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THE GENUS *HOMALICTUS* IN FIJI (HYMENOPTERA: HALICTIDAE)[1]

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Abstract. Four species of *Homalictus* are found in Fiji. *H. achrostus* and *H. hadrander* are described as new, while *H. suvaensis* is a new synonym of *H. fijiensis*. Genitalic similarities of the Fijian species indicate their close cladistic relationship except possibly for *H. achrostus*. Phenetically *H. hadrander* and *H. achrostus* are very distinctive.

This paper is a result of an investigation of variation within *Homalictus,* the only halictid genus found in Fiji. With the possible exception of *H. achrostus,* n. sp., the 4 species known to me from Fiji probably diverged there, to judge by the similar male genitalia and associated structures, which differ considerably from those of species on nearby island groups. Nonetheless, males of 2 of the 4 species (*H. hadrander,* n. sp. and *H. achrostus,* n. sp.) differ so much externally from the other Fijian species that superficially these species constitute a group by itself. *H. fijiensis* (Perkins & Cheesman) and *H. versifrons* (Perkins & Cheesman) belong to a superficially recognized group which includes such species as *H. perpessicius* (Kohl) from Samoa and *H. tannaensis* (Cockerell) from the New Hebrides. There are many characters that differentiate *H. hadrander* and *H. achrostus* from the other species listed above. But unless there has been convergence in genitalic and associated features, a most unlikely possibility, the cladistic relationships of *H. hadrander* and perhaps *H. achrostus* are much closer to *H. fijiensis* and *H. versifrons* and more distant from *H. perpessicius, H. tannaensis,* and other species not found in Fiji.

Many of the distinctive features of *H. hadrander* and *H. achrostus* are unusual in Halictini and are obviously derived characters. Thus, these species but not their relatives *H. fijiensis* and *H. versifrons* apparently changed greatly from the ancestral form. The reasons are totally unknown, but it is of interest that many of the characters are those of the males and result from feminization, i.e., acquisition of female characters by the males. Similar feminization is known in males of scattered Halictini in various parts of the world and will be treated in a subsequent paper. Masculinization of females can also occur. It is seen in various parasitic forms (Michener 1978), including the Samoan *Echthralictus,* derived presumably from the *Homalictus perpessicius* complex in Samoa.

Some common characters of the Fijian species include the union of sterna VII and VIII of the male to form a transverse bar with no median apical projection [as illustrated for *H. fijiensis* by Krombein (1951)]; the very short gonostylus (FIG. 4, 6, 8: b),

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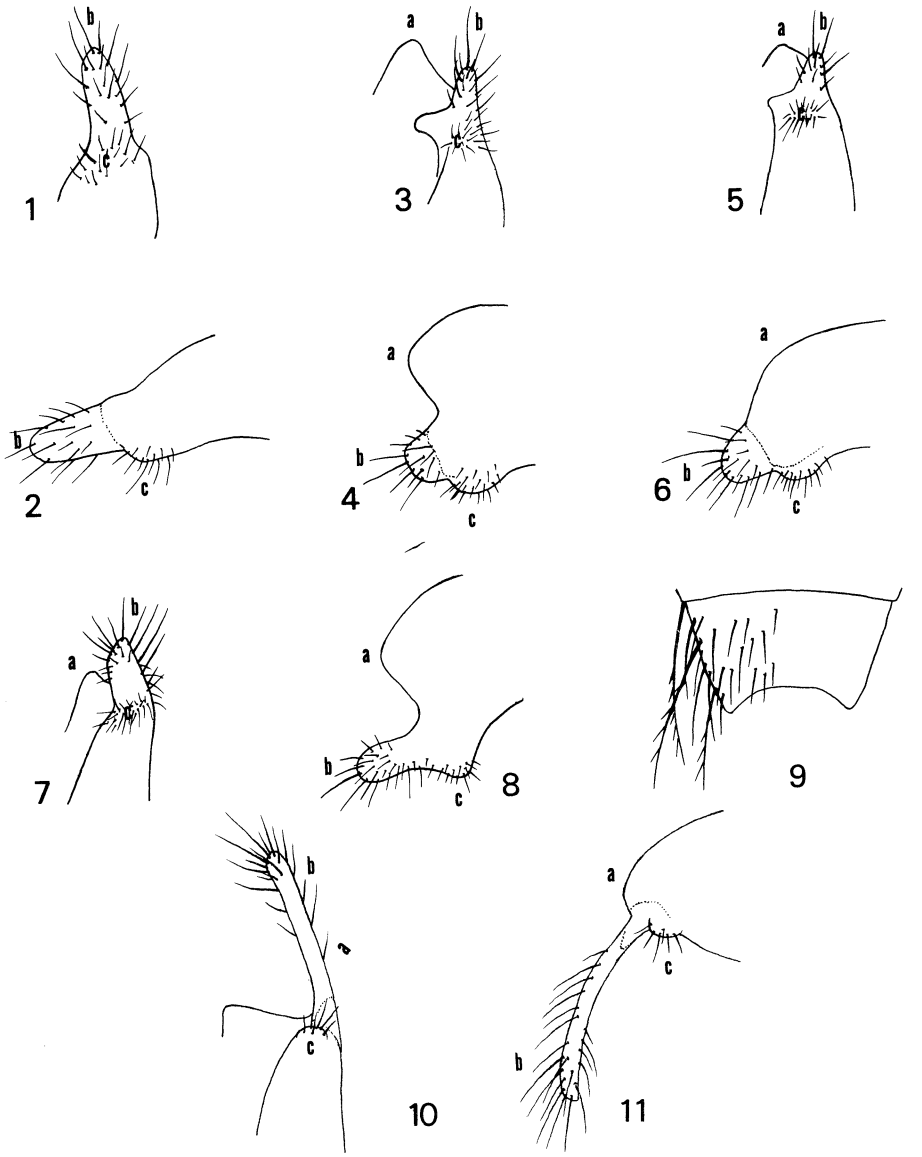

