

Review of Nearctic *Aulogymnus* (Hymenoptera: Eulophidae) with nomenclatural changes

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Received September 13, 2004; accepted December 15, 2004

Published December 30, 2005

Abstract. The taxonomy of the Nearctic species of *Aulogymnus* Förster, 1851 (Hymenoptera: Eulophidae) is revised. Five new species of *Aulogymnus* are described and illustrated: *A. bouceki* sp. nov., *A. gorditus* sp. nov., *A. purpurescens* sp. nov., *A. smithi* sp. nov., and *A. virginiensis* sp. nov. Lectotypes are designated for *A. flavimaculata* Girault, 1916, *A. flavitibiae* Girault, 1916, *A. io* Girault, 1916, and *A. marilandia*. *Aulogymnus marilandia* Girault, 1917 is synonymized with *A. io*. Most host records reflect a specialization by *Aulogymnus* spp. on gall wasps (Hymenoptera: Cynipidae), which form galls on various oaks (Fagaceae: *Quercus* spp.). A key to Nearctic species is given and host use is summarized.

Taxonomy, new species, synonymy, lectotype designation, Hymenoptera, Eulophidae, *Aulogymnus*, Cynipidae, galls, parasite, Nearctic region.

INTRODUCTION

In this paper we redescribe the five known Nearctic species of *Aulogymnus* and describe five new species recently discovered in this region. This genus is known throughout the Nearctic region, and, where known, parasitizes gall wasps (Hymenoptera: Cynipidae) on oak (Fagaceae: *Quercus* spp.)

Aulogymnus contains 31 species worldwide with 5 previously described in the Nearctic region (Noyes 2002). Recent treatments have focused only on the Iberian and Chinese faunas (Pujade 1991, Zhu et al. 1999) but Nearctic species have never been revised. Species are robust and some specimens are very large for Eulophidae measuring up to 5 mm. They are often among the most colorful of eulophine genera with species such as *A. io* and *A. smithi* sp. nov. exhibiting a rich mix of metallic blue/green with orange to citrine coloration (Figs. 13-15). *Aulogymnus* can be distinguished by the following: color often metallic green, purple, or blue, matte yellow or orange, or a combination of the two; clypeus bilobed; mesotibia with spur as long as or longer than mesobasitarsus (Fig. 8); notauli complete, straight (Fig. 1); funicle 2 or 3 segmented (Figs. 3, 7) although some males have 4; forewing with stigmal vein elongated and uncus separated from apex (Figs. 9-12), submarginal vein generally longer than marginal, larger species often with admarginal infuscate areas. Species of *Aulogymnus* are most easily confused with *Cirrospilus* Westwood, 1832. The two genera often have similar coloration, but *Cirrospilus* species typically have a 2-segmented funicle in the female. *Cirrospilus* do not generally have a bilobed clypeus and the stigmal vein is shorter with the uncus placed near the end of the vein. *Cirrospilus* generally have a transverse groove on the frons whereas in *Aulogymnus* this groove is sometimes missing, indicated by a color change, or present in some species. All these characters are subject to variation and it has been suggested that morphologically, the two groups may grade into one another (Gauthier et al. 2000). However, most *Cirrospilus* spp. with known biologies are associated with leaf miners and all *Aulogymnus* spp. are parasitic on cynipids, usually on oak

(*Quercus* spp.), with the exception of two unusual records from Gracillariidae and Scolytidae (Bouček & Askew 1968). These distinctive biologies lead us to retain the two groups as separate genera at this time.

MATERIAL AND METHODS

In the descriptions, structures not visible on the holotype but shown in the figures are indicated by brackets ([]). Lectotypes are designated to preserve nomenclatural stability per ICZN Article 74.7 (ICZN 1999) by establishing a type specimen to serve the name-bearing function for that taxon. A Nikon SMZ1500 stereomicroscope with 10X (Nikon C-W10X/22) and Chiu Technical Corp. Lumina 1 FO-150 fiber optic light sources were used for card- and point-mounted specimen observation. Mylar film was placed over the ends of the light source to reduce glare from the specimen. Scanning electron microscope (SEM) images were taken with an Amray 1810 (LaB6 source). Specimens were cleaned of external debris with bleach after Bolte (1996) and affixed to 12.7 X 3.2 mm Leica/Cambridge aluminum SEM stubs with Scotch™ 665 double-sided tape. Stub-mounted specimens were sputter coated using an Cressington Scientific 108 Auto with a gold-palladium mixture from at least three different angles to ensure complete coverage (~20-30nm coating). Wing and habitus TM images were prepared using an Auto-Montage image capture system (Microbiology International, Synchroscopy). With this system, digital images were captured from a stereoscope (Leica M400) by using a JVC 3-CCD Color Video Camera (Model No. KY-F55B) affixed to the microscope phototube and connected to the AutoMontage™ computer system. Abbreviations used are: CA (California), DC (District of Columbia), MA (Massachusetts), MN (Minnesota), VA (Virginia), WV (West Virginia), MPS (multiporous plate sensilla), F1-F3 (funicular segments 1, 2, or 3), G_n (gastral tergite_{number}), USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C.), BMNH (The Natural History Museum, London).

TAXONOMY

Genus *Aulogymnus* Förster, 1851

- Aulogymnus* Förster, 1851: 24; type species *Aulogymnus aceris* Förster, by monotypy.
Olynx Förster, 1856: 72; type species *Ichneumon gallarum* Linnaeus, by original designation; synonymized with *Aulogymnus* by Bouček 1965: 551.
Cyniphoctonus Reinhard, 1858: 22; type species *Ichneumon gallarum* Linnaeus, by original designation; synonymized with *Aulogymnus* by Bouček 1968: 28.
Olinx Reinhard, 1858: 22; emendation.
Ophelinoideus Ashmead, 1904: 163; type species *Ophelinoideus japonicus* Ashmead, by original designation; synonymized with *Aulogymnus* by Kamijo 1976: 482.
Scotolinx Ashmead, 1904: 354; type species *Scotolinx gallicola* Ashmead, by original designation; synonymized with *Aulogymnus* by Bouček 1988: 609.
Pseudiglyphella Girault, 1913: 255; type species *Pseudiglyphella caelestis* Girault, by original designation; description modified Girault 1915: 264; synonymized with *Aulogymnus* by Bouček 1988: 609.
Mirolinx Girault, 1916a: 131; type species *Mirolinx flavitibiae* Girault, by original designation; synonymized with *Aulogymnus* by Schauf and LaSalle 1993: 491.
Pseudolynx Girault, 1916b: 152; type species *Pseudolynx io* Girault, by original designation; synonymized with *Aulogymnus* by Schauf and LaSalle 1993: 491.
Scotolinx Ashmead, 1904: 354; type species *Scotolinx gallicola* Ashmead, by original designation and monotypy; synonymized with *Aulogymnus* by Bouček 1988: 609.
Scotolinx Girault, 1916c: 218–219; type species *Scotolinx gallicola* Girault, by original designation; based on same material as *Scotolinx gallicola* Ashmead; synonymized with *Aulogymnus* by Bouček 1988: 609.

Key to Nearctic species of *Aulogymnus*

- 1 Color of head and body predominately yellow (see diagnosis in Introduction).....2
- Color of head and body predominately metallic blue, purple, or green.....3
- 2 Uncus >3.0× its length from apex stigmal vein; occipital maculation only surrounds occipital foramen laterally to eye (eastern USA).....*A. smithi* sp. nov.

- Uncus <3.0× its length from apex stigmal vein; occipital maculation extends laterally to eye (western USA).....*A. californica* Gordh
- 3 Antenna with two funicular segments (Fig. 7) [3 in male *A. purpurescens*].....6
- Antenna with three funicular segments (Fig. 3) [male unknown].....4
- 4 Submedian lines of scutellum apparently absent; forewing asetose posterobasad parastigma.....*A. virginiensis* sp. nov.
- Submedian lines of scutellum present, though may be faintly indicated; forewing setose posterobasad parastigma, at least with basal and cubital setal lines (Figs. 7-12).....5
- 5 Flagellomeres robust with dense MPS (Fig. 3); submedian lines of scutellum faintly indicated by slight differences in color and sculpture, scutellum flat.....*A. bouceki* sp. nov.
- Flagellomeres gracile with discretely spaced MPS; submedian lines of scutellum distinct, scutellum rounded dorsally.....*A. flavitibiae* (Girault)
- 6 Head and body primarily dark with metallic purple reflections; metacoxa with smooth to very finely lineolate sculpturing; callus with <10 setae.....*A. purpurescens*, sp. nov.
- Not with above combination of characters: head and body dark metallic blue and/or green, often with areas of orange; metacoxa with coarser imbricate to reticulate sculpturing; callus with up to 18 setae.....7
- 7 Head and body primarily metallic greenish, lacking orange or yellowish in part; scutellum overhanging dorsellum apically.....*A. minyas* (Walker)
- Head and body primarily metallic blue/green with orange or yellowish in part; scutellum continuous with or minutely overhanging dorsellum apically.....8
- 8 Gaster elongate, 4.0× as long as broad.....*A. flavimaculata* (Girault)
- Gaster not elongate, <2.0× as long as broad.....9
- 9 Clava circular in lateral view, ~1.2× as long as broad.....*A. gorditus* sp. nov.
- Clava elongate in lateral view, >1.5× as long as broad.....*A. io* (Girault)

***Aulogymnus bouceki* sp. nov.**

(Figs 1–4, 15)

DIAGNOSIS. This species has three funicular segments, but is unlikely to be confused with the other *Aulogymnus* (*A. virginiensis* and *A. flavitibiae*) having three funiculars as *A. bouceki* has a flat scutellum with submedian lines faintly indicated by slight differences in color and sculpture, whereas the submedian lines are absent on the flat scutellum of *A. virginiensis* sp. nov., but present on the dorsally rounded scutellum of *A. flavitibiae* sp. nov.. The funiculars of *A. bouceki* sp. nov. are more robust with denser MPS (Fig. 3) than either *A. virginiensis* or *A. flavitibiae*.

