

The Nearctic species of *Oetophorus* (Hymenoptera, Ichneumonidae, Ctenopelmatinae)

John R. Barron

Crop Protection Program, ECORC
Agriculture and Agri-Food Canada,
Research Branch, K.W. Neatby Building
Ottawa, Ontario, K1A 0C6, Canada

Abstract: The Nearctic members of the genus *Oetophorus* Foerster are revised. There are four species, *O. pleuralis* (Cresson), and *O. obscurus*, *O. clavatus*, and *O. maculatus*, new species. The name *Oetophorus stretchii* (Cresson) is placed in synonymy with the name *Oetophorus pleuralis* (Cresson). Relationships of the genus with others in the tribe Perilissini and relationships of the species included in the genus are briefly discussed.

Key words: *Oetophorus*, Ichneumonidae, Nearctic species

Introduction

Foerster (1869) described the genera *Oetophorus* and *Symphobus* without included species. Davis (1898) included *Mesoleius stretchii* Cresson and his new species, *O. nasoni*, under the genus *Oetophorus* and *Tryphon pleuralis* Cresson under the genus *Symphobus*. Thus, *Tryphon pleuralis* is the type species of *Symphobus* by subsequent inclusion. Viereck (1914) subsequently designated *Mesoleius stretchii* Cresson as type species of *Oetophorus*. Townes (1939) noted that the names *Oetophorus* and *Symphobus* were congeneric. He also noted that *O. pleuralis* has pectinate claws, thus not fitting the original description of *Symphobus*. However, the International Code of Zoological Nomenclature (1985) states that the first species later included in a genus originally described without species becomes the type species of that genus (Townes, 1939). Burks (1952) noted the 'spine-like' seta at the apex of each paramere of males of *Oetophorus* but retained the species under the genus *Perilissus* Holmgren, 1856. Townes (1945) and Burks (1952) considered the name *Oetophorus* as a junior synonym of *Perilissus* and transferred the three species, *O. pleuralis*, *O. nasoni*, and *O. stretchii*. Townes and Townes (1951) resurrected the name *Oetophorus*, presumably based on the unique parameres of the three included Nearctic species. Townes (1970) included the western Palaearctic species *O. naevius* (Gmelin) and described the parameres of the males. Burks (1952) placed the name *O. nasoni* in synonymy with the name *O. pleuralis*, whereas Townes (1970) considered the names to represent distinct species. There are only

two previously described species of *Oetophorus* as here recognized, namely *O. naevius* in the western Palaearctic region and *O. pleuralis* in North America. There are three new species in the Nearctic region, described in this article. The species *O. naevius* is beneficial in the control of the gooseberry sawfly, *Nematus ribesii* Scopoli, in Europe. All males of the genus *Oetophorus* share the following character states: parameres near apex with spine-like seta, aedeagus at apex curved and in the form of a oblique flat disc.

Materials and Methods

Methods used, including measurement of malar space, statistical analyses of data, analyses of macrosculpture and microsculpture are the same as those used in the study of Nearctic species of *Perilissus* (Barron, 1992, 1994a) and *Lathrolestes* (Barron, 1994b). Terminology used to describe the microsculpture, such as sculpticells, is modified from that used by Allen and Ball (1980) for carabids. The area radiating from each setal pore on the integument consists of more-or-less oval cells, referred to as sculpticells, which can be convex, as in Figs. 5, 14, 40, 65 (Barron, 1992) or slightly convex or flat, as in Figs. 22, 31, 48, 56, 74, 82 (Barron, 1992). Several cells can form a 'daisy-like' pattern, as in Figs. 5, 14, 40, 65, 91 (Barron 1992). Each setal pore represents a puncture from which the seta arises. The sculpticells form a network of mesh-like or latticed patterns and the individual cells are isodiametric (Barron, 1992). The names of individuals and their representative institutions (including abbreviations used throughout the text) from

which material was borrowed are noted under acknowledgments.

Oetophorus Foerster

Oetophorus Foerster, 1869: 196. Type species: *Mesoleius stretchii* Cresson, through subsequent designation by Viereck, 1914: 104, from two species included by Davis, 1898: 251, 252. Townes, 1939: 96; Townes and Townes, 1951: 327; Townes, 1970: 94; Kasparyan, 1981: 331.

Symphobus Foerster, 1869: 199. Type species: *Tryphon pleuralis* Cresson, through subsequent monotypy from inclusion by Davis, 1898: 323. Synonymy by Townes, 1939: 96.

