

On the Species of *Araecerus* Schoenherr, 1823, Known
from the Hawaiian Islands

(Coleoptera: Anthribidae)

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The present account of the Hawaiian *Araecerus* is based on some 180 specimens, of which 110 have been entrusted to me for determination by the Bernice P. Bishop Museum, the others (mostly collected by Blackburn and Perkins) being the property of the British Museum (Natural History). This material was obtained on the six main islands: Hawaii, Maui, Lanai, Molokai, Oahu and Kauai. The genus, however, may be expected to occur also on some of the small outlying islands, such as Laysan, which have some vegetation.

Araecerus is an Old World genus, numerous in species, most of which are Oriental, only a few being known from the Aethiopian region. On the American continents only one species is found, *A. fasciculatus*, which has become cosmopolitan with the trade in coffee beans. This name was applied by Blackburn and Sharp (in 1885) to all the specimens which Blackburn had found on the Hawaiian Islands, and in 1900 Perkins followed their example, adding to the fauna a conspicuous new species he had discovered on Hawaii. In reality, the specimens considered to be *A. fasciculatus* represented three species, as is proved by the Blackburn and Perkins material before me. The oversight on the part of these authors is readily excused: at that time the descriptions of species of *Araecerus*, with some exceptions, were very superficial, the trenchant distinctions not being known. The specific differences in structure are mainly found on the under side, and as the specimens in collections are generally so mounted that the under side is concealed, it is not to be wondered at that these differences escaped notice. Errors in the determination of *Araecerus* are in consequence of frequent occurrence. For instance, I have had in the collection at Tring for many years a species as *Araecerus koebelei* Blackburn, 1900, which is not *koebelei* at all, as I saw at a glance when the transfer of the British Museum Anthribidae to Tring for amalgamation with my collection (presented to the British Museum) gave me an opportunity to turn the type of *A. koebelei* over

and look at its under side. A similar mistake caused by the inconvenient mounting of the specimens was made by O. H. Swezey, who, in 1934, recognized *A. vieillardi* Montrouzier, 1860, as a third species among the Hawaiian *Araecerus*, but accepting the determination, by previous authors and himself, of the commonest species as *A. fasciculatus*, was misled by great superficial similarity to regard as *A. vieillardi* a series of specimens of which some were *vieillardi* and others were true *A. fasciculatus*.

The Hawaiian *Araecerus* before me represent four species: two being indigenous and not known from elsewhere (*A. constans* Perkins, 1900, evidently a rarity and almost constant in coloring, and a new species, very variable and distributed over the archipelago), and two accidentally introduced (*A. fasciculatus* [Degeer 1775], cosmopolitan, and *A. vieillardi* [Montrouzier 1860] from the islands of the Pacific, exact westward distribution not yet known).

In consequence of the misidentifications referred to above, the records of habits and other biological details have lost most of their value. New observations are necessary. I have compared the records in the Proceedings of the Hawaiian Entomological Society with the labels on the specimens and found out in some instances to which particular species the published note applies. Perhaps Mr. E. C. Zimmerman will be successful in obtaining the original specimens on which the biological records were based. Two of the four Hawaiian *Araecerus* are common and easy to breed, and there is a great opportunity to study the larvae and discover specific differences in their morphology and perhaps their habits which would be of much value.

The majority of species of *Araecerus* are more easily recognized by the males. Determination, therefore, should generally be based on the male. In all true *Araecerus* the sexes are distinguished from each other by the last external segment: its tergum (pygidium) is more or less vertical in the male, with the apex rounded, and the sternum about as long medianly as the previous one; the antenna is somewhat longer, the fore tibia and fore tarsus are long-hairy beneath and prolonged, the tibia bearing, in three of the Hawaiian species, prominent tubercles on the underside, and in one (*A. vieillardi*), an apical mucro in addition. In the female the pygidium is longer, triangular, with the margin of the tip somewhat curved up, the last external sternum being much longer medianly than the preceding segment; in many females the ovipositor projects more or less from the anal segment; the foreleg, though longer than the midleg, is not long-hairy beneath and bears no tubercles in the female of any species. The organs of reproduction are not referred to here; their differences will be better understood in a survey of the whole genus.

