

ADDITIONS TO THE FLORA OF NIIHAU

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The only recent and extensive account of the vascular flora of the island of Niihau is by Charles N. Forbes, late botanist of the B. P. Bishop Museum.¹

He included in his report the few published records of the early collectors: Lay and Collie in 1826-1827, J. Remy between 1851 and 1855, and Dr. W. T. Brigham in 1865. His principal source of information, however, was the collection made during January, 1912, by J. F. G. Stokes.

Niihau is a low, arid island, only 73 square miles in extent and 1304 feet in height. Its original flora was probably small and it has long been subjected to grazing. Forbes enumerated in his catalog 25 endemic Hawaiian, and 39 indigenous species, as well as 10 of aboriginal introduction, and 41 of recent introduction.

There have been no more recent botanical explorations of Niihau. While working on the undetermined plants in the Bishop Museum, I found two bundles of Niihau plants. It was soon obvious that these were a part of the Stokes collection upon which Forbes's "Enumeration" was based. Most of them were duplicates of species and numbers already in the herbarium. Some, however, were numbers not included there, and a small number were additional records. In this collection some species were represented only by fragmentary or sterile material so that identification was difficult. Besides these, there were several numbers of excellent material that had been left undetermined. These were members of critical groups, as *Lobelia* and *Panicum*. Apparently Mr. Forbes did not name them in time for inclusion in his list, and then the bundle was shelved. Because of the isolation and the relative inaccessibility of Niihau, it seems desirable to print this list of additions to its vascular flora.

Family GRAMINEAE

Cenchrus echinatus Linnaeus.

A single bur, mixed with a collection of *Hydrocotyle* from Kaali.

Digitaria debilis (Desfontaines) Willdenow.

No data.

¹ Forbes, C. N., An Enumeration of Niihau Plants: B. P. Bishop Mus., Occ. Papers, vol. 5, no. 3, pp. 17-26, 3 Pl., 1 map, 1913.

PLATE I.—*Panicum nihaucense* St. John. Type.

Panicum niihauense St. John, new species (Pl. I).

Perennial and apparently caespitose; culms 50-53 cm. tall, velutinous, erect, leafy throughout, the nodes more or less pilose; leaf sheaths 5-10 cm. long, usually exceeding the internodes, densely velutinous with a narrow hyaline margin towards the base, and remotely hispid ciliate; ligule membranous, 0.3 mm. long, ciliate with white hispidulous hairs nearly 1 mm. long; leaf blades 15-30 cm. long, 7-9 mm. wide, stiff, ascending, linear, tapering, densely velutinous, the nerves prominent, the margins involute; panicle 13-17 cm. long, 5-15 mm. in diameter, enclosed in the uppermost sheath, later partly or almost entirely exerted, strict, dense, and narrowly cylindric, the branches all ascending and appressed; the axis and branches velutinous; branches not verticillate; pedicels mostly shorter than the spikelets, velutinous or pilosulous at least along the angles; spikelets 3-4 mm. long, glabrous, with strong raised nerves; first glume 5-nerved, long acuminate; second glume similar, only slightly shorter, 7-nerved; sterile lemma 2 mm. long, 7-nerved, short acuminate; fertile lemma pale, cartilaginous, 1.2-1.5 mm. long, acute; palea similar to and equaling the lemma.

Perenne caespitosum, culmis 50-53 cm. altis velutinis foliosis, vaginis 5-10 cm. longis, ligulis membranaceis ciliatisque, laminis 15-30 cm. longis 7-9 mm. latis rigidis velutinis involutis, paniculis 13-17 cm. longis compactis cylindricis, spiculis 3-4 mm. longis glabris valde nervosis, glumis acuminatis, lemmis 1.2-1.5 mm. longis acutis.

Niihau, foot of Mountain on West side, January, 1912, J. F. G. Stokes. Type in B. P. Bishop Museum.

