

Monograph of the Hawaiian Species of *Pleomele* (Liliaceae) Hawaiian Plant Studies 103¹

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ABSTRACT: This paper gives a monographic treatment, based on morphology, of *Pleomele* (Liliaceae) in the Hawaiian Islands. It recognizes as island endemics three species on Hawaii, two on Oahu, and one each on Kauai, Molokai, Maui, and Lanai. The new species are *P. auwahiensis*, *P. Halaapepe*, *P. kaupulehuensis*, *P. konaensis*, and *P. Rockii*.

THE HAWAIIAN SPECIES of *Pleomele* are trees with strap-shaped leaves and massive inflorescences of attractive, pendent, yellow flowers. Their classification follows the revision by N. E. Brown (1914:276), who restricted the genus *Dracaena* to species with the perianth segments free nearly to the base and with their filaments thickened at the middle. Brown separated those species with the perianth united into a tube for one-third or more than one-third of its length and with the filaments filiform as the genus *Pleomele* of Salisbury. These trees are not uncommon on the middle slopes of the six largest islands, but they were missed by the earlier collectors (Nelson, Menzies, Chamisso, Gaudichaud, Macrae, Lay and Collie, Meyen, Nuttall, Douglas, Barclay, Pickering and Brackenridge, and Didrichsen).

The first discovery of a Hawaiian species was by Horace Mann, Jr., who in 1867 published *Dracaena aurea*. It was based on his collections from Kauai, Maui, and Lanai, but these are not now considered conspecific. Here, these are evaluated, and a lectotype from

Kauai is chosen. Next, Degener (1932), in his *Flora Hawaiiensis*, described the narrow-leaved species characteristic of the Waianae Mountains, Oahu, as *Pleomele Forbesii*. In the same year, when publishing on *P. aurea*, Degener indicated a recognition of two short-flowered species on Hawaii, on Lanai, and apparently on Molokai. He printed the new binomials *P. hawaiiensis* and *P. lanaiensis*, but these were nomina nuda, lacking any description. In 1947, the writer described (1947: 39-42) the Lanai species as *P. Fernaldii*, dedicating it to his major professor. In 1980, Degener and Degener (1980: fam. 68) described *P. hawaiiensis* var. *mauiensis*. That summarizes the previous treatment of the genus in the Hawaiian Islands.

The present monograph recognizes the following number of species: Hawaii, 3; Oahu, 2; Kauai, 1; Molokai, 1; Maui, 1; Lanai, 1.

All dimensions given here were measured on dried specimens. The perianth shrinks about 10% in drying.

KEY TO SPECIES

- A. Perianth from jointed base to tip, when dried, 24-45 mm long,
 - B. Leaves 15-24 mm wide; perianth 42-45 mm long, the tube 27-30 mm long. Kauai *P. aurea*.
 - B. Leaves 9-25 mm wide; perianth 20-28 mm long,
 - C. Perianth 24-28 mm long. Lanai *P. Fernaldii*.
 - C. Perianth 31-40 mm long,

¹ Manuscript accepted 1 November 1984.

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- D. Perianth 37–40 mm long; leaves 18–22 mm wide; pedicels 7–11 mm long; perianth tube 26–29 mm long. Hawaii. *P. hawaiiensis*.
- D. Perianth 31–37 mm long; leaves 13–22 mm wide; pedicels 5–9 mm long; perianth tube 20–23 mm long. Hawaii. *P. konaensis*.
- A. Perianth with base 43–57 mm long,
- E. Leaves 5–14 mm wide,
- F. Perianth 47–55 mm long. Maui. *P. auwahiensis*.
- F. Perianth shorter,
- G. Corolla lobes linear-lanceolate; anthers sagittate; style 30 mm long; leaves about 45 cm long. Oahu. *P. Forbesii*.
- G. Corolla lobes deltoid, obtuse; anthers linear oblong; style 34 mm long; leaves 23–40 cm long. Molokai. *P. Rockii*.
- E. Leaves 14–27 mm wide,
- H. Leaves 14–24 mm wide, 40–80 cm long; perianth 43–57 mm long. Oahu *P. Halaapepe*.
- H. Leaves 23–27 mm wide, 36–38 cm long; perianth 43–47 mm long. Hawaii. *P. kaupulehuensis*.

Pleomele aurea (Mann) N. E. Brown, Kew Bull. 277, 1914.

Dracaena aurea Mann, Amer. Acad. Arts Sci., Proc. 7:207, 1867.

Draco aurea (Mann) Ktze., Rev. Gen. Pl. 2:710, 1891.

Figures 1, 8

ORIGINAL DIAGNOSIS: “Arborea, ramosa; foliis coriaceis planis linearibus attenuato-acuminatis; paniculis recurvo-pendulis folioso-bracteatis; pedicellis laxe racemosis solitariis raro geminis; perigonio (sesqui-bipollicari) tubuloso, subinfundibuliformi leviter curvato flavo, tubo lobis erectis lineari-oblongis triplo longiore. Not uncommon throughout the islands.—A tree 20 to 25 feet high. The linear and recurved-spreading leaves $1\frac{1}{2}$ to 2 feet long, an inch or less wide. Panicle a foot long, more or less, the bright lemon-yellow flowers very showy. This differs from the typical species of the genus in the erect lobes as well as the long tube of the perigonium. The berry is red, 4 to 8 lines in diameter, and is much sought after by birds.”

SUPPLEMENTARY DIAGNOSIS OF ISOTYPE: Leaf 55 cm long, 22 mm wide, in the outer quarter narrowing to the subacute tip; flowering part of panicle 38 cm long, each branch subtended by a foliaceous bract, the lowest one 11 cm long, 8 mm wide, lance-linear, and the bracts progressively reduced to the upper one, 18 mm long; pedicels 8–33 mm long, each sub-

tended by a pair of bracts 4–5 mm long, chartaceous; flowers 42–45 mm long, including the 4–5-mm contracted base, the expanded tube 27–31 mm long, about 8–9 mm in diameter at the apex, subcylindric, but narrowing toward the base, slightly curved; perianth lobes 11–16 mm long, 2–3 mm wide, narrowly oblong, obtuse; filaments 10–11 mm long, subulate; anthers 5 mm long, oblong, obtuse, slightly exserted; style 36–39 mm long, exserted; stigmas clearly three-lobed; seeds 6–7 mm long, shaped as a full, half, or third of a sphere.

SUPPLEMENTARY DESCRIPTION: Tree 6–12 m tall; trunk 20–25 cm in diameter; leaves 50–57 cm long, 15–34 mm wide, subcoriaceous, ligulate, but in the outer third tapering to the subacute apex, with numerous longitudinal veins, the margins thin, pale, cartilaginous; panicle single, terminal, cernuous and pendent; peduncle 23 cm long, 15 mm in diameter at base; panicle 35–45 cm long, 17–18 cm in diameter; seeds 8 mm long, shaped as a full, half, or third of a sphere, pale brown, smooth.

LECTOTYPE: Flora Hawaiiensis, Koloa, Kauai, *H. Mann & W. T. Brigham 362* (GH). Isotypes (BISH, CU).

SPECIMENS EXAMINED: Hawaiian Islands, all from Kauai Island, and in BISH. Kokee, wet forest, 3500 ft alt., 10 July 1966, *S. Carlquist 1,960*; ditto, 18 April 1968, *D. Herbst 1,065*; Kekoiki ridge, above Kilauea, 650 m alt., 13

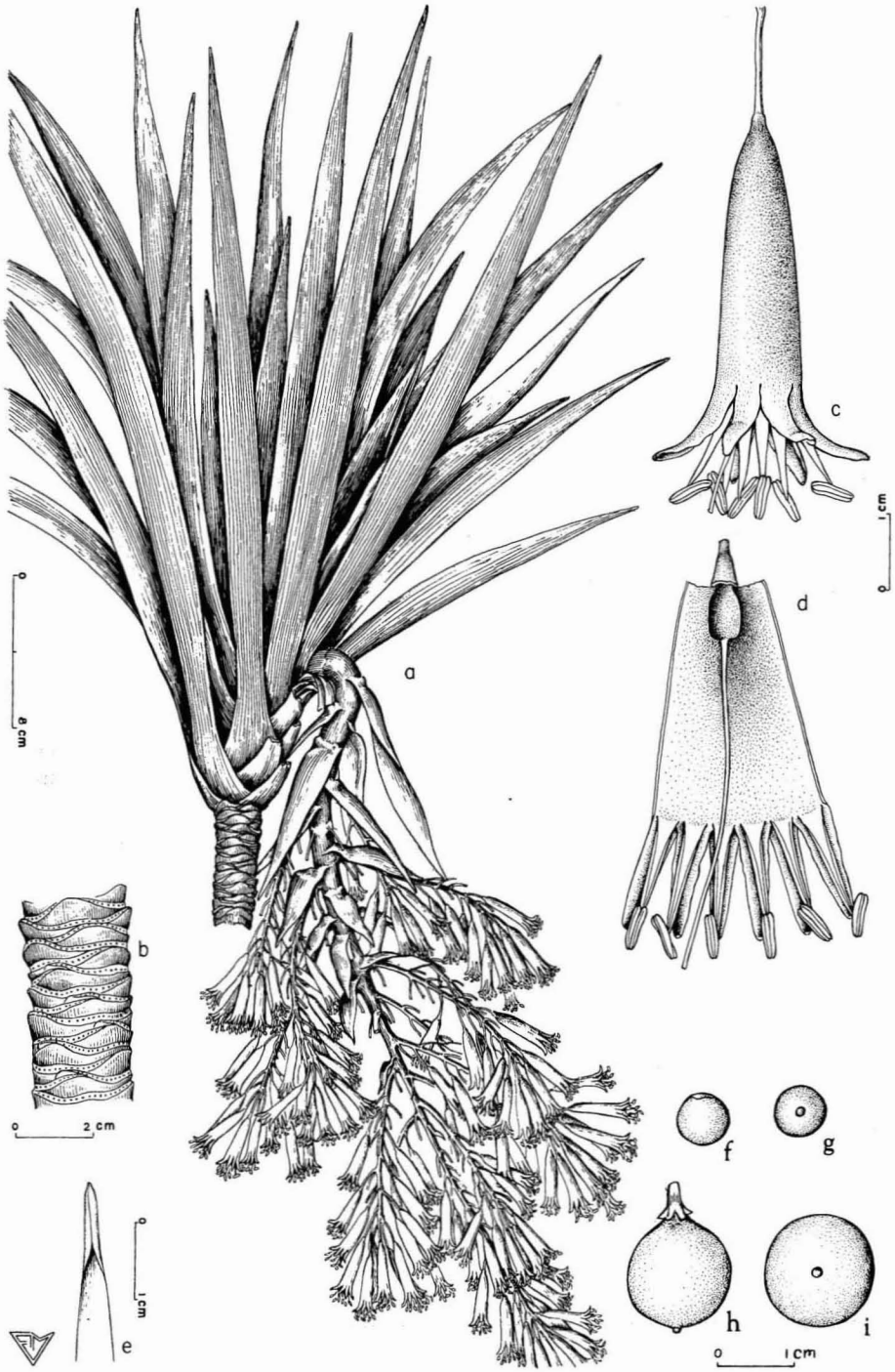


FIGURE 1. *Pleomele aurea* (Mann) N. E. Brown, from *St. John* 22,703. a, habit, $\times \frac{1}{2}$; b, branch, $\times \frac{1}{2}$; c, d, flower, $\times 1$; e, leaf tip, $\times 1$; f, g, seed, $\times 1$; h, i, drupe, $\times 1$.

