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THE STATUS OF THE GENUS *WILKESIA* (*COMPOSITAE*), AND DISCOVERY OF A SECOND HAWAIIAN SPECIES

Hawaiian Plant Studies 34

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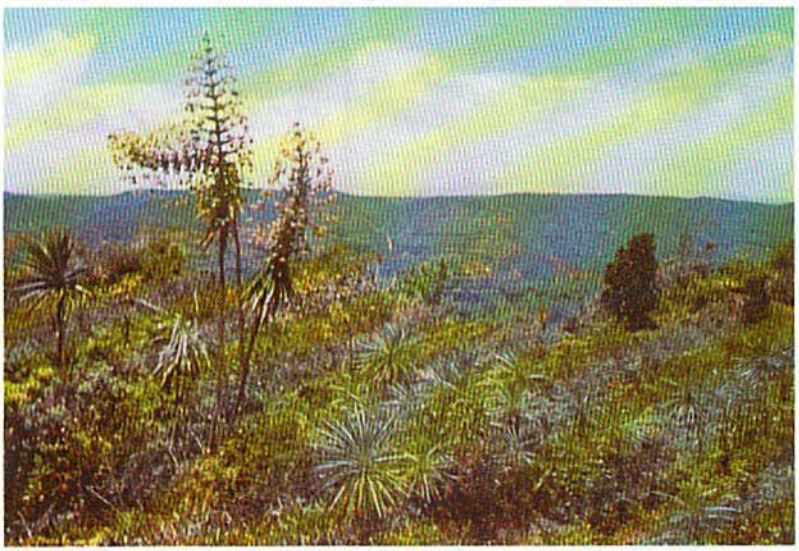


FIGURE 1.—Young and flowering *Wilkesia gymnoxiphium* Gray, or "iliau," at Iliau Nature Loop, Waimea, Kauai. Photo by Ralph E. Daehler.

THE FAMILY *Compositae* is present in the Hawaiian Islands, but the number of genera and species occurring there is not large. However, the local endemic genera include several outstanding shrubby or arborescent ones, such as *Wilkesia, Argyroxiphium, Hesperomannia, Railliardia, Dubautia, Remya, Tetramolopium,* and even *Bidens.*

Wilkesia has long been considered monotypic, with the solitary species *W. gymnoxiphium* Gray, a stately shrub with a great viscid panicle a meter long and with many globose, yellow flower heads (Figures 1, 3, 4*a*, 5, 7). It is known only on the leeward mountain slopes of Kauai Island, in the dry scrub zone, dry forest, or moist forest at from 2,000 to 3,500 feet altitude.

The second species, here described, is found far down the same leeward slopes, at 1,000 feet altitude, on the brink of the sea cliffs, in an open, barren, very arid zone. It has abundant characters separating it from the earlier known species.

SYSTEMATIC TREATMENT

Wilkesia Hobdyi sp. nov. (*Compositae, Galinsoginae*).

Nom. Vern.: "iliau" (Hawaiian Lang.)

Figures 2, 4*b-d*, 5, 6.

Diagnosis Holotypi: Frutex perennis ad 60 cm. altus et ad basim pluriramosus est, caulibus 8-12 mm. diametro teretibus brunneis sublucidis cum cicatricibus annulatis 1-4 mm. separatis, foliis 10-11.5 cm. longis 5-7 mm. latis anguste ligulatis sed ad partem liberam basalem 2-2.3 mm. latam et ad apicem acutam deminuentibus, laminis firmis viridibus in sectione mediali cum 9-17 nervis parallelis in dimidio quoque sed numero inaequali quod nervis in intervallis furcatis vel connatis paginis glabris sed marginibus adscendente albivillosis, foliis in verticillo 7 et in basi per 13-14 mm. connatis et tubulosis, foliis in apice nudo caulis congregatis, inflorescentia terminali 26 cm. longa 12 cm. diametro lanceoloidea vere racemosa cum 7 nodis fertilibus, rhachidi acriter 7-anguloso densiter capitati-hirsutulo albo viscido pilis 1-1.5 mm. longis, nodis cum circulo bracteis connatis eis in nodo infera fere 25 mm. longis et per 5 mm. connatis lobis liberis lanceolatis in parte apicali glabris sed in parte infera et in parte connata glandulosis atomiferis marginibus glabris, nodis superis cum bracteis simulantibus sed illis 15 mm. longis et parte libera lineari-lanceolata, pedunculis 1.5-7 cm. longis simpli-

