

type of *fullawayi* has the mandibles partly closed and it is impossible to examine the left mandible. In both specimens the first tergite conceals the posterior face of the propodeum, but I do not think there are any differences to be found on the sclerite. There is no difference in the basal joint of the anterior tarsus in the two specimens."

As the material so far accumulated shows considerable variation in the male, especially as to the color of the pubescence and dentation of the apical segment, and to a less degree in respect to the mandibles and the hair on the fifth tergite, I have no hesitation in regarding the identity of the local material with *fullawayi* as fully established.

### Description of a New Species of *Ootetrastichus* from Formosa (Hymen., Chalcid.).

BY P. H. TIMBERLAKE.

In February, 1916, Mr. F. Muir brought with him from Formosa to Honolulu some midribs of sugar cane leaves from which at least two species of *Ootetrastichus* were reared. One of these which was obtained in considerable numbers was placed in breeding cages and also liberated directly in the sugar cane fields of Oahu, but apparently did not reproduce under either condition, and certainly not in the breeding cages. Of the second species about twenty females and a few males were obtained and these were placed in breeding cages. Contrary to the results with the first species, this one, which is described below as *O. formosanus*, immediately began to reproduce on the eggs of *Perkinsiella saccharicida*, and the first generation at Honolulu amounted to about 78 males and 11 females; the second to about 93 males and 109 females; and the third generation to about 512 males and 536 females. After this the generations were inextricably confused and the species was bred in large numbers for distribution on the sugar cane plantations of Kauai, Oahu, Maui and Hawaii. The work was continued throughout 1916 and 1917 and at

the end of this time the parasites were found well established on many of the plantations.

Additional material was received from Formosa in December, 1916, from H. Sauter, arrangements for which had been made months earlier before it had become certain whether the *Ootetrastichus* would reproduce freely in the breeding cages. Both this and the original material collected by Mr. Muir was obtained in the vicinity of Tainan.

The following description is based almost wholly on Hawaiian-bred material, as the original specimens from Formosa were almost all utilized in the breeding cages.

***Ootetrastichus formosanus* n. sp.**

This species is closely allied to *O. pallidipes* Perkins from Java and the male clearly runs to *pallidipes* in Perkins' table (Bull. No. 10, Ent. Ser. Haw. Sugar Planters' Station, p. 7-8). It differs from the male type of *pallidipes* in having the scape not quite so broadly expanded and without conspicuous bristles on the dorsal margin, the parapsides largely pale except anteriorly (as seen in slide mounts), the mesopleura with a much larger pale area, and in having the basal half of the abdomen yellow without a pair of dark spots above on either side. The female has the base of the abdomen distinctly yellow, so that this sex runs better to *O. basalis* Perkins, also from Java. From the type of *basalis* the female differs in having slightly longer wings with the discal ciliation of the hind pair much longer and darker, and in having the yellow and metallic parts of the abdomen more sharply differentiated, with the apical half more strongly metallic. Of the Australian species described by Girault (Mem. Queensland Mus. 2, pp. 216-223) *inghamensis* appears to be similar to *formosanus*, but it is too briefly described to permit any exact comparison.

Female. Face below antennae, cheeks and postorbital region of head, thorax, except the tegulae, hind coxae and apical two-thirds of abdomen deep metallic green with brassy and golden reflections; rest of face, the frons and narrow area on occiput next to the eye-margins dusky yellow; ocellar region of vertex and rest of occiput fuscous; antennae pale brownish yellow; eyes dark chestnut brown, and much brighter red in

life; tegulae and legs, except hind coxae, pure pale yellow, with the tip of the last joint of tarsi blackish; basal third of abdomen yellow, the metallic green sometimes extending narrowly along the sides to the base; wings hyaline, the veins very pale yellowish.

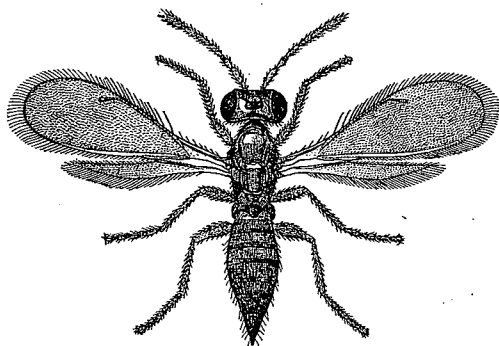


Fig. 1. *Ootetrastichus formosanus*, female.

