REVISION OF CHALCID WASPS
OF GENUS EURYTOMA
IN AMERICA NORTH OF MEXICO

By Robert E. Bugbee

The species of the genus *Eurytoma* Illiger, from America north of Mexico, have never been treated in a taxonomic study. The first species of the genus from the United States were described by Thomas Say in 1836, probably from specimens taken somewhere in the state of Indiana, but the type material is lost. Additional species were described by Francis Walker (1843 and 1846), Asa Fitch (1859), and Benjamin D. Walsh (1870). In 1881 William Ashmead published his first descriptions of new species of *Eurytoma* and continued to do so into the early 1900's. He was a most productive worker and in 1888 issued a revised generic table of the family Eurytomidae, designated genotypes for all genera of the family in 1894, and in 1904 published the comprehensive "Classification of the Chalcid Flies." These works, however, consisted primarily of brief descriptions and keys to the genera but did not include keys to the species. Although many of the Ashmead species are recognized today on the basis of his type

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material, some of his published descriptions are so brief and general that they could apply to many species within the genus.

In more recent years additional species have been added by A. A. Girault (1916–1920), A. B. Gahan (1922–1934), and the author of this revision (1939–), among others.

Source of Study Material

A study of several collections was made in preparation for this revision. With the aid of a grant, No. G–1308, from the National Science Foundation it was possible to spend a sabbatical year studying collections of this genus in the United States. Collections studied included those of the U.S. National Museum, Washington, D.C., Department of Agriculture, Ottawa, Canada, and Cornell University, Ithaca, N.Y. In addition, collections from the Universities of Oregon, North Dakota, Wisconsin, and Illinois, as well as my own collections, were available and contained some new species and important host and distribution data.

All available types in the United States and Canada have been examined. Type material of a number of species has been lost or destroyed. This is true for the two species described by Say (Eurytoma studiosa and E. orbiculata), three species described by Walsh (E. gigantea, E. bicolor, and E. auriceps), and E. solenozopheriae Ashmead. Neotypes are designated for these species, and E. studiosa and E. auriceps are redescribed below.

Nineteen new species are described and several species, the original descriptions of which were brief and inadequate, are redescribed.

The key to the 82 species treated in this revision is based on an unpublished one by the late A. B. Gahan, formerly of the U.S. Department of Agriculture, Division of Insects. Mr. Gahan's key was modified and enlarged considerably. The key suffices for most of the more distinct species, but for many of the species good key characteristics have been difficult to find. Experience reveals certain characteristics that may seem obvious to the worker constructing the key but which are difficult to interpret by those unfamiliar with the group. No claim is made for a completely accurate and workable key, but a first attempt must be tried at some time. It is hoped that the present key will eventually lead to the preparation of a more adequate one as weaknesses are discovered.

In the course of preparing this revision, I have received help from a number of people. Dr. B. D. Burks of the U.S. Department of Agriculture, Entomology Research Branch, Washington, D.C., and Dr. Oswald Peck, Canada Department of Agriculture, Research Branch, Ottawa, Canada, made available collections containing
Eurytoma. Both men read the manuscript and made many constructive suggestions and criticisms. Their encouragement and help are gratefully acknowledged. Dr. Henry Dietrich, Curator of Insects, Cornell University, Ithaca, N.Y., extended to me many courtesies while I studied the collection at Cornell. Frank Kurczewski and Mrs. Karlin Happe Grunau, former students at Allegheny College, prepared some of the drawings. I am also indebted to my secretary, Vanile Birkbeck, who typed the manuscript.

Systematic Treatment

In the systematic treatment the species occur in the same order as in the key. The citation of the original description in addition to important papers dealing with synonymy, host relationships, and life-history data follow. No attempt has been made to be exhaustive in the list of references, but some care has been taken to select those that seem to contain the most important information. A citation of the location of the types, type locality, distribution, and host follow in order.

The locality records for most of the species are shown on maps. The records are based on specimens that were actually seen in the various collections listed in a previous paragraph.

Host Relationships

Five orders of insects and six families of plants are represented among the hosts (see appendix). Hosts for all but 2 of the 82 species in the revision are listed but should be accepted with the reservations stated in the next paragraph. About half (33 species) of the parasitic species occur on hosts belonging to eight families of the order Hymenoptera. Coleoptera (17 species, 6 families), Diptera (7 species, 4 families), Lepidoptera (4 species, 7 families), and Homoptera (3 species, 1 family) follow in descending order. At least 12 species are phytophagous, and one of these (Eurytoma pachyneuron) is suspected of being both phytophagous and parasitic. The habits of the remaining species are unknown or uncertain.

Host data for many species are incomplete. In many cases the host gall from which the parasite emerged is indicated, but it cannot always be assumed that this implies a direct host-parasite relationship. In most galls there may be other primary and secondary parasites of other genera, families, or orders and often inquilines, so that unless the parasites have actually been observed to emerge from the host larvae, the exact association is unknown. Often only the plant species on which the wasp was caught or from which galls were
collected is known. The information tells nothing about actual host relationships, since most plants may have more than one species of gallmaker on them. However, some parasite-host relationships have been well established, e.g., in Eurytoma neomexicana Girault (Brandhorst, 1943) E. gigantea Walsh (Hughes, 1934 and Uhler, 1951), E. solenozopheriae Ashmead (Driggers, 1927), E. pissodis Girault (Taylor, 1929), E. obtusiventris Gahan (Hughes, 1934 and Uhler, 1951), E. pini Bugbee (Miller, 1953), and E. bolteri Riley (Leiby, 1922 and Barber, 1938). There are a few other species in which the evidence is quite convincing, but the number is not more than one-quarter of the species treated herein.

Several species are known to be phytophagous in such unrelated plant tissues as bulbs, stems, leaves, and buds of orchids (E. orchidearum (Westwood)), sumac seeds (E. rhois Crosby and E. seminis Bugbee), the fleshy parts of the fruits of juniper (E. juniperinus Marcovitch), the seeds of Ceanothus divaricatus (E. squamosa new species), and in the stems of certain grasses (E. bromi (Howard), E. eragrostidis (Howard)).

In at least one species, E. pater Phillips(=E. pachyneuron Girault), both phytophagy and parasitism have been suggested (Phillips, 1917). This evidence suggests that the Eurytoma larva begins as a parasite of the larva of Harmolita tritici (Fitch) in the stems of Elymus species, but may complete its development on plant tissue. Whether this represents a transition from parasitism to phytophagy or vica versa or simply an ability to be somewhat omnivorous in its eating habits is not clear from the evidence presented. Gahan (1922, pages 37-38) presents some arguments in favor of the first alternative mentioned.

The citation of the host applies to the type material and is taken from the original description except for specimens in which a host was not indicated. In the latter case, hosts are listed that were indicated on labels of determined specimens found in the various collections or cited in publications subsequent to the original description.

It has been impossible to check all of the names of the hosts. Several reference works, however, have been consulted often and have been most helpful. These include: "Catalogue of the Coleoptera of America North of Mexico" by Leng, published in 1920 and the supplements issued in 1927, 1933, 1939, and 1948; "Hymenoptera of America North of Mexico," 1951, by Musebeck, Krombein, Townes and others, and the first supplement published in 1958; "Insect Pests of Farm, Garden, and Orchard" by Peairs and Davidson, 1956; "Plant Galls and Gall Makers" by Felt, 1940; "Hymenoptera of Connecticut" by Viereck, 1916.
Explanation of Terms and Measurements

Segmentation of the abdomen: Following well-established homologies the propodeum and the petiole are counted as the first two segments of the abdomen. Thus the abdomen is considered to have seven terga beyond the petiole, and the long tergum, often referred to as the fourth, will be designated in this revision as the sixth.

The ninth tergum (ninth abdominal segment) varies from elongate and pointed to very short, broad, and stubby. Laterally, on each side, is a small round cercus.

Measurements of the ninth tergum have been made from the distal tip to the proximal limit of the chitinized area or to where the intersegmental membrane begins. In all cases the insect was viewed laterally. Measurements of the length of the abdomen were made from the same lateral view, from the distal tip of the ventral valves to the proximal end of the abdomen where it joins the petiole; i.e., the petiole is not included. The length of the sixth segment was measured in lateral view from the posterior border of the fifth segment to the posterior edge of the sixth, unless otherwise stated.

Female genitalia (fig. 4): The entire genitalia were dissected from the abdomen and mounted in diaphane on glass slides. Various terms have been applied to the parts of the female genitalia of the Chalcidoidea. In this paper the following terminology is used. The dorsal valves represent the ninth abdominal tergum, which consists proximally of two parts that fuse together distally to form the exposed tip of the ninth tergum. The ventral valves, designated as the gonoplac (Scudder, 1961) or third valvula (Snodgrass, 1935), lie internal to and extend distally beyond the dorsal valves. Proximally the ventral valves expand into a broad plate that bends dorsally or, sometimes, posteriorly. The fulcral plates, called the gonangulum (Scudder, 1961) or anterior plate (Snodgrass, 1935), are two rectangular-shaped parts that articulate at their proximal ends with the dorsal extension of the ventral valves, and along their anterior ventral margin with the proximal ends of the dorsal valves. Stylet arch is formed by the bending of the stylets dorsally, posteriorly, and finally ventrally to the point where they attach to the distal end of the fulcral plates. Depending upon the degree of dorsal extension of the ventral valves, the stylet arch may be in a horizontal, oblique, or vertical plane.

Petiole: The second abdominal segment connecting the abdomen to the propodeum.

Propodeum (fig. 3): The first abdominal segment fused with the thorax (Snodgrass, 1911). Viewed from the posterior of the thorax, the propodeum in most species is concave. In the center of
the concavity may be a wide or narrow, complete or incomplete, central or median groove demarked by lateral carinae. In the median groove there may be a single central carina that divides it equally into right and left halves. The carina usually extends ventrally only one-third to one-half the length of the groove. In other species the median groove may be absent and the whole surface uniformly punctate or irregularly ridged. Lateral areas are triangular and located laterad to the lateral carinae outlining the median groove. They are usually sculptured differently from the groove. Where the median groove is present dorsally only, the lateral areas blend into the concavity of the propodeum ventrally.

Tegula (fig. 1): A small scalelike sclerite carried on the thorax at the extreme base of the forewing.

Ocellocular line: Line between the lateral margin of a lateral ocellus to the medial margin of a compound eye as seen in dorsal view of the head.

Scape (fig. 2): The proximal division of the antenna that arises from the base of the scrobe cavity, and articulates distally with the pedicle.

Flagellum: That part of the antenna distal to the ring joint. The terminal unit may consist of what appears to be two and sometimes three closely fused segments. Most often the last two are closely fused, and the preceding third segment is separated by a distinct annulation. Thus the flagellum appears seven segmented or occasionally six segmented if all three terminal units are fused. In a few species the terminal unit may be weakly enlarged to give the appearance of a subclavate condition. The remaining segments of the flagellum are truncate distally.

Marginal vein (fig. 5): Measurement of the length was made from the point at which the proximal extension of the vein is flush with the margin of the wing, distally to the point at which the post-marginal and stigmal veins diverge.

Postmarginal vein: Measured from its point of departure from the marginal vein to its distal tip.

Stigmal vein and club: Short vein that extends from the distal end of the marginal vein outward at less than a 45° angle. It ends in a small enlargement known as the stigmal club.

Forecoxa: The anterior face of the forecoxa in most species has a shallow, oblique depression. In a few species the depression is accentuated by a raised carina that makes it appear much deeper.

Umbilicate puncture: Round depression circumscribed by a raised carina with a small raised tubercle in the center. It covers the dorsum of the thorax, head, and anterior of the head.
Genus *Eurytoma* Illiger

*Eurytoma* Illiger, 1807a, p. 192.—1807b, p. 128.

*Decatoma* Spinola, 1811, p. 151.

*Ennetoma* Dahlbom, 1857, p. 292.

*Ennetoma* [sic] Dalla Torre, 1898, p. 332. [Emendation.]

*Bepratella* Girault, 1913, p. 95.

Type species: *Chalcis abrotani* Panzer (=*Pt€rotnalus appendigaster*) Swederus, designated by Westwood, 1840.

Female.—Varies in length from 1.5 to 7.0 mm. Color is most often black; occasionally some yellow may occur on the head, lateral prothorax and mesothorax, tegula and legs; black may be replaced by deep brown in a few species. Abdomen showing seven terga not counting the petiole and propodeum; rectangular, oval, or circular from a lateral view with slight to extreme lateral compression; ninth tergum (exposed ends of the dorsal valves of the genitalia) varies in length from .06 to .45 mm; pointed and plow shaped with a prominent cercus on each side; may be in line with the horizontal axis of the abdomen or project dorsad with the ventral valves at a 30° to 40° angle. Petiole may be longer than wide and equal in length to the hind coxae or wider than long; sixth abdominal tergum usually as long or longer than fourth and fifth combined; lateral surface of sixth often covered with fine reticulations that may fade out so that dorsal surface is smooth and shiny, or they may extend over dorsal surface.

Internal genitalia variable; in most species dorsal and ventral valves turn dorsally, anteriorly, at less than a right angle; stylet arch is in an oblique plane; dorsal extension may be so slight that stylet arch is in horizontal plane in some species while in others dorsal and ventral valves may turn dorsally at right angle, and the ventral valves turn posteriorly forming an arc of 180°, in the latter case the stylet arch is in vertical plane; width of dorsal valves may be wide for horizontal length or quite narrow and may be yellow except for posterior tip or black for entire length.

Propodeum usually concave with or without a narrow to wide median furrow; if furrow is lacking, surface often finely reticulate; if furrow is present, lateral areas often reticulate or irregularly ridged; in a few species the propodeum is rounded or sloping posteriorly, but in most species it drops sharply at almost right angles to the scutellum.

Dorsal surface of the thorax covered with umbilicate punctures; parapsidal grooves on the mesothorax usually complete; broad collar-like pronotum usually as wide or only slightly less than width of mesonotum in dorsal view; prepectus always present.

Head with occiput, frons, and genae covered with umbilicate punctures, although in a few species punctures may be reduced or
wanting, especially on frons and genae; deep scrobal cavity; a few species with prominent striae converging on clypeus from below eyes and across lower part of face.

Antenna with one ring joint; pedicle usually shorter than first funicle joint; flagellum usually with five truncate segments followed by sixth segment that is separated from the terminal unit of two closely fused segments by a distinct annulation, but never as deeply excised as the preceding five segments; flagellum usually filiform although in a few species the terminal three units may be slightly swollen or subclavate.

Foretibia with a single curved tibial spur; hindtibia with two straight tibial spurs, one slightly longer than the other; front coxa rectangular with a shallow transverse depression on anterior surface; depression may be outlined ventrally in a few species by a raised carina.

Wings clear and hyaline; forewing with a short marginal vein that may be longer than or equal in length to the postmarginal; both veins most often linear, although in a few species marginal may be broader than postmarginal and more heavily chitinized; no true stigma; stigmal vein shorter than or equal in length to marginal and ending in a small club; only other vein present is the submarginal.

Male.—Smaller than the female, ranging from .85 to 4.2 mm. in length. Resembles the female as far as head, thorax, legs, and wing characteristics are concerned. Chief differences are in antenna and abdomen. Antenna consists of a scape with a rounded, knoblike protuberance just below articulation with petiole; flagellum with five, occasionally four, longer than wide, dorsally produced, pedicellate segments with two long whorls of hairs on two, three, and four; terminal unit of two or three closely fused segments. Abdomen with an elongate petiole, equal to or longer than hindcoxae; shape of the abdomen from the side triangular to oval; in cross section round to oval and not as long or deep as in female; sixth tergum usually the longest.

Summary of generic characteristics (female only): Small; mostly black with extremities of femur and tibia, often tegula, scape of antenna, and tips of ventral valves yellow; abdomen with seven terga; most often showing varying degrees of lateral compression; sixth tergum usually as long or longer than fourth and fifth combined and with fine scalelike sculpturing on at least lower lateral surface; ninth tergum often elongate and pointed, bearing a round cercus on each side.

Female genitalia with dorsal and ventral valves produced dorsally, anteriorly, in varying degrees so that stylet arch may be in a horizontal, oblique, or vertical plane.
Propodeum most often at approximately a right angle to the scutellum; usually shallowly concave and with or without a median furrow.

Thorax covered dorsally with coarse umbilicate punctures; parapsidal grooves on the mesonotum complete; pronotum collar-shaped and usually as long as the mesonotum; prepectus always present.

Head usually with umbilicate punctures on vertex, frons, and genae. Antenna elbowed; scape attached at the base of a deep scrobal cavity; one small ring joint between pedicle and first joint of the flagellum; flagellum 6- or 7-segmented; if 6-segmented, terminal unit consists of three closely fused segments; otherwise two closely fused segments; antenna usually filiform or weakly clavate.

Front coxa always with a shallow oblique depression on anterior face; in a few species depression appears deeper because of a raised carina; foreleg with one curved tibial spur and hindleg with two straight tibial spurs.

Remarks.—The description and summary of the characteristics of the genus *Eurytoma* are the author's concept of the genus, based on his knowledge of the North American species only. A revision of the genera of the family Eurytomidae on a worldwide basis might narrow or expand the limits of the genus, but as yet such a study has not appeared.

The genus is worldwide in its distribution with described species from the Arctic Circle to Patagonia and southern Africa. Although an accurate count has not been made, there must be in the neighborhood of 450 or more described species.

The author hopes that this treatment of the species of *Eurytoma* in North America north of Mexico will help increase the knowledge of this large genus and will aid those who are working with the genus in the United States and other countries, presently and in the future.

The key is restricted to the females because several species of *Eurytoma* lack males and in some others males occur sporadically in small numbers only. The species are not arranged phylogenetically although some of the more specialized morphologically appear at the beginning of the key and many of the more generalized toward the end.

Explanation of some of the structures and measurements used in the key appear in a preceding section.

Key to Species of *Eurytoma* of North America Based on Female

1. Abdominal petiole longer than wide; longer than, equal to, or only slightly shorter than the hindcoxa . . . . . . . Group A. *Petiolata* (p. 442)
   Abdominal petiole short; breadth may be equal to length or greater than length . . . . . . . . . . . Group B. *Brevipetiolata* (p. 443)
2. Head with frons, often clypeus and lateral surfaces of pronotum yellow or reddish brown. Complex I. *Bicolor* (p. 443) Head and thorax entirely black or wholly or in part dark brown. 3

3. Abdomen narrow and rectangular in lateral view; only slight lateral compression; triangular in cross section; propodeum sloping posteriorly with a deep, narrow, complete median furrow; ninth tergum and ventral valves in line with horizontal axis of abdomen. Complex II. *Pachyneuron* (p. 444) Abdomen and propodeum not as above. 4

4. Abdomen may be strongly laterally compressed, viewed from the side elongate or broad to deeply oval; in cross section narrowly oval with greatest width in upper one-third; ovipositor may be tilted dorsal in relation to longitudinal axis of abdomen. Complex III. *Gigantea* (p. 444) Abdomen not strongly compressed; more nearly oval in outline in lateral view and not greatly lengthened or deeply oval; ovipositor more nearly in line with longitudinal axis of abdomen. Complex IV. *Tylodermatis* (p. 445)

**Group A. Pelti/olata**

1. Abdominal petiole longer than hindcoxa, very slender, approximately round in cross section; pronotum with 3–4 transverse ridges; abdomen extremely laterally compressed. 1. *phloeo/tribi* Ashmead Abdominal petiole not longer than hindcoxa, not so slender; more nearly triangular in cross section; ridges on pronotum absent. 2

2. Abdominal petiole more nearly equal in length to hindcoxa. Abdominal petiole distinctly shorter than hindcoxa. 3

3. Face with prominent striae converging on the clypeus; abdomen elongate and laterally compressed; medium large species averaging 3.5 mm. in length; ninth tergum elongate and pointed. 2. *orchidearum* (Westwood) Face nonstriated; abdomen short and plump; small species averaging 2–2.5 mm. in length; ninth tergum short and blunt. 4

4. Propodeum with a prominent tubercle, dorsally, on each side of concavity; sixth tergum sculptured over entire surface; head entirely black. 3. *mammas*, new species Tubercles absent on propodeum; sixth tergum smooth and shining dorsally; head yellow except for black area around ocelli and occiput. 4. *lycti* Ashmead

5. Forecoxa with a prominent raised ridge on anterior face outlining a deep, rounded depression. 6

6. Legs yellow or orange yellow; black infusation when present on hindfemora only. 7

7. Anterior ocellus not separated from two lateral ocelli by distinct carinae; anterior edge of pronotum without tubercles; eyes without emargination medially. 5. *dorcascemas* Ashmead Anterior ocellus separated from two lateral ocelli by raised carina; two small tubercles projecting dorsally on anterior edge of pronotum; eyes with prominent emargination medially. 6. *semicircula*, new species

8. Propodeum with lateral areas narrow and rounded; surface covered with irregular ridges and pits; median furrow narrow and indicated by lateral carinae in dorsal half. 9

Propodeum broad and concavity shallow; surface covered with fine uniform punctations; median furrow absent. 7. *profunda*, new name
9. Length of sixth abdominal tergum dorsally, approximately equal to length of fifth or at most 1½ times length of fifth; ninth tergum stout and as long or longer than eighth tergum. 8. conica Provancher

Length of sixth abdominal tergum, dorsally at least twice the length of fifth; ninth tergum half or less than half the length of the eighth tergum.

10. Central carina of median furrow present in upper half only; first joint of flagellum a third longer than second joint; stigmatic club rectangular and large. 9. magdalis Ashmead

Central carina of median furrow extends to base of furrow; first joint of flagellum only a sixth longer than second; stigmatic club narrowly rectangular, appearing as slight enlargement of stigmatic vein.

10. inornata Bugbee

11. Propodeum sloping; narrowly concave with a narrow and deep median furrow; abdomen rectangular, very slightly compressed. 12

Propodeum vertical or abrupt; concavity wide; median furrow wide, narrow or absent; abdomen not as above. 13

12. Umbilicate punctures reduced on head and thorax, very shallow and delicate; abdomen with sixth segment longer than fifth dorsally.

11. minnesota Girault

Umbilicate punctures not reduced, sharp and deep; abdomen with sixth segment not much longer than fifth dorsally; marginal about twice the length of the postmarginal; antenna with distinct club.