February 1927, *L. H. MacDaniels* 669; Kokee, 26 December 1930, *St. John et al.* 10,732 $\frac{1}{2}$; Hanakapiai, Napali Coast, 31 December 1930, *St. John et al.* 10,931; Hanakapiai River Valley, lower woods, 600 ft alt., 23 December 1933, *St. John & F. R. Fosberg* 13,514; Wainiha Valley, dry lower forest, 700 ft alt., 1 January 1934, *St. John, Fosberg & Oliviera* 13,910; Nualolo, moist gulch, 1 mi inland, 1000 ft alt., 24 April 1965, *St. John* 20,699; Kokee, 10 August 1947, *St. John* 22,703; Kokee, August 1961, *W. L. Stern & S. Carlquist* 1,293.

DISCUSSION: In the original publication of *Dracaena aurea*, Horace Mann, Jr., failed to cite a type. Instead, he wrote: "Not uncommon throughout the islands." The first set of the Hawaiian collections by Mann and Brigham is in the Gray Herbarium, where Mann was trained and where he served as assistant to Asa Gray. This collection is comprised of only a single sheet, *Mann & Brigham* 362, from Koloa, Kauai. The second set of these plants was sold by Mann's mother, after his early death, to Cornell University, and it is there incorporated in the herbarium. It contains the number 362, with the same locality data as the first set, but it was undetermined. A small fruiting specimen is contained in a pocket on the same sheet, also numbered 362, but labeled Lanai. Number 362 is also present in the Bernice P. Bishop Museum as the Koloa, Kauai, collection.

Mann, who studied, prepared, and distributed the Mann and Brigham Hawaiian collections, gave them numbers in a consecutive series. Yet, his two collections of *Dracaena*, from Kauai and from Lanai, were both numbered 362. At the Gray Herbarium there is no formal book of numbers and collection data. Some records exist, however, for in a letter from Mann to Gray, dated 9 January 1865, there is a collection number list, from 408 to 471. Number 411 is "*Brenchleya* (foliage) Wailuku V., W. Maui = 362 Lanai."

The Bernice P. Bishop Museum has two of Mann's number lists, booklets given to the museum by W. T. Brigham in 1914. In the smaller booklet, there is an entry numbered "362 (*Brenchleya* Remy) Liliac. [eae] tree, l. [eaves] like *Freycinetia* = 411 Maui." Under

number 411 he has listed "*Brenchleya* (foliage) (= 362 Lanai) Wailuku Valley, W. Maui." In Mann's larger booklet, number 362 is unidentified, a plant from Pauoa Valley, Oahu; while number 411 is *Boehmeria* (*Procris*), from the Ridge East of Nuuanu, Oahu.

When dealing with others of the Mann and Brigham collections the author has attempted to understand Mann's system of numbering, but without success. He did give field collection numbers, and the two number booklets in the Bishop Museum show that he has two sets of field numbers. There is no list of the final numbers given to the herbarium specimens as distributed. Sometimes Mann used the number in one of the field books, other times not. Often, he combined collections from different islands under a single number, a species number.

The generic name *Brenchleya* used by Mann seems to be a manuscript name, still unpublished. Eventually, Mann published for this plant the binomial *Dracaena aurea*, but listed no collections and indicated no type. In his *Flora Hawaiiensis*, Degener (1932) accepted the plant as *Pleomele aurea* (Mann) N. E. Brown. He illustrated it from a specimen from Pupukea, Oahu, and recognized it as growing on the Koolau Range and the Waianae Range on Oahu, and on Kauai. For the type locality he quoted from Mann: "Not uncommon throughout the [Hawaiian] islands." Then he added, "The exact locality, not cited, is probably the Koolau Range of Oahu." This might be considered a typification, but it is vague. No lectotype was chosen.

Mann collected his *Dracaena aurea* on Maui, but this leaf specimen has disappeared; he collected a small fragment on Lanai (which is *P. Fernaldii* St. John); and he collected flowering and fruiting material at Koloa, Kauai (number 362). Mann's diagnosis and description give numerous characters, but they are mostly generalities and not now diagnostic. However, they apply nicely to his Kauai collection (number 362). This number in the Gray Herbarium is here chosen as the lectotype. Isotypes are at BISH, CU.

In 1897, A. A. Heller listed *Dracaena aurea* from Kauai and Oahu (1897:806), and stated, "the type number is M. & B. 362, without

exact locality, but probably from Oahu." This may well have been the source from which Degener (1932:8/10/32) obtained the idea, "The exact locality, not cited, is probably the Koolau Range of Oahu." In his publication of *D. aurea*, Mann (1867:207) cited no specimen, but in his Corrigenda on page 235 he cited for it (*M & B 36*), which in itself was an error for *M & B 362*.

Two nomina nuda should be mentioned. They were printed by Degener (1932:8/10/32) as follows: "On the island east of Oahu, these closely related long-flowered species are represented by two short-flowered ones, namely *P. hawaiiensis* of the island of Hawaii and apparently Molokai, and *P. lanaiensis* of Lanai." It will be seen that these two proposed species were given only a single descriptive phrase for the two of them, with nothing to separate one from the other. Thus, both of them are without a description or diagnosis, and both are invalid.

Pleomele auwahiensis sp. nov.

Figures 2, 8

DIAGNOSIS HOLOTYPE: Arbores glabrae usque ad 10 m altae sunt, trunco usque ad 40 cm diametro, ramulis 12–15 mm diametro sublaevibus, foliis 19–35 cm longis 8–11 mm latis subcoriaceis ligulatis sed in tertia apicali ad apicem acutum deminutentibus, paniculis solitariis terminalibus cernuis pendentibusque, pedunculo 10–15 cm longo in basi 7–12 mm diametro et bracteas foliaceas paucas ferentibus 8–18 cm longis, paniculis 23–25 cm longis 19–22 cm diametro ramis lateralibus quibusque a bractea 4–7 cm longa pallida sustentibus, ramis lateralibus simplicibus valde adscendentibus, nodis fertilibus a 2 bracteis 4–8 mm longis lanceolatis chartaceis subrubris sustentis, pedicellis in flore 8–12 mm longis sed in fructu 10–16 mm longis, floribus 47–55 mm longis subviridiluteis, basi infundibuliformi anguste perianthium 3–4 mm longo tubo expanso 32–36 mm longo in apice 8–9 mm diametro subcylindrico sed ad basim paulum deminuento paulum curvato, lobis perianthium 13–15 mm longis 4–5 mm latis 1-nervis

anguste oblongis obtusis eis 3 exterioribus cucullatis illis 3 interioribus fere planis, filamentis 11–12 mm longis in basi 3 mm latis cuneatis compressis, antheris paulum exsertis 4.5 mm longis 1.7 mm latis suboblongis pallide luteis, stylo 42 mm longo paulum exserto, stigmatibus vix incrassato paulum trilobato, baccis miniatis plerumque 1-loculatis et 11–13 mm diametro globosis rare 2–3-loculatis et 15–16 mm diametro oblate globosis et paulum 2–3-lobatis rostro stylaris brevi, seminibus 5–8 mm longis pallidis subbadiis laevibus globosis vel dimidio vel tertio globosis.

DIAGNOSIS OF HOLOTYPE: Trees glabrous, to 10 m tall, and the trunk to 40 cm in diameter; branchlets 12–15 mm in diameter, smoothish, gray to brown; leaves in a plume at the branchlet apex, 19–35 cm long, 8–11 mm wide, subcoriaceous, ligulate, but in the outer third tapering to the acute apex, with numerous longitudinal veins, the margins thin, pale, cartilaginous; panicles single, terminal, cernuous, and pendent; peduncle 10–15 cm long, 7–12 mm in diameter at base, bearing a few foliaceous bracts 8–18 cm long; panicle 23–25 cm long, 19–22 cm in diameter, each lateral branch subtended by a pale bract 4–7 cm long; lateral branches simple, ascending at an acute angle; each fertile node subtended by 2 bracts 4–8 mm long, lanceolate, chartaceous, reddish; pedicels in flower 8–12 mm long, striate, green to yellow, in fruit 10–16 mm long; flower buds cuneate sausage-shaped, the lobes imbricate in 3s; flowers 47–55 mm long, greenish yellow; perianth tube contracted to form a narrow funnel-form base 3–4 mm long, the expanded tube 32–36 mm long, 8–9 mm in diameter at the apex, subcylindric, but slightly narrowing toward the base, slightly curved; perianth lobes 13–15 mm long, 4–5 mm wide, 1-nerved, narrowly oblong, obtuse, the 3 outer ones cucullate, the 3 inner ones nearly plane; filaments 11–12 mm long, 3 mm wide at base, cuneate, compressed; anthers slightly exserted, 4.5 mm long, 1.7 mm wide, nearly oblong, pale yellow; ovary 5 mm long, obovoid, pale; style 42 mm long, slightly exserted; stigma scarcely enlarged, slightly 3-lobed; berries carmine, mostly with 1 fertile cell, then 11–13 mm in diameter, globose or seldom

