

A NEW FLORIDIAN *POLYCYRTIDEA* WITH COMMENTS
ON ZOOGEOGRAPHY OF FLORIDA MESOSTENINI
(HYMENOPTERA: ICHNEUMONIDAE)¹

CHARLES C. PORTER²

Department of Biological Sciences,
Fordham University, Bronx, N. Y. 10458

ABSTRACT

Polycyrtidea floridana n. sp. is described from Gainesville, Florida. Our only other United States *Polycyrtidea*, *P. limitis* Cushman from the Lower Río Grande Valley of Texas, also is described and compared. Possible zoogeographic relationships of these and other southeastern mesostenine ichneumonids are discussed.

Through courtesy of Dr. Howard V. Weems, Jr., Curator of the Florida State Collection of Arthropods, at Gainesville, I have received for study an undescribed species of the genus *Polycyrtidea* Viereck. At the same time, under grants from the Committee for Research and Exploration of the National Geographic Society, it has been possible for me to collect a series of *Polycyrtidea limitis* Cushman, a Mexican and Central American form, which has been found in the United States only in the southern tip of Texas.

Polycyrtidea is a small, primarily Neotropical genus belonging to the Subtribe Lymeonina of the Tribe Mesostenini. According to Townes (1966: 99, 1969:288), there are 5 described species and at least 6 more awaiting description. The genus ranges on the west from subtropical northern Argentina north to the Lower Río Grande Valley of Texas and on the east to Cuba and peninsular Florida, but its center seems to lie in tropical and subtropical South America. Unlike most ichneumonids, which prefer wet forests, most *Polycyrtidea* have adapted to semiarid desert or thorn scrub habitats. Thus, I have collected it in the northwest Argentine Dry Chaco and Subandean Desert, in river valleys of the Peruvian Coastal Desert, and in subtropical thorn scrub at McAllen, Texas. Little is known about the hosts of *Polycyrtidea*, but Walkley (1958:48) reported that *P. flavopicta* Ashmead has been reared in British Guiana from the schoenobiine pyralidid moth, *Rupela albinella* Cramer.

Genus *Polycyrtidea* Viereck

Polycyrtidea Viereck, 1913:382.

Type: *Polycyrtidea gracilis* Viereck. Original description.

The following diagnosis will separate *Polycyrtidea* from all other North American mesostenine genera: front with a median conical horn; epomia strong and ending above in a prominent tubercle on dorsal edge of pronotum; hind rim of metanotum without a small tooth on each side of

¹Contribution No. 332, Bureau of Entomology, Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Gainesville, Florida 32602.

²Research Associate, Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services, Gainesville.

postscutellum; areolet very small and lacking second intercubitus; base of second discoidal cell usually narrowed to a point; mediella very strongly arched; first gastric tergite extremely long and slender, without longitudinal carinae.

KEY TO U. S. SPECIES OF POLYCYRTIDEA

1. Mesoscutum with abundant large, coarse punctures, notauli reaching about $\frac{2}{3}$ its length; lower metapleuron coarsely puncto-reticulate throughout; female flagellum with white band; hind tarsus marked with white *P. limitis* Cushman
- 1'. Mesoscutum with sparse small to medium sized punctures, notauli reaching about $\frac{1}{3}$ its length; lower metapleuron becoming smooth and largely impunctate on much of upper anterior $\frac{3}{5}$; no white on female flagellum or hind tarsus.....
..... *P. floridana* n. sp.

Polycyrtidea limitis Cushman
(Fig. 1)

Polycyrtidea limitis Cushman, 1929. Holotype: female, USA: Brownsville, Texas (U. S. National Museum of Natural History, Washington, D. C.).