DESCRIPTION OF FEMALE. Body length 5.60 mm (Fig. 15). Color: metallic green with blue (prepectus, coxae) or bronze (mesoscutum, scutellum, dorsellum, propodeum dorsally) reflections; or yellow as follows: circumocular strip, interconnected both dorsally by strip extending posterad lateral ocelli and anteriorly by irregular, transverse strip at level of midpoint of medial ocular margin, this strip angling dorsad along scrobes before uniting into thin line that intercepts median ocellus broadly along its anterior margin; face and genae ventrad toruli; scape, apex pedicel; lateral edge and posteromedial edge of lateral lobe mesoscutum, axillae anterolaterally, tegulae, axillulae; legs; wing veins pale yellow basally becoming brown apically, infuscate admarginally between parastigma and stigmal vein with remainder of wing beyond basal setal line suffused with brown. Sculpture: face finely imbricate-reticulate ventrally becoming slightly coarser dorsally, scrobes similarly sculptured. Mesosoma, propleuron, mesepisternum (anterior to femoral depression), coxae, and metasoma reticulate-imbricate; prepectus and lateral pronotum coarsely reticulate; propodeum finely reticulate with some rugulosity along anterior margin, reticulation finest medially, with distinct median carina; prosternum pentagonal, reticulate-imbricate with fine median channel; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterior surface; mesepisternum imbricate-reticulate, in ventral view with median line extending length, sparsely setose apically; scutellum reticulate and lacking shallow submedian lines, interstices conspicuous; certain areas

polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, metapleuron, and gaster. Head: 0.71× as high as broad, eye height 2.11× malar space; malar sulcus curved (Fig. 2); scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture absent; clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocellular distance:postocellar distance as 9:14:22. Antenna: scape reaching just above venter of midocellus; funiculars and club robust, densely covered in MPS (Fig. 3); ratio scape (minus radicle):pedicel:anellus:F1:F2:F3:club as 40:10:4:22:17:16:25; F1-F3 each subequal in width along length, clava slightly asymmetric apically. Mesosoma: pronotum and mesoscutum with evenly scattered subdecumbent setation (Fig. 1), mesoscutum bare medially with stoutest setae near apical margin, scutellum with six pairs sublateral, stout, subdecumbent setae, two pairs in anterior quarter and two pairs near midline scutellum, one pair near apex, all oriented posteromedially; prepectus triangular, >2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeal spiracle ovate and positioned <1/2 its diameter from dorsellum, median carina present in anterior half, distinctly carinate; callus with 5 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00X longer than any seta on mesotibia; metacoxa 1.60× as long as broad, 0.70× as long as metafemur; metafemur 3.29× as long as broad; ratio marginal vein:postmarginal vein:stigmatal vein as 130:45:33; basal setal line present and cubital setal line terminating at apex basal setal line; costal cell with row of 5 marginal setae anterior parastigma, one longitudinal row of setae ventrally extend entire length costal cell, uncus 2.00× its length from apex stigmatal vein. Metasoma: elongate, ovate in dorsal view, tapered apically where ovipositor sheaths slightly extruded (Fig. 4); gastral petiole visible as transverse, transparent strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 30:10:13:17:18:26:??:7; cerci peg-like, roughly as long as broad.

Male. Unknown.

ETYMOLOGY. Named in honor of Zdeněk Bouček for his lifetime of devotion to Chalcidoidea.

TYPE MATERIAL. USA: Virginia: Essex Co.: Imi. SE Dunnsville, 30.IV-13.V.1991, Malaise trap, D. R. Smith (Holotype, ♀, USNM). Paratype, 1♀: District of Columbia: NW Washington, Rock Creek Park, 19.II.1984, W. E. Steiner; Ex dried frass in basal treehole of *Quercus alba* (USNM; left antenna slide mounted).

VARIATION. No noteworthy variation was detected. The specimen imaged has 8 scutellar setae.

HOST. Unknown.

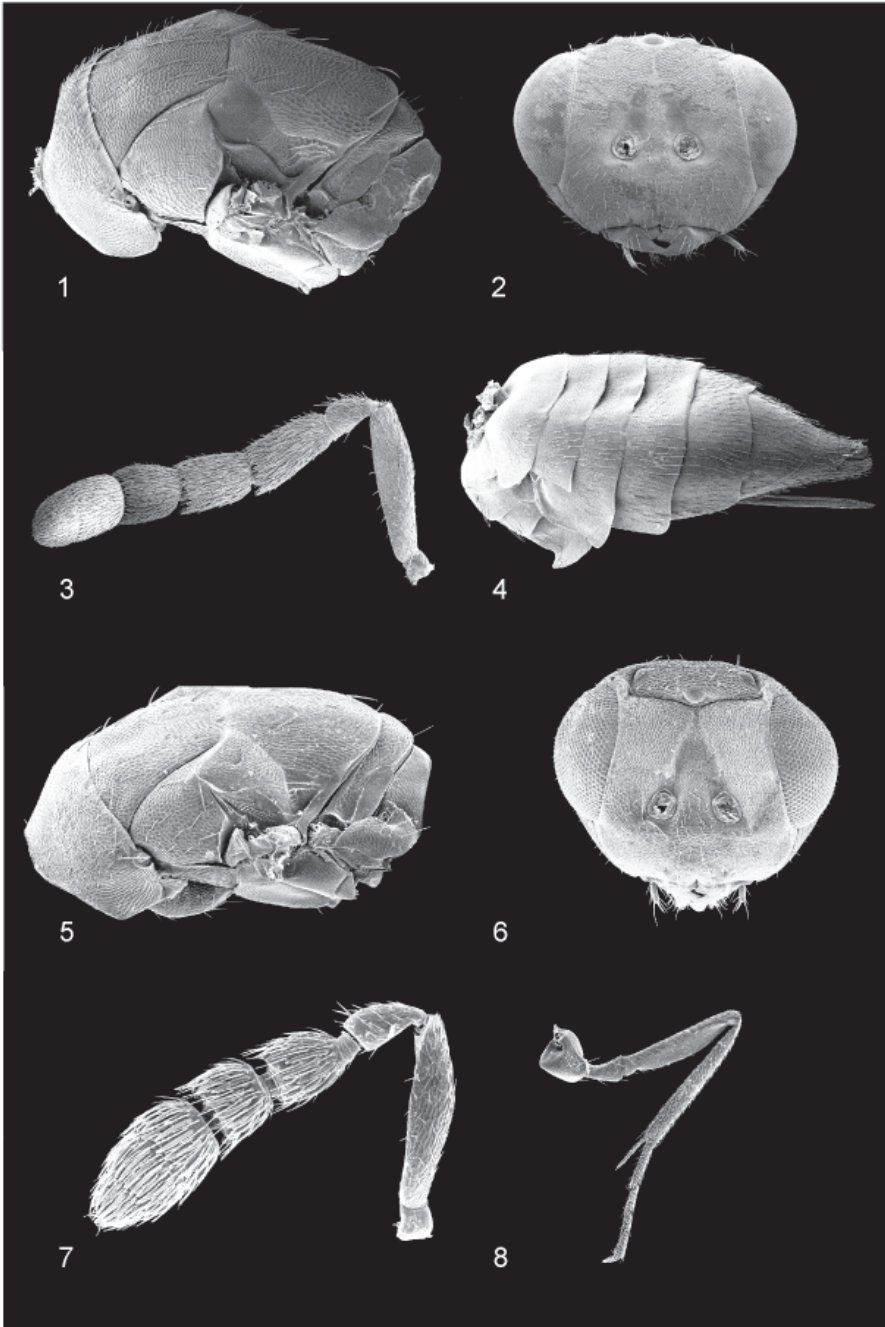
DISTRIBUTION. District of Columbia and Virginia.