12. illinoisensis Girault

13. Petiole about one-half the length of hindcoxa; marginal vein broad, but not heavily chitinized. 13. sphaera, new species

Petiole one-half or less the length of hindcoxa; marginal vein linear; stigmatic club rectangular. 14. obtusilobae Ashmead

Group B. Brevipetiolata

Complex I. Bicolor

1. Postmarginal vein one-half or less the length of the marginal vein ... 2
Postmarginal vein more than one-half the length of the marginal vein ... 3

2. Small species averaging 1.9 mm. in length; propodeum wide and shallow; surface finely and evenly punctate; no median furrow; all coxae yellow; venter of abdomen reddish brown. 15. semivena Bugbee

Medium-sized species averaging 2.9 mm. in length; propodeum wide and shallow with median furrow indicated by lateral carinae in upper half to two-thirds of length; hindcoxa often black on outer and anterior faces. 16. flavovultus Bugbee

3. Abdomen and thorax black; clypeus, upper part of frons, small spot behind eye, and spot on anterolateral edge of pronotum, yellow. 17. bicolor Walsh

Abdomen and thorax mostly deep brown; orange-yellow color on face, lateral aspect of pronotum, legs, and often coxae. 4

4. Medium-sized species averaging 3.3 mm. in length; antenna distinctly elevated with a long and narrow first funicle joint, clearly longer than the pedicle. 18. lutea, new species

Small species averaging 2.3 mm. in length; antenna filiform; first funicle joint only slightly longer or equal to pedicle as seen from above. 19. juniperinus Marcovitch
Complex II. Pachyneuron

1. Marginal vein thicker and broader (2 to 3 times) than postmarginal ... 2
   Marginal vein linear or less than twice width of postmarginal; not thick-
   ened ........................................ 3
2. Color deep reddish brown including mid- and hindcoxae; head and thorax
   with reduced umbilicate punctures .......... 20. *broni* (Howard)
   Color usually black; mid- and hindcoxae yellow; head and thorax with dis-
   tinct umbilicate punctures .................. 21. *pachyneuron* Girault
3. Body color light brown; legs and coxae yellow; sixth tergum two or more
   times the length of five and unsculptured laterally.
   Body color dark reddish brown including coxae; sixth tergum about 1½ times
   the length of the fifth and finely sculptured laterally to dorsal surface.
   22. *eragrostidis* (Howard)

Complex III. Gigantea

1. Abdomen in lateral view deeply oval to circular in outline; strongly com-
   pressed; ovipositor tilted dorsad so that it is transverse to the longitudinal
   axis of the abdomen .......................... 2
   Abdomen in lateral view elongate; if ovipositor is tilted dorsad, it is only
   slightly above the longitudinal axis of the abdomen .................. 6
2. Marginal vein broad in relation to postmarginal; postmarginal half the length
   of marginal; prominent striae converging on the elyptus, covering lower
   half of face; first funicle segment twice as long as broad.
   24. *californica* Ashmead
   Marginal vein linear or nearly same width as postmarginal; the latter more
   than half the length of marginal; striae absent or only a few present ... 3
3. Sixth gastral tergum strongly sculptured on sides, this sculpture extending
   dorsally nearly or to the horizontal dorsal portion of tergum ........ 4
   Sixth tergum smooth and polished dorsally; lateral sculpturing limited to
   lower two-thirds or less .................................................. 5
4. Ninth gastral tergum long, its cerea located five or six times the long diam-
   eter of cereal scar from apex of tergum; margin of scrobe cavity with a
   distinct angle or tubercle a little above base of scape; scape, tegula, and
   legs black .............................................. 25. *gigantea* Walsh
   Ninth tergum much shorter, the cereal scar not more than two or three times
   its own length from apex of tergum; margin of scrobe cavity without angle
   or tubercle; scape, tegula, and legs except coxae, testaceous.
   26. *quereri-globuli* (Fitch)
5. Legs with reddish-brown infusion on femora and tibiae; propodeum with
   a wide incomplete median furrow that narrows ventrally.
   27. *solenozopheriae* Ashmead
   Legs with femora and tibiae yellow; propodeum with a complete, wide median
   furrow that maintains same width dorsoventrally .......... 28. *furva* Bugbee
6. Face clothed with dense, long, recumbent yellow hair; legs more or less
   reddish ........................................... 29. *pisodis* Girault
   Face clothed with less dense, recumbent silvery white hair; legs yellowish
   brown ............................................. 7
7. Head unusually thick anteroposteriorly, anterior surface viewed in profile
   from above strongly convex; sixth gastral tergum laterally as well as
   dorsally very nearly sculputeless; legs, including anterior and midcoxae,
reddish testaceous; posterior pair sometimes with femora and tibiae infuscated .................................................. 30. cleri Ashmead

Head more transverse, if markedly convex anteriorly, the coxae at least are black and sixth tergum usually more strongly sculptured laterally ........ 8

8. Tegula, scape, flagellum, and legs, yellow; marginal vein about three times the length of the short postmarginal vein ........................................ 31. flavicrus, new species

Tegula, often scape, flagellum, and legs, except extremities, black; marginal less than three times the length of the postmarginal vein, about 1\(\frac{1}{2}\) .... 9

9. Average length 3.0 mm. (2.4–3.4); ninth tergum averages .22 mm. (20–25); sixth tergum longer than three and four combined or about one-third length of abdomen ............. 32. contractura, new species

Large species averaging about 5.0 mm. (3.7–6.6); ninth tergum averages .46 mm. (.27–.63); sixth tergum about same length as three and four combined or about one-quarter length of abdomen .............. 10

10. Scape yellow or with slight blackish tinge dorsally only; fore- and midlegs yellowish brown; veins pale clay yellow; marginal vein thin or linear; stigmatic club narrow to linear .................................... 33. discordans Bugbee

Scape, femora, and tibiae of all legs usually with some black infuscation; veins yellowish brown; marginal vein narrow to broad but never linear; stigmatic club rectangular to square ................................ 34. acuta Bugbee

Complex IV. Tylodermatis

1. Abdomen reddish brown or at least sixth tergum reddish brown; femora and tibiae all yellow or testaceous .................................................. 2

Abdomen dark brown to black .................................................. 3

2. Dorsal valves of genitalia narrow for horizontal length; stylet arch and funicular plate in a vertical plane; postmarginal vein averages about one-half the length of the marginal .................................. 35. prunicola Walsh

Dorsal valves of genitalia broad for horizontal length; stylet arch and funicular plate in an oblique plane; postmarginal vein averages about 80\% length of marginal .................................................. 36. celtigalla Bugbee

3. Face with strong striae converging on clypeus; tegulae yellow to brown, never black ...................................................................... 4

Face without strong, distinct, converging striae; may be a few weak striae limited mostly to lower angle of face; not covering whole lower half of face; tegula variable but most often dark brown to black .............. 8

4. Sixth tergum long, fully 40\% length of abdomen; heavily sculptured over entire surface; marginal vein linear and twice the length of the postmarginal .................................................. 37. lacucae, new species

Sixth tergum less than 40\% length of abdomen; sculpturing limited to lower three-quarters or less of sixth tergum; marginal vein may be broader and longer than, or equal in length to postmarginal .............. 5

5. Marginal vein equal in length to postmarginal vein; propodeum wide and shallow; median furrow indistinct or indicated dorsally only; abdomen oval and plump .................................................. 38. nigricoxa Provancher

Marginal vein longer than postmarginal; abdomen laterally compressed ..... 6

6. Legs with black infuscation on femora and tibiae; coxae black; funicule joints of male antenna not noticeably pedicellate and lacking long whorles of hairs .................................................. 39. querci Fullaway

Legs all yellow, or brownish infuscation on hindfemora and tibiae only; coxae black or with some yellow on fore- and often on midcoxae; funicule joints of male pedicellate .............................................. 7
7. Ninth tergum averages .12 mm. in length; marginal vein wider than post-
marginal; median furrow of propodeum indicated in upper one-third to
one-half. 40. auriceps Walsh
Ninth tergum averages .20 mm. in length; marginal and postmarginal linear
or about same width; median furrow complete to base.

41. breviva Bugbee
Propodeum within excavation, nearly uniformly alveolate sculpiured;
abdomen compressed, acute at apex.

42. obtusiventris Gahan
Propodeum broad and shallowly concave to almost flat; median furrow
absent or indicated by wide-spaced lateral carinae in upper one-third to
one-half only; rest of surface irregularly ridged and pitted or finely
punctate.

43. vernonia, new species
Propodeum rounded and narrowly concave with a deep and narrow median
furrow usually complete to base; head viewed dorsally, rounded anteriorly.

44. bigeloviae Ashmead
Long, dense, white hair absent on terga; sixth tergum bare, others sparsely
hairy, laterally, but vestiture not long.

45. atripes Gahan

13. Small species averaging 1.6 mm. (1.3-1.9) in length; veins yellowish brown
and linear; marginal averaging .20 mm. (.17-.25) and postmarginal aver-
aging .10 mm. (.07-.12); thus marginal averages twice the length of
postmarginal. 46. levivultus Bugbee
Larger species averaging 3.3 mm. (2.7-3.7) in length; veins dark brown and
marginal wider than linear postmarginal; marginal only slightly longer
than postmarginal; marginal averaging .11 mm. and postmarginal .10 mm.
in length.

47. tumoris Bugbee

14. Antennae club distinctly a little thicker than the funicule.

15. Antennae filiform or without a distinct club.

16. Propodeum with a wide, complete median furrow that fills concavity of
propodeum; lateral areas absent. 48. fossae, new species
Median furrow in upper one-half only or complete to base; lateral areas
distinct and finely punctate.

49. tomici Ashmead

16. Width of malar space less than half the eye height; sixth gastral tergum very
weakly sculptured at lower angles only, otherwise it is smooth; interstices
between umbilicate punctures of thorax unsculptured.

50. appendigaster (Swederus)
Width of malar space fully half as great as eye height (frequently longer);
sculpture of sixth tergum usually more extensive; interstices often
sculptured.

17. Abdomen plump; globular in lateral and dorsal view; indicating only slight
lateral compression; ninth tergum short, broad, and stubby, averaging
.17-.19 mm. in length; marginal and postmarginal veins often equal in length 18
Abdomen oval, showing some lateral compression, ninth tergum variable; marginal vein usually longer than postmarginal 20
18. Abdomen lightly sculptured and limited on sixth to lower half or less; dorsal surface smooth and shiny; sixth segment narrow, averaging about 1½ times the length of the fifth; marginal vein longer than postmarginal 21
Abdomen more or less uniformly reticulated all over; may disappear on dorsoposterior borders of fifth and sixth tergum or cover entire surface; marginal and postmarginal veins most often equal in length; sixth tergum more nearly twice length of fifth 19
19. Propodeum broad but with a narrow, deep, complete median furrow that narrows gradually toward base 22
Propodeum without a median furrow or an indication of one in dorsal one-third only 23
20. Sculpturing on sixth abdominal tergum heavy ventrally and extending over dorsal surface, either covering entire surface or forming a narrow band along anterior margin 21
Sculpturing on sixth tergum reduced to lower half to one-third or less of surface; dorsal surface smooth and shiny 30
21. Sixth tergum completely covered with fine reticulations; heavy ventrally, becoming lighter dorsally; dorsal valves broad for horizontal length. 54. terrea Bugbee
Sixth tergum with closely spaced heavy reticulations ventrally that become lighter dorsally and recede toward anterior margin in the form of a narrow band 22
22. Propodeum with a narrow or wide complete median furrow 23
Propodeum with an incomplete median furrow restricted to upper half or less 26
23. Dorsal valves narrow for horizontal length 24
Dorsal valves broad for horizontal length 25
24. Ninth tergum elongate and pointed, averaging .29 mm. in length (.20-.35); antenna filiform 25
Ninth tergum short and broad, averaging .16 mm. in length (.13-.19); antenna weakly clavate 56. stigmi Ashmead
25. Genitalia averages 2.1 mm. in length and .81 mm. in height; median groove with a median carina complete to base; ocellocarinal line about twice diameter of lateral ocellus 57. sciromatis Bugbee
Genitalia averages 1.5 mm. in length (1.4-1.8) and .75 mm. in height (.62-.87); thus the height is about half the length; stylet arch nearer to horizontal plane than an oblique plane; ocellocarinal line less than twice the diameter of the lateral ocellus 58. tyloidermatis Ashmead
26. Dorsal valves of female genitalia broad for horizontal length 27
Dorsal valves narrow for horizontal length 29
27. Legs with reddish-brown to black infuscation on fore- and hindfemora, rest of legs yellow; dorsal valves of female genitalia broad for horizontal length; marginal and postmarginal most often equal in length, averaging .20 mm. (.25-.35); marginal vein linear 59. gossypii, new species
Legs with black or dark-brown infuscation on femora and tibiae of all legs or lacking on foretibia only; marginal vein broader than postmarginal vein 28
28. Propodeum with an incomplete median furrow; area below furrow and lateral areas finely and evenly punctate. Internal genitalia short; length equal to twice the height; stylet arch in a horizontal plane.

60. *squamosa*, new species

Propodeum with a wide, shallow, complete median furrow that narrows ventrally; furrow crossed by irregular horizontal ridges; lateral areas roughly ridged and punctate. Internal genitalia with length less than twice the height and stylet arch in an oblique plane .

61. *calyceis* Bugbee

29. Size large, averaging 4.5 mm. (3.9–5.2) in length; ninth tergum elongate averaging .28 mm. in length (.25–.32); marginal and postmarginal veins often equal in length 

62. *pini* Bugbee

Size medium, averaging 3.2 mm. (3.0–3.7) in length; ninth tergum averaging .20 mm. (.17–.22) in length; marginal usually longer than postmarginal.

63. *baccae*, new species

30. Ninth abdominal segment short and blunt, averaging less than 0.20 mm. in length (range .10–.19) 

Ninth abdominal segment more elongate and acutely pointed, averaging 0.20 mm. or more in length (range .23–.29)

31. Median furrow of propodeum wide and indicated by lateral carinae in upper one-third to one-half only, or may be absent.

Median furrow complete to base of propodeum and limited laterally by complete lateral carinae

32. Abdomen quite plump, only slight lateral compression; marginal vein longer than postmarginal vein; ninth tergum very short and stubby averaging less than .10 mm. in length.

64. *rholis* Crosby

Abdomen compressed but not extremely so; marginal vein often equal in length to postmarginal; ninth tergum more elongate, averaging .10 mm. or more in length

33. Legs with a black to dark reddish-brown infuscation on all femora and tibiae; coxae usually black

Legs all yellow or black to dark-brown infuscation on hind- and midlegs only; coxae may be yellow or black

34. Color dark brown to black; marginal vein broader than postmarginal; tegula and scape yellow to brown

Color black, marginal vein linear or about same width as postmarginal; tegula and scape most often black or dark brown

35. Marginal and postmarginal veins most often equal in length; antenna filiform; dorsal valves of genitalia narrow for horizontal length and stylet arch in an oblique plane.

65. *levo*, new species

Marginal vein always longer than postmarginal vein; antenna subclavate; dorsal valves broad for horizontal length and stylet arch in a horizontal plane.

66. *crassineura* Ashmead

36. Propodeum with a median furrow that is wide at top but narrows ventrally; lateral and central carinae distinct in upper one-half to three-quarters; first funicle joint narrow and elongate.

67. *parva* Phillips

Propodeum flat and without a median furrow; surface finely punctate; first funicle joint longer than wide but not noticeably thin and elongate.

68. *fuscus*, new species

37. Legs with black or brown infuscation on hindfemora and tibiae and occasionally on midfemora and tibiae; marginal vein stout or broader than postmarginal vein. Ninth tergum short, averaging .15 mm. in length (.12–.17)

69. *iniquus* Bugbee
Legs all yellow often including front and midcoxae; marginal vein linear; ninth abdominal tergum short, averaging .19 mm. in length (.17–.20).

70. flavicurense Bugbee

38. Postmarginal vein averages 70–72% the length of marginal vein; dorsal valves narrow to medium .......................... 39
Postmarginal vein averages 80% or better the length of marginal vein; dorsal valves of female genitalia wide for horizontal length .... 40

39. Marginal vein long, averaging .42 mm. (.35–.45) in length; tegula black.

71. longavera Bugbee
Marginal vein short, averaging .29 mm. (.25–.37) in length; tegula black or dark brown .......................... 72. studiosa Say

40. Ninth abdominal tergum short and blunt, averaging .10–.13 mm. in length (.07–.15) ........................................... 41
Ninth abdominal tergum short, averaging .15 mm. or more in length (.10–.22).

73. spongiosa Bugbee

41. Sixth abdominal tergum about as long as four and five combined; median furrow of propodeum narrows toward base ... 74. obtusa, new species
Sixth abdominal tergum narrow, very little longer than fifth; median furrow with approximately parallel lateral carinae ... 75. imminuta Bugbee

42. Ocellocular line distinctly longer (approximately twice) than diameter of lateral ocellus ........................................ 76. bolteri Riley
Ocellocular line subequal (less than twice; more nearly equal) to diameter of lateral ocellus .......................... 43

43. Dorsal valves of the female genitalia broad for horizontal length; propodeum with a narrow median furrow outlined by lateral carinae to base of propodeum; tegula black .......................................................... 77. spina Bugbee
Dorsal valves of female genitalia narrow for horizontal length and only slight dorsal extension of dorsal and ventral valves; propodeum variable, wide, and shallow without median furrow or incomplete median furrow .................................................. 44

44. Marginal vein broader than postmarginal vein; all veins brown .......................... 45
Marginal vein linear and about same width as postmarginal; veins pale yellow .................................................. 46

45. Sculpturing on lateral surface of sixth tergum limited to lower half or less; dorsal surface smooth and shiny; femora and tibiae with black infuscation.

78. picca, new species
Sculpturing on sixth covers most of lateral surface but may disappear or continue over dorsal surface; femora and tibiae often yellow or with some brown infuscation ........................................ 79. calcarea Bugbee

46. Basic color of legs yellow with varying amounts of black or dark-brown infuscation on middle and hindtibia and femora; marginal vein longer than postmarginal vein .......................... 47
Basic color of legs orange-brown with brown infuscation on hindfemora in some specimens; marginal and postmarginal veins equal in length.

80. apiculae Bugbee

47. Legs yellow except for black or reddish-brown infuscation on hindfemora only; sculpturing on lateral aspect of sixth abdominal tergum limited to lower half .................. 81. mali, new species
Forelegs often yellow or with black infuscation on femora; black infuscation on mid- and hindfemora and tibiae; lateral sculpturing on sixth abdominal tergum usually covers lower half completely and then diminishes toward anterior margin to just below dorsal surface ... 82. diastrophi Walsh

219–931—67—2
1. Eurytoma phloeotribi Ashmead

Map 1

_Eurytoma phloeotribi_ Ashmead, 1894, p. 326.—Peck, 1951, p. 577.

Types: U.S. National Museum, no. 25505; type series consists of 6 females, 1 of which I have labelled and designated as lectotype.

Type locality: Morgantown, W. Va., bred Mar. 23, 1893, by A. D. Hopkins, Acc. no. 6117a, from Mulberry.


Additional locality records and specimens: U.S. National Museum collection (22 females and 11 males).

This species seems to be limited in its parasitism to the Engraver beetles of the family Scolytidae.

_Eurytoma phloeotribi_ with its abdomen extremely compressed laterally, round elongate petiole, and coiled female genitalia might well be separated from _Eurytoma_ as a distinct genus. Since only the one species is known, and there are only a few specimens, it seems best to leave it in _Eurytoma_ until more study material is available.

2. Eurytoma orchidearum (Westwood)


_Eurytoma phoenix_ Girault, 1917, p. 11; 1920, p. 204.—Bugbee, 1956, p. 504.


Type locality: Brazil.

Distribution: Cosmopolitan.

Host: Orchids (_Cattleya_ species).
Remarks: *E. orchidearum* (Westwood) occurs wherever orchids are grown and shipped. It first appeared in the United States in Natick, Mass. in 1889 (Felt, 1916). It is phytophagous in the bulbs, stems, buds, and leaves of many orchid species. An account of its biology is given by Moore (1916). See Bugbee (1956) for taxonomic notes. This species lacks the raised carinae bordering a deep depression on the anterior face of the forecoxae, and the propodeum has a deep median furrow with raised lateral carinae, especially prominent at the base.

3. *Eurytoma mammata*, new species

Figure 10; Map 2

Female: Mostly black. Average length 2.3 mm. (1.8–2.7). Abdomen bluntly oval in lateral view and approximately equal in length to the head and thorax combined; length not including the petiole averages 1.0 mm. (.82–1.2); surface of sixth tergum of the abdomen covered entirely with fine scalelike sculpturing that becomes more delicate over dorsal surface. Ninth tergum short, blunt, and about equal in length to the eighth tergum; averages .07 mm. (.05–.10) in length. Internal genitalia average 1.1 mm. in length; dorsal valves broad for horizontal length and turn dorsally, anteriorly along with ventral valves at less than a right angle; stylet arch close to a horizontal plane; dorsal valves black at distal tip, remainder yellow; distal tip of ventral valves extends only slightly beyond tip of dorsal valves. Petiole longer than wide, and about two-thirds the length of hindcoxae; flattened dorsally and without a median, dorsally produced scale at anterior end. Propodeum broad and shallowly concave; surface finely punctate except dorsally and sometimes a narrow strip down middle that may be irregularly ridged; carina outlining dorsal margin of concavity slanting ventrolaterally and produced into a posteriorly directed, sharp tubercle on each side before it bends ventromediaally; area lateral to carina, including sides of propodeum, punctate. Tegulae yellow. Pronotum flattened dorsally. Eyes, scrobe cavity, and elyptens emarginate. Antenna with yellow scape and pedicle; flagellum brown and six jointed, first segment longer than wide, two to five moniliform. Legs with dark-brown infuscation on femora only, except for midfemora that may lack it; tibiae yellow; forecoxae with an oblique raised carina on anterior face below a deep depression. Wing veins yellow; marginal and postmarginal linear; stigmal vein short; club narrow and rectangular; marginal longer than postmarginal vein, averaging .22 mm. (.20–.25) and .13 mm. (.10–.15) respectively.

Male: Unknown.


Host: Unknown for the type series. Possibly *Stigmu*s species and *Leperisinus aculeatus* (Say).

Distribution: United States: Virginia, New Jersey, Maryland, and Illinois.

Remarks: This species is close to *Eurytoma lycti* Ashmead but can be separated from it by the more extensive sculpturing that covers the dorsal surface of the sixth abdominal tergum, the tubercles on the propodeum, and the lack of any yellow on the head.

4. *Eurytoma lycti* Ashmead

**Map 2**


Types: U.S. National Museum, no. 11869. Type material consists of 1 female which I have labeled and designated as type.

Type locality: Morgantown, W. Va., bred Sept. 10, 1893, by A. D. Hopkins.

Distribution: United States: Virginia, West Virginia, Kansas.

Host: *Lyctus striatus* Melsh in Hickory (Ashmead, 1894).

Remarks: The only host record for this species is *Lyctus striatus* Melsh, nesting in Hickory, cited in the original description by Ashmead (1894). It is probably rather widely distributed as the lone specimen from Riley County, Kansas, suggests.

This species is distinguished by the presence on the propodeum of a very narrow but quite deep median furrow, the absence of a thin scale on the dorsal surface at the anterior end of the petiole, and a raised obtuse tubercle, and the absence of distinct, complete parapsidal grooves on the mesonotum.

5. *Eurytoma dorcaschemae* Ashmead

**Maps 5, 35**


*Eurytoma dorcasemi* Bridwell, 1899, pp. 203-211. [Emendation.]

Types: U.S. National Museum no. 11908. Type series consists of 2 females and 2 males and I have labelled and designated 1 female specimen as lectotype.

Type locality: Riley County, Kans. Marlatt collection, Sept., 718, 719.


Canada: Saskatchewan.