Diagnostic characters. Face and clypeus in dorsolateral profile moderately convex (Figs. 1, 6), slightly convex (Fig. 11), or flat (Fig. 18). Clypeus distinctly separated from face, with apical margin thick, broadly arcuate. Occipital carina dorsomedially complete, meeting hypostomal carina distinctly before base of mandible. Mandible with lower tooth longer than upper. Hind wing with cu-a inclivous; cu-a intercepted by Cu1 at or below middle (Figs. 3, 8, 14, 20). Tarsal claws distinctly pectinate to apex. Propodeum with carinae complete (Fig. 4) or with only area basalis at base not defined (Figs. 15, 21), those of *O. obscurus* only slightly raised and basal transverse carina absent (Fig. 9). First metasomal segment with glymma elongate, deep. First tergum with spiracle at or near middle; lateral longitudinal carina distinct from base to apex (Figs. 5, 10, 16, 22). Ovipositor straight, with dorsal notch distant from apex. Male genitalia with parameres longer than aedeagus, distinctly surpassing apex of metasoma; parameres each near apex on inner side with 'spine-like' seta (Fig. 17). Aedeagus without apical sensilla, at apex curved, transversely broadened into a oblique, flat disc (Fig. 17). Microsculpture in form of isodiametric sculpticells that are flat to distinctly convex; these forming a vague to distinct 'daisy-like' pattern. First and second metasomal terga of most species rugose, with sculpticells strongly convex.

Remarks. Individuals of the genus *Oetophorus* are distinguished from other members of the Perilissini by the parameres of males each with a subapical 'spine-like' seta; first and second metasomal terga rugose, with sculpticells convex, except those of *O. clavatus* slightly convex. The 'spine-like' seta on each paramere of males is usually distinct on mounted specimens, because the parameres protrude sufficiently beyond the apex of the metasoma for these projections to be visible.

Key to the Nearctic species of *Oetophorus*

1. Propodeum with carinae incomplete, slightly raised; area superomedia and area basalis confluent, very narrow, basal transverse carina absent (Fig. 9) *O. obscurus* sp. nov.
- Propodeum with carinae complete, distinctly or slightly raised, or only area basalis at base not defined; area superomedia and area basalis separated by basal transverse carina, relatively broad (Figs. 4, 15, 22) 2
- 2(1). Mandible with lower tooth much longer than upper. Hind legs with second trochanters each on ventral surface flat. Malar space short, 0.06 mm. Clypeus smooth, with punctures only at apical margin. Face of females and males reddish-yellow, each at middle with small black triangular macula. Hind wing with cu-a intercepted by Cu1 far below middle (Fig. 20). Face and clypeus in dorsolateral profile flat (Fig. 18) *O. maculatus* sp. nov.
- Mandible with lower tooth slightly longer than upper. Hind legs with second trochanters not modified. Malar space elongate, 0.09-0.12 mm. Clypeus entirely punctate. Face at middle without distinct triangular macula. Hind wing with cu-a intercepted by Cu1 at or slightly below middle (Figs. 3, 14). Face and clypeus in dorsolateral profile slightly to distinctly convex (Figs. 1, 11) 3
- 3(2). Antennae of males with apical articles expanded transversely into a club (Fig. 12). First metasomal tergum without median longitudinal impression (Fig. 16). Face and clypeus in dorsolateral profile slightly convex (Fig. 11). Mesopleuron and propodeum smooth, without microsculpture. First and second metasomal terga with sculpticells slightly convex. Face of females reddish-yellow, at middle with irregular black macula, or face black; face of males white *O. clavatus* sp. nov.
- Antenna of males not modified. First metasomal tergum with median longitudinal impression (Fig. 5). Face and clypeus in dorsolateral profile distinctly convex (Fig. 1). Mesopleuron and propodeum rugose, with microsculpture. First and second metasomal terga with sculpticells strongly convex. Face of most females black; face of most males pale yellow *O. pleuralis* (Cresson)

Oetophorus pleuralis (Cresson) (Figs. 1-7)

Tryphon pleuralis Cresson, 1864: 275. Holotype, female, New Jersey (ANSP).

- Symphobus pleuralis*; Davis, 1898: 323.
Oetophorus pleuralis; Townes, 1939:96; Townes and Townes, 1951: 328; 1970: 94.
Perilissus pleuralis; Townes, 1945:499; Burks, 1952: 97.
Mesoleius stretchii Cresson, 1878: 371. Holotype, female, California (ANSP). NEW SYNONYMY.
Oetophorus stretchii; Davis, 1898: 252; Townes and Townes, 1951: 328; Townes 1970: 94.
Perilissus stretchii; Townes, 1945: 500; Burks, 1952: 98.
Oetophorus nasoni Davis, 1898: 251. Holotype, female, Algonquin, Illinois (ANSP); Townes and Townes, 1951: 328; 1970: 94. Synonymy with *pleuralis* by Burks, 1952: 97.
Perilissus nasoni; Townes, 1945: 499; Burks, 1952: 97.

