

PELEA AND PLATYDESMA

JOSEPH F. ROCK

(WITH ONE FIGURE)

The family Rutaceae is represented in the Hawaiian Islands by several genera, of which the genus *Pelea*, named by ASA GRAY after the Hawaiian goddess of fire Pele, is the largest. The species, which number about 30, including the two here described, are more or less in a state of confusion. They are very difficult to separate, owing to the many varieties and intermediate forms. The writer was privileged to work for about three months at the Berlin Herbarium on the HILLEBRAND collection, shortly before the outbreak of the present war, and also at the Gray Herbarium, which enabled him to unravel some of the existing confusion. The present paper places a few species of *Pelea* in their proper positions and also clears up the synonymy of *P. auriculaefolia* Gray. Owing to HILLEBRAND'S misidentification of *P. kauaiensis*, HELLER, evidently relying on HILLEBRAND'S description of that species, described the true *P. kauaiensis* Mann as a new species, namely, *P. cruciata*, which must now remain a synonym.

PELEA SAPOTAEOFOLIA Mann, Proc. Bost. Soc. Nat. Hist. 10:312. 1866.—This species is not represented in the Hillebrand Herbarium. A cotype of MANN'S species is in the Gray Herbarium, "no. 559 leg. Mann, Kealia, Kauai." The capsule (only very young capsules are attached to the sheet in a separate pocket) is not cuboid, the leaves are long, whorled (in fours), thin papery, yellowish pubescent underneath especially along the midrib and slightly so on the upper surface.

HILLEBRAND'S two varieties  $\beta$  and  $\gamma$  have nothing in common with *P. sapotaefolia* Mann. His var.  $\beta$  is identical with *P. kauaiensis* Mann so far as the leaves are concerned; a single cuboid capsule (detached) is fastened in a paper pocket. In fact, HILLEBRAND'S label has the name first as *P. kauaiensis*, which he crossed out and wrote underneath "*sapotaefolia* fol. oppositis. Mts. of Waimea,

Kauai"; the following legend appears also on the label: "identical with MANN'S sp., only leaves not ternate, *Knudsen* 38."

HELLER'S *P. cruciata* is identical with *P. kauaiensis* Mann. HELLER'S no. 2870, labeled *P. sapotaefolia* var.  $\beta$  Hbd., has nothing to do with the plant of that name. It cannot be determined, however, as the specimen is in neither flower nor fruit.

Of HILLEBRAND'S var. (?)  $\gamma$  *procumbens*<sup>1</sup> there are two sheets in the Berlin Herbarium, "leg. *Knudsen* no. 165, high mountains of Waimea." This is not a variety of *P. sapotaefolia*, but a distinct species. The writer, in his book on the *Indigenous trees of the Hawaiian Islands*, expressed a similar view, but could make no definite statement, as he had not seen the Hillebrand nor the Harvard collection. HILLEBRAND'S label on the plant collected by *Knudsen* (no. 165) bears the following legend:

This is probably *P. sapotaefolia*; the leaves agree entirely with *Mann*'s no. 557, which is *P. sapotaefolia* fol. opposit., not *P. oblongifolia* as wrongly labeled. It is true that in the specimen there is only one flower in each axil, but on close examination the pedicel is found to rest on a very short peduncle; and in no. 559, the true type of *P. sapotaef.* fol. *3-natis*, there can be distinctly seen, alongside the one developed flower, quite a numerous cluster of small undeveloped buds, so that the inflorescence seems to be considered sub-umbellately many-flowered.

Portion of HILLEBRAND'S specimen leg. *Kn.* no. 165 is in College of Hawaii Herbarium. Of the typical *P. sapotaefolia* H. Mann, the College of Hawaii Herbarium possesses a specimen collected by *Faurie* (*F.* 188), C. H. Herb. no. 12710.

*Pelea Gayana*, n. sp.—*P. sapotaefolia* Mann var. (?)  $\gamma$  *procumbens* Hbd. Fl. Haw. Isl. 63. 1888.—A small procumbent shrub with terete glabrous branches; leaves opposite, elliptical-oblong, equally acute at both ends, thin chartaceous, glabrous on both sides, 10–13 cm. long, 3.5–4.5 cm. wide, on furrowed petioles 15–20 mm. long, dark green above, pale underneath, the midrib prominent underneath, the lateral veins united by an irregular arched intramarginal nerve; inflorescence in the axils of the leaves, very shortly pedunculate (about 1.5 mm.); pedicels bracteolate in lower and upper third, bracteoles 0.5 mm., pedicels filiform, 8 mm.

<sup>1</sup> *Flora Hawaiian Islands*, 63. 1888.