FEMALE. *Color*: scape dark brown above, white to pale yellow below; flagellum blackish with white band above on segments 6 or 7 to 10 or 11; head white to pale yellow with dark brown on apical $\frac{1}{5}$ to $\frac{1}{3}$ of mandible, a little dusky staining near anterior tentorial pits, more or less blackish between antennal sockets, with shining black on a broad area which reaches dorsad from antennal sockets, widens to include ocellar area, expands greatly onto occiput, reaches ventrad behind onto upper $\frac{1}{2}$ - $\frac{2}{3}$ of temple more narrowly, and finally continues rearward and below over most of postocciput; mesosoma shining black with profuse white to pale yellow markings as follows: broad band on dorsal margin of pronotum from epomia to apex, broad band on all but about median $\frac{1}{4}$ of front margin of pronotum sometimes confluent with dorsal band, apical margin to almost all of propleuron, a pair of broad longitudinal blotches on middle of mesoscutum bordering notauli externally, sometimes a pair of yellow marks on median lobe of mesoscutum along notauli, tegula, prescutellar ridge, most of scutellum, most of postscutellum, subalarum, a pair of very large narrowly separate to confluent blotches one on upper and one on lower half of mesopleuron, usually some brownish staining in sternaulus, sometimes blotch medially on mesosternum just below sternaulus or occasionally all of mesosternum yellow with brownish suffusion, upper metapleuron and sometimes most of hind rim of metanotum, almost all of lower metapleuron, very large blotch occupying most of propodeum behind weakly traceable apical trans-carina except for apical margin and a more or less large area reaching well forward from insertion of first gastric segment; gaster dull fulvous with variably developed dusky staining, especially on base of second tergite but sometimes nearly throughout, tergite 1 pale yellow on about basal $\frac{3}{5}$ and again on apical $\frac{1}{6}$, tergites 2-7 with a broad pale yellow apical band that more or less fades out laterad; fore and mid legs with coxae, trochanters, and trochantelli yellowish white with a little brown staining on

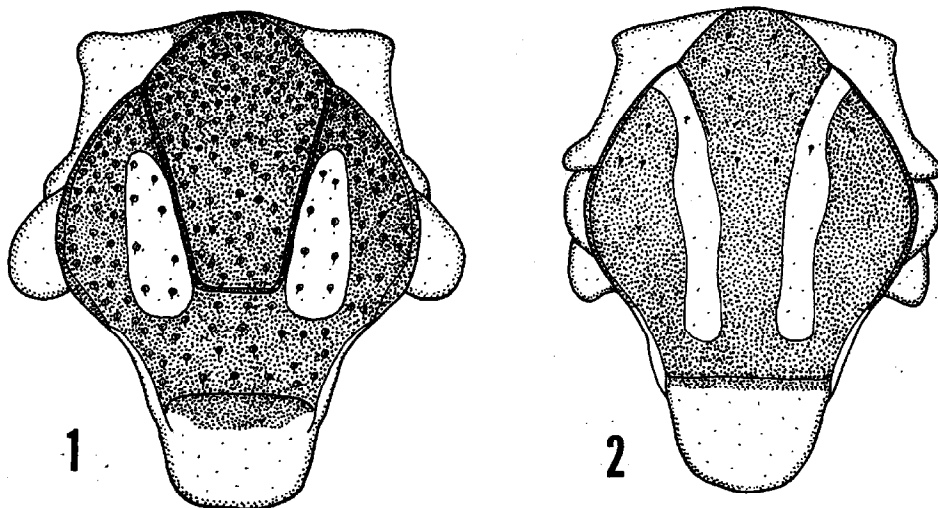


Fig. 1. *Polycyrtidea limitis*, female, McAllen, Texas. Mesonotum and dorsum of pronotum.

Fig. 2. *Polycyrtidea floridana*, female Holotype. Mesonotum and dorsum of pronotum.

apex of mid trochantellus and femora, tibiae, and tarsi fulvous with dusky staining on up to last 3 tarsomeres of fore leg and on tarsomeres 1 or 2 to 5 of mid leg; hind leg with coxa yellow with a very large black to pale brownish blotch on more than basal half of front face, a smaller black to dark brown blotch on apical half above, and a very large black to pale brownish blotch over more than basal half of hind face; trochanter and trochantellus often mostly black with yellow on apex but sometimes more extensively yellowish or brown and fulvous marked; femur fulvous, sometimes with considerable dusky staining; tibia fulvous with dusky staining briefly on base and on about apical 1/10 varying to extensively blackish with only a diffuse dull fulvous pre-basal band; tarsus blackish brown with white on apical 2/5 to 5/8 of first segment, all or almost all of second segment, sometimes in part or even throughout on third segment; wings hyaline.

