THE GENUS *OETHECOCTONUS* ASHMEEAD IN NORTH AMERICA
(HYMENOPTERA: PROCTOTRUPOIDEA: SCELIONIDAE)

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Abstract

The genus *Oethecoctonus* of North America is revised. Three species are recognized, of which two are new to science: *O. ophrynopus* and *O. pleuralis*. *O. oecanthi* (Riley), the type-species of the genus, is redescribed and figured. A generic diagnosis of *Oethecoctonus* and key to North American species are given. The higher classification and world distribution of *Oethecoctonus* species are discussed.

Résumé

L’ouvrage revoit le genre *Oethecoctonus* d’Amérique du Nord. Trois espèces sont identifiées, dont deux nouvelles, soit *O. ophrynopus* et *O. pleuralis*. *O. oecanthi* (Riley), l’espèce type du genre, est réédifiée et illustrée. L’auteur donne un diagnostic générique de *Oethecoctonus* et une clef d’identification des espèces nord-américaines. Il étudie la classification supérieure et la distribution mondiale des espèces de *Oethecoctonus*.

INTRODUCTION

Members of the genus *Oethecoctonus*, so far as known, attack the eggs of tree crickets (Orthoptera: Oecanthidae). The slender shape of the adult wasps is determined by the shape of the host eggs in which the entire postembryonic development of the parasitoid takes place. There is always only one parasitoid per egg attacked and it fills the entire inner space of the host egg when fully mature. The host eggs are laid randomly or in series, deeply embedded in the tissues of various plants. *Oethecoctonus* females presumably search for minute scars, indicators of oviposition, on the surface of plants. It seems that the wasps spend most if not all of their adult life around the plants. Consequently, adults of *Oethecoctonus* are very seldom caught by sweeping and never encountered in pan or pitfall traps. Malaise traps, particularly in the tropics, seem to be more productive. However, a beating sheet (with special sleeve-like attachment) is possibly the best collecting technique, particularly for night collecting on bushes. Adults of *Oethecoctonus* are assumed to be crepuscular and nocturnal in habits, as are their hosts, the tree crickets. This assumption is based on generally large ocelli in adults of most species; individuals of some undescribed Neotropical species of *Oethecoctonus* (in CNC) exhibit extremely large ocelli. Similarly, it is interesting to note that adults are sometimes caught in light traps.

*Oethecoctonus* is a pantropical genus, with only a few species penetrating the temperate zones (Masner 1976). No species is at present known from the Palearctic region and only three species are reported here from North America. The Neotropical region (excluding Chile) is particularly rich in species; 20 undescribed species were recognized in the large amount of Neotropical material in the CNC alone. Interestingly enough, only two species have been described from the Neotropical region, viz., *O. insularis* (Ashmead) and *O. laticinctus* (Ashmead), both from St. Vincent, W.I.

Masner (1976) classified *Oethecoctonus* in the tribe Calliscelionini and compared it with *Probaryconus* Kieffer. These two genera seem to intergrade, particularly in the Neotropical region. Solution of this problem is deferred to a later date when more accumulated material should permit proper interpretation of generic limits. At present the two genera are interpreted and distinguished upon character states used by Masner (1976, 1980). No attempt is made at this time to define species-groups in *Oethecoctonus*. However, the three species in North America appear to be closely related to one another, and
represent an extension of a Neotropical group which includes the Caribbean O. insularis. Some Neotropical species are characterized by the peculiar regional colour pattern in which the head and metasoma are melanic whereas the mesosoma is bright red.

MATERIAL AND METHODS

Material was borrowed from, or donated by, the following institutions (with curator’s names in parentheses) and persons:

AMNH — American Museum of Natural History, New York, NY (M. Favreau)
CAS — California Academy of Sciences, San Francisco, CA (P. Arnaud)
CNC — Canadian National Collection of Insects, Ottawa, Ont. (L. Masner)
Darling coll. — Collection D.C. Darling, Cornell U., Ithaca, NY
DFAS — Department of Food and Agriculture, Sacramento, CA (M. Wasbauer)
FSCA — Florida State Collection of Arthropods, Gainesville, FL (L. Strange)
MCZ — Museum of Comparative Zoology, Cambridge, MA (R. McGinley)
UAT — University of Arizona, Tucson, AZ (F. Werner)
USNM — United States National Museum of Natural History, Washington, D.C. (P. Marsh)
Wharton coll. — Collection R. Wharton, Texas A&M University, College Station, TX

All specimens were mounted on points. To study the microsculpture (e.g. fine shagreening on mesoscutum) and to avoid glare and light reflections at high magnification (160\times) a sheet of tracing paper (Mylar) was placed between the source of light and the specimen. For the best results the specimen should be as close to the above light disperser as safely possible.