KEY TO THE HAWAIIAN SPECIES

A. Males

- a. Fore tibia with apical mucro on under side.....**vieillardii** (Montrouzier).
Fore tibia without apical mucro..... b
- b. Fore tibia without prominent tubercles on under side; midcoxa without a tubercle.....**fasciculatus** (Degeer).
Fore tibia with tubercles on under side from near base to apex..... c
- c. Coloring of upper side very variable, subbasal swelling of elytra distinct; tibiae more or less blackish on upper side in middle.....
.....**varians**, new species.
Almost uniformly grey on upper side, subbasal swelling of elytra less distinct, the insect more evenly convex in lateral aspect, broader and larger than *A. varians*, tibiae uniform in color, or darkened at apex.....**constans** Perkins.

B. Females

- a. Prosternum centrally rough with large punctures and tubercles.....
.....**vieillardii** (Montrouzier).
Central area of prosternum without large punctures, at most with small ones along anterior margin..... b
- b. Tibiae with four blackish (or brown) spots: basal, antemedian, postmedian and apical; sculpture of pronotum and elytra as coarse as in *A. vieillardii*.....**fasciculatus** (Degeer).
Tibiae without dark spots, or without basal spot and with the ante- and postmedian spots confluent; sculpture of upper side less coarse..... c
- c. Subbasal swelling of elytra very distinct in lateral aspect, pronotum and elytra from behind subbasal swelling to near apex less convex than in the two preceding species, tibiae with large blackish median spot on upper side, first and second abdominal segments with fewer than five rows of punctures each side and the median rows sublaterally missing; color as in male.....**varians**, new species.
Larger and broader, subbasal swelling of elytra less distinct, tibiae not spotted, abdominal sternum I with five irregular rows of large punctures from side margin, II and IV with six to eight, sublaterally no large space devoid of punctures; upperside colored as in male.....**constans** Perkins.

1. *Aracercus constans* Perkins

Aracercus constans Perkins, Fauna Hawaiiensis 2 (3) : 182, 1900
(Hawaii: Kona, in flowers of white poppy).

Aracercus constans Perkins, Zimmerman, Proc. Hawaiian Ent. Soc. 10: 152, 1938 (key to Hawaiian Anthribidae).

Larger than the other Hawaiian *Aracercus*, pronotum and elytra together twice as long as broad, sculpture of upper surface less coarse than in *A. fasciculatus*, pubescence uniformly grey, with indications of grey spots on the elytra. Club of antenna less unsymmetrical than in *A. fasciculatus*, the proportional length (in male) of the three segments: IX 27, X 24, XI 30, width 14. Lateral angle of pronotal carina a little more than 90°, the lateral carina slightly more slanting than in *A. fasciculatus*. Subbasal swelling of elytra less elevate than in *A. varians*, the upper surface being more evenly convex in lateral aspect. Central antecoxal area of prosternum somewhat uneven with low swellings and small punctures and tubercles; midcoxa of male with a low transverse tubercle. Punctures at side of abdomen more

numerous than in the three other species. Tibiae rufescent or dark brown (discolored ?), without dark spots, fore tibia of male with distinct tubercles on inner side. Length 4.2 to 5 mm.

One male examined from Bishop Museum [plus four examples not seen by Jordan, E. C. Z.]. In British Museum three males and five females, original specimens collected by Perkins; the species does not seem to have been met with again. A card bearing a male and a female is marked "type". I select the male as the type. The card bears a crossed-out name which is preoccupied in *Araecerus*; mentioning the name would create an unnecessary synonym of *A. constans*. [Some of the Bishop Museum set also bear this name, E. C. Z.]

2. *Araecerus varians*, new species (fig. 1, A)

Curculio fasciculatus Degeer, Blackburn and Sharp, Trans. Royal Dublin Soc. (2) 3: 195, 1885 (Hawaii, Maui, Lanai, Oahu, Kauai; has no saltatory power whatever; partim).

Araecerus fasciculatus (Degeer), Perkins, Fauna Hawaiiensis 2 (3): 182, 1900 (partim).

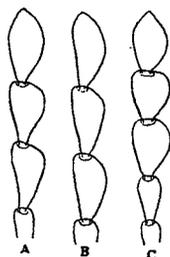


Figure 1.—Outlines of terminal segments of antennae of the males of three species of *Araecerus*.—A. *A. varians*, new species; B. *A. fasciculatus* (Degeer); C. *A. vieillardi* (Montrouzier). Hairs and bristles omitted.

