

Amaranthus interruptus R. Br. on Jarvis Island in the Central Pacific¹

UNO H. ELIASSON²

ABSTRACT: *Amaranthus interruptus* R. Br., a principally Australian species, has been recorded on Jarvis Island in the Central Pacific. The plant is supposed to have been introduced to the island some time between 1924 and 1935. It evidently became well established and was still there in 1964.

IN MAY 1982 Professor Harold St. John at the B. P. Bishop Museum in Honolulu handed over to me two unidentified plant specimens collected in June 1935 on Jarvis Island in the Central Pacific. The plants proved to be conspecific with *Amaranthus interruptus* R. Brown, a principally North Australian species.

Jarvis is an island of East Central Polynesia located just south of the equator in the Central Pacific. It is a low island of coral origin; the highest part does not exceed 5 m above mean tide. It has a central depression with remains of a saltwater lagoon, but there is no open-water body in the interior (Christophersen 1927). As is to be expected on a low atoll, the flora is poor. Only eight vascular plants were recorded by Christophersen (1927). He described the vegetation of the central depression as very open and scattered; only in a few places did *Sesuvium portulacastrum* L. and *Boerhaavia tetrandra* Forster form dense carpets. On the beach crests and their slopes the vegetation formed a continuous cover comprising *Lepturus repens* (Forster) R. Brown, *Boerhaavia tetrandra*, *Portulaca lutea* Solander, and *Sida fallax* Walpers. Christophersen's enumeration seems to be the only plant list published from the island.

The two *Amaranthus* collections from 1935 were made by Ahia and Graf and by Judd and Mitchell, respectively. An annotation label accompanying the Ahia and Graf specimen reads: "Collected 100 yd. south of camp from a slightly raised spot. Plant (about 200) scat-

tered over a patch 100 ft. square. . . . The only place this specimen has been seen, and it is, without doubt, rare. . . . June 5, 1935. . . . Ahia and Graf." Thanks to the courtesy of Professor F. R. Fosberg at the Smithsonian Institution in Washington, it was possible to trace and study a considerably more recent collection of the same species from Jarvis taken by C. D. Hackman in March 1964 during the U.S. Pacific Ocean Biological Survey Program. According to the information on the label, the "small herb, light green in color, was collected in the central island depression, 5-12 in., restricted to an area about 300 × 500 ft. sq."

Although differing in lower growth, smaller leaves, more compact inflorescences, and smaller seeds, the Jarvis specimens agree in most characteristics with North Australian material, including type material, of *Amaranthus interruptus*. The average longest diameter of the seed is 0.76 mm ($s = 0.063$, $n = 10$) in the Jarvis specimens as compared with 0.99 mm ($s = 0.088$, $n = 10$) in the Australian plants; but apart from the difference in seed size, there is good agreement in floral characteristics. The Jarvis plants are too close to *A. interruptus* to be regarded as a separate taxon. The differences mentioned may well be modifications.

The occurrence of *A. interruptus* on Jarvis in the Central Pacific is noteworthy. Although the species has been recorded from Papuasias, permanent occurrence outside Australia has been doubted (Kanis 1972). Collections from southeastern New Guinea, the Bismarck Archipelago, and the Solomon Islands have been interpreted as resulting from temporary introductions from Australia (Kanis 1972, 1974).

¹ Manuscript accepted September 1985.

² Dept. of Systematic Botany, University of Gothenberg, Carl Skottsbergs Gata 22, S-413 19, Gothenberg, Sweden.

Certainly *A. interruptus* is not indigenous on Jarvis. No species of *Amaranthus* was noted by the Whippoorwill Expedition to the island in 1924 (Christophersen 1927). Moreover, some decades ago Jarvis was exploited for guano, and there may have been ample opportunities for diaspores to be brought to the island. In all likelihood, *A. interruptus* reached Jarvis some time between 1924 and 1935. It is remarkable, however, that it became so well established on the island that it was still there some 30 years after the first collection. Unfortunately I know of no more recent collections or observations of the plant. It may well still be there. It is inconspicuous and may at first sight be mistaken for *Chenopodium ambrosioides* L.