Remarks: This species is similar to E. conica Provancher but differs from it in the yellow legs without dark brown to black infuscation on femora and tibiae.

The two female specimens from White Fox, Saskatchewan, Canada, differ slightly from the type female, but because of the all-yellow legs and only two specimens for comparison, it seems best to include them with E. dorcaschemae.

The scanty host data suggest that the species is parasitic on wood-boring beetles belonging to the families Cerambycidae and Scolytidae.

6. Eurytoma semicircula, new species

Figures 12, 22; Map 3

Female: Black. Averages 4.5 mm. (4.3–4.8) in length. Abdomen averages 2.0 mm. (2.0–2.2) in length; oval in lateral view; sculpturing on lateral aspect of sixth tergum heavy ventrally but extends only to about middle of surface so that dorsal surface is smooth and shiny; sixth tergum longer than three and four combined; ninth tergum short and stubby, averages .15 mm. (.12–.17) in length. Internal genitalia averages 2.0 mm. in length and .50 mm. in height; height equal to one-quarter the length; dorsal valves black and wide for horizontal length; dorsal and ventral valves turn dorsally, anteriorly, only slightly so that stylet arch is in a horizontal plane. Petiole longer than wide and about half the length of the hindcoxa; anterior end of petiole with a flat, rounded, dorsally projecting scale flanked on each side by a bluntly pointed, dorsolaterally, projecting tubercle. Propodeum with a narrow concavity; median furrow dorsally, with one large or two round or slightly oval depressions with shiny surfaces, followed below by a single row of round, shiny-surfaced depressions that may be smaller toward base; lateral areas finely and evenly punctate. Tegula black. Prothorax with two dorsally projecting tubercles on anterior border, one on each side of middorsal line. Median ocellus separated from two lateral ocelli by a raised, curved carina. Compound eyes with a prominent carina along medial margin. Short hairs on face may have a golden tinge. Antennae filiform; joints longer than wide; first funicle joint about twice the length of the pedicle; scape with outer face orange brown. Legs with the coxae black; front coxae with a prominent, flared carina on anterior face running diagonally from the upper, outer margin to medial margin; rest of legs orange brown, except hindfemora which may have some black infuscation medially on outer surfaces. Wing veins straw yellow to light brown in color; linear; marginal averages
.29 mm. (.27–.32) and postmarginal averages .25 mm. (.25–.27) in length.

Male: There are no males in the type series.


Host: Reared from larvae of Leptostylus gibbulosus in fruit of Sapindus drummondii in March 1947.

Distribution: Known only from the type locality in Texas.

Remarks: The new species is close to the E. conica, E. profunda, and E. dorcaschemae group of species. It can be separated from them by the curved carina between the front and the two lateral ocelli, the emarginated eyes, the slightly raised tubercles on the anterior border of the prothorax, and the orange-brown color of the legs and scape.

7. Eurytoma profunda Bugbee, new name

Map 3

Decatoma maculipes Ashmead, 1886, p. 126.

This new name with its redescription is presented for Eurytoma maculipes (Ashmead) 1887 not Eurytoma maculipes Motschulsky 1863.

Female: Black. Average length 3.7 mm. (3.0–4.1); abdomen averages in length 1.8 mm. (1.4–1.9); long sixth segment averages .73 mm. (.62–.80); thus the sixth is about 40% of the length of the abdomen; fine scaling on sixth segment covers lower ½ to ⅔ of lateral surface; heavy ventrally but becomes lighter and recedes toward anterior margin dorsally; dorsal valves (9th tergum) short and stubby; averages .16 mm. in length (.15–.17); abdominal petiole longer than is typical of the genus, averages .12 mm. (.10–.15); prominent dorsally projecting scale or node anteriorly where petiole joins the propodeum; petiole length equal to about one-quarter the length of the hindcoxae which averages .42 mm. in length (.35–.45). Internal genitalia with wide, stout dorsal valves with only slight dorsal curvature anteriorly; ventral valves bend dorsally, anteriorly, but extend only slightly above dorsal valves; stylet arch in a horizontal plane; length of genitalia averages 1.5 mm. (1.6–1.7); height averages .78 mm.; whole structure appears weakly developed with slight dorsal development, anteriorly. Propodeum wide and deeply concave; entire surface may be covered with fine uniform punctations or indication of median furrow that is wide at top but narrows abruptly and disappears in lower half.
Antenna short and stocky; scape yellow; flagellum including pedicel averages 1.0 mm. in length; first segment longer than wide; two to five becoming progressively shorter until four and five are approximately square; segments not moniliform but sharply truncate at distal ends; slightly swollen terminal unit composed of three closely fused segments; legs with the coxae black; dark brown to black on all femora; knees yellow; foretibiae may be yellowish brown or show dark-brown infuscation medially; dark brown to black infuscation on mid- and hindtibiae medially; forecoxae with a pronounced, semicircular, horizontal, carinated ridge about middle of anterior face in contrast to the usual shallow, rounded oblique depression characteristic of most species of the genus. Wing veins light yellow and thin; marginal vein averages .35 mm. in length (.30-.37) and postmarginal .24 mm. (.22–.25).

Male: Average length 3.3 mm. (3.2–3.4). Scape of antenna black; first 4 segments of flagellum, pedicellate distally, dorsally raised, and center slightly constricted; fifth segment not pedicellate distally but separated from terminal segments by a deep annulation; pointed terminal unit composed of two closely fused segments. Legs with black to dark brown on all femora and tibiae; knees yellowish brown. Marginal and postmarginal veins linear; marginal averages .33 mm. (.30–.35) in length and shorter postmarginal .23 mm. (.20–.27).

Types: Holotype female in the U.S. National Museum, no. 25506, Washington, D.C.

Type locality: Holotype locality, Jacksonville, Fla., bred April 1885.

Hosts: Specimens were bred from *Iva ciliata*, *Ambrosia trifida*, and *Solanum rostratum* stems. No insect host species stated. Holotype female from gall of *Dryorhizoxenus floridanus* Ashmead (Ashmead, 1886).

Distribution: Known so far only from central and southern Texas and Jacksonville, Fla.

Remarks: The redescription was based on the holotype female and the specimens listed above. The prominent raised almost horizontal carinated ridge on the forecoxae, the elongate petiole, the wide and shallow propodeum with the surface finely punctate, and the very long sixth abdominal segment make this species easily recognizable.

The host of this species was not given for any of the specimens in the series listed above. However, parasites determined as *Eurytoma tylodermatis* are recorded from weevil larvae (*Trichobaris texana*) in the stems of *Solanum rostratum* (Pierce 1908a, and Pierce, Cushman, and Hood, 1912), (*Lixus scrobicollis*) in *Ambrosia trifida* (ibid, and Pierce 1908b), and (*Trichobaris trinotata*) from stems of *Solanum*.
carolinense (Chittenden, 1911). It is possible that one or more of the aforementioned weevils might serve as host for this species.

Dalla Torre (1898, p. 329) proposed the name *Eurytoma maculitarsis* for *Eurytoma maculipes* of Motschulsky when it should have been proposed for Ashmead’s species. Since Dalla Torre did not accompany his proposal with a description and Motschulsky’s species is still good, *Eurytoma maculitarsis* of Dalla Torre is a nomen nudum. *Decatoma* (=*Eurytoma*) *maculipes* (Ashmead, 1886 and 1887) is preoccupied by *E. maculipes* of Motschulsky 1863.

I have hesitated to propose a new name for *E. maculipes* of Ashmead 1887, since I have not seen the type material of *E. maculipes* of Motschulsky 1863. However, since the species described by Motschulsky came from Ceylon and the species of Ashmead came from Florida, the chances of the two being the same are very remote; therefore, the new name is proposed for Ashmead’s species.

8. *Eurytoma conica* Provancher

*Figure 9; Map 3*


*Eurytoma abnorme* Hoffmann, 1942, p. 19.

*Eurytoma abnormis* Bugbee, 1956, p. 504.

*Eurytoma phloeosini* Ashmead, 1894, p. 327.—Bugbee, 1956, p. 504.

Types: Department of Agriculture, Ottawa, Canada: 1 female lectotype (see Bugbee, 1956).

Type locality: Ottawa, Canada.


Remarks: *Eurytoma conica* can be easily confused with *E. dorcaschemae*. The most consistent difference between the two is the presence in the former species of deep brown to black infuscation on all femora and tibiae in contrast to the all-yellow legs in the latter.

The hosts of this species are chiefly members of the family Scolytidae. For notes on synonymy, see Bugbee (1956).
9. Eurytoma magdalidis Ashmead


Types: U.S. National Museum no. 11868; type series consists of 2 females, 1 of which, with the accession number 60586, I have labelled and designated lectotype.

Type locality: Morgantown, W. Va., bred by A. D. Hopkins, Acc. no. 6058b.


Remarks: *E. magdalidis* Ashmead with its dark legs, rounded, narrow propodeum, long sixth abdominal segment, and generally smaller dimensions seems to be distinct from the preceding species. Its hosts belong to families of beetles whose larvae bore in plant tissue.

10. Eurytoma inornata Bugbee


Type locality: Plummer’s Island, Md.

Host: Believed to be *Euphilis rufigaster* (Packard), nesting in hibiscus stems.

Distribution: Maryland.

Additional specimens: Plummer’s Island, Md., collected July 22, 1962, by K. V. Krombein, 1 female; collected near Plummer’s Island, Md., Sept. 9, 1962, by K. V. Krombein and bred from cocoon of *Euphilis* sp., 1 female; Plummer’s Island, Md., collected Sept. 10, 1962, by K. V. Krombein and bred from cocoon of *Trypoxylon* species, 1 female.

Remarks: See Bugbee 1962.
11. *Eurytoma minnesotae* Girault

**Map 4**


Types: U.S. National Museum, no. 20322, 5 females and 2 males.

Type locality: Olmsted, Minn., reared from Quack grass, 1906, Ainslie collection.

Distribution: United States: Minnesota.

Host: *Agropyron* (Quackgrass sp.) (Girault, 1916).

Remarks: Additional specimens of *E. minnesotae* were not found in any of the collections examined. It seems to be a valid species, however, as the elongate petiole will separate it from any of the other species bred from Quackgrass, such as *E. pachyneuron* Girault. The small size, absence of a flared carina on the anterior surface of the front coxae, and the rounded narrow propodeum with a narrow and deep, complete, median furrow, will also help to distinguish *E. minnesotae*.

12. *Eurytoma illinoisensis* Girault

**Map 5**


Types: U.S. National Museum, no. 20629, 2 females.

Type locality: Urbana, Ill. Reared in connection with *Isosoma* = (Harmolita).


Remarks: The material included under *E. illinoisensis* Girault is a mixture of what may be more than one species. Unfortunately, good representative series from more than one locality were not encountered in this study. One or two specimens, often without host data, from a few scattered localities, are not enough to give an adequate picture of the variation of a species.

The rectangular-shaped abdomen with the narrow sixth abdominal tergum that is about equal in length to the fifth, the rounded propodeum with a deep and narrow concavity, and the obviously clavate, elongate antennae are characteristics of this species.

13. *Eurytoma sphaera*, new species

**Figure 17; Map 6**

Female: Black. Average length 2.9 mm. (2.6–3.2). Abdomen plump, globular, or approximately round in outline from a lateral
view; averages 1.3 mm. (1.2–1.5) in length; sculpturing heavy on lateral surface of sixth, but disappears dorsally; segment six from a dorsal view as long or longer than segments five and six combined; ninth tergum short and stubby, averaging .09 mm. (.07–.12) in length with a small oval cercus on each side. Internal genitalia with broad dorsal valves for horizontal length and very little dorsal extension anteriorly; arch of the stylets in a horizontal to an oblique plane; length of genitalia averages 1.3 mm. (1.1–1.5) and height averages .88 mm. (.72–1.1); length thus about 1.7 times the height. Petiole elongate; less than half the length of hindcoxa; a prominent pointed scale on dorsal anterior surface, a small lateral projecting tubercle on each side. Tegula yellow to dark brown. Propodeum with a shallow concavity with a distinct median furrow demarked by lateral carinae complete to base and a central carina for three-quarters of length; furrow narrows toward base; lateral areas finely punctate ventrally and irregularly ridged dorsally. Antenna filiform; scape yellowish brown; flagellum six segmented; joints longer than wide but becoming progressively less so from base to tip; last segment consisting of three closely fused units. Fine striae on face converging on clypeus from below eyes and base of antennae. Legs may be all yellowish brown or black smudge on middle of outer face of front femora and tibiae; black infuscation encircling mid- and hindfemora and tibiae; front coxae may be yellow or all black. Wing veins yellowish brown to brown; marginal stout and broad but not heavily chitinized; postmarginal short, stout, and truncate at outer end; marginal averages .30 mm. (.25–.35) and postmarginal averages .20 mm. (.17–.25); marginal vein always longer than postmarginal by about .10 mm.; stigmal vein short; club large and almost square.

Males: Black. Average length, 2.9 mm. (2.2–3.3). Scape of antenna yellowish brown or upper one-third black and rest yellowish brown. Legs all yellowish brown or hindfemora and sometimes hind-tibiae may have a brown to black smudge medially on outer surface; front coxae as in the female; midcoxae may be all yellow. Wing veins yellowish brown to dark brown. Marginal averages .29 mm. (.27–.35) and postmarginal averages .19 mm. (.15–.22).


Host: Disholcaspis spongiosa (Karsch) and D. quercus-globulus (Fitch) on Quercus stellata, Kinsey collected and determined.

Distribution: Southern Ohio and Illinois, south to the Gulf of Mexico; east to the Atlantic coast and west to eastern Texas and Missouri. This species seems to follow the coastal plain, extending
northward through the Mississippi River Valley and then spreading eastward and westward by way of its main tributaries, such as the Tennessee, Ohio, and Missouri. This suggests that the species may be found also even farther north, wherever its hosts occur.

Remarks: *E. sphaera* and *E. obtusiloba* Ashmead are closely related but *E. sphaera* has a longer petiole, averaging about half the length of the hindcoxae, in contrast to *E. obtusiloba* where the petiole averages nearer one-fourth the length of the hindcoxae. In addition, the marginal vein is broader, and also longer in relation to the postmarginal; the stigmal club is larger than in *E. obtusiloba*. *E. sphaera* also has a wider and not as deep a median furrow on the propodeum. *E. sphaera* has been bred from cynipid galls belonging to the genus *Disholcaspis* on oak only, while *E. obtusiloba* is restricted to the genus *Diplolepis* on rose.

### 14. *Eurytoma obtusiloba* Ashmead

**Map 6**


Types: U.S. National Museum, no. 25504; type series consists of 3 females and 1 male of which I have labelled 1 female specimen as lectotype.

Type locality: Jacksonville, Fla.

Distribution: United States: Probably all of North America (Bugbee, 1951).

Hosts: Undetermined cynipid gall on *Quercus obtusiloba* (Ashmead, 1885). *Diplolepis radicem* (Osten Sacken) on *Rosa palustris* and *R. carolina* (Bugbee, 1951).

Remarks: This species is closely related to *E. sphaera*. For distinguishing characteristics, see remarks under the latter species.

### Group B. Brevipetiolata

### Complex I. Bicolor

### 15. *Eurytoma semivenae* Bugbee

**Map 7**


Types: 5 females and 8 males; holotype female, allotype male and 3 paratypes in the U.S. National Museum (USNM 66035); paratypes in University of Texas and Cornell University.

Type locality: Palo Duro Canyon, Tex.

Host: *Pachypsylla vesicula* (Riley) on *Celtis reticulata*, *C. occidentalis* and *C. mississippensis* and *P. mamma* (Riley) on *C. occidentalis*.

Remarks: Additional characteristics that will help to separate this species from the succeeding one are the presence of only two tubercles on the proximal end of the fulcral plate; the shorter ninth tergum that averages .14 mm. (.10-.17) in length, and the yellow color of the horizontal length of the dorsal valves.

16. *Eurytoma flavovultus* Bugbee

**Map 8**

*Eurytoma flavovultus* Bugbee, 1957, pp. 45-47.

Types: 64 females and 25 males; holotype female, allotype male in the U.S. National Museum (USNM 66038); paratypes in the U.S. National Museum, University of Texas, and Cornell University.

Type locality: Austin, Tex.

Distribution: United States: Texas.

Host: *Pachypsylla venusta* Osten Sacken on *Celtis reticulata*.

Remarks: In addition to the characteristics listed in the key, the longer ninth tergum averaging .22 mm. (.20-.25), the black horizontal length of the dorsal valves, and the presence of three tubercles on the proximal end of the fulcral plate, will help to distinguish this species.

17. *Eurytoma bicolor* Walsh

**Map 7**


Type locality: Probably from the vicinity of Rock Island, Ill. where Walsh did much of his collecting. Neotypes: Bloomington, Ind.


Remarks: Some of the hosts listed for *E. bicolor* seem very doubtful, especially *Sphex harrisi* (Fernald) and *Scolytus rugulosus* (Ratzeburg). The hosts most commonly stated belong to the genus *Aulacidea* that produce galls on several species of *Lactuca*. *E. bicolor* is quite variable,
but the presence of yellow to yellow brown on the lower half of the frons, around the compound eyes, and the anterior lateral edges of the pronotum is quite consistent.

18. *Eurytoma lutea*, new species

**Map 8**

Female: Mostly brown to orange yellow. Average length 3.3 mm. (3.0–3.9). Abdomen oval from a lateral view; medium amount of lateral compression; deep brown in color except for yellow venter anteriorly; sculpturing on lateral aspect of sixth tergum limited to lower half; ninth tergum in line with horizontal axis of abdomen and averages .21 mm. (20–25) in length. Internal genitalia average 1.6 mm. in length and 1.0 mm. in height, thus the height is more than half the length; dorsal valves black and narrow for horizontal length; turn dorsally, anteriorly, with ventral valves at right angles; stylet arch in an oblique plane. Propodeum with a complete median furrow that occupies most of the wide, shallow concavity; lateral carinae complete to base and central carina in upper half only; lateral areas narrow with fine irregular ridges covering surface. Tegula yellow. Two small spots on dorsum and lateral surfaces of pronotum yellow; rest of thorax brown above and yellow laterally. Head yellow except brown vertex. Antenna with yellow scape and flagellum; clavate; all funicle joints longer than wide; terminal three joints fused together to form a slightly enlarged club. Legs including coxae orange yellow, except brownish infuscation medially on hindfemora and tibiae, and occasionally on midtibiae. Wing veins linear and pale yellow; marginal vein averages .29 mm. (25–35) and postmarginal averages .21 mm. (20–22) in length.

Male: Averages 2.9 mm. (2.7–3.1) in length. Mostly yellow except for black area on vertex around ocelli; black to dark-brown dorsum of thorax. Abdomen and petiole dark brown. Wing veins yellow. Antenna with yellow scape and brown flagellum; funicle consists of five longer than wide pedicellate segments; the sixth segment not pedicellate distally but separated from terminal unit by a distinct annulation.


Type locality: Monroe, Mich. L. C. Jones collector.


Host: From Elecampane (*Inula helenium* Linnaeus).

Remarks: No clear host relationship was discernible from the data on the labels, other than that the species was bred from Elecampane.
It might be phytophagous or parasitic on some gallmaker or borer.
The new species seems most closely related to *E. juniperinus* Marcovitch. The two can be separated, however, by the characteristics contained in the key.

19. *Eurytoma juniperinus* Marcovitch

**Map 8**


Types: Paratypes or cotypes in alcohol at Cornell University.

Type locality: Ithaca, N.Y.


Host: Phytophagous in the fleshy part of fruits of *Juniperus virginiana* (Marcovitch, 1915).

Remarks: The broad marginal vein in relation to the linear post-marginal and the weakly clavate antennae are additional characteristics to look for in this species.

Complex II. Pachyneuron

20. *Eurytoma bromi* (Howard)

**Map 9**

*Isosoma bromi* Howard, 1896, p. 11.

*Hannolita bromi* Gahan, 1922, p. 43.—Peck, 1951, p. 569.

*Eurytoma bromi* Bugbee, 1956, p. 505.—Burks, 1958, p. 80.

Types: U.S. National Museum, no. 2745, 2 females and 1 male.

Type locality: Los Angeles, Calif.

Distribution: United States: California, New York, Ohio.


Remarks: The weakly clavate antennae with a narrow and elongate first segment of the flagellum and the presence of the reddish-brown hindcoxae and sometimes midcoxae are additional characteristics of this species.

21. *Eurytoma pachyneuron* Girault

**Figure 6; Map 10**


Type locality: Glendale, Calif., collected in 1914 by T. D. Urbahns, Webster no. 11214.

Distribution: United States: Northern United States from coast to coast. Canada: Alberta, Quebec.


Remarks: See Bugbee (1956) for notes on synonymy of this species. The most likely hosts of *E. pachyneuron* appear to be species of *Harmolita* on *Elymus* species. The record from *Scolytus rugulosus* (Ratzeburg) seems doubtful. The reference to *Phytophaga destructor* (Say), although doubtful, might be possible, since Phillips (1917) showed that *E. pater* = *E. pachyneuron* may be parasitic on *Harmolita* larvae in the early stages of its larval development but can finish its late larval growth as a plant feeder. In its earlier stages, it might destroy Hessian fly larvae as well as *Harmolita*.

In the collections of the U.S. National Museum, Department of Agriculture, Ottawa, Canada and Cornell University are numerous long series of *E. pachyneuron*. In the majority of cases, the host plant is cited as a species of *Elymus*, but the insect host was determined in one or two cases only. In the Cornell University collection is a long series from Quackgrass (*Agropyron repens*) but without any insect host designation. *Harmolita* species do occur in this grass and therefore could serve as hosts.

This is a variable species as pointed out in the article by Bugbee (loc. cit.). Leg color which was used to separate *E. pachyneuron*, *E. pater*, and *E. phoebus* proved unreliable, and since the three species were alike in all other characteristics, the latter two were placed in synonymy with *E. pachyneuron*.

The wide postmarginal vein in relation to the linear marginal vein, the clavate antennae, the weakly developed female genitalia with the wide dorsal valves and stylet arch in a horizontal plane, added to the characteristics mentioned in the key, will help to distinguish this species.
22. *Eurytoma eragrostidis* (Howard)

**Map 8**


**Types:** Female holotype no. 2754, U.S. National Museum, Washington, D.C.

**Type locality:** Lafayette, Ind.

**Distribution:** United States: Indiana, Illinois.

**Host:** Reared from *Eragrostis poaeoides* by F. M. Webster in September 1885 and March 1886 (Howard, 1896). *Agrostis alba* (Peck, 1951).

**Remarks:** This species was shifted to *Eurytoma* from *Eurytomocharis* by Peck (1951). It shows some affinities with *E. pachyneuron* and *E. neomexicana* in possessing a deep, narrow, complete median furrow on the propodeum, and in the lack of lateral compression of the triangular-shaped abdomen as viewed in cross section. Distinguishing features include: reduced umbilicate punctures on the thorax; rounded propodeum without lateral areas; very scanty, if any, sculpturing on the ventrolateral surface of the sixth tergum and the all-yellow legs and coxae.