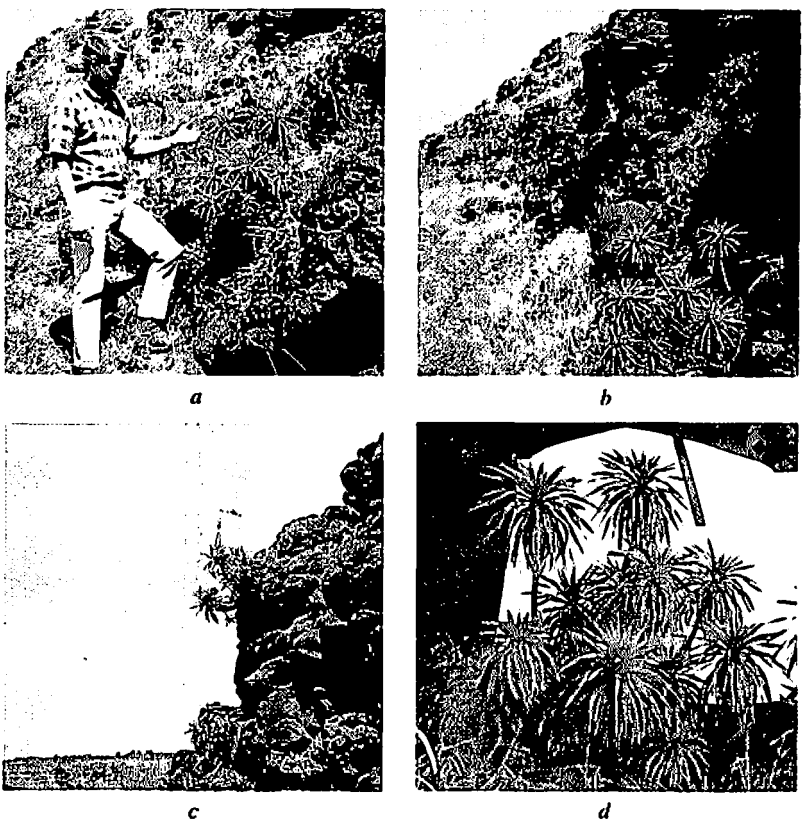
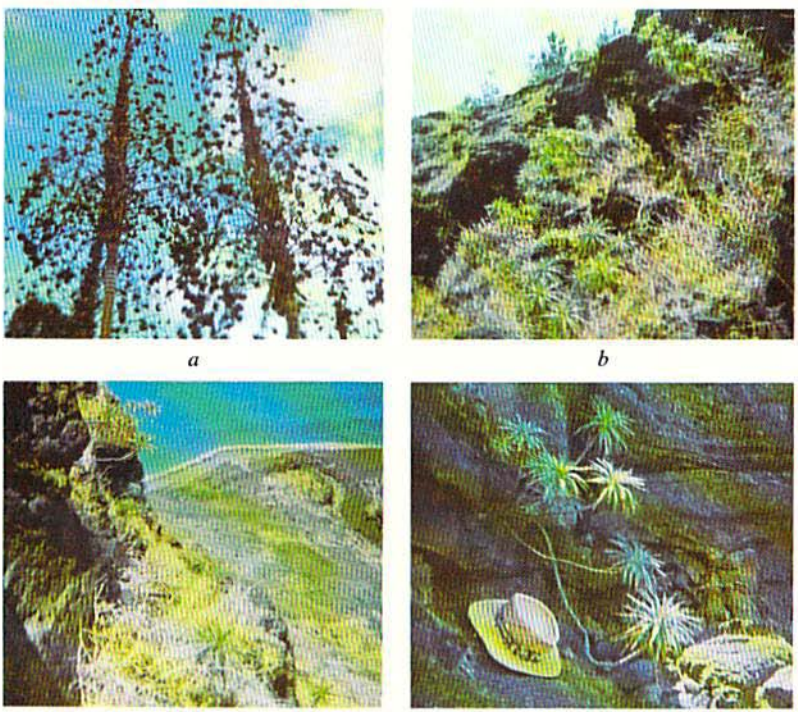


