

Notes on Hawaiian species of *Scaevola* (Goodeniaceae)
Hawaiian Plant Studies 19¹

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GOODENIACEAE

Scaevola kauaiensis

(Degener) St. John, comb. nov.

Camphusia glabra (Hooker & Arnott) De Vriese, var. *kauaiensis* Degener, Fl. Hawaiensis, fam. 340: text and fig. of flower and fruit on left of plate, Oct. 14, 1938, not *S. Gaudichaudiana* Cham. f. *kauaiensis* Skottsberg, Bernice P. Bishop Mus., Bul. 43: 27, 1927.

The genus *Scaevola* is well known in the Pacific, having littoral species widespread in the tropics, and more than 80 species in tropical Asia and the Pacific, but most of them in Australia and Oceania. The numerous species include various habit forms and a considerable range of morphological structure, but the genus has long been considered a clearly delimited and natural one. To be sure, the shrubs may be erect or scandent, the leaves alternate or opposite and glabrous or pubescent, the flowers solitary or in cymes, white striped, blue, purple, or yellow, and the

¹ This is the nineteenth of a series of papers designed to present descriptions, revisions, and records of Hawaiian plants. The preceding papers have been published in Bernice P. Bishop Mus., Occas. Papers 10(4), 1933; 10(12), 1934; 11(14), 1935; 12(8), 1936; 14(8), 1938; 15(1), 1939; 15(2), 1939; 15(22), 1940; 15(28), 1940; 17(12), 1943; Calif. Acad. Sci., Proc. IV, 25(16), 1946; Torrey Bot. Club, Bul. 72: 22-30, 1945; Lloydia 7: 265-274, 1944; Pacific Sci. 1(1): 5-20, 1947; Brittonia 6(4): 431-449, 1949; Gray Herb., Contrib. 165: 39-42, 1947; Pacific Sci. 3(4): 296-301, 1949; Pacific Sci. 4(4): 339-345, 1950; and Bernice P. Bishop Mus., Occas. Papers 20(6): 77-88, 1950.

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drupes white or black, but these are properly considered specific differences and the genus is a natural, easily recognized one because of its tubular corolla with a split down its proximal side. From this large assemblage of species, various segregate genera have been proposed. Among these is *Camphusia* of De Vriese (1850),³ based on the single Hawaiian species, *Scaevola glabra* Hooker & Arnott. This species is very distinct from all the other Hawaiian ones. In his subsequent monograph in 1854, De Vriese retained *Camphusia*, describing it in detail and giving as the key character the fact that its flowers were solitary. This character is of little value, as there are other dissimilar species which have solitary flowers: *S. Menziesiana* Chamisso, *S. coriacea* Nuttall, *S. Skottsbergii* St. John, etc. Degener (1938) revives the genus *Camphusia* and describes a new *C. glabra* var. *kauaiensis* with the sole character mentioned in the diagnosis being flowers twinned ("Flores gemini"), a character completely at variance with the key character chosen by De Vriese, "Flores solitarii." Degener in his English description mentions several other characters, such as length of peduncle, corolla, etc., but these are of varietal or specific significance only. Of course it is perfectly proper for a later author to redefine a genus and emphasize other characters as diagnostic. Degener does this for *Camphusia* De Vriese, separating it in his key as follows:

"Corolla tube strongly curved and on upper side not split to base; filaments

³ In Nederl. Kruidk. Arch. 2: 148, 1850.

not marcescent; calyx not bracteate at base CAMPHUSIA
 Corolla tube straight or nearly so and on upper side split to base; filaments early marcescent; calyx usually bi-bracteolate at base SCAEVOLA''

Among the Hawaiian species of *Scaevola*, the species *S. glabra* is conspicuous by having a strongly curved, fleshy corolla tube which is cleft on the proximal side only about half-way down and the calyx or hypanthium or base of the inferior ovary is naked or bractless at base. The question is, are these generic differences?