More rarely the lower part of the face and the cheeks are yellowish, and in one specimen from Tainan, Formosa, the thorax is metallic bluish instead of green.

Head somewhat wider than the thorax, the face above antennae and the fronto-vertex collapsing after death; the cheeks a little over three-fourths as long as the eyes and about as wide as long; genal suture distinct, running from the base of the mandibles to the lower corner of the eyes, where it furcates, a branch following the eye-margin for a short distance in both directions; the postorbital area wide and forming with the postsutural part of the cheeks in side view of the head a broadly lenticular area, the inner margin of which is more convexly curved than the occipital margin; eyes about as wide as long, their outer margin oblique and slightly broadly emarginate, their upper exterior corners passing slightly over on to the occipital surface; vertex broad or as wide as the whole head at the lower corners of the eyes; ocelli in a very obtuse triangle, the posterior pair somewhat less removed from the eye-margins than from each other.

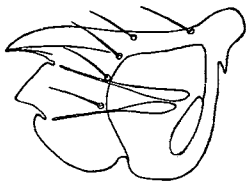


Fig. 2. Mandible of female *Ootetrastichus formosanus*.

Antennae inserted a little above the line connecting the lower corners of the eyes; scape reaching to the ocelli after shrinkage of the head, compressed and about three times as long as wide, excluding the radicle; pedicel nearly one-half as long as the scape and considerably wider at apex than the following joints; of the four ring-joints the first and fourth are longest, the first somewhat wedge-shaped and a little shorter on the inner side than the fourth, the second about one-fourth as long as the fourth and the third about one-half as long; first funicle joint nearly four times as long as thick and nearly equal to the next two joints combined, the second and third funicle joints equal in length but the third about a fourth thicker again than the second; club oval, slightly longer than the last two funicle joints combined and nearly a half wider again than the preceding joint, its apical joint about a third longer again than the basal joint and with a short, bluntly pointed nipple at apex. Funicle and club with numerous stout long bristles, better developed distad, the scape and pedicel with a few smaller bristles; the bristles in a transverse row near apical margin of the first joint of club, those in a similar row at the middle of the apical joint and several scattered near apices of the last two funicle joints considerably stouter than the other bristles and much enlarged at base; most of the bristles nearly or quite straight, but others, especially the shorter bristles near apex of the club, rather strongly curved inward.

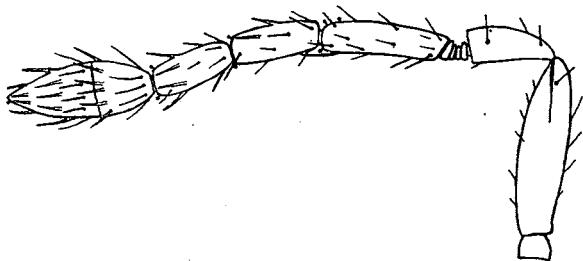


Fig. 3. Antenna of female *Ootetrastichus formosanus*.

Pronotum with a row of fine hairs along its posterior margin and a second row just anteriorly consisting of about three fine hairs on each side; mesoscutum with two or three pairs of hairs on each side near the outer margin, the pair just in front of the posterior corners slightly longer; the parapsides each with a single bristle-like hair near the posterior margin; sulci of scutellum very distinct, the submedian pair parallel; two pairs of converging blackish bristles present on the scutellum just outside of the submedian sulci; the anterior pair just behind the middle and the other pair near the apex.

Wings when closed reaching slightly beyond apex of the ovipositor; front pair rather wide, very broadly rounded at apex, the marginal cilia

longest on the posterior margin at a point about three-fourths of the distance from the base to apex, and even here considerably shorter than the stigmal vein; marginal vein more than twice as long as the submarginal and provided with about eleven or twelve bristle-like hairs which are rather longer than the cilia on the posterior margin, the submarginal with two bristle-like hairs; costal cell narrow and bare excepting two or three fine cilia near its apex, which are like the other discal cilia. Hind wings narrow, the cilia on the posterior margin nearly as long as the greatest width of the disk, those on the anterior margin not more than one-fifth as long; discal ciliation distinct except in the basal area opposite the submarginal vein.

