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KOKIA: A NEW GENUS OF HAWAIIAN TREES

With Five Plates

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KOKIA: A NEW GENUS OF HAWAIIAN TREES

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(With Five Plates)

A few beautiful malvaceous trees, known to the natives under the name of "kokio,"[1] are at present to be found at North Kona, Island of Hawaii, in the driest part of the island at an elevation of 2,000 feet in the rough lava fields on the slopes of the Volcano of Hualalai. They were discovered, in 1909, by Mr. Joseph F. Rock, of Honolulu, and represent the surviving members of a hitherto unrecognized species of a genus here to be described as new. Within a year two of the six original trees have been destroyed, and unless immediate steps are taken by the territorial authorities for their protection, the four remaining trees will be exterminated. Mr. Rock has very kindly furnished the writer with notes on the living trees as well as herbarium material collected by him, which have mainly afforded the data necessary for the description of the new genus and species.

Formerly there were to be found on some of the other Hawaiian islands a number of trees known as *Gossypium drynarioides,* and a "variety β," which we must regard as representing two distinct species, in addition to the one already mentioned. These trees were generally found standing singly or in small groups on rough lava-covered ridges. Probably much more abundant in former times, they were exterminated from all but the driest and most inaccessible portions of the islands, and so destructive have been men and cattle that within the past few years the few remaining trees have all been destroyed. The natives stripped the trees of their bark, which contained a red sap, a preservative of their fish nets, while cattle fed upon the large, succulent leaves.

The botanical history of *Gossypium drynarioides* and the "variety β" may be briefly stated as follows: In 1865 Berthold Seemann[2] described as *Gossypium drynarioides* a specimen in the herbarium of the

[1] Anderson's Hawaiian Dictionary defines the noun *ko-ki* as follows: "The extremity; the end of a tree; a very high place." The native name of these trees, *kokio,* possibly relates to the habitat.

[2] Seemann, B.: Flora Vitiensis, 1865, p. 22.

British Museum, collected on the Island of Molokai by Nelson, the companion of Captain Cook. The description was based upon incomplete material and the author was in doubt as to the genus to which the plant should be referred, no fruit having been seen by him. The species was later collected in 1851, again on Molokai, by E. Jules Remy, a member of the Société Botanique de France, and collaborator of Gay's Flora Chilena, while on a mission to Hawaii for the Paris Museum. Dr. Wm. Hillebrand,[1] in 1888, gave a very full description of the species and also briefly described the narrow-bracted variety β from the Island of Oahu. He mentions R. Meyer as having discovered three trees of the typical form on the western end of Molokai, which could not be found on a subsequent visit. Two years ago Mr. J. F. Rock discovered[2] a single, nearly dead tree, belonging to Seemann's species, in the type locality, which tree has since died.

To summarize briefly: We have (1) a new species on the Island of Hawaii, represented by the four trees now growing on the slopes of Hualalai; (2) the species described by Seemann from the Island of Molokai, and not seen since 1910; (3) Hillebrand's "variety β" from the Island of Oahu, which has not been re-discovered, so far as known, since the publication of Hillebrand's Flora in 1888. It is believed by the writer that these three species comprise a new genus, most nearly related to *Gossypium*. It may be described as follows:

KOKIA Lewton, new genus

Generic characters.—Trees 12 to 25 feet; woody throughout. Flowers single in the axils of the uppermost leaves; peduncle bearing below the middle a broadly sessile, obliquely clasping, caducous, ovate bract. Bracteoles 3, persistent, accrescent, ovate, entire, sinuate or slightly lobed, narrowed at the base, not in the least auriculate, coriaceous, glabrous, strongly reticulated, 7-13 nerved. Calyx urceolate, thin, scarious, punctate with black warts; lobes 5, shallow, rounded, the scarious almost hyaline margins overlapping and completely enclosing the bud. Calyx tube often with a median transverse vein, the upper half of the calyx usually soon breaking off at this point, giving the calyx the appearance of being truncate. At the base of the calyx tube at the point of insertion of the petals there is a ring of stiff, brownish hairs. Floral nectary naked, extra-floral nectaries not evident. Corolla two to three times the length of the bracteoles,

[1] Hillebrand, W.: Flora of the Hawaiian Islands, 1888, p. 51.