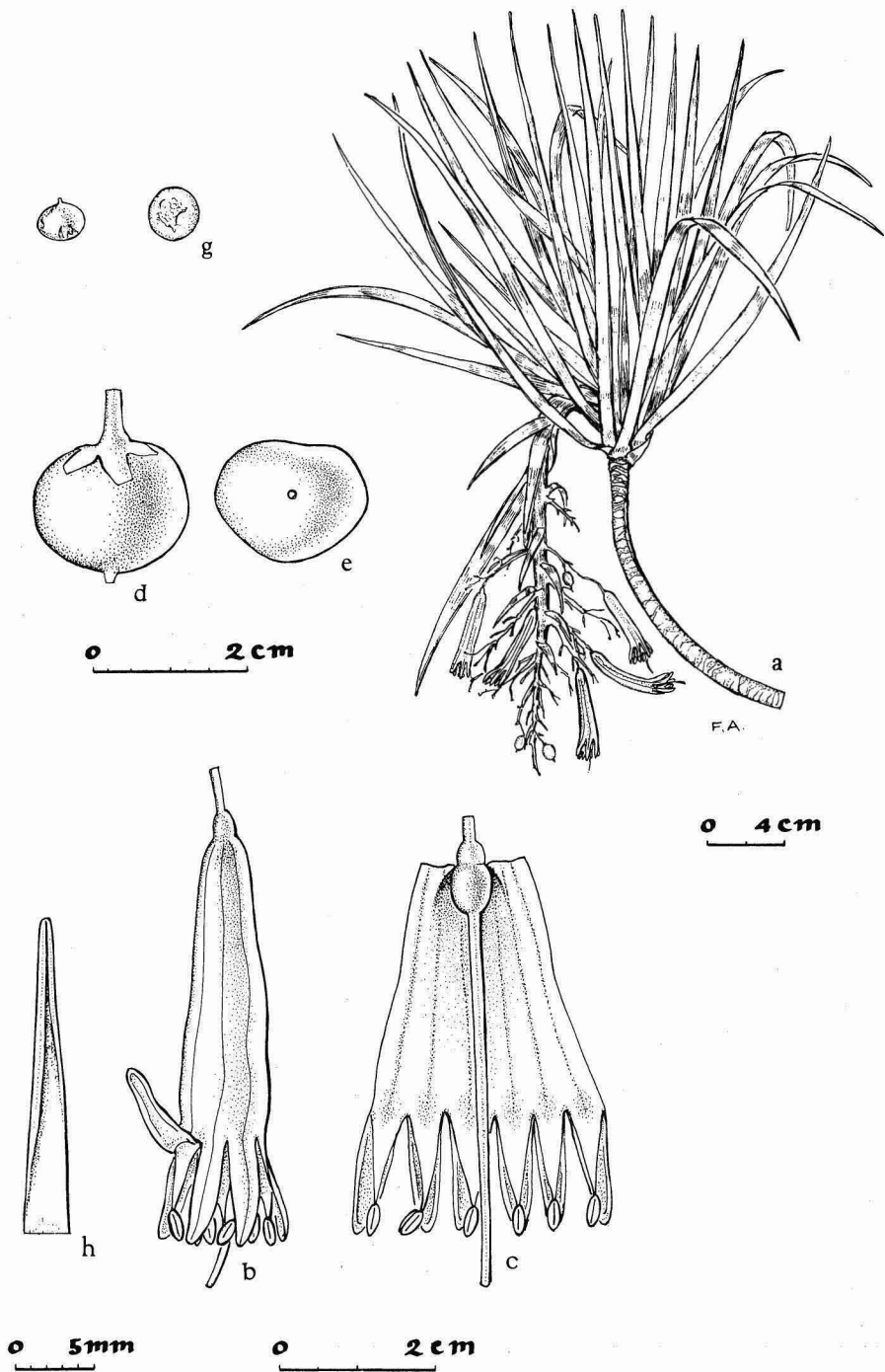


FIGURE 2. *Pleomele auwahiensis* St. John, from holotype. *a*, habit, $\times \frac{1}{4}$; *b*, *c*, flower, $\times 1$; *d*, *e*, drupe, $\times 1$; *f*, *g*, seed, $\times 1$; *h*, leaf tip, $\times 2$.

with 2–3 fertile cells, and then 15–16 mm in diameter, oblate globose and perceptibly 2–3-lobed, with a short stylar beak, and with a thin, juicy mesocarp; endocarp cartilaginous, thin, pale; seeds 5–8 mm long, shaped as a full, half, or third of a sphere, pale brownish, smooth.

EXPANDED DESCRIPTION: Peduncle base 7–16 mm in diameter.

HOLOTYPE: Hawaiian Islands, East Maui, Auwahi, 3800 ft alt., 30 June 1972, *H. St. John* 26,869 (BISH).

SPECIMENS EXAMINED: Hawaiian Islands, Maui Island, Makawao, forested gulch, 3 August 1939, *O. Degener & E. Ordonez* 12,550; Olowalu Valley, 9 May 1920, *C. N. Forbes* 2,290.M; Auwahi, in small ravine, common in remnant forest of scattered *Dodonaea*, *Nothocestrum*, and *Osmanthus*, 4000 ft elev., 8 July 1978, *K. M. Nagata & R. Hobdy* 1,681; Auwahi, head of gulch, in 'a'ā lava, with dry scrub (*Lantana*, *Opuntia*), 2075 ft alt., 30 December 1955, *G. A. Pearsall* 60; Auwahi 3500–4000 ft alt., 7 February 1954, *J. F. Rock*. The above all in (BISH).

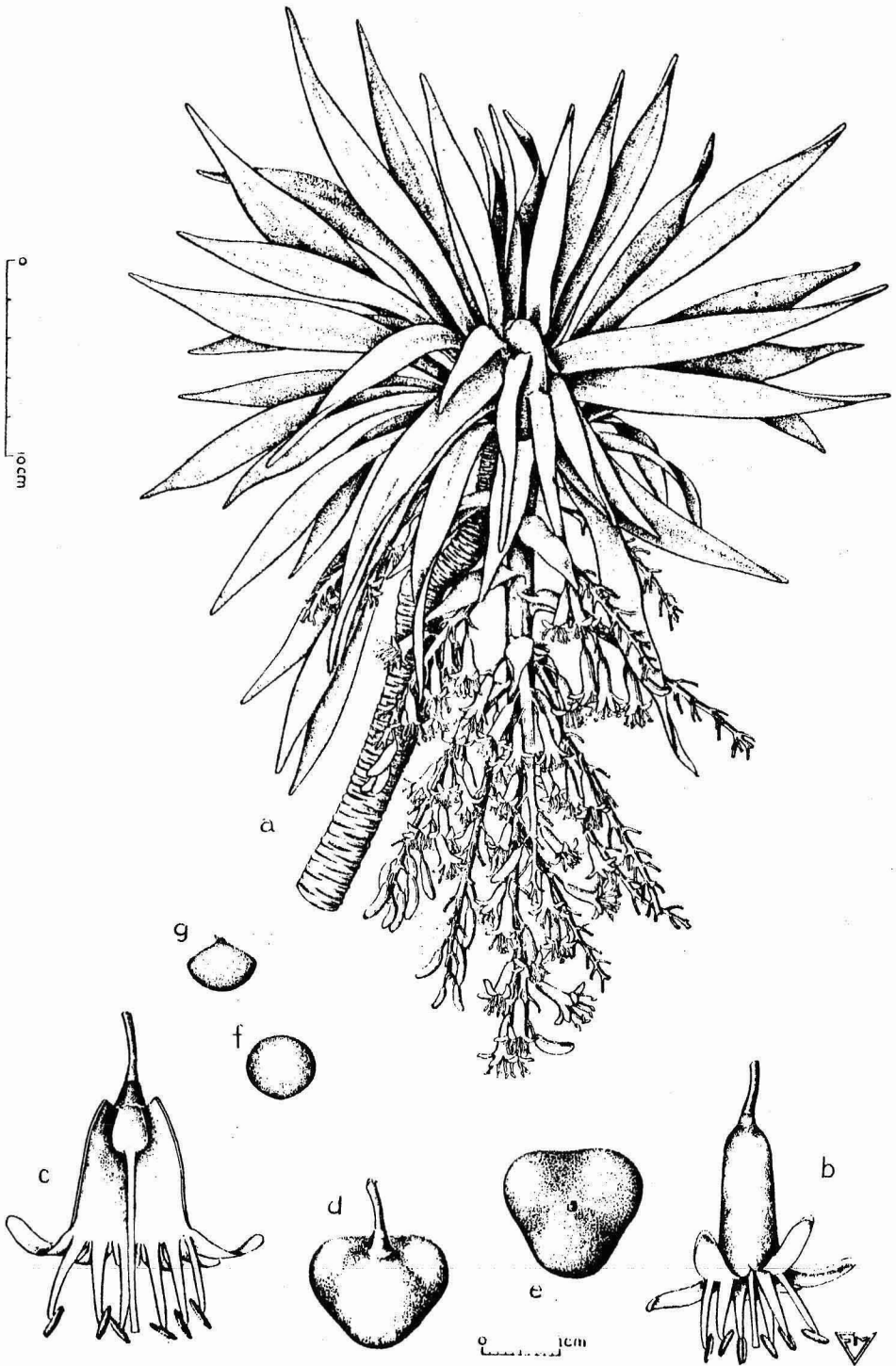
DISCUSSION: A specimen with flowers 48–50 mm long and leaves 10 mm wide agrees with the characters of this species. It has the printed label: Flora Hawaiiensis, Collected by W. Hillebrand and J. M. Lydgate, but no other data (BISH).

Rock (1913: 112) states: "On the lava fields of Auahi [= Auwahi] on the southern slope of Haleakala, the tree is most numerous, but differs in many regards from the specimens found in the forest of Makawao on the same mountain." Makawao is on the wet, windward side of the mountain. The collection from there, seen by the writer, is only with fruit. Until flowers are found in that area, the plant seems best placed with this single Maui species.

Pleomele Fernaldii St. John, Gray Herb., Contrib. CLXV: 39–42, pl. III, 1947; Degener & Greenw., Fl. Haw., Fam. 68: 5/28/56.