The Jarvis plant is a monoecious species, characterized by five tepals, three to five stamens, and indehiscent utricles which are strongly wrinkled in the lower half and smooth and composed of a spongy tissue in the upper part. The plant would key to *A. crispus* (Lesp. & Thév.) A. Br. or *A. muricatus* (Moq.) Gillies in Standley's (1917) treatment of the North American species. *Amaranthus crispus* differs in having crispate leaves, spatulate pistillate tepals, consistently five stamens, a morphologically different fruit, and the uppermost flower clusters not spiciformly arranged. *Amaranthus muricatus* is larger in all parts, the utricle is rugose-tuberculate all over its surface, and the seed is larger, about 1.5 mm in diameter. In Covas (1941) the Jarvis plant would key to the vicinity of *A. crispus*, *A. standleyanus* Parodi, or *A. vulgatissimus* Speg. The two last-mentioned species differ from the Jarvis specimens, among other things, in differently shaped pistillate tepals and different utricles.

Amaranthus interruptus normally has indehiscent utricles. If the fruits were considered to be circumscissile, the Jarvis plant would key in many works to *A. blitoides* S. Watson. Apart from differences in the indehiscent fruits, the Jarvis plant differs from *A. blitoides* in the rugose utricles with the structurally different upper part, the short bracts, the smaller seeds, and the tendency of the upper cymes to form a spiciform inflorescence.

Several introduced species of *Amaranthus*

have been recorded on the Hawaiian Islands (St. John 1973), but, on the whole, the genus is poorly represented in the Pacific. One endemic species, *A. brownii* Christoph. & Caum, is known from Nihoa, one of the Leeward Islands in the Hawaiian chain (Christophersen and Caum 1931). In the Galápagos Islands there are three endemic species, but this archipelago is more closely connected to South America than to the Pacific as regards floristic relationships. No endemic species or species with restricted distribution are to be expected on low coral islands in the Pacific. The scattered records of *Amaranthus* from such localities (*A. dubius* Mart., *A. spinosus* L., *A. viridis* L.; Fosberg, pers. comm.) represent introduced weeds.

As *A. interruptus* on Jarvis Island differs in some respects from Australian specimens, a description is given here based on the specimens cited from Jarvis. See Figures 1 and 2.

Monoecious, probably annual plant, to 20 cm tall. Taproot vertical, slender, gradually tapering. Stem richly branched from base, glabrous, striate and sulcate. Leaves petiolate, blade ovate-oblong to lanceolate, obtusely apiculate at apex, narrowed and gradually tapering along petiole at base, glabrous, somewhat undulate, mostly 5–10 (–15) mm long and 3–5 mm wide, petiole to ca. 5 mm long but not sharply set off from blade. Inflorescences appearing spiciform, interrupted below, comprising cymes densely arranged in rounded axillary glomerules 5–7 mm wide, sometimes almost completely obscuring stems and leaves. Flower-subtending bracts shorter than perianth, ovate to ovate-triangular, concave, ca. 1 mm long, transparent except near green midnerve. Tepals of male flowers 5, elliptic to oblanceolate, scarious, midnerve greenish, longest tepals ca. 2 mm long, inner tepals shorter; stamens 3–5, anthers ca. 1 mm long or shorter. Tepals of female flowers 5, oblong-obovate or oblong-spathulate, short-acuminate at apex, scarious, the green midnerve conspicuous and branched, especially in the outer tepals, tepals ca. 1.5 mm long, the innermost only slightly shorter than the outer ones; utricle indehiscent, in mature flowers ca. 1.5 mm long, the lower seed-containing half strongly rugose and wrinkled, the upper half

