

AMARANTACEAE OF SOUTHEASTERN
POLYNESIA

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INTRODUCTION

The plants described in this paper were collected by the Mangarevan Expedition in 1934. The type specimens are deposited in the herbarium of Bernice P. Bishop Museum.

SPECIES DESCRIBED

Achyranthes mangarevica, new species (fig. 1).

Arbor parva, cr. 5 m alta, truncus cr. 6 cm in diametro metiens. Ramuli seniores defoliati nodosi, substriati, glabri, fusco-cani, internodia sub inflorescentiis -3 cm longa, magnis cicatricibus (-3 mm) foliorum orbiculatis; ramuli foliati pilosi. Folia opposita, oblonga, basi et apice acuminata, -8.5 cm longa, -2.7 cm lata (in medio folio), integerrima, superne mox glabra, subtus pilosa, utrinque (paullum cano-) viridia, nervis ad marginem paullum revolutam arcuatim adscendentibus, subtus prominentibus. Petiolus -1 cm longus. Inflorescentiae paniculatae, multae, (pendulae ?). Panicula e multis inflorescentiis partialibus postremi ordinis oppositis, laxe spiciformibus, paniculatim dispositis, cr. 5 cm longis composita. Flores singuli spicarum plerumque spatiis 3-4 mm sejuncti, alterni, non oppositi. Flos hermaphroditus, pentamerus, cr. 4 mm longus, flavide albo-canus, plurimis pilis externis instructus (vide figur.). Bracteae et bracteolae cr. tertiam partem altitudinis perianthii aequantes, \pm glabrae, stramineae, pilis basalibus involutae, muticae; tepala straminea, lanceolata, dorso (imprimis interiora) multos pilos longos patenti-erectos, partim apicem floris aequantes, gerentia. Androeceum cum cyphella basali filamentorum et cum pseudostaminodiis palmatifidis, in margine et in lamina papillis glanduloideis instructis. Germen Achyranthis. Flores post anthesin haud reflexi. Fructus maturus deest.

Mangareva, Mt. Mokoto, south side, shelf on basalt cliff, altitude 290 meters, June 1934, St. John, D. Anderson, and Zimmerman no. 14891.

The native name is *teone pa akura*. *Achyranthes mangarevica* is distinguished from all herbaceous species of *Achyranthes* by the large paniced inflorescences, and from almost all other species by the beardless bracteoles. *A. mangarevica* is related to *A. arborescens*, the only other tree-like species of *Achyranthes* known. It is most closely related to *A. marchionica* F. Brown. *A. mangarevica* differs from *A. arborescens* in having leafless panicles, in the structure of the

¹ Mangarevan Expedition, Publication No. 4.

pseudostaminodia, and in the hirsute covering of the flower. The bracts and bracteoles have no nerve standing out on the back or at the top; the flowers are 5-parted (4-parted in *A. arborescens*). *A. mangarevica* differs from *A. marchionica* F. Brown in the shape of the paniced inflorescence and in the structure of the pseudostaminodia.

A. arborescens is found only in Norfolk Island; *A. marchionica* F. Brown in the Marquesas Islands; and *A. mangarevica* at the present time only in Mangareva. Without doubt these three species are



FIGURE 1.—*Achyranthes mangarevica* Suessenguth. Habit.

relicts of an old Pacific flora and are therefore of special phyto-geographical interest.

Achyranthes grandifolia Moquin.

Mangareva, Mt. Mokoto, altitude 310 meters, June 1934, St. John no. 14848.

The specimen examined is entirely typical in the leaf form, but the pseudostaminodia have a small cross-border on the inside. To prove Moquin's assertion, "pseudostaminodia dorso inappendiculata" (i.e. "ventre inappendiculata") it is necessary to see the type specimen.

Achyranthes velutina Hooker and Arnott form **rosea**, new form.

Perianthium, bractea bracteolaeque colore vini rubri tincta, nitida. Rhachis inflorescentiae fusco-albide lanuginosa.

