

ON THE BOTHRIOTHORACINE INSECTS OF THE UNITED STATES.

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NO PUBLISHED attempt has been made to divide the large and important chalcidid subfamily Encyrtinæ into tribal groups beyond the suggestion of the writer* of the use of the name Tetracnemini for the Encyrtinæ possessing branched antennæ. There are, however, several natural divisions of the subfamily to which tribal names should be given in any revision of the group. One of these is the group under consideration. The extraordinary sculpture of the head caused the partial association of *Bothriothorax* and *Phænodiscus* in the synoptical tables of Foerster, Thomson, and Mayr, and to these two genera are to be added two others, *Chalcaspis* and *Pentelicus*, based upon undescribed material in the U. S. National Museum.

We unfortunately know nothing of the habits of the new genera, since the few specimens known have all been collected by sweeping. Of *Bothriothorax*, however, the habits are well known, and the species are parasitic upon dipterous larvæ, as follows:

B. clavicornis, Dalman, from *Syrphus* sp. and *Anthomyia ceparum*; *B. peculiaris*, Howard, from Syrphid larva on oak; *B. californicus*, new species, from larva of *Catacomba pyrastris*, Linnaeus, feeding on rose aphid; *B. noveboracensis*, new species, from Syrphid larvæ preying upon hop aphid.

We have as yet no American species of *Phænodiscus*; but *P. ceropiformis* and *P. aeneus* of Europe, are said to be parasitic upon Coccidæ.

BOTHIOTHORACINI, new tribe.

Short, stout-bodied Encyrtinæ, with very large, thimble-like punctation to the very broad and very short head; short, stout legs, with five-jointed tarsi† and broad wings; antennæ inserted below the middle of face, eleven-jointed, funicle joints short, scape slender, or with leaf-like expansion.

* Proc. U. S. Nat. Mus., xv, 1892, p. 361.

† This seemingly unnecessary statement of the number of the tarsal joints is rendered necessary by the discovery by Aurivillius of a true Encyrtine with four-jointed tarsi (*Arrheuphagus*).

ANALYSIS OF THE GENERA.

Marginal vein very short or wanting.

Mesoscutum with a sculpture very similar to that of head.

Mesoscutum very short, only half as long as scutellum; antennal club as long as all funicle joints together; postmarginal vein as long as stigmal CHALCASPIS.

Mesoscutum at least as long as scutellum; antennal club shorter than funicle; postmarginal vein much shorter than stigmal BOTHRIOTHORAX.

Mesoscutum with punctures less dense than those of head, and with a plain shagreening of the surface; antennal club shorter than funicle; postmarginal and stigmal veins short, subequal PENTELICUS.

Marginal vein long, rarely shorter than stigmal; mesoscutum shagreened, with sparse punctures PHENODISCUS.

CHALCASPIS, new genus.

Female.—Body very short and very stout; head very thin antero-posteriorly, very broad (laterally); eyes long oval, very widely separated, faintly hairy; face very convex, not furrowed; occipital border very sharp; genal sulcus distinct, widely open at eye border; ocelli indistinct, at the corners of a very obtuse angled triangle, lateral ones near the eye border. Antennæ inserted at border of mouth; scape slender, not broadened, rather short; flagellum rather longer than scape; first funicle joint shorter than pedicel, remaining funicle joints not longer than wide; club large oval, slightly obliquely truncated, as long as all funicle joints together. Pronotum nearly covered by occipital border of head. Mesoscutum very short. Mesoscutellum long and broad, twice as long as scutum, nearly flat, rather pointed, with entire border emarginate; axillar sutures very indistinct, axillæ meeting at tips. Abdomen very short and broad. Legs stout. Wings short and broad; submarginal vein reaches costa at about one-half wing length; marginal vein lacking; stigmal long, curved; radial angle narrow; postmarginal as long as stigmal.

CHALCASPIS PERGANDEI, new species.

Female.—Length, 1.3 mm.; expanse, 3.4 mm.; greatest width of forewing, 0.59 mm. Punctuation of head (except the smooth occiput), mesoscutum, and mesoscutellum nearly uniform throughout, the punctures round, lengthened somewhat posteriorly on scutellum; tegulæ smooth, with a shallow fovea at inner base; mesopleura finely shagreened; rest of body smooth. Funicle joints of antennæ short, all broader than long, increasing in length and breadth from 1 to 6. Head, pronotum, and mesonotum greenish or coppery in color, with strong metallic reflections; eyes dark red or black, mandibles black; antennal scape honey yellow with black bulb; pedicel and club dark brown or black; funicle joints honey yellow, joint 1 darker than the others. Pleura and abdomen metallic with greenish or bluish luster. All coxæ metallic; all femora, tibiæ, and tarsi honey yellow. Entire forewing slightly infuscated.