Aulogymnus californica Gordh, 1977

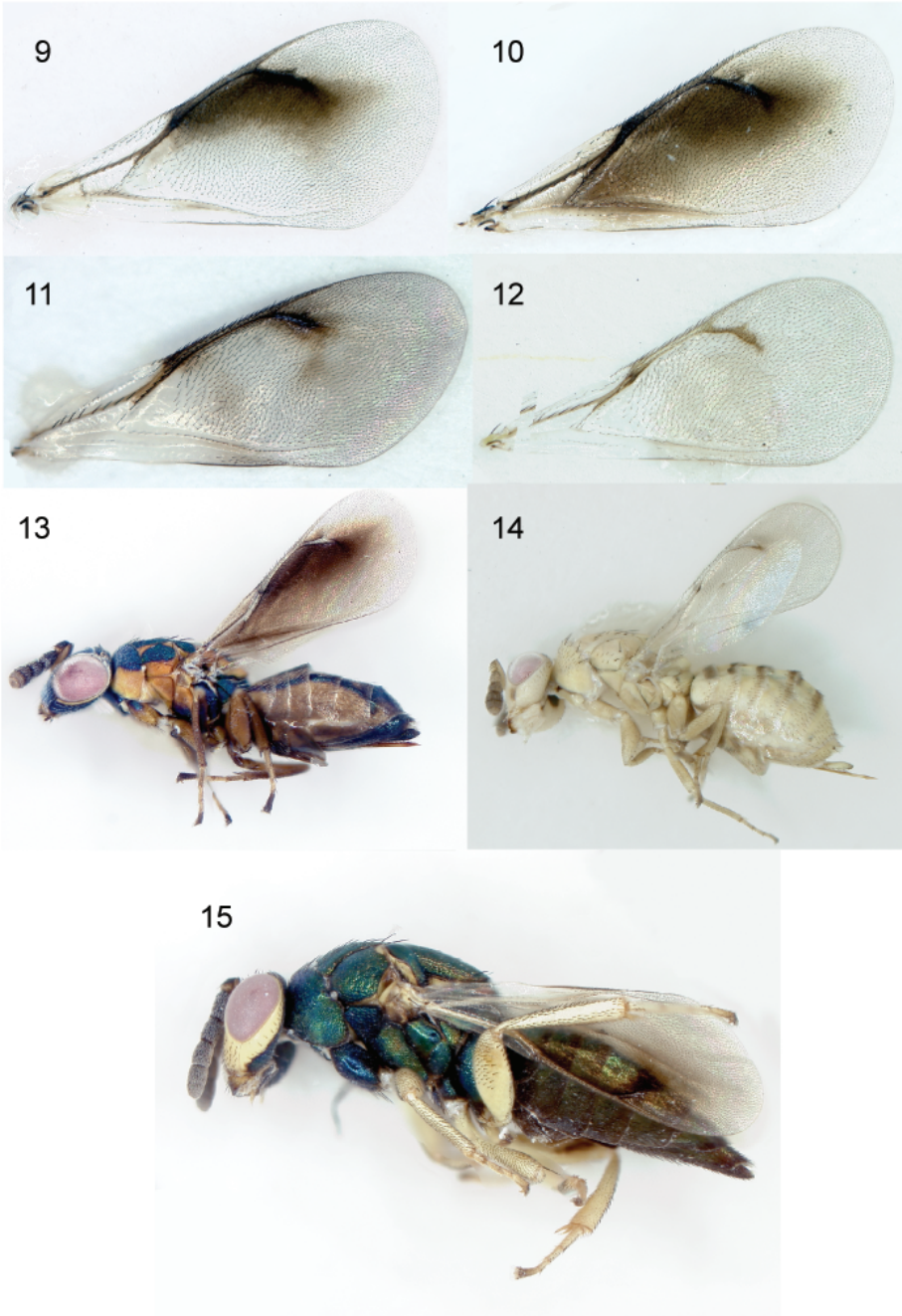
Aulogymnus californica Gordh, 1977: 207–208; holotype, ♀, by original designation (USNM Slide; 73743).

DIAGNOSIS. This species is most likely confused with *A. smithi* as both are primarily yellow with two funiculars. *Aulogymnus californica* generally has a gaster uniformly dark brown and *A. smithi* has dark banding along the tergal apices only, although some specimens may be suffused with brown ventrally. The uncus of *A. californica* is only 2.30X its length from the apex of the stigmatal vein whereas that of *A. smithi* is 3.50X its length. The occipital maculation extends laterally to the eye in *A. californica* and at most approaches the eye in *A. smithi* sp. nov.

DESCRIPTION OF FEMALE PARATYPE. Body length 2.30 mm. Color: yellow with the following areas brown: pedicel dorsoproximally, flagellomeres, medially interrupted transverse stripe between lower margins eyes, malar sulcus, triangular area encompassing occipital foramen and delimited by apex hypostomal bridge and dorsoposterior margin eyes, pronotum along anterior margin, axillular



Figs 1–8. *Aulogymnus bouceki*, sp. nov., 1–4: 1, mesosoma, lateral view; 2, head; 3, antenna; 4, gaster, lateral view. *A. smithi*, sp. nov., 5–8: 5, mesosoma, lateral view; 6, head; 7, antenna; 8, middle leg, anterior view.



Figs 9–15. *Aulogygnus io* (Girault), 9–10, forewings. *A. bouceki*, sp. nov., 11, 15: 11, forewing; 15, forewing. *A. smithi*, sp. nov., 12, 14: 12, forewing; 14, female habitus. *A. gorditus*, sp. nov., 13, forewing.

sulcus, acropleural sulcus, subalar region, mesopleural sulcus, mesepisternum medially, metapleuron, dorsellum laterally and medially, propodeum (with metallic green reflection subdorsally); wing veins brown with nebulous infuscation at parastigma and along length stigmal vein to middle wing disc, admarginal faintly infuscate. Sculpture: face finely imbricate-reticulate, scrobes polished. Mesosoma, propleuron, mesepisternum (anterior to femoral depression), coxae, and metasoma reticulate-imbricate; propodeum finely reticulate, this sculpture finest medially, with faint median carina in anterior half; prosternum pentagonal, transversely reticulate-imbricate with fine median channel; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate, in ventral view with median line extending length, sparsely setose apically; scutellum lineolate and lacking shallow submedian lines, interstices inconspicuous; certain areas polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, metapleuron, and gaster. Head: 0.85× as high as broad (frons/vertex and eyes slightly collapsed), eye height 2.35× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture very faintly indicated (concurrent with very fine transverse strip/collapse at level of midpoint of medial ocular margin); clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 5:6:18. Antenna: scape reaching just above venter of midocellus; funiculars and club elongate, covered in MPS; ratio scape (minus radicle):pedicel:anellus:F1:F2:F3:club as 28:12:2:15:12:10:16; F1-F2 each slightly increasing in width along length. Mesosoma: pronotum and mesoscutum with evenly scattered subdecumbent setation, mesoscutum bare medially with stoutest setae near apical margin, scutellum with two pairs sublateral, stout, subdecumbent setae, one pair in anterior quarter and one pair in posterior quarter scutellum, oriented posteromedially; prepectus triangular, >2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeal spiracle ovate and positioned ~1/2 its diameter from dorsellum, callus with 18 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 2.47× as long as broad, 0.67× as long as metafemur; metafemur 3.93× as long as broad; ratio marginal vein:postmarginal vein:stigmal vein as 35:23:22; basal setal line absent and cubital setal line terminating even with base MV; costal cell with row of 4 marginal setae anterior parastigma, one longitudinal row of setae ventrally extend 4/5 length costal cell, uncus 2.30× its length from apex stigmal vein. Metasoma: elongate, ovate in dorsal view, truncate apically (due to retraction of Gt₇₊₈ beneath Gt₆ during drying) where ovipositor sheaths slightly extruded; gastral petiole visible as transverse, transparent strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 30:10:13:17:18:26:???:7; cerci peg-like, roughly as long as broad.

Male [described from paratypes]. Length 1.22-1.50 mm. Similar to female except coloration and structure of antenna and gaster; with darker coloration on vertex and ocellar triangle, pronotum medially, mesoscutum, axilla laterally, scutellum laterally and broad stripe medially, dorsellum, metapleuron, mesopleuron medially, metacoxa, and propodeum completely dark; dark regions on the mesosoma mostly with metallic green reflection; scape reaching just above venter of midocellus; ratio scape (minus radicle):pedicel:A1:F1:F2:F3:club as 20:8:2:7:8:7:13; F1-F3 pedicellate, densely setose with setae extending beyond apex each flagellomere, clava symmetric and with spinose process apically. Metasoma: ovate in dorsal view, slightly tapered apically where aedeagus slightly extruded; gastral petiole barely visible in dorsal view, Gt₂ - Gt₇₊₈, (all measured dorsally): 20[fusion event?]:7:5:11:8:7.