\textit{Oethecoctonus Ashmead}

\textit{Cacus} Riley, in Ashmead, 1893, Bull. U.S. natn. Mus. 45: 223. Preoccupied.
\textit{Oethecoctonus} Ashmead, 1900, Can. Ent. 32: 368.
\textit{Cacellus} Ashmead, 1903, J1 N.Y. ent. Soc. 11: 92.
\textit{Neuroteleia} Kieffer, 1910, Bull. Soc. ent. France 1910: 293. Teste Masner (1976).

Slender, elongate forms; head in dorsal view subquadrate; mandibles short, tridentate; clypeus rectangular, rather narrow, not wider than outside rims of toruli, with anterolateral corners pointed but not prominent; palpal formula 4-2; frontal depression not developed, lower frons bisected by a median keel ascending from antennal insertion; cheeks with distinct fans of striae radiating from mandibular base; vertex rounded into occiput as horizontal part of occipital carina not developed; vertical part of occipital carina strong and sharp; ocellar triangle rather high, POL > LOL, posterior ocelli almost contiguous with inner orbits; eyes distinctly hairy; radicle short; antennal formula 12-12, female antenna with A3 longer than A2, and with distinct 6-segmented clava; male antenna with A3–A12 distinctly elongate, covered with very short hairs, A5 (sex segment) with weak carina basally.

Mesosoma cylindrical, elongate, about as high as wide; epomial carina in dorsal view prominent and sharp; notauli and skaphion absent; netrion well differentiated, distinctily open above fore coxa; scutellum in front with row of foveolae; mesopleuron between fore and middle coxae very long; acetalbar carina sharp and entire; mesopleural carina not developed or obscured by sculpturing; mesopleural depression rather shallow, mesepimeron in front with row of foveolae; metanotum narrow, not expanded, unarmed; propodeum dorsally not excavate, with two subparallel keels terminating dorsally in pair of protuberances or points; fore wing venal formula mg < st < pm, submarginal vein setose, not “broken” before merging into marginal vein, basal and medial veins at most indicated as traces; hind wing with complete submarginal vein; legs slender, tibial spur formula 1-1-1, tarsal formula 5-5-5.

Metasoma elongate, moderately pedunculate, with T1 and T2 longitudinally costate; in female with 6 visible tergites and 6 sternites, with T1 distinctly elongate, without hump,
with T2 almost as long as T3, the latter the widest, with T6 wider than long, with T7 not exposed but articulating with ovipositor; in male with 8 visible tergites and 7 sternites.

**KEY TO NORTH AMERICAN SPECIES OF *Oethecoctonus* (♀ ♂)**

1. Inner orbits of eyes (in front of posterior ocelli) distinctly elevated above eye margin, forming supraorbital tori; frons between tori moderately excavate (dorsal view); Arizona .......................................................... *O. ophrynopus* n. sp. ♀
   - Inner orbits of eyes not elevated above eye margin; frons between orbits not excavate (dorsal view) .......................................................... 2
2. Mesopleuron below mesopleural depression smooth, with only a few scattered minute punctures; head as long as wide, with occiput only moderately excavate; Arizona .......................................................... *O. pleuralis* n. sp. ♂
   - Mesopleuron below mesopleural depression distinctly sculptured, rugoso-punctate to densely punctate; head slightly wider than long, with occiput distinctly excavate (Fig. 3); Guatemala, Mexico, USA, Canada .......................................................... *O. oecanthi* (Riley) ♀ ♂

**Oethecoctonus ophrynopus** n. sp.

**Female.** Length 2.3 mm. Dark brown to black; radicle, mandibles, palpi, legs including coxae, tegulae and anterior rim of T1 yellowish brown; antennae brown; wings clear.

