (Quaintance); *Dialeurodes citri* (Ashmead); and *Dialeurodes citrifolii* (Morgan). However, a series of a species of *Delphastus* in the USNM collection bears the host data “on *Asterolecanium miliaris* (Boisduval), a pit scale. Kamiya (1966) records *Serangium japonicum japonicum* Chapin as feeding on the soft scales *Cerothylas rubens* Maskell and *Cerothylas japonicus* Green in Japan. It appears that members of the Serangiini feed on both whiteflies and scale insects. The species of *Delphastus* were taxonomically treated by Gordon (1970e).
Fig. 24. *Nipus occiduus*.

**Key to Species of Delphastus**

1. Length less than 1.10 mm; color pale reddish yellow; Florida .......... *pallidus* (LeConte)
   - Length more than 1.30 mm; color light reddish brown to black; not restricted to Florida ............................................. 2

2(1). Prosternal lobe densely, coarsely punctate; California .......... *catalinae* (Horn)
   - Prosternal lobe smooth; not restricted to California ............ *pusillus* (LeConte)

*Delphastus pallidus* (LeConte)
Fig. 25e, g; Map, Fig. 27

*Oeneis pallidus* LeConte, 1878a, p. 400.
*Cryptognatha pallida*: Horn, 1895, p. 83.


*Diagnosis*. Length 0.90 to 1.05 mm, width 0.70 to 0.80 mm. Color pale reddish yellow except leg yellow. Male genitalia as in Figure 25e, g.

*Discussion*. This small, pale species is readily recognizable by the key characters. The type is a unique female in the LeConte collection labeled "Sand Pt, Fla, 18-2/979/Type 6696(red paper)/Oeneis pallidus LeC." which must be considered the holotype.

*Type locality*. Sand Point, Florida.
*Type depository*. MCZ.
**Distribution.** Figure 27. FLORIDA: Homestead; Lake Alfred; Miami; Orlando; Pasco Co.; Sand Point; Volusia Co.

*Delphastus catalinae* (Horn)

Fig. 26a–d; Map, Fig. 27

*Cryptognatha catalinae* Horn, 1895, p. 83.


**Diagnosis.** Length 1.40 to 1.50 mm, width 1.10 to 1.18 mm. Color medium reddish brown, median area of pronotum slightly darker; legs and head of male pale yellowish brown. Male genitalia as in Figure 26a–d.
Discussion. The coarsely punctured prosternal lobe distinguishes this species from other North American Delphastus. In addition, D. catalinae is broader and usually paler in color than D. pusillus which it most closely resembles. The type is a unique female in the Horn collection labeled “Catalina Cal., 7-21-94/Holotype 3169(red paper)/Cryptognatha catalinae H.” which must be considered the holotype.

Type locality. Catalina, southern California.

Type depository. MCZ.

Distribution. Figure 27. CALIFORNIA: Catalina; Los Angeles Co., Oak Canyon, Tanbark Flat; Pasadena, San Antonio Canyon; Santa Barbara.

Delphastus pusillus (LeConte)
Fig. 28a–c; Map, Fig. 27

Oeneis pusilla LeConte, 1852, p. 135—Crotch, 1873, p. 377.
Cryptognatha pusilla: Crotch, 1874b, p. 207—Horn, 1895, p. 83.

Oeneis puncticollis LeConte, 1852, p. 135—Crotch, 1873, p. 377 (as female of pusilla).
Cryptognatha puncticollis: Crotch, 1874b, p. 207—Horn, 1895, p. 83.
Delphastus pusillus var. puncticollis: Casey, 1899, p. 112—Korschefsky, 1931, p. 220.

Diagnosis. Length 1.40 to 1.60 mm, width 1.10 to 1.20 mm. Color black; prosternum and leg yellow, male with head and lateral margin of pronotum yellow. Male genitalia as in Figure 28a, b. Female genitalia as in Figure 28c.

Discussion. Delphastus pusillus is a widely distributed, variable species. The color pattern described above was taken from a Maryland specimen which agrees quite well with LeConte’s original description. The southwestern U.S. specimens are usually dark brown rather than black and the males do not have lighter colored pronotal margins, it was to this form that Casey gave the name D. sonoricus. The brown form prevails south through Mexico and Central America with an occasional population from a coastal locality exhibiting the color pattern of typical D. pusillus. Its range appears to be continuous into South America at least as far as Peru.

I consider the three specimens of D. pusillus that remain in the LeConte collection type material. The first of these, a male labeled “(orange disc)/Type 6697(red paper)/Oe. pusilla LeC.”, I designate and label the lectotype. The second, bearing only an orange disc, and the third bearing a pink disc are designated as paralectotypes. LeConte apparently had only one example of O. puncticollis, and this specimen in his collection labeled “(orange disc)/Type 6698/Oeneis puncticollis LeC.” must be considered the holotype. Casey had 6 type specimens from southern Arizona and southern California. I designate and label a male as the lectotype and the remainder as paralectotypes.
Fig. 28. *Delphastus pusillus*.

**Type locality.** Of *pusillus*, Georgia (lectotype here designated); of *puncticollis*, “Southern States”; of *sonoricus*, Tucson, Arizona (lectotype here designated).

**Type depository.** Of *pusillus* and *puncticollis*, MCZ; of *sonoricus*, USNM (35230).

**Distribution.** Figure 27. Massachusetts to Florida, west to California.

**Cephaloscymmini**, new tribe

Sticholotidinae of small size, length less than 3.0 mm. Head prominent, exposed, deflected ventrally; eye large, narrow, elongate, very finely faceted, inner margin parallel or closer at posterior border of eye than at anterior border; apex of clypeus truncate or subtruncate; gena with or without narrow extension onto eye. Antenna inserted frontally at apex of eye, insertion exposed or not; antenna short, 8–10-segmented, club 3-segmented. Apical segment of maxillary palpus long, slender, conical or parallel sided. Mandible bidentate apically, or unidentate with feeble, subapical tooth Pronotum short, deeply excavated for reception of head, lateral border explanate, anterolateral angle strongly produced forward, extending nearly to apex
of eye. Prosternum broad, bicornate or not, produced anteriorly to partially conceal mouthparts or not. Epipleuron broad or narrow, not foveate for reception of leg. Leg slender, simple. Tarsus cryptotetramerous; tarsal claw without tooth. Abdomen with 5 visible sterna. Postcoxal line on 1st abdominal sternum complete (Fig. 30g). Male genitalia symmetrical.

The group of genera here assigned to this tribe contain some of the most unusual appearing Coccinellidae in the entire family. These genera have previously been placed in the Scymninae, but examination of all morphological characters shows that they belong in the subfamily Sticholotidinae. They are not closely related to members of any presently established tribe; therefore, the establishment of the tribe Cephaloscynmini is deemed necessary. The included genera are *Cephaloscynmus* Crotch, *Prodilis* Mulsant, *Neaporia* Gorham, *Aneaporia* Casey and *Prodioloides* Weise. The genus *Cephaloscynmus* has been placed in the Scymnini or Ortiillini by authors, while
Proditis, Neaporia, and Proditoides have been placed in the Ortaiiini. Casey considered Aneaporia to belong to the Exoplectrini but this was an obviously incorrect placement. All of these genera quite apparently share a common ancestry and must be grouped together as done here. Examination of species of this group in existing collections indicates that additional genera will have to be erected when a complete study is completed. The combination of short antenna; large, ventrally directed head; large, narrow, finely faceted eyes; and short, explanate pronotum readily separate this tribe, not only from other tribes of Sticholotidinae, but from all other North American Coccinellidae. The only genus in this tribe occurring north of Mexico is Cephaloscymnus.

Genus Cephaloscymnus Crotch


Cephaloscymnini with form elongate, slender (Fig. 29). Head broad between eyes, frons 3 times the width of an eye; inner margin of eyes nearly parallel; apex of clypeus subtruncate; gena not extending onto eye (Fig. 30a). Antennal insertion exposed; antenna 9-segmented, club 3-segmented (Fig. 30b). Apical segment of maxillary palpus slender, parallel-sided (Fig. 30c). Mandible unidentate apically, with feeble, subapical tooth (Fig. 30d). Surface of head and pronotum deeply, densely punctured, punctures contiguous or nearly so. Prosternum short, not produced anteriorly, without carinae (Fig. 30e). Male metasternum with large, deep, pubescent pit (Fig. 30f). Postcoxal line as in Figure 30g. Female genitalia without infundibulum; spermethecal capsule simple, lacking cornu or ramus (Fig. 31f).

The presence of a metacoxal pit in males and the short intercoxal prosternal process lacking carinae or an anterior protuberance distinguish Cephaloscymnus from the other genera of Cephaloscymnini. There are presently 7 species in this genus (Gordon, 1970b, 1974d), 2 of which are known only from Mexico and 4 from Mexico and the United States. Cephaloscymnus bruchi Weise was described from Brazil; I have not seen this species but suspect that it belongs in Proditis. No host data is available for members of this genus, but they are probably scale predators. Cephaloscymnus has been revised by Gordon (1970b), with a subsequent paper (Gordon, 1974d) on additional species from Mexico.

**KEY TO SPECIES OF Cephaloscymnus**

1. Length 2.15 mm or more; eastern United States, Texas, Arizona, New Mexico, and Mexico ......................................................... 2
   - Length 2.15 mm or less; California, Arizona, Texas, Mexico ......................................................... 3
2(1). Pronotum and elytron piceous to black; eastern U.S. ........................................................................... zimmermanni zimmermanni Crotch
   - Pronotum usually reddish, elytron piceous to brown; southwestern U.S. and northeastern Mexico .................................................................................................................. zimmermanni australis Gordon
3(1). Ventral surface black (except legs and mouthparts) ................................................................. laevis Gordon
   - Ventral surface piceous or brown .................................................................................................. 4
Fig. 30. *Cephaloscymnus* sp. a. Lateral view of head and pronotum. b. Antenna. c. Maxillary palpus. d. Mandible. e. Prosternum. f. Metasternum. g. Postcoxal line.

4(3). Pronotum finely punctured, anterior angle feebly explanate ........ *occidentalis* Horn
- Pronotum coarsely punctured, anterior angle strongly explanate ........ *insulatus* Gordon

*Cephaloscymnus zimmermanni zimmermanni* Crotch
Figs. 29, 31a–e; Map, Fig. 32


*Diagnosis*. Length 2.15 to 2.40 mm, width 1.30 to 1.45 mm. Form elongate (Fig.
29). Color piceous to black dorsally; ventral surface piceous, tarsus yellowish brown. Male genitalia as in Figure 31a–d. Female genitalia as in Figure 31e. Crotch had more than one type specimen, but only one female labeled “(yellow disc)/Type 8247/ Cephaloscynmus zimmermanni Crotch” remains in the LeConte collection. I designate and label that female the lectotype.

_Type locality._ “Central Valley” (Ohio, Illinois, etc.) (lectotype here designated).

_Type depository._ MCZ.

_Distribution._ Figure 32. DISTRICT OF COLUMBIA. INDIANA (state record). MARYLAND: Beltsville. NEW JERSEY: Montclair. SOUTH CAROLINA: (state record). TENNESSEE: Oak Ridge. VIRGINIA: Falls Church; Winchester. WEST VIRGINIA: Berkley.

_Cephaloscynmus zimmermanni australis_ Gordon

Fig. 31f; Map, Fig. 32


_Diagnosis._ Length 2.20 to 2.36 mm, width 1.38 to 1.60 mm. Color piceous to brown dorsally, pronotum red; venter black except leg, mouthparts and epipleuron
yellowish brown. Male genitalia as illustrated for zimmermanni zimmermanni. Female spermathecal capsule as in Figure 31f. See Gordon (1974d) for detailed discussion.

*Type locality.* Kerrville, Texas.

*Type depository.* USNM (70399).

*Distribution.* Figure 32. ARIZONA: Chiricahua Mts.; Cochise Co., Palmerlee; Huachucha Mts., Millers Canyon. NEW MEXICO: Las Vegas. TEXAS: Kerrville; Mountain Home.

*Cephaloscymnus occidentalis* Horn

Fig. 33a–c; Map, Fig. 32


*Diagnosis.* Length 1.85 to 2.10 mm, width 1.10 to 1.40 mm. Color brown dorsally, pronotum reddish brown; venter piceous, leg brown. Male genitalia as in Figure 33a–c. Female genitalia as in Figure 33e.

*Discussion.* Horn apparently had more than one specimen when he described *C. occidentalis*, but only one specimen, a female labeled “425/Los Angeles Cal/Lectotype 3030/C. occidentalis Horn” remains in his collection, I designate and label this specimen the lectotype.
Fig. 33. *Cephaloscynnus occidentalis*.

*Type locality.* Los Angeles, California (lectotype here designated).
*Type depository.* MCZ.
*Distribution.* Figure 32. Arizona to California, also Texas (Brownsville).

*Cephaloscynnus insulatus* Gordon
Fig. 34a–d; Map, Fig. 32

*Cephaloscynnus insulatus* Gordon, 1970b, p. 69.

*Diagnosis.* Length 2.00 to 2.10 mm, width 1.10 to 1.30 mm. Color brown dorsally,
pronotum reddish; venter piceous, legs, mouthparts, and epipleuron brown. Male genitalia as in Figure 34a–d.

*Type locality.* Santa Rita Mts., Arizona.

*Type depository.* USNM (70400).

*Distribution.* Figure 32. ARIZONA: Oracle; Santa Rita Mts., Box Canyon.

*Cephaloscymnus laevis* Gordon
Fig. 35a–e; Map, Fig. 32


*Diagnosis.* Length 2.00 mm, width 1.15 mm. Color light brown dorsally; venter black, mouthparts, leg, and epipleuron light brown. Male genitalia as in Figure 35a–d. Female genitalia as in Figure 35e.

*Discussion.* This species was originally described from a unique male from Nogales, Arizona. Gordon (1974d) recorded 2 specimens of *C. laevis* from Hidalgo, Mexico.

*Type locality.* Nogales, Santa Cruz Co., Arizona.

*Type depository.* CAS.
_Distribution._ Figure 32. ARIZONA: Pima Co.; Santa Rita Exp. Range. MEXICO: Hidalgo.

Subfamily Scymninae


Coccinellidae with dorsal surface pubescent (Scymmnini, Selvadiini, Blaisdelliana, Zagloba) or glabrous (Hyperaspini, Zilus); size small. Antenna very short, usually ¾ or less the length of head, inserted ventrally. Terminal segment of maxillary palpus not strongly secundiform, usually parallel sided or barrel shaped. Mentum broadly articulated with submentum. Epipleuron of elytron narrow, short. Middle coxae broadly separated. Each femur nearly cylindrical, stout, occasionally flattened. Tarsus cryptotetramerous or trimerous.

This subfamily contains the small, compact coccinellids as exemplified by members of the genera Scymnus and Hyperaspis. Della Beffa (1912) was the first to group the mostly pubescent Scymnini and usually glabrous Hyperaspini together, and this view was recently reinforced by Sasaji (1968). In America north of Mexico 5 tribes represent this subfamily, one of which, the Selvadiini, is erected for the first time. Zilini is provided as a replacement name for Scymnillini.