TYPE MATERIAL EXAMINED: [slide mounted]: **USA: California:** Felton, 1947, L. H. Weld, Ex *Callirhytis flora* [right label]; *Scotolinx californica* Gordh, *Quercus wislizenii*, Holotype, Type No. 73743 U.S.N.M. [red left label] (Holotype, ♀, USNM). [Slide mounted]: Allotype, 1♂, same data as holotype (USNM). Paratypes, 10♀ 5♂ : [Slide mounted]: **USA: California:** Whittier, 1947, on window in lab, H. Compere, Calif. # 224226 [right label], *Scotolinx californica* Gordh, Paratype, Type No. 73743 U.S.N.M. [red left label] (1♀ USNM); Whittier, 17.iv.1913,

Cynipid gall, Timb.#585a, P. H. Timberlake [right label], *Scotolinx californica* Gordh, Paratype, on *Quercus agrifolia*, det Gordh '75 [white left label] (1♀ 2♂ USNM); 5524°, gss, 9.ii.1893, Par. on cynipid on oak, Paratype No. 73743 U.S.N.M. [red label] (1♀ USNM); 5524°, gss[?], 9.ii.1893, Antenna mounted, Paratype No. 73743 U.S.N.M. [red label] (1TM USNM); 5524°, Les.[?], 29.iv.1893, Paratype No. 73743 U.S.N.M. [red label], [one male with small „♂ „, label and one with „Antenna mounted“ label] (3♀ 2♂ USNM); Felton, 1947, L. H. Weld, Ex *Callirhytis* flora on *Quercus wislizenii*, Paratype Type No. 73743 U.S.N.M. [red label], [1♂ point mounted separately, 2♀ co-mounted, 1♀ +1♂ co-mounted [x2]] (4♀ 3♂ USNM).

ADDITIONAL MATERIAL EXAMINED [slide mounted]. **USA: California:** Whittier, 17.iv.1913, Cynipid gall on *Quercus*, P. Timberlake [right label]; *Quercus agrifolia* stam. flr., Timb.# 585a, Type No. 73743 U.S.N.M. [red left label]; Solano Co.: Cold Canyon Rsrv., 11km w. Winters, 30.iii.1991, S. L. Heydon (3♀ USNM); 5524°, gss[?], 9.ii.1893 (2♂ USNM); Felton, *Q. wislizenii* (co-mounted ♀♂ USNM); Felton, *Q. wislizenii*, ex gall of *Callirhytis flora* Weld (co-mounted ♀♂ USNM).

VARIATION. In both sexes the wing infuscation ranges from nearly hyaline to having infuscation around the parastigma, stigma, and anteroapical margin; sometimes only the stigmal vein has an infuscate cloud posterad. Some female specimens have the mesosoma immaculate while others possess maculation on the scutellum. The gaster may be either entirely brownish to nearly entirely yellow with brown dorsally trending to transverse brown stripes along gastral terga. The propodeum can either be primarily yellow or having brown maculation as follows: propodeum brown except medially/submedially and posterolaterally or brown narrowly along anterior margin. One specimen has the propodeum nearly completely brown. Males can have the brown coloration reduced: a medial strip on the pronotum, spot laterally on the lateral lobe mesoscutum, mesoscutum except for anterolateral corners; or absent: metacoxa and mesopleuron solid yellow.

HOST. Reared from *Callirhytis* flora on *Quercus wislizenii*. This species is also associated with *Q. agrifolia* and the staminate flowers thereon.

DISTRIBUTION. USA (CA).

Aulogymnus flavimaculata (Girault, 1916)

Pseudolynx flavimaculata Girault, 1916b: 153–154; lectotype, ♀, here designated.

Pseudolynx flavimaculatus: Peck 1951: 456; name change.

Pseudolynx flavimaculatus: Schauff & LaSalle 1993: 492.

DIAGNOSIS. This species is similar in color to *Aulogymnus gorditus* sp. nov. and *A. io*, but differs in having the clava 2.31× as long as broad, gaster 4.00× as long as broad, dorsellum 2.00× as long as propodeum medially and with 8 scutellar setae; *A. gorditus* sp. nov. has the clava only 1.21× as long as broad, gaster 1.49× as long as broad, dorsellum 2.00× as long as propodeum medially and with 4 scutellar setae; whereas *A. io* has the clava 1.93× as long as broad, gaster 1.53× as long as broad, dorsellum 1.27× as long as propodeum medially and usually with 8 scutellar setae.

DESCRIPTION OF FEMALE HOLOTYPE. Body length 4.10 mm. Color: metallic blue-green (purple reflections on mesepimeron, metapleuron, callus, metacoxa) except following either orange: scape; circumocular strip, interconnected both dorsally by strip extending posterad lateral ocelli, narrower strip diverging from former dorsal strip at dorsal eye margin and extending anterad anterior ocellus, and anteriorly by transverse strip at level of midpoint of medial ocular margin (latter two interconnected medially along scrobal depression) and expanded medially as diamond shape dorsad toruli, ventral margin of toruli connected to circumocular strip by transverse strip that is continuous with circumoral strip; tegula; lateral panel pronotum; narrow triangular strip along anterolateral margin mesoscutum at notaulus; parapsidal lobe laterally, mesally and narrowly along posterior margin; axilla laterally, mesally and narrowly along posterior margin; scutellum along lateral and posterior margins; dorsellum in submedial three-quarters; prepectus; mesopleuron in dorsal third; axillula;

gaster laterally; or brown: pedicel dorsally, flagellum; gaster dorsally and ventrally (with faint metallic reflections); wing veins and infuscation posterad marginal vein between parastigma and stigmal vein, slight infuscation along basal and cubital setal lines. Sculpture: face reticulate, mesosoma, mesepisternum (anterior to femoral depression), metapleuron, coxae, propodeum and metasoma reticulate, interstices smooth and rounded; scutellum lacking shallow submedian lines; certain areas polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, and gaster. Head: 0.75× as high as broad, eye height 2.00× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus as narrow groove, transverse frontofacial suture faintly indicated, concurrent with transverse strip at level of midpoint of medial ocular margin; clypeal apex shallowly bilobate; ratio lateral ocellus:ocelloocular distance:postocellar distance as 6:9:21. Antenna: [antennae slide mounted]; funiculars and club stout, densely covered in MPS; ratio scape (minus radicle):pedicel:anellus: F1:F2:club as 35:15:4:21:15:30; F1 and F2 slightly narrowed basally. Mesosoma: [propleuron and prosternum partially obscured by head] propleuron subrectangular, reticulate-imbricate; prosternum pentagonal, transversely reticulate-imbricate with fine median carina; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate, in ventral view with median line extending length, sparsely setose apically; pronotum and mesoscutum with evenly scattered decumbent setation, scutellum with two sublateral rows of 4 subdecumbent setae, oriented posteromedially; prepectus triangular, ≥2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeum reticulate, this sculpture finest medially, spiracle ovate and positioned ~1/4 its diameter from dorsellum, callus with ~15 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 4.40× as long as broad, 0.59× as long as metafemur; metafemur 5.44× as long as broad; ratio marginal vein:postmarginal vein:stigmal vein as 60:40:41; basal and cubital setal lines complete; costal cell with row of 12 marginal setae anterior parastigma, two longitudinal rows of setae ventrally extend length costal cell, uncus 3.00× its length from apex stigmal vein. Metasoma: gaster [dorsally collapsed] elongate in dorsal view, pointed apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 35:30:35:30:45:50:35:18; cerci peg-like, ~2.0× as long as broad.

Male. Unknown.

TYPE MATERIAL EXAMINED. **USA: Minnesota:** Ramsay Co.: Type No. 19631 U.S.N.M.; *Pseudolynx flavimaculata* Girault ♀ type [handwritten]; [Slide of antennae]: 2 legs: *Pseudolynx flavimaculata* Girault ♀ type [handwritten]; 19631 [irregular red label] (Lectotype ♀ USNM).

VARIATION. Not applicable.

HOST. Unknown.

DISTRIBUTION. Minnesota (USA).

Aulogymnus flavitibiae (Girault, 1916)

Microlynx flavitibiae Girault, 1916a: 131-132; lectotype, ♀, here designated.

Aulogymnus flavitibiae: Schauff & LaSalle 1993: 492.

DIAGNOSIS. This species has faint submedian lines on the rounded scutellum and citrine extreme apices femora, tibiae, and tarsi. It is similar to *A. bouceki* sp. nov. in that there are 3 funiculars, but those of robust with denser MPS (Fig. 3); *A. smithi* sp. nov. and *A. californica* only have two funiculars. Although both *A. bouceki* sp. nov., *A. smithi* sp. nov. and *A. californica* have has yellow

extremities, there is no dark, distinct infuscation on the femora of these species. *Aulogymnus californica* and *A. smithi* sp. nov. range from dusky to citrine. The submedian lines of *A. bouceki* sp. nov. are faintly indicated by slight differences in color and sculpture, and are apparently absent in *A. californica* and *A. smithi* sp. nov.; all three of these latter species have the scutellum flat, not rounded dorsally.

