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Nomenclator and Review of *Phyllostegia* (Lamiaceae)

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ABSTRACT. In 1987 Harold St. John published 93 names in Hawaiian *Phyllostegia* and 1 in Tonga; only 3 of them were accounted for in the most recent taxonomic revision of the Hawaiian species by Wagner et al. in 1990. The types of these names are analyzed, and the names are here incorporated into the current classification. Only five of the new Hawaiian species are here recognized as distinct (*P. kaalaensis, P. kahiliensis, P. micrantha, P. pilosa, and P. warshaueri*), and one of the new combinations is accepted here (*P. velutina*), with the remainder here placed into the synonymy of other species. Five of the names were not validly published. The complete nomenclature of *Phyllostegia* at the species level and below is presented, including 181 names. A total of 32 Hawaiian *Phyllostegia* species are currently recognized, including the 5 recognized St. John species published in 1987 and 2 others, *P. haliiakalae*, resurrected from the synonymy of *P. mollis*, and *P. renovana*, discovered in 1989. The five Hawaiian species not treated in the 1990 revision are briefly characterized and discussed. Notes adding information on taxonomy, distribution, and population and conservation status not included in the recent treatment also are given. The genus also is known from Tahiti and Tonga, each with one species; the nomenclature for these two species is included, but they are not evaluated in this paper.

In late 1987 and early 1988, as the final manuscript for the *Manual of the Flowering Plants of Hawai‘i* (Wagner et al., 1990) was about to be sent to the publisher, St. John published an unfortunate, hurried series of papers, mostly cited in Wagner et al. (1990), in which he published about 880 manuscript names. Over a period of more than 30 years, he had developed lengthy manuscripts with accompanying detailed illustrations for a number of genera in a style similar to his treatment of O‘ahu *Cyrtandra* (St. John, 1966), but few of them had been published. St. John published the new taxa and combinations from all of these manuscripts in *Phytologia* and in a series of privately published papers, providing little more than a brief Latin diagnosis and an abbreviated (and sometimes partly erroneous) mention of the type. This has had serious consequences: errors in citation of specimens, the use of a name more than once in the same genus (often even in the same paper), and the use of the same specimen as the type of more than one name. More importantly, he did not incorporate the taxa into a carefully evaluated taxonomic system. Now, after nearly 10 years, most of the approximately 880 names (including combinations) have been analyzed.

This is the first of a series of papers analyzing the names published in 1987 and 1988 by St. John, in which the nomenclature is evaluated and the taxa are incorporated into current classifications. The second paper will be on names in the Cucurbitaceae (Wagner & Shannon, 1999). Additional papers in this series will deal with names in *Stenogyne* (Lamiaceae), *Cyrtandra* (Gesneriaceae), and the special problems of the not valid and illegitimate names. St. John names in Campanulaceae published in 1987 and 1988 have been studied by T. Lammers (see Lammers, 1998, and papers cited therein).

Although all names for Hawaiian angiosperms published through 1986 and a few from 1987 and 1988 were included by Wagner et al. (1990) in the *Manual of the Flowering Plants of Hawai‘i*, a rigorous assessment of them has never been done. The nomenclatural database, initiated in 1983 as part of the Hawaiian Flora Project at Bishop Museum, has been expanded to include all of these additional names by St. John. It will be available on the WWW in the future.

In analyzing the nomenclature for the genus *Phyllostegia* (Lamiaceae) a number of problems were discovered. These included names not validly published, errors in original publications, and typification problems. Only 3 of the 93 Hawaiian names published by St. John (1987) were incorporated into the taxonomy of the genus as treated in the most recent revision (Wagner et al., 1990). Presented here is a complete nomenclator of 181 names in *Phyllostegia*, including a number of not validly published names. Since the emphasis of this paper is on nomenclature rather than classification.
or phylogeny of the group, the accepted names are arranged alphabetically. Of the 93 Hawaiian taxa (78 new species, 3 new varieties, and 12 new combinations) described by St. John, 5 of the new species are here recognized as distinct (P. kaalaensis, P. kahiliensis, P. micrantha, P. pilosa, and P. warshaueri), with P. warshaueri being adopted in the 1990 revision by Wagner et al. In addition, one of the new combinations is accepted here (P. celutina), which was also adopted in the Wagner et al. revision; the remainder are here placed into the synonymy of other species. Five of the names were not validly published.