Closely agreeing with *A. constans* in structure. Smaller, but the largest individuals attaining the length of the smallest example of *A. constans* known to me. Subbasal swelling of elytra much more raised, the elytra, in lateral aspect, therefore, from this point backwards more slanting and flatter than in the other Hawaiian species, the swelling more glossy; disk of pronotum more flattened, angle of carina as in *A. constans*, lateral carina straighter; club of antenna a little broader than in *A. constans*, proportions in males 30, 24, 27, width 14. Central antecoxal area of prosternum nearly as smooth as in *A. fasciculatus*, with some small tubercles in front of coxae; abdominal sterna with fewer punctures than in *A. constans*, segment I bearing only four rows at sidemargin and the median rows disappearing about halfway between sidemargin and trochanter, leaving a fairly large area devoid of punctures except at margins; tibiae of well-preserved mature specimens with a large, diffuse dark median patch on upper side. In male the fore tibia with two rows of tubercles on inner surface (not very prominent in small males), no apical mucro; midcoxa with a low transverse tubercle or ridge. Pubescence of upper side very variable in color, the varieties connected by intergradations: elytra brown variegated and dotted with grey, somewhat as in *A. fasciculatus*,

but the alternate interspaces not contrasting as in that species,—or elytra grey with three transverse brown bands or patches,—or elytra brown with a grey lateral stripe from base to apex,—or elytra brown mottled with grey and bearing a grey sutural stripe,—or upper side grey with the side of the pronotum and a lateral well-defined patch on the elytron brown. Length 2.8-4.2 mm. (pronotum and elytra together).

Type in British Museum, from Maui: Iao Valley, March, 1894 (Perkins), a male with grey dots on elytra. 103 specimens examined (paratypes).

Hawaii: South Kona, November, on *Clermontia* (Swezey coll.); Kilauea, July, and Kona, June, July and September (Perkins coll.).

Maui: Kailua, June, on *Elaphoglossum* and *Straussia*, Halehaku, June, and Wailunanui, July (Bryan coll.); Haleakala, 3-4000 ft., March and April, 5000 ft., March and May (Perkins coll.).

Molokai: Kalae, August (Perkins coll.); Kalihuki, 3800 ft., August, on Hilo grass (C. M. Cooke, Jr., coll.).

Lanai: 2000 ft., December and January, and Halepaakai, July (Perkins coll.).

Oahu: Near Honolulu, May; Waianae Mts., April, 2-3000 ft., Nuuanu Valley, November (Perkins coll.); Kaumuahona, June (Bridwell coll.); S. Waianae Mts., November (Swezey coll.).

Kauai: Kaholuamano, 4000 ft., Halemanu, 4000 ft., May, and high plateau, August (Perkins coll.); Kumuwela, on *Cyanea* and *Pipturus*, August (Swezey coll.).

3. *Araecerus fasciculatus* (Degeer) (fig. 1, B)

Curculio fasciculatus Degeer, Mem. Hist. Nat. Ins. 5: 276, pl. 16, fig. 2, 1775.

Araecerus (*Curculio*) *fasciculatus* Degeer, Lucas, Ann. Soc. Ent. France, (4) 1: 404, 1861 (partim; synonymy, *fasciculatus* for the first time identified with *cacao* and *coffea* of Fabricius).

Araecerus fasciculatus (Degeer), Swezey and Bryan, Proc. Hawaiian Ent. Soc. 7: 299, 1929 (Molokai: in husk of kukui nut [*Aleurites moluccana*], partim).

Araecerus vieillardii (Montrouzier), Swezey *ibid.*, 9: 17, 1934 (partim).

In both introduced species the net-like sculpture of the pronotum and the granulation of the elytra are coarser than in the two indigenous ones, the elytra are more cylindrical and the sides of the pronotum more swollen; tibiae quadrimaculate. Size variable, but coloring of upper side nearly constant in the Hawaiian Islands, russet brown, clouded and spotted with grey pubescence.