23. *Eurytoma neomexicana* Girault

**Map 9**


**Types:** 3 females and 1 male, no. 20627, U.S. National Museum, Washington, D.C.

**Type locality:** Koebele, N. Mex.

**Distribution:** United States: New Mexico, Kansas, Nevada, Colorado. Canada: Saskatchewan, Quebec.

**Host:** Reared in connection with *Isosoma* (Girault, 1920). *Sideranthus spinulosus* (Brandhorst, 1943).

**Remarks:** Brandhorst (1943) remarks that "Most every seed of the plant (*S. spinulosus*) has been destroyed by this phytophagous eurytomid."

The reduction in the prominence of the umbilicate punctures on the head and thorax, the deep reddish-brown color, the noticeably clavate antenna, the broad dorsal valves of the female genitalia, and the short first segment of the flagellum that is approximately equal to the pedicle from a dorsal view may be added to the characteristics mentioned in the key.

219–931—67—3
Complex III. Gigantea

24. Eurytoma californica Ashmead

Map 11

_Eurytoma californica_ Ashmead, 1887, p. 195.—Peck, 1951, p. 575.

Types: U.S. National Museum, no. 25509; type series consists of 4 females and 2 males of which I have labelled and designated 1 female as lectotype.

Type locality: Los Angeles, Calif.


Remarks: _Eurytoma californica_ Ashmead is closest to _E. auriceps_ and seems to be the west coast equivalent of the latter species. There is a question as to whether it should be considered as a species distinct from _E. auriceps_. If additional material was available from Oregon and Washington as well as east of the Sierras, _E. auriceps_ and _E. californica_ might grade into each other. The material from Seattle, Washington runs smaller and some of the specimens lack the black splotches on the femora and the tibiae of the legs which are more typical of _E. auriceps_.

The presence of black infuscation on the legs of most specimens, shallow propodeum occupied by the wide median furrow, the heavier, stouter marginal vein, and the heavier, more extensive sculpturing on the sixth abdominal segment can be used to distinguish _E. californica_ from _E. auriceps_.

25. Eurytoma gigantea Walsh

Figure 7; Map 11


Types: 2 females captured at large (Walsh, 1870). The two original specimens have been lost. Neotypes: Neotype female emerged June 10, 1934 from a gall of _Eurosta solidaginis_, collected on Nov. 28, 1933 on _Solidago_, Bugbee collected and determined. Paratype series

Neotype locality: Bloomington, Ind.


Host: *Eurosta solidaginis* Fitch in Goldenrod.

Remarks: *Eurytoma gigantea* is one of the largest species of the genus found in the United States and is always well represented in most chalcid collections. Its host relationships, an external parasite of the trypetid fly, *Eurosta solidaginis*, have been well documented.

26. *Eurytoma querci-globuli* (Fitch)


*Eurytoma punctiventris* Walsh, 1870, p. 299.

Type: U.S. National Museum, no. 1829, holotype female.


Remarks: See Bugbee (1958) for taxonomic, and distributional notes. The color of the abdomen in this species may vary from all black to entirely reddish brown or show varying combinations in between. The yellow scape and legs with occasionally black infuscation on the hindfemora only, will distinguish this species from *Eurytoma gigantea*. 
27. Eurytoma solenozopheriae Ashmead

Map 13


Neotypes: 18 females and 15 males, collected May 1, 1949, by O. Peck from gall of Hemadas nubilipennis. Neotype female and neoparatypes in the collection of the Department of Agriculture, Ottawa, Canada. Neoparatypes in the Bugbee collection, Allegheny College, Meadville, Pa. Ashmead (1887) states that the species was described from specimens from Toronto, Canada, sent to him by William Brodie. The types seem to have been lost.

Neotype locality: Marmora, Ontario, Canada.


Host: Hemadas nubilipennis (Ashmead), gallmaker on blueberry, Vaccinium corymbosum, and V. pennsylvanicum (Driggers, 1927).

Remarks: Ashmead (1887) implies in his remarks following the description of E. solenozopheriae that the host gallmaker on blueberry was the cynipid Solenozopheria (= Loxaulus) vaccinii (Ashmead). Driggers (1927) demonstrated that the true gallmaker was a chalcid, Hemadas nubilipennis (Ashmead), and that he was unable to breed a single female specimen of S. vaccinii from the galls. It was discovered later that the single female specimen that Ashmead had was bred from a gall on oak rather than Vaccinium.

The yellow scape, tegula, and legs including the fore- and midcoxae and the deeper reddish-brown hindcoxa; the reddish-brown abdomen; the very narrow dorsal valves of the female genitalia that bend sharply dorsally, anteriorly, then posteriorly with the ventral valves, forming an arc of 180°, and the vertical plane of the stylet arch, are additional characteristics of this species.

28. Eurytoma furva Bugbee

Map 13

Eurytoma furva Bugbee, 1958a, p. 198.

Types: 11 females and 9 males; holotype female in the U.S. National Museum (USNM 66031); paratypes in the Bugbee collection, Allegheny College, Meadville, Pa., and in the U.S. National Museum.

Type locality: Napa, Calif.

Distribution: Known only from the type locality.

Host: Disholcaspis washingtonensis (Gillette) on Quercus douglasii.

Remarks: This species differs from Eurytoma quasi-globuli in the longer sixth abdominal tergum, the reduction of the sculpturing to
the lower half or two-thirds of the lateral surface of the sixth tergum, and in the deeper reddish-brown color of the abdomen and tegulae.

29. *Eurytoma pissodis* Girault

*Figures 1-5; Map 14*


Types: 1 holotype female, no. 20969, 2 paratype females, and 1 male paratype, in the U.S. National Museum, Washington, D.C.

Type locality: Minnesota.


Host: *Pissodes strobi* (Peck) (white pine weevil).

Remarks: Additional characteristics that will help to distinguish this species include the heavy sculpturing on the sixth tergum of the abdomen that covers the dorsal as well as the lateral surface, the yellow legs including the fore- and midcoxae, and the elongate ninth tergum.

30. *Eurytoma clerii* Ashmead

*Map 15*


Types: 1 female, no. 11206, in the U.S. National Museum, Washington, D.C. is the only type material of this species known, so I have designated it as the type.

Type locality: Morgantown, W. Va.

Distribution: United States: Virginia, North Carolina, New York, New Mexico, California, Montana.


Remarks: The greatly elongated ninth tergum averaging .42 mm. (.30–.54) and the narrow dorsal valves of the female genitalia in conjunction with the characteristics noted in the key make this species quite distinct.

31. *Eurytoma flavicrus*, new species

*Figures 19, 29; Map 15*

Female: Head and thorax black; abdomen black changing to reddish brown ventrally; antenna, tegula, legs including coxae yellow; occa-
sionally slight brownish infuscation on hindfemora and some black on forecoxae. Average 2.9 mm. (2.4–3.2) in length. Abdomen longer than head and thorax combined; averaging 1.9 mm. (1.4–2.1) in length; laterally compressed so that greatest width in cross section is in upper third; sixth segment as long as three, four, and five combined; its lateral surface heavily sculptured for lower three-quarters but dorsal surface smooth and shiny; ninth tergum long and pointed; averaging .35 mm. (.25–.40) in length; cercus about middle of length. Internal genitalia averages 2.1 mm. (2.0–2.2) in length and 1.2 mm. (1.1–1.3) in height; ventral and dorsal valves turn dorsally, anteriorly at approximately a right angle; broadened dorsal extension of ventral valves measures .25 mm. at widest part; dorsal valves narrow for horizontal length and yellow in color except for exposed black tip; stylet arch in an oblique plane; length of genitalia averages slightly longer than abdomen because of elongate ninth tergum. Propodeum with a wide concavity marked laterally by lateral carinae that may be complete to base or fade out in lower third; center of concavity finely punctate and with two or three short, incomplete carinae extending toward center from lateral carinae; lateral areas narrow and present in upper half only. Lateral ocelli large and approximately equal in diameter to length of ocellocular line. Antenna with seven segmented flagellum, first five segments longer than wide, truncate, moniliform; sixth separated from terminal unit of two closely fused segments by a distinct annulation. Wing veins light yellow, linear; postmarginal vein short, averaging .12 mm. (.10–.15); marginal vein averaging .35 mm. (.25–.40) or approximately three times the length of the postmarginal.

Male: Length 2.3 mm. Color much as in the female; may be black infuscation on hindfemora and hindcoxae; rest of legs yellow. Antenna with four longer than wide, pedicellate segments; fifth segment without pedicle but separated from six by an annulation; seven and eight closely fused; two whorls of long hairs on two, three, and four. Marginal and postmarginal veins with same relationships as in the female.


Type locality: Clemson, S.C., May 14, 1951, W. Mason.

Distribution: Known only from the type locality.

Host: From gall on *Nyssa sylvatica*. Host gallmaker not stated.

Remarks: This species seems most closely related to *Eurytoma contractura*, new species, *E. discordans*, and *E. acuta*. They all have
an elongated abdomen with considerable lateral compression and an elongated ninth tergum. The dorsal valves of the genitalia are narrow for their horizontal length. The yellow legs, tegula, antenna, the very short postmarginal vein in relation to the long marginal, and the four pedicellate segments of the male antenna instead of five, will distinguish this new species from those mentioned above.

32. *Eurytoma contractura*, new species

*Figures 13, 31; Map 15*

**Female:** Black except for tarsi and extremities of femora and tibiae. Average 3.0 mm. (2.4–3.4) in length. Abdomen averages 1.7 mm. (1.6–1.8) in length; longer than head and thorax combined and laterally compressed; sixth segment longer than two and three combined, or about a third length of abdomen; densely sculptured on lower half; sparse, silvery pile on segments seven and eight. Ninth tergum long and pointed, averaging .22 mm. (.20–.25) in length. Internal genitalia averages 1.7 mm. (1.6–1.8) in length and 1.1 mm. (1.0–1.2) in height; dorsal and ventral valves turn dorsally, anteriorly at a right angle; stylet arch in an oblique plane; dorsal valves entirely black and narrow for horizontal length but expand, after turning dorsally, into a broader plate; ventral valves expand dorsally into a broad plate averaging .20 mm. at widest part. Propodeum with a wide concavity that is practically all median furrow; lateral areas absent; surface with irregular, horizontal ridges; lateral carinae in upper half to two-thirds. Tegula black. Umbilicate punctures on pro- and mesothorax very shallow and widely spaced with shagreened surfaces between; punctations fade into a shagreened area on anterior third of mesothorax. Antenna with the scape black; flagellum with five longer than wide truncate segments; first segment about twice as long as wide; sixth separated from seventh by a deep annulation and slightly swollen so that antenna appears weakly clavate. Legs with coxae black and black to dark-brown infuscation on all femora and tibiae. Wing veins yellow and linear; marginal vein averages .25 mm. or about 1.3 times the length of the postmarginal that averages .19 mm. (.17–.20).

**Male:** Color as in the female. Averages 1.8 mm. (1.4–2.1) in length. Antenna with five longer than wide pedicellate segments; last two closely fused. Wing vein relationships as in the female except both veins shorter; marginal averages .21 mm. and postmarginal .16 mm. in length.

**Types:** 6 females and 6 males. Holotype female and allotype in the collection of the Department of Agriculture, Ottawa, Canada. Paratypes in the Bugbee collection, Allegheny College, Meadville, Pa.

Type locality: Marmora, Ontario, Canada, May 4, 1949, O. Peck.
Distribution: Known only from the type locality.
Host: Melanagromyza schineeri (Giraud).

Remarks: Eurytoma contractura is close to E. flavicrus, the preceding new species, in the similarly shaped, elongated abdomen, configuration of the female genitalia, and the elongated ninth tergum. The former differs, however, in the black tegula and legs, the shorter postmarginal vein in relation to the marginal, and in the male antenna that has five pedicellate segments instead of only four.

33. Eurytoma discordans Bugbee

**Map 16**


Type locality: Howe, Ind., galls, collected on Dec. 20, 1930.

Host: *Diplolepis globuloides* (Beutenmuller) = *(D. variabilis* (Bassett)) on *Rosa* species, *Periclistus pirata* (Osten-Sacken) and *Synophromorpha* = *(Periclistus) sylvestris* (Osten-Sacken).

Remarks: The host of this species is believed to be an inquilale, *Periclistus sylvestris* (Osten-Sacken), that modifies the host gall, *D. globuloides* (Beutenmuller), described by Beutenmuller in 1892 from the gall only. The true gallmaker has been determined as *Diplolepis variabilis* (Bassett), and so *D. globuloides* (Beutenmuller) is placed as a synonym of *D. variabilis* (Bassett) in Hymenoptera of America North of Mexico (1951). *Eurytoma discordans* differs from *E. acuta* in the color of the scape (all yellow or upper extremity black only), the pale yellow color of the wing veins, narrow stigmatic club and marginal vein, and the presence of a wide median furrow on the propodeum that maintains same width from top to bottom.

34. Eurytoma acuta Bugbee

**Map 16**

Eurytoma acuta Bugbee, 1951, pp. 225-228.—Burks, 1958, p. 80.


Type locality: Price, Utah.

Host: *Diplolepis tuberculatrix* *xerophila* Kinsey and Ayres on *Rosa* species, *Diplolepis arefsecta* (Gillette).

Subspecies: The following subspecies are included under *Eurytoma acuta*. The descriptions will be found in Bugbee, 1951, Ann. Ent. Soc. Amer. vol. 44, pp. 213-260.


Types: U.S. National Museum (USNM 61222).

Remarks: *E. acuta* is a close western relative of the eastern *E. discordans*. It can be distinguished from the latter, however, by the scape that may be all black or upper half black and lower half yellowish brown, the darker brown color of the wing veins, broader marginal vein, almost square stigmal club, the wide median furrow on the propodeum that narrows ventrally, and the black infuscation that usually occurs on all of the legs.

**Complex IV. Tylodermatis**

**35. Eurytoma prunicola Walsh**

*Eurytoma prunicola* Walsh, 1870, p. 298.—Peck, 1951, p. 578.

*Eurytoma prunicola globulicola* Walsh, 1870, p. 299.

Female: Reddish brown to black. Medium-sized species averaging 3.3 mm. (3.0–3.7) in length. Abdomen averages 1.6 mm. (1.5–1.7) in length; oval from a lateral view; laterally compressed but not extremely so; most often reddish brown in color with some black infuscation on dorsal surface of segments three through five and often on posterior half of ninth tergum; less often black may be more extensive but sixth segment usually reddish brown; longer than four and five combined and heavily sculptured on lower lateral surface; dorsal surface smooth; ninth tergum and ventral valves project upward at considerably less than a right angle in relation to horizontal axis of the abdomen; ninth tergum mediumly elongate, sloping and
somewhat blunt, averaging .19 mm. (.15–.25) in length. Internal genitalia with the dorsal valves very narrow for horizontal length and black to light reddish brown in color; dorsal and ventral valves turn dorsally, anteriorly, at approximately a right angle; ventral valves curve dorsally and then slightly posteriorly so that stylet arch and fuleral plate are in a vertical plane; whole structure averages 1.6 mm. (1.2–1.9) in length and 1.0 mm. (.87–1.1) in height; height averages about 64% of the length. Thorax with the tegula yellow or yellowish brown; most often some deep reddish-brown coloration on dorsal and lateral surface of the pronotum; less often dorsal thorax black, or reddish brown extensive on both dorsal and lateral surfaces. Propodeum narrowly concave; shallow concavity occupied almost entirely by the median furrow that may be delimited laterally by distinct, irregular carinae, or lateral carinae may lose identity in lower half; median carina more or less complete to base dividing furrow into small irregular rectangles, largest at top, smallest toward base; median carinae may separate deep rectangular depression below base of median furrow into two foveae; lateral areas narrow and irregularly ridged and pitted. Head most often black, occasionally deep reddish brown frons; fine striae on face converging on the clypeus. Antenna with the scape yellow; flagellum appears six jointed; segments longer than wide. Legs yellow including coxae. Wing veins yellow; marginal mediumly broad and stout and averages .32 mm. (.32–.37) in length; postmarginal linear, short, and averages .15 mm. (.15–.17) in length; thus the marginal is quite often twice the length of the postmarginal; stigmal vein short and club deeply rounded so that it appears almost square.

Male: Black or mostly reddish brown. Averages 2.6 mm. (2.3–3.0) in length. Thorax and abdomen most often black, or reddish-brown tinge to lateral pronotum and occasionally to dorsal pronotum and lower, lateral meso- and metanotum; may be a deep reddish-brown splotch on the lateral aspect of sixth abdominal segment. Head often black, or it may have a reddish-brown frons. Petiole longer than hindcoxa by about 1½ times; most often black but may be reddish brown. Legs and all coxae yellow or hindcoxae may be black to dark reddish brown. Tegula yellow. Antenna with the scape yellow; flagellum appears 7-segmented. Wing veins with same relationships as in the female.

Types: U.S. National Museum, no. 1531, 1 female and 4 males, labelled by A. Bolter, 1890.

Type locality: No locality is given for the types but Walsh described many of his species from material collected in the vicinity of Rock Island, Ill. Lacking any specific evidence otherwise, it seems
safe to assume that the type material of this species may have come from the same area.

Distribution: United States: Kansas, southern Illinois and Indiana to Maryland, south to South Carolina and Mississippi, and west to Texas.

Host: Walsh (1870) lists his specimens as having been bred "from the Cynipidous oak-gall Q. prunus, Walsh," which appears to be Amphibolips prunus (Walsh) that occurs on various Red Oak species. A. gainsei Bassett and Callirhytis seminator (Harris).

Remarks: There does not seem to be any basis by which E. prunicola globulicola Walsh can be distinguished from E. prunicola Walsh. The considerable variation in the reddish-brown coloration of the specimens examined, on which the redescription is based, ranges from abdomens that are all black, except the long sixth segment, to those that are all reddish brown, except for some black infuscation on the dorsal surface of segments three to five. Walsh distinguishes E. p. globulicola from E. prunicola because of the former’s reddish-brown (rufous) abdomen.

E. prunicola appears to be closest to E. querci-globuli. The reddish-brown coloration is much the same, and, as in E. querci-globuli, the color variation ranges from predominately black in some of the more northern populations (Indiana and Illinois), to predominately reddish brown in the southern material (Bonneau, S.C.). It differs, however, in the oval abdomen with less lateral compression, longer sixth abdominal segment, shorter ninth tergum, less posterior extension of the ventral valves of the female genitalia, less extensive sculpturing on the lateral surface of the sixth abdominal segment, a stouter, broader marginal vein, and a short postmarginal vein in relation to the marginal.

The redescription is based on the types in the U.S. National Museum collection and the considerable number of specimens in the author’s collection.

36. Eurytoma celtigalla Bugbee


Distribution: Known only from central Texas.
Host: Phytophaga celtiphylla Felt on Celtis species, C. mississippiensis and C. laevigata.

Remarks: This species runs generally smaller in all its measurements than Eurytoma prunicola. In addition, the dorsal valves of the female genitalia are broad in contrast to the narrow valves of the preceding species and the postmarginal vein is about 80% the length of the marginal instead of nearer 50%.

37. Eurytoma lacunae, new species

Map 18

Female: Mostly black. Averages 2.2 mm. (2.0–2.3) in length. Abdomen averages 1.1 mm. (1.0–1.2) in length; oval in outline from a lateral and dorsal view; dark brown to black in color; sixth tergum fully two-fifths to one-half the length of the abdomen; its surface both dorsally and laterally covered by fine sculpturing; ninth tergum averages .17 mm. (.15–.20) in length. Internal genitalia average 1.0 mm. in length and .62 mm. in height; thus the height is slightly more than one-half the length; dorsal valves narrow for horizontal length and turn dorsally, anteriorly, at a right angle; stylet arch in an oblique plane; dorsal valves yellowish brown except for exposed distal tip which is black. Propodeum with a wide, shallow depression without any median furrow or distinct lateral areas; surface covered with irregular, fine punctations except for several larger pits dorsally-laterally. Tegula yellow. Face with prominent striae from below eye and base of antennae that converge upon the clypeus. Antenna with yellow scape and yellow to light-brown flagellum; funicle five jointed; the first joint longer than wide, the rest becoming shorter, so that number five is about as long as wide; terminal unit of three closely fused segments. Legs including the fore- and midcoxae yellow; hindcoxae may have brown infuscation mixed with the yellow. Wing veins light yellow and linear; marginal vein, which averages .24 mm. (.22–.25), is twice the length of the postmarginal, which averages .12 mm. (.10–.12).

Male: Black. Averages 1.3 mm. in length. Legs all yellow except brownish infuscation on middle of hindfemora. Tegula yellow. Scape and flagellum of antenna yellow to yellowish brown; funicle consists of only four elongate, pedicellate joints; terminal unit of two closely fused joints separated from the fifth by an annulation. Wing veins yellow with the same length relationships as in the female.

Types: Holotype female, allotype, and paratypes in the U.S. National Museum (USNM 66055); paratypes in the Bugbee collection, Meadville, Pa.
Type locality: Kent Island, Md. Specimens collected Feb. 8, 1953, and emerged Mar. 3, 1953.

Host: Bred from galls of Protaplonx species on Baccharis helmifolia.
Remarks: The male antenna of this new species has only four pedicellate segments in the flagellum. The fifth is separated from the two closely fused terminal units by an annulation rather than a short pedicle. The lack of yellow or reddish brown on the head, thorax, and abdomen will distinguish this species from Eurytoma juniperinus or E. prunicola.

33. Eurytoma nigricoxa Provancher


Types: Department of Agriculture, Ottawa, Canada, 1 female with three labels. First label reads: "Type, E. nigricoxa Provancher no. 2513." Second label reads: "E. nigricoxa Provancher, Type 739." Third label reads: "Lectotype, E. nigricoxa Comeau, April, 1940."

Type locality: Ottawa, Canada.
Distribution: Canada: Quebec, British Columbia, and Manitoba.
Host: Rose galls and Periclistus species (specimens in Department of Agriculture collection, Ottawa, Canada).
Remarks: This species superficially resembles E. studiosa Say, but the thorax is more robust and the propodeum is broad and shallowly concave without a clearly defined median groove. It differs also in the equal length of the marginal and postmarginal veins.

39. Eurytoma querci Fullaway

Eurytoma querci Fullaway, 1912, p. 278.—Peck, 1951, p. 578.

Types: Leland Stanford University, lot 508, specimen 45, 1 female; lot 509, specimen 20, 1 male, paratype.

Type locality: Stevens Creek (Santa Clara County), Calif. Collected Nov. 24, 1906. The type female emerged Mar. 6, 1907, and the male emerged in the laboratory Jan. 27, 1907.
Distribution: United States: California.
Host: Acraspis guadaloupensis (Fullaway) on Q. chrysolepis (Fullaway, 1912) Andricus lasius (Ashmead) (Fullaway, 1912).
Remarks: The type female seems close to E. californica Ashmead, but it is smaller in all its measurements; has more black infuscation on the legs (not in blotches as in E. californica); brown rather than yellow tegulae, and the abdomen is not deeply oval but more rectangular in shape in a lateral view.
40. Eurytoma auriceps Walsh

MAP 19


*Eurytoma auriceps seminatrix* Walsh, 1870, p. 299.