Oeno Island, St. John and Fosberg no. 15199; Austral Islands: Raivavae, St. John and Wight nos. 16142, 15899; Maria Island, St. John no. 16969.

Achyranthes velutina Hooker and Arnott form **viridescens**, new form.

Flores primum virides, rubrotincti, in sicco flavescentes. Rhachis inflorescentiae albo-lanuginosa. Fructus non tam recurvi ut in forma rosea (non retrorsum rhachi adjacentes), sed deorsum angulum cr. 45° cum rhachi sub fructu formantes, recurvati.

Tuamotu Archipelago, Tepoto, St. John no. 14333. The native name is *putarau*.

Achyranthes velutina Hooker and Arnott has been previously known from the Tuamotu Archipelago, the Society Islands, the Caroline Islands, and the Marshall Islands. It differs from *A. splendens* Martius but not in the pseudostaminodia as Moquin has said.² In *A. splendens* Martius, the single laciniae of the pseudostaminodia are on the inside, turned toward the gynaeceum, in the form of a small cornicle or a very short thread. In *A. velutina* Hooker and Arnott, below the laciniae there are a number of closely crowded efflorescences in the form of a cross-set comb or a border turned inside with efflorescences.

² De Candolle, Casimir, *Prodromus systematis naturalis regni vegetabilis*, vol. 13, pt. 2, p. 316, 1849.

***Achyranthes aspera* Linnaeus.**

Pitcairn Island, June 1934; Middle Hill, Fosberg and Clark no. 11316; Téd side, coral sand on beach, St. John no. 15042; Bounty Bay, littoral rocks, Fosberg no. 11341; flatlands beside trail, Fosberg and Christian no. 11236. Rapa, Karapo Rahi Island, open woods on steep, July 1934, St. John and Maireau no. 15595. Austral Islands: Rimatara, Anapoto, sandy flat near shore, September 1934, St. John and Fosberg no. 16849; Raivavae, Pic Rouge, south side, sandy beach, woods near shore, August 1934, St. John and Fosberg no. 15914; Rurutu, Moerai, beach, August 1934, Fosberg 11948.

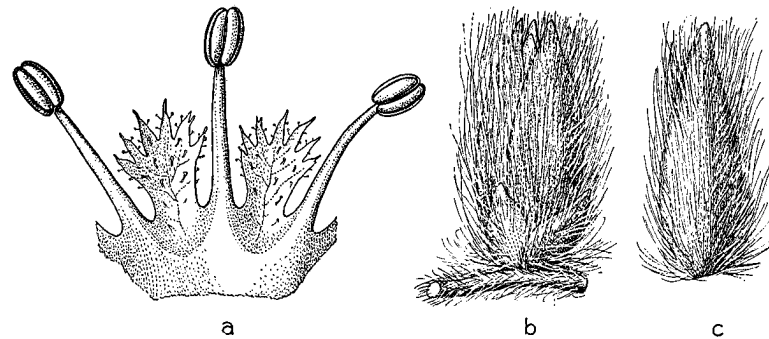


FIGURE 2.—*Achyranthes mangarevica* Suessenguth: a, part of androecium with two pseudostaminodia; b, outside of flower; c, segment of perianth (outside).

***Achyranthes aspera* Linnaeus form *subgrandifolia*, new form.**

In forma vergens ad *A. grandifoliam* Moquin foliis maioribus.

Mangareva, Aukena Island, Koivao, moist thicket, May 1934, St. John no. 14622.

The native name is *pukava-pua-tara*.

***Achyranthes aspera* Linnaeus variety *virgata* (Poiret) Boerlage.**

Achyranthes virgata Poiret.

Achyranthes argentea Lamarck variety *virgata* (Poiret) Moquin.

Tuamotu Archipelago, Anaa, Tukahora, on coral flat, May 1934, St. John no. 14260.

The native name is *tamangomango*.

***Alternanthera Bettzickiana* (Regel) Nichols corrected by Graebner.**

Austral Islands: Tubuai, Mataura, cultivated, August 1934, St.