Length of fore wing: 4.6-5.6 mm. *Head:* frontal horn large and high, 0.23-0.29 as long as first flagellomere. *Mesoscutum:* smooth and polished with abundant large, coarse, in part subadjacent to adjacent punctures; notauli sharply defined for about 2/3 the length of mesoscutum and with a transverse impression connecting their apices. *Metapleuron:* lower part coarsely puncto-reticulate throughout. *Propodeum:* apical trans-carina with prominent and more or less tubercular cristae, otherwise weakly and irregularly traceable. *First gastric tergite:* post petiole shining but throughout with minute wrinkling. *Second gastric tergite:* 2.7-3.4 as long as wide at apex, its surface nearly mat with very fine but strong wrinkling that becomes only a little weaker near apex.

MALE. Differs from female as follows: *Color:* flagellum without a white band.

Length of fore wing: 4.8-5.0 mm. *First gastric tergite:* postpetiole smooth and polished, largely without minute wrinkling. *Second gastric tergite:* 4.2-6.3 as long as wide at apex.

SPECIMENS EXAMINED. 8 females, 4 males, USA, Texas: Hidalgo Co., Valley Botanical Garden at McAllen, XII-73 in Malaise trap, 24-XII-73, I-74 in Malaise trap, 7-I-75, 12-21-I-74, III-74 in Malaise trap, C. C. Porter. (In collection of Charles C. Porter, McAllen, Texas and Florida State Collection of Arthropods, Gainesville, Florida).

VARIATION. Townes' description (1962:406) indicates that the ground color of the mesosoma may vary from black to reddish brown.

RELATIONSHIPS. *P. limitis* ranges from the lower Río Grande Valley south to Costa Rica. In South America it is replaced by the perhaps only subspecifically distinct *P. flavopicta*, which has a somewhat different color pattern. From *P. floridana*, on the other hand, *limitis* differs in many characters of color and sculpture, as summarized under the discussion of that species. These 2 U. S. *Polycyrtidea* thus appear to have had a separate origin.

FIELD NOTES. The Valley Botanical Garden at McAllen, Texas, where I collected material of *limitis*, comprises about 15 acres of subtropical thorn scrub dominated by *Prosopis juliflora* and *Celtis pallida*, but with a considerable admixture of *Acacia farnesiana*, *A. greggii*, *Condalia obovata*, and *Celtis lindheimeri*. Hand collected specimens of *limitis* were swept from a grassy and weedy area shaded by large *Celtis lindheimeri*. The Malaise trap which caught several additional specimens also was placed in the shade of *C. lindheimeri*. *P. limitis* seems to fly through much of the year in south Texas, on the basis of my records for December, January, and March and Townes' data (1962:407) for July and August. It probably will be found to be most abundant in winter, as is true for most Río Grande Valley ichneumonids.

Polycyrtidea floridana Porter, new species
(Fig. 2)

FEMALE. Color: scape yellow with a little brownish above; pedicel pale brownish above and yellow beneath; flagellum dull pale brown; head bright yellow with dark brown on apical 1/3 of mandible and shining black on a large area which begins just above antennal sockets, reaches dorsad and expands to include ocellar region, widens out behind on occiput and about upper 1/3 of temple, and finally continues rearward and ventrad over about upper 2/3 of postocciput; mesosoma shining black with profuse yellow markings as follows: very large area covering most of dorso-lateral half of pronotum, very broad and almost contiguous band on front margin of pronotum, most of propleuron, a pair of broad longitudinal almost percurrent stripes on mesoscutum, tegula, most of prescutellar ridge, scutellum, most of postscutellum, subalarum, very large blotch over most of upper half of mesopleuron, small dull spot on mesopleuron below well in front of mid coxa, a pair of dull and obscure areas on mesosternum in front of mid coxae, upper metapleuron almost wholly, almost all of lower metapleuron, a very large blotch occupying much of propodeum behind basal trans-carina; gaster dull fulvous with considerable dusky staining, tergite 1 pale yellow on basal 3/5 and again on apical 1/6; tergites 2-5 with a broad, pale yellow apical band which fades out laterad and succeeding tergites more narrowly and diffusely yellowish on apex; fore and mid legs yellow on coxae, trochanters, and trochantelli and otherwise pale fulvous with considerable yellow staining below on basal half of femora and more or less dusky staining on last tarsomere; hind coxa yellow with a

very large black area occupying most of front face except near apex and a large brown blotch on hind face; trochanter and trochantellus brownish grading into dull fulvous below and dull yellowish on apical rims; hind femur, tibia, and tarsus dull fulvous with dusky staining on last tarsomere; wings hyaline.