Diagnostic Characters. Face and clypeus in dorsolateral profile convex, not in same plane (Fig. 1). Propodeum with carinae complete, distinctly raised (Fig. 4). First metasomal tergum with median longitudinal impression (Fig. 5). First and second metasomal terga with sculpticells strongly convex. Head of most females black; face of males pale yellow, vertex black.

Description. Adult female, male. **Head.** Face and clypeus in dorsolateral profile distinctly convex, not in same plane (Fig. 1). Clypeus distinctly separated from face by a transverse groove, at apex projecting distinctly anteriorly, with apical margin convex, inflexed. Malar space elongate, $m = 0.12 \pm 0.008$ mm ($n = 90$). Mandible with lower tooth slightly longer than upper. Antennal flagellum with 28-42 articles, $m = 36.3 \pm 3.14$ ($n = 270$); that of males with apical articles not expanded into a club.

Mesosoma. Notauli very indistinctly discernible at base. Forewing with areolet slightly petiolate, 1m-cu with ramus absent (Fig. 2). Hind wing with cu-a slightly inclivous, intercepted by Cu1 at or slightly below middle (Fig. 3). Propodeum with carinae complete, distinctly raised; area petiolaris and area superomedia broad, area petiolaris much broader than area superomedia (Fig. 4).

Metasoma. First metasomal tergum with shallow median longitudinal impression (Fig. 5), lateral longitudinal carinae distinct from base to apex, sharp.

Sculpture. Face with sculpticells slightly convex, in 'daisy-like' pattern; punctures closely spaced. Clypeus entirely punctate, punctures not closely spaced. Mesopleuron with sculpticells almost flat, in distinct 'daisy-like' pattern; punctures less closely spaced. Propodeum with sculpticells distinctly convex, in distinct 'daisy-like' pattern; punctures closely spaced. First and second metasomal terga

with sculpticells strongly convex, in distinct 'daisy-like' pattern; punctures closely spaced; first, second, and third terga appearing rugose.

Colour. Variation in colour, particularly of head, mesopleuron, metasomal terga, is extreme and does not follow any clear geographic pattern, except possibly in the colour of the legs (see Variation section). Also, one can find various colour forms from the same specific locality.

Variation. Propodeum of some individuals with basal transverse carina at middle absent and a few individuals with basal transverse carina at sides incomplete. The punctures on the side of the mesopleuron of some specimens from Oregon and Arizona are less dense. The carinae on the propodeum of a few individuals are more strongly raised, but not according to any particular geographical pattern. A ramus is present on 1m-cu of the forewing of a few specimens but is very indistinct and appears only as a vestige. The first metasomal tergum of a few females from Michigan and Ontario is more strongly rugose and at apex longitudinally striate, and the carinae of the propodeum are more strongly raised. However, there are intermediates in these character states, some less rugose and less striate, most not striate.

Colour variation is extreme. Females are darker than males. The head and mesopleuron of most females is black, or black, in part reddish, or red. The face of most males is yellow, some with median longitudinal black band, some with face almost white and the mesopleuron of most males is mostly yellow. There is usually a correlation between colour of head and colour of mesopleuron, and metasomal terga. If one part is dark, or light, than the other parts are also dark, or light. In general females with face black, black with red macula, red, a few yellow; mesopleuron black, most red, some black and red, black with red macula, a few red tinged yellow. In general males with face yellow, a few yellow tinged red, a few white; mesopleuron black with yellow macula, most yellow or yellow tinged red, a few dorsally black or red, ventrally white. Front and middle legs of northeastern specimens with coxae and trochanters yellow tinged reddish, femora, tibiae, tarsi reddish-yellow. Hind legs with coxae and femora reddish-brown; femora at apex dark reddish-brown; trochanters yellow tinged reddish; tibiae paler reddish-yellow, each at immediate base pale yellow, in apical third dark reddish-brown; tarsi dark reddish-brown, each at immediate base pale yellow. Front and middle legs of most individuals from further south with coxae

and trochanters slightly paler. Hind legs darker reddish-brown, trochanters and tarsal segments each at base paler yellow tinged reddish. The middle legs of a few individuals from Michigan are reddish-yellow, the coxae and trochanters pale yellow tinged reddish; the hind legs dark reddish-brown, coxae and first trochanters pale red, second trochanters pale yellow, femora each at extreme base, tibiae each at apex pale yellow, tarsal segments each at immediate base pale yellow.