FIG. 1–11. **1–2.** Ventral and lateral views of gonostylus and apex of gonocoxite of *Homalictus perpessicius* from Samoa. **3–4.** Same, *H. fijiensis*. **5–6.** Same, *H. versifrons*. **7–8.** Same, *H. hadrander*. **9.** Dorsal view of tergum 7 of ♂, *H. hadrander*. **10–11.** Ventral and lateral views of gonostylus and apex of gonocoxite of *Homalictus achrostus*. Ventral views of genitalic structures have midline toward the left side of each sketch. a = dorsal subapical crest of gonocoxite; b = gonostylus; c = ventral basal convexity of gonostylus, presumably homologous to retrorse process of many species.

except for *H. achrostus*; lack of a retrorse basal gonostylar process but presence of a hairy convexity (FIG. 4, 6, 8, 10: c) in its place; presence of a dorsal subapical crest on the gonocoxite (weak in *H. versifrons* and *H. achrostus*) (FIG. 4, 6, 8, 10: a), in contrast, for example, to *H. perpessicius* from Samoa (FIG. 1, 2); and the very large, apically pointed and medially adjacent volcellae. Probably all of these features are synapomorphic.

Marked size variation is characteristic of females of the Fijian species (except *H. achrostus,* of which only 5 female specimens, all of rather uniform size, are known). Thus body length in females of *H. fijiensis, H. versifrons,* and *H. hadrander* ranges from nearly 5 to nearly 7 mm (fully 7 mm in *H. fijiensis*). Forewing length varies from 4 to 5 mm. There is less variation in males. The size variation in females suggests that these may be social species with female castes, although no such castes have been recorded in *Homalictus.*

Homalictus fijiensis (Perkins & Cheesman) FIG. 3, 4

Halictus fijiensis Perkins & Cheesman, 1928: 21.—Krombein, 1951: 282.
Halictus suvaensis Cockerell, 1929: 357. **New synonymy.**
Homalictus fijiensis: Michener, 1965: 180.
Homalictus suvaensis: Michener, 1965: 181.

A series of nearly 200 specimens from Tavua, Viti Levu, Fiji, was taken in an area not over 30 m in diameter on 23.VI.1959, by me. These specimens demonstrate the great variability that exists in this species, and there is little doubt from the description that *H. suvaensis* is based on variants like some of those taken at Tavua. A large series from the microwave station above Nandarivatu, Viti Levu (=Nadarivatu), 1100 m altitude, collected 1–16.VIII.1978 by S. & J. Peck, are all small, although both large and small females were taken by me on 23.VI.1959 in the same vicinity but at 823 m (2700 ft) altitude. Other specimens of *H. fijiensis* from the island of Viti Levu are from Suva and from Korolevu, collected 1.VII.1959 by C. D. Michener. Perkins & Cheesman (1928) list other localities. Krombein's (1951) record of females from the Solomon Is should be regarded as dubious until males are taken and their genitalia examined; Krombein's illustration of male genitalia was based on a Fijian specimen.

