The terminology of Graham (1969) is shown below with the exception of the side view of several thoraxae (from Conspere 1931 and Griswold 1976). Most of the illustrations are of a parapsyllid, but the terms apply fairly well to most chalcidooids. Some synonymous terms, which you might find used in the references cited, are ring segment for anellus, abdomen for gaster or mesosoma, mesoscutum for scutum, parapsyllides for notauli, thorax for mesosoma, and postspiracular sclerite for propectus. The numbering of metasomal segments is not always consistent. Some start with the propodeum as segment 1 and the petiole as segment 2. Others start with the first apparent segment (basal tergite of Graham) as segment 1. The most difficult problems of numbering are usually associated with the antennae. It is sometimes difficult to decide what is a funicle segment and what is a club segment. The interpretation of such segments may vary from worker to worker. We have tried to avoid the use of antennae as much as possible but they offer important characters and cannot be ignored entirely.
INTRODUCTION TO KEY

The key is designed to be "easy" to use, not necessarily absolutely technically or phylogenetically correct. It proceeds somewhat along the mental process we use to sort chalcidoids to family, i.e., the easily observed characters are used first. The first distinctive states the conspicuous characteristic, and if you cannot see the character because the specimen is too small, it usually means you should take the second alternative. All known chalcidoid families except the obscure Rootlidae from New Zealand and Chile are included (some as subfamilies). The key, however, is based on Neartic species so that it will not work in all instances for Old World groups even at the family level. A few odd genera are keyed out near families other than the correct one because they are found among (compared to the rest of the family) and generally cause a key to become filled with "either—or," and "if, and, or but" type statements. Generally, the families are fairly distinct morphologically (at least in one sex), but a few odd forms may cause a relatively simple key to become overly complex. Our feeling is that these few odd forms may be keyed out pragmatically (or learned by sight) and removed from the majority of species so that identification of the remaining forms becomes possible without too much difficulty. We have tried to structure the key so that all common material will run through it. Many uncommon taxa should run through it as well. Male specimens of a few families (e.g., some eulophids, proromalids) will not run through the key. For males we've added additional comments in the discussion of Distinguishing Characters to help.

The illustrations for the key were rendered in large part by Linda Lawrence and Deborah Rousey. A few drawings were borrowed (with modification) from sources listed in the text under the taxon being identified.
Handbook of Nearctic Chalcidoidea

Start

Hindfemur enlarged, with ventral teeth, either a few large ones or many small ones (saw-like); hindtibia subequal in length to femur and curved; specimens generally 5-15 mm, robust, rarely less than 1.5 mm.

Hindfemur ½-enlarged, ventral teeth, if present, 2 or less, or ventral edge serrate; hindtibia straight (rarely half length of femur); specimens generally 1-10 mm, robust to fragile.

Typical

Uncommon

Rare

To Page 22B

Prepectus reduced or fused, not readily apparent, or if so, not triangular in outline.

To Page 21

Prepectus apparent as a triangular plate.

To Page 22A
Ovipositor directed horizontally (in most species not extended beyond apex of metasoma (gaster)); tegula a nearly oval disc; forewing not folded longitudinally.

**Family Chalcididae**

Head projecting as 2 "horns" (surrounding antennae) in dorsal view.

**Dichiniinae**

Hindtibia squarely truncate, at apex; 2 hindtibial spurs.

**Halichelidinae**

Ovipositor curved dorsally over metasoma (gaster); tegula narrowly extended forward; forewing often folded longitudinally.

**Family Leucospidae**

Head not modified as "horns," essentially flat in dorsal view.

Hindtibia obliquely truncate at apex; either 1 hindtibial spur or spur not apparent.

**Chalcidinae**
Antenna with 5-8 segments between pedicel and club; tarsi normally 5-segmented (if with 4, then males of Tetracampidae, or tiny specimens with long antennae and characteristic wings, see Mymaridae illustration on next page).
Hindwing without stalk, expanded as shown; forewing venation ending beyond basal 1/3 (postmarginal present, stigmal elongate to sessile); specimens generally larger than 2 mm.

Hindwing stalked and elongate (rarely reduced to only a short tub, hooked at tip); forewing venation linear, ending in basal 1/3 (postmarginal absent, stigmal rudimentary), or apparently absent; specimens generally less than 2 mm.