Figures 3, 7u–z, A, B, 8

DESCRIPTION: Tree, glabrous, 6–8 m tall, 1.5–2 dm in diameter, erect, the branches few, dichotomous, gray, roughened by the short, raised internodes; youngest branchlets just below the foliage 8–12 mm in diameter, pale yellowish brown, half ringed by the pale, transversely linear leaf scars and roughened by the salient upper ridge of the brownish internode which is 0.3–3.5 mm high; leaves crowded in a terminal plume, 12–38 cm long, 9–25 mm wide, commonly 20 cm long by 12 mm wide, sessile, smooth, subcoriaceous, strap-shaped, slightly narrowed above the amplexant base, which is 1.5–2 cm wide, the upper third gradually narrowed to the callous, long cucullate-tubular, subacute tips, veins parallel, numerous, striate, but no midrib evident, margin thin, pale, cartilaginous; panicles single, terminal, sharply recurved and pendent; peduncle 8–10 cm long, 7–10 mm in diameter at base, stout, with a few foliaceous bracts; panicle 20–35 cm long, 10–20 cm in diameter, each lateral branch subtended by a foliaceous or pale yellowish bract 2–6 cm long, lateral branches simple, diverging at an acute angle; each fertile node subtended by 1–2 bracts 4–8 mm long, chartaceous, white toward the tip, reddish at base; pedicels 3–12 mm long, slender, pendent, pointed at apex; flower buds sausage-shaped and subfalcate, the lobes imbricate; flowers yellowish green or greenish yellow; perianth tube abruptly contracted to a pedicel-like base 1–1.5 mm long, the expanded tube 14–18 mm long, subcylindric but slightly narrowed from the throat to the base, at the middle 5–7 mm in diameter; perianth lobes 8–11 mm long, 1-nerved, the outer three slightly longer and narrower than the inner three, all narrowly oblong, somewhat narrowed to the cucullate tip; filaments attached in the throat, 9–11 mm long, flattened, subulate, descending and exserted; anthers 3.5–4 mm long, linear-oblong, pale yellow; ovary obovoid, green; style 20–23 mm long, filiform, the tip truncate, only slightly enlarged and with 3 scarcely perceptible lobes; berries cherry red, either with 1 fertile cell and then 5–10 mm in diameter or with 2 or 3 fertile cells and then 10–17 mm in diameter, depressed globose, 2- or 3-lobed, with a thin, juicy mesocarp, but drying and



PLEOMELE FERNALDII ST. JOHN

FIGURE 3. *Pleomele fernaldii* St. John, from holotype. *a*, habit, $\times \frac{1}{4}$; *b*, *c*, flower, $\times 1$; *d*, *e*, drupe, $\times 1$; *f*, *g*, seed, $\times 1$.

shrinking; endocarp thin, pale, cartilaginous; seeds 4–8 mm in diameter, shaped as a full, half, or third of a sphere, smooth, pale brown.

HOLOTYPE: Hawaiian Islands, Lanai, south ridge of Holopoe Gulch, Mahana, lower edge of forest, 2000 ft alt., tree 8 m × 2 dm, flowers yellowish green, 6 April 1947, *H. St. John & R. S. Cowan 22,666* (BISH). Isotype (GH).

SPCIMENS EXAMINED: Hawaiian Islands, Lanai Island, west slope of Puu Kilea, decadent forest, 2 March 1952, *O. Degener 22,171*; Kaiholena Ridge, patch of open forest, 10 August 1957, *O. & I. Degener 24,297*; Kaa, 4 April 1914, *G. C. Munro 38*; Kaena, 4 April 1914, *Munro 324*; Kanepuu, Kaa, low dry windswept forest of *Osmanthus sandwicensis*, 1700 ft alt., 5 April 1947, *H. St. John & R. S. Cowan 22,631*; Kapano Gulch, Kalulu, moist wooded gulch, 2200 ft alt., 6 April 1947, *St. John & Cowan 22,651*; southwest ridge of Kaiholena Gulch, Kamoku, common in lower forest, 2200 ft alt., 4 April 1947, *St. John & Cowan 22,595; 22,602*. The above cited specimens are all in BISH.

This species was named in honor of Professor Merritt Lyndon Fernald, of the Gray Herbarium, Harvard University.

Pleomele Forbesii Degener, Fl. Haw., Fam. 68: 8/10/32, with figure; Neal, In Gardens of Hawaii 206, 1965; St. John, Pac. Trop. Bot. Gard., Mem. 1: 84, 1973.

NOM. VERN.: “halapepe”
Figures 7e–l, 8

ORIGINAL DIAGNOSIS: “A *P. aurea* differt praecipue ramis 15 mm crassis et foliis 45 cm longis.”

ORIGINAL DESCRIPTION: “Glabrous 5 meter high tree with smooth grayish bark and upright yellowish 15 mm thick branches conspicuously ridged with leaf scars particularly toward the end. Leaves crowded at the ends of branches, linear, about 45 cm long and 1 cm or less wide, pale green, thick especially along center of under side, with partly clasping scarious-margined base about 2 cm wide. Flowers glabrous, on 1 cm long pedicel, in compact recurved panicle usually 2–3 dm

long. Perianth narrowly campanulate, greenish yellow, somewhat glaucous and partly translucent, with tube 3.5–4 cm long and 1 cm wide; lobes subequal, about 10–15 mm long and together with marginal wings 5 mm wide, linear-lanceolate, slightly keeled toward top. Stamens inserted at or slightly above base of perianth lobes, as wide as the lobes at the base and as long as the lobes, complanate-subulate; anthers sagittate, greenish yellow, 5 mm long; pollen yellow. Ovary obconic, longitudinally trisulcate, 5 mm long and 3 mm wide, yellow; style 3 cm long, thick, greenish yellow; stigma entire, trigonal. Fruit breaking laterally through marcescent perianth, 1-seeded and 10 mm in diameter or 2-seeded and bisulcate or rarely 3-seeded and trisulcate and 15 mm in diameter, on ripening first juicy and dark brown and then bright red and juicy and finally long persistent as wrinkled dried red drupe having thin chartaceous endocarp. Seeds globose, spherical, white, 7–9 mm in diameter.”

SUPPLEMENTARY DESCRIPTION: Tree 5–7 m tall, and up to 30 cm in diameter; leaves 28–45 cm long, 5–10 mm wide; flowers 43–47 mm long, the expanded tube 28–35 mm long, 10–15 mm in diameter at the throat; style 30–50 mm long; panicle up to 51 cm long and 15 cm in diameter.

HOLOTYPE: Hawaiian Islands, Oahu Island, Waianae Mountains, valley east of Kawaihapai, dry bare ridge in decadent forest, 28 September 1930, *O. Degener & K. K. Park* (BISH).

SPCIMENS EXAMINED: Hawaiian Islands, Oahu Island, Waianae Mountains, southern slope of Kahanaiki Valley, dry region, 1 November 1931, *O. Degener, K. K. Park, M. Kwon & N. Krauss 5,550*; small valley containing watering trough, near Kawaihapai, dry shrubby hill, 27 January 1929, *Degener & W. Bush 5,553*; southwest of Dillingham Ranch, Kawaihapai, decadent forest, 12 March 1937, *Degener, Martinez & Salucop 11,120*; middle Palawai Ridge, dry forest, 12 May 1936, *Degener & Takamoto 11,122*; Kapuna, near Mokuleia, decadent dry forest, 24 October 1937, *Degener & F. Salucop 11,506*; Mokuleia, common, 26 April–18 May 1912, *C. N. Forbes*

1,798.0; Kaawa-Kamokunui Ridge, Mokuleia, *Metrosideros* forest, 11 July 1934, *M. L. Grant 7,043*; Schofield Barracks Military Reservation, Wahiawa, mixed mesic forest, 20 February 1977, *P. K. Higashino 5,413*; upper Makua Valley, small hanging valley 50 yd south of cabin at Peacock Flats, with *Sapindus*, *Pisonia*, *Schinus*, 2200 ft elev., 27 May 1973, *K. Nagata, G. Spence & W. Gagné 1,149*; Piko Trail, on ridge between Kukuiala Gulch and second gulch from west end of Mokuleia, dry slope, among *Lantana*, 1000 ft alt., 4 February 1934, *H. St. John 14,095*; Puu Kaua, south branch of north fork of Ekahanui Gulch, lower dry forest, 1850 ft alt., 17 March 1946, *St. John 21,535*; Mokuleia, on dry ridge, 1600 ft elev., 23 October 1932, *O. Swezey et al.* Koolau Range, east fork of Kawela Valley, dry foothills, 1000 ft elev., 5 May 1928, *Degener 5,544*. Oahu, *W. A. Bryan*.

DISCUSSION: *Pleomele Forbesii* Degener is a clearly distinct species, but its original publication was in a state of confusion. Its heading in boldface type was "PLEOMELE FORBESII," printed as was Degener's custom in his *Flora Hawaiiensis*. The common name came next: "Forbes Dracaena. Hala-pepe." Next came in italics "*Dracaena* sp. Degener, Plants Hawaii Nat. Park 95, 1930," and "*Dracaena Forbesii* sp. nov. A *P. aurea* differt praecipue ramis 15 mm crassis et foliis 45 cm longis."

Degener heads it *Pleomele Forbesii* Degener; coins the English name Forbes Dracaena; then describes it as *Dracaena Forbesii* sp. nov., and gives diagnostic differences from *P. aurea*. It could be argued that he was giving alternative binomials for his new species, but it seems evident that at first he thought he had a new species of *Dracaena*, which was the generic name accepted by his predecessors in Hawaiian botany. It seems that later he decided to accept the segregate genus *Pleomele*, and so published *Pleomele Forbesii*, forgetting that in his diagnosis he called it *Dracaena Forbesii* sp. nov. It seems justified to accept his binomial *Pleomele Forbesii*, and to consider the binomial *Dracaena Forbesii*, given with his diagnosis, as a typographical error.

No collection by Hatheway (1952:166) has been found, but it is evident that his *Dracaena*

aurea, which he said was "One of the most common and striking of the trees of the Mokuleia dry forests," would now be called *Pleomele Forbesii*.

Pleomele Halaapepe sp. nov. (ill. as *P. aurea*, Degener, Fl. Haw., Fam. 68:8/10/32).

NOM. VERN.: "hala-a-pepe"

Figures 4, 8

DIAGNOSIS HOLOTYPE: Arbor est, ramulis 25 mm diametro, foliis 60–80 cm longis 20–22 mm latis subcoriaceis ligulatis sed in tertia apicali deminuentibus apice acuto nervis longitudinalibus multis midnervo nullo marginibus laevibus subtiliter cartilagineis, paniculis solitariis terminalibus cernuis pendentibus, pedunculo 21 cm longo 15 mm diametro, paniculo 40 cm longo 20 cm diametro ramis lateralibus quibusque a bractea sustentis, bractea infima 15–19 cm longa lineari-lanceolata foliacea, alteris 3–8 cm longis chartaceis pallidis, ramis lateralibus simplicibus subadscendentibus, nodis fertilibus cum 2 bracteis 4–10 mm longis lineari-lanceolatis subtiliter chartaceis, pedicellis in flore 7–12 mm longis, floribus 48–57 mm longis, tubo perianthorum in basi contracto anguste infundibuliformi et 9–10 mm longo, parte expansa 28–32 mm longa in apice 8–10 mm diametro subcylindrico sed ad basim paulum deminuenti paulum curvato subviridi-luteo et subglaucio, lobis 13–15 mm longis 3–3.5 mm latis oblongis cucullatis marginibus membranaceis, filamentis 13 mm longis subulatis in basi 2 mm latis, antheris 4.5–5 mm longis 1–1.3 mm latis anguste oblongo-ellipticis luteis, stylo 42 mm longo exserto, stigmatibus minime 3-lobato.