John and Fosberg no. 16256; Rurutu, Moerai, August 1934, Fosberg no. 11921; Mangareva, Rikitea, May 1934, Fosberg no. 11022.

Amarantus gracilis Desfontaines.

Austral Islands, Rimatara, Amaru, introduced, September 1934, St. John no. 16930; Mangareva, Mt. Duff, northeastern slope, altitude 100 meters, June 1934, Fosberg 11091.

Amarantus hybridus Linnaeus subspecies **cruentus** (Linnaeus)
Thellung variety **paniculatus** (Linnaeus) Thellung.

Austral Islands, Tubuai, Mataura, cultivated, August 1934, St. John and Fosberg no. 16304.

Charpentiera ovata Gaudichaud.

Charpentiera obovata Gaudichaud variety *ovata* (Gaudichaud)
Wawra.

Tubuai: Taitaa, northeastern slope, dense upper woods of *Metrosideros* and *Cyathea*, altitude 320 meters, August 16, 1934, St. John no. 16347, tree 8 meters high and 25 cm in diameter, flower deep rose-purple, leaves bright green and shining, bark green, sap wood white; west side of Taitaa, moist upper woods, altitude 370 meters, August 23, 1934, St. John no. 16544; south side of Panee, upper forest on ridge, altitude 350 meters, August 21, 1934, St. John and D. Anderson no. 16482, petioles and veins beneath magenta red, leaves dark, shiny green above, duller and paler beneath. Raivavae: Mt. Muanui, south slope, moist woods, altitude 200 meters, August 6, 1934, St. John and Zimmerman no. 15989; Mt. Taraia, north side, moist woods, altitude 220 meters, August 6, 1934, St. John no. 16024.

The genus *Charpentiera* was formerly known exclusively from Hawaii. These new localities lie 4,800 kilometers from Hawaii and are therefore of great phytogeographical importance. The genus may be a relict from a larger and more connected area.

The illustration of *Charpentiera ovata* Gaudichaud given by Gaudichaud³ and also by Schinz⁴ needs correction in several respects. The pseudostaminodia are in reality not leaflets but only small knobs between the filaments. The stigmata are not so covered with hair as the figure shows, and are thicker and not so pointed. In Schinz' description "pseudostaminodia" should be changed to "stamina."

³ Freycinet, Louis Claude Desaulle de, *Voyage autour du monde . . . l'Uranie et la physicienne . . . 1817-1820 . . . Botanique* par Charles Gaudichaud, 1826.

⁴ Engler, Adolf, and Prantl, Karl, *Die natürlichen Pflanzenfamilien*, 2d. ed., vol. 16c, p. 34, fig. 16, 1933. Wrongly marked as *Charpentiera obovata* Gaudichaud.

Cyathula prostrata (Linnaeus) Blume.

Austral Islands, Raivavae, Mt. Hiro, woods on south side, on ground in moist upper forest of *Metrosideros*, altitude 400 meters, August 1934, St. John no. 16176.

Comphrena globosa Linnaeus.

Austral Islands: Rurutu, Moerai, cultivated, August 1934, Fosberg no. 11985; Raivavae, Mahanatoa, cultivated, August 1934, Fosberg no. 11654; Tubuai, Mataura, cultivated, August 1934, St. John and Fosberg no. 16306. Pitcairn Island, Adamstown, cultivated, June 1934, Fosberg and Christian no. 11187. Mangareva, Rikitea, cultivated, June 1934, Fosberg no. 11030.

GENERAL DISCUSSION

In the middle Pacific area the following endemic species of Amaranaceae appear:

Hawaii: *Nothotrichium* Hillebrand (genus with 4 species), *Achyranthes splendens* Martius, *Achyranthes mutica* Gray, *Charpentiera obovata* Gaudichaud, and *Charpentiera elliptica* (Hillebrand) Heller.

Hawaii, Tubuai and Raivavae (Austral Islands): *Charpentiera ovata* Gaudichaud.

Marquesas Islands: *Achyranthes marchionica* F. Brown.