MT1 and MT2 petiolate; forewing reticulate. Rarely collected.

Only MT1 petiolate, often not visible and metasoma appearing broadly joined to thorax; forewing membrane smooth. Commonly collected.

Family Mymaridae

Family Mymarommatidae
Handbook of Nearctic Chalcidoidea

From Page 23

Mesopleuron exclave; midtibial spur thin and spine like.

Mesopleuron convex (bulging); midtibial spur relatively thick.

To Page 35:B

Head projecting forward, female mandible with raptorial appendage; at least hindtibia shorter than femur; male wingless (highly modified); from fruits of fig.

Agoniminae: Agonidae

To Page 25:B

Antennal insertion more than one torulus diameter above apical margin of clypeus; if questionable, then either eyes diverging ventrally or side of head ("cheeks") carinate.

To Page 25:A

Antennal insertion less than one torulus diameter above apical margin of clypeus; if questionable, side of head without carinate.

Head projecting downward, female without appendage or mandible; hindtibia at least as long as femur, usually longer; male similar to female.
Antennae arising at side and below apical margin of chytrum; MT1 longer than wide (petiolate). Commonly collected.

Spalanginae: Peromisidae

Antennae arising slightly above apical margin of chytrum; MT1 (i.e., petiolar) not visible. Rarely collected. (See also Asaphinae (p. 35) and Eumelinae (p. 32), Peromisidae).

Ceinae: Peromisidae

Forewing stigma enlarged, longer than stigmatic vein, and projecting toward hind margin of wing, ovipositor sheaths always exerted; antennae with 7 filiform segments.

Megastigminae: Tox心idae

Forewing stigma not enlarged, shorter than stigmatic vein (stigma sometimes surrounded by pigmented area or stain; ovipositor and antenna variable.)
Scutellum with submedian grooves that meet notauli and delimit median rectangular area (sa), or stigmal vein long and nearly at right angle to marginal vein (postmarginal may be absent); from figs in Florida, Arizona, and California. Rarely collected.

Sycophasinae, Epipteryginae, Sycorcytinae: Agastidiae

Scutellum without submedian grooves, or if present (rarely) then grooves do not meet notauli; notauli separated from scutellum by axilla (ax) or absent; either stigmal vein long and angled off of marginal vein or short. Common and widespread.

Hindcoxa much longer and wider than forecoxa (2-3X); if questionable, then notauli absent or weak and female with exserted ovipositor.

Hindcoxa nearly same size as forecoxa; if questionable, then notauli well developed and female ovipositor not exserted.

To Page 27

To Page 28
In female, ovipositor strongly exerted; both sexes: metasoma without pits; propodeum posterolaterally angled and not projecting over hind coxa (dorsal view); cerci of last tergum elongated and with long setae (not as apparent in male as female); propectus subequal to tegula; hind tibial spurs thin.

Torymidae: Torymidae

In female, ovipositor not exerted; both sexes: metasoma with pits; propodeum posterolaterally rounded and projecting over hind coxa (dorsal view); cerci of last tergum disk-like; propectus much smaller than tegula; hind tibial spurs thickened.

Family Ormyridae
Pronotum rectangular in dorsal view, about as wide as scutum, parallel-sided, and laterally flat; body black, yellow, or mixed black and yellow, but rarely metallic (and then only faintly); metasoma usually oval in cross-section and laterally compressed.

Family Eurytomidae

Pronotum in dorsal view narrowed to a transverse strip, or not visible (if elongate, then narrower at base than apex and sides concave for reception of front femora, rare, some Clonolyminae); body often metallic blue or green, rarely black; metasoma usually ker- shaped (triangular in cross-section) and somewhat dorsally compressed.

To Page 29
Family Eucharitidae

Pronotum not visible in dorsal view, covered by strongly arched scutum; metasoma "redder-like," with MT1 obviously petiolate.

To Page 30

Pronotum visible in dorsal view, scutum not strongly arched; metasoma usually elongate and MT1 usually not visible (petiolate forms do occur).

Prospectus fused to pronotum, not reaching tegula; frategiomerre 1 not reduced.

Eucharitinae

Prospectus not fused to pronotum, reaching tegula; frategiomerre 1 reduced (ring-like).

Oreasitinae
Metasoma covered by first two terga (or may appear to be covered by single tergum); body short and squat; head with well-defined clypeus and at least 1 mandible with 2 teeth.