DIAGNOSIS OF HOLOTYPE: Tree; branchlets 25 mm in diameter, shining, pale pinkish brown, ringed with stramineous leaf scars; leaves in a plume at the branchlet apex, 60–80 cm long, 20–22 mm wide, subcoriaceous, ligulate, but in the outer third tapering to the acute apex, with numerous longitudinal nerves but no midrib, the margins smooth, thin cartilaginous; panicles single, terminal, cernuous and pendent; peduncle 21 cm long, 15 mm in diameter; panicle 40 cm

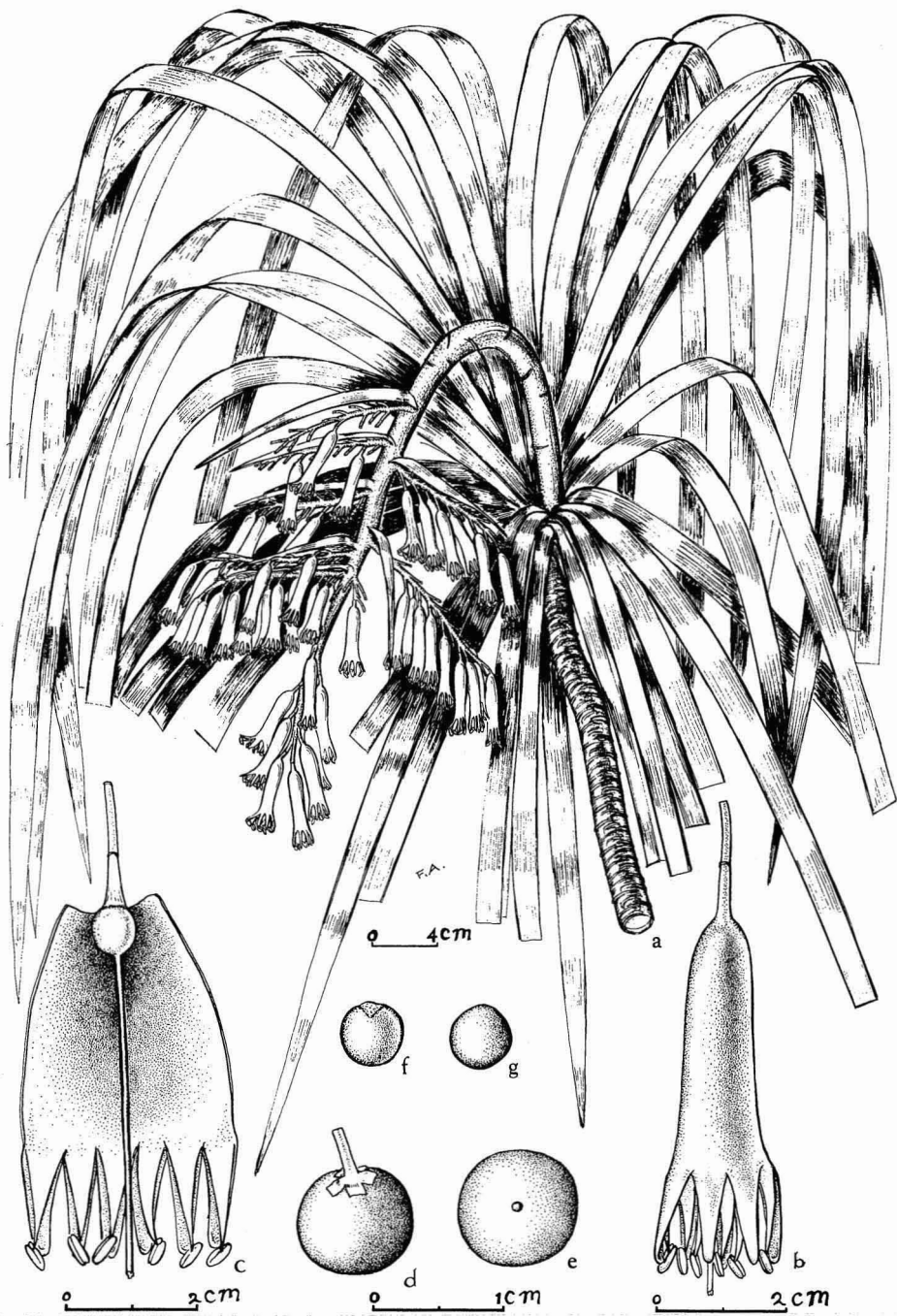


FIGURE 4. *Pleomele Halaapepe* St. John, from holotype. a, habit, $\times \frac{1}{4}$; b, c, flower, $\times 1$; d, e, drupe, $\times 1$; f, g, seed, $\times 1$.

long, 20 cm in diameter, each lateral branch subtended by a bract, the lowest one 15–19 cm long, linear-lanceolate, foliaceous, the others 3–8 cm long, chartaceous, pale; lateral branches simple, ascending at a wide acute angle; each fertile node subtended by 2 bracts, 4–10 mm long, linear-lanceolate, thin chartaceous; pedicels in flower 7–12 mm long, fleshy, shrinking, and striate; flowers 48–57 mm long; perianth tube contracted to form a narrow funnel-form base 9–10 mm long, the expanded tube 28–32 mm long, 8–10 mm in diameter at the apex, subcylindric, but slightly narrowing toward the base, slightly curved, greenish yellow and somewhat glaucous; perianth lobes 13–15 mm long, 3–3.5 mm wide, oblong, cucullate, with membranous margins; filaments 13 mm long, subulate, 2 mm wide at base; anthers slightly exerted, 4.5–5 mm long, 1–1.3 mm wide, narrowly oblong-elliptic, yellow; ovary 6 mm long, obovoid; style 42 mm long, exerted; stigma slightly 3-lobed.

SUPPLEMENTARY DESCRIPTION: Trees 5–10 m tall; branchlets 25–35 mm in diameter; leaves 40–80 cm long, 14–24 mm wide; peduncle 16–24 cm long, 12–20 mm in diameter, with several foliaceous bracts 15–20 cm long; panicle 20–40 cm long, 11–20 cm in diameter; flowers 43–57 mm long, opening when green or slightly yellowish green, turning golden yellow after several days or on drying; berries mostly with 1 fertile cell, then 12–17 mm in diameter, globose, nearly or quite beakless, reddish brown, becoming red; rarely 2–3-seeded, 15–18 mm in diameter, 2–3-lobed; endocarp white, thin cartilaginous; seed 5–6 mm in diameter, globose.

HOLOTYPE: Hawaiian Islands, Oahu Island, Kipapa Gulch, second north branch, Waipio, Koolau Mountains, 13 April 1930, *E. Y. Hosaka 216* (BISH).

SPECIMENS EXAMINED (ALL IN BISH): Hawaiian Islands, all from Oahu Island, east slope, Manoa-Palolo ridge, 1000 ft elev., 14 April 1928, *R. S. Bean*; middle ridge of Niu Valley, moderately dry forest, 4 June 1932, *Degener et al. 5,548*; talus southwest of Waimanalo Landing, 10 April 1936, *Degener et al. 11,121*;

Kaaawa Valley, 30 May 1909, *C. N. Forbes & I. Spalding 1,393.0*; south side of Kawaiiki Stream, near junction with Kawainui Stream, Palama Uka Camp, mesophytic native forest, with *Aleurites*, *Osmanthus*, *Sapindus*, *Diospyros*, 350 m alt., 26 November 1972, *W. C. Gagné & K. Nagata 657*; right ridge, at head of Kalihi Valley, 1 January 1920, *D. W. Garber 118*; Palolo Valley, 1912, *J. F. Rock*; Hahaione Valley, Maunaloa, 2 trees on cliffs, 600 ft alt., 14 December 1929, *H. St. John 10,127*; Waianae Mountains, Palikea, Honouliuli, dry hillside, 1200 ft alt., 23 February 1930, *St. John 10,389*; Waikane, lower woods, 300 ft alt., 21 June 1931, *St. John 11,107*; Manoa Valley, 300–400 m s.m., 18 August 1922, *C. Skottsberg 252*; Waiahole Ditch Trail, 800 ft elev., 27 November 1958, *B. C. Stone 2,707*; Nuuanu Pali, Lanihuli Ridge, 2000 ft alt., 3 May 1959, *Stone 2,766*; Haukulu, Manoa Valley, 27 July 1952, *P. Russell 158*; Manoa Valley, Woodlawn Trail, 26 September 1925, *D. L. Topping 3,232*; Koolau Range, gulch near Puu Kau, Kaunala, 25 January 1948, *G. L. Webster 1,199*; north end Koolau Range, above Pupukea-Paumalu Forest Reserve, 1800 ft alt., 25 January 1948, *R. L. Wilbur 426*.

DISCUSSION: Rock's photograph (1913: pl. 34) of a flowering branch as *Dracaena aurea* was probably made of a collection from Oahu of this new species.

The new epithet is the Hawaiian vernacular name of the species.

Pleomele hawaiiensis Deg. & Deg., Fl. Haw., Fam. 68:9/20/80.

Figures 7a–d, 8

ORIGINAL DIAGNOSIS: "Arbor 14 m alta, a foliis circa 30 cm longis et 2.5–3.0 latis et floriibus 3 cm longis."

DESCRIPTION: Glabrous tree; branchlets 12–16 mm in diameter, ash-colored, with brown encircling leaf scars; leaves in a terminal plume at the branchlet tips, 38–41 cm long, 18–22 mm wide, subcoriaceous, ligulate, but widest at the middle and tapering to an acute apex, this tubular and involute for 6–8 mm, the longitudinal veins numerous, the

margins thin, pale, cartilaginous; panicle single, terminal, cernuous, and pendent; peduncle 10 cm long, 6–10 mm in diameter, trigonous, with foliaceous bracts 10–15 cm long, linear-lanceolate; panicle 19 cm long, 6–8 cm in diameter, ovoid, each lateral branch subtended by a thinner bract 1–7 cm long, lanceolate, long acuminate; lateral branches racemose, ascending; each fertile node subtended by two chartaceous pale bracteoles 6–8 mm long; pedicels in flower 10–13 mm long; flowers yellowish; perianth 38–40 mm long, the tube contracted to form a funnel-form base 3.5 mm long, the expanded tube 28 mm long, 8 mm in diameter at the throat, 8 mm near the base, the lobes 10–11 mm long, narrowly lanceolate, cucullate, with a thick midrib and membranous sides; filaments 7 mm long, subulate; anthers 3.5–4 mm long, oblong with obtuse ends; ovary 5 mm long, globose; style 35 mm long; stigma slightly 3-lobed.