The corolla is cleft about halfway, but it has a suture from there down to the base on which it may split in age. This seems an extreme specific character, but not a generic one. The calyx or ovary is bractless at the base, but so also are the numerous flowers in the large cyme of *S. frutescens* (Miller) Krause of the Pacific and Indian Oceans, and so are they bractless in *S. Helmsii* E. Pritzl of Western Australia. The filaments of *S. glabra* are retained within the partly closed corolla tube and hence are little exposed. The filaments of most other *Scaevola* species are pushed outside as the slit tube of the corolla yields to the stress and turns to the anterior side and more or less flattens out, so the exposed filaments after anthesis wither and dry. However, no important difference between marcescent and non-marcescent filaments has been noted. The yellow color of the corolla is not unique, for other species have yellow flowers, as, for example, *S. enantophylla* F. von Mueller. Other species have their corollas of varying textures from membranous to fleshy, the Hawaiian species *S. coriacea* Nuttall having the whitish flowers of the 1- to 3-flowered cymes definitely fleshy. Other species, such as *S. tomentosa* Gaudichaud of Western Australia, have curved corollas. In some families the curving of the corolla provides good characters, but in *Scaevola*, with various species having the corolla tubes straight, nearly straight, or slightly or markedly curved, the attempt to

set off one species as a segregate genus by the use of this character is patently unsound. The key and diagnostic characters used by Degener for *Camphusia* are judged equally invalid as the one of De Vriese. In conclusion, *Camphusia* seems correctly placed as a synonym of *Scaevola*, as it was by nearly all botanists and as it was in the monograph by Krause (1912: 119, 130) and by Skottsberg in his earlier writing (1927: 39), though in a later paper (1939: 184) there is an indication that he intends to restore *Camphusia*.

No specimens of any plant like *S. glabra* from the island of Maui are available. Krause lists one collected by Hillebrand and now in the herbarium at Wien. This has not been available for study, and, like Skottsberg and Degener, the writer has seen no recent collections from that area. If it really came from Maui, it might well be a distinct kind.

Since *S. kauaiensis* is here accepted as a species, it is desirable to print a description of it:

Shrub up to 4 m. tall; branches forking but often elongate and wand-like, the bark smooth, pale brown with raised corky lunate leaf scars and branch scars; branchlets smooth leafy, often for a considerable distance, stout, 1–15 mm. in diameter; axils with a prominent hairy tuft, the abundant hairs tawny, silky lanate, 6–7 mm. long, tardily deciduous after the fall of the leaves; leaves glabrous, alternate, or in part subopposite; petioles 12–40 mm. long; blades 5–12 cm. long, 15–55 mm. wide, coriaceous, oblanceolate to oval, the apex acute, the base cuneate or decurrent, above dark green, below pale green; cymes axillary, reduced, and 1- or 2-flowered; peduncle 2–10 mm. long, glabrous except for the hairy tufts at the apex; bracts 2, opposite, terminal, 2–4 mm. long, lanceolate to elliptic, fleshy, with their axils tawny hairy tufted; pedicels 7–35 mm. long, glabrous, ascending or spreading, bractless; hypanthium 4–6 mm. long, narrowly obpyramidal, glabrous; calyx lobes 5–8 mm. long, linear or, rarely, lance-linear; corolla yellow, fleshy, curved; corolla

tube 28–35 mm. long, glabrous outside, but hirsutulous within from level of tip of calyx lobes to the throat, on proximal side cleft about halfway, and from the sinus to the base having a distinct suture along which the corolla may split in age; corolla lobes 6–15 mm. long, the outside glabrous, the inside hirsutulous except on the hyaline winged margins; filaments glabrous, about 33 mm. long; anthers 5 mm. long, linear; style 42–48 mm. long, exserted, stout, glabrous; indusium 3–4 mm. in diameter, ciliolate on the rim; drupe 16–20 mm. long, broadly oval, shining black; endocarp 9–13 mm. long, 8–9 mm. wide, 6 mm. thick, definitely flattened dorsiventrally, bearing several sharp ridges toward the apex, the walls in median cross section 0.5–0.8 mm. thick, smooth or with 1–2 slight ridges, stramineous.