FIGURE 2.—*a*, *Wilkesia Hobdyi* St. John, habitat, and its discoverer, Ralph W. Hobdy, at Polihale, Kauai, Sept. 10, 1969. *b*, the same, habitat. Photo by R. W. Hobdy. *c*, the same. *d*, the same, showing branching habit.

cibus densiter capitati-glandulosis albis viscidis plerumque sine bracteis sed paucis inferis cum bractea 6-8 mm. longa lancei-lineari, capitulis cernuis cum fere 10 bracteis in serie unico connatis, involucrum 8-10 mm. altum cupulatum formantibus, bracteis extra ad apicem et praecipue ad margines capitati-pilosis albis pilis 0.6-1 mm. longis lobis 2-2.5 mm. longis lanceolatis obtusis extra et in marginibus densiter albi-pilosis sed intra glabris parte cupulata capitate glandulosi-puberula viscida, receptaculo convexo et fere 50 floribus discoideis ferrenti eis perfectis et fertilibus et corolla 5 mm. longa basi 2 mm. longa 0.2 mm. diametro anguste tubulosa sed in basi distenta parte supera anguste campanulata 2.2 mm. longa glabra evidente lutea et

a *b*

FIGURE 3.—*Wilkesia gymnoxiphium* Gray. *a*, showing development from vegetative, to bud, to young flowering stages, at Iliau Nature Loop, Waimea, Kauai, June, 1969. Photo by Robert W. Hobdy. *b*, the same for an old fruiting stage.



a *b*

c *d*

FIGURE 4.—*a*, *Wilkesia gymnoxiphium* Gray, old fruiting stage, Iliau Nature Loop. Photo by R. W. Hobdy. *b*, *Wilkesia Hobdyi* St. John, habitat at Polihale, Kauai, June 1969. Photo by R. W. Hobdy. *c*, the same. *d*, the same.

cum 4-5 lobis 0.6-0.7 mm. longis late deltoideis apice albi-hirsutulo cum pilis 0.3 mm. longis, antheris 4-5 et 1.5-2.2 mm. longis 0.2 mm. latis stramineis fere in toto exsertis lineari-oblongis apice latiori ovato 0.3 mm. longo, filamentis et antheris omnibus separatis, stylo 8 mm. longo furcis binis 1.1 mm. longis appendici 0.5 mm. longa compressa in basi bulbosa apice subulato, achaeneis 5.5 mm. longis 0.7 mm. latis suboblancei-linearibus tetragonis sed compressis subviridi-brunneis et adscendente albi-pilosis pilis 0.2-0.3 mm. longis separatis, pappo cum 7-9 squamis 1.3-2 mm. longis rigidis stramineis anguste lanceolatis glabris lucidis marginibus hirsuti-ciliatis albis pilis ad basim deminuentibus eis supra 0.2 mm. longis.