HOLOTYPE: Hawaiian Islands, Hawaii Island, at 1900 ft near Belt Road. Mauka of Pohue Bay, Kau, in $\frac{1}{2}$ acre 'a'ā kipuka with *Metrosideros* and *Maba*, 4 September 1977, O. & I. Degener 34.432 (NY).

SPECIMENS EXAMINED: Hawaiian Islands, Hawaii Island, Hawaii Volcanoes National Park, Poliokiawe Pali, $\frac{1}{2}$ mi east of former Ainahou Ranch east boundary, on slope of pali, 2000 ft elev., 24 April 1975, Don Reeser (BISH).

***Pleomele kaupulehuensis* sp. nov.**

Figures 5, 8

DIAGNOSIS HOLOTYPE: Arbor 5 m alta 38 cm diametro est, ramulis 13–30 mm diametro, foliis 36–38 cm longis 23–27 mm latis subcoriaceis ligulatis sed sensim in dimidio apicali deminuentibus apice acuto et per 8–10 mm involuto marginibus tenuibus pallidis cartilagineis, panicula solitaria cernua pendenti, pedunculo 15 cm longo et in sicco 6–8 mm diametro et cum bracteis circa 15 cm longis foliaceis paucis, panicula 21 cm longa 15 cm diametro, ramulis lateralibus a bractea 5–10 cm longa pallida lanceolata sustentibus,

nodis fertilibus omnibus a bracteolis duobus 4–6 mm longis chartaceis sustentibus, pedicellis in flore 8–12 mm longis, floribus 43–47 mm longis pallide aurantiacis, tubo perianthii per 4–5 mm contractis et infundibuliformibus parte expansa 32 mm longa in apice 12 mm diametro deorsum paulum minori recta, lobis 11 mm longis in basi 4 mm latis deltoideis obtusis cucullatis, filamentis 9–10 mm longis in basi 4 mm latis, antheris lobis perianthii aequantibus 4–4.5 mm longis oblongis ellipsoideis, stylo 40 mm longo exserto, baccis 13 mm diametro ovoideo-subgloboseis acutis, semine 7 mm diametro globoso.

DIAGNOSIS OF HOLOTYPE: Tree 5 m tall, 38 cm in diameter; branchlets 13–30 mm in diameter, stramineous to brownish, shining, ringed with brown leaf scars; leaves in a plume at the branchlet tips, 36–38 cm long, 23–27 mm wide, subcoriaceous, ligulate, but gradually tapering in the apical half, the apex acute and tubular involute for 8–10 mm, with numerous longitudinal veins, the margins thin, cartilaginous, pale; panicle single, terminal, cernuous, and pendent; peduncle 15 cm long, 6–8 mm in diameter when dried, with a few foliaceous bracts about 15 cm long; panicle 21 cm long, 15 cm in diameter, each lateral branch subtended by a pale lanceolate bract 5–10 cm long; lateral branches simple, ascending; each fertile node subtended by a pair of chartaceous bracteoles 4–6 mm long; pedicels in flower 8–12 mm long; flowers 43–47 mm long, light orange; perianth tube contracted to form a narrow funnel-form base 4–5 mm long, the expanded tube 32 mm long, 12 mm in diameter at apex, narrowing slightly downward, straight; perianth lobes 11 mm long, 4 mm wide at base, deltoid, obtuse, cucullate; filaments 9–10 mm long, 4 mm wide at base; anthers equaling the perianth lobes 4–4.5 mm long, oblong ellipsoid; ovary 6 mm long, subglobose; style 40 mm long, exserted; berries 13 mm in diameter, ovoid-subglobose, acute; seed 7 mm in diameter, globose.

HOLOTYPE: Hawaiian Islands, Hawaii Island, Kaupulehu State Park, North Kona, dry forest, on 'a'ā, 700 m alt., 16 March 1973, J. Jacobi 251 (BISH).

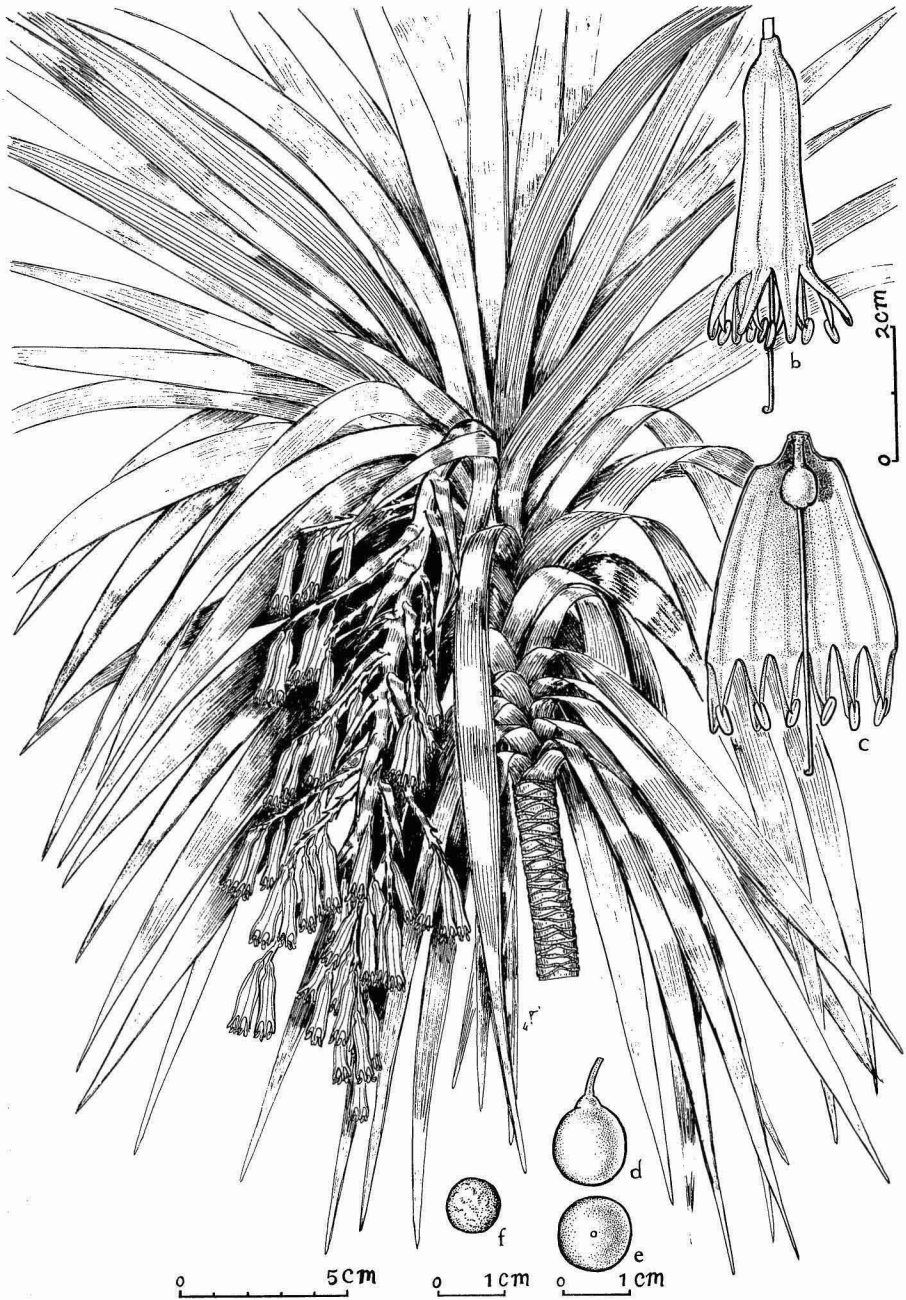


FIGURE 5. *Pleomele kaupulehuensis* St. John, from holotype. *a*, habit, $\times \frac{1}{2}$; *b*, *c*, flower, $\times 1$; *d*, *e*, drupe, $\times 1$; *f*, seed, $\times 1$.

Pleomele konaensis sp. nov.

Figures 6, 8

DIAGNOSIS HOLOTYPE: Ramulae floriferae 9–15 cm longae sunt, eis a bractea 3–4 cm longa lanceolata sustentibus, nodis fertilibus omnibus a 2 bracteolis 4–8 mm longis lanceolatis chartaceis pallidis sustentibus, pedicellis in flore 5–9 mm longis carnisos quando siccis contractis et cum liris longitudinalibus, alabastris rectis oblongo-ellipsoideis lobis in tribus imbricatis, floribus ut videtur pallide viridibus 31–37 mm longis et in basi 3–4 mm longa infundibuliformi contractis, tubo expanso 20–23 mm longo in fauce 7–8 mm diametro subcylindrico recto sed sensim ad basem deminuenti, lobis perianthii 7 mm longis in basi 4 mm latis anguste obtusatis cucullatis, filamentis 5–6 mm longis in basi 3 mm latis obtusatis, antheris 4 mm longis ellipsoideis apicibus retusis, stylo 31 mm longo, stigmatum paulum trilobato.

DIAGNOSIS OF HOLOTYPE: Lateral flowering branches 9–15 cm long, subtended by a pale chartaceous bract 3–4 cm long, lanceolate; each fertile node subtended by 2 bracteoles 4–8 mm long, lanceolate, chartaceous, pale; pedicels in flower 5–9 mm long, fleshy, shrinking to form longitudinal ridges; flower buds straight oblong-ellipsoid, the lobes imbricate in 3s; flowers apparently pale green, 31–37 mm long, contracted to form a funnel-form base 3–4 mm long, the expanded tube 20–23 mm long, 7–8 mm in diameter at the throat, subcylindric, straight, but slightly narrowing toward the base; perianth lobes 7 mm long, 4 mm wide at base, narrowly obtusate, cucullate; filaments 5–6 mm long, 3 mm wide at base, obtusate; anthers 4 mm long, ellipsoid, retuse at each end; ovary 10 mm long, broadly ovoid; style 31 mm long; stigma slightly 3-lobed.