In *A. fasciculatus* head and rostrum grey, with some brown markings shining through: on rostrum a subapical transverse band medianly enlarged backwards, on frons each side a patch separate from eye, on occiput a pair of smaller patches nearer together, in many specimens these markings diffuse or are obsolescent; apical area of pronotum grey, usually with a marginal brown spot each side of a grey median dash, rest of pronotum suffused with

grey, in some specimens with the spots more distinct; on elytra a distinct but ill-defined grey patch above shoulder and another at apex, and in many individuals a short grey sutural stripe behind scutellum, alternate interspaces somewhat contrasting in an aspect from front, III, V, VII and IX being feebly convex and bearing each 5 to 7 grey spots. Club of antenna unsymmetrical, more so in male than in female, proportions of IX-XI: 30, 27, 27, width 13. Central antecoxal area of prosternum smooth, at most with some small punctures at anterior margin. Puncturation of abdomen essentially as in *A. varians*. Midcoxa of male without tubercles and anterior tibia without rows of tubercles present in the other three species, no apical mucro. Length (pronotum and elytra together) 2.3 to 4 mm., but more dwarfed specimens may be expected to occur (as elsewhere).

Forty-seven specimens, all but three in Bishop Museum:

Maui: Iao Valley, December, on coffee tree (Bryan coll.).

Molokai: Kainalu, July, kukui nut and *Cassia occidentalis* (Bryan coll.).

Oahu: Honolulu (Hawaii Agric. Exper. Station), star apple, April, University of Hawaii farm, October, Bishop Museum, June, Honolulu, February, Kawailoa, June, Waialae Iki, November, Oahu Plantation, Waipio, September, Ewa coral plain, on *Morinda*, December (Bryan coll.); Honolulu, no date, Palolo, February (Illingworth coll.); Honolulu, in algaroba seeds, April (Perkins coll.); Keakakei Valley, on a lobelioid, June, (Adamson coll.); Palolo, ex koa, January (Young coll.); Mokuleia, on breadfruit, March, (Wilder coll.); Manoa, February, and Honolulu, October (Ball coll.); Tantalus, no date, no collector.

Kauai: Ahukini, sugar cane, July, and Lihue, ex sun flower, August (Bryan coll.).

In British Museum 3 specimens collected by Blackburn, one of them labelled Oahu.

Whereas Blackburn emphatically states that what he identified as *A. fasciculatus* has no saltatory power, observers in other parts of the world report that *A. fasciculatus* is very lively and makes jumps 2-3 cm. high and 4 cm. wide. Perhaps *A. varians* does not jump, which would be an interesting distinction.

4. *Araecerus vieillardii* (Montrouzier) (fig. 1, C)

Curculio vieillardii Montrouzier, Ann. Soc. Ent. France (3) 8: 873, 1860 (New Caledonia; footnote: "Genre *Araecerus*").

Araecerus fasciculatus (Degeer), Swezey and Bryan, Proc. Hawaiian Ent. Soc. 7: 299, 1929 (Molokai, in husks of kukui nut; partim).

Araecerus vieillardii (Montrouzier), Swezey, *ibid.*, 9: 17, 1934 (specimens in collection Hawaiian Sugar Planters'; partim, some being *A. fasciculatus*).

In general appearance and the coarse sculpture of pronotum and elytra resembling *A. fasciculatus* so much that the two species are easily mixed up. It is fairly easy, however, to distinguish one from the other by a comparison

of the antennae, the forelegs and the underside of the thorax. Club of antenna shorter, the segments almost symmetrical, proportional length in male 25, 20, 22, width 15 (measurements varying in all four species); central antecoxal area of prosternum uneven, with tubercles and some large punctures; in male the midcoxa with a distinct conical tubercle and the fore tibia on innerside with an apical mucro and two rows of tubercles, which are readily visible in a lateral view of the tibia.

In the Bishop Museum material examined are 13 specimens; in British Museum 6, of which 5 collected by Blackburn are left without indication of the island and one (Perkins coll.) was obtained on Oahu.

Molokai: Kainalu, kukui nut, and at sea level, July (Bryan coll.).

Oahu: Koko Head, no date (Illingworth coll.); Rooke Valley, November (Swezey coll.); Kawaihoa, June, and Honolulu, August (Bryan coll.); Nuuanu Valley, May (Perkins coll.).

Kauai: Haena, August, Lihue, September, and Summit camp, September (Swezey coll.); Honopu, June (Bryan coll.).