This collection was determined by C. N. Forbes as *Panicum nephelophilum* Gaudichaud, var. *xerophilum*? and listed by him under that name. It is somewhat similar to that plant, but of the Hawaiian members of the genus it comes closer to the species than to the variety. The two may be distinguished as follows: *Panicum nephelophilum* Gaudichaud has the culms 1-1.5 m. tall, glabrous; the sheaths papillose-pilose or glabrate; the ciliations of the ligule 4 mm. long; the blades flat, glabrous or ciliate on the margin, 8-25 mm. wide; the panicle open, as much as 50 cm. long and 30 cm. wide, the branches ascending, glabrous, or the axils pilosulous; the pedicels glabrous or sparsely scaberulous; the spikelets 2-2.5 mm. long; the glumes equal, the second acute; and the fertile lemma about 1.7 mm. long. *Panicum niihauense* St. John has the culms 50-53 cm. tall, velutinous; the sheaths velutinous; the ciliations of the ligule 1 mm. long; the blades with involute margins, densely velutinous, 7-9 mm. wide; the panicle strict, not over 17 cm. long and 15 mm. wide, the branches erect, velutinous; the pedicels velutinous or pilosulous at least along the angles; the spikelets 3-4 mm. long; the glumes

unequal, the second glume longer, acuminate; and the fertile lemma 1.3-1.5 mm. long. It is a member of the section *Eupanicum* of Hackel or the subgenus *Eupanicum* as it is treated by some recent authors.

In seeking for similar species in this large and intricate genus, I have not found any that appear intimately related. Perhaps the closest is *Panicum amplexicaule* Rudge which is an aquatic or sub-aquatic, and has the culm up to 1 meter tall, decumbent and rooting at the lower nodes, glabrous; the nodes dark; the sheaths ciliate; the blades scabrous on the margins; the spikelets 5-5.5 mm. long; the first glume one-third the length of the spikelet; and the second glume and sterile lemma scabrous nerved. *Panicum niuhauense* St. John, on the other hand, is a xerophyte and has the culms 50-53 cm. tall, erect, velutinous; the nodes not dark; the sheaths velutinous; the blades velutinous; the spikelets 3-4 mm. long; the first glume eleven-twelfths the length of the spikelet; and the second glume and sterile lemma glabrous.

The name is formed from the name of the island Niuhau and the Latin suffix *ensis*, to indicate it as a native of this small, outlying, arid island of the Hawaiian group.

Family CYPERACEAE

Scirpus maritimus Linnaeus, var. **digynus** Boeckeler.

Ponds, southern end.

This sterile material is perhaps the basis of the entry in the list by Forbes:

"*Cyperus* species. Only leaves collected."

Family PIPERACEAE

Peperomia Candollei St. John, new species (Pl. II).

Somewhat fleshy herb; stem decumbent at base, rooting at the lower nodes, then ascending, leafy throughout, hirtellous, 15-25 cm. tall, fleshy, when dried 1.5-3 mm. thick at base; internodes usually 1.5-2 cm. long; nodes swollen; leaves opposite or 1-2 of the median nodes with whorls of 3 leaves; petioles 1-5 mm. long, densely hirtellous with hairs that are brownish when dried; blades 9-30 mm. long, 6-17 mm. wide, fleshy, on both sides densely hirtellous from dark papillose bases, palmately 5-nerved, the main nerves and the reticulate veinlets distinctly visible, elliptic to obovate, obtuse, cuneate or subcuneate at base; spikes terminal or terminal and axillary, solitary or few; peduncles 5-11 mm. long, slender, hirtellous at base, sparsely so above; spikes 4-6.5 cm.