*Eurytoma vagabunda* Ashmead, 1881a, p. 134.

Female: Black. Length averages 3.3 mm. (2.7–4.0). Abdomen black to deep reddish brown; oval in lateral view; averaging 1.3 mm. (1.0–2.0) in length; lateral compression medium; segment six dorsally equal in length to segments four and five combined; sculpturing on lower lateral surface of sixth heavy, but it plays out dorsally so that upper half of lateral surface and dorsal surface are smooth and shiny; white pile covers dorsal and lateral one-half of segment eight; a few scattered hairs on dorsal and lower lateral aspect of seven; ninth tergum short, broad and stubby; averaging .12 mm. (0.7–.22) in length; ninth with exposed ends of ventral valves projecting upward at less than a 45° angle in relation to horizontal axis of the abdomen. Internal genitalia average 1.3 mm. (1.0–2.0) in length; 1.0 mm. (.82–1.5) in height, height averages about 77% of the length; dorsal and ventral valves anteriorly turn dorsally at approximately a right angle; expanded plate of ventral valves may bend slightly posteriorly so that stylet arch approaches a vertical plane; dorsal valves black for horizontal length and narrow; black may or may not continue onto slightly wider dorsal extension of dorsal valves. Tegula yellow. Propodeum shallowly concave; median furrow outlined by distinct lateral carinae, clearly indicated in dorsal third or half only, extent of median carina same or ventrally for about three-quarters of length of furrow; lower area crossed by irregular horizontal ridges dividing surface roughly into rectangles. Scape with outer face all yellow or upper half black to dark brown; antenna filiform; segments of the flagellum in the larger specimens longer than wide with the fifth only a little shorter than the first; in smaller specimens, segments become progressively shorter distally, so that fifth may be almost square; six closely applied to seven and separated by a shallow annulation; seven appears to consist of two closely fused units, about equal in length to first segment. Lower half of face covered with striae that converge upon the clypeus. Legs chrome yellow or brownish infuscation on hindfemora and tibiae; front coxae may be all yellow, or medial and anterior faces yellow only; midcoxae also variable from yellow to black; hindcoxae black. Wing veins yellow to yellowish brown; marginal vein stout and wider than postmarginal; marginal averages .30 mm. (.22–.42) and the short, stubby postmarginal vein averages .16 mm.
(12–22) in length; the postmarginal averages about 53% the length of the marginal; stigmal vein short and stout, averaging .14 mm. (12–20).

Male: Body black. Abdominal petiole long, averaging 1.33 times the length of hindcoxa, or hindcoxa about three-fourths length of petiole; legs most often including all coxae, scape and tegula yellow; less often hindcoxa black and some black infuscation on middle of outer face of hindfemora and occasionally hindtibiae. Pile covering face and on thorax, often with a golden-yellow tinge; less often silvery white. Wing veins brown; marginal vein stout, averaging .30 mm. (20–37) and postmarginal averages .16 mm. (12–20) in length; stigmal averages .17 mm. (15–20).

Neotypes: Neotype female and male in U.S. National Museum; paratypes in the Bugbee collection, Meadville, Pa. Additional specimens in the series from which the types were picked include 31 females and 19 males.


Host: Reared from pupa June 5 and 6, 1946, in gall of Callirhytis seminator (Harris), L. H. Weld determined, on Quercus alba. The lost type material came from Aceraspis erinacei (Beutenmuller), A. hirta (Osten-Sacken), Amphibolips spongifica (Osten-Sacken) and Diplolepis radicum (Osten-Sacken).

Distribution: E. auriceps occurs over most of the eastern half of the United States and Canada probably to the northern limit of white oak distribution. Its hosts are species of cynipids, producing galls, principally on the white oaks Quercus alba and Q. stellata.


Remarks: This is a highly variable species. It has been impossible to find any good morphological characteristics that would distinguish more than one species. All characters seem to intergrade throughout the widespread distributional area.

Since the original types seem to be lost, the redescriptions is based on a neotype and a paratype series from a locality in Illinois in proximity to the area where Walsh is believed to have collected.
41. *Eurytoma brevivena* Bugbee

**Map 20**

*Eurytoma brevivena* Bugbee, 1958a, p. 198.

Types: 13 females and 1 male; holotype female in the U.S. National Museum (USNM no. 66032); paratypes in Bugbee collection, Meadville, Pa.


Distribution: Known only from the type locality.

Host: *Disholcaspis quercus-globulus* (Fitch) on *Quercus gambelii* (Bugbee, 1958).

Remarks: The host of this species is probably not the species indicated on the labels, because *D. quercus-globulus* does not extend westward to Arizona according to Weld in Muesebeck and others (1951). Its host will probably be found to be a western species of the genus *Disholcaspis* associated with *Quercus gambelii*.

The strong striations on the lower face converging on the clypeus, the short postmarginal vein that averages about half the length of the marginal, and the wide median furrow on the propodeum that narrows ventrally, are additional characteristics of this species.

42. *Eurytoma obtusiventris* Gahan

**Map 20**


Types: Holotype female, no. 49893, and 57 paratype females in the U.S. National Museum, Washington, D.C.

Type locality: Ithaca, N.Y., collected and reared by G. F. Hughes in 1930.


Host: *Eurosta solidaginis* Fitch on *Solidago* species (Gahan, 1934).

Remarks: No males have appeared in any of the series of *E. obtusiventris* from the more northern states (New York, Michigan, Indiana) and southern Canada. The females, therefore, must be parthenogenetic. However, the series reared from *Tephritis (=Neo-tephritis) finalis* (Loew) on *Helianthus* species from Columbus, Miss., by Breland (1939) and determined by Gahan as *E. obtusiventris* does contain several males. I have examined some of the Breland specimens and have included them in the succeeding new species.

Characteristics that separate this species from the next one, in
addition to those listed in the key, are given in the section entitled "Remarks," under the succeeding species.

43. *Eurytoma vernonia*, new species

**Figure 15; Map 21**

Female: Medium-sized species averaging 2.1 mm. (1.8–2.5) in length. Black except for proximal and distal extremities of tibiae and femora, all of tarsi and wing veins which are yellow to yellowish brown. Abdomen dorsally arched anteriorly, triangular in shape from a lateral view and moderately laterally compressed; averaging 1.3 mm. (1.3–1.4) in length; sculpturing on lateral aspect of the long sixth tergum heavy for lower half and then becomes lighter in upper half, disappearing entirely so that dorsal surface is smooth and shiny; ninth tergum short and pointed averaging .12 mm. (.10–.15) in length and in line with the horizontal axis of the abdomen; black to dark brown in color. Internal genitalia short; dorsal and ventral valves turn dorsally, anteriorly, at a right angle to horizontal axis so that stylet arch is in an almost vertical plane; height more than half of length; height averaging .82 mm. (.80–.87) and length 1.2 mm. (1.1–1.3); dorsal valves black and narrow for horizontal length. Propodeum at right angles to the scutellum; wide shallow concavity that is evenly punctate except for three or four large round pits with shiny surfaces along dorsal margin; median furrow, lateral and central carinae may be absent or carinae indicated dorsally by short stubs only. Tegula black. Pronotum narrow; its width less than half its length. Antenna short and stocky; enlarging slightly distally so that they appear clavate; pedicle and first funicle segment about equal in length viewed from above; first funicle segment slightly longer than wide, rest almost square; three closely fused units in the club; scape black. Front coxa with a prominent tubercle about midway on the anterior outer margin. Wing veins yellow; marginal and postmarginal linear, the marginal longer than the postmarginal, averaging .17 mm. (.15–.20) in length and the postmarginal averaging .12 mm.

Male: Black; exceptions as in the description of the female. Length averages 1.6 mm. (1.3–1.9). Antenna with the first four funicle segments about equal in length, pedicellate, longer than wide and depressed medially; a whorl of long hairs arises from each hump on either side of the depression and extends outward at right angles to the longitudinal plane of the segment; fifth funicle segment not pedicellate distally, nor noticeably depressed; its proximal end has longer hairs that appear to arise from a slight eminence and may or may not simu-
late a whorl; distal end with shorter hairs; terminal unit of two, short, closely fused segments separated from the fifth by a deep annulation and about same length as fifth; hair much shorter and extends anteriorly or in same plane as terminal segments. Marginal vein of the forewing averages .16 mm. (.15-.20) and postmarginal vein .11 mm. (.10-.12) in length.


Type locality: Manhattan, Kans. Collected by R. Schwitzgebel, Sept. 1, 1940. Paratypes collected in August and September 1940.


Host: Bred from trypetid seed maggots in seeds of Vernonia interior Small (Ironweed).

Additional host: Tephritis (=Neotelephritis) finalis in sunflower (Breland, 1939).

Remarks: This new species is most closely related to Eurytoma obtusiventris Gahan. The relationship is suggested by the presence of the raised tubercle on the outer margin of the forecoxae, the narrow pronotum, the short, stocky female antenna, and the sharp angle formed by the scutellum and propodeum. It can be separated from E. obtusiventris, however, by its smaller size, the evenly punctate propodeum in contrast to the transversely striated propodeum of E. obtusiventris, its more oval and laterally compressed abdomen, and the presence of males with their distinctive antennae.

Schwitzgebel and Wilbur (1943) list two species of parasites as Eurytoma new species that were bred from trypetid seed maggots (p. 8). The series of 56 females mentioned above, from which this new species was described, was part of their reared material so that it is very likely that its real host is one of the species of trypetid listed in their paper. The exact relationships of host and parasite were not determined.

44. Eurytoma bigeloviae Ashmead

MAP 21

Eurytoma bigeloviae Ashmead, 1890, pp. 25, 45.—Peck, 1951, p. 575.—Bugbee, 1956, p. 504.

Eurytoma chalcidiformis Girault, 1917a, p. 3.

Types: U.S. National Museum no. 11865. Original description based on 1 female specimen, which is designated as type.

Type locality: West Cliff, Colo. (reared by T. D. A. Cockerell).

Distribution: United States: Colorado, California, Utah.

Host: Trypetta (=Tephrella) bigeloviae (Cockerell) (Ashmead, 1890).

Remarks: For notes on the synonymy of E. chalcidiformis Girault with this species, see Bugbee (1956, p. 504).
45. Eurytoma atripes Gahan

Map 22


Types: U.S. National Museum, 1 type female and 1 allotype, no. 44538, plus a paratype series of 24 specimens.

Type locality: Carlisle, Penn.


Host: Hessian fly puparia Phytophaga destructor (Say) and 1 specimen from Cephus cinctus Norton (Gahan, 1933). Larvae of both Cephus cinctus Norton and Bracon cephi (Gahan) (Nelson, 1953).

Remarks: Locality records shown on the map were taken from the paper by Gahan (1933) and represent the types plus the 24 additional specimens on which he based the description of the species.

This is a small species with a very short, stubby ninth tergum averaging 0.8 mm. (.06-.10). The female genitalia are weakly developed with wide dorsal valves, only slight dorsal extension anteriorly, and the stylet arch is in a horizontal plane. The antennae are weakly clavate.

46. Eurytoma levivultus Bugbee

Map 21

Eurytoma levivultus Bugbee, 1957, pp. 48-49.


Type locality: Columbus, Ohio, collected June 1955 by J. Moser.

Distribution: United States: Ohio and Texas.

Host: Pachypsylla gemma Riley.

Remarks: The lack of any yellow or reddish-brown color on the frons, the reduced umbilicate punctures on the pronotum, vertex, and occiput of the head, the flat evenly punctate propodeum, and the black infuscation always on the middle and hind femora and tibiae and often on the front legs help to distinguish this species.

47. Eurytoma tumoris Bugbee


same locality, collection, and rearing dates as above. Types and paratypes in the U.S. National Museum and paratypes in the Bugbee collection, Allegheny College, Meadville, Pa. and the University of California at Berkeley.

Type locality: Santa Cruz, Santa Cruz County, Calif.
Host: Believed to be phytophagous in the stems of *Pinus sylvestris*. Distribution: California.
Remarks: See Bugbee (1962).

48. *Eurytoma fossae*, new species

**Figures 11, 24; Map 22**

**Female:** Averages 2.8 mm. (2.2–3.3) in length. Black except for the tarsi, knees, and apices of mid- and hindtibiae, occasionally all of foretibiae and wing veins. Abdomen, viewed laterally, narrowly oval; longer than head and thorax combined; averaging in length 1.5 mm. (1.2–1.7); sixth tergum dorsally, longer than three and four combined; sculpturing limited to lower anterior half of lateral surface; rest of surface shiny black; ninth tergum short, averaging .14 mm. (.12–.17) in length. Internal genitalia average 1.5 mm. in length and .77 mm. in height; thus height is about half the length; dorsal valves narrow and black for horizontal length and turn dorsally, anteriorly, with ventral valves at less than a right angle in relation to the horizontal axis; stylet arch in an oblique plane. Propodeum rounded with a deep, narrow concavity occupied by a median furrow, wider at top and delimited laterally by complete lateral carinae to base; central carina may extend from dorsal margin for half to three-quarters length of median furrow; spaces in furrow with shiny, unsculptured surfaces; lateral areas absent or if present very narrow. Thorax with the tegula black. Antenna with the scape black; first segment of the funicle slightly longer than pedicle, itself longer than wide and truncate distally; next four segments subequal to square and truncate distally; distal three segments grouped closely together to form a slightly expanded club. Legs with black infuscation on all femora and tibiae, except occasionally foretibiae; tarsi may have black infuscation on dorsal surface. Wing veins light brown and linear; marginal vein longer than postmarginal, averaging .32 mm. (.25–.35) in length and postmarginal averaging .22 mm. (.20–.22).

**Male:** Averages 1.9 mm. (1.6–2.2) in length. Wing veins are dark brown; marginal longer than postmarginal, averaging .27 mm. (.25–.30), and postmarginal averaging .16 mm. (.15–.17) in length.

Type locality: Albany, Alameda County, Calif., collected May 1958 by L. E. Caltagirone.

Distribution: United States: California.

Host: Bred from gall on Salix species produced by Euura pacifica (Marlatt), Burks determined, and E. resinicola (Marlatt).

Remarks: The new species resembles Eurytoma stigmi Ashmead and E. tomici Ashmead in the slightly clavate antennae and the wide median furrow of the propodeum.

49. Eurytoma tomici Ashmead

MAP 22


Types: 1 male type no. 11870, U.S. National Museum. Apparently this is all the type material there is and so the 1 male specimen is designated as type.

Type locality: Morgantown, W. Va.


Additional hosts: Phloeosinus species, and Cylindrocopturus longulus (LeConte); records U.S. National Museum.

Remarks: Eurytoma tomici Ashmead is very close to E. stigmi Ashmead. The temptation to call them one species was strong, but because of the rather meager material of both species, it seems best to keep them separate with the hope that adequate series with precise host data will be available someday.

In general E. tomici seems to have more black infuscation on the legs, especially in the male, and less sculpturing on the surface of the sixth tergum. In E. stigmi the fine scaling may extend over the dorsal surface while it is limited to the lower one-half of the lateral surface of the sixth tergum in E. tomici.

50. Eurytoma appendigaster (Swederus)

MAP 23

Pteromalus appendigaster Swederus, 1795, p. 217.


Types: Swederus types nonexistent (see below). Neotype female in the collection of the Naturhistoriska Riksmuseum, Stockholm.

Type locality: Uncertain.
Distribution: Canada: Ontario, New Brunswick.


Remarks: The status of *Eurytoma appendigaster* in the United States is uncertain. It is listed by Peck (1951) as occurring in New England, New Jersey, Pennsylvania, and Wisconsin, but I have been unable to verify these localities. I have not recognized the species in my own extensive collection of eurytomids and the only material that I feel sure of in the U.S. National Museum collection is from Europe. The only specimens that seem to fit *E. appendigaster* are in the collection of the Department of Agriculture, Ottawa, Canada.

M. F. Claridge (1959) states that there is no Swederus material of this species existent, but there is material of Boheman, who probably saw the original material. He sent me one of Boheman's specimens and a specimen that Claridge himself had determined as *E. appendigaster*. I have also seen some specimens in the U.S. National Museum collection that A. B. Gahan compared with Boheman's specimens and determined as *E. appendigaster*. There are several characteristics that stand out in the material mentioned above. The male antenna are distinctly seven segmented with segment six separated from seven by a short petiole. All of the males of North American species of *Eurytoma* that I have seen have segments six and seven either closely fused or separated by a shallow annulation, not by a distinct petiole. The female has the sculpturing reduced on the long sixth abdominal segment, so that it is limited to the lower anterior third of the lateral surface. The umbilicate punctures on the mesonotum are large, close together, and the ridges between them are not sculptured but are smooth and shiny. The first segment of the antenna is longer than wide, at least twice as long as wide. The redescription by Claridge (loc. cit.) does not mention some of the characteristics listed above. He does, however, pick a neotype female from the Boheman collection.

The species is included in this revision because of the specimens in the collection of the Department of Agriculture, Ottawa, Canada.

51. *Eurytoma seminis* Bugbee

Map 24

*Eurytoma seminis* Bugbee, 1941, pp. 98–102.—Peck, 1951, p. 578.

Types: 15 females and 8 males; holotype female, male, and female
paratypes in the U.S. National Museum (USNM 58244); paratypes in Bugbee collection, Allegheny College, Meadville, Pa.

Type locality: Hays, Kans.

Host: Phytophagous in the seeds of Schmalizia = (Rhus) trilobata (Nuttall).

Distribution: United States: Kansas, Oklahoma.

Remarks: The lack of black infuscation on the tibiae of the legs and the reddish-brown to yellow scape of the antenna are additional characteristics to look for in this species.

52. Eurytoma alitifossa, new species

Figures 21, 23; Map 23

Female: Black except for yellow fore- and midtibiae, extremities of hindtibiae and all femora, scape of antenna, and wing veins. Average in length 3.4 mm. (3.2–3.8). Abdomen globular and plump with only slight lateral compression; sixth tergum about 1 1/2 times the length of the fifth; sculpturing of fine, shallow punctations covers all of lateral surface of sixth tergum and extends over dorsal surface on anterior half; covers most of lateral and dorsal surfaces of all other abdominal terga; ninth tergum short and stubby, averaging .14 mm. (.12–.17) in length. Internal genitalia with broad dorsal valves for horizontal length and their color is black; very little dorsal extension anteriorly, of dorsal and ventral valves, so that stylet arch is close to a horizontal plane; average length of genitalia 1.5 mm. and average height .75 mm.; thus height is about half of length. Propodeum broad with a shallow concavity in center of which is a deep, narrow, complete median furrow that narrows gradually toward base; central carina in upper third; large lateral areas. Antenna filiform; flagellum with five truncate segments distally; sixth separated from seventh by a distinct annulation, terminal unit of two closely fused segments. Legs may have fore- and midtibiae yellow or with slight, light-brownish infuscation on middle of outer surface; same on hindtibiae; darker brown infuscation toward base of fore- and midfemora and on middle of hindfemora. Wing veins linear; marginal slightly longer than postmarginal; marginal averages .30 mm. (.25–.37) and postmarginal averages .25 mm. (.17–.30); stigmal club rectangular.

Male: Color much the same as in female except that color of the legs is darker and more extensive. Average length 2.4 mm. Relation of wing veins as in the female but average slightly shorter.

Types: 5 females and 1 male. Holotype female, allotype, and paratypes in the collection of the Department of Agriculture, Ottawa, Canada and paratypes in the Bugbee collection, Allegheny College, Meadville, Pa.
Host: From galls on *Oxytropis lamberti*. Host relationship not stated.
Distribution: Known only from the type locality.
Remarks: This new species resembles *Eurytoma crassa*, new species, in its plump, globular abdomen and extensive sculpturing of the abdominal terga. It differs, however, in the complete, narrow median furrow on the propodeum, the shorter postmarginal vein in relation to the marginal, and the lack of as dark and extensive infuscation on the legs.

53. *Eurytoma crassa*, new species

**Figures 16, 25; Map 24**

Female: Black. Length averages 3.4 mm. (3.1–3.8). Abdomen plump; oval from a lateral view; averaging 1.9 mm. (1.7–2.0) in total length; most often whole surface of segments four through eight covered with fine punctations; less often sculpturing reduced on dorsal surface of sixth to a narrow band covering anterior half of surface; ninth tergum broad and pointed, averaging .19 mm. (.15–.22) in length and usually in line with horizontal axis of the abdomen. Internal genitalia with broad and stout dorsal valves for horizontal length anterior to concavity behind exposed tip; dorsal and ventral valves turn dorsally, anteriorly, at slightly less than a right angle; stylet arch in an oblique plane; length of genitalia averages 1.8 mm. (1.7–2.0) and height averages .98 mm. (.92–1.0); anterior dorsal expanded plate of ventral valves, narrow, maintaining same width or narrowing slightly at top. Propodeum broad, shallowly concave, without a median furrow, or an indication of one in dorsal third only; rest of surface covered with irregular ridges with fine punctations between. Tegula black. Antenna with the scape most often entirely black; less often with yellow base; flagellum filiform; segments one to five longer than wide; six closely applied to seven but distinguished from it by a shallow annulation. Legs with black infuscation on all femora and tibiae. Wing veins yellow; marginal and postmarginal linear; marginal averages .26 mm. (.22–.30) in length and postmarginal averages .27 mm. (.27–.32); thus the postmarginal is most often longer than the marginal, less often equal to it in length; stigmal club small and narrowly rectangular in shape.

Male: Black. Averages in length 2.0 mm. (1.5–2.8). Abdomen may be covered with fine, delicate punctations over entire surface, or sculpturing extends over two-thirds of lateral surface of sixth segment
only, leaving dorsal surface smooth and shiny. Propodeum may have a complete wide median furrow that maintains same width from top to bottom. Wing vein relationships and color of the legs same as in the female.


Type locality: Gosport, Ind. Holotype collected on Mar. 28, 1933; emerged May 30, 1933. Paratypes collected on Mar. 28 and Apr. 3, 1933; emerged May 30 and June 1, 1933.

Host: Bred from dipterous gall on Ragweed (Ambrosia species). The gallmaker is believed to be a species of Tryptetidae.

Additional hosts records include T. (Callachna) gibba Loew, and T. (=Aciurgina) notata Coquillett.

Distribution: Eastern half of the United States, from Illinois, Ohio, and Indiana, south to Louisiana and west to Texas and New Mexico.

Remarks: The most likely hosts of this new species seem to be dipterous gallmakers of the family Tryptetidae and Oratalidae.

This species differs from E. tylodermatis and E. pinii in having a broader, shallow, concave propodeum with a wider median furrow that is indicated dorsally only; in other specimens the median furrow may be lacking entirely, and the surface may be covered with fine, even punctations dorsally and irregular horizontal ridges ventrally; postmarginal vein is usually longer or equal in length to the marginal, seldom shorter; the extensive reticulation of the abdominal segments, especially the sixth, which may be completely covered or reduced to a narrow band on the anterior half of the dorsal surface.

54. *Eurytoma terrea* Bugbee

*Eurytoma terrea* Bugbee, 1951, pp. 238–240.—Burks, 1958, p. 82.