The original home of *A. fasciculatus* was India or Africa, whereas *A. vieillardii* is essentially an inhabitant of the Pacific. There might be an opportunity for a Japanese species (described by Sharp in 1891 as *A. tarsalis*, a species found among beans by Lewis) to invade the Hawaiian Islands. This species is similar to *A. vieillardii*, but is darker, generally more regularly maculate on the elytra, segments IV and V of the antenna are together but little longer than III, the angle of the pronotal carina is smaller (more acute), the tarsi are broader, particularly in the male, the fore tibia of the male has no mucro, etc.

Records of *Araecerus* in the Proceedings of the Hawaiian Entomological Society:

Araecerus fasciculatus, Giffard 1:181, 1908 (Lanai, beaten from kukui).

Araecerus fasciculatus, Bridwell 4:22, 1919 (imago of hymenopteron *Perisierola emigrata* eating larva).

Araecerus fasciculatus (!), Bridwell, loc. cit.:407 (near Pearl City, pods of *Samanea saman* attached).

Araecerus fasciculatus, Swezey, *ibid.*:452, 1921 (Sugar Loaf Hill and Waianae Mts., description of eggs found in koa pods, probably this species, but see also note below).

Araecerus fasciculatus, Swezey 5:15, 1922 (one specimen bred from *Sicana odorifera*).

Araecerus fasciculatus, Swezey loc. cit.:187, 1923 (eggs described in 1921 not this species).

- Areocerus* (!) *fasciculatus*, Swezey 6: 233, 1923 (one specimen bred from rotten branches of *Plumeria*).
- Araecerus fasciculatus*, Swezey and Bryan, loc. cit. : 417, 1927 (Molokai, one at Kamiloloa).
- Araecerus fasciculatus*, Illingworth, 7: 44, 1928 (Lanai).
- Araecerus fasciculatus*, Illingworth loc. cit. : 250, 1929 (Kona, Hawaii, in and about cotton bolls).
- Araecerus fasciculatus*, Swezey and Bryan *ibid.* : 299, 1929 (Molokai, 11 at sea level to 100 ft., husks of kukui nut, etc. ; 1 at Kamiloloa [Adamson]).
- Araecerus fasciculatus*, Illingworth, *ibid.* : 409, 1931 (Waipio, in water of Waiahole ditch).
- Araecerus fasciculatus*, Swezey *ibid.* : 498, 1931 (Maui, on *Cheirodendron gaudichaudii*).
- Araecerus vieillardii*, Swezey, 9: 17, 1935 (among *A. fasciculatus* in H.S.P.A. collection, list of localities).
- Araecerus vieillardii*, *id.*, loc. cit. (misprint).
- Araecerus fasciculatus*, Swezey, 9: 201, 1936 (food plants of larvae in Hawaii).
- Araecerus fasciculatus*, *A. vieillardii*, and *A. constans*, Zimmerman 10: 152, 1938 (the genus represented in Hawaii by three described species and some new species).
- Araecerus fasciculatus* and *A. vieillardii*, Marlowe, *ibid.* : 359 (Waimea, larvae in green and in ripe fruit of *Passiflora laurifolia*).
- Araecerus fasciculatus* and *A. vieillardii*, Swezey, *ibid.* : 362, 1940 (Oahu, from bunch of bananas in his garden).
- Araecerus vieillardii*, Swezey *ibid.* : 366, 1940 (reared from banana bunch, Manoa Valley, Oahu).
- Araecerus fasciculatus*, Sakimura and Linford, *ibid.* : 452, 1940 (Lanai, ripe pineapple fruit and old fruits of *Melia azedarach*).
- Areocerus* sp., Holdaway and Nishida, 11: 167, 1942 (Oahu, Ewa Plantation, September, in freshly threshed dry beans).
- Araecerus fasciculatus* and *A. vieillardii*, Holdaway and Look, *ibid.* : 257, 1942 (Hawaii Agric. Exper. Station, dry garden beans).
- Araecerus fasciculatus* and *A. vieillardii*, Krauss, 12: 88, 1944 (Maui; Molokai).
- Araecerus fasciculatus*, Swezey, 12: 358, 1945 (intercepted in California on *Dendrobium macrophyllum* from Borneo).