Head in dorsal view subquadrate, only slightly transverse (31:35), slightly wider across temples than across eyes; lower frons (above antennal insertion) smooth, frons along inner orbits densely punctate, sculpture becoming gradually rougher, granular-rugulose on supraorbital tori; tori distinctly elevated above eye level (in front of posterior ocelli) in both lateral and frontal views; frons between tori moderately concave, with little smooth spot in front of anterior ocellus; interocellar space finely rugosopunctate, occiput with deeper and larger punctures; antennal segments in relative proportions (length/width): 23:5, 9:4, 13:2.5, 9:3, 5:4, 4:5, 6:7, 5:7, 4:7, 4:7, 6:5:5.

Mesopleuron below mesopleural depression rugoso-punctate; scutellum mostly smooth, with a few scattered punctures; propodeal keels terminating in low points in anterior half of propodeum.

T3 almost smooth, under high magnification (160×) with fine longitudinal aciculation medially; T3–T6 smooth, with a few scattered setigerous punctures, punctuation denser on T6.

**Male.** Unknown.

**Type material.** Holotype ♀ (CNC No. 17027), ARIZONA, Cochise Co., 5000’, Cave Creek Canyon, October 19 1978, L. Masner, sweeping vegetation along creek; paratype ♀ (CNC), ARIZONA, Ramsey Canyon, Huachuca Mts., 6000’, 15 mi S. Sierra Vista, August 1967, R. F. Sternitzky.

**Distribution.** Arizona.

**Variability.** The female from Ramsey Canyon shows longitudinal striae on T3 more distinct than in the holotype. This kind of sculptural variation involving T3 is found also in *O. oecanthi*.

**Remarks.** *O. ophrynopus* can be distinguished from *O. oecanthi* by having strong supraorbital tori and frons between them more concave. From *O. pleuralis* it differs by sculpturing of mesopleura. The name of this new species refers to its supraorbital tori ("eyebrows"), unique among the Nearctic members of *Oethecoctonus*.
Oethecoctonus pleuralis n. sp.

**Male.** Length 2.4 mm. Dark brown to black; antennae and legs (except for darker coxae) light brown; wings clear.

Head in dorsal view subquadrate, almost as long as wide (30:31), slightly wider across eyes than across temples; most of frons smooth, parts adjacent to inner orbits and below anterior ocellus finely punctate; small smooth spots immediately in front of anterior ocellus and behind posterior ocelli; no supraorbital tori; frons between inner orbits not depressed; interocellar space granular; vertex coriaceous, with scattered punctures; occiput only slightly excavate medially; temples behind eyes at first parallel, then receding, shorter than eye length (12:15); antennal segments in relative proportions (length/width): 19:4, 8:4, 16:4, 15:3.5, 12:4, 11:4, 10:4, 9:4, 9:4.5, 9:4.5, 9:4.5, 12:4. Mesopleuron below mesopleural depression predominantly smooth, with only few fine scattered punctures situated mainly near acetabular carina; mesopleural carina not developed; mesopleural depression shallow, smooth; propodeal points situated near middle of propodeum; venal formula 10:12:27.

Metasoma very slender; T3 with longitudinal sculpture all over, with no rugulosities or coriaceous elements at sides; T4-T6 almost smooth, with scattered setigerous punctures.

**Female.** Unknown.

**Type material.** Holotype ♀ (USNM), ARIZONA, Santa Rita Mts., Madera Canyon, August 9 1961, at UV light, F. Werner and J. Nutting; type well preserved.

**Distribution.** Arizona.

**Remarks.** The record at UV light indicates again that some members of *Oethecoctonus* are nocturnal. The predominantly smooth mesopleura as well as the nearly quadratic head will distinguish this species from the other two Nearctic species. There is little likelihood that *O. pleuralis* may be the opposite sex of *O. ophrynopus*, because adult sexual dimorphism of this sort is not evident in *O. oecanthi*, for which both sexes are known. The name of this new species refers to the remarkable smoothness of its mesopleuron.

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**Oethecoctonus oecanthi** (Riley)

_Figs. 1–7_

*Cacus oecanthi* Riley in Ashmead 1893, Bull. U.S. natn. Mus. 45: 223.

*Oethecoctonus oecanthi*: Ashmead 1900, Can. Ent. 32: 368.