[2] Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii, Dec., 1910, p. 72.

red. Ovary five-celled, with one ascending ovum in each cell. Capsule ovoid, ligneous, opening tardily. Seeds obovoid, sharply angled on the ventral side, rounded on the dorsal, covered with short, brick-red tomentum. Cotyledons punctate with black dots. Bark containing a reddish brown sap. Species, 3. Hawaiian Islands.

Type.—Kokia rockii Lewton.

KOKIA ROCKII Lewton, new species

Tree 25 feet high, averaging 10 to 12 inches in diameter. Bracts broadly obovate 6.5 cm. long, 6.5 to 8 cm. broad, with three to five blunt and shallow lobes, very strongly reticulated and veined below. Leaves glabrous below except for a dense patch of rusty hairs, 2 to 2.5 cm. in diameter at point of attachment of the petiole, the pulvinus of which is also hairy. Staminal tube 9 to 10 cm. long, curved. Seeds 2 cm. long by 1 cm. wide; lint 3 mm. long. Type in U. S. National Herbarum, no. 691082, collected at Huehue-Puu-waawaa, Hualalai, North Kona, Hawaii, altitude 2,000 feet, by J. F. Rock (no. 3549), June, 1909. Known to the writer only from the type specimen.

KOKIA DRYNARIOIDES (Seemann) Lewton, nov. comb.

Gossypium drynarioides Seemann, Fl. Vit., 1865, p. 22.

Hibiscus drynarioides Kuntze, Rev. Gen. Pl., 1891, vol. 1, p. 68.

With the exception of the calyx, this species is adequately described in Hillebrand's Flora of the Hawaiian Islands. A fragmentary specimen in the Gray Herbarium of Harvard University, collected by Dr. Hillebrand, and identified as *G. drynarioides,* has the narrow bracts of his "variety" here described as *Kokia lanceolata;* while an immature capsule in a pocket attached to the sheet has the broad, almost cordate bracts of the typical form which the writer considers as representing *Kokia drynarioides.* The same herbarium contains a sheet representing Remy's No. 568 from Molokai, evidently from a diseased tree. The involucral bracts are smaller than in Hillebrand's specimen, but are as broad as long.

The U. S. National Herbarium, contains two sheets of this species. The first, consisting of two scraps, represents Hillebrand's No. 1921, no locality being given. The second specimen, consisting of a branch and two mature capsules, was collected at Mahana, Island of Molokai, by J. F. Rock (No. 7076) April, 1910. The latter specimen has leaves which are glabrous below except for a few brownish hairs at the base of the veins.