KEY TO TRIBES OF SCYMNINA

1. Abdomen with 5 visible sterna ........................................ 2
   – Abdomen with 6 or 7 visible sterna .................................. 3
2(1). Prosternum with large anterior lobe concealing mouthparts; Florida ...... Cryptognathini
   – Prosternum unmodified, not concealing mouthparts; Florida and elsewhere .... Zilini
3(1). Surface of elytron pubescent ........................................ 4
   – Surface of elytron glabrous ........................................... 5
4(3). Anterior margin of prosternum lobed, at least partially concealing mouthparts (Figs. 48c, 59c) .............................................. 5
   – Anterior margin of prosternum not lobed ................................ 6
5(4). Length less than 2.0 mm; pronotum black ............................... Stethorini
   – Length more than 3.0 mm; pronotum reddish yellow
     ...................................................................................... 7
     Cryptolaemus montrouzieri Mulsant (Scymnini)
6(4). Head narrow, elongate in front of eye; apex of clypeus strongly emarginate, anterolateral angle produced forward (Fig. 292a) Blaisdelliana sexualis Casey (Hyperaspini/)
   – Head broad, not elongate in front of eye; apex of clypeus truncate or nearly so, anterolateral angle not produced ........................................ 7
7(6). Form flattened, nearly parallel sided; eyes small, separated by 3 times the width of an eye; antennal club symmetrical (Fig. 287b) .................. Selvadiini
   – Form usually convex, rounded; eyes large, separated by twice the width of an eye;
     antennal club asymmetrical (Fig. 68a) ..................................... Scymnini

Tribe Zilini, new name

Scymnillini Casey, 1899, p. 112—Leng, 1920, p. 214—Korschefsky, 1931, p. 171—

Scymninae of small size, usually less than 2.30 mm long; form round or elongate,
convex; dorsal surface either distinctly pubescent or apparently glabrous, head and
anterolateral pronotal angle always pubescent. Head partially inserted in pronotum.
Antenna short, compact, insertion exposed, 10-segmented, club symmetrical. Maxillary palpus with apical segment cylindrical or slightly secundiform. Pronotum deeply emarginate anteriorly, lateral margin slightly explanate, anterolateral angle produced.
Prosternum with intercoxal process broad, flat, without carinae. Leg free, simple; tarsus cryptotetramerous; tarsal claw with or without basal tooth. Abdomen with 5 visible sterna, sterna compact and tightly joined. Male genitalia symmetrical, form simple. Female genitalia with sperm duct short; genital plate elongate, triangular.

There are 2 North American genera in this tribe, Zaglopa and Zilus. The tribe is strictly New World in distribution and forms a tightly knit group of genera and species. The 5-segmented abdomen, broad intercoxal process of the prosternum, and partially concealed head distinguish this tribe from other tribes in the Scyminae. Examination of species of Zilus and Scymnillus indicates that they are congeneric, therefore Scymnillus is placed as a junior synonym of Zilus, and the tribal name changed to Zilini.

**KEY TO GENERA OF ZILINI**

1. Elytron apparently glabrous ........................................... Zilus Mulsant
   – Elytron densely pubescent ..................................... Zaglopa Casey

**Genus Zilus Mulsant**

*Scymnus (Zilus)* Mulsant, 1850, p. 958—Korschěsky, 1931, p. 117. Type-species; *Scymnus (Zilus) fulvipes* Mulsant, by monotypy.


*Scymnillus* Horn, 1895, p. 110—Casey, 1899, p. 114—Leng, 1920, p. 214—Kor-


Zilini with length less than 2.0 mm. Dorsal surface often with a metallic tint of varied colors; pubescence usually limited to head and pronotum with occasional sparse hairs present on elytron. Antenna extremely short, compact, club apparently 3-segmented (Fig. 36a). Apical segment of maxillary palpus slightly securingiform (Fig. 36b). Gena extending onto eye. Tarsal claw with basal tooth (Fig. 36c). Postcoxal line extending downward from base of first abdominal sternum, joining apex of sternum nearly at lateral margin (Fig. 36d). Male genitalia simple, symmetrical. Female genitalia with infundibulum slender, elongate (Fig. 36e).

The key characters will separate Zilus from Zagloba. In addition, Zilus often has a metallic tint of green, violet, or blue, etc., on the dorsal surface, and the postcoxal line extends in an arc from the base of the sternum to the posterolateral angle. Most species of Zilus are neotropical with 4 species recorded from the United States. They are apparently predators on various scale insects such as Lepidosaphes spp. and Aspidiotus spp, but one species has been recorded on the whitefly Aleurocanthus woglumi Ashby. The genus has not been treated taxonomically as a whole.

**KEY TO SPECIES OF ZILUS**

1. Length 1.0 mm or less .......................... eleutherae (Casey), n. comb.
   - Length 1.20 mm or more ..........................
     2
2(1). Dorsal surface with purple or blue tint; form broad; known only from Florida .......................... subtropicus (Casey), n. comb.
   - Dorsal surface black or brown; form somewhat elongate; not restricted to Florida 3
3(2). Dorsal surface reddish brown; western United States ....... aterrimus (Horn), n. comb.
   - Dorsal surface black; eastern United States .......................... horni, n. sp.

*Zilus aterrimus* (Horn), new combination

Fig. 37a–f; Map, Fig. 39


**Diagnosis.** Length 1.25 to 1.60 mm, width 0.90 to 1.35 mm. Form elongate, oval (Fig. 37f). Color reddish brown except antenna, mouthparts and leg yellowish brown. Male genitalia as in Figure 37a–d. Female genitalia as in Figure 37e.

**Discussion.** I cannot separate *Z. cochisensis* (Nunenmacher) from *Z. aterrimus*; therefore, I place *Z. cochisensis* as a junior synonym of *Z. aterrimus*. Nunenmacher stated that he had 20 cotypes of *S. cochisensis*, 2 of which (male and female) are now in the California Academy of Science. I here designate and label the female as the lectotype and the male as a paralectotype. Horn had more than one specimen of *S. aterrimus*, and there are 3 specimens now in his collection, the first of these, a
female labeled "Oregon Koebele/40/Lectotype 3185/Scymnillus aterrimus Horn", I designate the lectotype, the remaining 2 are designated as paralectotypes.

_Type locality._ Of _aterrimus_, Oregon (lectotype here designated); of _cochisensis_, Benson, Cochise Co., Arizona (lectotype here designated).

_Type depository._ Of _aterrimus_, MCZ; of _cochisensis_, CAS.

_Distribution._ Figure 39. Idaho and Washington to California and Arizona.

**Zilus horni**, new species

Fig. 38a–f; Map, Fig. 39


_Description._ Male, length 1.40 mm, width 1.0 mm. Form oval (Fig. 38f). Color black except mouthparts, antenna, and leg yellowish brown. Head coarsely punctured, punctures separated by less than a diameter. Pronotum with coarse punctures as on head laterally, separated by a diameter or less, discal area finely punctured, punctures separated by one to 2 times a diameter. Elytron finely punctured as on pronotal disc, punctures separated by one to 3 times a diameter. Ventral surface smooth, finely punctured medially, becoming dull with alutaceous sculpture and coarse punctures laterally. Genitalia as in Figure 36a–d.

Female, similar to holotype except length 1.50 mm, width 1.10 mm. Genitalia as in Figure 36c.

_Variation._ Length 1.40 to 1.60 mm.

_Holotype._ Male. MARYLAND: Piney Pt., Coll. Hubbard & Schwarz (USNM 101330).


_Paratypes._ Total 23. MARYLAND: same data as holotype; same data as allotype; College Park, X-2-1960, P. J. Spangler. (USNM).
Fig. 37. *Zilus aterrimus.*

*Distribution.* Figure 39. Maryland to Florida, west to Wisconsin. Disjunct localities: LOUISIANA: Caddo Parish; East Baton Rouge Parish; Rapides Parish.

This eastern species has been confused with *Z. aterrimus* (Horn) although the distributions are disjunct. In addition to differences in male and female genitalia,
these 2 species are also separable externally. *Zilus horni* is entirely black dorsally, and the pronotum is finely punctate medially. *Zilus aterrimus* is reddish brown dorsally, and the pronotum is closely, coarsely punctate throughout. The specific epithet is in honor of George H. Horn.

*Zilus eleutherae* (Casey), new combination

Fig. 40a–e; Map, Fig. 39

*Scymnillus eleutherae* Casey, 1899, p. 115—Korschefsky, 1931, p. 171—Blatchley, 1920, p. 44.

*Diagnosis.* Length 0.90 to 1.0 mm, width 0.78 to 0.80 mm. Form round, convex (Fig. 40e). Color purplish black; lateral pronotal border, ventral surface, and leg (except tarsus) dark brown; antenna, mouthparts and tarsus yellow. Male genitalia as in Figure 40a–c.

*Discussion.* This minute species was described from the Bahamas and first recorded from Florida by Blatchley (1920). The size and muted purplish black dorsum characterize *Z. eleutherae* in the North American fauna. There are 3 types in the Casey collection, the first of which I designate and label the lectotype and the other 2 as paralectotypes.
Type locality. Eleuthera, Bahamas (lectotype here designated).

Type depository. USNM.

Distribution. Figure 39. FLORIDA: Cape Sable.

Zilus subtropicus (Casey), new combination
Fig. 41a–f; Map, Fig. 39

Delphastus subtropicus Casey, 1924, p. 170—Korschefsky, 1931, p. 221.
Scymnilodes subtropicus: Chapin, 1930, p. 493.

Diagnosis. Length 1.60 to 1.80 mm, width 1.28 to 1.42 mm. Form broad, oval (Fig. 40f). Color metallic purple or blue, pronotum often metallic green; ventral surface yellow to reddish piceous, leg and mouthparts yellowish brown. Male genitalia as in Figure 41a–d. Female genitalia as in Figure 41e.

Discussion. The metallic blue or purple dorsal color is very distinctive among North American coccinellids but is shared with several other members of this genus that occur in the West Indies. This species is apparently restricted to southern Florida but may also occur in the West Indies. The type specimen is a unique female in the Casey collection (holotype).

Type locality. Key West, Florida.

Type depository. USNM (35228).

Distribution. Figure 39. FLORIDA: Biscayne; Coral Gables; Davie; Florida City; Fort Pierce; Hialeah; Key West; Miami; Paradise Key; Vero Beach.

Zilini with length usually less than 2.00 mm. Dorsal surface without metallic tint, pubescence dense, mostly erect, present throughout. Antenna short, compact, club distinctly 3-segmented (Fig. 42a). Apical segment of maxillary palpus not securiform, sides nearly parallel, narrowed slightly at apex (Fig. 42b). Gena extending onto eye. Tarsal claw with basal tooth (Fig. 42c). Postcoxal line complete or incomplete (Figs. 43f, 46f), never reaching apex of first abdominal sternum. Male genitalia simple, symmetrical. Female genitalia with infundibulum usually large, flattened laterally, sperm duct very short (Fig. 44e).

The described species of Zagloba occur from Venezuela and Colombia north to Oregon and Pennsylvania with 3 known from the neotropics and 4 from the United States. These species are not commonly collected and I have not seen host data for
any of the United States species. At least one Neotropical species, *Z. obscura* Gordon, has been taken feeding on “scale insects” on banana and orange. We may presume, therefore, that all species of *Zagloba* are likely to be scale predators. *Zagloba* has not been taxonomically treated as a whole, but Gordon (1970g) reviewed the Central and South American species.

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Fig. 42. *Zagloba* sp. a. Antenna. b. Maxillary palpus. c. Tarsus.
KEY TO SPECIES OF Zagloha

1. Pronotum entirely yellowish red; elytron black or dark brown (Fig. 44f); Florida
   - Pronotum entirely black or brown, at most with some lateral paler areas; elytron uniformly dark or dark with yellow maculation; not known from Florida ........... 2

2(1). Elytron brown with yellow maculation; Pacific Coast, Arizona .......... ornata (Horn)
   - Elytron black or brown, immaculate; not known from the Pacific Coast .......... 3

Fig. 43. Zagloha ornata.
Fig. 44. Zaglobo bicolor.

3(2). Punctures within arc of postcoxal line coarse, distinct; pronotum paler than elytron

- Punctures within arc of postcoxal line fine, indistinct; pronotum and elytron concolorous

\[ \textit{hystrix} \text{ Casey} \]

\[ \textit{satana}, \text{n. sp.} \]

\[ \textit{Zaglobo ornata} \text{ (Horn)} \]

Fig. 43a–g; Map, Fig. 45

\[ \textit{Cephaloscymnus ornatus} \text{ Horn, 1895, p. 111.} \]


\[ \textit{Zaglobo laticollis} \text{ Casey, 1899, p. 114—Leng, 1920, p. 214. New Synonymy.} \]

\[ \textit{Zaglobo orbipennis} \text{ Casey, 1899, p. 114—Leng, 1920, p. 214. New Synonymy.} \]

\[ \text{Diagnosis.} \text{ Length 1.75 to 2.00 mm, width 1.43 to 1.65 mm. Form elongate, oval. Color dark brown to light brown; antenna, mouthparts, and leg yellowish brown; pronotum often with yellowish brown lateral areas; elytron usually with 2 nebulous, yellow spots feebly connected (Fig. 43g), but pattern variable as in Figure 43g. Postcoxal line complete (Pullus type) in both sexes (Fig. 43f). Male genitalia as in Figure 43a–d. Female genitalia with infundibulum small, elongate (Fig. 43e).} \]
Discussion. This species is unique among North American members of the genus in having the postcoxal line complete in both sexes and in having a simple, reduced infundibulum. Zagloba laticollis Casey and Z. orbipennis Casey are conspecific with Z. ornata, and I place both names as junior synonyms. Both species were described from unique specimens in the Casey collection which must be considered holotypes. Zagloba ornata was described from several specimens, all from California, and I designate and label as the lectotype a female in the Horn collection labeled “702/ Aug./Siskiyou Co., Cal./lectotype 3186(red paper)/C. ornatus Horn.” Three other type specimens from various California localities are designated as paralectotypes.

Type locality. Of ornata, Siskiyou Co., California (lectotype here designated); of laticollis, California; of orbipennis, Healdsburg, Sonoma Co., California.

Type depository. Of ornata, MCZ; of laticollis (35234) and orbipennis (35233), USNM.

Distribution. Figure 45. Southern Arizona and California, north to southwestern Oregon.

Zagloba bicolor Casey
Fig. 44a–f; Map, Fig. 45


Diagnosis. Length 1.65 to 1.85 mm, width 1.22 to 1.33 mm. Form elongate, oval (Fig. 44f). Color pale yellowish brown; pronotum yellowish red; elytron black or dark brown; meso- and metasternum and first abdominal sternum dark brown. Postcoxal
line incomplete in both sexes. Male genitalia as in Figure 44a–d. Female genitalia with infundibulum large, flattened laterally (Fig. 44e).

Discussion. This species is apparently restricted to Florida, and the color pattern alone will distinguish it from other members of the genus. The type is a unique (holotype) female in the Casey collection.

Type locality. Capron, Florida.

Type depository. USNM (35236).

Distribution. Figure 45. FLORIDA: Alachua Co., Gainesville; Dunedin; Jefferson Co., Monticello; Miami; Tampa.

Zagloba hystrix Casey
Fig. 46a–g; Map, Fig. 45


Diagnosis. Length 1.45 to 1.75 mm, width 1.35 to 1.50 mm. Form rounded, pronotum and elytron abruptly discontinuous in outline (Fig. 46g). Color medium reddish brown; antenna, leg and mouthparts yellowish brown; elytron dark brown to black. Postcoxal line incomplete in both sexes (Scymnus, s. str., type) (Fig. 46f). Male genitalia as in Figure 46a–d. Female genitalia as in Figure 46e.

Discussion. This species is difficult to separate from Z. satana, n. sp., but the pronotum is usually distinctly paler than the elytron in this species, and the abdominal punctuation is definitely coarser than in satana. There are 6 type specimens of hystrix in the Casey collection, and the first of these, a female, is designated and labeled as the lectotype. The other 5 types bear the same data and are designated as paralec- totypes.

Type locality. Brownsville, Texas (lectotype here designated).

Type depository. USNM (35237).

Distribution. Figure 45. TEXAS: Brownsville; San Antonio; Zavalla Co., Nueces River.

Zagloba satana, new species
Fig. 47a–h; Map, Fig. 45

Description. Male, length 1.65 mm, greatest width 1.32 mm. Form rounded (Fig. 47h), outline of pronotum and elytron strongly discontinuous. Color black; ventral surface and lateral border of pronotum dark reddish brown; antenna, mouthparts, and leg yellowish brown. Dorsum densely pubescent with grayish white hairs, hairs erect on pronotum and elytron, appressed on head. Head densely, finely punctured, punctures separated by a diameter or less. Pronotum ⅓ the length of elytron; punctures fine, separated by twice a diameter on disc, becoming contiguous along lateral margin. Elytral punctuation finer than on pronotum, punctures separated by less than to twice a diameter. Metasternum smooth, nearly impunctate medially, punctures becoming coarse and dense laterally. Abdominal punctuation fine, punctures within arc of postcoxal line indistinct; postcoxal line complete (Fig. 47g). Genitalia as in Figure 47a–d.
Fig. 46. Zaglopa hystrix.