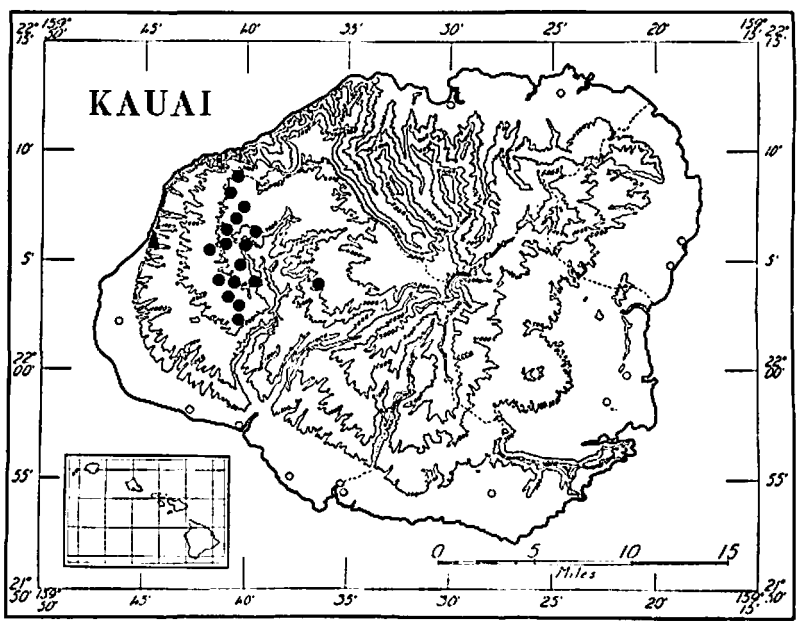


FIGURE 5.—Distribution of the genus *Wilkesia*. Round dots, *W. gymnoxiphium* Gray; triangle, *W. Hobdyi* St. John.

Diagnosis of Holotype: Perennial shrubs, less than 60 cm. tall, branching several times near the base; stems 8-12 mm. in diameter, terete, brown, somewhat shiny, ringed by the darker, annular leaf scars, these 1-4 mm. apart; leaves 10-11.5 cm. long, 5-7 mm. wide,

narrowly ligulate but tapering down to the basal free part 2-2.3 mm. wide, and up to the acute apex, the blades firm, green, at midsection with 9-17 parallel longitudinal veins in each half, but the number not constant, as the veins either fork or unite at intervals, the surfaces glabrous but the margins ascending white villous, the leaves 7 in a whorl and connate at base for 13-14 mm. into a cuneate tube; the leaves all in a terminal plume at the apex of the naked stem; inflorescence terminal on an old naked stem which dies after fruiting, the inflorescence 26 cm. long, 12 cm. in diameter, lanceoloid, strictly racemose, the one seen with 7 flowering nodes; rhachis sharply 7-ridged, and densely white, viscid, capitate glandular hirsutulous, the hairs 1-1.5 mm. long; the nodes with a ring of connate flowering bracts, those of a lower node about 25 mm. long, united for about 5 mm., the free lobes lanceolate, glabrous on outer part, but atomiferous glandular on lower and on united part, the margins glabrous; upper nodes with similar bracts but these 15 mm. long, and the free lobes linear lanceolate; peduncles 1.5-7 cm. long, always simple and unbranched, densely white, viscid, capitate glandular hirsute, mostly bractless, but a few of the lower ones with a 6-8 mm. lance linear bract; heads nodding; discoid bracts forming an involucre hemispheric, 8-10 mm. high, of about 10 bracts in a single series, united almost throughout and cupulate, the outer surface near the apex and especially the margins white capitate pilose, the hairs 0.6-1 mm. long, the free lobes 2-2.5 mm. long, lanceolate, obtuse, densely white pilose on outer surface and margins, but glabrous within, the cupulate part viscid and capitate glandular puberulous; receptacle convex, bearing about 50 disk florets, these perfect and fertile, and with the corolla 5 mm. long, the base 2 mm. long, 0.2 mm. in diameter, narrowly tubular, except for the distended base, the upper part narrowly campanulate, 2.2 mm. long, glabrous, evidently yellow, bearing 4-5 lobes 0.6-0.7 mm. long, broadly deltoid, the apex white hirsutulous with hairs 0.3 mm. long; the 4-5 anthers 1.5-2.2 mm. long, 0.2 mm. wide, stramineous, almost wholly exserted and in age separated, linear oblong, with a slightly broader ovate tip 0.3 mm. long, the filaments and anthers all separate; style 8 mm. long, including the two 1.1 mm. long apical forks; stigmatic appendages 0.5 mm. long, bulbous at base, compressed, bearing a subulate tip; achenes 5.5 mm. long, 0.7 mm. wide, slightly oblance-linear, tetragonous but compressed, greenish brown, with ascending white pilosity, the hairs 0.2-0.3 mm. long, spaced; pappus of 7-9 rigid stramineous scales 1.3-2 mm. long, nar-

rowly lanceolate, the surfaces glabrous and shining but the margins white hirsute ciliate, the hairs shorter towards the base, but the middle and upper ones up to 0.2 mm. long.