DESCRIPTION OF FEMALE LECTOTYPE. Body length 2.71 mm. Color: dark brown with metallic green-blue reflections except following either yellow: scape (remaining antenna yellow-brown), all tibiae and tarsi, excluding apex pretarsomeres brownish [head of HT smashed on slide; following orange/yellow: thin circumocular strip, interconnected both dorsally by strip extending posterad lateral ocelli and anteriorly by transverse strip (discontinuous at scrobal depression) at level of midpoint of medial ocular margin, scrobal depression from midpoint to median ocellus]; or brown: tegula, wing veins and infuscation posterad parastigma and stigmal vein. Sculpture: [face reticulate, scrobes polished]. Mesosoma, mesepisternum (anterior to femoral depression), metapleuron, coxae, propodeum and metasoma reticulate-imbricate with scutellum tending toward lineolate and having shallow submedian lines, interstices inconspicuous; certain areas polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, and gaster. Head: [0.78× as high as broad, eye height 1.61× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at midfrons before intercepting median ocellus; transverse frontofacial suture faintly indicated (concurrent with transverse strip at level of midpoint of medial ocular margin); clypeal apex shallowly bilobate; ratio lateral ocellus: ocellular distance: postocellar distance as 8:10:26. Antenna: [scape reaching just above venter of midocellus]; funiculars and club stout, densely covered in MPS; ratio scape (minus radicle): pedicel: anellus: F1:F2:F3: club as 31:10:3:12:11:10:23; F1-F3 each subequal in width along length. Mesosoma: propleuron subrectangular, reticulate-imbricate; prosternum pentagonal, transversely reticulate-imbricate with fine median carina; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate, in ventral view with median line extending length, sparsely setose apically]; pronotum and mesoscutum with evenly scattered subdecumbent setation, scutellum with two sublateral rows each of 3 subdecumbent setae, 2 in anterior third and one in posterior third scutellum, oriented posteromedially; prepectus triangular, ≥2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeum finely reticulate, this sculpture finest medially, with fine median carina, spiracle ovate and positioned ~1/4 its diameter from dorsellum, callus with 9-10 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 1.94× as long as broad, 0.81× as long as metafemur; metafemur 3.23× as long as broad; ratio marginal vein: postmarginal vein: stigmal vein as 54:33:35; basal and cubital setal lines complete; costal cell with row of 6 marginal setae anterior parastigma, two longitudinal rows of setae ventrally extend length costal cell, uncus 3.00× its length from apex stigmal vein. Metasoma: elongate, tear-drop shape in dorsal view, pointed apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (measured dorsally): 35:18:15:15:18:25:12:8; cerci peg-like, roughly as long as broad.

Male. Unknown.

TYPE MATERIAL. USA: California: Santa Cruz Co.: Santa Cruz Mts; Type No. 19648 USNM.; [Slide mounted: antennae, wing, head]: *Microlynx flavitibiae* Girault type, Type No. 19648 U.S.N.M. [handwritten red label, wing from a paralectotype as lectotype has two wings] (Lectotype ♀ USNM). Paralectotypes, 3♀, same data as lectotype (USNM).

MATERIAL EXAMINED. USA: California: San Diego Co.: Cleveland NF, Fry Creek Campground, 15.xi.1988, L. Fry, ex gall on *Quercus* (1♀ USNM).

VARIATION. The yellow areas on the legs can range from citrine to a dusky yellow. Metallic coloration on head and body ranges from dark black-green to a brighter green-blue.

HOST. Known from an undetermined cynipid gall on staminate flowers on *Quercus agrifolia* Nee. Weld (1957) reported *Callirhytis congregata* (Ashmead, 1896) galling the staminate flowers in the fall in Oakland, CA. *Callirhytis flora* (Weld, 1922), a midrib and petiole galler, on *Quercus wislizenii* A.DC is also a recorded host.

DISTRIBUTION. California (USA).

DISCUSSION. Apparently, the wings from „the female“ (presumably the type specimen) that Girault slide mounted actually originated from one of the paratypes as the holotype retains a full complement of wings.

Aulogymnus gorditus sp. nov.

(Fig. 13)

DIAGNOSIS. This species is similar in color to *Aulogymnus flavimaculata* and *A. io*, but differs with the clava only 1.21× as long as broad, gaster 1.49× as long as broad, dorsellum 2.00× as long as propodeum medially and with 4 scutellar setae. *Aulogymnus flavimaculata* has the clava 2.31× as long as broad, gaster 4.00× as long as broad, dorsellum 2.00× as long as propodeum medially and with 8 scutellar setae; whereas *A. io* has the clava 1.93× as long as broad, gaster 1.53× as long as broad, dorsellum 1.27× as long as propodeum medially and usually with 8 scutellar setae.

DESCRIPTION OF FEMALE HOLOTYPE. Body length 2.70 mm. Color: metallic blue-green except following either orange: scape and pedicel ventrally; lateral panel pronotum; tegula; narrow triangular strip along anterolateral margin mesoscutum at notaulus; parapsidal lobe laterally, mesally and narrowly along posterior margin; axilla laterally, mesally and narrowly along posterior margin; scutellum along lateral and posterior margins; prepectus; mesopleuron in dorsal half and along femoral depression, extending ventrally to midline of mesopleuron; axillula; metapleuron in anterior half; dorsellum except laterally anterad spiracle; metacoxa in apical 4/5; or orange-brown: legs with exception lateroproximal procoxa and ventral mesofemur metallic greenish; or whitish: circumocular strip, interconnected both dorsally by strip extending posterad lateral ocelli and anteriorly by transverse strip at level of midpoint of medial ocular margin, ventral margin of toruli connected to circumocular strip by transverse strip; or brown: scape and pedicel dorsally (faint metallic reflections); gaster (darker and with metallic reflections, along dorsolateral margin and Gt₆₋₇₊₈), wing veins and extensive infuscation posterad marginal vein between parastigma and stigmal vein, along basal and cubital setal lines (Fig. 13). Sculpture: face reticulate. Mesosoma, mesepisternum (anterior to femoral depression), metapleuron, coxae, propodeum and metasoma reticulate, interstices smooth and rounded; scutellum lacking shallow submedian lines; certain areas polished or polished with faint reticulation: dorsellum anteriad spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, and gaster. Head: 0.68× as high as broad, eye height 1.90× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at midfrons before intercepting median ocellus, transverse frontofacial suture faintly indicated, concurrent with transverse strip at level of midpoint of medial ocular margin; clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 5:7:22. Antenna: scape reaching just above venter of midocellus; funiculars and club stout, densely covered in MPS; ratio scape (minus radicle):pedicel:anellus: F1:F2:club as 27:10:2:14:10:17; F1 narrowed basally, F2 subquadrate, clava nearly circular in lateral view (Fig. 13). Mesosoma: propleuron subrectangular, reticulate-imbricate; prosternum pentagonal, transversely reticulate-imbricate with fine median

carina; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin and anterior face; mesepisternum reticulate, in ventral view with median line extending length, a setose apically; pronotum and mesoscutum with evenly scattered decumbent setation, scutellum with two sublateral rows of 2 subdecumbent setae, oriented posteromedially; prepectus triangular, $\geq 2.0\times$ size of tegula, surface sculpture similar to lateral pronotum; propodeum reticulate, this sculpture finest medially, spiracle ovate and positioned adjacent to dorsellum, callus with 15 erect setae; mesotibia with robust seta apicoposteriorly, at least $2.00\times$ longer than any seta on mesotibia; metacoxa $2.00\times$ as long as broad, $0.73\times$ as long as metafemur; metafemur $3.67\times$ as long as broad; ratio marginal vein:postmarginal vein:stigmatal vein as 40:25:24; basal and cubital setal lines complete; costal cell with row of ~ 16 marginal setae anteriorly, two irregular longitudinal rows of setae ventrally extend length costal cell, uncus $5.10\times$ its length from apex stigmatal vein. Metasoma: ovate in dorsal view, pointed apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 10:10:15:23:22:25:7:7; cerci peg-like, $\sim 2.0\times$ as long as broad.

ETYMOLOGY. From the diminutive form of the Spanish word *gordo*, meaning "fat".

Male. Unknown.

TYPE MATERIAL. **USA: Virginia:** Essex Co.: 1mi. SE Dunnsville, 37°52' N 76°48' W, 4-22.IV.1996, MT, D. R. Smith (Holotype, ♀, USNM). Paratype, ♀, same data as holotype: **Louisa Co.:** 4mi. S. Cuckoo, 16.iii-4.iv.1989, J. Kloke & D. Smith, Malaise trap (1♀, USNM).

VARIATION. Not applicable.

HOST. Unknown.

DISTRIBUTION. Virginia (USA).

Aulogygnus io (Girault, 1916) comb. nov.

(Figs 9, 10)

Pseudolynx io Girault, 1916b; lectotype, ♀, here designated.