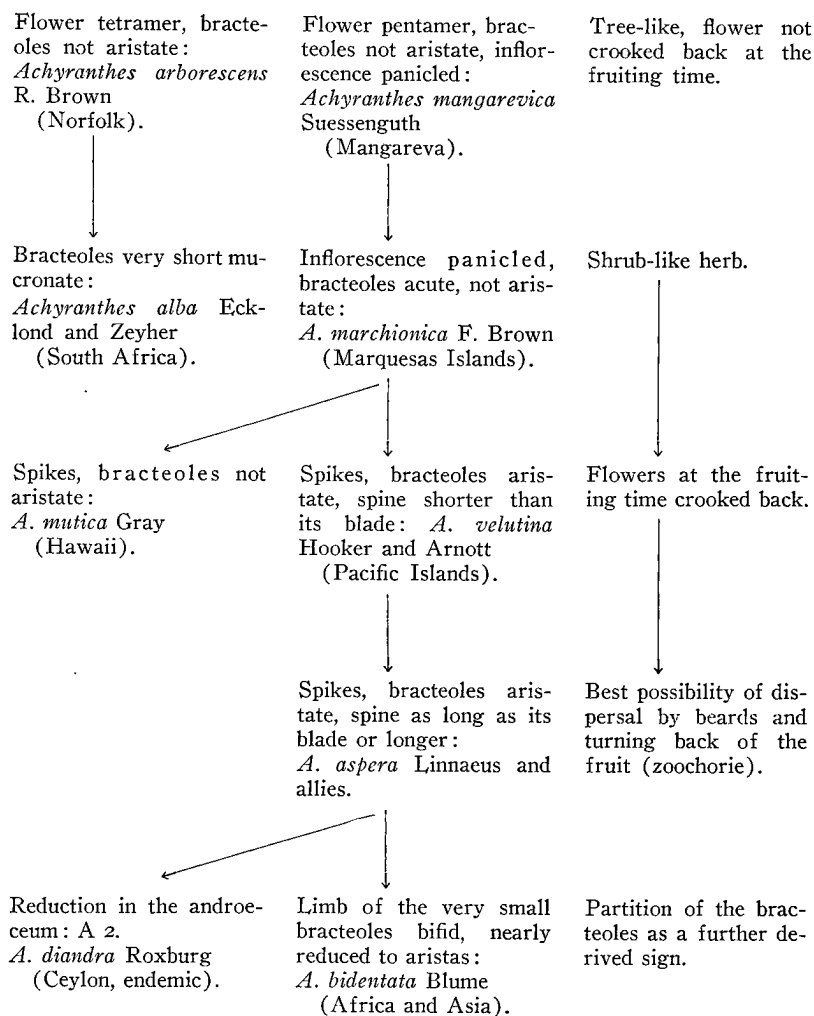
Norfolk Island: *Achyranthes arborescens* R. Brown.

Mangareva: *Achyranthes mangarevica* Suessenguth.

Tuamotu Archipelago, Society Islands, Caroline and Marshall Islands, Maria Island (Austral Islands): *Achyranthes velutina* Hooker and Arnott.

The following Amaranaceae, *Achyranthes arborescens* R. Brown, *Achyranthes mangarevica* Suessenguth, and *Nothotrichium sandwicense* Hillebrand, and the three species of *Charpentiera* have a small tree-like habit. These tree-like species are found only in the middle Pacific area.

The following table shows the relationship of those species which are important in the evolution of the genus *Achyranthes*. (The arrows do not indicate direct descent but rather the general direction of later development.)



It has been supposed that the 5-parted flower is more primitive than the 4-parted; that the beardless bracteole is more primitive than the bearded; that the unit form of the bracteoles is more primitive than the partition into 2; that the erect attitude of the fruits is more primitive than the crooked back; and finally that the tree-like growth is more primitive than the herbaceous. These suppositions are in

accordance with what is at present known of primitive and derived characters.

According to this reasoning, the oldest known forms of *Achyranthes* are found in the Pacific region (*A. arborescens*, *A. mangarevica*). The Pacific must therefore be considered the development center of the genus.