Female, similar to holotype except length 1.60 mm, width 1.29 mm; postcoxal line incomplete (Fig. 47f); genitalia as in Figure 47e.

Variation. Length 1.45 to 1.75 mm, width 1.20 to 1.37 mm.

**Allotype.** Female. Same data as holotype except “on Pithecolobium”. (USNM).

**Paratypes.** (Fig. 45) Total 8. TEXAS: “Texas”; Devils River, V-4-07, FC Pratt Collector; same data as holotype; Laredo, 28-5, Hubbard and Schwarz. (USNM).

This is the only known species of *Zagloba* exhibiting sexual dimorphism in the shape of the postcoxal line. The punctuation, both dorsal and ventral, is obviously finer than in *hystrix* which *satana* most closely resembles. Genitalia should be examined in members of this group to ensure accurate determination. The specific epithet refers to the type locality.

**Tribe Stethorini**


Seymnninae of small size, less than 2.0 mm; pubescent dorsally. Antenna 11-segmented; inserted between eye and clypeus, clypeus not emarginate around base. Maxillary palpus with terminal segment convergent apically. Prosternum lobed anteriorly, partially concealing mouthparts; intercoxal process without carinae. Leg free, simple; tarsus cryptotetramerous or trimerous. Abdomen with 6 visible sterna.

This tribe contains a single genus, *Stethorus*, which has usually been placed in the tribe Scymnini. Dobzhansky (1924) erected the tribe Stethorini, but Korschelsky (1931) synonymized Stethorini with Scymnini, and Kapur (1948) agreed with this placement. Sasaji (1968) considered Stethorini a valid tribe and I concur with his treatment.

Stethorini is easily separated from all other tribes of Scymninae because the clypeus is not emarginate around the antennal bases, and the prosternum is arcuately produced in front, partly concealing the mouthparts.

**Genus Stethorus** Weise


Body color black except antenna and mouthparts yellow, legs often yellow. Head with moderately coarsely faceted eye; clypeus truncate anteriorly, anterolateral angle rounded. Antenna short, 11-segmented (Fig. 48a); inserted between eye and clypeus, clypeus not emarginate around base. Maxillary palpus with apical segment oblong, obliquely truncate and narrower toward apex (Fig. 48b). Prosternum without carinae, produced anteriorly to partly conceal mouthparts (Fig. 48c). Tarsus trimerous or cryptotetramerous; tarsal claw bifid (Fig. 48d), inner claw shorter in male than in female. Abdomen with postcoxal line on basal sternum complete (Fig. 49e). Male genitalia with basal lobe symmetrical or asymmetrical. Female spermathecal capsule present or absent, genital plate small, not triangular (Fig. 48e).

There are 65 described species in this genus, and they are found in most parts of the world; 6 species occur in America north of Mexico. Most coccinellids are pre-
daceous on insects of the order Homoptera, and some are plant feeders, but species of *Stethorus* feed almost exclusively on tetranychid mites. The western Hemisphere species were treated by Gordon and Chapin (1983), see that publication for more detailed information.

**KEY TO SPECIES OF Stethorus**

1. Postcoxal line not arched beyond middle of first abdominal sternum (figs. 54d); basal abdominal sternum densely, coarsely punctured .......................................................... 2

   - Postcoxal line arched beyond middle of first abdominal sternum (Figs. 51e, 53e); basal abdominal sternum sparsely, finely punctured .......................................................... 3
2(1). Postcoxal line short, arc not reaching middle of first abdominal sternum; elytral punctures larger than pronotal punctures .................. punctillum Weise
- Postcoxal line usually arched to middle of first sternum or nearly so (Fig. 53e); elytral and pronotal punctures equal in size .................. punctum punctum (LeConte)
3(1). Leg (except tarsus) black or brown; punctures on abdominal sterna coarse, dense (Fig. 53g) ............................................ punctum picipes Casey
- Leg with at least tibia yellow; punctures on abdominal sterna fine, sparse (Fig. 49e) ............................................
5(4). Clypeal apex truncate; lateral pronotal punctures dense, contiguous .................. pinachi Gordon and Chapin
- Clypeal apex emarginate; lateral pronotal punctures sparse, not contiguous ...... 5

Stethorus utilis (Horn)
Fig. 49a–c; Map, Fig. 52

Scymnus utilis Horn, 1895, p. 107.

Diagnosis. Length 1.0 to 2.0 mm, width 0.75 to 1.0 mm. Form elongate, oval. Color black; antenna, mouthparts, and leg yellow except basal ¾ of femur brown. Dorsal pubescence moderately long, semierect, mostly yellowish white with traces of brown. Head finely punctured, punctures separated by a diameter or less; pronotal punctures coarse, slightly larger than elytral punctures, separated by about a diameter on disc, less than a diameter laterally; elytral punctures shallow, separated by one to 2 times a diameter; metasternum with fine, dense punctures except nearly impunctate on basomedian area; abdominal sterna finely, sparsely punctured. Arc of postcoxal line extending ¾ length of 1st abdominal sternum, angulate (Fig. 49e). Apex of 6th abdominal sternum truncate. Male genitalia as in Figure 49a–c. Female spermathecal capsule as in Figure 49d.

Discussion. This species is most easily confused with S. caseyi, but the dorsal pubescence of S. caseyi is reddish brown. The male genitalia are similar in these 2 species, but the basal lobe in S. caseyi is more obviously triangular and shorter than that of S. utilis.

Type locality. Of utilis, Barstow, Florida; of atomus, Columbus, Texas.
Type depository. Of utilis, MCZ; of atomus, USNM.
Distribution. Figure 52. North Carolina to Florida, west to east Texas.

Stethorus caseyi Gordon and Chapin
Fig. 50a–f; Map, Fig. 52


Diagnosis. Length 1.10 to 1.31 mm, width 0.75 to 1.05 mm. Form short, rounded (Fig. 50f). Color black; antenna, mouthparts and leg except basal ¾ of femur yellow.
Fig. 48. *Stethorus* sp. a. Antenna. b. Maxillary palpus. c. Venter. d. Tarsus. e. Genital plates.

Dorsal pubescence long, nearly erect, reddish brown. Head shiny, finely punctured, punctures separated by a diameter; pronotum with punctures coarser than on head, punctures separated by one to 3 times a diameter; elytral punctuation coarse, punctures separated by about a diameter; metasternum with fine punctures medially, punctures becoming coarse and dense laterally. Abdominal sterna with fine punctures sparse on first sternum, dense on remaining sterna. Arc of postcoxal line extending ¾ length of first abdominal sternum, angulate (Fig. 50e). Apex of 6th abdominal sternum feebly notched. Male genitalia as in Figure 50a–c. Female genitalia as in Figure 50d.

**Discussion.** The round form, reddish brown pubescence, and sparsely punctured pronotum will separate *S. caseyi* from *S. utilis* which it most closely resembles.

**Type locality.** Devils River, Texas.

**Type depository.** USNM (10061).

**Distribution.** Figure 52. ARIZONA: Catalina Springs; Chiricahua Mountains; Oracle; Santa Rita Mountains. NEW MEXICO: Albuquerque. TEXAS: Brownsville; Devils River; El Paso; Laredo; San Antonio; San Diego; Uvalde. UTAH: Leeds; St. George.
Fig. 49. *Stethorus utilis.*
Fig. 50. *Stethorus caseyi*.

*Stethorus pinachi* Gordon and Chapin
Fig. 51a–e; Map, Fig. 52


*Diagnosis*. Length 1.25 to 1.40 mm, width 0.80 to 1.10 mm. Form elongate, oval. Color black; antenna, mouthparts, and leg yellow except basal ¾ of femur brown. Dorsal pubescence short, semierect, yellowish white with traces of brown. Head shiny, finely punctured, punctures separated by a diameter or more; pronotal punctuation coarser than on head, discal punctures separated by a diameter, lateral punctures
Fig. 51. *Stethorus pinachi*.

Contiguous; elytral punctuation very coarse, punctures separated by less than a diameter. Metasternum coarsely and densely punctured laterally, punctures finer and sparser medially; abdominal sterna with fine punctures sparse on first sternum, dense on remaining sterna. Arc of postcoxal line extending more than ¾ length of first abdominal sternum, rounded (Fig. 51e). Sixth sternum feebly emarginate apically. Male genitalia as in Figure 51a–c. Female genitalia as in Figure 51d.

*Discussion.* This species is quite distinctive in the form of the male genitalia which are most similar to those of *S. punctum*. The truncate apex of the clypeus will
Fig. 52. Distribution. *Stethorus utilis* (shaded); *S. caseyi* (dot); *S. pinachi* (open circle).

To distinguish *S. chapini* from *S. utilis* which it most closely resembles in external appearance.

*Type locality.* Carrizo Springs, Dimmit Co., Texas.

*Type depository.* USNM (100664).

*Distribution.* Figure 52. TEXAS: type locality.

*Stethorus punctum punctum* (LeConte)

Fig. 53a–e; Map, Fig. 55

*Scymnus punctum* LeConte, 1852, p. 141—Horn, 1895, p. 106.


*Diagnosis.* Length 1.35 to 1.55 mm, width 0.95 to 1.15 mm. Form elongate, oval. Color black; antenna, mouthparts, and leg yellow except femur usually brown. Dorsal pubescence short, semierect, yellowish white. Head finely punctured, punctures separated by more than a diameter; pronotum finely, densely punctured, punctures separated by a diameter on disc, contiguous laterally; elytral punctures subequal in size to those on pronotum, separated by a diameter or less; metasternum coarsely punctured anteriorly and laterally; abdominal sterna with coarse, dense punctures separated by less than a diameter. Arc of postcoxal line usually reaching middle of basal abdominal sternum, sometimes shorter (Fig. 53e). Apex of 6th abdominal sternum notched. Male genitalia as in Figure 53a–c. Female spermathecal capsule as in Figure 53d.
Discussion. This species is native to North America, but somewhat difficult to distinguish from the introduced punctillum without examination of genitalia which are highly distinctive in the males. The postcoxal line is shorter in S. punctillum than in S. punctum, and the elytral punctures are distinctly larger than the pronotal punctures in S. punctillum, nearly equal in S. punctum. The female of punctillum lacks a spermathecal capsule.

Type locality. Ontario, northern shore of Lake Superior.

Type depository. MCZ.

Distribution. Figure 55. Southeastern Canada to North Carolina, west to Montana and Colorado.

Stethorus punctum picipes Casey
Fig. 53f, g; Map, Fig. 55


Diagnosis. Description as for punctum except the leg black or dark brown (except tarsus), the ventral punctation is noticeably more coarse and dense, and the postcoxal line (Fig. 53g) extends beyond the middle of the basal abdominal sternum. Female spermathecal capsule as in Figure 53f.

Discussion. The male and female genitalia are identical in punctum and picipes, but the 2 nominate forms can be distinguished on the basis of the characters mentioned above. I prefer to treat them as subspecies with punctum occurring from the east coast to Colorado and Montana and picipes occurring from California and British Columbia to Idaho and Alberta.

Type locality. Of picipes, Santa Rosa, Sonoma Co., California; of brevis, Siskiyou Co., California.

Type depository. Of picipes and brevis, USNM.

Distribution. Figure 55. Idaho to British Columbia, south to southern California.

Stethorus punctillum Weise
Fig. 54a–d; Map, Fig. 56


Coccinella minima Rossi, 1794, p. 89 (not Coccinella minima Muller, 1776).

Scymnus (Stethorus) minimus: Weise, 1885a, p. 74.

Coccinella pusilla Herbst, 1797, p. 346 (not Coccinella pusilla Muller, 1776).

Coccinella atra Illiger, 1798, p. 413 (not Coccinella atra Gmelin, 1790).

Stethorus ater. Korschefsky, 1931, p. 112.

Diagnosis. Length 1.35 to 1.57 mm, width 0.90 to 1.12 mm. Form elongate, oval. Color black, antenna, mouthparts, and leg brownish yellow except basal ¾ of femur brown. Dorsal pubescence short, semierect, yellowish white. Punctation on head and pronotum fine, pronotal punctures separated by about a diameter; elytral punctures
Fig. 53.  a–c. Stethorus punctum punctum. f, g. S. p. picipes
Fig. 54. *Stethorus punctillum*.
coarse, separated by less then a diameter; abdominal sterna with coarse, dense punctures separated by less than a diameter. Arc of postcoxal line short, not reaching middle of basal abdominal sternum, rounded (Fig. 54d). Male genitalia as in Figure 54a–c. Female genitalia lacking a spermathecal capsule and infundibulum.

Discussion. This species is apparently a European introduction, but not an intentional one. Brown (1950) first reported it from North America (Framingham, Mass.; Vineland Station and Leamington, Ontario) and gave a key to separate S. punctillum, S. punctum, and S. picipes. Stethorus punctillum is now known from several North American localities and is often mixed with S. punctum in collections. The species has become established on the west coast of the United States, but again it was not intentionally introduced.

Type locality. Not stated.

Type depository. Type not examined.

Distribution. Figure 56. Eastern: southeastern Canada to Massachusetts, west to Michigan and Wisconsin. Western: British Columbia (Vancouver), to Oregon.

Tribe Scymnini


Scymninae of small size, usually less then 3.0 mm; form oval, rounded, or oblong; dorsal surface and eye pubescent. Antenna 8 to 11 segmented, terminal segments
forming distinct club. Maxillary palpus with apical segment cylindrical or securiform. Leg free, simple, not expanded or enlarged; tarsus trimerous or cryptotetramerous, tarsal claw simple or with basal tooth. Abdomen with 6 visible sterna, sterna usually not fused medially, apex of 6th abdominal sternum of male modified. Male genitalia vary from symmetrical to asymmetrical, form simple (Fig. 93b), or complex (Fig. 190a). Female genitalia with sclerotized infundibulum; genital plate long and narrow, or short, nearly round.

Gordon (1976b) included the genera Selvadius and Blaisdelliana in this tribe. I now consider Blaisdelliana a member of the Hyperaspiini and erect the tribe Selvadini for Selvadius. There remain 6 North American genera in the Scymnini: one, Cryptolaemus, is introduced; another, Didion, is apparently endemic; and the other 4 are worldwide in distribution. Three of these genera (Scymnus, Nephus, and Diomus) have previously been treated by Gordon (1976b); therefore, the descriptions of the species are not included here, but the keys, illustrations, and synonymies are repeated.

**Key to Genera of Scymnini**

1. Head with mouthparts directed postero-ventrad in repose, concealing prostemum; basal antennal segment strongly enlarged (Fig. 57c) .......................... *Nephaspis* Casey
   - Head with mouthparts not concealing prostemum; basal antennal segment not strongly enlarged .......................................................... 2

2(1). Prosternum enlarged, expanded, capable of concealing mouthparts in repose (Fig. 59c) .............................................................. *Cryptolaemus* Mulsant
   - Prosternum not enlarged, not concealing mouthparts .......................................................... 3

3(2). Prosternum with distinct carinae on intercoxal projection, carinae often reaching anterior margin of prosternum (Fig. 68c) .......................................................... 4

- Prosternum without carinae, or at most with short ridges next to coxal cavities (Fig. 229g) .......................................................... 5
4(3). Postcoxal line extending downward, joining hind margin of first abdominal sternum
(Fig. 257b), apex not recurved .............................................. *Dionus* Mulsant
- Postcoxal line complete or incomplete, not joining hind margin of first abdominal
  sternum, apex recurved (Fig. 268e, g) ............................... *Scymnus* Kugelann

5(3). Postcoxal line complete, recurved to base of first abdominal sternum (Fig. 62e)

- Postcoxal line extending nearly to lateral margin of first abdominal sternum, either
  parallel to hind margin (Fig. 229j), or with apex curved forward (Fig. 229h) ........
  ................................................................. *Nephus* Mulsant

Genus *Nephaspis* Casey

*Nephaspis* Casey, 1899, p. 168—Casey, 1905, p. 161—Wingo, 1952, p. 44—Gordon,
gorhami* Casey, by subsequent designation of Gordon, 1972b.