The complete nomenclature of Phyllostegia at the species level and below is presented. A total of 32 Hawaiian Phyllostegia species are currently recognized, including the 5 recognized St. John species published in 1987 and 2 others, P. haliakalae, resurrected from the synonymy of P. molla, and P. renovans, discovered in 1989. The five species (P. kaalaensis, P. kahiliensis, P. micrantha, P. pilosa, and P. renovans) not treated in the 1990 revision are briefly characterized and discussed. Notes adding information on taxonomy, distribution, and conservation status not included in the recent treatment also are given, especially for the 14 taxa listed as endangered since 1987, and others I believe to be at risk. The genus also occurs in Tahiti and Tonga, each with one species; the nomenclature for these two species is included, but they are not evaluated in this paper.


Phyllostegia konaensis H. St. John, Phytologia 63: 176. 1987. Syn. nov. TYPE: Hawaiian Islands [U.S.A.]. Hawai'i: Hanehane, Kona, a few miles SW of Pu'uwai'a'wa'a, 16 June 1911, C. N. Forbes 183a.H (holotype, BISH-53371). St. John used a portion of Forbes 183.A.H. and added "a" to the collection number; the other portion of this collection was published as the holotype of P. decumbens and Stenogyne adpressa. Neither of these names is validly published under ICBN Art. 34.2 (Greuter et al., 1994).


The range of Phyllostegia ambigua is expanded on the island of Hawai‘i somewhat with the addition of the types placed here to include Kilauea Volcano, the Kohala Mountains, and at least until 1911 Hualalai in addition to Mauna Loa. It also occurs on East and West Maui.


Phyllostegia bracteata historically occurred at a number of widely separated localities on East and West Maui, but is now quite rare with apparently only a few populations still extant. It has only been collected a few times this century, and was most recently collected in 1992 (Waikamoi, East Maui, Wood et al. 1623, NY, PTBG, US). According to J. Lau (pers. comm. 1998) there are several extant populations, including one along the Waikamoi Flume road, and another on the Waikamoi Flume, Kipahulu Valley and the adjacent Manawainui. He estimated there are most likely a number of unreported populations since there is a lot of wet forest habitat on East and West Maui, and it is in relatively good shape.


Phyllostegia brevidens was considered to be extinct, because it was known from only two collections made in the mid to late 1800s (Wagner et al., 1990). It has been recently discovered on East Maui in Kipahulu Valley, and rediscovered on Hawai‘i (type of P. polyantha). It is apparently known from only a few populations and probably should be considered endangered. These collections, at least one of which I earlier determined as P. ambigua, did not completely fit the description of P. brevidens provided by Wagner et al. (1990). They appear to be better accommodated within a somewhat emended P. brevidens than in P. ambigua, where they did not fit the description provided by Wagner et al. (1990) in the more numerous flowers per verticillaster (14–30), glabrate in the upper part and densely hisurate on lower stems, smaller calyx 4–6 mm long, and the nearly obsolete calyx lobes (on Maui with lobes up to 1.8 mm long).

Specimens examined. HAWAIIAN ISLANDS [U.S.A.].


Phyllostegia mollis Bentham var. skottsbergii Sherff, Field


Phyllostegia electra has been collected at many localities over the past decade. It is not common anywhere, but has a wide, scattered distribution in mesic and wet forest over much of Kaua‘i. It is probably the most commonly collected species of the genus on Kaua‘i. It has a partly overlapping distribution with P. helleri, with which it is sometimes confused, but differs in its short-hispidulous pubescence, the trichomes 0.1–0.3(–0.5) mm long, and usually some of the trichomes are gland-tipped. It is probably most closely related to P. pareflora.


Phyllostegia floribunda is considered to be rare, known from a few scattered sites; it was most recently collected in 1982 and again in 1991 behind the Volcano Village dump (Flynn 761, PTBG, and Wood et al. 505, PTBG not seen), and in 1982 between Ka‘awali‘i and Kawaihahahalii Streams (type of P. axillaris). J. Lau (pers. comm. 1998) indicated that extant populations are known from Puna District (couple of sites in Pu‘u Maka‘ala; Kahaualea; couple of places on the East Rift Zone; and Volcano Dump), North Hilo District (several locations in Laupahoehe), and South Kona District (Kukuio-pae).