Expanded Description: Leaves 7-9 at a node, and 5-8 mm. wide, those of a node connate for 13-22 mm.; inflorescence a raceme 26 cm. long, or even a partial panicle 38 cm. long, the 3 lower nodes

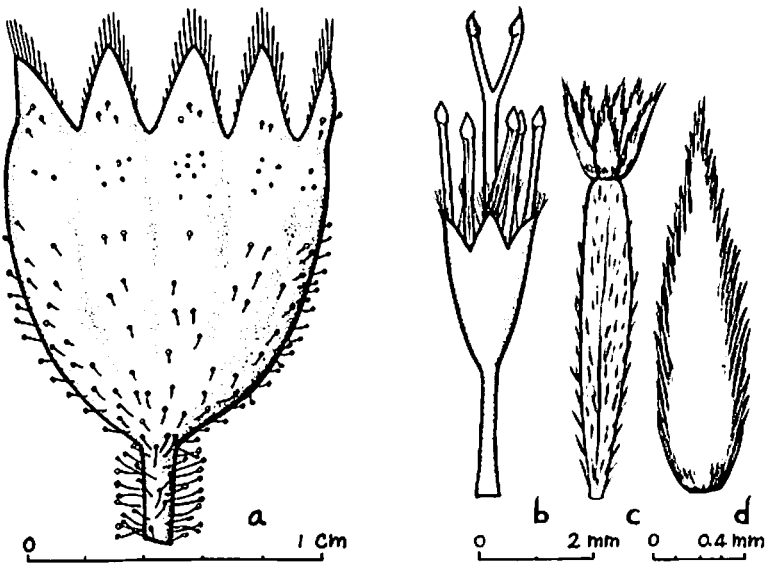


FIGURE 6.—*Wilkesia Hobdyi* St. John. *a*, inner discoid, involucre, × 5; *b*, disk flower, × 10; *c*, achene with pappus × 10; *d*, pappus scale, × 40.

having about half of the peduncles forked, the flowering nodes 7-8, and the middle ones with bracts 2-4 cm. long, their free part glabrous or capitate glandular puberulous on surface and margins; disk florets about 50-70; anthers 2-2.5 mm. long; style 6.5-8 mm. long; achenes 5.5-6 mm. long; pappus scales 6-9.

Holotypus: Hawaiian Islands, Kauai, on arid end of Polihale ridge, 12/16/68, *Robert W. Hobdy 52* (BISH).

Specimens Examined: topotype, same as above, 1,000 ft. alt., Sept. 10, 1969, *R. W. Hobdy 155* (BISH).

DISCUSSION

The description of the foregoing new species in the genus *Wilkesia* needs a justification, since the last monographic study of the group, by D. D. Keck (1936, p. 22) reduced the genus to the synonymy of *Argyroxiphium*. He compared the two old genera, demonstrated that *W. Grayana* Hbd. was intermediate in several characters, but on the whole was best transferred to the genus *Argyroxiphium*. This transfer was made earlier in the same year by Degener, and the writer agrees that it is a better classification. That leaves in *Wilkesia* only the species *gymnoxiphium*, a stately shrub, restricted to the island of Kauai, while all of the species of *Argyroxiphium* are found only on Maui and Hawaii. The presence of ray flowers in the heads of the species of *Argyroxiphium* has long been emphasized, while in *Wilkesia gymnoxiphium* they are absent. Keck indicated (1936, pp. 11-12):

> A series may be arranged on the basis of the number of ray-flowers starting with *Argyroxiphium sandwicense*, which has the most, through *A. virescens* and *A. caligni* with progressively fewer, and *A. Grayanum* with an occasional radiate head to *Wilkesia gymnoxiphium*, which has no trace of a ray flower. . . . In addition to the ray-flower character, the distinctness of *Wilkesia* as a genus had been greatly weakened by a consideration of other characters of first importance.

At no place did Keck state what he considered to be the other important characters that weakened the distinction between the two plant groups. Keck then reduced the monotypic genus *Wilkesia* to the status of a section under *Argyroxiphium*. The writer has re-examined this problem, and gives in Table 2 the significant differences that he finds between the two genera. Besides the heterogamous or homogamous character, which is of value, there are others in the true involucre, the discoid cupulate inner involucre, disk corolla shape, achene pubescence, phyllotaxy and pubescence of the leaves.