RANGE: Swampy woods or high bogs at 3,500 to 4,700 feet altitude and the open bog of Alakai Swamp from the Kalalau Pali to Keaku Cave; also near Wahiawa Swamp at 2,100 feet altitude.

TYPE: Kauai, Waieke Swamp, Kokee, June 28, 1926, *Otto Degener and Henry Wiebke* 2,187.

SPECIMENS EXAMINED: All from Kauai: Kokee, *C. Skottsberg* 1,020; Kawaikoi Stream, *C. N. Forbes* 908.K; Kalalau Pali, *C. N. Forbes* 1,037.K; n. w. end Alakai Swamp, *H. St. John et al.* 10,736; Kauluwehi, *J. F. Rock* 12,914; central plateau, trail to Kaluiti stream and Keaku cave, *J. F. Rock* 5,063 (also duplicates under the temporary numbers 5,075, 5,077, and 5,078); Kaholuamanoa [=Kaholuamanu], *A. A. Heller* 2,806; and near Wahiawa bog, *L. H. MacDaniels* 619.

The only collector recording the stature of the plant was MacDaniels and he gave it as "small tree, height 4 meters." The plant is a shrub rather than a tree.

The diagnostic characters of the two species are as follows:

S. kauaiensis (Degener) St. John has the branches often long and wand-like, leafy for

some distance; axillary hairy tufts 6–7 mm. long; peduncle 2–10 mm. long; pedicel 7–35 mm. long; calyx lobes 5–8 mm. long, linear or rarely lance-linear; corolla tube 28–35 mm. long; corolla lobes hirsutulous within except on hyaline-winged margins; endocarp wall in median cross section 0.5–0.8 mm. thick, stramineous, the surface smooth or with 1–2 slight ridges.

S. glabra Hooker & Arnott has the branches, or at least the lateral ones, ascending with leaves crowded near the stem tips; axillary hairy tufts 3–5 mm. long; peduncle 0–3 mm. long; pedicel 13–30 mm. long; calyx lobes 2–5 mm. long, narrowly deltoid; corolla tube 15–24 mm. long; corolla lobes hirsutulous within only for a short distance just near the base in the submarginal areas; endocarp wall in median cross section 1–2 mm. thick, dark brown, the surface with several prominent sharp ridges.

Scaevola frutescens (Miller) Krause

Scaevola frutescens (Miller) Krause is distinguished from its varieties by having its leaves glabrous from the first or, if sparsely puberulent near the midrib below, then glabrate long before maturity. This species is common on the outer Leeward Islands of the Hawaiian Group, extending from Kure (Ocean) Island to Midway, Pearl and Hermes to Laysan. Then it occurs on Kauai near Nawiliwili Bay and inland on the slopes of the Haupu Range; and it has been found on Kahoolawe Island. On the shores of the other main Hawaiian Islands the plant occurs only as the var. *sericea*, which is abundant and widespread along the shores.

Scaevola frutescens (Miller) Krause, var. *sericea* (Forster f.) Merrill

S. frutescens forma *moomomiana* Degener & Greenwell, ex Degener Fl. Haw. 340: 12/1/49.

SPECIMENS EXAMINED: Molokai: Kaluakoi, Kawakui Road, 600 feet altitude, low bushes

growing on sand dunes, Dec. 22, 1932, *H. St. John et al.* 12,450.

One of the commonest littoral plants is this widespread variety, known from many parts of the tropical Pacific. It occurs near the beach or the sea shores on all types of soil. It has not been reported far from the beach or at high elevation, hence, this locality at 600 feet altitude and 1¼ miles from the shore is worthy of record. At the shore there are extensive and large dunes of coral sand and shell sand at Moomomi, Molokai. Southwest by west from here is a broad strip up the foothills where the strong northeast trade winds blow the dunes before them right up the hillsides. These inland dunes climb to the crest of the ridge at 600 feet and partway down the declivity on the other side. They have, at least in part, the same vegetation as those of the coast, *Boerhavia diffusa*, *Scaevola*, *Ipomoea pes-caprae*, etc. They are doubtless saline enough in this arid area, and the plant seeds have been blown inland along with the sand. Though these inland localities are of striking interest, they are easily explained.

