

are two small widely separated spots; in all those from southern California it is immaculate. The elytral spots vary much in size and in the Oregon examples coalesce into a broad vitta narrowed a little before the middle; the spots are sometimes dark green instead of blue.

Some specimens are colored nearly as in *insulatus* and were once somewhat generally distributed as such by Ricksecker.

GALL-FLY PARASITES FROM CALIFORNIA.

BY DAVID T. FULLAWAY,

HONOLULU, HAWAIIAN ISLANDS.

While at Stanford University, in 1910, I had an opportunity to study a fine collection of cynipid gall-flies collected by Mrs. Rose Patterson Blakeman. This collection was made by Mrs. Blakeman when a student in the University in 1905-6-7, and contains most of the described species from California. The collection also includes the parasitic species bred from the galls, but this material I was not able to examine carefully until recently. Although there is nearly as much parasitic as host material in the collection, I can distinguish only a few species, which are described herewith.

CHALCIDOIDEA.

TORYMIDÆ.

TORYMINÆ.

SYNTOMASPIS Förster.

S. californica Ashm.?

Female.—Length 4.5 mm., ovipositor 7.5 mm., expanse of wings 9 mm., greatest width of fore-wing 2 mm. Head and thorax (except mesopleura posteriorly and metathorax, which are smooth and shining) rather coarsely transversely rugose, the mesonotum, axillæ and scutellum in front of the transverse line which divides it beyond the middle, with very coarse umbilicate punctures; these much finer and largely effaced on head and pronotum; scutellum beyond the transverse line shagreened; all covered with a whitish pubescence which is especially marked on face and metathorax laterally; abdomen and legs smooth and shining, but microscopically reticulate, coxæ rather coarsely so, with a few sparse hairs.

Head transverse, slightly wider than the thorax, rather thin anterior-posteriorly, occiput completely margined, front broad between the eyes, which are large and bulged, face broadening slightly below, cheeks extremely thin in front, separated from face by a groove, broad behind eyes to occipital margin, ocelli almost in a straight line, antennæ inserted on the middle of the face, 11-jointed (scape, pedicel, 1 ring-joint, 7 jointed funicle and undivided club), joint measurement in mm. 1 .39, 2 .1, 4-10 .17-.18, 11 .3. Thorax broad, convex, pronotum fairly long, narrowing anteriorly, mesonotum a little longer than scutellum, parapsidal grooves distinct, scutellum rhomboidal, divided beyond the middle by a transverse line, metathorax and sides of scutellum anteriorly sloping abruptly. Abdomen not quite so long as head and thorax together, greatly compressed, elongate elliptical from above, hatchet-shaped from side, the segments telescoping, the four first dorsally ridged with the posterior margins incised, ovipositor projecting from tip of dorsum and elevated, sheaths clothed with short hairs. Legs stout and hairy, the hind coxæ, femora and tibiæ especially broad and flat, the outer edge of the coxæ quite sharp, femora faintly serrate on lower margin.

Brilliant metallic green with æneous and purplish reflections, antennæ fuscous brown, almost black, eyes and mandibles red, legs outwardly from coxæ reddish brown, ovipositor sheath black.

Wings hyaline, veins light brown, submarginal nearly a third longer than the marginal, which reaches beyond the middle of the costal border, stigmal vein undeveloped—a mere blob on the marginal, postmarginal vein also short, the disc pubescent with quite evident hair lines.

From *Andricus quercus-californicus*, *Callirhytis quercus-pomiformis* and strawberry gall on *Quercus dumosa* and pimply gall on *Q. douglasi*, from which no gall-flies were bred.

Described from many specimens in Coll. L. S. J. U. (Lot 497, s. 8).

***S. cærulea*, new species.**

Length 4 mm., ovipositor 3.5 mm., expanse of wings 8 mm., greatest width of fore-wing 1.5 mm. Head and thorax finely transversely rugose, with a short, closely appressed whitish pubescence; front of head, scutellum and mesonotum posteriorly with an almost effaced umbilicate punctuation, face, cheeks and anterior margin of the metathorax conspicuously hairy, metathorax, abdomen and mesopleura behind femoral furrow smooth and shining, the abdomen microscopically reticulate.