Great variability occurs in a number of the related insular species of *Homalictus,* as has been noted by Perkins & Cheesman (1928) and Cheesman & Perkins (1939). The variation discussed below for *H. fijiensis* is found in the series from Tavua; specimens from other localities do not add to the variations observed.

Size varies from specimens as large as *H. perpessicius* (from Samoa) to far smaller specimens. (♀: length 4.9–7.0 mm; forewing length 4.1–5.0 mm. ♂: length 5.0–6.0 mm; forewing length 3.7–4.2 mm.) *Coloration.* The body is brassy, this color much weaker on the metasoma; in some males the brassy or coppery coloration is very strong on the dorsum of the thorax. In most females the scutum and scutellum are largely or wholly green; sometimes only the scutellum is green. The coxae, trochanters, and femora except the apices are black with brassy reflections like the body; the tibiae and tarsi and apices of the femora are reddish brown, the middle portions of mid and hind tibiae of males and some females are infuscated or blackish; in some males these tibiae are blackish except for brown bases and apices. Even the front tibiae

are infuscated medially in a few males. *Sculpturing.* In most specimens of both sexes the frons, from the level of the antennae upward, is finely vertically striate, the striae of the median part diverging laterally as they approach the median ocellus, those of the lateral parts also diverging and curving over the summits of the eyes as in *H. epiensis* (Cockerell) from the New Hebrides. In some specimens (about 10% of the Tavua series) the striae are weak or absent on the lower part of the frons, although often the granular pattern is so organized as to appear lineolate or very finely strigose. In some such specimens a fine reticulate pattern is prevalent on the upper part of the frons so that the striae are inconspicuous or stand out only in certain lighting positions. Finally, in nearly 5% of the specimens no striae are visible on the finely reticulate frons. Even in such specimens fine striae curving over the summits of the eyes are usually discernible, distinct transverse striae are present behind the ocelli, and the genal areas are striate. The surface of the scutum and scutellum is shiny but strongly lineolate except sometimes on the most elevated part of the scutellum, which may be smooth between punctures. The punctures of these sclerites are small, widely separated, and poorly defined; those on the disc of the scutum may be separated by only 2 puncture widths while more sparsely punctured specimens have these punctures separated by 4 or more puncture widths. The dorsal area of the propodeum is quite variable; the striae are sometimes all distinct, sometimes interconnected to form a considerable basal reticulate area. Sometimes the striae near the longitudinal median stria are longitudinal near the base of the propodeum; less commonly they are all directed laterally so that the main pattern is largely transverse. Posteriorly, there is never a sharp limit to the dorsal area, which curves onto the posterior and lateral surfaces of the propodeum, and laterally the striae of the dorsal area curve onto the upper posterior lateral surfaces of the propodeum. The lower part of the posterior surface of the propodeum usually has strong transverse rugae, but the number is variable; they do not slope upward laterally as in *H. versifrons.* The metasomal terga are shining but minutely transversely lineolate (more finely so than in *H. perpessicius*), but the elevated areas just in front of the depressed marginal areas are in some specimens almost smooth. *Structure.* The apex of tergum 7 in the male is usually rounded or a short median part of the margin is sometimes straight so that the tergum is truncated medially. As in *H. perpessicius,* the inner hind tibial spur of the male has a few coarse teeth instead of the fine teeth found in most halictids. The number of teeth on the inner margin varies from 3 to 9. The outer margin usually has 3 or 4 similar coarse teeth distally, and finer teeth basally, but they may be all coarse like those of the inner margin, or mostly fine.

All these variations are continuous so that distinctive groups of specimens do not exist. I am reasonably convinced that only 1 species is involved. The male genitalia (FIG. 3, 4) are similar in all variants.

Homalictus versifrons (Perkins & Cheesman) FIG. 5, 6

Halictus versifrons Perkins & Cheesman, 1928: 22.
Homalictus versifrons: Michener, 1965: 181.

This species is similar to *H. fijiensis*; the most conspicuous difference is the rather dull scutum and scutellum as described below. The type specimen is from an unknown locality in Fiji; Perkins & Cheesman (1928) say that it was taken with *H. fijiensis.* Specimens before me are from Nandarivatu (=Nadarivatu), Viti Levu, 823 m (2700 ft) altitude, collected 23.VI.1959 by C. D. Michener and from the same locality but from a malaise trap at microwave station, 1100 m altitude, collected 1–16.VIII.1978 by S. & J. Peck. At the lower altitude only 9 individuals were taken but it was the predominant species at 1100 m altitude, where well over 100 specimens (many still in alcohol) were taken in the malaise trap. *H. fijiensis* and *H. hadrander* were also taken at both sites, and *H. achrostus* at one of them.