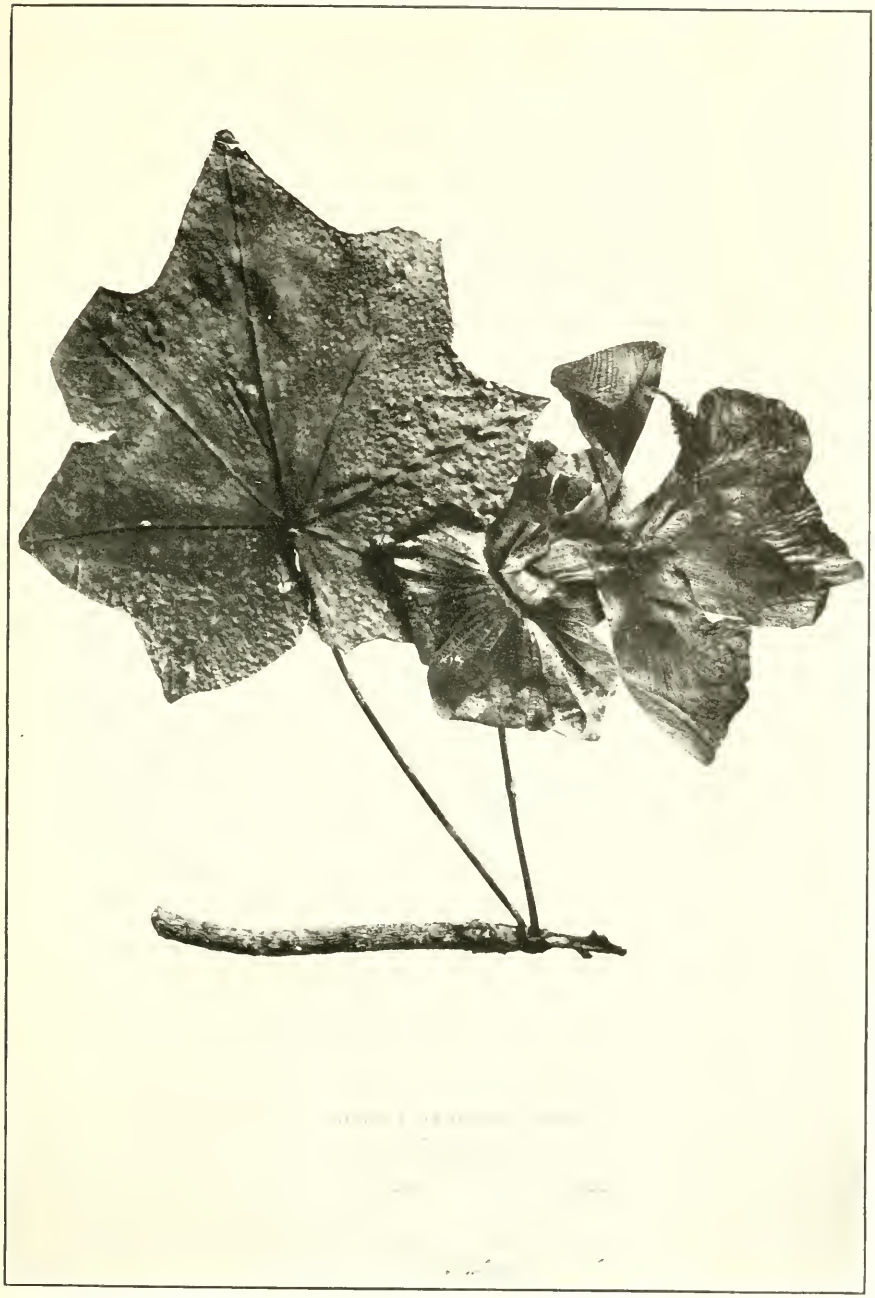
KOKIA LANCEOLATA Lewton, new species

Gossypium drynarioides var. β Hilleb. Fl. H. I., 1888, p. 51.

Under *G. drynarioides* variety β, Hillebrand mentions two trees having lanceolate involucral bracts which are only one-half as wide as long. These were found on the hills of Makaku and Koko Head, at the eastern end of Oahu. Mr. J. F. Rock, after a careful search, failed to discover a single tree now growing on the Island of Oahu.

No specimen, known definitely to have been collected in Oahu, has been seen by the writer, but a study of Hillebrand's narrow-bracted specimen in the Gray Herbarium, referred to under *K. drynarioides,* which was without locality, has convinced the writer that Hillebrand's variety β should be considered as a distinct species.

This view is taken (1) because in the variety as described by Hillebrand, and in the narrow-bracted specimen collected by him, the involucral bracts are but one-half as wide as long, or less, whereas, in the four specimens of *K. drynarioides* examined these parts are as wide as long, or wider; and (2) on account of the restriction of the variety to another island of the Hawaiian group, in keeping with the very limited distribution on certain islands of many Hawaiian plants and animals.