Scymnini with form elongate, somewhat oval; length less than 1.60 mm. Head with
mouthparts directed posteroventrally in repose, concealing prosternum (Fig. 57a);
clypeus extending beyond eye, anterolateral angle produced, rounded, anterior margin
truncate, lateral margin emarginate at antennal insertion; gena partially dividing eye.
Maxillary palpus with apical segment somewhat secundiform (Fig. 57b). Antenna with
8-segmented scape, basal 2 segments enlarged, club 3-segmented (Fig. 57c). Pronotum
widest at postero lateral angle, narrowed apically. Prosternum short, only slightly
longer than anterior coxa, intercoxal process narrow, apex truncate. Metasternum
tumid. Front and middle femora slender, not enlarged; hind femur enlarged medially;
all tibiae slender; tarsus cryptotetramerous, claw simple, not toothed. Abdomen with
6 visible sterna; postcoxal line as in *Scymnus* (S. str.) (Fig. 57d). Male genitalia
symmetrical (Fig. 57e-g). Female genitalia with distinctly sclerotized spermathecal
capsule, infundibulum absent; genital plate long, slender.

The extremely large basal antennal segment, strongly tumid sternum and postero-
ventrally directed mouthparts characterize this genus. It is unlike any other Western
Hemisphere genus in these respects, being similar only to the Old World genus
*Clitostethus*.

The 4 known species are all entirely neotropical except *N. oculatus* which is es-
tablished in the United States. This species is probably native to Central America
and may have entered the West Indies and the United States on imported plant
materials. It is well established in Florida, and Wingo (1952) described it as *N.
amnicola* from specimens taken in Iowa. All available host data indicate that mem-
ers of this genus are predators on whiteflies of the family Aleurodidae. Specific host
records are: *Aleurodicus dispersus* Russell and *A. cacois* (Curtis). This genus was
revised by Gordon (1972b).

*Nephaspis oculatus* (Blatchley), new combination
  Fig. 57e–l; Map, Fig. 58

*Scymnus oculatus* Blatchley, 1917, p. 140.
*Scymnus amnicola* Wingo, 1952, p. 44—Gordon, 1972b, p. 149—J. Chapin, 1974,
Fig. 58. Distribution. *Nephaspis oculatus.*

*Diagnosis.* Length 1.19 to 1.48 mm, width 0.79 to 1.00 mm. Color yellow; elytron usually piceous to black along base and lateral margin, central area yellowish brown, apex narrowly yellow (Fig. 57j); elytron in male is varied from completely black (except apical yellow area) to black or piceous with red or yellow discal spot (Fig. 57i–l). Discal spot small and round, or elongate. Male genitalia as in Figure 57e–g. Female genitalia as in Figure 57h.
Discussion. The name Scymnus oculatus Blatchley was overlooked during preparation of the revision of the genus Scymnus (Gordon, 1976b) and was brought to my attention by Herbert Dozier. Examination of the holotype revealed that S. oculatus is the same species later described as amnicola Wingo.

Type locality. Of oculatus, Dunedin, Florida; of amnicola, Iowa, Boone, Ledges State Park.
Type depository. Of *oculatus*, PU; of *amnicola*, USNM.

Distribution. Figure 58. FLORIDA: distributed throughout the state. IOWA: Boone, Ledges State Park. LOUISIANA: Pointe Coupe Parish. NEW HAMPSHIRE: Webster. TEXAS: Cameron Co., La Feria; Weslaco.

Genus *Cryptolaemus* Mulsant


Scymnini with length more than 3.00 mm; form oval, convex. Antenna with 7-segmented scape, club 3-segmented, loose (Fig. 59a). Maxillary palpus with apical segment secundiform (Fig. 59b). Prosternum broadly rounded anteriorly and produced to cover mouthparts and antenna (Fig. 59c); carinae weak, parallel, extending less than halfway to anterior margin of prosternum. Tibial spurs absent; tarsus trimerous; tarsal claw with broad basal tooth equal to half the length of claw (Fig. 59d). Abdomen with postcoxal line complete, as in *Scymnus* (*Pullus*) (Fig. 59e). Male genitalia with basal lobe symmetrical. Female genitalia with strong spermathecal capsule; sperm duct short; infundibulum reduced to a small sclerite at head of bursa; genital plates long, triangular (Fig. 59f).

*Cryptolaemus* is a small genus of the Indo-Australian region. The only species present in the Western Hemisphere is *C. montrouzieri* which was introduced as a scale predator. The expanded prosternum and large size readily separate *Cryptolaemus* from other genera of New World Scymnini. In my previous key (Gordon, 1976b) to the genera of Scymnini, I inadvertently omitted this genus. Specific host records are as follows: *Chloropulvinaria psidii* (Maskell); *Chrysomphalus pinnulifer* (Maskell); *Coccus viridis* (Green); *Dactylopius confusus* (Cockerell); *Dactylopius opuntiae* (Cockerell); *Dactylopius tomentosus* (Lamarck); *Dysmicoccus bonisius* (Kuwana); *Dysmicoccus brevipes* (Cockerell); *Eriococcus araucariae* (Maskell); *Ferrisia virgata* (Cockerell); *Nipaecoccus aurilanus* (Maskell); *Nipaecoccus filamentosus* (Cockerell); *Nipaecoccus nipae* (Maskell); *Planococcus citri* (Risso); *Planococcus krauhniae* (Kuwana); *Planococcus vitis* (Neidielski); *Pseudococcus calceolariae* (Maskell); *Pseudococcus comstocki* (Kuwana); *Pseudococcus crotonis* (Green); *Pseudococcus hirsutus* (Green); *Pseudococcus longispinus* (Targioni-Tozzetti); *Pseudococcus maritimus* (Ehrhorn); *Pseudococcus obscurus* (Essig); *Pulvinaria icerya* (Guerin); *Pulvinaria psidii* (Maskell); *Rastrococcus iceryoides* (Green); *Saccharicoccus sacchari* (Cockerell); *Trionymus insularis* (Ehrhorn). Ghorpade (1981) recorded *C. montrouzieri* as feeding on *Aphis gossypii* Glover in India.

*Cryptolaemus montrouzieri* Mulsant

Fig. 60a–e; Map, Fig. 61

*Cryptolaemus montrouzieri* Mulsant, 1853, p. 140.


Diagnosis. Length 3.40 to 4.50 mm, width 2.40 to 3.10 mm. Head, prothorax, tip
of elytron and abdomen reddish yellow; mesosternum and metasternum, leg and elytron (except tip) black or blackish (Fig. 60e). Punctuation of head and pronotum dense, elytral punctuation similar except on humeral callus which is shining, almost devoid of punctures. Male genitalia as in Figure 60a–d.
**Discussion.** This species is well established in California and south and central Florida. There are 2 syntypes of *montrouzieri*, one in the UCCC collection, one in the PM collection (R. D. Pope, pers. comm.).

*Type locality.* “Australia.”

*Type depository.* BMNH.

*Distribution.* Figure 61. CALIFORNIA: San Francisco to San Diego. FLORIDA: Clearwater. INDIANA: Lafayette (from Wingo, 1952). MISSOURI: Washington (from Wingo, 1952).

**Genus Didion** Casey


Scymnini with form elongate, oval; length less than 2.00 mm. Head short, eye partially concealed by pronotum. Pronotum with lateral margin strongly convergent apically (except *D. nanum*), base of pronotum distinctly narrower than base of elytra (Fig. 63e). Antenna with scape 7-segmented, club 3 segmented, club segments uneven on lower margin (Fig. 62a). Maxillary palpus with apical segment cylindrical, apex oblique (Fig. 62b). Apex of prosternum truncate; intercoxal process flat, with a short carina next to each coxa (Fig. 62c). Tarsus cryptotetramerous; tarsal claw with strong basal tooth (Fig. 62d). Abdomen with postcoxal line on basal sternum complete, as in *(Pullus)* (Fig. 62e). Male genitalia with basal lobe somewhat triangular in ventral view, shorter than paramere; paramere broad, apex rounded; trabes longer than
phallobase (Fig. 63a). Female genitalia with spermathecal capsule bent near apex; accessory gland present; sperm duct short, inserted at base of infundibulum; infundibulum long, slender; coxal plate long, slender, with apical stylus (Figure 62f).

*Didion* is apparently restricted to North America and is represented by 3 species. No concrete information is available on host preferences of members of this genus, but Wingo (1952) thought *D. punctatum* might be feeding on the two-spotted spider mite. Belicek (1976) listed *D. longulum* as being on plants infested with spider mites.

Species of *Didion* are most likely to be confused with members of the genus
Scymnus, subgenus Pullus, but Didion lacks complete prosternal carinae, has 10-segmented antennae, usually has the lateral pronotal margin nearly straight and strongly convergent anteriorly, and has the pronotal base distinctly narrower than the elytral base.

**KEY TO SPECIES OF Didion**

1. Elytron black with reddish orange discal spot (Fig. 63e)  ... punctatum (Melsheimer)
   - Elytron immaculate  ........................................................................................................ 2
2(1). Lateral margin of pronotum arcuate (fig. 67f); abdomen densely, coarsely punctured

- Lateral margin of pronotum nearly straight, margins convergent apically (Fig. 63e);
  abdomen not densely, coarsely punctured .................................................. 3

3(2). Punctures on elytron large, deep, distinct; form extremely elongate, narrow (fig. 63e)

- Punctures on elytron small, shallow, indistinct; form oval ......................... longulum Casey

*Didion punctatum* (Melsheimer)

Fig. 63a–f, Map, Fig. 64


**Diagnosis.** Length 1.45 to 1.80 mm, width 0.90 to 1.25 mm. Form extremely elongate, slender. Dorsal surface black or dark brown with anterior pronotal angle pale; disc of elytron usually with reddish-orange spot (Figs. 63e, f), occasionally immaculate. Elytral punctures large, deep, distinct. Male genitalia as in Figure 63a-d. Female genitalia as in Figure 62f.

**Discussion.** There are 8 specimens in the type series, all mounted in pairs on 4 points on the same pin bearing the labels "Melsh, punctatus/(a ragged piece of red paper)." The top specimen nearest the tip of the point is here designated and labeled as the lectotype, and the remaining 7 specimens as paralectotypes.
Type locality. “Pennsylvania” (lectotype here designated).
Type depository. MCZ.

Distribution. Figure 64. Quebec to Alabama, west to British Columbia and California.

Didion longulum Casey
Fig. 65a–e; Map, Fig. 66


Diagnosis. Length 1.38 to 1.75 mm, width 0.95 to 1.20 mm. Form elongate, oval. Dorsal surface black or piceous. Pronotum with surface alutaceous, punctures nearly invisible except some northern specimens with fine but distinct punctures. Elytral punctures fine, shallow. Abdominal sterna feebly punctured, mostly smooth. Male genitalia as in Figure 65a–d. Female genitalia as in Figure 65e.

Discussion. This species and D. nanum are similar, but D. nanum has distinct, coarse punctures on the pronotum and the surface between punctures is shiny. The siphonal apices are also different in the 2 species (Figs. 65c, 67c).

In my revision of the subgenus Pullus (Gordon, 1976b), I had intended to point out that Scymnus (Pullus) occiduus Casey belonged in the genus Didion, but failed to do so. Therefore I now so indicate and also place occiduus as a junior synonym of longulum. There are 2 types of occiduus (male and female) in the Casey collection, I designate and label the female as the lectotype and the male as a paralectotype. The types of D. longulum and D. parviceps are unique females (holotypes). I cannot separate D. parviceps from D. longulum and consider them synomymous.

Type locality. Of longulum, California, Sonoma Co., Duncans Mills; of parviceps, California, Sonoma Co.; of occiduus, Nevada, Reno (lectotype here designated).
Type depository. Of longulum (35247), parviceps (35248), and occiduus, (35249), USNM.

Distribution. Figure 66. Alberta to British Columbia, south to California.

Didion nanum (LeConte)
Fig. 67a–f; Map, Fig. 66


Diagnosis. Length 1.50 to 1.80 mm, width 1.15 to 1.40 mm. Form elongate, oval (Fig. 67f). Color black; anterolateral angle of pronotum, mouthparts and leg dark reddish brown. Punctuation on head fine, punctures separated by a diameter or less.
Pronotum with punctures equal in size to those on head, separated by less than to twice a diameter; lateral margins not convergent anteriorly, rounded in apical ¼. Elytron smooth, shiny, punctures coarser than on pronotum, separated by a diameter or less; pubescence grayish white, arranged in S-curve. Postcoxal line nearly reaching hind margin of first sternum. All abdominal sterna coarsely, densely punctured; 5th
sternum feebly emarginate apically; 6th sternum broadly, deeply emarginate. Male genitalia as in Figure 67a-d. Female genitalia as in Figure 67e.

Discussion. This species has often been identified as Scymnus (Pullus) tenebrosus in collections. The form is broader than in other species of Didion, the pronotal margins are not convergent anteriorly, and all abdominal sterna are coarsely, densely punctured. Didion nanum resembles a typical Pullus in fascies more than it does other species of Didion.

LeConte (1852) stated that he had 2 specimens of nanum. There are 2 specimens now in his collection. The first of these, a female labeled "(pale green disc)/4698/Type 6747(red paper)" is here designated and labeled the lectotype. The second specimen, a male, bears a pale blue disc which denotes a Lake Superior locality; thus I do not consider this specimen to be a type.

Type locality. "Missouri Territory" (lectotype here designated).

Type depository. MCZ.

Distribution. Figure 66. IOWA: state record. ILLINOIS: Quincy. KANSAS: Atchison. MASSACHUSETTS: Berlin; Boston. ONTARIO: Brockville; Pt. Pelee; Prince Edward Co. PENNSYLVANIA: Dauphin Co., Harrisburg; Monroe Co., Canadensis; Wind Gap.

Genus Scymnus Kugelann

Scymnus Kugelann, 1794, p. 545.—Mulsant, 1846, p. 219.—Mulsant, 1850, p. 948.—Mulsant 1853, p. 152.—Costa, 1849, p. 82.—LeConte, 1852, p. 130.—Crotch, 1874b, p. 239.—Chapuis, 1876, p. 211.—Weise, 1885a, p. 6, 67.—Horn 1895, p.
NORTH AMERICAN COCCINELLIDAE


Scymnini with form varying from rounded to elongate, oval, widest at middle of elytra unless otherwise stated. Antenna 10 or 11-segmented, club of 4 or 5 segments, lower margin of club segments uneven (Fig. 68a, b). Apical segment of maxillary palpus cylindrical, apex obliquely truncate. Anterior margin of clypeus truncate or slightly convex, clypeus extending slightly beyond eye, a narrow, short projection extending onto eye at antennal insertion. Tarsus with 4 segments, tarsal claw of male with inner claw larger than in female. Prosternum with distinct carinae (Fig. 68c). Postcoxal line recurved toward base of first abdominal sternum, complete or incomplete. Female genitalia with sclerotized infundibulum; genital plate long, narrowly triangular (Fig. 68d).

The genus Scymnus was revised by Gordon (1976b); therefore, only additional locality records and some necessary corrections in synonymy are included for each species herein, except for one introduced species not included in 1976b, Scymnus (P.) suturalis Thunberg.

KEY TO SUBGENERA OF SCYMNSUS

1. Postcoxal line incomplete, apical end recurved, directed toward base of first sternum (Fig. 68e) ........................................ Scymnus Kugelann
   - Postcoxal line complete, recurved, extending to base of first sternum (Fig. 68g) ....
     ........................................ Pallas Mulsant

Subgenus Scymnus Kugelann


Antenna 10 or 11-segmented (Fig. 68a, b); apical segment of maxillary palpus cylindrical, obliquely truncate apically. Prosternum with 2 strong carinae nearly always reaching anterior margin. Postcoxal line incomplete, curved forward apically (Fig. 68e, f); male 5th and 6th abdominal sterna truncate or emarginate apically. Female with distinct infundibulum (Fig. 69e).