♂. Length 4 mm; forewing length 3.5 mm (varying to 3.3 mm). *Coloration and pubescence.* As in *fijiensis*

(in a few specimens dorsum of thorax copper-colored). *Sculpturing.* Head as in some specimens of *fijiensis,* frons finely reticulate-striate, showing a fine vertical striate pattern in most specimens, but in a few upper ⅛ to ½ of frons with a transverse pattern. (The type has the maximum of such transverse striation but 1 specimen from Nandarivatu, 1100 m, is similar.) Scutum and scutellum minutely reticulate, duller than in *fijiensis* although somewhat shining, the reticulate pattern in some areas so arranged that one can see a linear pattern. (Put in other terms, the fine lines with few interconnections in *fijiensis* have many interconnections in *vitiensis,* so that the resulting interspaces are not, or are scarcely, elongate.) Scutellum not, or scarcely, more shining than scutum. Punctures of scutum and scutellum usually almost unrecognizable, poorly defined, small, widely separated, as in more sparsely punctured individuals of *fijiensis* but less conspicuous because of reticulate background. Dorsal area of propodeum as in the most reticulate specimens of *fijiensis.* Lower posterior surface of propodeum with transverse striae weaker than usual in *fijiensis* and all but the lowest ones usually sloping upward laterally, crossing the posterior lateral surfaces of propodeum, and uniting with the striae of the lateral parts of the dorsal area, or in many specimens striae of posterior and postero-lateral surfaces variously reduced or absent. *Structure.* Dorsal subapical crest of gonocoxite (FIG. 5, 6: a) weakly developed compared to *fijiensis.*

♀. Length 5.5 mm (varying from 5.0 to 6.9 mm); forewing length 4 mm (varying to 5 mm). Coloration as in ♂ but scutum and scutellum deep green in allotype, coppery in a few paratypes, usually brassy or brassy green. Sculpturing as described for ♂.

Homalictus hadrander Michener, **new species** FIG. 7, 8, 9

This species is a member of the group of *H. fijiensis,* to judge by the male genitalia. However, in many external features it is very distinctive. These features include the broad body form of the male, suggestive of a female; the broad head of the male with enormous mandibles, each reaching almost to the base of the opposite mandible; the fine sculpturing; the bluish or purplish thoracic dorsum; the long coarse hairs of the metasomal stern of the male, suggestive of the sternal scopa of females; and the bidentate apex of tergum 7 of the male.

♂. Length 6.5 mm; forewing length 5 mm. *Coloration.* Head and thorax dark blue, scutum and scutellum with strong purple reflections, the following areas black: lower ²/₅ of clypeus, area along lower inner ocular margin. Posterior margin of pronotum, including pronotal lobe, black with feeble bluish tints. Tegula infuscated dark brown. Metasoma, including pygidial plate, black, not metallic, or pygidial plate sometimes brown (extensively yellow-brown in *fijiensis*). Mandible black, grading to red in distal ½. Labrum black. Antenna black, flagellum dark brown beneath, especially distally. Legs black, coxae and sometimes trochanters and femora feebly bluish, the following parts brown: "knees," fore tibia (yellowish brown on anterior surface), apices of mid and hind tibiae, and tarsi (paler toward apices, basitarsi infuscated). Axillary sclerites dark brown; wing veins and stigma blackish; wing membrane slightly brownish. *Pubescence.* Sparse, dusky; whitish on genal area, on and behind posterior pronotal lobe, on coxae and undersides of trochanters and femora; yellow-brown on undersides of tarsi. *Sculpturing.* Head much as in *fijiensis* but usually finer, vertical striae on frons distinct, at upper ends stronger striae usually end at level of lower margin of lateral ocellus and may be directed toward lateral ocellus, only fine lineolations curving around summit of eye; striae of vertex, genal and hypostomal areas finer than in *fijiensis.* Scutum and scutellum with fine sculpturing intermediate between *fijiensis* and *versifrons,* being quite reticulate as in the latter but in many areas with the reticulations arranged to form distinct lineolae; in shininess also intermediate, these sclerites being less shiny than in *fijiensis* but more so than in *versifrons.* Remainder of thorax sculptured like the more finely sculptured individuals of *fijiensis.* Dorsal surface of propodeum dull with minute roughening, radiating rugae rather numerous and fine, often considerably interconnecting basally and thus forming a reticulate pattern, distally not reaching rounded posterior margin of dorsal area (or laterally in a few specimens, a few rugae curving over onto posterior lateral parts of propodeum); carinae delimiting posterior surface of propodeum extending up only a short distance above metasomal articulation (in *fijiensis* these carinae are strong and extend at least halfway up the propodeal declivity); transverse rugae across lower posterior surface of propodeum absent. Metasomal terga sculptured as in *fijiensis. Structure.* Face