**Family Perilampidae**

Metasoma with 1 or more readily visible terga; body usually elongate; head variable but generally with inconspicuous clypeus and small mandibles with 3 or 4 teeth.

**Family Pteromalidae**

Propectus not fused to pronotum (scutum clearly visible).

**Chrysolampinae**

Propectus fused to pronotum (scutum absent or faintly indicated).

**Perilampinae**

Subfamilies of Pteromalidae & Tetracampidae

To Page 31
Axillae (ax) advanced far forward of scutellum or cutting a sharp angle into side lobe of scutum.

Axillae not extending forward of scutellum, or if slightly advanced, not cutting a sharp angle into side lobe of scutum.

Axillae enlarged, nearly meeting medially; body covered with white, scale-like setae.

Axillae not enlarged, not close medially; body without white, scale-like setae.

Scutellum posteriorly without triangular "projection" and with parallel-dorsal grooves.

Scutellum posteriorly with triangular "projection" (actually part of the metanotum) and without apparent dorsal grooves.

Axillae not extending forward of scutellum, or if slightly advanced, not cutting a sharp angle into side lobe of scutum.

To Page 32
Head in dorsal view with posterior ocelli touching sharp occipital edge.

Euscinidae: Pteromalidae

Head in dorsal view with posterior ocelli distant from rounded occipital margin; if questionably so, then head with curved black stout setae.

Head with projection between antennae, visible both from above and side (antennae not shown); non-metallic brown.

Pteromalinae: Pteromalidae

Head without ocellar-antennal projection; mostly metallic or black.
Head and thorax dorsally with black, curved stout setae (brushes), hindcoxae with fine transverse carinae.

*Diparinidae: Pteromalidae*

Head and thorax may have setae, but smoother, not stout or brush-like; hindcoxae sculptured or smooth, without transverse carinae.

Body characteristic elongate (1-2 mm); head with ridged, raised area between eye and scrobal basin. Extremely rare.

*Leptothyrididae: Pteromalidae*

Body less elongate (generally less than 1 mm); head without ridged, raised area between eye and scrobal basin. Common.

*To Page 34*
Either eyes, head, and thorax densely covered with setae, or scutellum essentially polished and with only 2 pairs of bristles. Rarely collected.

Eyes, head, and thorax densely covered with setae.

Eyes large; scutellum essentially polished and with 2 pairs of prominent bristles.

Family Tetracampidae

Although distinct from Peromaliidae, this family most radially keys here.

Inner eye margins essentially parallel; pronotum always wider than long.

Eyes not densely setose, head and thorax occasionally so; scutellum rarely with paired bristles, but if so there are 3 or more pairs and they are incomplicate.
Sides of head ('cheeks') carinate laterally.
Asiaphinae: Pteromalidae

Sides of head rounded laterally.
Pteromalinae/Microgastrinae: Pteromalidae

B
From Page 24

Fore & midcoxae nearly touching (midcoxa anterior to middle of mesopleuron); axilae (ax) meeting medially, wider than long; marginal vein usually shorter than stigma or postmarginal vein; cercus at apex of metasoma.

Family Encyrtidae

To Page 36
Handbook of Nearctic Chalcidoidea

From Page 35

**Family Eupelmidae**

- Notauli rarely visible, rarely meeting; propectus flat and not projecting forward.

**Family Tanaostigmatidae**

- Notauli often meeting medially; propectus inflated and projecting forward lateral of pronotum.

**Neanastatinae**

- Without membranous area anterior to mid coxal insertion.

**Calosotinae**

- Scutum wider than pronotum, with anterolateral shoulders produced. Pronotum not divided medially not with longitudinal white line. Both sexes.

**Tanaostigmatinae**

- With membranous area (m) anterior to midcoxal insertion.

- Scutum not much wider than pronotum with anterolateral shoulders indistinct. Pronotum usually divided medially or with longitudinal white line. Females.
Handbook of Neartic Chalcidoidea

Generally 1 mm or more in length; body often metallic or dark in color; metasoma narrowly joined at propodeum (petiole may or may not be apparent); tarsi always 4-segmented; postmarginal vein present or absent.