*Cacellus oecanthi*: Ashmead 1903, JI N.Y. ent. Soc. 11: 92. Brues in Wytsman 1908, Genera Insectorum 80: 36; Kieffer 1908, Ann. Soc. Sci. Bruxelles 32: 120; Kieffer 1926, Das Tierreich 48: 414.

*Oethecoctonus oecanthi*: Muesebeck and Walkley in Muesebeck et al. 1951, Hymenoptera of America north of Mexico, Synoptic Catalog, Agric. Monogr. 2: 703; Muesebeck and Walkley 1956, Proc. U.S. natn. Mus. 105: 376; Masner 1964, Acta Soc. ent. Cechosl. 61: 139–140; Muesebeck _in Krombein et al._, 1979, Catalog of Hymenoptera in America North of Mexico, Smithsonian Institution Press, Vol. 1: 1155.

**Female.** Length 2.0–2.4 mm. Dark brown to black; legs, including coxae and A1–A6 from yellowish brown to dark brown; wings almost clear, or at most slightly tinted.

Head subquadrate, slightly wider than long; distinct median keel (often consisting of several finer parallel keels) arising from antennal insertion and reaching to about middle of frons; frons predominantly sculptured, shagreened-punctate or rugulose-punctate, with smaller or larger smooth area around and above median keel, and with smaller smooth area immediately below are anterior ocellus, sometimes these two smooth areas confluent; cheeks above and below subocular suture with distinct fan-like striae; mandibles tridentate,
with median tooth smallest; interocellar space coriaceous, with scattered punctures; upper occiput distinctly excavated medially, coriaceous-punctate to regulose-punctate; occipital carina well developed at sides, absent at meson; supraorbital tori not developed; A3 3.0–4.3 times as long as wide, from as long as to 1.5 times longer than A2; A4 1.7–2.7 times as long as wide, from shorter than to as long as A2; A5 from distinctly transverse to slightly elongate. Pronotum at sides with distinct chain of foveolae subparallel to lower anterior margin (from fore coxa to epomial carina), with distinct patch of granular sculpture in posterodorsal corner (in front of spiracle); space on pronotum between granular patch and epomial carina usually smooth, rarely coriaceous or with slight longitudinal rugulae; netrion with transverse ridges; mesoscutum with dense punctuation, interstices between
punctures predominantly shagreened except in front of scutellum and variably at postero-lateral as well as median parts of mesoscutum; scutellum deeply and densely punctured, with no shagreened microsculpture, with deep foveolae along anterior and posterior margins, in some individuals with minute point situated postero-medially; mesopleuron from rugoso-punctate to predominantly punctate; mesopleural depression partly smooth, with distinct mesopleural pit; mesepimeron smooth, separated from mesepisternum by chain of deep foveolae; propodeal points from indistinct to sharply protruding, often obscured by dense pilosity; fore wings slightly surpassing tip of metasoma; stigmal vein 1.8–2.3 times as long as marginal vein.

Metasoma slightly longer than head and mesosoma combined; T1 always longitudinally costate; T2 usually striate as T1, often with some coriaceous sculpture in posterior part and at sides; T3 usually striate longitudinally at meson, and with rugosopunctate or coriaceous-punctate sculpturing at sides, rarely entire T3 reticulate-rugose or coriaceous, with scattered punctures, or almost smooth and with only delicate longitudinal aciculation and few scattered punctures; T4–T6 punctate, T4 in some individuals with some coriaceous sculpturing.

**Male.** Differing from female in secondary sexual characters: A3 3 times as long as wide, slightly longer than A4; A5–A11 2.5 times as long as wide, A5 with low keel reaching slightly over basal half of the segment.