Aulogygnus io: Schauff & LaSalle 1993: 492.

Pseudolynx marilandia Girault, 1917; lectotype, ♀, here designated; **syn. nov.**

Pseudolynx marylandia Peck, 1951; unjustified emendation of *Pseudolynx marilandia* Girault, 1917.

Aulogygnus marilandia: Schauff & LaSalle, 1993: 492.

DIAGNOSIS. This species is similar in coloration to *Aulogygnus flavimaculata* and *A. gorditus* n. sp., but differs with the clava $1.93\times$ as long as broad, gaster $1.53\times$ as long as broad, dorsellum $1.27\times$ as long as propodeum medially and usually with 8 scutellar setae. *Aulogygnus flavimaculata* has the clava $2.31\times$ as long as broad, gaster $4.00\times$ as long as broad, dorsellum $2.00\times$ as long as propodeum medially and with 8 scutellar setae; whereas *A. gorditus* has the clava only $1.21\times$ as long as broad, gaster $1.49\times$ as long as broad, dorsellum $2.00\times$ as long as propodeum medially and with 4 scutellar setae.

DESCRIPTION OF FEMALE LECTOTYPE. Body length 3.20 mm (mesosoma+gaster only; head smashed on slide). Color: metallic blue-green (stronger green on lateral surfaces, dorsum duller bronze-green) except following either orange: [head of HT smashed on slide; following orange: circumocular strip, interconnected both dorsally by strip extending posterad lateral ocelli and anteriorly by transverse strip at level of midpoint of medial ocular margin, ventral margin of toruli connected to circumocular strip by transverse strip] tegula; narrow triangular strip along anterolateral margin mesoscutum at notaulus; parapsidal lobe laterally, mesally and narrowly along posterior margin; axilla laterally, mesally and narrowly along posterior margin; scutellum along lateral and posterior

margins; prepectus except for spot near anterodorsal margin; mesopleuron in dorsal third and along femoral depression, extending ventrally to midline of mesopleuron; axillula; dorsellum in submedial half; or orange-brown: trochanters and legs; or dark brown: gaster (with faint metallic reflections, particularly in anterior quarter), wing veins and infuscation posterad marginal vein between parastigma and stigmal vein, slight infuscation along basal and cubital setal lines. Sculpture: face indiscernible [holotype head smashed on slide]. Mesosoma, mesepisternum (anterior to femoral depression), metapleuron, coxae, propodeum and metasoma reticulate, interstices smooth and rounded; scutellum lacking shallow submedian lines; certain areas polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, and gaster. Head: [0.71× as high as broad, eye height 2.39× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus, transverse frontofacial suture faintly indicated (concurrent with transverse strip at level of midpoint of medial ocular margin)]; clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 8:10:26. Antenna: scape reaching just above venter of midocellus]; funiculars and club stout, densely covered in MPS; ratio scape (minus radicle):pedicel:anellus: F1:F2:club as 36:13:3:22:15:26 [club slightly collapsed laterally]; F1 and F2 slightly narrowed basally. Mesosoma: [propleuron subrectangular, reticulate-imbricate; prosternum pentagonal, transversely reticulate-imbricate with fine median carina]; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate, in ventral view with median line extending length, sparsely setose apically]; pronotum and mesoscutum with evenly scattered decumbent setation, scutellum with two sublateral rows of 4 subdecumbent setae [see Variation section], oriented posteromedially; prepectus triangular, ≥2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeum reticulate, this sculpture finest medially, spiracle ovate and positioned ~1/4 its diameter from dorsellum, callus with 13 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 2.22× as long as broad, 0.59× as long as metafemur; metafemur 3.33× as long as broad; ratio marginal vein:postmarginal vein:stigmal vein as 62:35:33; basal and cubital setal lines complete; costal cell with row of 9 marginal setae anterior parastigma, two longitudinal rows of setae ventrally extend length costal cell, uncus 3.33× its length from apex stigmal vein. Metasoma: ovate in dorsal view, pointed apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 25:10:17:18:17:47:15:14; cerci peg-like, ~2.0× as long as broad. Male. Unknown.

TYPE MATERIAL EXAMINED. **USA: Massachusetts:** Essex Co.: North Saugus, 5-24-07; JC Crawford collector; Type No. 19630 U.S.N.M.; *Pseudolynx* [*flavitibia* crossed out] *io* ♀ type [handwritten]; [Slide mounted: antennae, wing, parts of two legs, head]: *Pseudolynx* [*flavitibia* crossed out] *io* Girault ♀ type [handwritten white label]; 19648 [Irregular red label] (Lectotype ♀ USNM).

ADDITIONAL MATERIAL EXAMINED. **Illinois:** Piatt: White Heath, 25.iv.1939, J. C. Dirks, shrub #3 (1♀ USNM); **Maryland:** Montgomery: Plummers Island, 14.iv.08, H. S. Barber (1♀ USNM); **Minnesota:** Olmsted: C. N. Ainsdale (1♀ USNM); **South Carolina:** Pickens: Clemson, Fant's Grove, 13.iv.1951, W. F. Chamberlain, alfalfa field, 172 (1♀ USNM); **Virginia:** City of Falls Church: Reared 12.iv.1916 from *Quercus palustris*, Middleton Wm, 12050 Hopkins US (2♀ USNM); Reared 28.iv.1914 from *Quercus*, W. Middleton, 12029 Hopkins US (1♀ USNM); 18.iv.1918, Middleton Wm, (1♀ USNM); Essex: 1 mi. SE Dunnsville, 37 52'N 76 48'W, 4-22.iii.1995, D. Smith, MT (2♀ USNM); Fairfax: Vienna, 17.iv.1913, R. A. Cushman (1♀ USNM); **West Virginia:** Monongalia: Morgantown, 10.v.1983, L. Butler, Cacapon Batt. P.A., #143 (1♀ USNM).

VARIATION. Females vary in length from about 2.50-3.50 mm. In females, the orange areas vary in width and extent especially around the edges of mesosomal regions (scutellum, lateral lobe mesoscutum, dorsellum, etc.). The coloration on the legs, particularly the femur, can range from an

orange to having darker infuscation with metallic reflections. The scutellum usually has 4 or 6 setae and 5-9 marginal costal setae apically with 1 or 2 rows ventral setae ventrally on costal cell. The coxae can range from orange apically to almost entirely metallic. The infuscation on the forewing is more or less extensive along the anterior margin (Figs. 9, 10). Comparison of the lectotypes of *A. io* and *A. marilandia* indicate no differences substantial enough to warrant specific status. F1 is slightly shorter in *A. marilandia* than in *A. io*, but the two specimens are otherwise very similar in coloration, size, setation and sculpture. The lateral protibia and lateral prepectus metallic blue in *A. marilandia* are purported differences from *A. io*, however, the latter specimen has the protibia faintly suffused with metallic blue and the lateral prepectus with a blue spot dorsally. What we currently conceive of as *Aulogymnus io* may contain cryptic species that could be better discerned via morphometric analysis coupled with focused rearings of both sexes from a given host.

HOST. The Hopkins numbers from the City of Falls Church records above indicate the hosts include Cynipidae on *Quercus*. Hopkins 12029 notes indicate this specimen was attempting to oviposit into a marked bud on *Quercus alba* L. Although several cynipid genera are known to gall buds (*Acraspis* Mayr 1881, *Neuroterus* Hartig 1840, *Andricus* Hartig 1840, *Callirhytis* Förster 1869, and *Liodora* Förster 1869), only *Callirhytis* (as *Andricus*) *seminator* (Harris 1841) (Cynipidae), the wool sower, is mentioned in the notes. However, this gall is usually observed in May after ovipositional activity by the galler during bud break. It is unknown how early in the development of a cynipid gall that *Aulogymnus* spp. attack. Hopkins 12050 indicates two live *Aulogymnus* were removed from galls of *Amphibolips* (Reinhard 1865) on *Quercus coccinea* Muenchh. According to Weld (1959), six species of *Amphibolips* attack scarlet oak, galling acorns (*A. prunus* Cresson), buds (*A. tinctoriae* Ashmead 1896, *A.* near *cookii* Gillette 1888), and leaves (*A. nubilipennis* (Harris 1841), *A. confluenta* (Harris 1841), *A. quercuscoelebs* (Osten Sacken 1861)).

DISTRIBUTION. Massachusetts, Minnesota, West Virginia, Virginia (USA).

Aulogymnus minyas (Walker, 1847)

Eulophus minyas Walker, 1846: 143; nomen nudum by Peck (1951: 594).

Eulophus minyas Walker, 1847: 26; lectotype, ♀, designated by Burks (1975: 146)

Aulogymnus minyas: Burks 1975: 146.

DIAGNOSIS. Among species of *Aulogymnus*, this species is uncommon in that it possesses an apically carinate scutellum that overhangs the dorsellum and, though likely less reliable, a coppery-green coloration.