Type locality: Ashland, Oreg.

Distribution: Oregon.

Host: *Diplolepis polita* (Ashmead) var. on *Rosa* species.

Remarks: Additional characteristics that will help to define this species include: black tegula and scape; black infuscation on femora and tibiae of all legs; broad dorsal valves of the female genitalia that turn dorsally, anteriorly, only slightly with ventral valves, so that stylet arch is in a horizontal plane.
55. *Eurytoma incerta* Fullaway

**Map 16**


Types: 4 females and 1 male in collection L.S.J.U. (lot 499, specimen 23). Types could not be located under the above number and must be presumed lost. Neotypes: Junction City, Oreg., Apr. 9, 1920, from *Diplolepis neglectus* on *Rosa* species Kinsey collected. In addition, there are 22 females and 20 males in the U.S. National Museum and in the Bugbee collection, Meadville, Pa.

Neotype locality: Junction City, Oreg.


Host: *Diplolepis neglectus* (Gillette) (= *D. tuberculatrix* (Cockerell)), *D. polita* (Ashmead) variety and *D.t. descansonis* Kinsey and Ayres, on *Rosa* species.


Host: *Diplolepis tuberculator descansonis* Kinsey and Ayres.

Remarks: *Diplolepis neglectus* galls are indicated as being modified inquiline inhabited galls of *D. tuberculatrix* (Kinsey and Ayres, 1922). The actual host then is an unknown inquiline cynipid species rather than the true gallmaker.

*Eurytoma incerta* is the equivalent of *E. acuta* of the east. It runs smaller in all its measurements, the propodeal median furrow is narrower and deeper, and the scape of the antenna is most often all black.

56. *Eurytoma stigmatic* Ashmead

**Map 26**

*Eurytoma stigmatic* Ashmead, 1895, p. 271.—Peck, 1951, p. 578.

Types: Type series consists of 2 females and 3 males, no. 25507, U.S. National Museum. One female specimen is labelled and designated as lectotype.

Type locality: Los Angeles, Calif.

Distribution: United States: California, Oregon.

Host: *Stigmus inordinatus* Fox (Ashmead, 1895).

Remarks: See *E. tomići*.

57. *Eurytoma sciromatidis* Bugbee


Host: Bred from cankers on loblolly pine (Pinus taeda) and slash pine (P. elliotti) caused by Cronartium fusiforme.
Distribution: United States: Louisiana and Georgia.
Remarks: The exact host relationships of this species are not known (see discussion, Bugbee, 1962).

58. Eurytoma tylodermatis Ashmead

Figure 30; Map 25


Bruchophagus herrerae Ashmead, 1902, p. 324.

Female: Black. Length averages 3.9 mm. (3.6-4.8). Abdomen, from the side, narrowly oval or conical; lateral compression slight; averaging 2.2 mm. (1.8-2.6) in length; sixth segment long, averaging .78 mm. (.70-.90) at widest point; sculpturing on lateral surface of sixth tergum heavy ventrally, continues dorsally for about one-half to two-thirds of surface and then fades out so that dorsal surface is smooth and shiny. Valves of ovipositor usually in line with the horizontal axis of abdomen. Ninth tergum short to moderately elongate, broad and somewhat bluntly pointed; averaging .19 mm. (.12-.25) in length. Internal genitalia with very little dorsal extension of valves anteriorly; dorsal valves mediumly broad for horizontal length turning dorsally with ventral valves at much less than a right angle; stylet arch in a horizontal to oblique plane; whole structure averages 1.5 mm. (1.4-1.8) in length and .75 mm. (.62-.87) in height; thus height is half of length or length equal to about twice the height. Tegula black. Propodeum with a wide, shallow concavity and a narrow and deep, to wide and shallow, usually complete median furrow; furrow widest at top and narrows ventrally; lateral areas with rough punctations between fine irregular ridges; median carina in furrow in upper one-third to one-half only; lateral carinae usually discernible to base. Antenna filiform; the scape all yellow or dark brown to black except yellow base; flagellum often with segments one to five longer than wide, moniliform, or segments four and five may be almost square; segment six separated from seven by a distinct annulation but not as truncate as proximal segments; whole structure appears short and
stocky. Legs may have dark brown to black infuscation on all femora and tibiae or may be all yellowish brown; most often some infuscation medially on hindfemora and tibiae; all coxae black or deep reddish brown. Wing veins yellow to yellowish brown; marginal linear to about twice the width of postmarginal; marginal averages .36 mm. (.30-.42) and postmarginal averages .28 mm. (.22-.37) in length; thus marginal is always longer than postmarginal; stigmal club small and more or less rectangular in shape.

Males: Black. Length averages 3.4 mm. (3.0-4.0). Scape of antenna most often black; less often base of scape with varying amounts of yellow or yellowish brown. Legs variable; may be black to dark-brown infuscation on all femora and tibiae; less often infuscation on hindfemora only or legs all yellowish brown. Wing veins brown to brownish yellow; marginal vein averages .33 mm. (.27-.37) and postmarginal averages .24 mm. (.20-.27) in length.

Types: Lectotype female and allotype male, USNM 25503, Agriculture rearing number 113203. One additional female with Agriculture number 113202 in the U.S. National Museum collection, Washington, D.C. The first female cited above is labelled and designated as lectotype. Additional specimens used in connection with the redescription include 89 females and 29 males also in the U.S. National Museum collection.

Type locality: Rosslyn, Va., F. H. Chittenden.

Host: From the larva of Tyloderma foveolatum Say.

Distribution: Canada and the eastern two-thirds of the United States, Ontario, south to South Carolina and Louisiana and west to Texas and Arizona.

Remarks: In 1896 Ashmead described Eurytoma tylodermatis as a parasite of the "larva of a beetle, Tyloderma foveolatum Say." Additional determinations during the succeeding years have raised the number of hosts of E. tylodermatis to 56 or more (Peck, 1951, in Muesebeck et al., U.S. Dept. Agric. Monogr., no. 2).

This is due in part to Ashmead’s description which is so general that it encompasses many species of the genus Eurytoma. Furthermore, his description was based on two females and one male specimen only, which was not enough material to give an adequate picture of the range and limits of variation of the species.

In 1951 the U.S. National Museum loaned me all the specimens which had been accumulating in their collection of Hymenoptera for many years under the label of E. tylodermatis. A study was made of the material plus specimens in my own collection amounting altogether to about 4000 individuals. Even this number was not enough to give an adequate picture of the geographical distribution, or the range of variation of the several species in the complex. Many
collections consisted of only one or two specimens. Too often the host was not indicated or only the host plant was named from which the parasite was bred. Exact relationships of host and parasite, therefore, were impossible to determine in many cases.

The results of this study must be considered as only tentative. The need for more material from additional localities, plus more exact determinations of host relationships, will lead to clearer definitions of the species of the complex in the future. Nevertheless the importance of these parasites, occurring as they do on many hosts of economic importance, makes it necessary to make some attempt to put the classification of the parasites on a more realistic basis. The redescriptions is based on the holotype female, allotype male, and an additional series of 7 females in the U.S. National Museum collection, Washington, D.C.

This species has its closest affinities with the Eurytoma pini, E. diastrophil, and E. bolteri group of species. The whole complex is probably associated with the larvae of weevils and small moths that live in stems of various species of plants. They act as either primary or secondary parasites. Hosts listed for the specimens of E. tyloder-matis examined include: Trichobaris texana, which is reported to occur in stems of Solanum rostratum; Lixus scrobicollis in stems of Ambrosia trifida (Pierce, 1908 a, b, and c; Pierce, Cushman and Hood, 1912); Tylodera foceolatum in the stems of Oenothera biennis; Mom-phha eloisella also in stems of O. biennis. Additional possibilities reported in the literature include Trichobaris trinotata in Solanum carolinense (Chittenden, 1911) and Lixus musculus, in Polygonum pennsylvanicum (Pierce, 1907); Coleophora malivorella and Trichob-aris rostratum.

59. Eurytoma gossypii, new species

Map 26

Female: Black. Length averages 4.2 mm. (3.8–4.6). Abdomen plump and oval in lateral view; averages 2.2 mm. (1.9–2.4) in length; long sixth abdominal segment averages .68 mm. (.62–.75); surface of sixth covered by fine shallow pitting which covers all of lateral surface for lower half to three-fourths, then sculpturing recedes toward anterior margin and may continue over dorsal surface in a narrow band. Ninth tergum, mediumly long and pointed; averages .26 mm. in length (.25–.30); anterior half naked and with finely shagreened or smooth surface; posterior half with shallow pits and covered with white pile. Internal genitalia average 2.1 mm. in length; in height 1.2 mm.; anterior expanded plate of dorsal valves averages .20 mm. in width at widest point; dorsal and ventral valves bend dorsally, anteriorly, at about a right angle and stylet arch is in
an oblique plane; dorsal valves broad for posterior two-thirds. Propodeum narrow; deeply concave; median furrow, if present, wide and indicated in upper one-quarter to one-third only; lateral surfaces roughly pitted and center crossed by fine horizontal irregular carinae; flat carina across top center bends ventrolaterally; shallow rectangular depression at base. Tegula black to dark brown. Antenna with the outer face of scape yellowish brown; whole structure short and stocky; segments truncate on distal ends; first segment longer than wide; two to five almost square; last three closely fused to form a bluntly pointed terminal unit. Legs reddish brown on base of forefemora and reddish brown to black medially on hindfemora; apices yellow; tibiae yellowish brown. Wing veins light yellow and thin; marginal and postmarginal veins usually equal in length; marginal averages .29 mm. (.27–.32); postmarginal averages .29 mm. (.25–.35).

Male: Black. Length averages 3.0 mm. (2.6–3.5). Scape usually with lower half yellowish brown and upper half black or dark brown; antenna with first five segments pedicellate; six and seven closely united; first segment longer than wide and covered with long hairs; two to five shorter, though still slightly longer than wide and each with two whorls of long hairs. Legs with dark brown on all femora and tibiae; knees and apices yellowish brown. Wing veins yellow and marginal and postmarginal veins equal in length, marginal averages .26 mm. (.25–.27); postmarginal averages .26 mm. (.25–.30).


Distribution: Its range will probably correspond to that of its host *Anthonomus grandis*, the cotton-boll weevil, although this study included specimens from Texas, Oklahoma, and Louisiana only. Fenton and Dunnam (1929) record a species determined as *E. tylodermatis*, which could be this species, from Florence, S.C., and Pierce, Cushman and Hood (1912) list *E. tylodermatis* as a cotton-boll weevil parasite from Arkansas, Louisiana, Oklahoma, Texas, and Mexico.

Host: Parasite of *Anthonomus grandis* Boheman, the cotton-boll weevil.

Remarks: This species seems to be close to *E. pini* in the equal length of the marginal and postmarginal veins, the fine pitting on the surface of segment 6 of the abdomen, which extends as a narrow band over the anterodorsal surface, and the short, stocky antenna with segments 2 to 5 approximately square.
It may be distinguished from *E. pini* by the broad dorsal valves of the female genitalia; the narrower, more deeply depressed propodeum; lack of brown infusation on the yellowish tibiae; and the shorter but equal lengths of the marginal and postmarginal veins.

The importance of this parasite in reducing the number of the boll weevils is considerable. Fenton and Dunnam (loc. cit.) found it third in importance to *Microbracon mellitor* (Say) and *Catolaccus hunteri* Crawford, at Florence, S.C. Pierce (1910) believes that it occurs most often as a primary, ectoparasite of the larvae of *A. grandis*. He also believed (Pierce 1908a) that this species, which he knew as *E. tylodermatitis*, had several alternate hosts including *Lixus scrobicollis* in the stems of *Ambrosia trifida*. In several ways this species is close to *E. tylodermatitis* which has been bred from *L. scrobicollis*, but the characteristics listed above will separate them. *L. scrobicollis* is a native weevil while the cotton-boll weevil was introduced from Central America, and it seems to be almost exclusively confined to cotton as its host. Furthermore, the weevil passes through 3 to 5 generations a year thus providing ample stages for the parasite to oviposit on, and a need for alternate hosts seems quite unlikely.

The sex ratio favors the females, as Pierce (1908b) found the percentage of males in his rearings to be 35.4%. Pierce, Cushman, and Hood (1912) report a sex ratio of 64.9% females to 35.1% males.

60. *Eurytoma squamosa*, new species

**Figure 20; Map 27**

Female: Mostly black. Averages 2.2 mm. (2.0–2.6) in length. Abdomen oval from a lateral view and quite plump; averaging 1.1 mm. (1.0–1.3) in length; terga two through eight heavily sculptured laterally, becoming lighter over dorsal surface; sixth tergum, laterally and dorsally as long or longer than four and five combined; ninth tergum short and stubby, averaging .08 mm. (.07–.10) in length. Internal genitalia short and widely spread; average 1.3 mm. (1.2–1.5) in length and .65 mm. (.57–.75) in height; thus the height is equal to half the length; dorsal valves broad for horizontal length and black; dorsal and ventral valves turn dorsally, anteriorly, only slightly at much less than a right angle; stylet arch in a horizontal plane. Propodeum concavity broad, wide and shallow; median furrow indicated dorsally by barely discernible lateral carinae that converge and fade out entirely about the middle of propodeum; area below median furrow and lateral areas finely and evenly punctate with a few fine horizontal ridges among punctations. Tegula dark brown to black. Scape of antenna black or yellow; pedicle not less than three-quarters the length of the first funicle joint, that is, slightly longer than wide;
rest of funicle joints approximately square. Legs with black to dark-brown infuscation on all femora and tibiae, except yellow foretibiae in a few. Wing veins brownish yellow; marginal vein broad, especially toward distal end; postmarginal vein linear; marginal vein only slightly longer, averaging .19 mm. (.17–.22) in length, than the postmarginal which averages .17 mm. (.17–.20).

Male: Mostly black. Averages 1.8 mm. (1.7–1.9) in length. Abdomen with fine sculpturing over entire surface. Legs with black infuscation on all femora and tibiae. Scape of antenna black; flagellum with five pedicellate segments and a terminal unit of two closely fused segments. Wing veins brown; marginal vein broad, averaging .19 mm. and postmarginal averages .16 mm. in length.


Type locality: Ventura County, Calif. Holotype female collected Jan. 11, 1941, lot 41-594. Paratypes collected Jan. 11, 1941, lot 41-594, from Pleasanton, Calif.


Host: Bred from seeds of Ceanothus divaricatus.

Additional host species: C. thyraiflorus, C. cordulatus, C. velutinus, and C. sanguineus.

Remarks: This new species is apparently phytophagous within the seeds of several species of Ceanothus. It seems to be closely related to the phytophagous seed infesting species (Eurytoma rhois Crosby and E. seminis Bugbee) in sumac. The sixth abdominal tergum that is longer than four and five combined, and the short stubby ninth tergum, averaging .08 mm. in length will distinguish this species from E. seminis, while the plump abdomen with the more extensive sculpturing of the sixth tergum will separate it from E. rhois.

61. Eurytoma calycis Bugbee

Map 27


Type locality: Black Sturgeon Lake, Ontario, Canada. Emerged July 2, 1958, J. B. Thomas collection, vial 4, no. 6, lot 59–153. Paratype specimens from the same locality, collected by J. B. Thomas on June 13, 1956, 2 females and 2 males; July 2, 1956, 1 female; emerged June 4–25 and July 2–4, 1958, 24 females and 11 males; June 1958,
15 males. All specimens except those collected in 1956 from vial 4 or 5, nos. 1, 2, 3, 4, 5, 6, 7; lot 59-153.

Distribution: Canada: Ontario.

Host: Phytophagous in the buds of jack pine (Pinus banksiana).

Remarks: This species is close to E. squamosa in its size relationships, short ninth tergum, sculpturing of the abdomen, color of the legs, and phytophagous habit. It differs, however, in the shallow, complete median furrow and the rougher sculpturing of the lateral areas, the more dorsally produced female genitalia, and the different host.

62. Eurytoma pini Bugbee

Map 27


Type locality: Washington, D.C., A. D. Hopkins collection.


Distribution: Throughout the pine-growing regions of Canada and the United States from southern Quebec, Ontario, Manitoba, Saskatchewan, and British Columbia south to Maryland, Virginia, Missouri, and Nebraska.

Remarks: For more complete details of host relationships, see Bugbee (1958). This important parasite has been confused for many years with Eurytoma tylodermatis Ashmead. It differs from E. tylodermatis, however, in averaging larger (4.5 mm.); presence of more extensive sculpturing on the sixth abdominal tergum; longer ninth tergum (averaging .28 mm.); narrow horizontal portion of the dorsal valves and the lack of a well-defined, complete median furrow on the propodeum.

63. Eurytoma baccae, new species

Figure 26; Map 28

Female: Black. Averages in length 3.2 mm. (3.0-3.7). Abdomen oval; lateral compression medium; abdomen averages in length 1.8 mm. (1.6-2.5); sixth segment averages .57 mm. (.50-.62); three-quarters of its lateral surface covered with fine, shallow punctations.
which recede dorsally toward anterior margin and continue over dorsal surface in a narrow band; ninth abdominal segment elongate and sharply pointed, averaging .20 mm. (.17-.22) in length. Internal genitalia dorsally extended, anteriorly, so that both dorsal and ventral valves turn dorsad at approximately a right angle in relation to horizontal length; stylet arch in an oblique plane or halfway between a horizontal and vertical plane; dorsal valves not broad, mediumly narrow for horizontal length; whole structure averages 1.6 mm. (1.5–1.7) in length, 1.1 mm. (1.0–1.1) in height. Propodeum concave; faint, wide median furrow sometimes indicated by lateral carinae in dorsal half only or often lacking; lateral areas irregularly punctate and ridged. Tegula black. Scape variable, all black or dark brown except base, or outer face all yellowish brown; flagellum short and stocky; first segment longer than wide; segments two to five becoming progressively shorter so that five is approximately square; six to eight closely grouped, although six is separated from seven by a shallow annulation; flagellum same diameter throughout length, and segments one to five truncate distally. Legs with black to dark brown on all femora and tibiae except sometimes yellowish brown foretibiae; knees and apices yellowish brown. Wing veins yellow and narrow to linear; marginal either longer than postmarginal or equal to it in length; marginal averages .27 mm. (.25–.32) in length and postmarginal averages .24 mm. (.22–.25); stigmal club small and rectangular in shape.

Male: No males in the type series. Two male specimens from Glen Burnie, Md., appear to belong to this series.

Types: 4 females. Holotype female and paratypes in the U.S. National Museum collection (USNM 66061); additional paratypes (3 females and 2 males) in the Bugbee collection, Meadville, Pa.

Type locality: Wathena, Kans., emerged July 3–11, 1939, P.G. Lamerson collection.

Distribution: United States: Kansas, Maryland.

Host: Parasite (external on larvae) of the Strawberry Leafroller (Ancylis comptana (Frolich)), and hyperparasite (?) of Cremastus cookii Weed, a primary parasite of the Strawberry Leafroller.

Remarks: This species can be distinguished from E. pini by its more dorsally produced genitalia that turn dorsad anteriorly, at almost a right angle; its smaller size; shorter marginal and postmarginal veins; and the short, stocky antenna with the segments of the flagellum truncate distally.

The host is a native of Europe; it was introduced into the United States and is now quite widespread. According to Peairs and Davidson (1956, p. 495) it is “present over a large part of the United States, from the Mississippi Valley eastward.”
61. Eurytoma rhois Crosby

Map 28


Types: Female holotype and male allotype, plus paratypes, in the collection of Cornell University, Ithaca, N.Y.

Type locality: Ithaca, N.Y.


Host: Phytophagous in the seeds of sumac, _Rhus typhina_, _R. glabra_, and _R. copallina_.

Remarks: This widespread species occurs wherever its host, sumac species, are found. The oval abdomen with the sixth tergum equal in length to four and five combined, the reduced sculpturing on the lateral surface of the sixth, and its smaller size, will help to differentiate this species from _E. seminis_ Bugbee.

65. Eurytoma levo, new species

Map 29

Female: Black. Length averages 3.3 mm. (2.5–3.8). Abdomen averages 2.0 mm. (1.7–2.4) in length; plump with slight lateral compression; laterally and ventrally dark brown to rufous, shiny black dorsally only; oval from a lateral and dorsal view; sculpturing limited to lower half of segment six or less. Ninth tergum short and broad, averaging .15 mm. (.12–.17) in length. Internal genitalia with the dorsal valves mediumly narrow for horizontal length or the length of the exposed portion of the ninth tergum is about two-thirds the width of the dorsal valves at their widest point; dorsal and ventral valves turn dorsally, anteriorly, at less than a right angle; stylet arch oblique; whole structure averages 1.6 mm. (1.5–1.7) in length and 1.0 mm. (.09–1.1) in height; thus height averages 62 percent of the length. Tegula dark brown. Propodeum broad; shallowly depressed; wide median furrow indicated dorsally by lateral carinae for about one-half or less of length; surface of furrow crossed by irregular horizontal ridges; deep pit absent at base of propodeum; lateral areas narrow; dorsal carina flat across top of furrow. Antenna filiform, with the scape yellowish brown and flagellum dark brown; segments of funicle moniliform, longer than wide; legs with dark-brown to black infuscation on all femora; dark brown on middle of mid- and hindtibiae and often on foretibiae; knees and apices yellow and foretibiae may be also; medial and outer faces of forecoxae may be yellowish brown. Wing
veins yellow; marginal broader than postmarginal; marginal averages .26 mm. (.25–.30) and postmarginal averages .26 mm. (.22–.30) in length; thus marginal and postmarginal often equal in length; stigmal club small and rectangular in shape.

Males: There are only two males in the series that are curled up so that a true measurement of their length cannot be made. Probably averages 2.18 mm. in length. Abdomen shiny black to very deep brown. Tegula dark brown. Scape of antenna black except base which may be yellowish brown. Legs with black or dark brown on all femora and tibiae; apices and knees yellowish brown. Wing veins much the same as in the female; marginal averages .25 mm. and postmarginal .23 mm. in length.


Type locality: King and Queen Co., Va. Collected June 5 and 8, 1940. L. A. Hetrick collection.

Distribution: United States: Known only from Virginia.

Host: Parasite of pine xyelid gall.

Remarks: The marginal vein is broader than the linear postmarginal and the two veins are most often equal in length. The female genitalia are short in relation to the height and the dorsal valves are narrow for their horizontal length. Scape and tegula are yellowish brown.

66. Eurytoma crassineura Ashmead

Map 29

_Eurytoma crassineura_ Ashmead, 1894, p. 324.—Schedl, 1932, pp. 1, 2.—Peck, 1951, p. 576.

Types: U.S. National Museum no. 25508. Type series consists of 6 females and 3 males of which 1 female has been labeled and designated as lectotype.

Type locality: Morgantown, W. Va. from _Scolytus rugulosus_ Ratzeburg.


Remarks: The rectangular-shaped abdomen, very broad dorsally, with the long sixth abdominal tergum that often covers the seventh tergum and that lacks sculpturing except at the extreme ventral, anterior edge, help to distinguish this species. In addition, the
slightly longer petiole that has its width about equal to its length, the broad postmarginal vein that is usually twice the length of the marginal, the very weakly developed female genitalia with widespread and broad dorsal valves, and the stylet arch in a horizontal plane make this species quite distinct.