This red-flowered species, along with P. knudsenii and P. waurana, was placed in Phyllostegia sect. Lateriflorae A. Gray by Sherff (1935). The same delimitation was followed by Wagner et al. (1990). Based on the ample material of the white-flowered species now at hand I exclude them from the section, because they have both axillary and terminal inflorescences, which was the only character to distinguish the section.

6a. Phyllostegia glabra (Gaudichaud) Bentham var. glabra


Islands [U.S.A.]. Kaua'i: Waimea, 1000 m, 1910, U. Faurie 896 (holotype, BISH-510030). The label may not be correct as to island because this species is otherwise unknown from Kaua'i. Although the Degener did not indicate where the type was located, the leaf description closely fits the BISH collection. Part 2 was published on 8 Aug. 1960.


Phyllostegia glabra var. lanaiensis is listed as endangered (Herbst, 1990, 1991). It is historically known from Lana'i/hale, but was definitely known only from Kaoholena Gulch (Herbst, 1991), and was last observed in the 1980s by R. Hobdy in a gulch feeding into the back of Maunalei Valley, another drainage from Lana'i/hale (Herbst, 1990, 1991); however, this observation appears to have actually been of P. glabra var. glabra (J. Lau, pers. comm. 1998).


Phyllostegia makauwaeensis H. St. John, Phytologia 63: 177. 1987. Syn. nov. TYPE: Hawaiian Islands [U.S.A.]. Maui: East Maui, Makawao, J. M. Lydgate s.n. (holotype, BISH-53689). The type is possibly a mixed collection; a densely villous sterile stem represents either another species or a juvenile shoot. The label on this collection is made only by Forbes for Hillebrand and Lydgate material, which gives both as collectors and was used on many collections made exclusively by Lydgate.


This species was treated as Phyllostegia immutata by Wagner et al. (1990), but examination of the type of P. haliakalae showed it to be the same taxon. It was historically known from Lana'i (last collected in 1928 near Maunalei, Munro 247, BISH), East Maui (Wagner et al., 1990), and from Molokai (Degener 5395 in 1928, BISH); it is apparently extinct as it has not been collected in 70 years.


Phyllostegia helleri was listed from only Koke'e Plateau and Mount Kahili by Wagner et al. (1990). The Mount Kahili collections have been excluded here as P. kahilliensis. Phyllostegia helleri appears to be closely related to P. wawura, now that more material is available of the latter species, but differs in its shorter hirtellous pubescence, the trichomes 0.5–1 mm long, strictly terminal inflorescences, shorter pedicels (1–3–5 mm long, and calyx veins relatively inconspicuous. It is known from the Koke'e Plateau and appears to be extinct, as it has not been collected since 1916 (Hitchcock 15367, US, Oct. 1916, Rock s.n., BISH).

10. Phyllostegia hillebrandii H. Mann ex Hil-

Phyllostegia hillebrandii is known only from the two collections cited above and is almost certainly extinct (Wagner et al., 1990).


Phyllostegia hirsuta, although historically known from the central Wai’anae Mountains (from Kuku’ula (Pahole) Gulch to North Palawai Gulch) and nearly throughout the Ko’olau Mountains (from Pu’uka’o-Kahuku Trail to Palolo Valley), is now restricted to 10 populations in the Wai’anae Mountains in the southern part of its range from Makaha and Wai’anae Kai to North Palawai Gulch, and from only 6 populations in the Ko’olau Mountains from Kawaihui Gulch in Kawaiola Training Area to South Kaukonahua drainage. It was listed as endangered in 1996 (Bruegmann, 1995c; Russell & Bruegmann, 1996b). The total number of known individuals is less than 200. J. Lau (pers. comm. 1998) gave a view seemingly at variance with this assessment of less than 200 individuals. He said, “There are numerous populations in the Wai’anae Mountains, with many plants. There are also many populations in the Ko’olau Mountains, with many plants, although it has not been seen in recent decades in the southern part of the mountain range.”