DESCRIPTION: Tree 5 m tall; branchlets 20 mm in diameter, pale brown, ringed with darker leaf scars; leaves in a plume at the branchlet apex, 25–39 cm long, 13–22 mm wide, subcoriaceous, ligulate, but in the outer third tapering to the acute apex, with numerous longitudinal veins, the margins thin, pale, cartilaginous; panicles single, terminal, cer-

nuous, and pendent; peduncle 7–12 cm long, 9–17 mm in diameter at base, bearing a few foliaceous bracts 8–10 cm long, lanceolate; panicle 19–28 cm long, 9–12 cm in diameter, each lateral branch subtended by a pale chartaceous bract 2–6 cm long, ovate-lanceolate; lateral branches simple, ascending at an acute angle; each fertile node subtended by 2 bracteoles 3–10 mm long, lanceolate, thin chartaceous, pale; pedicels in flower 5–9 mm long, in fruit 6–12, fleshy; flowers pale green to yellowish, 31–37 mm long, contracted to form a funnel-form base 3–4 mm long, the expanded tube 20–23 mm long, 7–8 mm in diameter at the throat, subcylindric, straight, but slightly narrowing toward the base; perianth lobes 7 mm long, 4 mm wide at base, narrowly obtusate, cucullate; filaments 5–6 mm long, 3 mm wide at base, obtusate; anthers 4 mm long, ellipsoid, retuse at each end; ovary 10 mm long, broadly ovoid; style 31 mm long; stigma slightly 3-lobed; berries scarlet, turning golden brown, mostly with 1 fertile cell, 10–12 mm in diameter, globose, with a stylar beak; endocarp cartilaginous, very thin, pale; seed 6.5 mm in diameter, globose, pale brown, smooth.

HOLOTYPE: Hawaiian Islands, Hawaii Island, Huehue, 3000 ft elev., May 1932, *A. Meebold* (BISH).

SPECIMENS EXAMINED (ALL IN BISH): Hawaiian Islands, Hawaii Island, Kohala, dry forest, 2400 ft alt., 3 September 1963, *Mrs. Charles Christensen 1*; North Kona Dist., steep dry slopes of Puu Anahulu Ridge near Puu Huluhulu, 2300 ft elev., 2 May 1975, *D. Herbst & G. Spence 5,298*; Puu Waawaa, stone corral, west of ranch houses, 2800 ft alt., 21 July 1946, *Y. Kondo 44*; South Kona, Kapua 2000 ft alt., January–February 1912, *J. F. Rock 10,034*; Manuka Mauka, on loose 'a'ā lava, 1000 ft alt., 26 December 1931, *H. St. John et al. 11,343*; North Kona Dist., 2 mi north of Huehue Ranch House, in scrub on 'a'ā lava, 2100 ft alt., 28 December 1946, *St. John, R. S. Cowan & D. P. Rogers 22,454*; North Kona, Puuwaawaa, dry 'a'ā lava fields, 2000 ft alt., 21–23 June 1948, *G. L. Webster & R. L. Wilbur 1,848*.

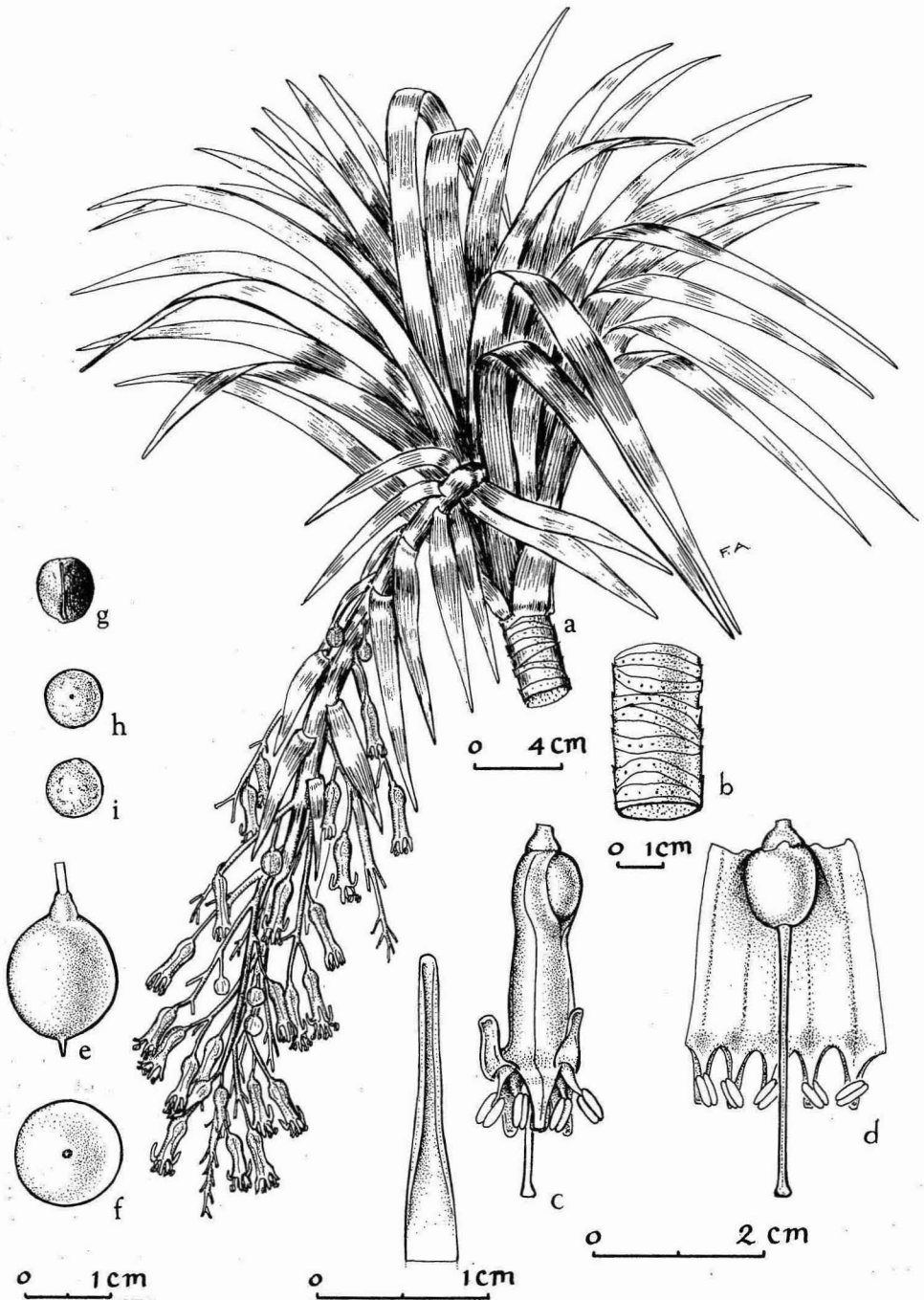


FIGURE 6. *Pleomele konaensis* St. John, from Meinecke III/11/1975. a, habit, $\times \frac{1}{4}$; b, branch, $\times \frac{1}{2}$; c, d, flower, $\times 1$; e, f, drupe, $\times 1$; g, h, i, seed, $\times 1$.

DISCUSSION: The collector of the holotype was Alfred Meebold, an Austrian amateur botanist who made two lengthy visits to the Hawaiian Islands. He left the following comment with this collection: "These flowers are so very different from those on Oahu, that it seems to me the Hawaii tree merits the rank of a separate species much more than some species." It will be seen that the present writer concurs with Meebold's opinion.

Rock's photograph (1913:pl. 36) of this species at Kapua, South Kona, shows a much taller tree, with a stout trunk; and his plate 35 of a fruiting branch may well have been photographed from the same tree. This was perhaps the tree that was 35 ft tall and 3 ft in diameter to which he referred (1913: 109).

The new epithet is formed from the name of the district, Kona, and *-ensis*, the Latin adjectival suffix.

Pleomele Rockii sp. nov.

Figures 7*m*–*t*, 8

DIAGNOSIS HOLOTYPI: Ramulae 18 mm diametro sunt, foliis in apice ramulae congregatis 35–40 cm longis 8–12 mm latis subcoriaceis ligulatis sed in dimidio apicali sensim deminuentibus apice licet acuto marginibus subtilibus obscuris cartilagineis, panicula solitaria terminali cernua pendentique, pedunculo 10–14 cm longo 11–12 mm diametro et bracteas foliaceas paucas 20–22 cm longas ferentibus, panicula 17–32 cm longa 10–17 cm diametro, ramis lateralibus omnibus cum bractea 5–12 cm longa lanceolata pallida, ramis lateralibus simplicibus valde curvate ascendentibus, nodis fertilibus omnibus a bracteolas binas 4–8 mm longas lanceolatas chartaceas pallidas sustinentibus, pedicellis in flore 5–12 mm longis carnosis tarde contractis, alabastris arcuatis tomaculaceis, lobis in tribus imbricatis, floribus 40–45 mm longis luteis in basi 10 mm longa angusta infundibuliformi contracta, tubo expanso 38 mm longo in apice 12 mm diametro proxima basem 6 mm, lobis 10 mm longis in basi 5 mm latis deltoideis obtusis cucullatis, filamentis 6 mm longis in basi 2 mm latis obtusis, antheris 6 mm longis lineari-oblongis, stylo 34 mm longo paulum exserto.

DIAGNOSIS OF HOLOTYPE: Branchlets 18 mm in diameter, pale brown, smoothish, but ringed by crowded leaf scars; leaves in a plume at the branchlet apex, 35–40 cm long, 8–12 mm wide, subcoriaceous, ligulate, but gradually tapering in the outer half, the apex probably acute, with numerous longitudinal veins, the margins thin, dark, cartilaginous; panicle single, terminal, cernuous, and pendent; peduncle 10–14 cm long, 11–12 mm in diameter, bearing a few foliaceous bracts 20–22 cm long; panicle 17–32 cm long, 10–17 cm in diameter, each lateral branch subtended by a pale lanceolate bract 5–12 cm long; lateral branches simple, curved ascending at an acute angle; each fertile node subtended by a pair of bracteoles 4–8 mm long, lanceolate, chartaceous, pale; pedicels in flower 5–12 mm long, fleshy, later shrunken; flower buds arcuate, sausage-shaped, the lobes imbricate in 3s; flowers 40–45 mm long, yellow, the perianth tube contracted to form a narrow funnel-form base 10 mm long, the expanded tube 38 mm long, 12 mm in diameter at the apex, 6 mm near the base; the lobes 10 mm long, 5 mm wide at base, deltoid, obtuse, cucullate; filaments 6 mm long, 2 mm wide at base, obtuse; anthers 6 mm long, linear-oblong; ovary 4 mm long, ellipsoid; style 34 mm long, slightly exserted.

SUPPLEMENTARY DESCRIPTION: Tree 5 m tall, 20 cm in diameter; leaves 23–40 cm long, 8–17 mm wide, bright green above, pale green below, tapering from near the base to the subulate tip; infructescence 31 cm long, 12 mm in diameter at base, cernuous, the apical half fruit bearing; lateral branches 2.5–4 cm long, bearing numerous fruit; pedicels 15–18 mm long, joined at 6–8 mm from the tip, and above the joint fleshy enlarged and twice as thick as below, pink; drupes carmine (Ridgway 1912:pl. 1), subglobose, the 1-seeded ones 11–13 mm in diameter, the 2–3-seeded ones 15–17 mm in diameter, the flesh slightly paler carmine; seeds 8–9 mm in diameter, subglobose, white.