67. *Eurytoma parva* Phillips

*Maps 30, 35*

*Eurytoma bolteri* var. *parva* Phillips, 1918, pp. 11, 14.—Gahan, 1933, pp. 1-147.

*Eurytoma bolteri* Riley *parva* Girault, 1920, pp. 207, 208.


*Eurytoma bolteri parva* Peck, 1951, p. 575.

Types: Female holotype and 5 female paratypes in the U.S. National Museum, no. 23779.


Additional hosts: *Cephus cinctus* (Department of Agriculture collection, Ottawa, Canada).

Remarks: This species has never had a full description published. Phillips (1918) published a picture but did not give a description because he was using a manuscript name given the species by Girault. Girault’s paper (1920) was delayed in publication and does not contain a description either but merely a reference to some specimens from Youngstown, Ohio, Front Royal, Va., Holliday, Utah, and Waterloo, N.Y., with a few notes on scape color, wing vein length, and on variation in the median channel of the propodeum. Thus the species is credited to Phillips. I have been unable to discover all the specimens that Girault mentions, but the three females from Falls Church, Va. (R. A. Cushman collection) from lepidopteran galls on *Solidago* have been determined by me as *Eurytoma bolteri* Riley. The type specimens in the U.S. National Museum, collected by Phillips, are quite different from *E. bolteri*. On the basis stated above, I doubt that *E. parva* has been bred from lepidopterous galls on *Solidago* as stated in Girault’s paper.

In the description of *Eurytoma atripes*, Gahan (1933) points out that *E. atripes* and *E. parva* are very similar. He further suggests that the two species may be one and the same. He separates the two on the basis of the smaller size and the shorter funicle joints of *E. atripes*.
Both species are bred from wheat, but *E. atripes* parasitizes Hessian fly puparia (*Phytophaga destructor* (Say)) and *E. parva* destroys larvae of the wheat jointworm (*Harmolita tritici* (Fitch)). There are also records of both species having been bred from the larvae of the wheat stem sawfly (*Cephus cinctus* Norton). *E. atripes*, so far as I have been able to determine, has never been observed emerging from *H. tritici* larvae. Until suitable life-history studies are made that show that these two species of *Eurytoma* are either restricted to distinct hosts or will parasitize the same hosts, it seems best to treat them as two good species.

*E. parva* displays an additional characteristic that can be used to separate it from *E. atripes*. The propodeum has a wider median furrow with lateral and median carinae that extend ventrally about three-fourths the length of the propodeum before fading out. Below the furrow the surface is finely punctate.

68. *Eurytoma fusca*, new species

**Map 30**

Female: Black. Length averages 2.1 mm. (1.8–2.9); abdomen plump; oval from a lateral view and with some lateral compression; length averages 1.4 mm. (1.2–1.6); sixth abdominal segment at longest point averages .47 mm. (40–.55); fine pitting limited to lower anterior quarter of lateral surface of sixth; surface of rest of segment smooth; ninth abdominal segment short but sharply pointed, averaging in length .15 mm. (.12–.17). Internal geintalia short and weakly developed dorsally, anteriorly; dorsal valves narrow for horizontal length and bend dorsally at less than a right angle anteriorly; stylet arch in an oblique plane but only a little above a horizontal plane; whole structure averages 1.4 mm. in length, .73 mm. in height, and expanded dorsal extension of ventral valves averages .12 mm. in width. Propodeum only slightly depressed to flat; median furrow absent or indicated in upper one-half only; surface finely punctate; slightly arched dorsal carinae curves ventrally for about one-third length of propodeum and then fades out or turns laterally. Scape of antenna most often with outer face black to dark brown, except yellowish-brown base; less often lower half yellowish brown; rest black to dark brown; segments of flagellum slightly longer than wide; first the longest, two to five about equal, six to eight closely fused as a terminal unit. Legs most often with black to dark brown on all femora and tibiae; knees and apices yellowish brown; less often foretibiae all yellowish brown. Tegula often deep reddish brown. Wing veins straw yellow; marginal longer than postmarginal; marginal averages
.24 mm. (.20–.27) and postmarginal averages .18 mm. (.17–.20) in length.

Male: Black. Averages 1.6 mm. (1.1–2.1) in length. Scape with outer face black to dark brown. Black to dark brown on all femora and tibiae of legs, except for knees and apices which are yellowish brown. Wing veins light yellow; marginal averages .23 mm. (.20–.27) and postmarginal averages .18 mm. (.15–.22) in length.


Type locality: Crown Point, N.Y., July 19, 1934, O. H. Hammer collection.


Host: Bred from apple curculio material, Tachypterellus quadrigibbus (Say), T. q. magnus List, and T. consors Dietz.

Remarks: This species is close to Eurytoma mali, new species, but can be separated from it by its much smaller size, more black to dark-brown infuscation on the legs, and the shallower more uniformly punctate propodeum.

It is probably a primary parasite of the apple curculio. Specimens which were determined as Eurytoma tylodermatis have been shown by Parker and Lamerson (1934) and Hammer (1936) to be external parasites of the larvae, pupae, and occasionally adults of T.q. magnus List and T. quadrigibbus (Say). Although this smaller species is bred from the Apple Curculio along with E. mali, and both species occurred in the same series, they can be easily separated by the characteristics mentioned above.

69. Eurytoma iniquus Bugbee

Map 31

Eurytoma iniquus Bugbee, 1951, pp. 253, 254.—Burks, 1958, p. 81.


Type locality: Manitou, Colo.


Host: Diplolepis neglecta (Gillette) (=D. tuberculatrix) on Rosa species.

Remarks: The short ninth tergum averaging .15 mm. in length, combined with the broad marginal vein in contrast to the linear postmarginal, and the narrow dorsal valves that turn at right angles dorsally, anteriorly, with the ventral valves so that the stylet arch is vertical, help to characterize this species.
70. *Eurytoma flavicrurensa* Bugbee

**Map 31**

*Eurytoma flavicrurensa* Bugbee, 1951, pp. 258, 259.—Burks, 1958, p. 81.


Type locality: Ashland, Oreg.


Host: *Diplolepis polita* (Ashmead) variety on *Rosa* species.

Remarks: This species differs from other eurytomids from rose galls in the yellow legs including the fore and midcoxae.

71. *Eurytoma longavena* Bugbee

**Map 35**

*Eurytoma longavena* Bugbee, 1951, pp. 249, 250.—Burks, 1958, p. 81.


Type locality: Terrace, B. C., Canada.

Distribution: Canada: British Columbia.

Host: *Diplolepis bicolor* (Harris) subspecies on *Rosa* species.

Remarks: The unusually long marginal vein that averages 1.4 times the length of the postmarginal and the long sixth tergum with the sculpturing reduced to the lower one-third of the lateral surface aid in differentiating this species.

72. *Eurytoma studiosa* Say

**Map 32**


*Eurytoma succinipedis* Ashmead, 1881, p. 31.


Female: Mostly black. Length averages 2.6 mm. (2.3-3.2). Abdomen deep reddish brown to black; oval from a side view and broadly oval from a dorsal view indicating only slight lateral compression. Length of abdomen averages 1.3 mm. (1.3-1.5); long sixth segment equal to four and five combined and lateral surface finely scaled or pitted on lower half to one-third only. Ninth tergum mediumly elongate and pointed, averaging .13 mm. (.10-.17) in length. Internal genitalia with the dorsal valves narrow or mediumly wide for horizontal length; dorsal and ventral valves turn dorsally, anteriorly at less than a right angle, and expanded plate of ventral valves bends only slightly posteriorly; stylet arch and fulcal plate in an oblique rather
than a vertical plane; whole structure averages 1.5 mm. \((1.4-1.9)\) in length and .98 mm. \((.87-1.2)\) in height; thus the height averages about 65% of the length. Thorax black or with a deep reddish-brown tinge. Tegula brown to black. May be a few weak striae on lower part of face. Propodeum shallowly concave with a wide median furrow that may be complete to base; furrow may narrow toward base; central carina divides furrow into squares with largest at top; carina may be complete to base or fade out about halfway down; surface of squares shiny and smooth; large carinated pits dorsolateral to furrow; lateral areas with rough-pitted and ridged surfaces. Scape of antenna yellowish brown to black; flagellum distinctly 6-jointed; joints longer than wide but they become progressively shorter distally so fourth and fifth may be almost square. Legs with black or deep reddish-brown infuscation on all femora and mid- and hindtibiae or fore- and midlegs yellow and hindlegs with infuscation only; coxae black or deep reddish brown. Wing veins yellow, linear; marginal always longer than postmarginal; averaging \( .29\) mm. \((.25-.37)\) in length and postmarginal averages \( .21\) mm. \((.17-.27)\); thus postmarginal is equal to about 72% of length of marginal.

Male: Black. Averages \(2.2\) mm. \((1.8-2.6)\) in length. Tegula black or deep brown. Scape black or base may be yellow. Antenna with the flagellum seven segmented; first five segments truncate and pedicellate on distal ends and all about equal in length; six and seven closely applied together but separated by a shallow annulation. Legs with black infuscation on all femora and tibiae except forelegs in a few; coxae black. Petiole slightly longer than hindcoxa which averages about 85 to 90% length of petiole.


Host: Neotypes from *Acraspis pezomachoides* (Osten Sacken) on *Quercus alba*, Kinsey determined.

Range: The United States wherever oak occurs.

Additional host records from specimens in the study collections include: *Acraspis hirta*, *A. erinacei*, *A. macrocarpae*, *A. villosa*, *A. derivatus*, *A. ozark*, *A. gemmula*, *Andricus ignotus*, *A. ciatricula*, *A. flocci*, *Callirhytis elongata*, *C. dacula*, *C. seminator*, *Disholcaspis spongiosa*, *D. washingtonensis*, *D. quercus-globulus*, *D. succinipes*.

Remarks: The additional hosts indicated below were taken from the list compiled by Peck (1951, *in* Muesebeck et al., Monogr., no. 2, U.S. Dept. Agric.):
Rhodophaga batatus Walsh, R. brassicoides Osten Sacken, R. cornuta Walsh, R. strobiloides Walsh, dipterous gall on Leptilon canadense, galls of Euura nodus Walsh, E. salicis-ovulum (Dalla Torre), E. perturbans (Walsh), Nematus hospes (Walsh), Amphibolips spongifica (Osten Sacken), Callirhytis seminator (Harris), Diastrophus fragariae Beutenmuller, Dryocosmus palustris (Osten Sacken), Xanthoteras forficorne (Walsh), Mordellistena nigricans (Melsheimer) in galls of Eurosta solidaginis Fitch, Euura orbitalis Norton, E. salicicola Smith, Phylloxera caryae-fallax Riley, P. c.-globuli Walsh, Lasioptera solidaginis Osten Sacken.

Eurytomid specimens from most of the above hosts were not encountered in the various collections studied so that I can vouch for only those detailed following the redescription of E. studiosa.

The majority of hosts belong to the gall-making genera, Acraspis and Andricus of the family Cynipidae.

E. studiosa is an extremely variable, wide ranging species with a wide selection of hosts. It probably contains several subspecies and might be separated into two or more species. The whole complex needs more detailed morphological and life-history studies so that accurate host data can be secured.

The original types of E. studiosa are believed lost. In the U.S. National Museum collection are several specimens determined by Ashmead as this species from Jacksonville, Fla. However, they do not seem to fit the original description too well. The original description is rather meager and so generalized that it could be applied to any number of eurytomid species. In one respect, however, Say's description is quite clear—that the color of the legs (i.e., femora and tibiae) is dark, except for the "whitish" tarsi. This is not much to go on, but the specimens determined by Ashmead and other specimens determined later by A. B. Gahan have yellow legs with at the most some light-brown infuscation on the femora and tibiae, as well as yellowish-brown fore- and midcoxae. Say's description also implies that the general coloration of the species is black. Many of the specimens in the collection of the U.S. National Museum have brown abdomens, yellow to brownish scapes and tegulae. In addition, Say's original specimens came from Indiana; and the neotype specimens from Bloomfield, Ind., bred from Acraspis pezomachoides on Quercus alba, seem to come closer to Say's description than any other material examined.

Ashmead (1887) lists E. lanulae Fitch, E. teredon Walker, E. pythes Walker, and E. bolteri Riley as synonyms of E. studiosa. E. bolteri Riley is a good species. I have been unable to check the two Walker species, so they are not included. E. lanulae is represented in the
U.S. National Museum by a single female whose characteristics fall within the range of variation of *E. studiosa* as limited in the revision.

73. *Eurytoma spongiosa* Bugbee

*Eurytoma spongiosa* Bugbee, 1951, pp. 254-257.—Burks, 1958, p. 82.


Type locality: Bloomington, Ind.


Host: *Diplolepis rosae* (Linnaeus), *D. dichlocera* (Harris), and *D. iuberculator* (Cockerell) on *Rosa* species.


Remarks: *E. spongiosa* is the eurytomid parasite bred from the common mossy rose gall (*Diplolepis rosae* (Linnaeus)) on wild rose. Its small oval abdomen with only slight lateral compression, short sixth abdominal tergum that is about the same length as the fifth, black tegula, and its weakly developed female genitalia, anteriorly, with the stylet arch in a horizontal plane are distinguishing characteristics in addition to those given in the key.

71. *Eurytoma obtusa*, new species

*Figure 28; Map 31*

Female: Black. Length averages 3.3 mm. (3.0-4.1). Abdomen plump; slight lateral compression; averages 1.9 mm. (1.8-1.9) in length, first segment, in lateral view, rises abruptly almost straight dorsal from petiole before curving posteriorly. Sixth segment, viewed laterally or dorsally longer than segments four and five together; averages .74 mm. (.70-.80) in length; sculpturing on lateral surface of sixth covers lower half to three-fourths then recedes anteriorly; does not extend over dorsal surface; ninth abdominal segment short and stubby, averaging .13 mm. (.12-.15) in length; fringe of hairs limited to tip and along ventral margin, covering posterior third to quarter of segment; rest naked; cercus close to ventral margin and oval in outline. Internal genitalia averages 1.7 mm. (1.6-1.8) in length, .97 mm. (.95-1.0) in height, and anterior expanded plate of ventral valves averages .18 mm. (.17-.20) in width at widest point; whole structure short but sturdy; dorsal valves wide for horizontal length except just anterior to exposed tips; dorsal and ventral valves turn dorsally, anteriorly at less than a right angle; stylet arch in an
oblique plane. Propodeum depressed and with a narrow, shallow, but distinct median furrow; widest at top; lateral carinae converging immediately below two large rectangular depressions at top of furrow; lateral to rectangular depressions; leading lateroventrally, are three or four pentagonal- or hexagonal-sided pits; below these, rest of lateral areas covered with fine small pits. Tegula black. Scape of antenna all yellowish brown or with upper tip dark brown; segments one to five of flagellum longer than wide and moniliform; segment six closely applied to segment seven but separated by a distinct annulation; six to eight form terminal unit; flagellum filiform. Legs all yellowish brown except black coxae and white tarsi or may be dark brown on base of forefemora and medially on hindfemora; wing veins thin, yellow in color; marginal averages .31 mm. in length (.30-.37) and postmarginal averages .25 mm. (.22-.27); thus the marginal is always longer than the postmarginal.

Male: Black. Averages 2.6 mm. (2.1-3.2) in length; scape of antenna with lower half to two-thirds yellowish brown, rest black; segments one to five pedicellate and slightly constricted; six separated from seven by a distinct annulation; all segments longer than wide; two to five with two whorls of long hairs. Legs light yellowish brown, except hindfemora which are brown or black medially; tarsi white. Marginal vein averages .29 mm. (.27-.32) in length and postmarginal averages .20 mm. (.20-.22).


Type locality: Haddon Heights, N.J., collected Aug. 8, 1931, by L. J. Bottimer.

Host: Bred from Bruchus brachialis Fahraeus in seeds of Vicia villosa (Hairy vetch).

Distribution: The host weevil (B. brachialis) of this species was introduced from Europe into the United States and first discovered at Haddon Heights, N.J. in June 1930 (Pinckney, 1937). Bridwell and Bottimer (1933) give the distribution of the host as New Jersey, Delaware, Maryland, North Carolina, and Virginia. Peairs (1947) and Peairs and Davidson (1956) add Georgia, and state that it has been "recorded in a limited area near Portland, Oregon, and in Washington." The only parasite specimens that I have seen came from the type locality.

Remarks: This species is close to E. tylodermatis in size, length of abdomen, relation of length of marginal and postmarginal veins, genitalic, and antennal characteristics. It differs in possessing a
shorter ninth abdominal segment, a more dorsally arched and plumper abdomen, lighter colored scape of the antenna, and its range.

75. Eurytoma imminuta Bugbee


Type locality: Pyramid Lake, Nev.


Host: *Diplolepis variabilis* (Bassett) variety on *Rosa puberulenta*.

Remarks: Although close to *E. spongiosa*, this species can be separated by its very short dorsal valves (ninth tergum) that average .10 mm. (.07-.12) in length, and the narrow and deep, complete median furrow on the propodeum.

76. Eurytoma bolteri Riley


Types: 3 females, no. 2789 in the U.S. National Museum.

Type locality: One of the female types bears the no. 38E. The following notations under type locality were taken from a card file in the U.S. National Museum. Washington, D.C., galls collected Aug. 1867; emerged May 1, 1868.


Host: *Gnorimoschema gallaesolidaginis* (Riley) on *Solidago* species.

Remarks: The commonest host for this species is *Gnorimoschema gallaesolidaginis* on *Solidago* species. Other host designations are questionable as I have bred many specimens of eurytomids and never recovered this species from any other host.

*E. bolteri* is a large species averaging 5.0 mm. in length. The marginal and postmarginal veins are most often equal in length, and the propodeum is wide with a shallow concavity, in the center of which is a narrow, shallow median furrow that narrows ventrally. The lateral surface of the sixth tergum is heavily sculptured to the dorsal surface where sculpturing becomes lighter and may continue over dorsal surface along anterior border, or fade out altogether.
77. *Eurytoma spina* Bugbee

**Map 34**

*Eurytoma spina* Bugbee, 1951, pp. 250, 251.—Burks, 1958, p. 81.

Types: 5 females; holotype female, paratypes in U.S. National Museum collection, no. 61234.

Type locality: La Grande, Oreg.


Host: *Diplolepis tuberculata* var. *versicolor* Kinsey and Ayres on *Rosa* species.

Remarks: Characteristics in addition to those in the key include the length of the ninth tergum that averages .22 mm., the length of the marginal and postmarginal veins (the marginal averages only .04–.05 mm. longer than the postmarginal), and the weakly developed female genitalia with wide dorsal valves for horizontal length.

78. *Eurytoma picea*, new species

**Map 35**

Female: Black except for brown wing veins, yellow base of scape, and extremities of femora, tibiae, and whitish tarsi. Length averages 3.6 mm. (3.1–4.1). Abdomen oval from lateral and dorsal views; medium lateral compression so that greatest width in cross section is nearer middle; sixth tergum about two times the length of the fifth; smooth and shiny surface except for fine scaling on lower, anterior half; ninth tergum elongate, averaging .22 mm. (.24–.25) in length. Internal genitalia with narrow dorsal valves that turn dorsally, anteriorly, with the ventral valves at slightly less than a right angle so that stylet arch and fulcral plate are in an oblique plane; dorsal valves dark brown to black for entire length; whole structure averages 1.7 mm. (1.6–1.8) in length and .97 mm. (.95–1.0) in height. Propodeum narrowly concave with a wide, shallow, complete median furrow that narrows toward base; central carina about one-quarter to three-quarters length of furrow; surface between horizontal ridges within furrow, smooth and shiny; lateral areas narrow or nonexistent. Antenna with a flagellum of five truncate, slightly moniliform, segments; sixth separated from the terminal unit by a shallow annulation. Legs with black to dark-brown infuscation on all femora and tibiae. Wing veins brown; marginal about two times the width of postmarginal, quite long, averaging .40 mm. (.35–.50) in length; postmarginal averages .27 mm. (.22–.32) in length.
Male: Color as in the female except that scape is entirely black. Length averages 2.2 mm. (2.1–2.4). Abdomen sculptureless dorsally and laterally. Umbilicate punctures on mesothorax with interstices sculptureless. Antenna with five pedicellate segments and a terminal unit of two closely fused segments in flagellum; segments two to five with two whorles of long hairs. Marginal vein averages .36 mm. (.32–.40) and postmarginal averages .25 mm. (.22–.27) in length.


Host: *Pissodes sitchensis* Hopkins on *Picea sitchensis*.

Remarks: This new species runs smaller than *Eurytoma pissodis*; has more infuscation on the legs; brown wing veins; less sculpturing on the sixth abdominal tergum and a distinct, complete median furrow on the propodeum. Its host is a different species of weevil occurring on the Sitka Spruce (*Picea sitchensis*).

79. *Eurytoma calcarea* Bugbee


Type locality: Wellsville, Utah.

Distribution: Eastern two-thirds of the United States from the Atlantic coast west to Oregon and south to Kansas.

Host: *Diplolepis variabilis* (Bassett) and *D. bicolor* (Harris) on *Rosa* species.

Subspecies: Description, Bugbee (1951).

*Eurytoma calcarea ignobilis* Bugbee (USNM 61228). Nebraska. Host: *Diplolepis bicolor* (Harris).


E. c. mimica Bugbee. Maine and Massachusetts. Host: 
D. bicolor (Harris). (USNM 61231.)
E. c. singularis Bugbee. Massachusetts. Host: D. nebulosus 
(Bassett). (USNM 61232.)
Remarks: The dorsal and ventral valves of the female genitalia turn 

dorsally, anteriorly, at right angles so that the stylet arch is in 
an oblique plane and the dorsal valves are uniformly narrow for their 
horizontal length (see figs. 9 and 10, Bugbee, 1951).

80. Eurytoma apiculae Bugbee

Eurytoma apiculae Bugbee, 1966, pp. 210-211.

Types: 21 females and 17 males. Holotype and allotype from a 
series of 8 females and 10 males from Contra Costa County, Calif. 
Collected July 8, 1965, from nest of Ceratina punctigena, nos. 261 and 
142 c, d, e, h, by T. Brown and H. Daly. Types and paratypes in the 
U.S. National Museum, Univ. of California, Berkeley, and Bugbee 
collection, Allegheny College, Meadville, Pa.
Type locality: Contra Costa County, Calif., Russel Tree Farm. 
Host: Ceratina punctigena Cockerell, C. nanula Cockerell, and 
C. dallatorreana Friese.