Abdomen about a fourth longer again than the head and thorax combined, the ovipositor sheaths slightly protruded, rather stout and tapering to apex; sides of abdomen and apical fourth of the dorsum set with fairly numerous pale-colored hairs, the vibrissal plates of the last segment each with one long black seta directed obliquely outward.

Cheeks very finely lineolate-reticulate, occiput microscopically reticulate, the fronto-vertex and face more alutaceous; mesoscutum and scutellum more finely longitudinally lineolate than the cheeks, some of the microscopic impressed lines interlacing; scutellum with a minute round osteole on each submedian lobe situated about half way between the bristles and somewhat larger than the osteoles in which the bristles themselves are set; these are hardly visible in dry material, but prominent in slide mounts; parapsides and axillae more coarsely sculptured than the cheeks, the former reticulate, the latter lineolate; pronotum much more roughly sculptured than other parts of the thorax, the reticulations, however, hardly coarser than those of the parapsides, metanotum nearly smooth and polished, the propodeum comparatively coarsely but delicately reticulate, and with a median carina furcating in front of the apical neck, the branches extending outward to the sides; abdomen a little more coarsely reticulate than the propodeum.

Length of body: (0.94 to) 1.53; width of mesoscutum: 0.306; length of abdomen: 0.836; length and width of forewings: 1.24 by 0.428; length and width of hindwings: 1.01 by 0.153; length and width of scape excluding radicle: 0.169 by 0.056; length of pedicel: 0.087; length of flagellum: 0.436; length of first funicle joint: 0.122; length of club: 0.143 mm.

Male: Coloration considerably paler than in the female; head, tegulae, underparts of thorax, except metapleura, basal half of abdomen and legs pale yellow (about Naples yellow of Ridgway), the upper part of the occiput with a dusky spot and the vertex somewhat greenish around the ocelli; pronotum, anterior third of mesoscutum, parapsides, propodeum, metapleura, and apex of abdomen metallic green; remainder of the mesoscutum, axillae and scutellum greenish yellow and somewhat metallic in larger specimens with the apex and sides of the scutellum often decidedly metallic green, but in very small specimens all of these

parts are pale dusky yellow; metallic green of abdomen confined to the three apical segments shading into piceous on the two preceding segments and finally into the yellow of the basal half; antennae pale brownish yellow, the flagellum slightly darker; wings as in the female.

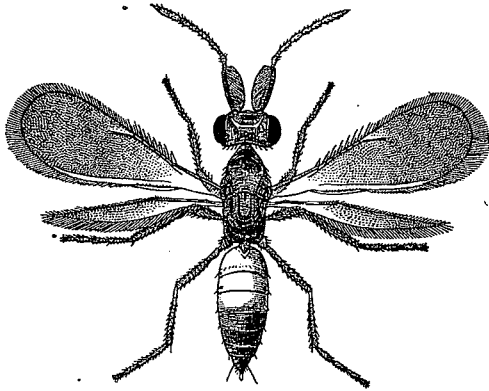


Fig. 4. *Ootetrastichus formosanus*, male.

Head somewhat similar in shape to that of female but softer and shrinking more after death; in life the upper part of the head is much thinner fronto-occipitally than in the female, the frontovertex convexly protuberant and very much wider than long, its anterior margin as seen from above somewhat concave between the eyes and separated by a sharp angle from the face; ocelli nearly in a straight line, the anterior one being but slightly advanced in front of the lateral pair and close to the angle bounding the upper limits of the face so that the frons is practically absent, the lateral ocelli about equidistant from each other and the nearest eye-margin; eyes considerably less than one-half as large as in the female but nearly of the same shape; cheeks rather longer than the diameter of the eye, nearly as wide as long as seen from the side; face convex below the antennae and hollowed out above them to form a large common scrobe.

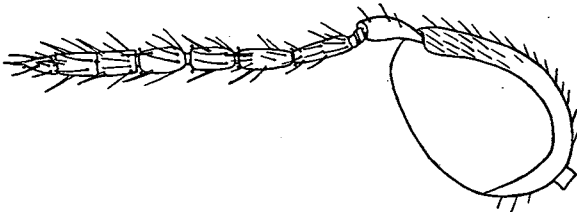


Fig. 5. Antenna of male *Ootetrastichus formosanus*.