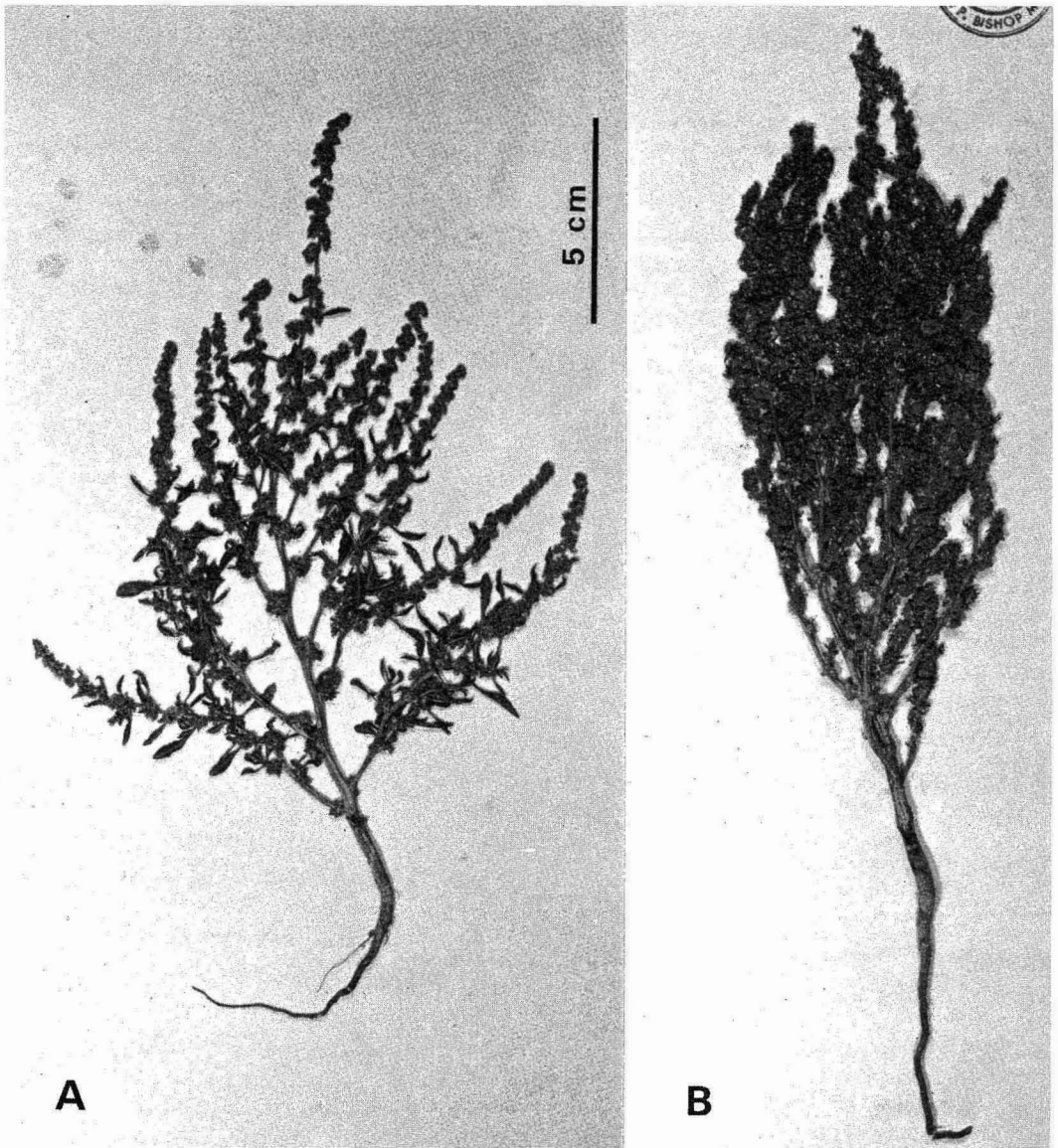


FIGURE 1. *Amaranthus interruptus* from Jarvis Island. A, Hackman 2 (HAW). B, Ahia & Graf P9(X) (BISH).