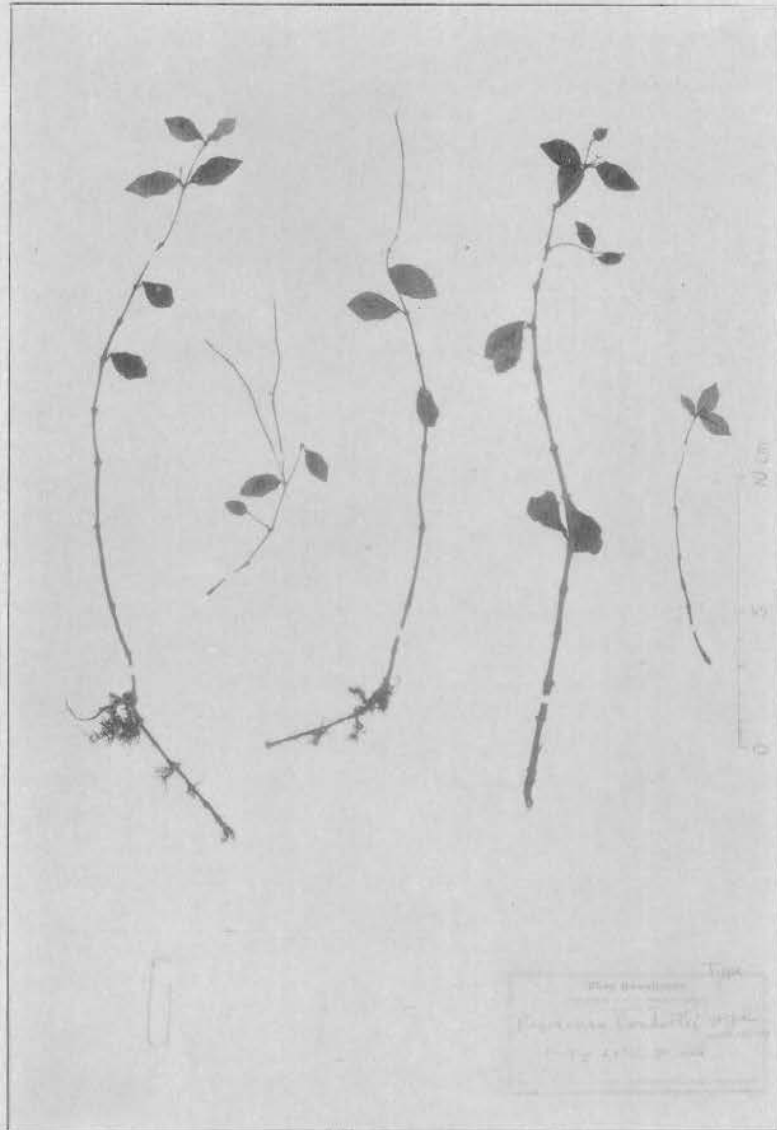


PLATE II.—*Peperomia Candollei* St. John. Type.

long, 0.5-0.7 mm. thick when dried, glabrous, densely flowered, foveolate; bracts 0.7 mm. in diameter, suborbicular, pedicellate, peltate $\frac{1}{3}$ of the distance from the margin; stamens 2; filaments shorter than the anthers, oblong-oval, yellowish, with 2 parallel sacs, 0.2 mm. long; ovary ovoid; stigma terminal minute, undivided; fruit 0.5-0.7 mm. long, broadly ellipsoid to subspherical, densely papillose glandular.

Herba carnosae, caulibus decumbentibus ad basim 15-26 cm. altis, foliis oppositis vel verticillatis, petioli 1-5 mm. longis hirtellis, lamina 9-30 mm. longis 6-17 mm. latis hirtellis 5-nervosis ellipticis obovatisve obtusis cuneatis, amentis 4-6.5 cm. longis 0.5-0.7 mm. latis glabris terminalibus paucis, pedunculis 5-11 mm. longis gracilibus hirtellis, bracteis 0.7 mm. latis suborbicularibus peltatis, staminibus 2, stigmatibus terminalibus integris, baccis 0.5-0.7 mm. longis ellipsoideis papilloso-glandularibus.

Niihau, foot of Mountain on West side, January, 1912, J. F. G. Stokes. Type in B. P. Bishop Museum.

It is not without hesitancy that I publish a new species of the large and intricate genus *Peperomia*. Yet, this collection from Niihau differs in numerous particulars from any other Hawaiian species, as it also seems to differ from any known extra-Hawaiian species. It is closest to *P. Helleri* C. de Candolle, from the nearest island, Kauai. This species has the leaves acute, the upper surface dark glandular papillose and sparsely hispid or glabrate, the lower surface similar but more hispid; the spikes 3-4 cm. long, half longer than the leaves; and the stigma oblique, below the summit of the ovary. *P. Candollei* St. John has the leaves obtuse with both surfaces densely hirtellous from dark papillose bases; the spikes 4-6.5 cm. long, 2-4-times longer than the leaves; and the stigma terminal, minute, undivided. Of the exotic species the most similar is *P. pubicaulis* C. de Candolle, from Lombok, which has the stem about 12 cm. long, hirsute; the leaves 3-nerved, the peduncles 15 mm. long; the bracts about 0.5 mm. in diameter; and the stigma papillose. In contrast, *P. Candollei* St. John has the stem 15-26 cm. tall, hirtellous; the leaves 5-nerved; the peduncles 5-11 mm. long; the bracts 0.5-0.7 mm. in diameter; and the stigma glabrous.