Antennae inserted somewhat above the middle of the face as seen in frontal view of head or a little above the lower corners of the eyes; scape enormously expanded beneath, strongly convex on the inner face and concave on the outer; pedicel nearly ovate in outline, about equal to the first funicle joint in length and twice as wide; flagellum slender and cylindrical; the second of the three ring-joints shortest, the third longest, or about twice as long as the first and somewhat longer on its inner side, the first joint about a fourth longer again than the second; first funicle joint about a fourth longer than the second and a third longer than either the third or fourth joint, the latter somewhat thicker than the preceding joints; club about as long as the last three funicle joints combined and hardly wider, the first two joints subequal and somewhat shorter than the third, which is triangular in outline with a long cylindrical nipple fully one-half as long as the basal part of the joint. Bristles on antennae nearly as in the female, but those on the scape and pedicel hardly weaker than the smaller ones on the funicle; those with enlarged base occur near apex of the last two funicle joints and on the first two joints of the club.

Thorax nearly as in the female, the submedian sulci of scutellum slightly diverging behind; wings and legs as in the female, the front tarsi not modified. Abdomen hardly longer than the head and thorax combined, its sides parallel and the apex much less acutely pointed than in the female. Sculpture similar to that of the female but rather finer and more delicate, the inner or dorsal surface of the scape minutely and alutaceously roughened.

Length of body: (0.80 to) 1.13; width of mesoscutum: 0.261; length of abdomen 0.563; length and width of forewing: 1.02 by 0.327; length and width of hindwing: 0.853 by 0.106; length and width of scape excluding radicle: 0.259 by 0.181; length of pedicel: 0.089; length of flagellum: 0.438 mm.

Described from the following Hawaiian material all from the eggs of *Perkinsiella saccharicida* Kirkaldy: Ten females, three males, reared October 11-17, 1918, Mt. View, Hawaii (*Swezey*), (holotype female, allotype and paratypes); one female reared February 14, 1918, from same locality (*Swezey*), (paratype); five females, eight males reared March 19-21, 1919, Hilo Sugar Co., Hawaii (*Swezey*), (paratypes); one male reared February 19, 1918, Waipio, Oahu, (paratype); one female reared July 5, 1918, Pauhau, Hawaii (*Williamsj*), (paratype); one female reared July 8, 1918, Honokaa, Hawaii (*Williams*), (paratype); one female reared June 26, 1918, Koloa Gap, Kauai (*Timberlake*), (paratype); 59 females, 17 males, from breeding cages, Honolulu, during 1916 and 1917

(*Timberlake*), (paratypes); seven females, eight males reared from material collected March 24, 1920, Honolulu Plantation, Oahu (*Swezey*), (paratypes). Also from the following Formosa material, from eggs of *Perkinsiella saccharicida* and possibly of other Delphacidae on sugar cane: two females, one male reared March 13-28, 1916, Tainan, Formosa (*Muir*), (paratypes); and one female, one male reared December 7, 1916, Tainan, Formosa (*H. Sauter*), (paratypes).

Types and paratypes in the collection of the Hawaiian Sugar Planters' Experiment Station, No. 1003, paratypes in the author's collection.

### On Some Samoan Fulgorids (Homoptera).

BY F. MUIR.

Hawaiian entomologists have always been interested in the insect fauna of the Samoan archipelago, especially since Dr. Perkins described a species of *Proterhinus*\* from there. As none of the Hawaiian entomologists could arrange to visit Samoa, Mr. W. M. Giffard did the next best thing—he interested a resident of Pago Pago in insects and persuaded him to collect.

In the latter part of 1917 Mr. Giffard, through his friend, Captain J. H. Trask of the S. S. Sonoma, started a correspondence with Captain J. M. Poyer of the U. S. N. who at that time was Governor of American Samoa. Governor Poyer referred him to Dr. H. C. Kellers, U. S. N., then stationed in Tutuila. This was a very fortunate choice as Dr. Kellers, although professing to be no entomologist, got together a very interesting collection which, in some of the groups of smaller insects, has given us our first good idea of what is present in the islands of Tutuila and Niue. This good result is also partly due to Mr. Giffard's advice as to what to look for and to the collecting apparatus that he forwarded to Dr.

---

\* Pro. Haw. Ent. Soc. I, 3, p. 88, July, 1907.