Described from four female specimens, two collected by Mr. Theodor

Pergande, in the District of Columbia, in July and August, 1878, one taken by myself in September, 1884, and one captured by Mr. J. M. Aldrich, in South Dakota. All in the U. S. National Museum collection. I have also seen two females in the collection of the American Entomological Society at Philadelphia.

Genus *BOTHRIOTHORAX*, Ratzeburg.

Bothriothorax, RATZEBURG, Ichnenmonen d. Forst-insekten, I, 1844, p. 208.—FOERSTER, Hymenopterologische Studien II, 1856, p. 32.—SUELLEN VAN VOLLENHOVEN, Schetsen, 1871, Tab. VII.—THOMSON, Hymenoptera Scandinaviae, IV (1875), p. 133.—MAYR, Die Europäische Encyrtiden, 1875, p. 80 (754).

Female.—The body is rather broad and flattened. The antennæ arise not far from the border of the mouth; the scape is quite long and not flattened; the pedicel is as long as or longer than the first funicle joint; this last is as long as or longer than thick; the club is shorter than the funicle or (with *B. paradoxus*) twice as long. The face is delicately impressed; vertex and clypeus are very broad, and the ocelli form a very obtuse-angled triangle. The thin (antero-posteriorly) broad (laterally) head is very deeply punctured, as are also mesonotum and scutellum; in the center of each puncture is a little papilla, from which springs a delicate hair; besides this, there is a leather-like sculpture. The mesoscutum and scutellum are rather strongly transversely arched, and the lateral borders of the latter are quite sharp. The ovipositor is not at all, or very slightly, extruded. The marginal vein of the hyaline wings is very short, or is lacking; the stigmal is long, and the postmarginal is short, or very short; radial angle wide.

Male.—Very similar to the female and only distinguished by the antennæ and by the sparser punctuation of the head. The pedicel is short, somewhat longer than thick; the funicle quite lengthened, and the joints small and strongly concave beneath, so that the funicle appears somewhat toothed above; most of the joints have two half whorls of long hair; the club is almost as long as the last two funicle joints together.

ANALYSIS OF THE SPECIES OF *BOTHRIOTHORAX*.

- Punctures of mesonotum deep but very irregular, giving a strongly rugose appearance VIRGINIENSIS.
 Punctures of scutum quite round and regular.
 Axillæ meet at tips PECULIARIS.
 Axillæ separated at tips:
 Scutellum more or less emarginate at tip.
 Scutellum nearly uniformly punctured.
 Emargination of tip of scutellum faint; antennæ rather long and slender NOVEBORACENSIS.
 Emargination very distinct; antennæ short and stout CALIFORNICUS.
 Normal punctuation of scutellum ceases on posterior third, and is replaced by delicate longitudinal aciculation; emargination of tip slight NIGRIPES.
 Scutellum not emarginate at tip.
 Notum transversely and longitudinally convex; vertex rounding up between the eyes ROTUNDIFORMIS.
 Notum nearly flat; vertex flat PLANIFORMIS.

BOTHRIOTHORAX VIRGINIENSIS, Howard.

Bothriothorax virginensis, HOWARD, Bull. 5, Div. Entom., U. S. Dept. Agric., 1885, p. 20.

Female.—Length, 1.63 mm.; wing expanse, 3.96 mm.; greatest width of forewing, 0.69 mm. Face and vertex with large, round, thimble-like punctures, each with a central umbilicus, becoming sparser on lower face and more elongate. Cheeks also faintly shagreened; punctation of mesoscutum more irregular than on vertex, individual punctures elongated and more or less irregular; mesoscutellum like scutum, except that it is aciculate at base. Abdomen smooth; pleura smooth; eyes faintly hairy; antennæ regularly clavate; pedicel longer than first funicle joint, which is a little longer than broad; remaining funicle joints increasing slightly in width and in length; club slightly longer than sixth funicle joint. Color metallic greenish black; antennæ jet black; all coxæ metallic; all femora metallic, brownish at tip; front and middle tibiæ brownish yellow, hind tibiæ greenish black; all tarsi yellow; wing veins light brown.

Described from one female specimen collected September 18, 1881, at Arlington, Va. Type in the U. S. National Museum.

BOTHRIOTHORAX PECULIARIS, Howard.