DESCRIPTION OF FEMALE LECTOTYPE. Body length 2.80 mm. Color: dark brown with metallic yellow-green reflections, cupreous reflections dorsally, except following either golden: scape (remaining antenna brown), apices femora, all tibiae and tarsi, excluding apex pretarsomeres brownish; or brown: tegula, femora [some metallic reflections], wing veins and faint infuscation posterad marginal and stigmal vein, gaster. Sculpture: face and scrobes reticulate. Mesosoma, mesepisternum (anterior to femoral depression), metapleuron, coxae, propodeum and metasoma reticulate-imbriate with scutellum tending toward lineolate laterally and lacking shallow submedian lines, interstices conspicuous; certain areas polished or polished with faint reticulation: dorsellum anteriorad spiracle, Gt1; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, and gaster. Head: 0.78× as high as broad, eye [collapsed] height 2.50× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture faintly indicated (concurrent with coppery transverse strip at

level of midpoint of medial ocular margin); clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 7:6:18. Antenna: scape reaching just below midocellus; [flagella collapsed] funiculars and club stout, covered in 2-3 rows staggered MPS; ratio scape (minus radicle):pedicel:anellus: F1:F2:club as 30:12:2:18:10:23; F1-F2 each subequal in width along length. Mesosoma: [propleuron and prosternum obscured by head]; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate-imbricate, in ventral view with median line extending length, asetose apically; pronotum and mesoscutum with evenly scattered subdecumbent setation, scutellum with two sublateral rows each of 2 subdecumbent setae, one in anterior third and one in posterior third scutellum [abraded], apex carinate, overhanging dorsellum; prepectus triangular, $\geq 2.0\times$ size of tegula, surface sculpture similar to lateral pronotum; propodeum finely reticulate, this sculpture finest medially, with fine median carina, spiracle ovate and positioned $\sim 1/4$ its diameter from dorsellum, callus with 2 erect setae; mesotibia with robust seta apicoposteriorly, at least $2.00\times$ longer than any seta on mesotibia; metacoxa $2.60\times$ as long as broad, $0.78\times$ as long as metafemur; metafemur $4.00\times$ as long as broad; ratio marginal vein:postmarginal vein:stigmal vein as 45:30:28; basal and cubital setal lines complete; costal cell in apical half with row of 11 marginal setae antieriad parastigma, single longitudinal row of setae ventrally extend length costal cell, uncus $3.67\times$ its length from apex stigmal vein. Metasoma: [badly collapsed laterally] elongate, pointed apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse strip in dorsal view, [accurate measurements not possible due to extensive collapse]; cerci peg-like, roughly as long as broad.

Male. Unknown.

TYPE MATERIAL EXAMINED. Lectotype [circular label with purple edging]; ♀ *Eulophus minyas* Walk., Des. as LT by Burks, put in *Aulogygnus*; ♀ gen. nr. *Olynx*, det. Z. Bouček 1974; B.M. Type Hym. 5.2277. [No locality label on lectotype; Walker (1846: 143) indicates that this species was collected at St. John's Bluff, Florida] (Lectotype ♀, BMNH).

VARIATION. Not applicable.

HOST. Unknown.

DISTRIBUTION. Florida (USA).

DISCUSSION. This species is similar to an unassociated male from the Wichita Mountains National Wildlife Refuge, OK. Aside from secondary sexual characteristics and some coloration differences (infusate tibiae, pale band across vertex), the two specimens are alike in general habitus and both have the carinate, overhanging scutellum. It is mentioned in the event that the alternate sex of either specimen is reliably determined at some point.

Aulogygnus purpurescens sp. nov.

DIAGNOSIS. This species is the only one to possess primarily metallic purple reflections, a smooth metacoxa with very fine lineolate sculpture and callus with sparse setation (<10 setae). Those species having reduced metacoxal sculpture (e.g., *A. smithi* sp. nov.) never have metallic purple reflections.

DESCRIPTION OF FEMALE HOLOTYPE. Body length 2.05 mm. Color: brown with metallic purple to bluish (head, mesosoma, coxae, femora, less distinctly: gaster) reflections; or pale brown as follows: circumocular strip in dorsal half eye, interconnected as follows: dorsally both by strip extending posterad lateral ocelli and by strip extending antieriad median ocellus; transverse strip at level of midpoint of medial ocular margin, this strip angling dorsad along scrobes before uniting into thin line that intercepts strip extending antieriad median ocellus; wing veins pale brown basally becom-

ing yellow apically, hyaline. Sculpture: face finely imbricate-reticulate ventrally becoming slightly coarser dorsally, scrobes similarly sculptured, genae becoming lineolate. Pronotum finely, transversely imbricate; mesoscutum, prepectus reticulate; mesopleuron smoother, finely imbricate-reticulate; propodeum finely reticulate with some rugulosity along anterior margin, reticulation finest medially, without median carina; prosternum pentagonal, imbricate with fine median channel; procoxa convex anteriorly, imbricate, with a few sparse, subdecumbent setae along anterior surface; mesepisternum glabrous, in ventral view with median line extending length, sparsely setose apically; scutellum lineolate and lacking shallow submedian lines, interstices conspicuous; certain areas polished or polished with faint reticulation: dorsellum anterior spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, metapleuron, and gaster. Head: 0.80× as high as broad, eye height 1.67× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture present; clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 3:5:20. Antenna: scape reaching just above venter of midocellus; funiculars and club robust, densely covered in MPS; ratio scape (minus radicle):pedicel:A1:F1:F2:club as 22:8:2:8:7:18; F1-F2 each subequal in width along length, clava symmetric apically. Mesosoma: pronotum and mesoscutum with sparsely scattered subdecumbent setation, mesoscutum bare medially and two rows of 4 setae subdorsally with stoutest setae near apical margin, scutellum with two pairs sublateral, stout, subdecumbent setae, one pair in anterior third and one pair near apex, all oriented posteromedially; prepectus triangular, >2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeal spiracle ovate and positioned <1/2 its diameter from dorsellum, median carina absent; callus with 6 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 3.00× as long as broad, 0.75× as long as metafemur; metafemur 5.71× as long as broad; ratio marginal vein:postmarginal vein:stigmatal vein as 25:13:17; basal setal line present and cubital setal line terminating at apex basal setal line; costal cell with row of 6 marginal setae anteriorly parastigma, one longitudinal row of setae ventrally extend apical 4/5 length costal cell, uncus 2.50× its length from apex stigmatal vein. Metasoma: elongate, ovate in dorsal view, tapered apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse, transparent strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 12:10:15:15:17:18:9:8; cerci peg-like, roughly as long as broad.

Male. Length 1.65-1.73 mm. Similar to female except in the structure of the antenna and gaster as follows: scape reaching just above venter of midocellus; ratio scape (minus radicle):pedicel:A1:A2:F1:F2:F3:club as 21:7:1:1:8:8:16; F1-F3 pedicellate, densely setose with setae extending well beyond apex each flagellomere, clava symmetric and with spinose process apically. Metasoma: ovate in dorsal view, slightly tapered apically where adeagus slightly exerted; gastral petiole barely visible in dorsal view, Gt₂ - Gt₇₊₈, (all measured dorsally): 10:12:11:11:12:10:5.

ETYMOLOGY. Derived from the Latin stem *purpura*, meaning purple.

TYPE MATERIAL EXAMINED. USA: Virginia: Essex Co.: 1mi. SE Dunnsville, 23.III-11.IV.1995, Malaise trap, D. R. Smith (Holotype, ♀, USNM). Paratypes, 2♂, same data as holotype (USNM).

VARIATION. Color patterns are consistent and the number of setae on the callus ranges from 6-8. Some may have been abraded, but setal sockets are difficult to see for finer setae.

HOST. Unknown.

DISTRIBUTION. Virginia (USA).

Aulogymnus smithi sp. nov.

(Figs 5–8, 12, 14)

DIAGNOSIS. This species is most likely confused with *A. californica* as both are primarily yellow with two funiculars. *Aulogymnus smithi* sp. nov. generally has a gaster more yellow with darker banding along the tergal apices only, although some specimens may be suffused with brown ventrally and *A. californica* uniformly dark brown. The uncus of *A. smithi* sp. nov. is 3.50× its length from the apex of the stigmal vein, whereas that of *A. californica* is only 2.30× its length from the apex of the stigmal vein. The occipital maculation at most approaches the eye in *A. smithi* sp. nov. and extends laterally to the eye in *A. californica*.