Head transverse, wider than thorax, rather thin anterior-posteriorly, occiput completely margined, front broad between the eyes, which are large and bulged, face also broad, cheeks extremely thin, ocelli arranged in an obtuse triangle, antennæ inserted on middle of face, 11-jointed (scape, pedicel, 1 ring-joint, 7 jointed funicle and undivided club), joint measurement in mm. 1 .47, 2 .11, 4 .2, 5 .18, 6-8 .16, 9 .15, 10 .13, 11 .27. Thorax broad, slightly convex, pronotum short, parapsidal grooves distinct, scutellum more or less angulate and truncate behind, divided by a transverse line just beyond the middle, behind which the

surface is shagreened, metathorax only slightly convex. Abdomen not quite as long as head and thorax together, very much compressed beneath, short elliptical and rather broad from above, triangular from side, truncate at apex of 4th segment, following segments projecting dorsally and the rather long ovipositor elevated, 1st segment distinctly and the following two more or less incised apically. Legs hairy, hind coxæ enlarged, hind femora broad and flat, faintly serrate and with a distinct tooth near apex.

Blue green to green and blue with some purplish reflections, antennal scape at base, mandibles, tegulæ, tibiæ and tarsi golden brown, eyes and ocelli red, terebra reddish brown, antennæ beyond scape and ovipositor sheaths black, the latter hairy.

Wings hyaline, pubescent, with some very evident hair lines, marginal vein long, nearly as long as submarginal, postmarginal a trifle longer than stigmal, all the veins brown except stigmal which is black.

From gall of *Callirhytis quercus-agrifoliæ* (Bass.), *Andricus quercus-californicus*, and pimply gall on *Q. douglasi* from which no gall-flies were bred.

Described from many specimens in Coll. L. S. J. U. (Lot 499, s. 3).

This species has some characters which would exclude it from the group in which it is placed and for a long time I was inclined to consider it as belonging to the genus *Cryptopristus* Först. in the next sub-family, but it has the wings of a genuine Torymine and in any event is so like the preceding that it would naturally go with it.

ORMYRINÆ.

ORMYRUS Westwood.

O. distinctus, new species.

Female.—Length 3.5 mm., expanse of wings 6 mm., greatest width of fore-wing 1 mm. Faintly reticulately rugose, the fine sculpture of head and thorax running transversely, reticulate sculpture of abdomen more pronounced; also finely punctate and covered with pubescence; mesopleura behind femoral furrow, 1st abdominal segment medially and all the segments narrowly at apex smooth and shining.

Head transverse, slightly wider than thorax, fairly thick anterior-posteriorly, eyes moderate and convex, ocelli arranged in an obtuse triangle, front wide between the eyes, face not narrowed, cheeks broad, separated from face by a groove extending from lower margin of eye to base of mandibles, antennæ inserted on middle of face, only scape, pedicels, ring-joint, and 6 funicle joints present. Thorax convex, pronotum about half the length of the mesonotum, the latter without parapsides, axillæ widely separate, scutellum convex, elongate, hind margin truncate but rounded from oblique sides, slightly emarginate posteriorly, the margin overhanging metanotum and indistinctly costate, the meta-

thorax sloping abruptly, almost smooth, with a distinct longitudinal carina on either side of the median line. Abdomen fairly broad and elongate, narrowing gradually beyond the middle to a fine point, ridged dorsally from basal margin of 2d segment to apical margin of 4th, some deep punctures at base of 3d and 4th segments and a transverse row of broad shallow costæ anteriorly on 2d, 3d, 4th and 5th segments, each with a fringe of long procumbent hairs posteriorly. Sheath of ovipositor broad and flat, slightly protruding. Legs stout and hairy, hind coxæ greatly developed.

Metallic green with some purplish reflections, head and thorax bluish green, hind trochanters, knees, tips of tibiæ and tarsi reddish to yellowish, antennæ black and hairy. Wings hyaline, marginal vein nearly as long as submarginal, stigmal vein short, postmarginal somewhat longer; all brownish.

From strawberry gall on *Quercus dumosa* from which no gall-flies were bred.

Described from one specimen in Coll. L. S. J. U. (Lot 497, s. 5).

EURYTOMIDÆ.

EURYTOMINÆ.

EURYTOMA Illiger.

E. incerta, new species.

Female.—Length 4.5 mm., expanse of wings 7.25 mm., greatest width of fore-wing 1.35 mm. Head and thorax closely umbilicately punctate, rather thickly clothed with a silvery white pubescence, prothorax laterally, hind coxæ outwardly and mesopleura above shagreened, the latter aciculate below, abdomen smooth and shining, segments 1, 2, 3, 4 basally, 5, 6, 7 entirely microscopically punctate and sparsely clothed with silvery hairs. Head transverse, front wide between the eyes, which are small, face also broad, ocelli arranged in an obtuse triangle, antennæ inserted on middle of face, 9-jointed (1 ring-joint and an undivided club), joint measurements in mm. 1 .33, 2 .12, 4 .18, 5, 6 and 8 .13, 7 .12, 9 .32. Thorax convex, almost tuberculate, pronotum as long as mesonotum, parapsidal grooves distinct, scutellum convex, rounded posteriorly, metathorax sloping abruptly, depressed in the middle. Abdomen compressed, elongate elliptical from above, triangular from side, apically produced to a fine point, 4th segment widest, wider than 2 and 3 together, sheaths of the ovipositor broad, slightly protruding. Legs pubescent, hind coxæ enlarged.