KEY TO SPECIES OF SCYMNSUS (SCYMNSUS)

1. Species with elytron entirely pale or mostly pale with some dark areas, if mostly dark then pale areas not restricted to apical third nor forming distinct median spot on elytron .................................................. 2
   - Species with elytron black or black with distinct, pale, median or apical spot 3
2(1). Form evenly tapered at both ends; average length less than 2.0 mm; elytron never with distinct, irregular, dark spots ........................................... *difficillus* Casey
   - Form broad in apical third, pronotum and elytron noticeably discontinuous; average length more than 2.0 mm.; elytron with distinct, irregular, dark spots at least on California specimens ........................................... *nebulosus* LeConte
3(1). Elytron black with pale antero-median spot .......................... *circumspectus* Horn
   - Elytron black without pale antero-median spot ............................... 4
Fig. 69. *Scymnus (S.) nebulosus.*

4(3). Postcoxal line distinctly separated from hind margin of first abdominal sternum (Fig. 68f) ........................................ 5
- Postcoxal line reaching hind margin of first abdominal sternum or approaching it closely (Fig. 68e) ........................................ 7

5(4). Species known only from east of the Mississippi River; postcoxal line approaching hind margin of first sternum .................. *indianensis* Weise
- Species known only from west of the Mississippi River; postcoxal line not approaching hind margin of first sternum .................. 6

6(5). Apex of elytron with pale area forming a spot occupying apical 1/4 or more ................................. *coosi* Hatch
- Apex of elytron not or very feebly pale ................................. *fenderi* Malkin

7(4). Apical 1/3 or more of elytron yellowish red; pronotum alutaceous .......... *opaculus* Horn
- Apex of elytron black or with narrow, pale yellow border; pronotum not alutaceous (except *caurinus*) ........................................ 8
Fig. 70. Distribution. *Scymnus (S.) nebulosus*.

8(7). Pronotum alutaceous with punctures finer than on head; distribution mostly west of Rocky Mountains .............................................. *caurinus* Horn
   - Pronotum not alutaceous, punctures usually larger than on head; distribution mostly east of Rocky Mountains .................................................. 9

9(8). Form extremely elongate, nearly parallel sided; known only from west of the Mississippi River ...................................................... 10
   - Form rounded, not parallel sided; known from both east and west of the Mississippi River ......................................................... 11

10(9). Surface of elytron smooth, punctures distinctly coarser than on pronotum ........................................... *apicanus pseudapicanus*, new name
   - Surface of elytron distinctly micro-reticulate, punctures not or barely larger than on pronotum .................................... *paracanus linearis* Gordon
Fig. 71. *Scymnus (S.) difficilis.*

11(9). Basal lobe of male genitalia emarginate ventrally in lateral view (Fig. 82b); female infundibulum slender, tapered at spermathecal end (Fig. 82e)  . *americanus* Mulsant
- Male and female genitalia not as described above ........................................ 12

12(11). Paramere of male genitalia short, strongly tapered from base to apex (Fig. 87b); female infundibulum slender, sinuate toward spermathecal end (Fig. 87e) 
- *paracanus paracanus* J. Chapin
- Paramere of male genitalia elongate, not tapered toward apex (Fig. 84b); female infundibulum short, broad at spermathecal end (Fig. 84e)  
  . *apicanus apicanus* J. Chapin

*Scymnus (Scymnus) nebulosus* LeConte
Fig. 69a–e; Map, Fig. 70

*Scymnus nebulosus* LeConte, 1852, p. 137.—Crotch, 1874b, p. 262.—Horn, 1895, p. 95.—Steinweden, 1929, p. 29.


Scymnus phelpsii Crotch, 1874a, p. 77.—Horn, 1895, p. 96.—Gordon, 1976b, p. 15.
For detailed description, and discussion see Gordon, 1976b, p. 13.

Scymnus (Scymnus) difficilis Casey
Fig. 71a–e; Map, Fig. 73

For detailed description, and discussion see Gordon, 1976b, p. 19.

Scymnus (Scymnus) coosi Hatch
Fig. 72a–d; Map, Fig. 73

For detailed description, and discussion see Gordon, 1976b, p. 20.
Fig. 73. Distribution. *Scymnus* (S.) *difficilis* (dot); S. (S.) *coosi* (star).

*Scymnus (Scymnus) fenderi* Malkin
Fig. 74a–e; Map, Fig. 75

*Scymnus (Scymnus) fenderi* Malkin, 1943a, p. 109.—Gordon, 1976b, p. 23.
For detailed description, and discussion see Gordon, 1976b, p. 23.

*Scymnus (Scymnus) caurinus* Horn
Fig. 76a–e; Map, Fig. 77

*Scymnus caurinus* Horn, 1895, p. 97.
Fig. 74. *Scymnus (S.) fenderi.*


For detailed description, and discussion see Gordon, 1976b, p. 26.
Fig. 75. Distribution. Scymnus (S.) fenderi.
Fig. 76. *Seymnus (S.) caurinus.*
Fig. 77. Distribution. *Scymnus* (S.) *caurinus*.
Scymnus (Scymnus) indiannensis Weise
Fig. 78a-e; Map, Fig. 79

Scymnus indiannensis Weise, 1929, p. 33.


Scymnus (Scymnus) rusticus Casey, 1899, p. 154 (not Weise, 1895a).—Leng, 1920, p. 214.

For detailed description, and discussion see Gordon, 1976b, p. 30.
Fig. 79. Distribution. *Scymnus (S.) indianensis.*
Fig. 80. *Scymnus (S.) circumspectus*.

*Scymnus (Scymnus) circumspectus* Horn

Fig. 80a–e; Map, Fig. 81

*Scymnus circumspectus* Horn, 1895, p. 96.


For detailed description, and discussion see Gordon, 1976b, p. 32.
Fig. 81. Distribution. *Scymnus* (S.) *circumspectus*. 
Fig. 82. *Scymnus (S.) americanus.*
Fig. 83. Distribution. *Scymnus (S.) americanus*.

*Scymnus (Scymnus) americanus* Mulsant
Fig. 82a–e; Map, Fig. 83


*Scymnus americanus*: LeConte, 1852, p. 137.—Crotch, 1874b, p. 262.—Horn, 1895, p. 97.—Wilson, 1927, p. 170.

For detailed description, and discussion see Gordon, 1976b, p. 35.
Fig. 84. *Scymnus (S.) apicanus apicanus.*
Fig. 85. Distribution. *Scymnus* (S.) *apicanus apicanus* (dot); *S. a. pseudapicanus* (star).

*Scymnus (Scymnus) apicanus apicanus* J. Chapin
Fig. 84a–c; Map, Fig. 85


For detailed description, and discussion see Gordon, 1976b, p. 38.
Fig. 86. *Scymnus (S.) apicanus pseudapicanus.*

*Scymnus (Scymnus) apicanus pseudapicanus*, new name
Fig. 86a–c; Map, Fig. 85


For detailed description, and discussion see Gordon, 1976b, p. 38.

*Scymnus (Scymnus) paracanus paracanus* J. Chapin
Fig. 87a–e; Map, Fig. 88


For detailed description, and discussion see Gordon, 1976b, p. 41.
Fig. 87. *Scymnus (S.) paracanus paracanus.*
Fig. 88. Distribution. *Scymnus (S.) paracanus paracanus* (dot); *S. p. linearis* (star).

*Scymnus (Scymnus) paracanus linearis* Gordon
Fig. 89a–e; Map, Fig. 88

*Scymnus (Scymnus) paracanus linearis* Gordon, 1976b, p. 44.

For detailed description, and discussion see Gordon, 1976b, p. 41.
Fig. 89. *Scymnus (S.) paracanus linearis.*
Fig. 90. *Scymnus* (*S.*) *opaculus*.

*Scymnus* (*Scymnus*) *opaculus* Horn
Fig. 90a–e; Map, Fig. 91

*Scymnus opaculus* Horn, 1895, p. 96. — Casey, 1899, p. 160.


For detailed description, and discussion see Gordon, 1976b, p. 45.
Fig. 91. Distribution. *Scymnus* (S.) *opaculus*.

**Subgenus *Pullus* Mulsant**


Antenna 11-segmented (Fig. 68b); apical segment of maxillary palpus cylindrical, obliquely truncate apically. Prosternum with 2 strong carinae nearly always reaching anterior margin. Tarsus cryptotetramerus. Postcoxal line complete, recurved apically, reaching base of first abdominal sternum (Fig. 68g); male 5th and 6th abdominal sterna moderately to strongly emarginate and impressed apically.
Fig. 92. Regions corresponding to the keys to species of *Scymnus* (*Pullus*).

**Key to the Species of *Scymnus* (*Pullus*) of Region I**

Map, Fig. 92

1. Male with tubercle at center of first abdominal sternum; pronotum black or dark with an obscure, narrow, pale anterior border; leg entirely black or piceous (see *postpictus* Casey) ........................................... *marginicollis* Mannerheim
   - Male lacking abdominal tubercle; pronotum variable but if black then with anterior border also black; leg variable but rarely entirely dark .................................. 2

2(1). Dorsal color pattern light reddish yellow with a dark median area extending from basal portion of pronotum posteriorly along elytral suture, narrowed at apex of elytron (Fig. 130e) (see *nugator* Casey) ........................................... *loewii* Mulsant
   - Dorsal color pattern not as described above ........................................... 3

3(2). Color entirely light yellowish brown; introduced into Eastern Canada and North Carolina (see *suturalis* Thunberg) ........................................... *impexus* (Mulsant)
   - Color not entirely yellowish brown, usually mostly black (except some forms of *brulcrii*) ........................................... 4

4(3). Species entirely black dorsally except head may be partly or entirely pale, apex of elytron sometimes narrowly red or yellow, pronotal angle sometimes obscurely paler than disc ........................................... 5
   - Species with at least anterior pronotal angle pale red or yellow, usually with pronotum entirely pale or with a black, parabolic spot anterior to scutellum .... 9

5(4). Apex of elytron with a distinct yellow border ........................................... *pulvinatus* Wingo
   - Apex of elytron black or barely perceptibly red ........................................... 6

6(5). Abdomen with median area of last 3 sternae distinctly pale, yellowish brown; anterior pronotal angle with a relatively broad, obscure area noticeably paler than disc; length less than 2.00 mm ........................................... *compar* Casey
- Abdomen usually entirely black; anterior pronotal angle entirely black or with very narrow paler area on margin; length more than 2.0 mm (except abbreviatus) ................................................................. 7

7(6). Length 1.90 to 2.05 mm; 1st abdominal sternum of male with a tri-angular, feebly depressed, shining area medially ......................... abbreviatus LeConte
- Length 2.0 mm or more, nearly always more than 2.20 mm; 1st abdominal sternum of male with a flattened median area, not depressed, somewhat rectangular ... 8

8(7). Average length 2.30-2.40 mm; form broad, robust; male genitalia as in Figure 138 .................................................. tenebrinus Mulsant
- Average length 2.10-2.20 mm; form elongate, slender; male genitalia as in Figure 211 .................................................. lacustris

9(4). Elytron entirely light brown or with dark areas in basal ½ ........ brullei Mulsant
- Elytron with at least basal ½ black ........................................ 10

10(9). Pronotum entirely red or yellow ........................................ 11
- Pronotum with at least median, basal projection black, usually with a large, black, parabolic spot medially ........................................ 14

11(10). Form rounded, sides of elytra not parallel; lateral pronotal margin continuous with lateral margin of elytron; male with last sternum distinctly impressed ... 12
- Form elongate, sides of elytra parallel at least medially; pronotum narrower than elytra at base; male with last sternum barely perceptibly impressed. kansanus Casey

12(11). Elytron with large, red, apical spot, often occupying apical jh1 .................. 13
- Elytron with apex narrowly red ......................................... cervicalis Mulsant

13(12). Form robust, rounded; apex of elytral spot strongly arcuate. nemorivagus Wingo
- Form elongate; apex of elytral spot feebly arcuate (Fig. 108) .................. semiruber Horn

14(10). Elytron with a distinct, pale area or spot in apical jh1 .................. 15
- Elytron black, usually with a narrow, apical red or yellow border, always straight, never taking the form of a defined spot ........................................ 22

15(14). Form elongate, sides parallel medially; elytron with large, apical red spot extending forward at suture (Fig. 120) .................. festatus Wingo
- Form rounded, sides not parallel, apical spot not extending forward at suture ... 16

16(15). Pronotum entirely red except basal median projection black; posterior third or more of elytron red ........................................ 17
- Color combination not as above ........................................ 18

17(16). Species known only from Missouri and Arkansas; male genitalia with basal lobe heavily sclerotized, almost rectangular with a small median projection (Fig. 123) .................. nemorivagus Wingo
- Species known only from extreme eastern United States, Massachusetts to Florida; male genitalia with basal lobe feebly sclerotized, slender, apex pointed (Fig. 108) .................. semiruber Horn

18(16). Length 2.00 mm or less, width less than 1.50 mm.; dorsal pubescence short, appressed, grayish white; apical spot on elytron curved toward apex at suture (Fig. 116) .................. rubricula Casey

- Characters not all as above ........................................ 19

19(18). Length more than 2.00 mm, width 1.40 mm or more; dorsal pubescence long, erect, yellowish white; apical spot on elytron as described for rubricula; pronotum entirely black except antero-lateral angle pale .................. securus J. Chapin
- Not entirely as described above; pronotum usually pale with black median spot ........................................ 20

20(19). Elytron with red apical spot usually occupying at least apical ¼, red (Fig. 225); last sternum of male deeply emarginate, lateral angle of emargination abrupt .................................. brullei Mulsant
- Elytron with apical pale spot restricted to apical ⅓ (Fig. 125); last sternum of male feebly emarginate, feebly impressed ........................................ 21
21(20). Male genitalia with dorsal processes of basal lobe convergent apically (Fig. 127) ................................................................. lousianae J. Chapin
- Male genitalia with dorsal processes of basal lobe widely separated apically (Fig. 125) ................................................................. fraternus LeConte
22(14). Male genitalia with ventral ala strongly fused to basal lobe, apex of basal lobe bluntly triangular (Fig. 215) ........................................ caudalis LeConte
- Male genitalia not as described above ......................................... 23
23(22). Last sternum of male deeply emarginate, lateral angle of emargination abrupt; genitalia robust, heavily sclerotized, dorsal margin of paramere with long setae (Fig. 225) ................................................ brullei Mulsant
- Male genitalia not as described above ......................................... 24
24(23). First sternum of male with a deep, elongate-oval pit surrounded by dense hairs, often with a faint, longitudinal carina in middle of pit (Fig. 150); basal lobe of genitalia with ventral projection blunt ................................ iowensis Casey
- First sternum and genitalia not as described above ..................... 25
25(24). First sternum of male with a small, deep, triangular pit at apical margin; basal lobe of genitalia with ventral apical projection feebly developed, an elongate-oval, lightly sclerotized area on each side of middle in ventral view (Fig. 170) ........................................... consobrinus LeConte
- First sternum and genitalia not as described above ..................... 26
26(25). Male genitalia with apex of basal lobe pointed, abruptly hooked downward in lateral view (Fig. 198) ................................ unicus Wingo
- Male genitalia not as described above ......................................... 27
27(26). Male genitalia with basal lobe and ventral ala fused, apex of basal lobe projecting, pointed, (Fig. 200) ................................................... puncticollis LeConte
- Male genitalia not as described above ......................................... 28
28(27). Male genitalia with ventral projection of basal lobe tapered to a point, much longer than dorsal projection (Fig. 136) ......................... socer LeConte
- Male genitalia not as described above ......................................... 29
29(28). Male genitalia heavily sclerotized, basal lobe broad, apex triangular in dorsal view, ventral projection tapered to a blunt point in ventral view (Fig. 153) ........................................ majus, new name
- Male genitalia not as described above ......................................... 30
30(29). Male genitalia with apex of basal lobe bluntly rounded, fused to ventral ala, margins of siphonal passage fused before apex (Fig. 218) .......... creperus Mulsant
- Male genitalia not as described above ......................................... 31
31(30). Male genitalia with basal lobe fused to ventral ala, apex of basal lobe flattened, triangularly spatulate, projecting beyond ventral ala (Fig. 217) . peninsularis Gordon
- Male genitalia with basal lobe pointed apically; paramere slender, lower margin produced medially (Fig. 187) ........................................ wingoi Gordon