broad; clypeal length to breadth as 3:10 (4.3:10 in *fijiensis*); minimum distance between lower ends of eyes scarcely less than that between upper ends; mandible long, almost reaching base of opposite mandible when closed; labrum with rather slender apical process as long as body of labrum, rounded at tip but sides at an acute angle to one another (shorter and right angular in *fijiensis*), this process margined with long, coarse setae as in ♀; scape slender, reaching above ocelli; flagellum slender, segment 1 scarcely shorter than 2, all segments distinctly longer than broad. Dorsolateral angle of pronotum forming blunt tooth (as in *fijiensis*). Inner hind tibial spur pectinate with 4 or 5 long teeth as in ♀, outer margin finely toothed like outer spur. Metasoma broad, as in ♀, tergum I, as seen when whole metasoma is viewed from above, about 2× as wide as long; carina of tergum VII produced posteriorly at each side to form a distinct tooth between which apical margin is concave (FIG. 9); sterna II–V with long hairs suggesting sternal scopa of ♀; gonostylus more elongate than in *fijiensis* (FIG. 8: b); gonocoxite with dorsoapical crest (FIG. 7, 8: a) as in *fijiensis*.

♀. Length 6 mm; forewing length 5 mm. Similar to ♂ except for the usual sexual characters and the following: scutum and scutellum blue, without purple; lower ½ of clypeus black; legs entirely brownish black, front tibia and tarsus browner; hairs of outer sides of hind tibia and basitarsus and often of mid tibia blackish, hairs of metasomal scopa yellowish white, sometimes dusky at extreme sides. Striae of dorsal surface of propodeum not reaching posterior lateral region of propodeum. Face broader than in *fijiensis*, clypeal length to breadth as 3:10 (about as in *fijiensis*); antenna about as in *fijiensis*, segments 1 and 2 broader than long or about as long as broad.

Holotype ♂, allotype ♀, and 43♂,4♀ paratypes: FIJI: Viti Levu: Nandarivatu (=Nadarivatu), 823 m (2700 ft) altitude, 23.VI.1959, C. D. Michener; 5♀ paratypes, same locality but from malaise trap at microwave station, 1100 m altitude, 1–16.VIII.1978, S. & J. Peck. The holotype and allotype are in the Snow Entomological Museum, University of Kansas. Paratypes are in the Canadian National Collection, Ottawa; the Bishop Museum, Honolulu; and the British Museum (Natural History), London.

While all the female type material consists of rather large individuals, a series of females from the 1100 m site have the body length about 5 mm and forewing length about 4 mm. Moreover, the head and thorax are brassy except for the dark blue or blue-green scutum and scutellum, and the legs tend to have more brown than in large females, apices of the femora being yellow-brown.

The species name is derived from the Greek *hadros,* stout, and *andros,* male.

Homalictus achrostus Michener, **new species** FIG. 10, 11

This species differs from others in the almost complete lack of green, blue, or brassy coloration. The widely separated scutal punctures are coarser and more conspicuous than in other species, and the dorsal propodeal striae are finer. The male has the broad abdomen and other feminized features much as in *H. hadrander.*