81. Eurytoma mali, new species

Figures 18, 27; Map 36

Female: Black. Averages 4.1 mm. (3.4-4.8) in length. Abdomen 
plump with only slight lateral compression, averaging 2.4 mm. in 
length (2.1-2.6); sixth abdominal segment long, averaging .74 mm. 
(.65-.80); sculpturing on lateral face of sixth limited to half lower 
ninth segment elongated and sharply pointed, averaging .25 mm. in 
length (.20-.30); internal genitalia averages 1.9 mm. (1.5-2.1) in 
length and in height 1.1 mm. (1.0-1.2); expanded anterior plate of 
ventral valves averages .19 mm. (.15-.22) at widest point; dorsal 
valves narrow for horizontal length and turn dorsally with ventral 
valves, anteriorly, at a right angle in relation to horizontal length; 
stylet arch oblique or halfway between a vertical and horizontal 
plane. Propodeum concave; indications dorsally of a wide, shallow 
median furrow that may fade out completely in lower quarter; 
lateral areas with uneven surface finely punctate and irregularly 
ridged, and without deeper five- or six-sided punctures limiting areas 
dorsally. Tegula deep brown to black. Antenna with the outer 
face of scape all yellowish brown; segments one to five of a flagellum
longer than wide and truncate distally; six separated from seven by a shallow annulation; flagellum filiform. Legs may have all femora and tibiae yellowish brown or hindfemora may be brown to dark brown medially. Wings with the veins yellow to brown; marginal vein thin and long, averaging .38 mm. (.35-.40) in length; postmarginal shorter than marginal, averaging .30 mm. (.27-.32) in length; stigmal club narrowly rectangular in shape.

Male: Black. Averages 3.3 mm. (3.0-3.6) in length. Outer face of scape black except yellowish-brown basal extremity. Legs with femora and tibiae of fore- and midlegs yellowish brown; hindfemora dark to light brown, except yellowish-brown apices and knees; hind-tibiae yellowish brown. Wing veins brownish yellow to straw yellow; marginal vein longer than postmarginal; marginal averages .37 mm. (.35-.40) in length; postmarginal averages .27 mm. (.25-.27).


Type locality: Troy, Kans. Collected or bred (?) July 2–14, 1932. P. G. Lamerson collection.


Hosts: Parasite of the apple curculio, Tachypterella quadrigibbus (Say), T. q. magnus List, and T. consors Dietz.

Remarks: This species is apparently widespread, occurring wherever apples are grown and its hosts, the apple curculio, Tachypterella quadrigibbus or T. consors, are present. The importance of the parasite as a natural control of the host is great. Parker and Lamerson (1934) credit it with over half of the total parasitism of the curculio (T.q. magnus) in northeast Kansas in the years 1932–1933. Ritcher (1936), using the name E. tylodermatis, states that it was the most important and numerous parasite in Wisconsin in 1934–1935, where parasitism ran as high as 40–63%. Hammer (1936) lists it again as E. tylodermatis, from T. quadrigibbus in the Champlain Valley.

Distinguishing features of this species are the extremely narrow dorsal valves of the female genitalia, the reduced sculpturing on the sixth abdominal segment, the all yellowish-brown legs with the exception of the reddish-brown tinge to the hindfemora, and the longer than wide segments of the antenna. It resembles E. fusca, new species, but the characteristics mentioned above will separate them.
82. *Eurytoma diastrophii* Walsh

**Map 37**


Types: Walsh (1870) states that there were 2 males and 19 females on which his description was based. In the U.S. National Museum is a single male, bearing the type no. 1532 and the notation, "through A. Bolter, 1890." This male specimen is probably not one of the original types. In order to have something more definite to go by, I have chosen a neotype female from Bloomington, Ind. The female emerged May 23, 1933, from a gall of *Diastrophus nebulosus* collected by R. Bugbee on Apr. 12, 1933, on *Rubus* species, Kinsey determined. An additional neoparatype series from the same locality, date of collection, and host includes 49 males and 28 females that emerged from May 23–30, 1933. Neotype female and neoparatypcs in the Bugbee collection, Allegheny College, Meadville, Pa. and in the U.S. National Museum, Washington, D.C.

Type locality: Probably from the vicinity of Rock Island, Ill. where Walsh conducted much of his collecting. Neotype locality, Bloomington, Ind.


Remarks: The host record *Callachna gibba* (Loew), is very doubtful as this species seems to be restricted to gallmakers on blackberry belonging to the cynipid genus *Diastrophus*.

This is a medium-sized species averaging 3.9 mm. in length. The propodeum displays an incomplete, weakly developed median furrow in the upper half to one-quarter, or furrow may be absent entirely. Ninth tergum averages .26 mm. (.17–.32) in length. Female genitalia moderately developed anteriorly, so that stylet arch is in an oblique plane.
Appendix

Species Not Included in the Revision

The species listed below have not been included in the revision for one or more of the following reasons: Types not checked by the author; types inadequate to make a satisfactory judgment; types lost; the original description too brief or general to allow a definite decision; inclusion in the genus *Eurytoma*, as limited by the generic description, doubtful.

The types of the six species *Eurytoma abatos*, *E. cretheis*, *E. hecale*, *E. pythes*, and *E. teredon*, described by Walker (1843) and *E. iphis* Walker (1846), are located in the British Museum and I have not been able to check them personally. Letters from M. F. Claridge, Department of Zoology, University College, Cardiff, England, and G. J. Kerrich of the British Museum, London, give their impressions of the Walker types. They seem to agree that *E. iphis*, *E. cretheis*, and *E. pythes* are probably not true *Eurytoma*. The British Museum did loan me a single cotype male of *E. teredon*, and it is a good *Eurytoma*, but the single male specimen is insufficient to determine the status of the species.

*E. abnormicornis* Walsh (1870). This species was described from a single female captured at large that seems to be lost. The three males in the U.S. National Museum collection under this species are not adequate to determine the position of the species.


*E. albitarsis* Ashmead, nomen nudum (Bugbee, 1956).

*E. ashmeadi* (Ashmead). Ashmead (1894, page 327) described *Eurytomocharis minuta* and designated it as the genotype. *Minuta* was preoccupied by Walker (1832), and so the new name was proposed by Peck (1951, page 575) who, at the same time, placed *Eurytomocharis* as a synonym of *Eurytoma*. Until the genera of the family *Eurytomidae* are revised, I would exclude *ashmeadi* from the genus *Eurytoma*.

*E. aulacis* Ashmead, nomen nudum (Bugbee, 1956).

*E. brachypterum* (Ashmead). This species was originally described as *Systole brachyptera* by Ashmead in 1886 (page 126). In 1894 (page 328) he transferred the species to *Evoxysoma* and in 1951 (page 574) Peck placed the genus as a synonym of *Eurytoma*. The very elongate abdomen is not typical of the genus *Eurytoma*, so the species is not included in the revision.
E. floridana (Ashmead) 1887, was described as Lamprostylus floridanus from a single male captured at large and transferred to the genus Eurytoma by Peck (1951). The shape and sculpturing of the abdomen are not typical of Eurytoma.

E. hegebi, nomen nudum (Bugbee, 1956).

E. lanulæ Fitch, 1859. This species is a synonym of Eurytoma studiosa Say, 1836, according to Ashmead, 1887. The single female type, no. 1824, in the U.S. National Museum collection would fall within the range of variation of E. studiosa.

E. maga Girault, 1920. Removed to the genus Prodecatoma (Bugbee, 1956).

E. medicaginis (Gahan). Transferred to the genus Tenuipetiolus (Bugbee, 1951).

E. mühlenbergiae (Howard), 1896. Removed to the genus Eurytomocharis (Bugbee, 1956).

E. nevadense Ashmead, 1894. This species is represented by a single male specimen located in the collection of the Philadelphia Academy of Science.

E. orbiculata Say, 1836. Described from a single male specimen that seems to be lost. The description is not complete enough to place this species with certainty.

E. polygraphi (Ashmead). Transferred to the genus Ipideurytoma (Bugbee, 1956).

E. querci-pisi (Fitch), 1859. Described originally in the genus Macroglenes, the species was removed to Eurytoma by Ashmead in Smith’s, “Insects of New Jersey,” 1900. The holotype female, no. 1830, in the U.S. National Museum collection has the abdomen broken off and glued on a tip below the rest of the specimen. It is possible that this is not the original type as it does not fit the original description. The specimen is yellow to reddish brown and Fitch describes the species as black.

E. sculpta Ashmead, 1887. Transferred to Bruchophagus (Bugbee, 1956).

E. triodiae (Howard), 1896. Holotype female no. 2755 in the U.S. National Museum. Howard placed this species in the genus Eurytomocharis but Peck in Muesebeck, Krombein and others (1951) placed it in Eurytoma. Until the genera of the family Eurytomidae are studied and more clearly delimited, I prefer to exclude this species from Eurytoma, chiefly on the basis of the lack of any sculpturing on the lateral surface of the sixth tergum.

E. vítis (Saunders), 1869. Although transferred to the genus Eurytoma by Peck (1951), this species belongs in the genus Evorysoma, which seems to be a recognizable genus (see Bugbee, 1936, pages 199, 200).
Fossil Species

_Eurytoma sepulta_ Brues, 1910. Described from three specimens, no. A9 (type), A103 both from Station 14 and no. 2100, MCZ, Florissant, Colo. Types in the American Museum of Natural History.

_Eurytoma sequax_ Brues, 1910. No. A120 from Station 14, Florissant, Colo. Type in the American Museum of Natural History.

**Parasites and Hosts**

_Eurytoma acuta_ Bugbee

_Diplolepis tuberculator_ var. _zerophila_ Kinsey and Ayres.  
_D. areflecta_ (Gillette) on _Rosa_ species.

_E. altifossa_ Bugbee

From galls on _Oxytropis lamberti_; host relationship not stated.

_E. apiculae_ Bugbee

_Ceratina punctigena_ Cockerell  
_C. nanula_ Cockerell  
_C. dallatorreana_ Friese

_B. appendigaster_ (Swederus)

_Macrocentrus ancyliovus_ Rohwer  
_Apanteles solitarius_ (Ratzeburg)  
_Cremastus minor_ Cushman

_E. atripes_ Gahan

_Phytophaga destructor_ (Say)  
_Cephus cinctus_ Norton  
_Bracon cephi_ (Gahan)

_E. auriceps_ Walsh

_Amphibolips spongifica_ (Osten Sacken)  
_A. cookii_ Gillette  
_Andricus pattoni_ (Bassett)  
_A. foliatus_ Ashmead  
_A. ignotus_ (Bassett)  
_A. flocci_ (Osten Sacken)  
_Acraspis pezomachoides_ (Osten Sacken)  
_A. erinacei_ (Beutenmuller)  
_Callirhytis lanata_ (Gillette)  
_C. seminatlor_ (Harris)  
_Diplolepis radicem_ (Osten Sacken)  
_D. welfi_ (Beutenmuller)  
_Discolaspis mammia_ (Cresson)  
_D. spongiosa_ (Karsch)  
_D. quercus-globulus_ (Fitch)

_E. baccae_ Bugbee

_Ancylis comptana_ (Frollich)

_E. bicolor_ Walsh

_Aulacidea tumida_ (Bassett)  
_A. podagrae_ (Bassett)  
_Isodontia harrisi_ (Fernald)  
_Scolytus rugulosus_ Ratzeburg  
_Eurosta solidaginis_ Fitch  
_In dried galls on stem of _Typha latifolia_; host relationship not stated.

_E. bigeloviae_ Ashmead

_Trypeta bigeloviae_ (Cockerell)
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E. bolteri Riley
Gnorimoschema gallaesolidaginis (Riley)
Eurosta solidaginis Fitch
Tylodera foveolatum Say

E. brevivena Bugbee
Disholcaspis quercus-globulus (Fitch)

E. bromi (Howard)
Phytotrophic in stems of Bromus ciliatus,
Muhlenbergia sylvatica, and timothy.

E. calcarea Bugbee
Diplolepis bilolar (Harris)
D. variabilis (Bassett)

E. californica Ashmead
Callirhytis pomiformis (Ashmead)
Andricus californicus Ashmead
Disholcaspis corallina (Bassett)
D. plumbea Kinsey
D. washingtoniensis (Gillette)

E. calycis Bugbee
Phytotrophic in buds of Pinus banksiana

E. celtigella Bugbee
Phytotrophic celtiphylla Felt

E. cleri Ashmead
Dendroctonus frontalis Zimmermann
D. monticolae Hopkins
Ips oregoni (Eichhoff)
Pissodes strobi (Peck)

E. conica Provancher
Dendroctonus frontalis Zimmermann
D. brevicomis LeConte
Pissodes strobi (Peck)
Cylindrocopturus longulus (LeConte)
Phloeosinus dentatus (Say)
Stephanoderes dissimilis (Zimmermann)

E. contractura Bugbee
Melanagromyza shineri (Giraud)

E. crassa Bugbee
Trypeta (= Callachna) gibba (Loew)
T. (= Actiurina) notata (Coquillet)
Dipterous galls on Ambrosia species

E. crassineura Ashmead
Scolytus rugulosus Ratzeburg
Magdalis armicolalis Say

E. diastrophi Walsh
Diastrophus cuscueliformis (Osten Sacken)
D. nebulosus (Osten Sacken)
D. niger Bassett
Callachna gibba (Loew)

E. discordans Bugbee
Diplolepis variabilis (Bassett)
Periclistus pirata (Osten Sacken)
Synophromorpha (= Periclistus) sylvestris
(Osten Sacken)

E. dorcaschemae Ashmead
Dorcaschema alternatum (Say)

E. eragrostidis (Howard)
Phytotrophic in stems of Eragrostis
poaceoides and Agrostis alba

E. flavicus Bugbee
Galls on Nyssa sylvatica

E. flavicurensa Bugbee
Diplolepis polita (Ashmead) var.

E. flavovultus Bugbee
Pachypsylla venusta Osten Sacken

E. fossae Bugbee
Euura pacifica (Marlatt)
E. resincola (Marlatt)

E. furva Bugbee
Disholcaspis washingtoniensis (Gillette)

E. fusca Bugbee
Tachypterellus quadrigibbus (Say)
T. q. magnus List
T. consors Dietz

E. gigantea Walsh
Eurosta solidaginis Fitch
E. gossypi E. illinoensis Host relationships unknown, reared in connection with Harmolita and from Elymus species
E. immin {Diplolepis variabilis (Bassett)}
E. incerta {Diplolepis neglecta (Gillette)}
D. polita (Ashmead)
E. tuberculatus var. descansoni Kinsey and Ayres
E. iniquus {Diplolepis neglecta (Gillette)}
E. inornata E. ruficaster (Packard) in Hibiscus stems
E. juniperinus Phytogaphous in the fruits of Juniperus virginiana
E. lacuna From galls of Protaplonz species
E. levir E. levo From pine xylel gall
E. longarena E. bicolor (Harris)
E. lutea From Elecampane
E. lycti Lyctus striatus Melsh
E. magdalis Anthribus cornutus (Say)
E. mami Anthrocopturus longulus (LeConte)
E. armicollis Say
Oncidres cingulatus (Say)
E. magnu Tachypterellus quadrigibbus (Say)
T. q. magnus List
T. consors Dietz
E. mammas Leperisinus aculeatus (Say)
Stigmus species
E. minnesota Phytophagous in Agropyron species
E. neomexicana Reared in connection with Harmolita
Phytogaphous in seeds of Sideranthus spinulosus
E. nigricoza Periclistus species
E. obtusa Bruchus brachialis Fahraeus
E. obtusiloba Diplolepis radicum Osten Sacken
E. obtusiventris Eucrassassa solidaginis Fitch
E. orchidearum Phytophagous in Cattleya species
E. pachyneuron Phytophagous in Agropyron repens, Elymus canadensis, and E. triticoides
Parasite of Harmolita tritici (Fitch) and Phytophaga destructor (Say)
Galls on Sisilias grandiflora
Harmolita tritici (Fitch)
Lepidopterous galls on Solidago
Cephus cinctus Norton
E. phloeotri Phloeothes frontalis (Oliver)
P. denticronis (Blackman)
Pityophthorus liquidembarus Blackman
Pseudopityophthorus minutissimus (Zimmermann)
P. pruinosus (Eichhoff)
Scolytus muticus Say
E. picea Bugbee
E. pini Bugbee

E. pissodis Girault
E. profunda Bugbee
(= E. maculipes Ashmead)
E. prunicola Walsh

E. querci Fullaway
E. querci-globuli (Fitch)

E. rhois Crosby
E. sciromatis Bugbee
E. semicircula Bugbee
E. seminis Bugbee
E. semivena Bugbee
E. solenozopheriae Ashmead
E. sphaera Bugbee

E. spina Bugbee
E. spongiosa Bugbee
E. squamosa Bugbee

S. abietis Blackman
Stephanoderes dissimilis (Zimmermann)
Pissodes sittheanis Hopkins
Acrobasis rubrifasciella Peck
Eucosma scudderiana Clemens
Pectinophora gossypiella (Saunders)
Rhyacionia buoliana (Schiffermuller)
R. frustrana (Comstock)
R. rigidana (Fernald)
Thyridopteryx ephemeraeformis (Haworth)
Epiblema strenuana (Walker)
Cremastus cookii Weed
Pissodes strobli (Peck)
Dryorhizogenes floridanus (Ashmead)
Belonocnema treatae Mayr
Amphibolips prunus (Walsh)
A. gainesi Bassett
Philonix fulvicollis Fitch
Callirhytis seminitor (Harris)
Acraspiis guadalupensis (Fullaway)
Andricus lasius (Ashmead)
Disholcaspis quercus-globulus (Fitch)
D. colorado (Gillette)
D. mamma (Cresson)
D. cinerosa (Bassett)

Phytophagous in seeds of Rhus typhina, R. glabra, and R. copallina
From cankers on Pinus taeda and P. elliottii caused by Cronartium fusiforme
Leptostylus gibbuleus
Phytophagous in seeds of Schmalltizia trilobata
Pachypsyilla vesicula Riley
Hemadas nubilipennis (Ashmead)
Disholcaspis spongiosa (Karsch)
D. quercus-globulus (Fitch)
D. succinipes (Ashmead)
D. sileri (Bassett)
Diplolepis tuberculatus versicolor Kinsey and Ayres
Diplolepis rosea (Linneaus)
D. dicholcerus (Harris)
D. tuberculatus (Cockerell)
D. l. wasatchensis Kinsey and Ayres
Phytophagous in seeds of Ceanothus divaricatus
C. thyraiflorus
C. cordulatus
C. velutinus
C. sanguineus
E. stigmi Ashmead
E. studiosa Say

Stigmus inordinatus Fox
Acraspis pezomachoides (Osten Sacken)
A. hirta (Osten Sacken)
A. erinacei (Beutenmuller)
A. macrocarpae Bassett
A. villosa Gillette
A. derivatus (Kinsey)
A. ozark (Kinsey)
A. gemmula (Bassett)
Andricus ignotus (Bassett)
A. cicatricula Bassett
A. flocci (Osten Sacken)
Callirhytis elongata (Kinsey)
C. clavula (Osten Sacken)
C. seminator (Harris)
Disholcaspis spongiosa (Karsch)
D. washingtonensis (Gillette)
D. quercus-globulus (Fitch)
D. succinipes (Ashmead)
D. sileri (Bassett)
D. colorado (Gillette)
Dryocosmus palustris (Ashmead)
Philonix fulvicollis Fitch
Sphaeroteras melleum (Ashmead)
Xenothertas eburnea (Bassett)
Diplolepis polita (Ashmead) var.
E. terrea Bugbee
E. tomiic Ashmead

Tomicus (=Pityogenes) plagiatus (LeConte)
Cylindrocopturus ealonii Buchanan
C. furnissi Buchanan
C. longulus (LeConte)
Epiblema strenuana (Walker)
Phloeosinus species

E. tumoris Bugbee
E. tylodermatatis Ashmead

Phytophagous in stems of Pinus sylvestris
Tyloderma foeolatum Say
Coleophora malivorella Riley
Mompha eloisella (Clemens)
Trichobaris texana LeConte
T. trinotata (Say)
Lizus scrobicollis Boheman
L. musculus Say

E. vernonia Bugbee

Tephritis (=Neotephritis) finalis Loew
Trypetid seed maggots in Vernonia interior
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Figures 1-5.—*Eurytoma pissodis* Girault, female: 1, lateral view; 2, antenna, lateral view; 3, propodeum, posterior view; 4, genitalia, lateral view; 5, forewing, dorsal view.
Figures 6–13.—Female, lateral view: 6, Eurytoma pachyneuron, abdomen; 7, E. gigantea, abdomen; 8, E. contractura, new species, abdomen; 9, E. conica; 10, E. mammae, new species; 11, E. fossae, new species; 12, E. semicircula; 13, E. contractura, new species.
Map 1.—Locality records for *E. phloecotribi*.

Map 2.—Locality records. 
*E. mammae* ○  *E. lycti* •
Map 3.—Locality records.

E. semicircula  ●  E. profunda  ●  E. conica  ●

Map 4.—Locality records.

E. magdalidis  ●  E. minnesotae  ●
Map 5.—Locality records.
E. illinoisensis ★ E. dorcaschemae ○

Map 6.—Locality records.
E. sphaera ★ E. obtusilobae ○
Map 7.—Locality records.
E. semivena E. bicolor

Map 8.—Locality records.
E. flavovultus E. lutea E. juniperinus E. eragrostidis
Map 9.—Locality records.
E. bromi • E. neomexicana ○

Map 10.—Locality records for E. pachyneuron.
Map 11.—Locality records.  
E. californica □ E. gigantea ●

Map 12.—Locality records for E. querci-globuli.
Map 13.—Locality records.

E. solenzopheriae • E. furva ○

Map 14.—Locality records for E. pissodis.
Map 15.—Locality records.

E. cleri • E. flavicrus • E. contratura

Map 16.—Locality records.

E. discordans • E. acula • E. incerta
Map 17.—Locality records for *E. prunicola*.

Map 18.—Locality records.

*E. celtigalla* • *E. lacunae* • *E. nigricoxa* • *E. querci*
Map 19.—Locality records for *E. auriceps*.

Map 20.—Locality records.

*E. brevivena* ○ *E. obtusiventris* ●
Map 21.—Locality records.

*E. vernonia* ●  *E. bigeloviae* ○  *E. levivultus* ●

Map 22.—Locality records.

*E. atripes* ●  *E. fossae* ○  *E. tomići* ●
Map 23.—Locality records.
E. appendigaster • E. altifossa ○

Map 24.—Locality records.
E. crassa • E. seminis ○
Map 25.—Locality records.

*E. tylodermatis* • *E. terrea* •

Map 26.—Locality records.

*E. stigmi* • *E. gossypii* •
Map 27.—Locality records.

E. squamosa • E. calycis • E. pini •

Map 28.—Locality records.

E. baccae • E. rhois •
Map 29.—Locality records.

E. levo • E. crassineura ●

Map 30.—Locality records.

E. parea ● E. fusca ○
Map 31.—Locality records.

E. iniquus  E. flavicrurensa  E. obtusa  E. imminuta

Map 32.—Locality records for E. studiosa.
Map 33.—Locality records for *E. spongiosa*.

Map 34.—Locality records.

*E. bolteri* • *E. spina* •
Map 35.—Locality records.

E. dorcaschemae • E. parva • E. longaveena • E. picea

Map 36.—Locality records.

E. calcarea • E. mali
Map 37.—Locality records for *E. diastrophii*. 