The writer has also observed this variety on Oahu at 500 feet altitude. This was near the crest of the Koolau Range, east of the King's Highway Pass, east of Makapuu Head Lighthouse, above the first beach in Waimanalo. Here the *Scaevola* is to be seen in gulches, nearly to the top of the divide. This is on the windward side of the island and is fully exposed. Here storm winds obviously are responsible for lifting salt spray, sand, and seeds of beach plants up the gullies on the face of the precipitous cliffs. The distance inland, however, is only a small fraction of a mile.

Degener has also observed and collected this shrub of the inland dunes and has recently described it as *S. frutescens* forma *moomomiana* Degener and Greenwell. Its only distinguishing characters were stated to be: "This brittle-leaved form has densely velvety leaves." The type specimen, *Degener* 7,730, is in the herbarium of the New York Botanical Garden. The writer studied the type in June,

1950, and found it a full sheet. The leaves are densely ascending white pilosulous above and below, a little more hairy and velvety than usual in the variety, but the hairs are of exactly the kind found on the leaves of var. *sericea*. The type has blades 3.5–10.0 cm. long, spatulate, and, when dried, thick and rigid, showing no evidence of having been brittle. The writer was unable to perceive brittleness as a usable character for this forma in the herbarium or in the type locality where he has observed this plant several times. There were also present three other collections from near the type locality, *Degener* 7,728, 7,729, and 7,731; in these, differences in the length and density of the pubescence were observed, but they and 7,730 did not seem separable on the pubescence alone. All are better referred to *S. frutescens* var. *sericea*.

Scaevola mollis Hooker & Arnott, forma *albiflora* (Degener & Greenwell) comb. nov.

S. mollis var. *albiflora* Degener & Greenwell, in *Degener, Fl. Haw.*, fam. 340: 10/1/47.

Corolla white except for the violet margin of the sinus of the split tube.

TYPE: Oahu, "Shrubby, cloudy east slope near top; between Puu Kanehoa and Puu Kaua, Waianae Range, June 23, 1940, *Degener* No. 17,643."

SPECIMENS EXAMINED: Puu Hapapa, Waianae Mts., southeast slope, among bushes near top, June 4, 1939, *Otto Degener & Emilio Ordonez* 12,364; Puu Kaaumakua, Koolau Range, Waipio, low forest near peak, 2,400 ft. alt., 1 m. shrub, Aug. 23, 1942, *Harold St. John and June Suzuki* 20,312.

The species, *Scaevola mollis*, is abundant in the Koolau Range, Oahu, occurring from the moist forest of the Ohia Zone up to the crest of the mountains in the Cloud Zone. It is readily distinguished from the other species on Oahu by having its leaves soft hairy beneath and by having its flowers blue, or more

exactly, pale blue with the veins and sinus margin violet. It is a very distinct species and quite homogeneous.

Only recently has the species been known in the Waianae Mountains. Besides Degener's type specimen (of var. *albiflora*) from the Waianae Mts., he apparently has a second collection. Its label reads, "*Scaevola mollis* H. & A. forma nov. with white flowers or more likely somewhat hybridized with *S. Gaudichaudiana* Cham." It matches nicely our collection from the Koolau Range. In the

leaf shape, size, tothing, permanent pubescence, inflorescence form, pubescence, flower structure, all details tally exactly with those of *S. mollis*. No indications of hybridity are apparent to the writer. *S. Gaudichaudiana* is so different in structure and appearance that it should leave some visible trace in a hybrid offspring besides the lack of pigment in the flower. In conclusion, there seems no evidence of a hybrid origin. The plants differ from the species only in the albino flowers, hence, are best classified as a color form.