**KEY TO THE SPECIES OF SCYMNUS (Pullus) OF REGION II**

Map, Fig. 92

1. Elytron black with a large, median, reddish orange spot (Fig. 98) ........................................ pacificus Crotch
- Elytron without median spot ..................................................... 2
2(1). Form extremely elongate, parallel-sided; lateral margin of pronotum and elytron strongly discontinuous (Fig. 93) ................................ coniferarum Crotch
- Form oval, not parallel-sided; lateral margin of pronotum and elytron not noticeably discontinuous

3(2). Dorsal surface pale yellowish brown, elytron and pronotum unicolorous; length 2.00 mm or less; elytron distinctly alutaceous

- Dorsal surface dark, or with a contrasting color pattern, not entirely pale, if pronotum and elytron unicolorous then length more than 2.25 mm; elytron not alutaceous

4(3). Dorsal color reddish brown, scutellum and sutural margin of elytron narrowly black; length 2.00 mm or less

- Dorsal color not as described above

5(4). Length less than 1.77 mm; pronotum pale yellowish brown, elytron dark reddish brown; Texas, Big Bend

- Length nearly always more than 1.75 mm; color pattern not as described above or if so, then length more than 2.50 mm

6(5). Dorsal color pattern light brown with a dark median area extending from basal portion of pronotum posteriorly along elytral suture, narrowed at apex of elytron (Fig. 130e)

- Color pattern not as described above

7(6). Form elongate, nearly parallel-sided; dorsal color pattern either entirely reddish brown or with a median, black, pronotal spot

- Color pattern not as above, or if so, then form distinctly rounded (brullei Mulsant)

8(7). Length 2.00 mm or less; dorsal color pattern light yellowish brown with basal projection of pronotum and narrow sutural border dark brown to black, some specimens also with a black lateral and anterior border on elytron; Texas, Big Bend

- Length usually more than 2.00 mm.; color pattern not as described above

9(8). Pronotum entirely red or yellow

- Pronotum with at least median, basal projection black

10(9). Form rounded, sides of elytra not parallel; lateral pronotal margin continuous with lateral margin of elytron; male with last sternum distinctly impressed

- Form elongate, sides of elytra nearly parallel, at least medially; pronotum narrower than elytra at base; male with last sternum barely perceptibly impressed

11(9). Dorsal color entirely light reddish brown except some dark color on pronotum, sometimes an obscure dark area present on basal jhi of elytron (Fig. 225); male with last sternum strongly emarginate, angle of emargination abrupt

- Dorsal color and male last sternum not as described above

12(11). Species with a large, definite pale area at apex of elytron

- Species with apex of elytron black or with a more or less well-defined, pale apical border, never a definite pale spot (see socer LeConte)

13(12). Punctures on elytron coarse, arranged in curved, transverse rows, giving a slightly rugose appearance; male first sternum with tubercle medially

- Punctures on elytron fine, not arranged in rows; male first sternum without tubercle

14(13). Length less than 2.10 mm, form elongate, nearly parallel-sided (Fig. 116)

- Length more than 2.10 mm; form rounded, not parallel-sided

15(14). Elytron with apical spot usually restricted to apical ½, yellow (Fig. 125); last sternum of male feebly emarginate, feebly impressed
16(15). Male genitalia with dorsal processes of basal lobe convergent apically (Fig. 127) ....................................................... louisianae J. Chapin
- Male genitalia with dorsal processes of basal lobe widely separated (Fig. 125) .......................................................... fratermus LeConte
17(12). Postcoxal line reaching hind margin of first sternum; form elongate, almost parallel-sided; apex of elytron distinctly reddish yellow ........ monticola Casey
- Postcoxal line not reaching hind margin of first sternum; color and form variable .......................................................... 18
18(17). Pronotum entirely black or black with a very small, obscure, paler area at antero-lateral angle .............................................. 19
- Pronotum mostly pale with a central dark area, or at least with antero-lateral angle broadly, distinctly red or yellow (see hortii Gorham) ....................................................... 28
19(18). Known from the eastern edge of Region II (see compar Casey) ...... tenebrosus Mulsant
- Known from Colorado westward (see weidi Casey) ....................... 20
20(19). Male genitalia with basal lobe slender, nearly as long as ventral ala, not fused to ventral ala (Fig. 157) ...................... renicus Casey
- Male genitalia not as described above ........................................... 21
21(20). Male genitalia with basal lobe much shorter than ventral ala, not fused to ala, inner portion of ala lightly sclerotized, outer portion heavily sclerotized (Fig. 160) ....................................................... mormon Casey
- Male genitalia not as described above ........................................... 22
22(21). Male genitalia pale, nearly transparent (Fig. 166) ...................... aridus Casey
- Male genitalia darkened, definitely sclerotized ................................ 23
23(22). Male genitalia with apex of ventral projection of basal lobe robust, truncate (Fig. 151) ....................................................... calaveras Casey
- Male genitalia not as described above ........................................... 24
24(23). Male genitalia with basal lobe and ventral ala fused, apex more or less pointed in lateral view (Fig. 197) ................................ 25
- Male genitalia with basal lobe and ventral ala fused, apex broadly rounded in lateral view .................................................. 27
25(24). Sclerotized area of ventral ala nearly truncate apically, apex of basal lobe bluntly pointed (Fig. 197) ...................................... papago Casey
- Male genitalia not as described above ........................................... 26
26(25). Sclerotized area of ventral ala deeply emarginate apically, apex of basal lobe sharply pointed (Fig. 192) .............................. wickhami Gordon
- Sclerotized area of ventral ala not emarginate, rounded apically, apex of basal lobe sharply pointed (Fig. 184) .............................. impliatus Gordon
27(24). Male genitalia with apex of basal lobe wide in lateral view, slightly enlarged before apex (Fig. 211) ............................. lacustris LeConte
- Male genitalia with apex of basal lobe narrow in lateral view, not enlarged before apex (Fig. 213) .................................................. 28(18). Elytron strongly alutaceous, feebly shining; length about 2.00 mm ...... tahoeensis Casey
- Elytron not noticeably alutaceous, strongly shining; length usually more than 2.00 mm .................................................. 29
29(28). Pronotum mostly yellow or red with a small parabolic spot medially at base, spot not approaching anterior margin of pronotum .................................................. 30
- Pronotum mostly black with lateral margin and/or antero-lateral angle yellow or red, anterior margin of pronotum black or very narrowly pale .................. 35
30(29). Elytron with apical pale border wide, at least 1/8 of a mm; pronotal spot small,
usually confined to area just anterior to basal median projection (see uncus Wingo) creperus Mulsant
  - Elytron with apical pale border narrow, less than 1/6 of a mm.; pronotal spot usually extending the distance to anterior margin or more .......................................................... 31
31(30). Form rounded; length 2.40 mm ........................................................... garlandicus Casey
  - Form elongate; length 2.25 mm or less ....................................................... 32
32(31). Male genitalia with basal lobe and ventral ala not fused (Fig. 150) .......... 34
  - Male genitalia with basal lobe and ventral ala fused (Fig. 174) ................... 33
33(32). Male genitalia short, compact, feebly sclerotized (Fig. 174) ................... cockerellii Casey
  - Male genitalia long, slender, lightly sclerotized (Fig. 215) ......................... caudalis LeConte
34(32). Male genitalia with ventral projection of basal lobe bluntly rounded, only slightly longer than dorsal projection (Fig. 150); male with pit on first sternum deep, elongate-oval, often with a fine, longitudinal carina at middle (Fig. 150) ............ towensis Casey
  - Male genitalia with ventral projection of median lobe pointed, distinctly longer than dorsal projection (Fig. 186); median area of male first sternum glabrous, slightly flattened, densely punctured ................................................ simulans Gordon
35(29). Length 2.00 mm or less ................................................................. 36
  - Length more than 2.10 mm ........................................................................ 38
36(35). Male genitalia pale, nearly transparent ................................................... 37
  - Male genitalia darkened, definitely sclerotized (Fig. 156) ......................... utableis Gordon
37(36). Male genitalia with apex of dorsal projection of basal lobe broad, truncate (Fig. 162) .......................................................... ardelio Casey
  - Male genitalia with apex of dorsal projection of basal lobe slender, no wider than ventral projection (Fig. 166) .......................................................... aridus Casey
38(35). Dorsal pubescence at least partly yellowish brown ................................ 39
  - Dorsal pubescence entirely grayish or yellowish white ............................... 40
39(38). Black area of pronotum extending to anterior margin of pronotum, broad antero-lateral angle pale .................................................. barberi Gordon
  - Black area of pronotum not quite reaching anterior margin medially, broad antero-lateral angle and narrow anterior border pale ............................................ solidus Casey
40(38). Male genitalia with basal lobe and ventral ala fused; male without pit on first sternum .......................................................... 41
  - Male genitalia with basal lobe and ventral ala not fused, ventral projection of basal lobe bluntly rounded (Fig. 150); male with deep elongate-oval pit on first sternum (Fig. 150) ........................................ towensis Casey
41(40). Male genitalia with central carinae of basal lobe divergent at apex, leaving a blunt, triangular apical area (Fig. 215) .................................................. caudalis LeConte
  - Male genitalia with central carinae of basal lobe not divergent, apex of basal lobe pointed in ventral view (Fig. 211) ................................................ lacustris LeConte

KEY TO THE SPECIES OF SCYMNUM (PULLUS) OF REGION III
Map, Fig. 92

1. Elytron with a large, median, reddish orange spot (Fig. 98) ...................... pacificus Crotch
  - Elytron without a median spot .................................................................. 2
2(1). Length nearly twice the width; lateral margin of pronotum strongly discontinuous with lateral margin of elytron; elytron yellowish brown with suture and scutellum usually black or dark brown (Fig. 93) ........................................... coniferarum Crotch
  - Length much less than twice the width; lateral pronotal margin more or less continuous with elytron; color variable ......................................................... 3
3(2). Dorsal color primarily light brown or yellow, with or without a dark pattern ........ 4
   - Dorsal color primarily black or dark brown, with or without pale areas ........ 12
4(3). Postcoxal line on first sternum reaching hind margin of sternum ............ 5
   - Postcoxal line on first sternum not reaching hind margin of sternum ....... 6
5(4). Form elongate; pronotum entirely pale or with a median black area; postcoxal
      line angulate .................................................................................. 7
   - Form rounded; pronotum always black at least medially; postcoxal line rounded,
     not angulate ................................................................................... 8
6(4). Elytron distinctly alutaceous, feebly shining; dorsum entirely light yellowish brown;
      form round; length less than 2.00 mm ........................................ 9
   - Elytron not alutaceous, shining; dorsum with or without a dark pattern, length
     variable ......................................................................................... 10
7(6). Form elongate; dorsum entirely yellowish brown .................................. 11
   - Form not particularly elongate, dorsum not entirely yellowish brown........ 12
8(7). Length less than 1.75 mm, pronotum pale yellowish brown, elytron reddish brown;
      Texas, Big Bend ........................................................................ 13
   - Length more than 1.75 mm; color pattern not as described above ............ 14
9(8). Length 2.00 mm or less; dorsal color pattern light yellowish brown with basal
      projection of pronotum and narrow sutural border dark brown to black, some
      specimens also with a black lateral and anterior border on elytron; Texas, Big
      Bend ......................................................................................... 15
   - Length usually more than 2.00 mm, color pattern not as described above .... 16
10(9). Dorsal color pattern light brown with a dark median area extending from basal
       portion of pronotum posteriorly along elytral suture, narrowed at apex of elytron
       (Fig. 130e) ................................................................................. 17
   - Color pattern not as described above ............................................. 18
11(10). Length 2.00 mm or slightly less; paramere of male genitalia as broad as basal
        lobe (Fig. 177) ........................................................................ 19
   - Length 1.75 mm or less; paramere of male genitalia narrower than basal lobe
     (Fig. 179) .................................................................................. 20
12(3). Pronotum entirely red or yellow ......................................................... 21
   - Pronotum black at least basally ..................................................... 22
13(12). Apical ⅓ to ⅓ of elytron red (Fig. 134); punctures on elytron coarse, arranged in
        curved, transverse rows, giving a slightly rugose appearance to elytron; male first
        sternum with tubercle ................................................................ 23
   - Species with all characters not as described above .............................. 24
14(13). Male with tubercle at middle of first sternum; elytron black except narrow apical
        border pale; leg usually all black; pronotum with color variable but always with
        at least a narrow anterior border pale ........................................... 25
   - Male without tubercle; leg usually pale or at least apical ⅓ of tibia pale ...... 26
15(14). Species with a distinct pale area on apex of elytron, or a pale, discal spot .... 27
   - Species with apex of elytron black or with a straight pale border, never with a
     distinct pale spot ........................................................................... 28
16(15). Species with a transversely oval, yellow spot restricted to apical ⅓ of elytron . 29
   - Species with apical ⅓ to ⅓ of elytron red or with an elongate, median, red spot on
     elytron (Fig. 130) ................................................................. 30
17(16). Pronotum black, anterolateral angle very narrowly yellow; male 1st sternum not
        depressed medially, coarsely, densely punctured ........................ 31
   - Pronotum usually with median, parabolic, black spot, at least antero- lateral angle
     broadly yellow or red; male 1st sternum depressed medially, finely, densely punctured ............................................. 32