The species is named in honor of the late Anne Casimir Pyramus de Candolle, the monographer of this genus and family. It is curious that no species of *Peperomia* bears this specific name, but he was for so many years the authority on this group that he had almost a monopoly of its study. Hence, it is with pleasure that I give the specific name in honor of de Candolle, the fourth botanist in direct line in the most noteworthy family of botanists.

Family MALVACEAE

Malva rotundifolia Linnaeus.

Talus, north Kona cliffs. (Sterile.)

Family LABIATAE

Ocimum Basilicum Linnaeus.

Foot of plateau, southeast.

Family CUCURBITACEAE

Cucumis dipsaceus Ehrhart.

Talus, north Kona cliff.

Family LOBELIACEAE

Lobelia niihauensis St. John, new species (Pl. III).

Low and probably prostrate shrub; stems solid, gnarled or twisted, branched several times, woody and strong, but on drying shrinking and wrinkling between the leaf-scars, 2-3.5 dm. or perhaps more in length, at base as much as 2.5 cm. in diameter, the young leafy twigs 7-10 mm. in diameter, the bark tan-colored or yellowish brown, with the prominent lunoid leaf-scars scattered along 5-10 cm. of stem, then closely massed along the 2-5 cm. of somewhat swollen leafy tips; leaves 7-14 cm. long, 9-14 mm. wide, subsessile, subcoriaceous, glabrous, linear-oblongate, entire or occasionally minutely undulate towards the tip; flowering branches ascending, remotely leafy below, scape-like and merely bracted for about 1 dm.; raceme 12-15 cm. long, 27-60-flowered, subvirgate, hispidulous; bracts linear-lanceolate, 3-5 mm. long, hispidulous; pedicels 10-25 mm. long, curved downwards, then upwards and to one side, slender, hispidulous; calyx-tube turbinate, at least when dried much constricted below the receptacle, 2-3 mm. long, glabrous or with a few lines of hairs; calyx-teeth 1-2 mm. long, deltoid-lanceolate, sparsely hispidulous; buds falcate; corolla apparently lavender or magenta, 2.5-2.8 cm. long, glabrous, cleft between the upper lobes more than half way to the base, the two upper lobes linear, equaling the tube, becoming reflexed and curled or spiraled, the three lower lobes lanceolate, 6 mm. long; filament-tube stout, 20-23 mm. long, remotely puberulent at base, glabrous above; anthers 7-9 mm. long, glabrous except for the penicillate lower ones; immature capsule turbinate to subglobose, 4 mm. long.

Frutex depressus, ramis furcatis, 2-3.5 dm. longis, foliis subsessilibus glabris subcoriaceis lineari-oblongatis integris subintegrisve 7-14 cm. longis 9-14 mm. latis, racemis 12-15 cm. longis 27-60-floriferis, pedicellis 10-25 mm. longis, corollis 2.5-2.8 cm. longis glabris, antheris superis 7-9 mm. longis glabris, inferis penicillatis.

Niihau, Kaali, January, 1912, J. F. G. Stokes. Type in B. P. Bishop Museum.



PLATE III.—*Lobelia nīhauensis* St. John. Type.

This plant appeared in Forbes's "Enumeration of Niihau Plants," B. P. Bishop Mus., Occ. Papers, vol. 5, no. 3, p. 25, 1913, as *Lobelia neriifolia* Gray, var. ———. However, as shown by the six sheets at hand, this collection represents a new species, one that is most closely related to *Lobelia tortuosa*, instead of to *Lobelia neriifolia*. The following tabular material will indicate the distinctive differences between the two species. *Lobelia tortuosa* Heller has the leaves membranaceous, narrowly lanceolate-oblong, acuminate at apex, serrate nearly to the base, 8-21 cm. long, 10-18 mm. wide, somewhat puberulent above, pale and densely soft puberulent beneath; the bracts subulate, tomentose; the calyx-tube and lobes densely puberulent; and the corolla puberulent. It is endemic to Kauai. *Lobelia niihauensis* St. John has the leaves subcoriaceous, linear-ob lanceolate, glabrous, entire or occasionally minutely undulate towards the tip, 7-14 cm. long, 9-14 mm. wide; bracts linear-lanceolate, hispidulous; the calyx-tube glabrous or with a few lines of hairs, the lobes sparsely hispidulous; and the corolla glabrous.

This list of additional species adds to the flora of Niihau 3 endemic Hawaiian species, 1 indigenous species, and 5 plants of recent introduction.