Remarks. Davis (1898) did not include the species *O. pleuralis* under the genus *Oetophorus* along with *O. nasoni* and *O. stretchii*, but instead placed it as the first included species of the genus *Symphobus*. Burks (1952) placed the name *O. nasoni* Davis in synonymy with the name *O. pleuralis*, but retained *O. stretchii* as a separate entity. He described the female of *O. pleuralis* as forewing with stigma dark brown, yellow at base, and the male as face entirely yellow. He described the female of *O. stretchii* as forewing with stigma entirely yellowish-tan, and the male as face yellow with median black stripe.

The following indicates the colour variation of the type series, all seen during the course of this study, and now applied to the name *O. pleuralis*:

O. pleuralis (Cresson). New Jersey. Female. Head black, clypeus yellow. Notum black. Pleuron mostly black, at posterior third reddish-brown. Scutellum red tinged black. Mesopleuron entirely reddish-yellow. Propodeum black. Metasomal terga black, each at immediate apex white.

O. nasoni Davis. Head black, face yellow. Notum reddish-brown, at sides yellow. Pleuron reddish-yellow, dorsal part at middle black. Mesopleuron reddish-yellow, at ventral side yellow. Propodeum black. Metasomal terga black, each tergum at immediate apex white.

O. stretchii (Cresson). Female. Head black, clypeus reddish-yellow. Mesosoma and propodeum entirely black. First metasomal tergum black, at apex more reddish tinged black; terga 2 to 4 reddish; apical terga reddish lightly tinged black. Male. Head black, face yellow, at middle with narrow longitudinal median black band. Propodeum, mesosoma, metasomal terga black.

Hosts. *Amauronematus* Konow, *Arge pectoralis* (Leach), the Birch sawfly, on *Alnus*, *Betula*, *Corylus*, *Crataegus*, *Salix*; *Nematus currani* Ross (= *Pteronidea nigriventris* Curran) on *Populus*; *Nematus hudsoniimagnus* Dyar (= *Pteronus populi* Marlatt) on *Populus*; *Nematus* sp.; *Pontania*; *Pristiphora*; Tenthredinid on White poplar, White ash.

Distribution: North America: Transcontinental.

Specimens examined: 221 females, 194 males.

Canada. Alberta: Wabamun, 4.VII, 1 female (AEIC); Edmonton, 16.VI, 1 male (CNCI). British Columbia: Cowichan Bay, Vancouver Island, 2.VI, 2 females (CNCI); Fort Nelson, 13.VI, 1 female (CNCI); Hixon, 11, 20.VI, VI, 3 females (CNCI); Miracle Beach, near Oyster River, 11, 13.VI, 2 females (CNCI); Nelson, 11.V, 1 female (CNCI); Rayston, 7.VI, 1 female (CNCI); Robson, 25, 26, 27.IV, 29.V, 3 females, 2 males (CNCI); Salmon Valley, emerged 12.II, ex Tenthredinidae, 1 female (CNCI); Sproat Lake, 22.VI, 1 female (CNCI); Taft, emerged 23, 25.II, ex *Pontania*, 1 female, 1 male (CNCI), emerged 12, 15.V, ex *Nematus nigriventris*, 2 females (CNCI); Vancouver, 1 male (USNM); Trinity Valley, 12.III, ex *Arge pectoralis*, 1 male (CNCI); Vernon, emerged 7.II, ex Pteronidae sp., 1 male (CNCI). Manitoba: Ninette, 21.V, 1 male (CNCI); Duck Mountain, Forest Research, emerged 17.II, ex Tenthredinid sp. from White poplar, 1 female (CNCI). New Brunswick: Kouchibouguac National Park, 17.VI, 1 female (CNCI). Northwest Territories: Norman Wells, 20.VI, 3.VII, 2 females (CNCI). Ontario: Arthur, Lake Huron, emerged 16.II, ex Tenthredinidae, 1 male (CNCI); Batchewana, emerged 14, 18.II, ex *Nematus* sp., 2 females (CNCI); Belleville, emerged 3.IV, ex White ash, 1 female (CNCI); Brentwood, Lake Simcoe, emerged 25.II, ex Tenthredinidae, 1 female, 1 male (CNCI); Constance Bay, Carleton County, V-VII, 1 male (CNCI), emerged 14.II, ex *Pristiphora* sp., 1 female (CNCI); Cumberland, 21, 25, 27.V, 1, 6, 8.VI, 9 females, 7 males (AEIC); Dana Township, 3.III, ex Tenthredinidae, 1 female (CNCI); Delhi, Lake Erie, emerged 19, 25.II, ex Tenthredinidae, 2 females (CNCI); Fort Frances, emerged 20-22.II, ex *Nematus* sp., 1 male (CNCI); Innisville, 31.V, 2 females, 1 male (CNCI); Jockvale (Ottawa), 28.V, 1 female (CNCI); Lindsay, emerged 14.II, ex Tenthredinid sp., 2 females, 1 male (CNCI); Listowel, 27.V, 1 male (CNCI); Low Bush River, emerged 3.II, ex Tenthredinidae, 1 female (CNCI); Manitoulin Island, Cup and Saucer Trail, 6-23.V, 1 female (AEIC), Maple Point, 16-22.V, 1 male (AEIC); Markstay, emerged 21.II, ex *Amauronematus* sp., 1 female (CNCI); Marmora, 31.V, 1 male (CNCI); Ottawa, 19, 21, 24, 29.V, 1.VI, 8 females, 28 males (BMNH, CNCI); Point Pelee National Park, 12.VII, 3 males (AEIC); Red Lake Road, emerged 12.VI, 1 male (CNCI); Saint Lawrence Islands National Park, Grenadier Island, 11.VI, 1 male (CNCI); Simcoe,