........................................... 33
18(15). Pronotum entirely black (see tahoensis Casey) ........................................ 19
   - Pronotum with at least anterolateral angle distinctly pale .................... 24
19(18). Male genitalia with apex of ventral apical projection truncate in ventral view
   (Fig. 151) .................................................. calaveras Casey
   - Male genitalia not as described above ............................................. 20
20(19). Male genitalia with basal lobe and ventral ala fused, apex of basal lobe sharply
   pointed (Fig. 184) ........................................... impletus Gordon
   - Male genitalia not as described above ............................................. 21
21(20). Male genitalia with median area of ventral ala not sclerotized, and elongate-oval
   area on each side of basal lobe also unsclerotized (Fig. 190) ... tenebricus Gordon
   - Male genitalia not as described above ............................................. 22
22(21). Male genitalia with sclerotized area of anterolateral angle of ventral ala produced,
   basal lobe with 2 median folds (Fig. 197) ......................................... papago Casey
   - Male genitalia not as described above ............................................. 23
23(22). Male genitalia with basal lobe and ventral ala strongly united, basal lobe slightly
   shorter than ventral ala, apex rounded in lateral view (Fig. 202) ... weidii Casey
   - Male genitalia with basal lobe shorter than ventral ala, inner portion of ventral
     ala membranous, extending beyond outer portion (Fig. 160) ... mormon Casey
24(18). Elytron strongly alutaceous, feebly shining; pronotum pale with a small, black,
   parabolic spot anterior to scutellum ............................................ uteanus Casey
   - Elytron not noticeably alutaceous, strongly shining; pronotum variable ...... 25
25(24). Elytron not black but a dark mahogany brown with sutural and lateral borders
   obscurely black, apex of elytron with a wide, pale border; length usually less
   than 2.00 mm ........................................................................... gilae Casey
   - Elytron black, apex of elytron with a narrow, pale border ...................... 26
26(25). Pronotum pale with a black, basal spot not approaching anterior margin of
   pronotum ................................................................................... 27
   - Pronotum mostly black, black area either reaching anterior border or very nar-
    rowly separated from it .................................................................. 32
27(26). Pronotum with black area poorly defined, restricted to median, basal ½ of pronoto-
   rum ......................................................................................... creperus Mulsant
   - Pronotum with black area parabolic, well defined, extending more than ⅔ the
     distance to apical margin ......................................................... 28
28(27). Male genitalia with apical ventral process of basal lobe long, stout, curved upward
   in lateral view (Fig. 143) ......................................................... garlandicus Casey
   - Male genitalia not as described above ............................................. 29
29(28). Male genitalia of the brullei type, basal lobe inflated (Fig. 223) ... hubbardi Gordon
   - Male genitalia not as described above ............................................. 30
30(29). Male genitalia with basal lobe and ventral ala fused (Fig. 174) ... cockerelli Casey
   - Male genitalia not as described above ............................................. 31
31(29). Male genitalia without ventral ala (Fig. 129) .................................... apithanus Gordon
   - Male genitalia with ventral ala (Fig. 159) ......................................... horni Gorham
32(26). Pronotum black with anterolateral angle narrowly yellow; femur black except
   apex pale .................................................................................. aridoides Gordon
   - Pronotum with anterolateral angle broadly pale yellow; femur with at least apical
     pale ....................................................................................... 33
33(32). Male genitalia of the brullei type but with membranous lateral projection as in
   figure ....................................................................................... 34
   - Male genitalia not of the brullei type, lacking membranous lateral projections ... 35
34(33). Black area of pronotum separated from anterior margin by a narrow, yellow
   border; Texas (Big Bend) ......................................................... howdeni Gordon
Black area of pronotum reaching anterior margin; Arizona .... *huachuca* Gordon
35(33). Male genitalia with apical ventral process of basal lobe long, stout, curved upward in lateral view (Fig. 143) .................................. *garlandicus* Casey
- Male genitalia not as described above .......................... 36
36(35). Male genitalia with basal lobe inflated in lateral view, a winglike lobe on each side of siphonal aperture (Fig. 220) ................ *bryanti* Gordon
- Male genitalia not as described above .......................... 37
37(36). Male genitalia with apical ventral process of basal lobe long, broad at base, tapered to blunt apex (Fig. 154) .................................. *ignarus* Gordon
- Male genitalia not as described above .......................... 38
38(37). Male genitalia lightly sclerotized, nearly transparent ................................................................. 39
- Male genitalia normally sclerotized ................................ 40
39(38). Male genitalia with apical dorsal projection of basal lobe broad, truncate at apex (Fig. 162) .................................. *ardelio* Horn
- Male genitalia with apical dorsal projection tapered to a point (Fig. 166) .......................... *aridus* Casey
40(38). Male genitalia with inner border of ventral ala sclerotized (Fig. 142a) (see *humboldti* Casey) .................................. *solidus* Casey
- Male genitalia with inner border of ventral ala not sclerotized (Fig. 148) .......................... *barberi* Gordon

**KEY TO THE SPECIES OF *Scymnus* (Pullus) OF REGION IV**

Map, Fig. 92

1. Elytron with a large, median, reddish orange spot (Fig. 98) ........ *pacificus* Crotch
   - Elytron without a median spot .................................. 2
2(2). Length nearly twice the width; lateral margin of pronotum strongly discontinuous with lateral margin of elytron; elytron yellowish brown with suture and scutellum usually black or dark brown (Fig. 93) .................................. *conferrum* Crotch
   - Length much less than twice the width; lateral pronotal margin more or less continuous with elytron; color variable .................................. 3
3(2). Dorsal surface distinctly alutaceous, completely pale yellowish brown .................................. *pallens* LeConte
   - Dorsal surface not noticeably alutaceous, at least some dark areas present, usually almost completely black .................................. 4
4(3). Dorsal color pattern light brown with a dark median area extending from basal portion of pronotum posteriorly along elytral suture, narrowed at apex of elytron (Fig. 130), lateral border may also be dark (Fig. 130) ........ *loewii* Mulsant
   - Dorsal color not as described above .................................. 5
5(4). Apical 2/3 of elytron yellowish red, rest of elytron and pronotum except narrow lateral border black (Fig. 140); California (Channel Islands) .... *falli* Gordon
   - Color pattern not as described above .................................. 6
6(5). Dorsal color primarily pale yellowish brown with some dark marking .................................. 7
   - Dorsal color primarily black or dark brown, sometimes with pale marking .................................. 8
7(6). Form elongate, margins of elytra subparallel; sutural border of elytron narrowly black, an obscure dark border on lateral margin .................................. *mimoides* Gordon
   - Form round, margins of elytra not parallel; sutural border of elytron narrowly black but with no dark lateral border ........ *ockerelli* Casey
8(6). Apical ¾ to ⅞ of elytron red (Fig. 134); punctures on elytron coarse, arranged in
curved, transverse rows, giving a slightly rugose appearance to elytron; male 1st sternum with tubercle medially

- Apex of elytron black or narrowly pale; elytron not appearing rugose; male 1st sternum not tuberculate (except marginicollis) .................................................. postpictus Casey

9(8). Male with median tubercle on 1st sternum; elytron black except narrow apical border; legs usually all black or at least femora entirely black; pronotum varying from almost entirely yellow to nearly all black but with at least apical border narrowly pale ................................ marginicollis Mannerheim

- Male 1st sternum without tubercle; legs usually pale but if black then at least apex of femur pale ............................................................................................. 10

10(9). Pronotum entirely red or yellow (see cervicallis Mulsant) ........................................... carri Gordon

- Pronotum at least partly black .................................................................................. 11

11(10). Pronotum mostly yellow or red with a black area medially anterior to scutellum, black area not approaching anterior margin of pronotum

- Pronotum mostly or entirely black, black area reaching anterior margin or very narrowly separated from it .................................................................................. 14

12(11). Postcoxal line reaching hind margin of 1st sternum; elytron distinctly micro-reticulate (see uetanus Casey) .................................................. nevadensis Weise

- Postcoxal line not reaching hind margin of 1st sternum; elytron not micro-reticulate or feebly so .................................................................................. 13

13(12). Length less than 2.00 mm.; 1st sternum of male densely punctured medially

- Length 2.00 mm or more, 1st sternum of male with a flattened, shining, impunctate area medially (see garlandicus Casey) ........................................ horni Gorham

14(11). Elytron dark mahogany brown with suture and lateral border black, apex of elytron with a wide, pale border; length less than 2.00 mm

- Elytron black or black with a pale apical border; length variable but usually more than 2.00 mm .................................................................................. 15

15(14). Pronotum entirely black .................................................................................. 16

- Pronotum with at least anterolateral angle pale ................................................................ 28

16(15). Large, robust, length usually 2.65 mm or more; dorsal pubescence yellowish brown; dorsal surface entirely black except narrow apical margin pale

- Characters not all as described above ............................................................................. 17

17(16). Male genitalia with basal lobe much shorter than ventral ala (Fig. 172) ............. 18

- Male genitalia with basal lobe as long as ventral ala or nearly so .................................. 19

18(17). Male genitalia with basal lobe extremely short (Fig. 172); 6th sternum of male deeply, abruptly emarginate .................................................................... mendecino Casey

- Male genitalia with basal lobe not extremely short (Fig. 194); male 6th sternum normally emarginate ............................................................... elusivus Gordon

19(17). Basal lobe of male genitalia slender, not fused to ventral ala

- Basal lobe of male genitalia robust, fused to ventral ala ................................................ 21

20(19). Basal lobe of male genitalia with dorsal apical projection not wider than ventral apical projection, dorsal margin of basal lobe sinuate (Fig. 157) .... reoicus Casey

- Basal lobe of male genitalia with dorsal apical projection wider than ventral apical projection, dorsal margin of basal lobe not sinuate (Fig. 145) .... jacobianus Casey

21(19). Male genitalia with a small, elongate sclerite medially at base of basal lobe, apex bluntly pointed in lateral view, basal lobe and ventral ala fused (Fig. 202) ..............

- Male genitalia not as described above ............................................................................. 22

22(21). Apex of basal lobe of male genitalia rounded in lateral view (Fig. 207) .............. 23

- Apex of basal lobe of male genitalia pointed in lateral view (Fig. 184) ......................... 26
23(22). Apex of basal lobe slender, evenly rounded in lateral view (Fig. 213) .......... 24
   - Apex of basal lobe broad, rounded dorsally, abruptly angled ventrally in lateral
     view (Fig. 207) ...................................................... hesperius Gordon
24(23). Basal lobe with median ventral carinae slightly separated, ventral ala fused in
   basal 3/4 (Fig. 213) ...................................................... tahoensis Casey
   - Basal lobe with median ventral carinae joined, ventral ala fused in more than
     basal 3/4 (Fig. 211) ...................................................... 25
25(24). Apex of basal lobe as wide or wider than paramere in lateral view lacustris LeConte
   - Apex of basal lobe narrower than paramere in lateral view ........... tahoensis Casey
26(22). Apex of ventral ala angulate, produced, or with a median membranous area ... 27
   - Apex of ventral ala not angulate or produced (Fig. 184) .......... impletus Gordon
27(26). Apex of ventral ala simple, angulate (Fig. 192) wickhami Gordon
   - Apex of ventral ala divided by median membranous area, inner sclerotized area
     angulate (Fig. 190) ........................................... tenebricus Gordon
28(15). Male first sternum with a deep, elongate-oval pit, pit often with a median carina;
   ventral apical projection of basal lobe of male genitalia rounded (Fig. 150) ....
   - Male first sternum without a pit, at most with a shallow depression; ventral apical
     projection of basal lobe of male genitalia not as described above .......... 29
29(28). Male genitalia feebly sclerotized, nearly transparent ................................... 30
   - Male genitalia distinctly sclerotized, darkened ...................................... 31
30(29). Apex of dorsal projection of basal lobe truncate (Fig. 162) ............... ardelio Horn
   - Apex of dorsal apical projection of basal lobe pointed (Fig. 166) .......... aridus Casey
31(29). Basal lobe of male genitalia ovate in ventral view, ventral alae and paramere
   curved inward (Fig. 181) ........................................... nuttingi Gordon
   - Male genitalia not as described above ........................................... 32
32(31). Male genitalia with basal lobe and ventral ala fused ......................... 33
   - Male genitalia with basal lobe and ventral ala not fused ....................... 37
33(32). Basal lobe of male genitalia with apex broadly rounded in lateral view, no median
   sclerite at base in ventral view ........................................... 34
   - Basal lobe of male genitalia slender, a median, basal sclerite present in ventral
     view ........................................................................... 36
34(33). Median, ventral carinae of basal lobe distinctly separated at least basally (Fig.
   208) ................................................................. luctuosus Casey
   - Median, ventral carinae of basal lobe united or nearly so from base to apex (Fig.
     211) ................................................................. 35
35(34). Apex of basal lobe broad, broadly rounded in lateral view (Fig. 211) ...........
   - Apex of basal lobe narrow in lateral view (Fig. 213) ........... tahoensis Casey
36(33). Basal lobe of male genitalia evenly tapered from base to apex (Fig. 204) Alberta
   - Basal lobe of male genitalia narrowed before apex, apex slightly bulbous (Fig.
     206); California ...................................................... aquilonarius Gordon
   - Basal lobe of male genitalia slender, tapered from base to apex (Fig. 156) ....
     ................................................................. martini Gordon
37(32). Basal lobe of male genitalia slender, tapered from base to apex (Fig. 156) ....
   - Basal lobe of male genitalia not as described above .......... 38
38(37). Male genitalia with inner margin of ventral ala sclerotized, basal lobe broad (Fig.
   142) ................................................................. solidus Casey
   - Male genitalia with inner margin of ventral ala not sclerotized, basal lobe slender
     (Fig. 146) ................................................................. humboldti Casey
Scymnus (Pullus) caffer Gordon

Fig. 96a–d

Scymnus (Pullus) caffer Gordon 1976b, p. 65.

For detailed description, and discussion see Gordon, 1976b, p. 65.

Scymnus (Pullus) coniferarum Crotch

Fig. 93a–f; Map, Fig. 95

Scymnus coniferarum Crotch, 1874a, p. 77.—Horn, 1895, p. 105.

For detailed description, and discussion see Gordon, 1976b, p. 66, and Gordon (1982).

Scymnus (Pullus) suturalis Thunberg

Fig. 94a–c; Map, Fig. 95


Diagnosis. Description as for S. (P.) coniferarum: Body slightly broader, less elongate in appearance; punctures on elytron coarse, dense, separated by the diameter of a puncture or less; basal lobe of male genitalia broad in ventral view, abruptly narrowed in apical 1/4, apex in lateral view distinctly bent downward; apex of siphon S-shaped (figs. 94a-c); female genitalia with infundibulum slender, rodlike (fig. 94e).

Discussion. Gordon (1976b) included this species as S. (P.) coniferarum which is primarily a California species. Subsequent investigation revealed that the Pennsylvania and New York specimens were actually S. (P.) suturalis (Gordon, 1982). It was introduced into Michigan from Germany in 1961, and has recently been collected there, but whether this population is a result of the introduction or an accidental establishment is not apparent (Hoebek, in press).

Type locality. "Suecia".

Type depository. Type not examined.

Distribution. Figure 95. CONNECTICUT: Middlesex Co., Clinton. MICHIGAN: Saginaw Co., Saginaw. NEW YORK. PENNSYLVANIA: (see Gordon, 1982, for specific localities).

Scymnus (Pullus) impexus Mulsant

Fig. 97a–d

Scymnus (Pullus) abietis Mulsant, 1846, p. 247 (not Paykull, 1798).—Mulsant, 1850, p. 979.
Fig. 93. *Scymnus (P.) coniferarum.*
Fig. 94. *Scymnus (P.) suturalis.*
Fig. 95. Distribution. *Scymnus (P.) coniferarum* (shaded, peripheral localities dotted); *S. (P.) suturalis* (star); *S. P. caffer* (triangle).

For detailed description, and discussion see Gordon, 1976b, p. 70. Establishment of this species has been effected in the Willamette Valley of Oregon following releases made in 1960 and 1962.

*Scymnus (Pullus) pacificus* Crotch

Fig. 98a–c; Map, Fig. 99

*Scymnus pacificus* Crotch, 1874a, p. 77.—Horn, 1895, p. 100.


*Scymnus strabus* Horn, 1895, p. 100.—Gordon, 1976b, p. 72.


For detailed description, and discussion see Gordon, 1976b, p. 72.

Scymnus (P.) caffer.

Scymnus (Pullus) flavescens Casey
Fig. 100a–d; Map, Fig. 101


For detailed description, and discussion see Gordon, 1976b, p. 75.

Fig. 97. *Scymnus (P.) impexus.*
Fig. 98. *Scymnus (P.) pacificus.*
Fig. 99. Distribution. *Scymnus (P.) pacificus*. 
Fig. 100. *Scymnus (P.) flavescens.*
Fig. 101. Distribution. *Scymnus* (*P.*.) *flavescens* (dot); *S.* (*P.*) *nigricollis* (star).
Fig. 102. *Scymnus (P.) nigricollis*.

*Scymnus (Pullus) nigricollis* Gordon  
Fig. 102a–d; Map, Fig. 101

*Scymnus (Pullus) nigricollis* Gordon, 1976b, p. 78.

For detailed description, and discussion see Gordon, 1976b, p. 78.
Fig. 103. *Scymnus (P.) kansasus*.

*Scymnus (Pullus) kansasus* Casey

Fig. 103a–d; Map, Fig. 104


For detailed description, and discussion see Gordon, 1976b, p. 78. *Additional locality record*: NEW JERSEY: Fort Lee.
Fig. 104. Distribution. *Scymnus (P.) kansanus.*
Fig. 105. *Scymnus (P.) pauculus*.

*Scymnus (Pellus) pauculus* Gordon
Fig. 105a–d; Map, Fig. 106

*Scymnus (Pellus) pauculus* Gordon, 1976b, p. 81.

For detailed description, and discussion see Gordon, 1976b, p. 81. Additional locality record. ARIZONA: Oracle.
Fig. 106. Distribution. Scymnus (P.) pauculus (star); S. (P.) pallens (dot).
Fig. 107. *Scymnus (P.) pallens.*

*Scymnus (Pullus) pallens* LeConte
Fig. 107a–d; Map, Fig. 106

*Scymnus pallens* LeConte, 1852, p. 137.—Crotch, 1847b, p. 263.—Horn, 1895, p. 99.