**Material examined. Arizona:** 6 ♀ ♂ Cave Creek Canyon, Chiricahua Mts., Cochise Co., 5000’, Oct. 19 1978, L. Masner (CNC); 2 ♀ and ♂ as above but caught September 26-29 1966,
P. Arnaud (CAS); ♂ Guadalupe Canyon nr. Douglas, August 9 1977, L. Masner (CNC); ♀ Santa Cruz, River Valley. May 9 1940, R. H. Crandall (UAT). California: ♀ El Dorado Co., 2 mi SW Somerset, September 8 1977, R. Wharton (Wharton coll.). Florida: 3 ♀ ♀ Leon Co., Tall Timbers Res. Sta., July-September 1971, D-vac, D. Harris (FSCA). Georgia: ♀ Forsyth, September 8-22 1970, Malaise trap, F. Naumann (CNC). Indiana: ♀ (Lectotype of Cacus oecanthi Riley) (USNM) and 5 ♂ (Paralectotypes) (USNM), Lafayette, May 31 1881, from eggs of Oecanthus niveus (De Geer), F.M. Webster. Kansas: 2 ♀ ♀ Douglas Co., Brevidenthal Res., 2 mi N Baldwin, October 14 1978, L. Masner (CNC). Massachusetts: ♀ Wellfleet, Cape Cod, Audubon Bird Sanctuary, September 9 1970, L. Masner (CNC); ♀ Holliston, September 9 (? year), N. Banks (MCZ). Michigan: ♀ Livingston Co., Edwin S. George Res., September 17, G. Gibson (CNC). Missouri: ♀ Williamsville, August-September 1969, Malaise trap, J.T. Becker (CNC). New York: 2 ♀ ♀ Tompkins Co., Varna, September 10-13 1979, D.C. Darling and N.F. Johnson (Darling coll.); ♀ Long Island, Huntington, Kalbfleisch Res. Sta. July 25 1962, P. Arnaud (AMNH). Ontario: ♀ Stittsville, October 1-8 1979, Malaise trap, S.B. Peck (CNC); ♀ Marmora area, Crow Lake, August 25 1959, L.K. Smith (CNC); 4 ♀ ♀ Hamilton, August-November 1980, Malaise trap, M. Sanborne (CNC); ♀ Pt. Pelee Nat. Park, September 9 1954 (CNC); ♀ McDonald Is., St. Lawrence Islands Nat. Park, October 4 1976 (CNC); 2 ♀ ♀ Kentville, September 18 1979, H. Goulet, (CNC). Texas: 4 ♀ ♀ Big Bend Nat. Park, Chisos Mts., July 1977, L. Masner (CNC); 2 ♀ ♀ and ♂ as above but caught in June 1976, H.E. Evans (CNC). Virginia: ♀ Mountain Lake nr. Blacksburg, September 20 1980, L. Masner and B. Bowen (CNC). Mexico: ♀ Baja California Sur, Los Barriles, May 1-2 1979, Malaise trap, M. Wasbauer (DFAS); ♀ Baja California Sur, Sierra de La Laguna, 6000', December 14-16 1979, Malaise trap, M. Wasbauer (DFAS); ♂ Cornelia, September 9 1939, R.H. Crandall (UAT); ♂ San Jose Purna, March 1 1968, O. Peck (CNC). Guatemala: 2 ♀ ♀ Panajachel (Atitlan), November 4 1973, J. Klapperich (CNC).

Distribution. Specimens were examined from Florida to Ontario in the eastern Nearctic, midwest of USA, and from Guatemala through Mexico to California in the west. This is the most frequently encountered Nearctic species of Oethecoctonus, obviously widespread but sporadic in number of individuals.

Variability. This is a highly variable species, the most remarkable differences among individuals being found in the sculpturing of T3, colour of legs and antennae and the sculpturing of frons, mesoscutum and mesopleuron. Less remarkable but still important variations occur in characters such as the ratios of marginal and stigmal veins in the fore wing, length/width ratios of A3, A4 and A5 in female antenna, sculpturing of T4, as well as the total body length. This usually high degree of variability could be perhaps explained by the wide range of distribution of O. oecanthi. However, none of the above variations (or their combinations) could be linked to a particular geographic area, meaning that they represent merely intrapopulational variations. Nevertheless, some of the above extremes (e.g. the sculpturing of T3) considered alone are very striking, only rarely paralleled by similar variation among other Nearctic scelionid wasps.

Biology. Individuals were bred from eggs of Oecanthus fultoni Walker and O. quadripunctatus Beut. (Muesebeck in Krombein 1979).

Remarks. This is the most frequent North American species of Oethecoctonus. It differs from the other two, more rare Nearctic species as follows: from O. ophrynopus by lack of supraorbital tori, and from O. pleuralis by densely sculptured mesopleuron as well as by slightly transverse head.

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