Black, mandibles, base of scape outwardly, tip of ovipositor sheaths and legs (with the exception of the femora and tibiæ outwardly) brown (only base and apex of hind femora and tibiæ brown). Wings hyaline, marginal vein short, postmarginal vein nearly as long, but stigmal shorter, ending in a club.

Male.—Length 3.75 mm. Like the female but the funicular joints of antennæ nodose, pedicellate at apex, each node with two whorls of long hairs. Club not quite as long as scape but longer than funicle joints, which are all subequal, pedicel very small and obconic. Abdomen long petioled, much reduced in size and rather hatchet-shaped. Petiole broad and flat and shagreened.

From large pointed gall on rose from which no gall-flies were bred.

Described from 4 ♀♀ and 1 ♂ specimens in Coll. L. S. J. U. (Lot 499, s. 23).

E. querci, new species.

Female.—Length 2.5 mm., expanse of wings 4 mm., greatest width of fore-wing .92 mm. Similar to preceding but 1st funicle joint not longer than 2d, abdomen less markedly produced at apex, only extreme base of antennal scape brown, postmarginal vein of wings no longer than stigmal.

From disc-shaped galls of *Callirhytis guadaloupensis* Full. on under side of leaves of *Quercus chrysolepis*.

Described from one specimen in Coll. L. S. J. U. (Lot 508, s. 45).

A male specimen with corresponding characters, although from a different lot (Lot 509, s. 20 ex fuzzy gall of *Callirhytis lasia* Ashm. on *Quercus chrysolepis*) is 2.5 mm. long, funicle joints somewhat incised and hairy but not nodose, pedicellate at apex, with two whorls of hairs.

DECATOMINÆ.

DECATOMA Spinola.

D. kelloggi, new species.

Female.—Length 2.75–3 mm., expanse of wings 4.35 mm., greatest width of fore-wing .92 mm. Head and thorax (including petiole) umbilicately punctate, thickly clothed with whitish pubescence, which is lengthened on the mesosternum, mesopleura below and anteriorly on metathorax into a silvery fringe. The sculpture of the face, cheeks and petiole is rather shallow, mesopleura aciculate, abdomen smooth and shining with a few sparse hairs. Head slightly wider than the thorax, transverse and fairly thick anterior-posteriorly, eyes small, face broad, cheeks emarginate, front wide between the eyes, ocelli arranged in an obtuse triangle, antennæ inserted on level with lower margin of eyes, rather broad and deep antennal groove on face almost reaching lower ocellus, antennæ 9-jointed (one ring-joint and an undivided club). Thorax convex, almost tuberculate, pronotum as long as the mesonotum, parapsidal grooves present but indistinct, scutellum rounded posteriorly and very convex, metanotum sloping abruptly, with a shallow fovea at the base smooth and shining. Abdomen compressed, elliptical from above, triangular from the side, petiole fairly long and broad, only five segments visible, 3d the widest, ventral valves evident but not protruding. Legs pubescent, hind tibiæ very thickly clothed with stiff white hairs, hind coxæ and femora very much swollen, a few long hairs on the former.

Reddish brown, the prothorax and legs paler, almost golden brown; mandibles, occiput largely with a narrow strip on cheek, the vertex and front of head, two lateral and two transverse stripes on the pronotum, mesonotum largely,

mesosternum, scutellum, metanotum, abdomen dorsally and laterally beyond the middle, all the femora and tibiae outwardly, middle and hind tibiae almost entirely black. Eyes brown. Antennae fuscous, the scape and pedicel golden brown, black above. Ocelli red. Wings hyaline, slightly iridescent, marginal vein short, stigmated, a brown gourd-shaped cloud extending across the middle of the wing two thirds its width, the short capitate stigma projecting from the outer side of the neck.

From twig swelling on *Quercus chrysolepis* from which no gall-flies were bred.

Described from two specimens in Coll. L. S. J. U. (Lot 509 s. II).