FIG. 1.—*Pelea Gayana* Rock; type no. 1972

when in flower, 25 mm. with fruit; flowers very small, sepals broadly ovate, acute, about 1 mm., puberulous; petals ovate, acute, 2.5 mm.; stamens about one-third the length of the petals, all of equal size; ovary deeply lobed, puberulous; capsule puberulous, thin papery, only one locule usually maturing, often with one or two abortive ones, locules divided almost to the base but still united; seeds not seen.

KAUAI.—Swampy forest on the high plateau of Waimea, elevation 4500 ft., collected in company with Mr. FRANCIS GAY of Kauai, who knew the plant by its native name "Kaleiohiaka"; fruiting March 3, 1909, *Rock*, type no. 1972 in College of Hawaii Herbarium; flowering September 1909, same locality, *Rock* no. 5285 in College of Hawaii Herbarium.

HILLEBRAND'S specimen in the Berlin Museum, *Knudsen* no. 165, belongs here; a portion of this specimen is deposited also in the College of Hawaii Herbarium.

PELEA CINEREA (Gray) Hbd. var. *rubra*, n. var.—*P. oblongifolia* Gray  $\beta$  var. (?) Hbd. Fl. Haw. Isl. 65. 1888; *P. cinerea* (Gray) Hbd. var.  $\delta$  *Rock*, not Hbd. in *Indig. Trees Haw. Isl.* 239. 1913.—Shrub with rambling branches; leaves elliptical to elliptical-oblong, thick chartaceous, glabrous on both sides, dull green, acute at apex, mucronate, rounded at base or subcordate, 7.5–9 cm. long, 3–4.5 cm. wide, on petioles 1.5 cm. long; peduncle 3 mm., stout and quadrangular; the single hirsute pedicel 2 mm.; flowers unknown; capsule hirsute with reddish hair, the cocci (separated) divided to the base, cohering only at the very base, 1.5 cm. long, nearly 1 cm. high, strongly nerved, endocarp hirsute, pale yellowish, and free.

HAWAII.—Lava beds of Huehue, North Kona, fruiting June 6, 1909, *Rock* no. 3565 type in College of Hawaii Herbarium.

This variety of *P. cinerea* was doubtfully referred to *P. oblongifolia* by HILLEBRAND, who collected it in South Kona, Hawaii. Of his fruiting specimen in the Berlin Herbarium only one coccus of each of the two capsules is developed, the others are abortive. This might have misled him, as it cannot be determined clearly whether the cocci are cohering or not. In the writer's specimen, which is identical with that of HILLEBRAND, the carpels are discrete and therefore must be referred to *P. cinerea* (Gray) Hbd. The writer had previously referred it to HILLEBRAND'S var.  $\delta$  of that species. It is apparently intermediate between *P. cinerea* and *P. elliptica*.

PELEA CINEREA (Gray) Hbd. var. SULFUREA Rock.—This is HILLEBRAND'S  $\beta$ , of which there is only one sheet in the Berlin Herbarium collected on Lanai. No specimen is represented from Maui. The writer collected this variety on the Island of Maui above Makawao slopes of Mount Haleakala. The leaves are pale and more or less glabrous on both sides. The capsule is smaller and sulphur-yellow. HILLEBRAND'S Lanai specimen has darker leaves, with a dirty olivaceous tomentum. A portion of his specimen is in the College of Hawaii Herbarium, also *Rock* no. 8550, from Maui.

PELEA CINEREA (Gray) Hbd. var. HAWAIIENSIS (Wawra) Rock.—*P. hawaiiensis* Wawra, *Flora* 110. 1973; *P. cinerea* (Gray) Hbd. var.  $\gamma$  Hbd. *Flora Haw. Isl.* 69. 1888.—Of HILLEBRAND'S specimens (three sheets in Mus. Bot. Berlin) two were collected by him in 1862 at Kawaihaeiuuka on Hawaii, the third is from the Kohala chain, Hawaii. A specimen from Kawaihaeiuuka ex. herb. Hillebrand is in the College of Hawaii Herbarium, with specimens collected by the writer in South Kona, Hawaii, on Puuwaawaa Hill, June 15, 1909, *Rock* no. 3654.

The writer's no. 10210 belongs here, although the leaves are glabrate or only slightly pubescent, but are of thick leathery texture as in var. *sulfurea*. They were collected in the Kipuka Puaulu near Kilauea on the slopes of Mauna Loa, alt. 4000 ft. July 1911.

PELEA WAWRAEANA Rock, *Indig. Trees Haw. Isl.* 231. 1913.—This species, while distinct, is closely related to *P. sandwicensis* Gray. In the Gray Herbarium there is a specimen ex. herb. Hillebrand labeled *P. sandwicensis* Gray *microcarpa*, which is identical with *P. Wawraeana*. It was evidently included by HILLEBRAND in *P. sandwicensis*, as he makes no mention of it in his *Flora*; the locality is given as the western end of Oahu. It is the writer's no. 3020 in the College of Hawaii Herbarium.