29.V, 16.VI, 1 female, 1 male (CNCI); Smoky Falls, Mattagami River, 19, 20, 22.VI, 4 females (CNCI); Spencerville, Limerick Forest, 29.V, 2 females (CNCI); Stittsville, Carleton County, 21, 22, 27.V, 3 females, 2 males (CNCI); Sudbury, 15, 16, 21, 26.V, 8.VI, 3 females, 3 males (AEIC); Swastika, ex *Nematus populi*, 1 female (CNCI). Quebec: Aylmer, 11.VI, 1 female (CNCI); Gatineau, 19.VI, 1 female (CNCI); Hull, 18.VI, 1 female (CNCI); Nominique, 1 female (CNCI); Old Chelsea, Summit King Mountain, 20.VI, 1 male (CNCI); Ste.-Foy, Université Laval, 26.VI-2.VII, 1 female (CNCI); Wright, 10.VI, 1 female (CNCI). Saskatchewan: Attons Lake, Cut Knife, 30.V, 4.VI, 2 females (CNCI); Bapauma, emerged 3.III, ex *Tenthredinid* sp., 1 female (CNCI); Elbow, 26.VI, 1 female (CNCI); Erwood, emerged 12.II, ex *Nematus ? populi*, 1 female (CNCI); Great Sand Hills, W. Swift Current, 28.V, 1 female (CNCI); Waskesiu, 11.VI, 1 female (CNCI); Saskatchewan, no further data, 1 female (CNCI).

United States. Alabama: Muscle Shoals, 7-8.V, 1 female (AEIC). Arizona: Marshall Gulch, Santa Catalina Mountains, 2.VI, 1 male (UAIC); Oak Creek Canyon, 13, 20.V, 1 female, 3 males (AEIC); Parker Creek, Sierra Ancha, 2, 4, 5, 7, 9.V, 7 males (AEIC); Workman Creek, Sierra Ancha, 6, 8.V, 6 males (AEIC). Arkansas: Lake Ouachita, 9-30.V, 1 male (CNCI); Mountain Pine, Lake Ouachita State Park, V, 1 male (CNCI). California: Alpine Creek, Tahoe, 7.V, 1 female (USNM); Altamont, Alameda County, 26.III (UCRC); Applegate, 11.V, 1 male (AEIC); Cazadero, 31.III, 2 males (AEIC); Colfax, 20.V, 1 male (UCDC); Fish Canyon, 27.IV, 2 males (AEIC); Julian, 11, 24, 27.V, 10 males (AEIC); Lake Wohlford, 22.IV, 1 male (AEIC); San Geronimo, Marin County, 23.IV, 1 female (USNM); Twin Peaks, San Francisco County, 20.V, 1 female (UCDC); Ukiah, Mendocino County, 31.III, 2 females (USNM); Willits, 30.V, 1 female (UCDC); California, no further data, holotype of *O. stretchii* (Cresson), 1 female (ANSP). Colorado: Boulder, Flagstaff County, 5400, 5500, 5800 ft., 3 females (CNCI); Colorado, no further data, 1 male (ANSP). Georgia: Forsyth, 1-12, 14-22.IV, 21.IV-5.V, 18-23.V, 2 females, 3 males (CNCI). Idaho: Lowman, 12.VI, 2 females (AEIC); Valentine Refuge, 5, 7.VI, 1 female, 8 males (AEIC). Illinois: Algonquin, type of *O. nasoni* Davis, 1 female (ANSP). Iowa: County number 88, 18.IV, 1 male (CNCI). Kansas: Douglas County, 24.IV, 1 male (SEMC). Kentucky: Golden Pond, V, 26.V-10.VI, VI, 3 females (AEIC). Maryland: Takoma Park, 28.V, 1.VII, 1 female, 1 male (AEIC). Massachusetts: South Hadley, 25.V, 1 male