A single male specimen corresponding closely in structure was bred from the gall of *Disholcaspis eldoradensis* collected in the vicinity of Stanford University. The following slight differences are noted:

Slender, greatest width of fore-wing .76 mm. Antennae 8-jointed (only 4 joints in funicle), the club slightly enlarged, metanotum more or less flat, abdomen not compressed ovate dorsal margin (from side) semicircular, ventral margin straight, 3d segment occupying half the abdomen, 4th and 5th rather inconspicuous; hairy, black on head beyond ocelli, on to face, and on vertex beyond eyes, thorax also black except lateral angles of pronotum and narrow strip in front, and mesopleura.

D. doanei, new species.

Female.—Length 2.75 mm., expanse of wings 4.25 mm., greatest width of fore-wing .90 mm. Head and thorax umbilicately punctate, rather thickly clothed with silvery pubescence, which is longer on mesosternum and laterally on metathorax; mesopleura faintly shagreened in front, aciculate behind, petiole only faintly rugose; abdomen smooth and shining, with a few sparse hairs. Head triangular (when viewed from in front), slightly wider than the thorax, transverse and fairly thick anterior-posteriorly, eyes small, front between wide, ocelli arranged in an obtuse triangle, antennae inserted on level with lower margin of eyes, antennal groove broad and nearly reaching lower ocellus, antennae 9-jointed (one ring-joint and an undivided club). Thorax convex, almost tuberculate, pronotum as long as mesonotum, parapsidal grooves present but indistinct, scutellum rounded posteriorly and very convex, metanotum more or less flat, with a shallow fovea medially at the base smooth and shining. Abdomen compressed, elliptical from above, semicircular from side, the ventral line straight, petiole fairly long and broad, 7 segments visible, 3 and 4 wide, much wider than any of the others, ventral valve slightly protruding. Legs pubescent, hind tibiae very thickly clothed with hairs and with a row of stiff bristles on posterior face, hind coxae and femora very much swollen.

Black, a line around the eyes and continued on to the face into antennal groove, anterior face and sides of prothorax, tegulæ and a thin stripe above, mesopleura, base and sides of abdomen reddish brown, antennæ fuscous, scape and pedicel reddish brown, black above. Ocelli red. Legs pale reddish brown, outer faces of coxæ, femora and tibiæ marked with black, which is more extensive on posterior pair.

Wings hyaline, faintly iridescent, marginal vein short, stigmated, post-marginal and stigmal veins about equal and quite short, a thin brown, parallel-sided band reaching two thirds across wing.

From gall of *Disholcaspis eldoradensis* on *Quercus dumosa*.

Described from one specimen in Coll. L. S. J. U. (Lot 509, s. 19).

D. gracilis, new species.

Male.—Length 2 mm., expanse of wings 3.15 mm., greatest width of fore-wing .70 mm. Head and thorax umbilicately punctate, rather thickly clothed with whitish pubescence which is considerably lengthened on mesosternum, laterally on metathorax and outwardly on hind coxæ; abdomen smooth and shining; petiole and mesopleura in front faintly shagreened, the latter behind aciculate. Head transverse, fairly thick anterior-posteriorly, eyes small, face broad, front wide between the eyes, ocelli arranged in an obtuse triangle, antennæ inserted at lower level of eyes, 8-jointed (only 4 joints in funicle). Thorax convex, pronotum as long as mesonotum, parapsidal grooves indistinct, scutellum convex and rounded posteriorly, metanotum somewhat convex. Abdomen compressed, ovate from above, triangular from side, 3d segment longest, covering more than half the abdomen and enclosing those following, petiole fairly long and slender, tip of abdomen hairy. Legs pubescent, hind tibiæ with rows of bristles on posterior face, fore and hind coxæ and femora somewhat swollen, a few long hairs on hind coxæ.

Black, the face anteriorly, pronotum (except for a median V-shaped black area anteriorly) and legs lemon yellow (mid and hind femora and tibiæ and hind coxæ outwardly marked with black); antennæ brown beyond the pedicel. Wings hyaline, faintly iridescent, marginal vein short and stigmated, the stigma semicircular and black, stigmal vein slightly projecting.

From gall of *Andricus quercus-californicus*.

Described from one specimen in Coll. L. S. J. U. (Lot 508, s. 30).

EULOPHIDÆ.

TETRASTICHINÆ.

TETRASTICHUS Haliday.