KOKIA ROCKII LEWTON

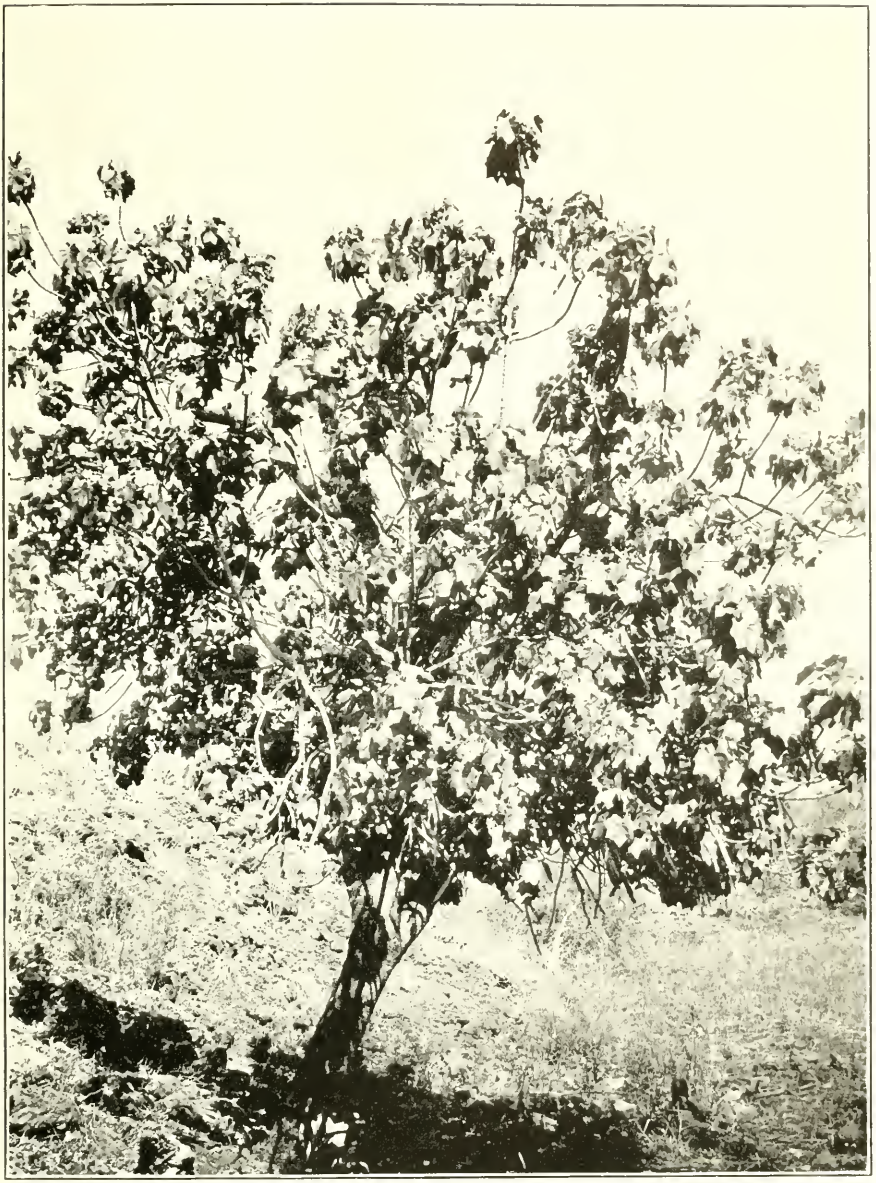
Part of the type specimen
(Two-fifths natural size)

INVOLUCRE (LOWER SIDE) OF "KOKIO" (KOKIA ROCKII)

Showing reticulation of veins and scar left by the sheathing bract on the pedicle
(From type specimen; natural size)

FLOWERING BRANCH OF "KOKIO" (KOKIA ROCKII)

From tree in the type locality: Puu-waawaa, North Kona, Hawaii
(Photograph by J. F. Rock; about one-third natural size)



"KOKIO" TREE (KOKIA ROCKII)

Growing on lava fields at Puu-anahulu, Hawaii, H. T.
(Photograph by J. F. Rock)

KOKIA DRYNARIOIDES (SEEM.) LEWTON

Herbarium specimen from the last surviving tree in the type locality: Mahaua, West end of Molokai, H. T.
(Two-fifths natural size)