Bothriothorax peculiaris, HOWARD, Bull. 5, Div. Entom., U. S. Dept. Agric., 1885, p. 20.

Female.—Length, 1.75 mm.; expanse, 4.25 mm.; greatest width of forewing, 0.7 mm. Axillæ meet at tips, face uniformly punctate, cheeks behind genal sulcus impunctate, faintly shagreened; punctures of mesonotum supplemented by faint granulation; scutellum nearly smooth at tip, faintly emarginate; tegulæ faintly granulate, abdomen and pleura smooth. First funicle joint of antennæ somewhat shorter than pedicel; funicle joints subcylindrical, increasing in diameter from one to six; joint six as thick as long; club as long as three preceding funicle joints together, much flattened and sharply, somewhat obliquely, truncate at tip. General color blue green; basal half of antennal scape honey yellow; distal half black above, yellowish below; flagellum black with green luster; middle and hind femora honey yellow; front and middle tibiæ honey yellow; hind tibiæ black; all tarsi honey yellow; wing veins light brown.

Male.—Antennæ much longer and more slender than those of female; pedicel twice as long as thick; joint one of funicle three times as long as thick, and one-third, or a little more, longer than pedicel; other funicle joints subequal in length, about as long as pedicel, well separated and increasing slightly in thickness; club flattened, very obliquely truncate, and nearly as long as two preceding funicle joints together; all joints clothed with short, close hair. In coloration similar to female, except that the antennæ and front femora are honey yellow throughout.

Described from three females and ten males, reared in November from a Syrphid larva, found on an oak leaf at Arlington, Va. Types in the U. S. National Museum.

BOTHRIOTHORAX NOVEBORACENSIS, new species.

Female.—Length, 1.6 mm.; expanse, 3.8 mm.; greatest width of forewing, 0.7 mm. Axillæ well separated at tips; punctation of head as with preceding species; same with that of mesonotum and scutellum. Axillæ nearly smooth, scutellum faintly emarginate at tip, tegulæ smooth, eyes faintly hairy; marked depression at central hind border of mesoscutum; abdomen faintly shagreened, mesopleura smooth, antennæ more slender than with preceding species; joint 1 of funicle one-half length of pedicel; joints 2 to 6 increasing slightly in width and length; club obliquely truncate, as long as the two preceding funicle joints together. General color bright metallic blue-green; tegulæ light brown at tip, somewhat metallic at base; antennal scape honey-yellow at base, brown toward tip; flagellum brown; all legs honey-yellow, front and middle femora brownish, hind tibiæ black, all coxæ metallic; wing veins brown.

Described from two female specimens, one collected on hop at Richfield Springs, N. Y., by Mr. Theodor Pergande, October 7, 1887, close to a Syrphid larva, and the other by Mr. Koebele at Boscawen, N. H., October, 1884. The measurements apply to the New York specimen; the New Hampshire specimen is considerably larger. Types in the U. S. National Museum.

BOTHRIOTHORAX CALIFORNICUS, new species.

Female.—Length, 1.75 mm.; expanse, 4.4 mm.; greatest width of forewing, 0.8 mm. Axillæ well separated at apex, scutellum distinctly emarginate, eyes plainly hairy; head punctured as with preceding species, facial depression slightly marked. Scutum and scutellum similarly punctured, the punctations on the side of the scutellum becoming somewhat elongate, less so in the center, the punctations with shagreened center; punctures lacking at extreme tip of scutellum, but shagreening persistent. Axillæ nearly smooth, with one or more faint depressions; tegulæ shagreened on basal half. Abdomen smooth, except second segment, which is faintly shagreened. Occiput rather strongly shagreened, mesopleura smooth. Antennæ short, stouter than with preceding species; flagellum not more than one-third longer than scape; first funicle joint one-half as long as pedicel; joint 2 equal to joint 1, joints 3, 4, 5, and 6 becoming each a little longer and a little wider than its preceding joint. Club flattened, obliquely truncate nearly to base, and as long as three preceding funicle joints together. General color metallic bluish-green, tegulæ also metallic, antennæ black throughout, all legs dark brown, hind tibiæ metallic, middle and fore tibiæ lighter toward tip; all tarsi honey yellow; wing veins brown.

Described from three female specimens reared by Albert Koebele at Alameda, Cal., in July, from pupa of *Catacomba pyrastu*, Linnaeus, among aphides on rose. Types in the U. S. National Museum.

BOTHRIOTHORAX NIGRIPES, new species.