(AEIC); Ludlow, 10.VI, 1 female (CNCI). Michigan: Agriculture College, 4.VI, 1 female, 1 male (USNM); Ann Arbor, 21-23, 23, 25, 27, 28, 28-29, 30-31.V, 1, 4, 5, 8.VI, 6 females, 6 males (AEIC); Bay County, 2.VI, 1 female (AEIC); Big Star Lake, Lake County, 4-7.VI, 1 female (AEIC); Charlevoix County, 31.V, 1 female (AEIC); East Lansing, 24.V, 1.VI, 1 female, 1 male (AEIC); Gratiot County, 8.V, 1 male (USNM); Iron River, 8.VII, 1 female (AEIC); Iron County, V, 1 female (AEIC); Midland County, 15.V, 2, 5.VI, 3 females (AEIC, USNM); Naubinway, 6.VI, 2 females (AEIC); Newaygo County, 20.VI, 1 female (AEIC); 5 mi. N Newaygo, Newaygo County, 4-7.VI, 1 female (AEIC); Ontonagon County, 18.VI, 1 female (AEIC); Saginaw County, 1.VI, 1 female (AEIC); Sault Ste. Marie, 5.VI, 2 females (AEIC). Minnesota: Aitkin County, 9.VII, 1 female (UMIC); Beaver Creek Valley State Park, Houston County, 12.VI, 1 female (UMIC); Buffalo River State Park, Clay County, 19, 26.VI, 4 males (UMIC); Camden State Park, Lyon County, 17.VI, 1 female, 1 male (UMIC); Glacial Lakes State Park, Pope County, 12.VI, 1 female (UMIC); Itasca County, 22-24.VI, 1 female (UMIC); Itasca Park, 17.VI, 1 female (UMIC); Ramsey County, 30.III, 1 male (UMIC). Nebraska: Valentine Refuge, 7.VI, 1 female (AEIC). New Jersey: Moorestown, 2, 23, 30.VI, 4, 12.VII, 5 females, 1 male (female collected 23.VI with metasoma absent, metasoma of male glued to side of pin) (AEIC, CNCI); New Jersey, no further data, type of *O. pleuralis* (Cresson), 1 female (ANSP). New York: Farmingdale, 2.VII, 1 female, 1 male (AEIC, USNM); Ithaca, 27, 29.V, 2.VI, 2 females, 1 male (AEIC); Long Island, New York, Babylon, 10.VI, 1 female (USNM); Greenport, 2.IX, 1 male (USNM); Riverhead, 26.V, 18.VI, 16.VIII, 3 males (USNM). North Carolina: Highlands, 6, 23.V, 1 female, 1 male (CNCI). North Dakota: Fargo, 1.VI, 1 female (UMIC). Oregon: Corvallis, 30.IV, 6, 7, 8, 9, 11, 12, 18, 25.V, 22 females, 7 males (AEIC); Hyatt Reservoir, 19, 20, 22, 29.VI, 8 females, 20 males (AEIC); Lake-of-the-Woods, 23.VI, 1 female (AEIC); Ochoco Creek, 8, 11, 14.VII, 6 females, 10 males (AEIC); Pinehurst, 21, 23, 29.VI, 2.VII, 6 females, 2 males (AEIC); Selma, 13, 14, 20, 21, 27, 28, 29.V, 8 females, 8 males (AEIC). Pennsylvania: Bald Eagle State Park, 29.V, 13.VI, 3 females (AEIC); Hockton Mills, 8.VII, 1 female (USNM); Philadelphia, 21.VII, 1 female (BMNH); Spring Branch, 12.V, 2 males (AEIC). South Carolina: Cleveland, 5, 7, 10, 17, 18, 22, 25, 28.V, 8 females, 2 males (AEIC). Virginia: Falls Church, 13.VI, 1 male (USNM); Harpers Ferry, 14.V, 1 female (CNCI); Rosslyn, 1 female (USNM).

Washington: Bingen, 8,9.V, 2 females, 1 male (AEIC); Spokane, 20.V, 1 female, 2 males (UMIC); Washougal, 10.V, 1 female (AEIC). Wisconsin: Gibson Lake, Polk County, 7.VIII, 1 female (USNM).