Length of fore wing: 3.6 mm. *Head*: frontal horn low, 0.15 as long as first flagellomere. *Mesoscutum*: smooth and polished with very sparse small to medium sized punctures that become only moderately denser on anterior 1/3; notauli reaching only about 1/3 length of mesoscutum, without a transverse impression between apices. *Metapleuron*: lower part smooth and practically impunctate on much of upper anterior 3/5 but rearward and below with increasingly more numerous large punctures which finally become subadjacent to adjacent and mingled with weak oblique wrinkling. *Propodeum*: apical trans-carina weakly traceable laterad, where it forms obscure cristae. *First gastric tergite*: postpetiole smooth and highly polished, without minute wrinkling or shagreening. *Second gastric tergite*: 2.2 as long as wide at apex, its surface shining with well developed minute wrinkling that nearly fades out on apical 1/5.

MALE. Unknown.

TYPE MATERIAL. Known only from the holotype female: USA, Florida, Alachua Co., Gainesville (Doyle Conner Building), 4-XII-1971, H. V. Weems Jr. & C. Artaud, in Malaise trap. Holotype in Florida State Collection of Arthropods, Gainesville.

FIELD NOTES. The type locality is an area of sandy soil which supports a forest of *Pinus palustris*, various oaks, and the saw palmetto, *Serenoa repens*.

RELATIONSHIPS: *Floridana* is a distinctive species. It differs strongly from the Texan and Middle American *P. limitis* not only by those characters already mentioned in the key but also in the following details: yellow markings of mesoscutum in the form of almost percurrent stripes instead of shorter broad blotches, mesopleuron with a large yellow blotch covering most of upper half but without any yellow on lower half except for a small spot below well in front of mid coxa, gastric tergites 6-7 only narrowly and diffusely yellowish on apex, hind coxa with a very large black area occupying most of front face except near apex and a large brown blotch on hind face but without a dark area dorsally, frontal horn 0.15 (vs. 0.23-0.29) as long as first flagellomere, without a transverse depression between apices of notauli, apical trans-carina of propodeum developed laterally into obscure (rather than prominent and somewhat tubercular) cristae, postpetiole without minute wrinkling, second gastric tergite 2.2 (vs. 2.7-3.4) as long as wide at apex.

The only other *Polycyrtidea* which might approach *floridana* is the Cuban *P. pusilla* Cresson. The unique type of *pusilla* in the Gundlach collection at Havana, Cuba is not available for study. According to Townes (1966:99) this specimen has lost both the head and the abdomen. However, Cresson's original description (1865:31-32) shows that *pusilla* differs from *floridana* in the following characters: notauli "rather deeply impressed" (vs. weakly impressed in *floridana*), mesosternum pale yellowish instead of mostly dark, mesopleuron with only subalarum yellow lacking a very large pale blotch on its upper half, first gastric tergite pale yellow on basal half but without yellow on apex, succeeding tergites "honey yellow" with base of second blackish but without pale yellow bands on apex.

As to origin of *floridana* and the cause of its present geographic isolation, at least 3 possibilities may be suggested:

(1) When we know more about the Cuban *P. pusilla*, we may find it closely related to *floridana*. This would suggest that *floridana* is a remote or recent immigrant from across the water to the south. However, all available evidence indicates that ichneumonids cross water gaps rather infrequently. Of the 39 species of Mesostenini presently known from Florida (Townes, 1962), only 5 occur also in Cuba (making up about 23% of that apparently impoverished fauna). Moreover, of those 5, only *Compsocryptus fasciipennis* Brullé and *Lymeon bicinctus* Cresson are shared exclusively between Florida and Cuba, while the other 3 (*Pachysomoides fulvus* Cresson, *P. stupidus* Cresson, and *Acerastes pertinax* Cresson) also range widely in the rest of the United States and in the mainland tropics. Exchange of ichneumonids between Florida and the neighboring West Indies thus would appear minimal.

(2) *P. floridana* or its ancestor could have followed the Gulf Coastal Plain up from Middle America into Florida. However, no species closely related to *floridana* presently is known from México or Central America. If *floridana* and the Texan-Middle American *limitis* stem from a common ancestor, the degree of distinctness between them suggests that their separation must have taken place very long ago.