Generally 1 mm or less in length; body usually pale yellow to white, sometimes with dark markings or wholly dark, but not metallic; metasoma broadly joined at propodeum; postmarginal vein absent; tarsi usually 3 or 5-segmented (if 4-segmented, then club large and undivided or wing fringed with long setae, or only middle tarsi 4-segmented).

Hindcoxa greatly enlarged; posterior scutellum (actually metanotum) with triangular, usually translucent flap overhanging propodeum; hindtibia with irregular, linear, or diamond-shaped patterns of setae; habitus as shown.

Hindcoxa "normal"; posterior scutellum without overhanging triangular flap; hindtibia without irregular patterns of setae.

To Page 39

Family Eulophidae

To Page 38
Family Eulophidae

Scutellum with 1 pair of setae; submarginal vein with 2 setae; face usually with scrobal and facial grooves.

Scutellum with 2 pairs of setae (rarely 3 or more); submarginal vein with 3 or more setae (rarely with 1 or 2); face usually without distinct grooves.

Forewing with bare area posterior to marginal vein with single row of ventral setae; usually with 2 or 3 "lines of setae" radiating from stigmal vein.

Forewing usually evenly setose posterior to marginal vein, without row of setae; rarely with any "lines of setae" radiating from stigmal, but when present usually only 1 line.

Postmarginal vein usually absent; scutellum generally with paired submedian grooves which divide the scutellum into three distinct pieces.

Postmarginal vein present; scutellum without submedian grooves, rarely with lateral grooves, when present at extreme lateral margins.

Euestaoninae

Euderinae

Terzasticlinae

Eulophinae
Tarsi 3 segmented; setae on wings often arranged in rows; stigmal vein usually elongate; antennae short and with few funicular segments recognizable, male with elongate antennal "setae."

Family Trichogrammatidae

Tarsi 4 or 5 segmented; setae on wings usually absent, evenly covering wings, or with only a few bare spots or rows present, stigmal vein short and not noticeably divergent from wing margin; antennae variable, but usually with recognizable funicular segments (if not, then with large undivided club).

Propodeum without median triangular area; scutellum (sc) not transverse (anteasc. posterior sides not parallel); axillae (ax) distinct from scutellum, rarely meeting medially; club of antenna almost always septate (a few spp. have antennae like signiphoridae).

Family Signiphoridae

Propodeum with triangular median area (ma); scutellum (sc) transverse (parallel sided), axillae either united with scutellum or widely separated; club of antenna elongate and unssegmented.

To Page 40
Axillae (a) not meeting medially, generally widely separated; notauli (n) present; (antennal club in Eremocerus large and undivided, tarsi 4-segmented).

Family Aphelinidae
The ensuing family write-ups we have used the following standard sequence for organizing information:

INTRODUCTION: A generalized statement as to the overall current state of knowledge about the family. Depending upon available literature this may refer to the Neartic, Neotropical, or world fauna. The higher classifications used are based upon what we consider a consensus of current thought.

STATISTICS: The approximate number of world genera and species is given as well as figures for the Neartic (essentially United States northward) and Neotropical (Mexico southward) regions. World data is taken from Noyes (1990a), Neartic data from the 1979 Hymenoptera catalog, and Neotropical figures from De Santi's works (see "Literature Resources," p. 9). These figures are by no means fixed, nor necessarily exact. They are the best estimates currently available and are intended to give the reader some idea of the relative diversity of the group. The figures may represent only one-fifth the total chalcidoid fauna.

BIOLOGY: In most cases the known hosts for the family are outlined. Unusual hosts and/or biologies are discussed where data indicate divergence from a behavior expected for the group. For example, many hundreds of Euploïdijdæ paratize Lepidoptera, whereas a few attack flies or tritips or are aquatic.

DISTINGUISHING CHARACTERS: The best characters for separating closely related (or similar appearing) families are given. These characters, as well as problems involved with identification, are discussed at more length than is possible in the key. This serves both as a check against tentative identifications made with the key as well as a shortcut for those who may have specimens to believe that a particular specimen is a member of a particular family. In general, except Pteromalidae, we do not discuss subfamily level characters in the text, but show them in the key.

COLLECTING: Likely habitats or hosts are suggested based primarily on personal collecting experiences throughout the United States and parts of Canada. The sections on biology also point out the sort of hosts one should collect to rear certain types of chalcids.

DISTRIBUTION: A general summary of distribution is given, especially with reference to groups of restricted habit.