In the HILLEBRAND collection his var.  $\beta$  of *P. sandwicensis* is marked as var. *macrocarpa* Hbd., and his var.  $\gamma$  of the same species var. *tenuifolia* Hbd.

In the typical *P. sandwicensis* the capsule has the carpels parted half way and in some specimens even more, while *P. Wawraeana* has distinctly cuboid capsules, which are much smaller than in *P. sandwicensis*.

HILLEBRAND'S var.  $\gamma$  *tenuifolia* of *P. sandwicensis* has also a cuboid capsule, but leaves are three in whorl. He says: "otherwise the same as  $\beta$ ." This is not so, for *P. sandwicensis macrocarpa* has larger capsules and the carpels are divided to the middle.

PELEA KNUDSENII Hbd. Fl. Haw. Isl. 70. 1888.—In the Berlin Herbarium is only one sheet of this species, but labeled in Hillebrand's handwriting "*Pelea villosa* Hbd. Waimea, Kauai, Knudsen no. 210." It is identical with, and answers the description of, *P. Knudsenii*, which is *Knudsen* no. 210. The writer's *P. multiflora* is probably identical with it, but owing to the much larger inflorescence and numerous flowers, often more than 200 on a single inflorescence, it may be reduced to varietal rank as *P. Knudsenii* var. *multiflora* Rock.

The species occurs on the Island of Kauai, while the variety grows on the southern slopes of Mount Haleakala on the Island of Maui.

PLATYDESMA.—In the Gray Herbarium is a leaf mounted and labeled *Melicope grandiflora* U.S. Expl. Exped. Sandw. Isl. The leaf is recognizable at a glance as belonging to the genus *Platydesma*; it belongs unquestionably to *P. campanulatum* Mann. *P. cornutum* Hbd. occurs only on Oahu, while the former species is found on Kauai, Maui, Hawaii, and Oahu. The specific name given by GRAY is *grandiflora* in the manuscript and *grandifolia* in the publication.<sup>2</sup> Another sheet in the Gray Herbarium contains a paper pocket with a fruit and fragments of fruit identical with HILLEBRAND'S *P. cornutum*. The fragments and fruit were communicated to GRAY by Dr. WM. T. BRIGHAM, of Honolulu, with the remark "Sandwich Islands, sem. in loculis 6" (evidently referring to the number of seeds in each locule). It bears the name of *Melicope* (?) *grandiflora* Gray in GRAY'S handwriting. He evidently associated the fruit collected by BRIGHAM with the leaf shoot collected by the United States Exploring Expedition. A careful illustration of a flower and fruit of what is HILLEBRAND'S *P. cornutum* accompanies the specimen.

PELEA AURICULAEFOLIA A. Gray, Bot. U.S. Expl. Exped. 343. pl. 36. 1854.—No specimen exists of this species in the Gray Her-

<sup>2</sup> U.S. Expl. Exped. 14: 354. 1854.

barium. HILLEBRAND'S single specimen in the Berlin Herbarium marked *Platydesma auriculaefolia* (Gray) Hbd. is certainly not a *Pelea* but a *Platydesma*. The leaves in the specimen are opposite and not ternate, and are somewhat auriculate. It is neither in flower nor in fruit. This plant of HILLEBRAND'S is identical with the writer's var. *sessilifolium* of *Platydesma campanulatum* collected in the Kohala Mountains on Hawaii, from whence HILLEBRAND'S specimen originates. *Platydesma auriculaefolia* Hbd. is not a synonym of *Pelea auriculaefolia* Gray, but a synonym of *Platydesma campanulatum sessilifolium* Rock. The plant represented on the excellent plate in the atlas of the United States Exploring Expedition is a typical *Pelea*.

PELEA GAYANA and *P. CINEREA* var. RUBRA.

*Pelea recurvata*, n. sp.—*P. kauaiensis* Hbd. (not H. Mann), Fl. Haw. Isl. 64. 1888.—A small tree 5 m. high with rambling branches (teste HILLEBRAND); leaves opposite, ovate or elliptico-oblong, 10–12.5 cm. long, 5–6.5 cm. wide, on petioles 1.75–2.5 cm. long, moderately acuminate, chartaceous, marginal nerve remote from the edge, with one or two sets of meshes between, shining above, clothed underneath, especially along the midrib, with a dense velvety or cobwebby villosity; flowers small, one or more in a cluster, on filiform pedicels 4–6 mm. long, which are bracteolate at the base; sepals ovate; 2–3 mm. long; petals thin, 3–5 mm. long; capsule thin, deeply 4-parted to near the base, the narrow elongate cocci divaricate and strongly recurved, about 12 mm. long, 4 mm. broad, keeled at the upper suture, one or more often abortive.

KAUAI.—Waimea at elevations of 2000–3000 ft.; Knudsen no. 64 in Herb. Hillebrand Berlin Bot. Museum is the type, and part of the type is in College of Hawaii Herbarium no. 12711.

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