For detailed description, and discussion see Gordon, 1976b, p. 84.

*Additional locality record*: TEXAS: Patricio Co., Martin, 12 mi. S.
Fig. 108. *Scymnus (P.) semiruber*.

*Scymnus (Pullus) semiruber* Horn
Fig. 108a–e; Map, Fig. 109

*Scymnus semiruber* Horn, 1895, p. 102.

For detailed description and discussion see Gordon, 1976b, p. 86.
Fig. 109. Distribution. *Scymnus (P.) semiruber.*
Fig. 110. *Scymnus (P.) gilae.*

*Scymnus (Pullus) gilae* Casey
Fig. 110a–d; Map, Fig. 111

*Scymnus (Pullus) gilae* Casey, 1899, p. 147.—Leng, 1920, p. 213.—Korschefsky, 1931, p. 159.—Gordon, 1976b, p. 89.


For detailed description, and discussion see Gordon, 1976b, p. 89.
Fig. 111. Distribution. *Scymnus (P.) gilae.*
Fig. 112. *Scymnus (P.) mimoides*.

*Scymnus (Pullus) mimoides* Gordon

Fig. 112a–d; Map, Fig. 113

*Scymnus (Pullus) mimoides* Gordon, 1976b, p. 93.

For detailed description and discussion see Gordon, 1976b, p. 93.
Fig. 113. Distribution. *Scymnus (P.) mimoides.*
Fig. 114. *Scymnus (P.) cervicalis.*
Fig. 115. Distribution. *Scymnus (P.) cervicalis* (disjunct localities dotted).

*Scymnus (Pullus) cervicalis* Mulsant

Fig. 114a–d; Map, Fig. 115


*Scymnus cervicalis*: LeConte, 1852, p. 139.—Crotch, 1874b, p. 266.—Horn, 1895, p. 103.—Wilson, 1927, p. 169.

For detailed description, and discussion see Gordon, 1976b, p. 95.
Scymnus (Pullus) rubicaudus Casey
Fig. 116a–c; Map, Fig. 117
Scymnus (Pullus) rubicauda Casey, 1899, p. 141.—Leng, 1920, p. 213.—Korschovsky, 1931, p. 165.
Scymnus (Pullus) chromopyga Casey, 1899, p. 141.—Leng, 1920, p. 213.—Wingo, 1952, p. 32.
Fig. 117. Distribution. *Scymnus (P.) rubricaudus* (peripheral and disjunct localities dotted).


*Scymnus (Pullus) chromopygus*: Korschelsky, 1931, p. 156.

For detailed synonymy, description, and discussion see Gordon, 1976b, p. 98.
Fig. 118. *Scymnus (P.) enochrus*.

*Scymnus (Pullus) enochrus* Gordon
Fig. 118a–d; Map, Fig. 119

*Scymnus (Pullus) enochrus* Gordon, 1976b, p. 102.

For detailed description, and discussion see Gordon, 1976b, p. 102.
Fig. 119. Distribution, *Scymnus (P.) eochrus*. 
Fig. 120. *Scymnus (P.) festatus.*
Fig. 121.  Distribution. *Scymnus (P.) festatus* (dot); *pulvinatus* (star).

*Scymnus (Pullus) festatus* Wingo
Fig. 120a–f; Map, Fig. 121

*Scymnus (Pullus) festatus* Wingo, 1952, p. 31.—Gordon, 1976b, p. 103.

For detailed description, and discussion see Gordon, 1976b, p. 103.
Fig. 122. *Scymnus (P.) pulvinatus*.

*Scymnus (Pullus) pulvinatus* Wingo
Fig. 122a–d; Map, Fig. 121


For detailed description, and discussion see Gordon, 1976b, p. 106.
Fig. 123. *Scymnus (P.) nemorivagus*.

*Scymnus (Pullus) nemorivagus* Wingo  
Fig. 123a–d; Map, Fig. 124


For detailed description, and discussion see Gordon, 1976b, p. 109.
Fig. 124. Distribution. *Scymnus (P.) n. nemorivagus*.

*Scymnus (Pullus) fraternus* LeConte
Fig. 125a-f, Map, Fig. 126


*Scymnus (Pullus) creperus* var. *fraternus*: Casey, 1899, p. 140. — Leng, 1920, p. 213.


*Scymnus dentipes* Fall, 1901, p. 234. — Fall, 1904, p. 176.
Fig. 125. *Scymnus (P.) fraternus.*
Fig. 126. Distribution. Scymnus (P.) fraternus (peripheral and disjunct localities dotted).


For detailed description, and discussion see Gordon, 1976b, p. 109.
Fig. 127. *Scymnus (P.) louisianae.*
Fig. 128. Distribution. Scymnus (P.) louisianae.

*Scymnus (Pullus) louisianae* J. Chapin
Fig. 127a–d; Map, Fig. 128


For detailed description, and discussion see Gordon, 1976b, p. 115.
Fig. 129. *Scymnus (P.) apithanus*.

*Scymnus (Pullus) apithanus* Gordon
Fig. 129a–d; Map, Fig. 132

*Scymnus (Pullus) apithanus* Gordon, 1976b, p. 118.

For detailed description, and discussion see Gordon, 1976b, p. 118.
Fig. 130. *Scymnus (P.) loewii.*

*Scymnus (Pullus) loewii* Mulsant
Fig. 130a–h; Map, Fig. 131


*Scymnus loewii*: Crotch, 1874b, p. 271.
Fig. 131. Distribution. *Scymnus* (*P.* *) loewii* (peripheral localities dotted).

Fig. 132. Distribution. *Scymnus* (*P.* *) apithanus* (star); *S. (P.*) marginicollis* (shaded, peripheral and disjunct localities dotted).
Fig. 133. Scymnus (P.) marginicollis.

*Scymnus cinctus* LeConte, 1852, p. 137.—Crotch, 1874b, p. 263.—Horn, 1895, p. 99.


*Scymnus suturalis* LeConte, 1852, p. 138 (not Thunberg, 1795).—Crotch, 1874b, p. 264.

*Scymnus lecontei* Crotch, 1874b, p. 264.—Horn, 1895, p. 99.

Scymnus flebilis Horn, 1895, p. 100.
Scymnus (Pullus) flebilis: Casey, 1899, p. 160.—Leng, 1920, p. 213.—Korschefsky, 1931, p. 158.—Gordon, 1976b, p. 120.
Scymnus (Pullus) sarpedon Casey, 1899, p. 152.—Leng, 1920, p. 213.—Korschefsky, 1931, p. 165.—Gordon, 1976b, p. 120.
Scymnus (Pullus) nubes Casey, 1899, p. 151.—Leng, 1920, p. 213.—Korschefsky, 1931, p. 163.—Gordon, 1976b, p. 120.
Scymnus scotti Nunenmacher, 1934, p. 17.—Gordon, 1976b, p. 120.

For detailed description, and discussion see Gordon, 1976b, p. 119.
Additional locality record: TEXAS: Garza Co.; 2 mi. N. Justiceburg.
Fig. 135. Distribution. *Scymnus (P.) postpictus*.

*Scymnus (Pullus) marginicollis* Mannerheim
Fig. 133a–e; Map, Fig. 132

*Scymnus marginicollis* Mannerheim, 1843, p. 313.—Mulsant, 1850, p. 1053.—LeConte, 1852, p. 140.—Crotch, 1874b, p. 267.—Horn, 1895, p. 104.


*Scymnus californicus* Boheman, 1859, p. 207.

*Scymnus (Pullus) californicus*: Casey, 1899, p. 142.—Leng, 1920, p. 213.
Fig. 136. *Scymnus (P.) socer.*


For detailed description, and discussion see Gordon, 1976b, p. 125.

*Scymnus (Pullus) postpictus* Casey

Fig. 134a–e; Map, Fig. 135

*Scymnus (Pullus) postpictus* Casey, 1899, p. 141 (lapsus).—Korschel’sky, 1931, p. 164.

*Scymnus (Pullus) postpictus* Casey, 1908, p. 405 (emendation).—Leng, 1920, p. 213.—Gordon, 1976b, p. 130.—Belicek, 1976, p. 304.

For detailed synonymy, description, and discussion see Gordon, 1976b, p. 130.
Fig. 137. Distribution. *Scymnus (P.) socer.*

*Scymnus (Pullus) socer* LeConte
Fig. 136a–d; Map, Fig. 137

*Scymnus socer* LeConte, 1852, p. 139.—Crotch, 1874b, p. 267.—Horn, 1895, p. 103.

For detailed description, and discussion see Gordon, 1976b, p. 133.
Fig. 138. *Scymnus (P.) tenebrosus*. 
Fig. 139. Distribution. *Scymnus (P.) tenebrosus*.

*Scymnus (Pullus) tenebrosus* Mulsant
Fig. 138a–e; Map, Fig. 139


*Scymnus tenebrosus*: LeConte, 1852, p. 140.—Crotch, 1874b, p. 268.—Horn, 1895, p. 106.

For detailed description, and discussion see Gordon, 1976b, p. 137.
Fig. 140. Scymnus (P.) falli.
Fig. 141. Distribution. *Scymnus (P.) falli* (star); *S. P. solidus* (peripheral localities dotted).

*Scymnus (Pullus) falli* Gordon
Fig. 140a–e; Map, Fig. 141

*Scymnus (Pullus) falli* Gordon, 1976b, p. 140.

For detailed description, and discussion see Gordon, 1976b, p. 140.

*Additional locality record*: CALIFORNIA: Ventura Co., Santa Barbara Island.
Fig. 142. *Scymnus (P.) solidus*.

*Scymnus (Pullus) solidus* Casey
Fig. 142a–d; Map, Fig. 141


For detailed description, and discussion see Gordon, 1976b, p. 143.
Fig. 143. *Scymnus (P.*) Garlandicus.*
Fig. 144. Distribution. *Scymnus (P.) garlandicus* (star); *S. (P.) jacobianus* (dot).

*Scymnus (Pullus) garlandicus* Casey
Fig. 143a–d; Map, Fig. 144


For detailed description, and discussion see Gordon, 1976b, p. 145.
*Fig. 145. Scymnus (P.) jacobianus.*

*Scymnus (Pullus) jacobianus* Casey
Fig. 145a–d; Map, Fig. 144


For detailed description, and discussion see Gordon, 1976b, p. 148.
Fig. 146. *Scymnus (P.) humboldti*.

*Scymnus (Pullus) humboldti* Casey  
Fig. 146a–d; Map, Fig. 147


For detailed description, and discussion see Gordon, 1976b, p. 150.
Fig. 147. Distribution. *Scymnus (P.) humboldti* (disjunct locality dotted).
Fig. 148. *Scymnus (P.) barberi.*

*Scymnus (Pullus) barberi* Gordon
Fig. 148a–d; Map, Fig. 149


For detailed description, and discussion see Gordon, 1976b, p. 153.
Fig. 149. Distribution. *Scymnus (P.) barberi* (star); *S. (P.) iowensis* (dot).

*Scymnus (Pullus) iowensis* Casey

Fig. 150a–d; Map, Fig. 149


*Scymnus collaris* Melsheimer, 1847, p. 180 (not Herbst, 1797).—LeConte, 1852, p. 141.—Mulsant, 1856, p. 152.—Horn, 1895, p. 103.—Blatchley, 1910, p. 529.—Weise, 1929, p. 33.

*Scymnus (Pullus) collaris* Casey, 1899, p. 143.—Leng, 1920, p. 213.—Korschefsky, 1931, p. 162.

*Scymnus melsheimeri* Weise, 1929, p. 33 (replacement name).

For detailed description, and discussion see Gordon, 1976b, p. 156.
Fig. 150. *Scymnus (P.) iowensis.*
Fig. 151. *Scymnus (P.) calaveras*.

*Scymnus (Pullus) calaveras* Casey
Fig. 51a–d; Map, Fig. 152


Scymnus (Pullus) calaveras ab. tenuivestis: Korschefsky, 1931, p. 156.

For detailed description, and discussion see Gordon, 1976b, p. 159.
Scymnus (Pullus) majus, new name
Fig. 153a–d


Diagnosis. Description and distribution.—See Gordon (1976b). It has been pointed out to me by Herbert Dozier that the name majusculus Wingo, 1952, is a homonym of majusculus Mader, 1950. I therefore propose the name majus, a Latin adjective referring to the large size, for this species.
Fig. 154. *Scymnus (P.) ignarus*.

*Scymnus (Pullus) ignarus* Gordon
Fig. 154a–d; Map, Fig. 155

*Scymnus (Pullus) ignarus* Gordon, 1976b, p. 163.

For detailed description, and discussion see Gordon, 1976b, p. 163.
Fig. 155. Distribution. *Scymnus* (P.) *ignarus* (star); *S. (P.) monticola* (rectangle); *S. (P.) utahensis* (dot).

*Scymnus (Pullus) monticola* Casey

Fig. 155


For detailed description, and discussion see Gordon, 1976b, p. 165.
Fig. 156. *Scymnus (P.) utahensis*.

*Scymnus (Pullus) utahensis* Gordon
Fig. 156a–d; Map, Fig. 155

*Scymnus (Pullus) utahensis* Gordon, 1976b, p. 165.

For detailed description, and discussion see Gordon, 1976b, p. 165.
*Additional locality records:* OREGON: Harney Co.
Fig. 157. *Scymnus (P.) renoicus*.

*Scymnus (Pullus) renoicus* Casey  
Fig. 157a–d; Map, Fig. 158


For detailed description, and discussion see Gordon, 1976b, p. 169.

Fig. 158. Distribution. *Scymnus (P.) renoicus* (star); *S. (P.) horni* (shaded, peripheral localities dotted).

*Scymnus (Pullus) horni* Gorham
Fig. 159a–d; Map, Fig. 158


For detailed description, and discussion see Gordon, 1976b, p. 172.

Additional locality records: TEXAS: Brewster Co., Marathon; Culberson Co., SE Van Horn; Garza Co. 2 mi. N. Justiceburg; Hudspeth Co. 10 mi. S. Cornudas.
Fig. 159. *Scymnus (P.) hornii.*
Fig. 160. *Scymnus (P.) mormon.*

*Scymnus (Pullus) mormon* Casey  
Fig. 160a–d; Map, Fig. 161


*Scymnus (Pullus) subsimilis* Casey, 1899, p. 150.—Casey, 1910, p. 109.—Casey, 1924, p. 176.

For detailed description, and discussion see Gordon, 1976b, p. 175.
Fig. 161. Distribution. Scymnus (P.) mormon.
Fig. 162. *Scymnus (P.) ardelio.*

*Scymnus (Pullus) ardelio* Horn
Fig. 162a–d; Map, Fig. 163

*Scymnus ardelio* Horn, 1895, p. 105.


*Scymnus (Pullus) decipiens* Casey, 1899, p. 147 (not Weise, 1885).—Leng, 1920, p. 213.—Weise, 1929, p. 33.—Gordon, 1976b, p. 177.

*Scymnus sanctus* Weise, 1929, p. 33 (new name for *decipiens* Casey).—Korschefsky, 1931, p. 165.

For detailed description, and discussion see Gordon, 1976b, p. 177.

Fig. 163. Distribution. Scymnus (P.) ardelio.
**Scymnus (Pullus) erythronotum** Gordon

Fig. 164a–d; Map, Fig. 165

*Scymnus (Pullus) erythronotum* Gordon, 1976b, p. 181.

For detailed description, and discussion see Gordon, 1976b, p. 181.
Fig. 165. Distribution. *Scymnus (P.) erythronotum*. 
Fig. 166. *Scymnus (P.) aridus*.

*Scymnus (Pullus) aridus* Casey
Fig. 166a–d; Map, Fig. 167


For detailed description, and discussion see Gordon, 1976b, p. 184.

*Additional locality records*: UTAH: San Juan Co., 26 mi. S. Hanksville.