♂. Length about 5 mm; forewing length 4.3 mm. *Coloration.* Black, face with extremely weak brassy reflections. Tegula infuscated dark brown, lighter posteriorly. Pygidial plate yellow-brown with dark margin. Mandible infuscated red in distal ½. Apices of femora and anterior surface of front tibia yellow-brown; tarsi slightly brownish. Axillary sclerites dark brown; wing veins and stigma blackish; wing membrane slightly brownish. *Pubescence.* Sparse, dusky; whitish on genal area, side of thorax, coxae, undersides of trochanters and femora; yellowish on undersides of tarsi. *Sculpturing.* Head as described for *H. hadrander.* Scutum and scutellum with ground more shining than in other Fijian species but nonetheless finely reticulate on scutum, in many areas reticulations so arranged as to form distinct lineolae; punctures rather coarse although mostly separated by several puncture widths, much more conspicuous than the fine sculpturing between them. Sides of thorax minutely roughened and rather dull, not striate except for

hypoepimeral area of mesepisternum and upper part of metapleura. Dorsal surface of propodeum with fine, close, regular, radiating striae, not interconnecting or forming a reticulate pattern, distally not reaching rounded posterior margin of dorsal area except at extreme sides; carinae delimiting posterior surface of propodeum extending up only a short distance above metasomal articulation; transverse rugae across lower posterior surface of propodeum absent and striae on sides of propodeum scarcely discernible. Metasomal terga with ground largely smooth and shining, feeble transverse lineolations on basal and lateral areas of terga II and III and posterior marginal areas of posterior terga; tergum I without punctures; remaining terga with well-separated punctures somewhat coarser than in other Fijian species; apical margins of terga broadly depressed and impunctate. *Structure.* Clypeal length to breadth as 3:10.2; median part of clypeus strongly depressed, the depression broader below, at clypeal margin, than above; minimum distance between lower ends of eyes slightly less than between upper ends; mandible long, reaching base of opposite mandible when closed; labrum without long, coarse setae, somewhat broader than long, surface rather flat without separable base (or body) and process, lateral margins tapering to broadly truncate apex which is less than ½ as wide as base; scape slender, reaching middle of posterior ocellus; flagellum slender, segment 1 much broader than long and shorter than 2, segments 2–6 slightly longer than broad, 7–10 about as broad as long. Dorsolateral angle of pronotum prominent, almost right angular. Inner margin of inner hind tibial spur with 3 large teeth, outer margin with about 7 low teeth, considerably coarser than those of outer spur. Metasoma broad as in ♀, tergum I as seen when whole metasoma is viewed from above about 2× as wide as long; pygidial plate broadly truncated posteriorly but marginal carina rounded at ends of truncation, not produced posteriorly as in *H. hadrander*; sterna II–V and underside of posterior femur with hairs suggesting scopa of ♀; gonostylus elongate (FIG. 10, 11); gonocoxite with dorsoapical crest weak.

♀. Length 6 mm; forewing length 5 mm. Similar to ♂ except for usual sexual characters and the following: apices of femora black or nearly so; hairs of outer sides of hind tibiae and basitarsi black or nearly so; hairs of femoral and metasomal scopas yellowish white, those of latter dusky at sides. Face about as described for *hadrander*; middle flagellar segments about as broad as long; mandible simple, subapical tooth (apex of pollex) scarcely noticeable; body of labrum with median ⅓ elevated; apical process of labrum fully as long as body, parallel-sided to truncate apex, median keel rather low but highest subapically.

Holotype ♂, allotype ♀, and 4♀ paratypes: FIJI: Viti Levu: malaise trap at microwave station, Nandarivatu, 1100 m altitude, 1–16.VIII.1978, S. & J. Peck. The holotype and allotype and 2 paratypes are in the Canadian National Collection, Ottawa. The other paratypes will be deposited in the Bishop Museum, Honolulu, and the Snow Entomological Museum, University of Kansas.

The species name is latinized from the Greek *achrostos*, without color, with reference to the virtual absence of green or bronzy metallic coloration.

ARTIFICIAL KEY TO THE FIJIAN *Homalictus*

1. Thorax black, without metallic coloration ..... **achrostus**
   Thorax strongly brassy, green, blue, purple or red 2
2. Middle and hind tibiae black or largely so; pygidial plate of ♂ produced posteriorly to form a distinct tooth at each side ..... **hadrander**
   Middle and hind tibiae largely reddish brown; pygidial plate of ♂ rounded apically or slightly truncated medially 3
3. Scutum and especially scutellum shining, fine pattern between punctures consisting of more or less parallel lines with some interconnections ..... **fijiensis**
   Scutum and scutellum both rather dull, fine pattern between punctures consisting of lines with many interconnections so that spaces between the lines are not, or are scarcely, elongate ..... **versifrons**

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for sending long series of *Homalictus* preserved in alcohol, which are from the microwave station above Nandarivatu, taken in a malaise trap at 1100 m altitude, 1–16.VIII.1978. The type of *H. versifrons* was kindly lent for study by the authorities of the British Museum (Natural History).

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