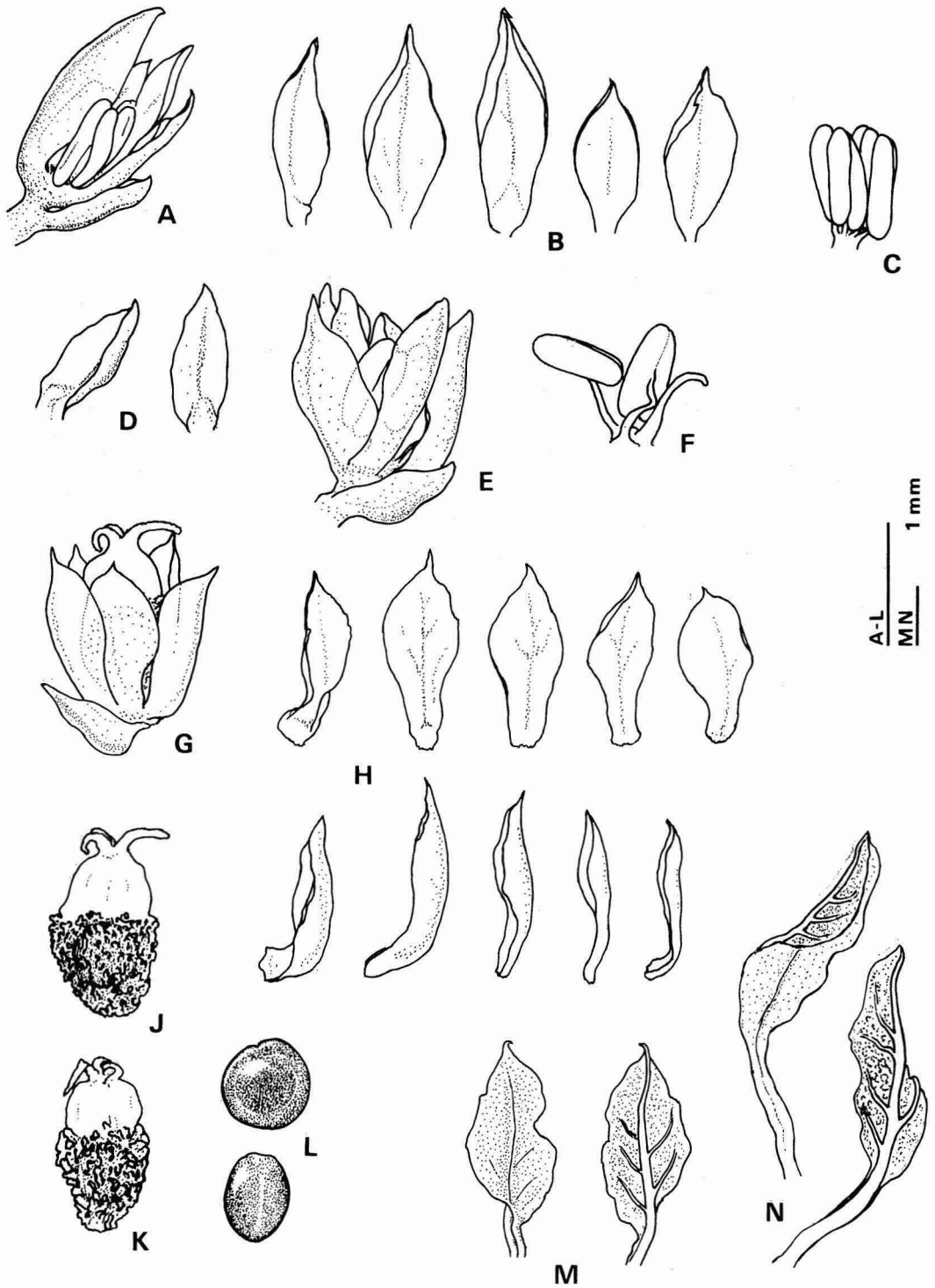


FIGURE 2. *Amaranthus interruptus* from Jarvis Island (*Ahia* & *Graf* P9(X)). *A*, *E*, male flowers. *B*, tepals from male flower. *C*, *F*, androecia with four and three stamens, respectively. *D*, bract from male flower, in the right figure seen from adaxial side. *G*, female flower. *H*, tepals from female flower seen from adaxial (upper row) and lateral (lower row) sides. *J*, *K*, utricles. *L*, seed seen from different sides. *M*, *N*, leaves.

smoother, composed of a spongy tissue; stigma branches 3; seed ca. 0.75 mm in longest diameter, ca. 0.5 mm thick, reddish black, testa shiny, almost smooth.

SPECIMENS EXAMINED: Jarvis Island. 5 June 1935, *Ahia & Graf P9(X)* (BISH). June 1935, *Judd & Mitchell 51* (BISH). 17 March 1964, *Hackman 2* (HAW).

LITERATURE CITED

- CHRISTOPHERSEN, E. 1927. Vegetation of Pacific equatorial islands. B. P. Bishop Mus. Bull. 44: 1-79.
- CHRISTOPHERSEN, E., and E. L. CAUM. 1931. Vascular plants of the Leeward Islands, Hawaii. B. P. Bishop Mus. Bull. 81: 1-41.
- COVAS, G. 1941. Las Amarantáceas bonarienses. *Darwiniana* 5: 328-368.
- KANIS, A. 1972. A review of the Amaranthaceae in Papuasias. *Contrib. Herb. Aus.* 1: 1-18.
- . 1974. Further notes on the Amaranthaceae in Papuasias. *Contrib. Herb. Aus.* 7: 7-13.
- STANDLEY, P. C. 1917. Amaranthaceae. *North American Flora* 21(2): 95-169.
- ST. JOHN, H. 1973. List and summary of the flowering plants in the Hawaiian Islands. *Pacific Tropical Botanical Garden Memoir* No. 1. Lawai, Hawaii.