There has been no general agreement among the students of the Hawaiian flora that Keck's classification of the two genera was the best one. It was followed, without discussion, by Fosberg (1948, p. 115) in his table of origins of Hawaiian genera. Others have rejected it. Skottsberg (1944, p. 511) said, "After the removal of *W. grayana, Wilkesia* stands out as a well-marked genus, not only as a subgenus (Keck l. c.) of *Argyroxiphium*." Degener described, illustrated, and accepted *Wilkesia* in 1932, then reprinted and maintained it in 1946 (Degener, 1932, 1946), subsequent to Keck's revision.

FIGURE 7.—Flowering *Wilkesia gymnoxiphium* Gray, at Iliau Nature Loop, Waimea, Kauai. Photo by Ralph E. Daehler.

SUMMARY

The author's conclusion is that *Wilkesia* is an abundantly characterized, very distinct genus. To it is now added a second species, here described, also from Kauai, Hawaiian Islands.

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TABLE 1

COMPARISON OF THE TWO *Wilkesia* SPECIES

Wilkesia gymnoxiphium	*Wilkesia Hobdyi*
Stem simple, unbranched, 3-5 m. tall	Stems less than 0.6 m. tall, many-branched
Internodes 2-17 mm. long	Internodes 1-4 mm. long
Leaves 10-20 at each node, 20-43 cm. long, 4-12 mm. wide, those of each whorl connate at base for 18-62 mm.	Leaves 7 (-9) at each node, 10-11.5 cm. long, 5-7 (-8) mm. wide, those of each whorl connate at base for 13-14 mm.
Panicle 60-100 cm. long, with 10-20 nodes, the middle nodes with bracts 8 cm. long, the free lobes with margins villous ciliate	Raceme 26 cm. long (-38 cm. long and then partially paniculate), with 7 (-8) flowering nodes, the middle nodes with bracts 2 (-4) cm. long, the free lobes glabrous (or capitate glandular puberulous on surface and margins)
Peduncles (or rays) 5-30 cm. long, and near the tip once or twice forked, capitate glandular puberulous, the hairs 0.3-0.8 mm. long.	Peduncles 1.5-7 cm. long, undivided, capitate glandular hirsutulous, the hairs 1-1.5 mm. long
Disk florets 120-225; corolla 6-7 mm. long, 4-toothed; anthers 3 mm. long; style 10 mm. long; achenes 6-7 mm. long; pappus scales 9-12, and 1-2.6 mm. long.	Disk florets about 50 (-70); corolla (4.5-) 5 mm. long, 4-5-toothed; anthers 2.2 mm. long; style (6.5-) 8 mm. long; achenes 5.5 (-6) mm. long; pappus scales (6-) 7-9, and 1.3-2 mm. long.
Flowering in June and July, fruiting a month later.	Flowering September to October, or even in December.

TABLE 2

COMPARISON OF *Argyroxiphium* AND *Wilkesia*

Argyroxiphium	*Wilkesia*
7 species, Maui and Hawaii	2 species, Kauai
Leaves single, alternate, in close spiral phyllotaxy, from white silvery to gray or greenish pubescent (but in *A. Grayanum* early glabrate and the bases connate for a few mm.)	Leaves 7-20 at each node, whorled, united at base into a sheath, glabrous except for the villous ciliate margins
Heads heterogamous (or mostly so)	Heads discoid
Bracts of the true involucre in one series, free or partly connate below	True involucre lacking
Discoid bracts forming a second inner series, more or less connate to form a cup	Discoid bracts united to near the tip into a cupulate, viscid involucre
Disk corollas tubular below, only slightly widened to the throat	Disk corolla tubular below, the upper half narrowly campanulate
Achenes glabrous	Achenes pubescent

* Volume XXIV of the Occasional Papers is published in honor of Edwin H. Bryan, Jr., whose service to Bishop Museum began in 1919. He was for many years Curator of Collections, and at present is Manager of the Museum's Pacific Scientific Information Center. Several of the papers in this volume were read at a Symposium, held at the Museum on April 13, 1968, honoring Mr. Bryan on the occasion of his 70th birthday.