Female.—Length, 2.2 mm.; expanse, 5 mm.; greatest width of forewing, 0.93 mm. Axillæ well separated; eyes, naked, scutellum slightly emarginate; head punctured as with preceding species, facial depression not marked; punctation of scutum and scutellum like that of head, except that posterior one-third of scutellum bears no large punctures, but is very finely and longitudinally shagreened or aciculate. Axillæ smooth, except for two large round punctures side by side on the wider portion of each. Tegulæ as with preceding species. Entire surface of abdomen faintly shagreened; pleura smooth; occiput as with preceding species. Antennæ as with the preceding species, except that the first funicle joint is as long as the pedicel. General color metallic bluish-green, with strong bronze reflections on thorax, these reflections being given off from the interspaces between the punctures. Base of antennal scape brownish, remainder of antennæ black; tegulæ black; all legs black, except that the tarsi are honey-yellow, and fore tibiæ are light brown; wing veins light brown.

Described from two female specimens, one collected on cabbage at Las Cruces, N. Mex., by Mr. T. D. A. Cockerell, and the other collected at Los Angeles, Cal., by Mr. D. W. Coquillett. Types in the U. S. National Museum.

BOTHRIOTHORAX ROTUNDIFORMIS, new species.

Female.—Length, 1.7 mm.; expanse, 4.3 mm.; greatest width of forewing, 0.85 mm. Scutellum not emarginate at tip; axillæ well separated at tips; notum of thorax transversely and longitudinally convex (a character which this species possesses in common with, though in rather more marked degree than, all the preceding species, but in which it differs radically from the following species). Head punctured as with preceding species, occiput transversely shagreened, facial depression well marked, transversely rugose; eyes faintly hairy. Scutum punctured like head, scutellum similarly punctured anteriorly, punctures becoming fainter toward tip, which is delicately transversely shagreened; axillæ with several small faint impressions; tegulæ smooth; pleura smooth; abdomen smooth, ovipositor very slightly exerted; antennæ, as with *californicus*, not so thickly clothed with pile as most of the other species. General color metallic bluish green; tegulæ dark brown, somewhat metallic at base; antennæ dark brown, with scape yellowish at base. All coxæ metallic, hind femora metallic, middle and front femora dark brown at middle, yellowish at tips; front femora rather darker than middle. Front and middle tibiæ honey-yellow, hind tibiæ nearly black, all tarsi honey-yellow, except apical

joints. Wing veins brown, with darker spot at juncture of submarginal and stigmal.

Described from one female specimen taken in Placer County, Cal., by A. Koebele, in August. Type in the U. S. National Museum.

BOTHRIOTHORAX PLANIFORMIS, new species.

Female.—Length, 1.8 mm.; expanse, 3.9 mm.; greatest width of forewing, 0.8 mm. Axillæ nearly touching, scutellum not emarginate, eyes plainly hairy; notum of thorax flat, mesoscutum and scutellum in same plane. Head punctured as with preceding species on front and vertex; facial depression very distinct, occupying nearly all of lower half of face, depression irregularly shagreened; face between depression and genal sulcus, rugose; cheek behind sulcus faintly longitudinally shagreened. Punctures of mesoscutum rather small and less pronounced than those of the head, but dense and accompanied by faint shagreening; on mesoscutellum punctures become much sparser, and the shagreening, which takes a longitudinal direction, much more marked. Axillæ with many small punctures; tegulæ faintly shagreened over entire surface; mesopleura distinctly shagreened, especially on anal half. Abdomen smooth at sides, faintly shagreened above and below, ovipositor distinctly exerted. Both scape and flagellum of antennæ rather longer than in preceding species; first funicle joint longer than second and rather shorter than pedicel; third and fourth equal to second; fifth, and sixth equal to first; club as with preceding species. General color black, faintly metallic, mesoscutellum with faint coppery luster, facial depression with brilliant purple luster; tegulæ black, somewhat metallic, middle tibiæ becoming lighter toward tip; tarsi as usual yellowish, with black apical joints. Wing veins brown, stigmal and short projection of submarginal darker than submarginal.

Described from one female specimen collected in Placer County, Cal., by A. Koebele, in August. This species resembles *Phenodiscus* in punctuation of mesoscutellum, but in venation and other respects belongs to *Bothriothorax*. Type in the U. S. National Museum.

BOTHRIOTHORAX PECKHAMII, Ashmead.

Bothriothorax peckhamii, ASHMEAD, Trans. Amer. Ent. Soc., XIII, 132.—CRESSON. Synopsis Hymenoptera North America, pt. ii, p. 240.

This species, Mr. Ashmead informs me, is not a *Bothriothorax*. He has kindly allowed me to see the type, and it seems to form a new genus near *Comys*, but lacks the scutellar tuft.