***Oetophorus obscurus* Barron, new species**
(Figures 6-10)

Diagnostic characters. Face and clypeus in dorsolateral profile convex, not in same plane (Fig. 6). Propodeum with carinae incomplete, slightly raised; basal transverse carina absent or at sides scarcely discernible; area superomedia and area basalis confluent, narrow (Fig. 9). First and second metasomal terga with sculpticells strongly convex. Face of females dark reddish-yellow, vertex black; face of males yellow, vertex black.

Description. Adult female, male. Head. Face and clypeus in dorsolateral profile convex, not in same plane (Fig. 6). Clypeus distinctly separated from face by a transverse groove, at apex projecting distinctly anteriorly, with apical margin convex, inflexed. Malar space elongate, $m = 0.11 \pm 0.008$ mm ($n = 33$). Mandible with lower tooth slightly longer than upper. Antennal flagellum with 30-34 articles, $m = 31.9 \pm 1.08$ ($n = 31$); that of males with apical articles not expanded into a club.

Mesosoma. Notauli not evident. Forewing with areolet slightly petiolate, 1m-cu with ramus absent (Fig. 7). Hind wing with cu-a slightly inclivous, intercepted by Cu1 slightly below middle (Fig. 8). Propodeum with carinae incomplete, slightly raised; basal transverse carina absent or at sides scarcely discernible; area superomedia and area basalis confluent, narrow, area superomedia very narrow (Fig. 9).

Metasoma. First tergum without distinct median longitudinal impression from base to near apex; lateral longitudinal carinae distinct from base to apex, sharp (Fig. 10).

Sculpture. Face with sculpticells slightly convex, in 'daisy-like' pattern; punctures not closely spaced. Clypeus entirely punctate, punctures not closely spaced. Mesopleuron with sculpticells slightly convex, in 'daisy-like' pattern; punctures closely spaced. Propodeum with sculpticells more strongly convex, in distinct 'daisy-like' pattern; punctures closely spaced. First and second metasomal terga with sculpticells strongly convex, in distinct 'daisy-like' pattern; first tergum with sculpticells more strongly convex than those of second and third terga, and punctures more closely spaced. First tergum particularly, second, and third rugose.

Colour. Female. Body mostly reddish-yellow. Head black; face, genae dark reddish-yellow; clypeus, mandibles, palpi paler; antennae reddish-yellow. Mesosoma mostly reddish-yellow; notum at each side and at anterior margin medially with small black macula. Legs light reddish-yellow; trochanters paler; femora each at immediate apex, tibiae each at immediate base pale yellow. Propodeum reddish-yellow tinged black. First metasomal tergum dark reddish-yellow, at apex paler reddish-yellow; apical terga reddish-yellow, paler than first tergum. Male. Males differ from females by the face, genae, inner orbits, mandibles, palpi pale yellow, except mandibles each at apex dark reddish-brown.

Variation. Some females with facial orbits black, mesonotum each side without black macula. Some without median black macula at anterior margin of metasoma. One female from Ann Arbor, Michigan, mostly dark reddish-yellow, except vertex black, propodeum at sides in part tinged black, metasomal terga reddish-yellow. One female from McClellenville, South Carolina, mostly dark reddish-yellow; head reddish-yellow, except vertex and temple black; mesoscutum, propodeum, and metasomal terga dark reddish-yellow. Some males with mesopleuron at dorsal margin with black macula. Some males with propodeum dorsally mostly black instead of mostly dark reddish-yellow.

Remarks. The specific epithet, *obscurus*, refers to the propodeal carinae which are less distinct and reduced.

Hosts. Not known.

Distribution. Eastern United States: New Jersey, Michigan, South Carolina.

Specimens examined: 12 females, 21 males.

Type material. Holotype, adult female, High Point State Park, New Jersey, 31.V.1973, R. Reardon (AEIC). Paratypes: United States. Michigan: Ann Arbor, H.&M. Townes, 1.VI, 1 female (AEIC). New Jersey: High Point State Park, 7, 14, 22, 25, 30, 31.V, R. Reardon, 9 females, 21 males (AEIC). South Carolina: McClellenville, 6.V, Malaise trap, 1 female (AEIC).

***Oetophorus clavatus* Barron, new species**
(Figures 11-17)

Diagnostic characters. Face and clypeus in dorsolateral profile slightly convex, not in same plane (Fig. 11). Antennae of males with apical 6 flagellar articles expanded transversely into a distinct club (Fig. 12), and club darker, contrasting in

colour from basal articles. Propodeum with carinae complete, slightly raised, except area basalis at base not defined (Fig. 15). First and second metasomal terga with sculpticells strongly convex. Face of females reddish-yellow, at middle with black macula, vertex black; face of males white, vertex black.