DESCRIPTION OF FEMALE HOLOTYPE. Body length 2.56 mm. Color: pale yellow with the following pale brown: pedicel dorsoproximally, F2, clava, spot antieriad malar sulcus, area surrounding occipital foramen, mesopleural sulcus, nuchal margin, transverse strips dorsoapically on Gt₁₋₅ (these interconnected by dorsomedial line); or white: circumocular strip in dorsal half eye, interconnected as follows: dorsally both by strip extending posterad lateral ocelli and by strip extending antieriad median ocellus; transverse strip at level of midpoint of medial ocular margin (very faint), this strip angling dorsad along scrobes before uniting into thin line that intercepts strip extending antieriad median ocellus; wing veins pale yellow, hyaline except for brownish stigmal vein and spot appressed to distal end. Sculpture: face finely imbricate-reticulate ventrally becoming slightly coarser dorsally, scrobes similarly sculptured, genae becoming lineolate. Pronotum finely, transversely imbricate; mesoscutum, prepectus reticulate; mesopleuron smoother, finely imbricate-reticulate; propodeum finely reticulate, reticulation finest medially, without median carina; prosternum pentagonal, imbricate with fine median channel; procoxa convex anteriorly, imbricate, with a few sparse, subdecumbent setae along anterior surface; mesepisternum glabrous, in ventral view with median line extending length, sparsely setose apically; scutellum lineolate and lacking shallow submedian lines, interstices conspicuous; certain areas polished or with faint reticulation: dorsellum antieriad spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, metapleuron, and gaster. Head: 0.67× as high as broad, eye height 2.20× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture present; clypeal apex shallowly bilobate; ratio lateral ocellus:ocellocular distance:postocellar distance as 5:7:15. Antenna: scape reaching just above venter of midocellus; funiculars and club robust; ratio scape (minus radicle):pedicel:A1:A2:F1:F2:club as 21:9:1:1:8:7:17; F1-F2 each increasing in width along length, clava symmetric apically. Mesosoma: pronotum and mesoscutum with sparsely scattered subdecumbent setation, mesoscutum bare medially and two rows of 4 setae subdorsally with stoutest setae near apical margin (additional small seta laterad anterior-most seta on left side), scutellum with two pairs sublateral, stout, subdecumbent setae, one pair in anterior third and one pair near apex, all oriented posteromedially; prepectus triangular, >2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeal spiracle ovate and positioned <1/2 its diameter from dorsellum, median carina absent; callus with 7 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 4.00× as long as broad, 0.80× as long as metafemur; metafemur 4.00× as long as broad; ratio marginal vein:postmarginal vein:stigmal vein as 35:33:23; basal setal line present and cubital setal line terminating 3 setae beyond apex basal setal line; costal cell with row of 9 marginal setae antieriad parastigma, one longitudinal row of setae ventrally extend apical entire length costal cell, uncus 3.50× its length from apex stigmal vein. Metasoma:

elongate, ovate in dorsal view, tapered apically where ovipositor sheaths slightly extruded; gastral petiole visible as transverse, transparent strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 11:20:20:22:21:17:11:12; cerci peg-like, roughly 0.75× as long as broad.

Male. Unknown.

ETYMOLOGY. Named in honor of David Smith (USDA, Agricultural Research Service, Plant Science Institute, Systematic Entomology Laboratory (retired) Washington, DC), without whose extensive malaise trapping over the past 20+ years, most of the specimens included herein would not have been collected.

TYPE MATERIAL. USA: Virginia: Essex Co.: 1mi. SE Dunnsville, 23.III-11.IV.1995, Malaise trap, D. R. Smith (Holotype, ♀, USNM). Paratypes, 3♀, same data as holotype; 1♀, same data as holotype but date 4-22.iii.1995 (USNM).

VARIATION. Primary variation occurs in extensiveness of the darker maculation on the body: the genal maculation can be absent or extend anteriorly toward malar sulcus; occipital maculation can extend ventrad foramen magnum toward ventral mouthparts; mesepisternum may or may not be maculated; dorsal maculation on the gaster ranges from a vague longitudinal smear only through a dorsal smear trending into transverse bands along the apical margins gastral terga with diffuse maculation ventrally to distinct dorsal and ventral transverse bands.

HOST. Unknown.

DISTRIBUTION. Virginia (USA).

Aulogymnus virginiensis sp. nov.

DIAGNOSIS. This species has three funicular segments, but is unlikely to be confused with the other *Aulogymnus* (*A. bouceki* sp. nov. and *A. flavitibiae*) having three funiculars as *A. virginiensis* sp. nov. is primarily orange with faint purple reflections dorsally on the mesosoma propodeum. Both *A. bouceki* sp. nov. and *A. flavitibiae* are metallic blue/green without any purple and have at least some indication of submedian lines on the scutellum, which are lacking in *A. virginiensis* sp. nov..

DESCRIPTION OF FEMALE HOLOTYPE. Body length 2.60 mm. Color: orange-brown with metallic purple-blue reflections as follows: ocellar triangle, mesoscutum, axilla centrally, scutellum and propodeum; tibiae apically and tarsi paler, excluding pretarsomeres brownish; wing veins pale yellow to brown with brown, U-shaped infuscation connecting parastigma and stigmal vein, admarginal area hyaline. Sculpture: face finely imbricate-reticulate, scrobes polished. Mesosoma, propleuron, mesepisternum (anterior to femoral depression), coxae, and metasoma reticulate-imbricate; propodeum finely reticulate, this sculpture finest medially, with faint median carina in anterior half; prosternum pentagonal, transversely reticulate-imbricate with fine median channel; procoxa convex anteriorly, imbricate, with sparse, erect setae along anterolateral margin; mesepisternum reticulate, in ventral view with median line extending length, sparsely setose apically; scutellum lineolate and lacking shallow submedian lines, interstices inconspicuous; certain areas polished or polished with faint reticulation: dorsellum anteriorly spiracle, Gt₁; or with reticulation shallower than on dorsum of mesosoma: acropleuron, mesepimeron, metapleuron, and gaster. Head: 0.85× as high as broad (frons/vertex and eyes slightly collapsed), eye height 2.35× malar space; malar sulcus curved; scrobal depression shallow, scrobes uniting at mid-frons before intercepting median ocellus; transverse frontofacial suture very faintly indicated (concurrent with very fine transverse strip/collapse at level of midpoint of medial ocular margin); clypeal apex shallowly bilobate; ratio lateral ocellus:ocelloccular distance:postocellar distance as 5:6:18. Antenna: scape reaching just above venter of midocellus; funiculars and club elongate, covered in MPS; ratio scape (minus

radicle):pedicel:anellus:F1:F2:F3:club as 28:12:2:15:12:10:16; F1-F2 each slightly increasing in width along length. Mesosoma: pronotum and mesoscutum with evenly scattered subdecumbent setation, mesoscutum bare medially with stoutest setae near apical margin, scutellum with two pairs sublateral, stout, subdecumbent setae, one pair in anterior quarter and one pair in posterior quarter scutellum, oriented posteromedially; prepectus triangular, >2.0× size of tegula, surface sculpture similar to lateral pronotum; propodeal spiracle ovate and positioned ~1/2 its diameter from dorsellum, callus with 18 erect setae; mesotibia with robust seta apicoposteriorly, at least 2.00× longer than any seta on mesotibia; metacoxa 2.47× as long as broad, 0.67× as long as metafemur; metafemur 3.93× as long as broad; ratio marginal vein:postmarginal vein:stigmatal vein as 35:23:22; basal setal line absent and cubital setal line terminating even with base MV; costal cell with row of 4 marginal setae anteriorly, one longitudinal row of setae ventrally extend 4/5 length costal cell, uncus 2.30× its length from apex stigmatal vein. Metasoma: elongate, ovate in dorsal view, truncate apically (due to retraction of Gt₇₊₈ beneath Gt₆ during drying) where ovipositor sheaths slightly extruded; gastral petiole visible as transverse, transparent strip in dorsal view, Gt₂ - Gt₇₊₈, ovipositor sheath (all measured dorsally): 30:10:13:17:18:26:?:?:7; cerci peg-like, roughly as long as broad.

Male. Unknown.

ETYMOLOGY. Commemorative of the Commonwealth from which this species was recovered, Virginia.

TYPE MATERIAL: **USA: Virginia:** Essex Co.: 1mi. SE Dunnsville, 30.IV-13.V.1991, Malaise trap, D. R. Smith (Holotype, ♀, USNM).

HOST. Unknown.

DISTRIBUTION. Virginia (USA).

REMARKS. There exist at least 8 morphospecies of unassociated males in our possession. It may be that certain of these taxa are conspecific with nominal species known only from females. However, until such time as coordinated rearing or experimental mating information becomes available, we shall only mention that these specimens are deposited in the *Aulogymnus* spp. section of the USNM collection. Rearing efforts are underway seeking to obtain more definitive male-female associations. Our information suggests that there are likely many more species to be discovered with additional early spring collecting.

A c k n o w l e d g e m e n t s

We dedicate this paper to Zdeněk Bouček, whose research on world Chalcidoidea remains unsurpassed and forms the foundation for future accomplishments by those who follow, and with best wishes for continued health. We acknowledge the help of Eric Grissell and Gary Miller (USDA, Agricultural Research Service, Plant Sciences Institute, Systematic Entomology Lab), and Greg Evans (USDA, Animal Plant Health Inspection Service) who reviewed the manuscript.

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