T. pattersonae, new species.

Female.—Length 2 mm., expanse of wings 4 mm., greatest width of fore-wing .92 mm. Head and thorax faintly reticulately rugose with a system of

minute punctures, each puncture enclosing a hair, mesopleura behind and abdomen smooth and shining, microscopically reticulate. Head broader than thorax, extremely thin anterior-posteriorly, the ocelli on the vertex arranged in an obtuse triangle, a groove extending outwardly from these to eyes, which are small and convex, face between wide and sunken in middle, cheeks not very broad, separated from face by a well-defined groove, antennæ 7-jointed (scape, pedicel, 1 ring-joint, 3-jointed funicle and an undivided club), inserted at lower level of eyes, scape not quite as long as funicle, longer than club, which is somewhat expanded, the individual funicular joints and pedicel subequal. Parapsidal grooves on mesonotum distinct, a median groove posteriorly and four longitudinal grooves on scutellum, which is more or less truncate behind, followed by a thin post-scutellum. A median carina on metanotum bifurcating at about middle forming two large fields above. Abdomen short oval, depressed, concave in dry specimens, hind margin hairy, ovipositor not exerted. Legs fairly long, hairy.

Metallic green, legs lemon yellow outwardly from middle of femora, tips of tarsi black, eyes red, mandibles reddish brown, antennæ yellowish brown, somewhat infuscated. Wings hyaline, marginal vein as long as submarginal and fairly thick, stigmal vein short and the club capitate with a spur, postmarginal vein extremely short and pointed, ♂ antennæ clothed with long hairs and tip of abdomen with a short brown spur.

From gall of *Diplolepis echina* O. S.

Described from 1 ♀ and 3 ♂ specimens in Coll. L. S. J. U. (Lot 508, s. 19).

T. stanfordiensis, new species.

Female.—Length 2.10 mm., expanse of wings 4 mm., greatest width of fore-wing .85 mm. Very similar in habitus to preceding but with fewer punctures and less hairy. Abdomen elongate, pointed at apex; median line on mesonotum extending the whole length of same.

Metallic green, tips of femora, tibiæ and tarsi yellowish brown to sordid white; antennæ fuscous brown; stigmal vein in wing longer, with distinct spur.

From pimply gall on *Quercus douglasi*, from which no gall-flies were bred.

Described from one ♀ specimen in Coll. L. S. J. U. (Lot 497, s. 8).

There were also among the parasitic material two Pteromalids apparently belonging in the tribe Pteromalini; also an extremely interesting single male Torymid, apparently running to the genus *Oligosthenus* Först., black, metallic, rugose and hairy, with hairy eyes, a rather long stigma and a dusky spot below on disc, but the material was either insufficient or in too poor condition for description.

It may be interesting, also, to note that along with the gall-flies, inquilines and parasites, there were bred various Cecidomyids, saw-flies, cuckoo-flies, ichneumons, braconids and ants.

MISCELLANEOUS NOTES AND DESCRIPTIONS OF NORTH AMERICAN GEOMETRIDÆ.

BY JOHN A. GROSSBECK,

NEW YORK, N. Y.

Petrophora rubrosuffusa, new species.

Expanse, 24-27 mm. Palpi and front deep brown, vertex whitish or reddish, sometimes composed of a combination of these colors. Thorax and abdomen soiled yellowish, the collar and patagia of the former marked with black, all wings soiled whitish suffused with a delicate shade of grayish-brown, and, on the costal area of the primaries with pink most pronounced toward the apex. Intradiscal line of primaries absent or marked on the costa one-fourth out by a white, squarish spot. Median line similarly marked on the costa slightly inward of the middle. Extradiscal line whitish, rather broad, distinct on anterior half of wing, obscure or absent on posterior half; extends from one third in on costa in an even outward curve to M_3 , then, forming an acute angle, runs in an even inward curve to inner margin. Discal spots absent. Beneath, pinkish-ash except on posterior half of primaries where it is soiled whitish tinged with smoky toward the basal portion. Primaries with anterior part of extradiscal line reflected and marked inwardly by a blackish shade. Secondaries with an elongate black discal mark divided by a clear white dot. A brown extradiscal line on the outer fourth of the wing running subparallel to the outer margin may be traced from the inner margin to vein Cu_2 or M_1 and from here on is marked on the veins by more or less distinct dashes.

Types.—Three males from Dr. Barnes, one cotype of which is deposited in the American Museum of Natural History.

Habitat.—White Mts. and Palmerlee, Arizona.

From above this species very closely resembles *Stamnodes delicata*, but besides having pectinated antennæ in the male, the present species is very different in design beneath. Structurally and in maculation it is more nearly related to *Petrophora volucer* and from this species may be distinguished by its somewhat shorter and broader wings and by its deeper coloring.



Fullaway, David T. 1912. "Gall-fly parasites from California." *Journal of the New York Entomological Society* 20, 274–282.

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