PENTELEICUS, new genus.

Female.—In habitus this form is intermediate between *Bothriothorax* and *Chalcaspis*, but has the shagreened mesonotum of *Phenodiscus*, the round punctures of the mesonotum, however, being rather close instead of sparse. It is not so short and broad as *Chalcaspis*. The

head resembles that of *Chalcaspis*; the ocelli are similarly placed, the eyes are shorter, more rounded, and hairy; facial depression well marked, genal sulcus plain but not widely opened at eye-border, as in *Chalcaspis*. Mesosentum is nearly as long as scutellum; axillæ are very difficult to distinguish and are widely separated at tips; scutum and scutellum rather closely punctate, with plain shagreening in addition. Scutellum rather flat, margined round entire free border, and with a delicate central longitudinal carina. Antennæ resemble those of *Bothriothorax*. Forewings broad and rather short, stigmal given off before submarginal reaches costa, postmarginal about as long as stigmal; both, however, short. Radial angle narrow. Abdomen short, triangular, rather sharply pointed at tip.

PENTELOCUS ALDRICHI, new species.

Female.—Length, 1.5 mm.; expanse, 2.8 mm.; greatest width of forewing, 0.6 mm. Punctuation of front divides at top of facial depression and runs in a narrow band down below each eye. Walls of facial depression faintly shagreened, the shagreening continuing in a longitudinal manner upon the cheeks, each side of the genal sulcus and so around upon the occiput. Mesoscutum with punctures lacking upon its anterior border. Tegulæ smooth; abdomen smooth; mesopleura faintly shagreened. Antennæ with indistinct joints, funicle joint one nearly as long as pedicel; funicle joints subequal in length, but increasing in width to flattened and very obliquely truncate club, which is as long as two preceding funicle joints together. General color somewhat metallic greenish-black; face highly metallic, with greenish-bronzy reflections, facial depression with bright green reflections; mesonotum much duller. Tegulæ black, antennæ dark brown or black, scape honey-yellow. All femora and tibiæ black, with yellowish extremities: trochanters yellowish; tarsi light honey-yellow, with black apical joints.

Described from one female specimen collected in South Dakota by Mr. J. M. Aldrich. Type in the U. S. National Museum.

Genus PHENODISCUS, Foerster.

Phenodiscus, FOERSTER, Hymenopterologische Studien, II, 1856, p. 144.

Discodes, FOERSTER, Hymenopterologische Studien, II, 1856, p. 32.—SUELLEN VAN VOLLENHOVEN, Schetsen, 1871, Tab. VII.

Phenodiscus, THOMSON, Hymenoptera Scandinaviae, IV, 1875, p. 136.—MAYR, Europäische Encyrtiden, 1875, p. 83.

No American species of this genus have yet been found. So many European genera, however, have already been recognized that it is probably only a question of time before species of this genus will be found to occur in the United States. I know the genus only through a single male specimen of *P. aeneus*, Dalman, given to me by Dr. Mayr, and am therefore obliged to repeat here this author's comprehensive description of the genus.

Female.—Body short, moderately broad; antennæ inserted not far

from mouth border; scape rather short, with no leaf-like expansion; pedicel is shorter or longer than first funicle joint; funicle moderately compressed or almost entirely cylindrical; club as long as two or three last funicle joints together. Facial depression slight; genal sulcus sharp, reaching from the eye to the mouth border; front and vertex very broad; ocelli at the corners of an obtuse-angled triangle; head thickly and very coarsely punctate; mesoscutum and scutellum rather strongly shagreened, with sparse hair-bearing punctures; pleura shagreened, not glistening; axillæ of the slightly arched scutellum meet at tips; ovipositor entirely or almost entirely hidden. Wings wholly or partly infuscated. Marginal vein is as long as or somewhat shorter than stigmal, never very short; postmarginal variable in length.

Male.—Somewhat like the female; scape short, pedicel as long as broad; funicle joints and club subequal in thickness, with short and rather close pile; sculpture of the head is lighter and sparser than in the female, the thorax also with finer sculpture; scutellum, especially behind, more strongly arched than with female; wings not infuscated; venation like female.

ADDENDUM.

Walker's genus *Aenasius*, just redescribed by the writer,* belongs to this new tribe. It differs at once from the genera here described by possessing a broad leaf-like expansion to the antennal scope. It is a monotypical genus, and has been found only on the island of St. Vincent, B. W. I.

* Journal Linnean Society, xxv, 1894, p. 88.