Among other Florida Mesostenini, only 4 species have a distribution somewhat like that outlined above. *Pachysomoides fulvus* occurs throughout the United States, in Cuba, and south into México at least to Orizaba. *Pachysomoides stupidus* ranges from North Carolina and Florida west to Texas and south through Middle America and the West Indies to Venezuela. *Acerastes pertinax* extends from Maryland south to Brasil and Paraguay. *Diapetimorpha macula* Cameron reaches from Maryland south through Texas into México at least as far as Veracruz. Note that none of these species is restricted to the Gulf Arc. All are modern, highly adaptable Neotropical elements of recent penetration in the United States. It is this adaptability which has allowed them to include the whole Gulf Arc in their ranges. During the present interglacial epoch and, indeed, most probably since the end of the Tertiary (Graham 1973:305-310) faunal and floral exchange between Mexican humid forests and those of the southeastern United States appears to have been blocked by the persistence of a wide band of desert and thorn scrub in northern México and southeastern Texas. Moisture, far more than temperature, is the prime factor governing ichneumonid distribution, and its lack probably explains why much more of the fantastically rich Mexican ichneumonid fauna has not spread into the at present climatically favorable southeastern United States. Of course *Polycyrtidea* is a relatively dry-adapted genus but one which penetrates deserts in the vegetation along river banks. As pointed out by Graham (1973:305), "drainage systems that could serve as migration routes via gallery forests tend at right angles to the required direction of migration rather than paralleling the Texas coast."

(3) *Polycyrtidea floridana* may be one of the relicts of the diverse North American Neotropical biota which existed in the Tertiary but was later decimated by Pleistocene glaciation. Until the Oligocene, a wet subtropical forest community covered most of North America. This included plant genera, such as *Philodendron* (Araceae), *Ficus*, *Ocotea* and *Nectandra* (Lauraceae), and *Podocarpus*, all suggestive of a mild, if not necessarily

frost-free, wet forest community not unlike that growing today in southeast Brasil and ideal for Neotropic sylvan ichneumonids (Dilcher 1973:44). At that time, the ancestor of *P. floridana* may have ranged widely over North America. With glaciation, however, tropical species retreated south, and the northern limits of their distribution were fragmented among refugia such as ravines, river valleys, and coastal plains. At glacial maxima, temperate conditions blanketed most of México, with subtropical climates beginning around 20 degrees north latitude along the coasts and genuinely tropical conditions starting at about the Nicaraguan border, while in eastern North America only the southern half of Florida enjoyed a subtropical climate (Udvardy 1969:322). During interglacials, temperatures improved but rain diminished, hampering northward dispersal of moisture-loving forms, such as ichneumonids, especially from the Middle American refugium. As already noted, the only eastern refugium of subtropical climate was Florida, and much of Florida was inundated at various times during the Pleistocene although "a number of substantial islands" (Spencer and Stegmaier 1973:9) remained above water at all times during that period. As grossly impoverished island faunas all over the world suggest, ichneumonids do not cross water with facility. Furthermore, some authors believe that the latest glaciation (the Wisconsin) may have been severe enough to "entirely eliminate" (Spencer and Stegmaier 1973:10) any genuinely tropical element from Florida. Thus, that part of the North American Neotropic Tertiary fauna which was driven southwest into México survived the glaciations in that favorable region with its open connection to the south, whereas the eastern component that was pushed toward Florida mostly became extinct from the cold and from lack of ability to escape across the water to the Florida islands or the West Indies. During the present interglacial, those species which did find refuge in what now is Florida in many cases have moved out over much of the east. Most of these today range westward only as far as the limit of the southeastern Pine-Oak forests around Houston, Texas. However, some of the more adaptable ones have attained the Río Grande Valley of southern Texas and parts of northern México, coming into contact with relatives from which they have been separated since the end of the Tertiary and from which they now are specifically distinct.

This third zoogeographic pattern is the one to which most Florida ichneumonids of Neotropic affinities seem to pertain, as illustrated by the following list:

1. *Baryceros audax* Cresson: Eastern U. S. as far west as Kansas.
2. *B. texanus* Ashmead: Maryland and Michigan west to Arkansas, Oklahoma, and Texas, with 1 record for Sonora State in northern México.
3. *Mallochia agenoides* Viereck: Eastern U. S. as far west as Nebraska.
4. *M. laevis* Townes: S. Georgia and Florida.
5. *Trachysphyrus weemsi* Porter: Florida.
6. *Lanugo retentor* Brullé: New Jersey and Illinois west to central Texas.
7. *Diapetimorpha brunnea* Townes: S. Georgia and Florida.
8. *D. picta* Townes: S. Georgia and Florida.
9. *D. rufigaster* Cushman: Maryland and Michigan to Florida.
10. *D. introita* Cresson: North Carolina to northern Nuevo León, México.