HOLOTYPE: Hawaiian Islands, Molokai Island, Makolelau Gulch, sides of gulch in remnant of mesic forest, with *Diospyros*, *Pouteria*, *Styphelia*, *Dodonaea*, *Sida*, *Lipo-*

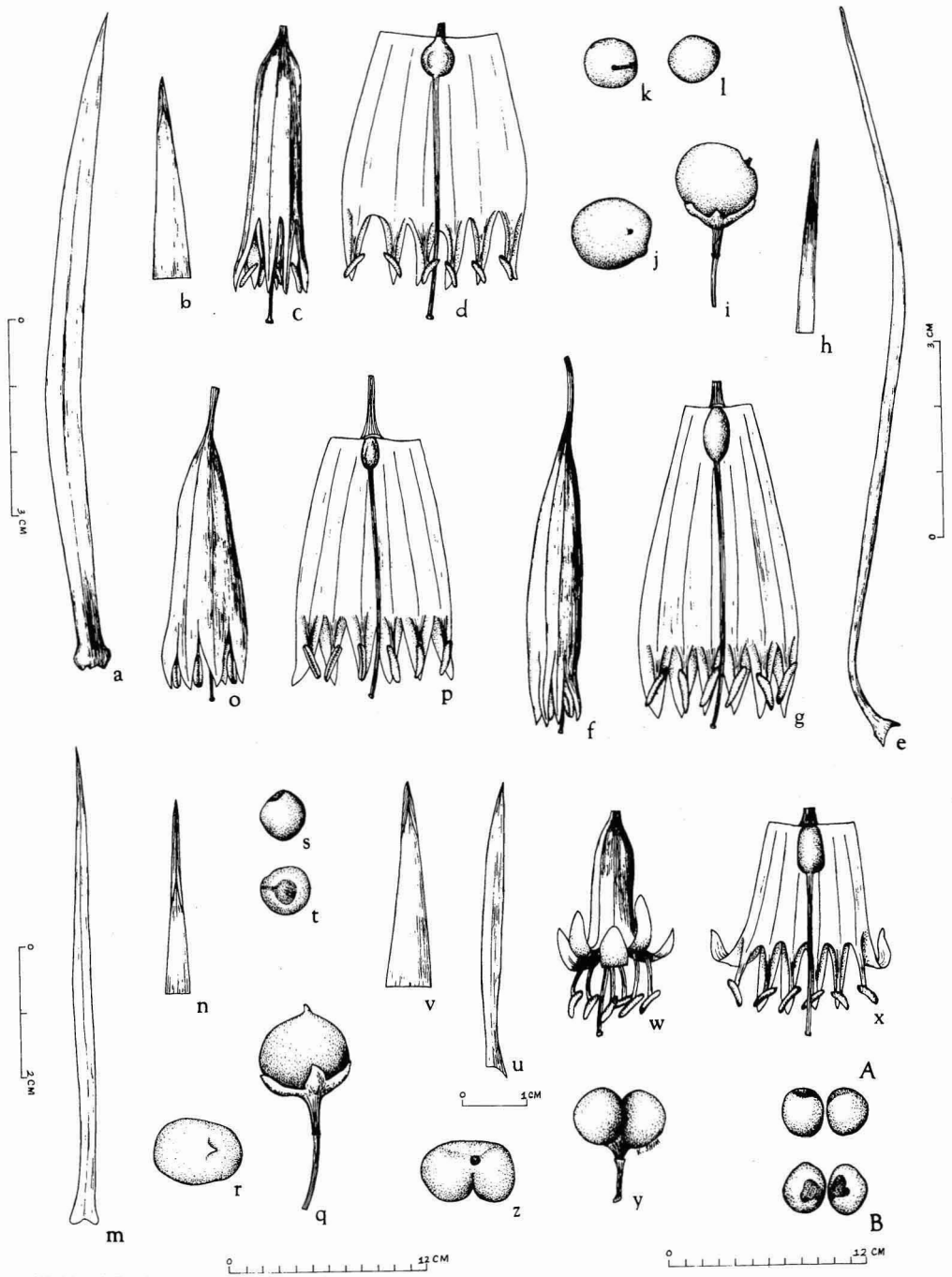


FIGURE 7. *Pleomele hawaiiensis* Deg. & Deg., from Reeser. Poliokiawe. *a*, leaf, $\times \frac{1}{4}$; *b*, leaf tip, $\times 1$; *c*, *d*, flower, $\times 1$. *Pleomele Forbesii* Degener, from holotype. *e*, leaf, $\times \frac{1}{4}$; *f*, *g*, flower, $\times 1$; *h*, leaf tip, $\times 1$; *i*, *j*, drupe, $\times 1$; *k*, *l*, seed, $\times 1$. *Pleomele Rockii* St. John, *m-t* from holotype. *m*, leaf, $\times \frac{1}{4}$; *n*, leaf tip, $\times 1$; *o*, *p*, flower, $\times 1$; *q*, *r*, drupe, $\times 1$; *s*, *t*, seed, $\times 1$. *Pleomele Fernaldii* St. John, *u-x* from holotype. *u*, leaf, $\times \frac{1}{4}$; *v*, leaf tip, $\times 1$; *w*, *x*, flower, $\times 1$; *y*, *z*, drupe, $\times 1$; *A*, *B*, seed, $\times 1$.

HAWAIIAN ISLANDS ASSEMBLED

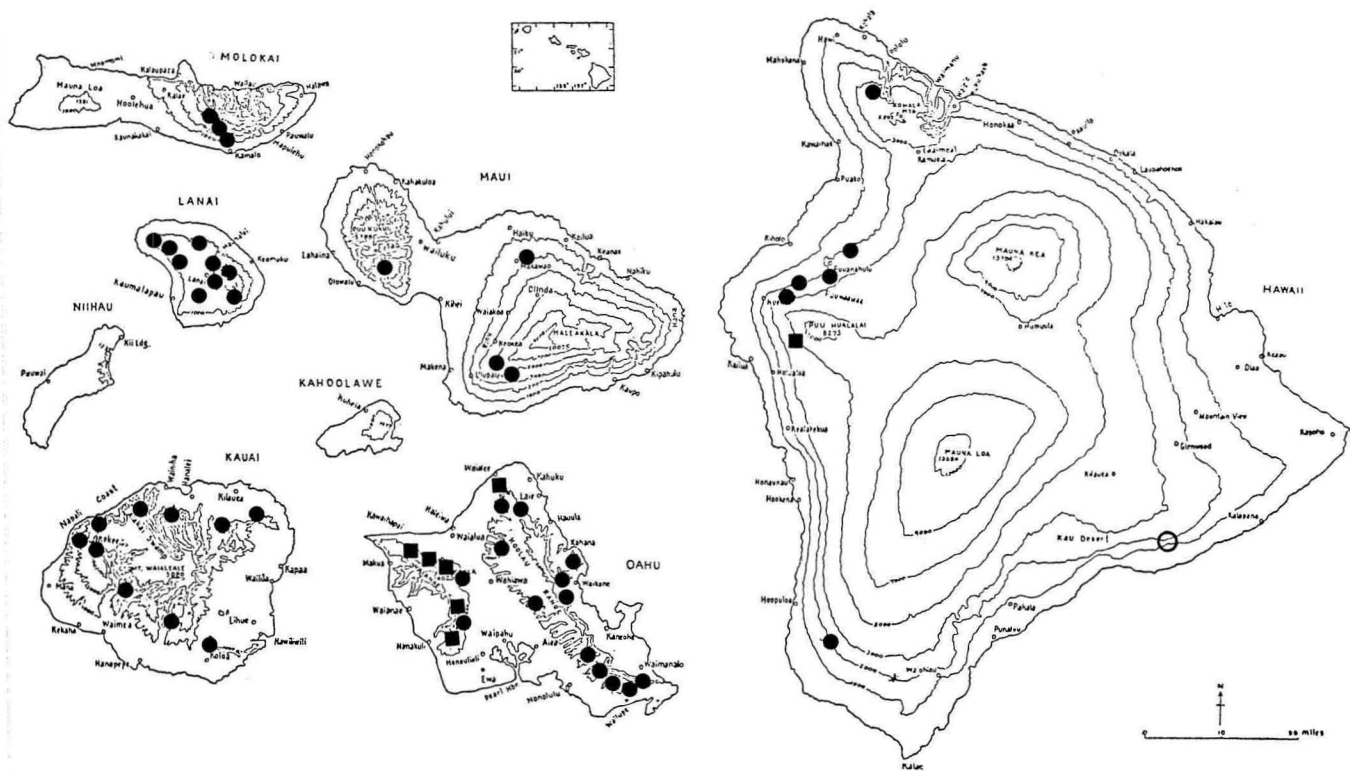


FIGURE 8. Distribution of *Pleomele* species. Molokai, *P. Rockii* St. John; Lanai, *P. Fernaldii* St. John; Maui, *P. auwahiensis* St. John; Kauai, *P. aurea* (Mann) N. E. Brown; Oahu, squares, *P. Forbesii* Degener; solid dots, *P. Halaapepe* St. John; Hawaii, square, *P. kaupulehuensis* St. John; solid dots, *P. konaensis* St. John; circle, *P. hawaiiensis* Deg. & Deg.

chaeta, and *Nothoestrum*, 760 m alt., 15 May 1971, *W. Gagné 673* (BISH).

SPECIMENS EXAMINED: Hawaiian Islands, Molokai Island, Waiakuilani Gulch, west facing slopes in remnant of mesic forest, with *Pritchardia munroi*, *Styphelia*, *Osmanthus*, *Dodonaea stenoptera*, 825 m alt., 25 January 1973, *Gagné* (BISH); Molokai, *J. F. Rock* (BISH); ridge between Maunahui and Kaunakakai and Hanalilolilo, Kawela, open grassy old woods, 2500 ft alt., 20 December 1932, *H. St. John*, *R. J. Baker*, *J. W. Coulter*, *F. R. Fosberg* & *T. G. Yuncker 12,316* (BISH).

Dubious Variety

Pleomele hawaiiensis Deg. & Deg., var. *mauiensis* Deg. & Deg., Fl. Haw., Fam. 68:9/20/80 was based on *Degener & Degener 27,742* from Olinda, Maui. It was stated to differ from the species by having longer leaves and flowers, and with the perianth lobes and stamens more prominent. The holotype has been studied and it shows the leaves 10% longer, but of the same width, and the flowers of the same size and proportions as those of the species. The genus is little known on windward Haleakala, and until better documented, this variety is considered dubious.

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