Description. Adult female, male. Head. Face and clypeus in dorsolateral profile slightly convex, not in same plane (Fig. 11). Clypeus separated from face by a shallow transverse groove, at apex projecting moderately anteriorly, with apical margin convex, inflexed (Fig. 11). Malar space elongate, $m = 0.09 \pm 0.014$ mm ($n = 26$). Mandible with lower tooth slightly longer than upper. Antennal flagellum with 33-37 articles, $m = 35.5 \pm 1.34$ ($n = 18$); apical 6 flagellar articles of males expanded transversely into a distinct club (Fig. 12), club darker, contrasting in colour from basal articles.

Mesosoma. Notauli evident at immediate base, distinctly impressed. Forewing with areolet slightly petiolate; 1m-cu with ramus distinct (Fig. 13). Hind wing with cu-a slightly inclivous, intercepted by Cu1 at or slightly below middle (Fig. 14). Propodeum with carinae complete, slightly raised, except area basalis at base not defined; area petiolaris and area superomedia broad, area petiolaris broader than area superomedia (Fig. 15).

Metasoma. First metasomal tergum without median longitudinal impression; lateral longitudinal carinae distinct from base to apex, sharp (Fig. 16).

Sculpture. Face with sculpticells distinct, slightly convex, in 'daisy-like' pattern; punctures closely spaced. Clypeus entirely punctate, punctures not closely spaced. Mesopleuron and propodeum smooth, without microsculpture; punctures fine, slightly impressed, not closely spaced. First and second metasomal terga with sculpticells slightly convex, in 'daisy-like' pattern, punctures closely spaced. Third metasomal tergum with sculpticells flat, in 'daisy-like' pattern; punctures not closely spaced.

Colour. Female. Head and metasomal terga mostly black, mesosoma mostly reddish-brown. Head black; face reddish-yellow, with median black macula, at middle with small reddish-yellow macula, genae yellow. Clypeus at base reddish-yellow, at apex black. Mandibles, palpi pale yellow, mandibles each at apex dark reddish-brown. Antennae reddish-brown, scape at apex paler reddish-yellow. Mesosoma reddish-brown. Notum at ventral margin pale yellow, at middle with black macula. Me-

sopleuron at dorsoanterior corner pale yellow, at anterior margin black. Legs reddish-yellow. Fore and middle legs with coxae and trochanters pale yellow, tarsal segments each at immediate base pale yellow. Hind legs reddish-yellow, second trochanters pale yellow; tibiae each at immediate apex dark reddish-brown; tarsi black, each segment at base pale yellow. Propodeum reddish-brown, at base black tinged reddish. Metasomal terga black tinged reddish, each tergum at immediate apex pale reddish-yellow. Male. Head black, in large part white; mesosoma mostly reddish-brown; metasomal terga mostly black. Head black; face, inner orbits, genae, clypeus, mandibles, palpi white, mandibles each at apex dark reddish-brown. Antennae reddish-yellow, on ventral side paler; scape and pedicel on dorsal side black, on ventral side white; flagellum with apical articles paler reddish-yellow, articles 15, 16 dark reddish-brown, apical 6 articles forming club black. Mesosoma reddish-brown; pleuron, notum pale yellow; notum in ventral part white, at dorsoanterior margin with black macula. Mesopleuron at anterior margin, dorsoanterior corner white, in ventral part with longitudinal white band, at dorsal margin with median black macula. Scutellum reddish-yellow. Legs reddish-yellow. Fore and middle legs with coxae and trochanters white; tarsal segments each at immediate base white. Hind legs with second trochanters mostly paler yellow; tibiae each in apical half darker reddish-brown; tarsal segments each at immediate base very pale yellow. Propodeum black, at sides mostly reddish-brown. Metasomal terga black tinged reddish; each tergum at immediate apex pale reddish-yellow.

Variation. Three females with inner orbits black, except small reddish-brown macula between compound eye and antennal socket. A few specimens with ramus on 1m-cu of forewing indistinct or absent.

Remarks. The specific epithet, *clavatus*, refers to the apical articles of the antennae of males which form a club. This seems to represent the only Nearctic species where the ramus of 1m-cu of the forewing of most individuals is present.

Hosts. Not known.

Distribution. Southwestern United States: Arizona, Oregon, California.

Specimens examined: 5 females, 21 males.

Type material. Holotype, adult male, 8 mi. W. Winters, Solano County, California, 14.III.1964, F.D. Parker (UCDC). Paratypes: United States. Arizona: Parker Creek, Sierra Ancha County, 20,