11. *Lymeon, cinctiventris* Cushman: Maryland to Lower Río Grande Valley.
12. *L. orbum* Say: Connecticut and Michigan to Lower Río Grande Valley.
13. *Polycyrtidea floridana* Porter: Florida.
14. *Cryptanura banchiformis* Megerle: New England to central Texas.
15. *Polycyrtus neglectus* Cushman: Massachusetts and Michigan to north-east Texas, with a disjunct population in the Sierra Madre Oriental of northeast México at Cola de Caballo near Monterrey.
16. *Messatoporus rufiventris* Cushman: U. S. and southern Canada.
17. *M. compressicornis* Cushman: Connecticut and Ohio west to Alabama; closely related to the Mexican *M. arcuatus* Cresson.
18. *Agonocryptus discoidaloides* Viereck: E. U. S. to Lower Río Grande Valley.

The above information, based on Townes' (1962) revision of the North American Mesostenini as well as on the Florida State Collection of Arthropods and the author's personal collection, suggests that there is a distinctive northeast North American mesostenine ichneumonid fauna of Neotropical and Sonoran (*Compsocryptus* and *Lanugo*) origins. This complex, in which *Polycyrtidea floridana* seems to fit, may constitute, in the case of its Neotropic members, the remnants of a much larger Tertiary fauna mostly extirpated by the Pleistocene glaciations (the Sonoran elements probably extended eastward during the driest parts of some of the Pleistocene interglacials).

To complete our picture of the Florida mesostenines, we should note that, besides the 22 Neotropic and 2 Sonoran species already mentioned, the state also harbors 15 mesostenines of Holarctic origin and belonging to the genera *Apsilops*, *Agrothereutes*, *Gambrus*, *Aritranis*, *Ischnus*, *Habrocryptoides*, *Trychosis*, *Listrognathus*, *Mesostenus* (*transfuga* group), and *Xylophrurus*.

LITERATURE CITED

- CUSHMAN, R. A. 1929. A revision of the North American ichneumon-flies of the genus *Mesostenus* and related genera. Proc. U. S. Nat. Mus. 74(16):1-58.
- CRESSON, E. T. 1865. On the Hymenoptera of Cuba. Proc. Ent. Soc. Philadelphia 4:1-200.
- DILCHER, D. L. 1973. A palaeoclimatic interpretation of the Eocene floras of southeastern North America, p. 39-57 In A. Graham (ed.), Vegetation and vegetational history of northern Latin America. Elsevier Scientific Publishing Co., Amsterdam.
- GRAHAM, A. 1973. History of the arborescent temperate element in the northern Latin American biota, p. 301-312 In A. Graham (ed.), Vegetation and vegetational history of northern Latin America. Elsevier Scientific Publishing Co., Amsterdam.
- SPENCER, K. A., AND C. E. STEGMAIER, JR. 1973. Agromyzidae of Florida. Arthropods of Florida and neighboring land areas 7:1-205. Division of Plant Industry, Gainesville.
- TOWNES, H. K. 1962. Ichneumon-flies of America north of México: 1. Subfamily Gelinae, Tribe Mesostenini. Bull. U. S. Nat. Mus. 216: 1-676.

- TOWNES, H. K. 1966. A catalog and reclassification of the Neotropic Ichneumonidae. Mem. Amer. Ent. Inst. 8:1-367.
- TOWNES, H. K. 1969. Genera of Ichneumonidae, Part 2: Gelinae. Mem. Amer. Ent. Inst. 12:1-537.
- UDVARDY, M. D. F. 1969. Dynamic zoogeography, p. 1-445. Van Nostrand and Reinhold, New York.
- VIERECK, H. L. 1913. Descriptions of twenty-three new genera and thirty-one new species of ichneumon-flies. Proc. U. S. Nat. Mus. 46:359-386.
- WALKLEY, L. M. 1958. Ichneumonidae, p. 36-62 In K. V. Krombein et al., Hymenoptera of America north of México. Agriculture Monograph No. 2, U. S. Dep. Agr., p. 1-1420.

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