Phyllostegia hispida is known only from the mountainous eastern portion of Moloka’i. It was last collected in 1979 (Jacobi & Higashino 1561, BISH). The current status of all populations is not known, and J. Lau (pers. comm. 1998) considered this species to be endangered. He reported that only three solitary plants have been seen in recent years, and one of them died about two years ago. Both of the living plants are on the Pelekunu rim, one in Kamakou Preserve, the other in Pu’u Ali’i Natural Area Reserve. The dead plant was in Kamakou Preserve in the Waikolu Drainage.


Wagner et al. (1990) discussed the populations here treated as Phyllostegia kaalaensis as possibly distinct from P. glabra. Phyllostegia kaalaensis differs from P. glabra in having leaves with dentate margins and calyces and bracts sparsely ciliate. It is listed as endangered (Bruegmann, 1995c; Russell & Bruegmann, 1996b). It is known from only five populations and about 50 individuals from scattered areas in the Wai’anae Mountains (‘Ekahuanui Gulch, Pahole Gulch, Palikea Gulch, and Wai’anae Kai). In August and September 1998 J. Lau (pers. comm. 1998) visited several populations of P. kaalaensis at three locations (Wai’anae Kai, Pahole Gulch, and ‘Ekahuanui Gulch), with a total of about 20 plants. The other populations (Palikea Gulch, and additional drainages in Pahole and Ekahuanui Gulches) have not been revisited in 10–20 years. Lau estimated the total number of plants still alive may be under 100. The Wai’anae Kai population has gone way down in numbers since it was first found seven years ago. The mesic habitat of this species is very threatened.

860 m, 4 Jan. 1974, J. J. Fay 156 (holotype, PTBG-5552; isotype, BISH).

The three collections of this species from Mount Kahili at ca. 860 m were included under Phyllostegia helleri by Wagner et al. (1990), but they pointed out that unlike all other populations of *P. helleri* these three specimens (the type, Flynn et al. 2228, PTBG, and Wagner et al. 5217, BISH) have retrorsely appressed pubescence and may represent a distinct taxon. *Phyllostegia helleri* always has spreading trichomes throughout its range. It seems best to recognize the population with retrorsely appressed pubescence as distinct. Similar pubescence differences are characteristic in a number of other species in the genus, often making identifications difficult. It also has pedicels only 1–2 mm long, whereas *P. helleri* has pedicels usually 3–5–9 mm long. Field or greenhouse study is needed to determine whether there are other differences. *Phyllostegia kahiliensis* is apparently very rare.


*Phyllostegia knudsenii* was known only from the type collection from the woods of Waimea on Kaua‘i and was considered extinct by Wagner et al. (1990). An individual of this species was located in the Koa‘i Canyon growing in diverse mesic forest and was reported by Lorence et al. (1995). It was listed as endangered based on this rediscovery (Bruegmann, 1995a; Russell & Bruegmann, 1996a). It is currently known from two locations in Koa‘i Canyon.

This species, along with *P. wawrana* and *P. floribunda*, was placed in *Phyllostegia* sect. *Lateriflorae* A. Gray by Sherff (1935). The same delimitation was followed by Wagner et al. (1990). Based on the ample material now at hand I exclude all but the type, *P. floribunda*, from the section, because the others have both axillary and terminal inflorescences. With the exclusion of these two white-flowered species the section can now also be characterized by red corollas.


**17. Phyllostegia macrophylla** (Gaudichaud) Bentham, Edward’s Bot. Reg. 15: 1292. 1830. [Epithet published as “macrophyllum.”] *Prasium macrophyllum* Gaudichaud, Voy. Uranie 453. 1829. TYPE: s.l., 550–735 m, 1819, G. Gaudichaud-Beaupré s.n. (holotype, P). Based on distribution of this species, Gaudichaud probably collected the type on Hawai‘i. St. John treated this collection as mixed, using the short inflorescence as a distinctive character.


short infrutescence as the holotype of *P. interrupta* H. St. John.


*Phyllostegia phytalaccoides* (Sherff) H. St. John var. salebrosa H. St. John, Phytologia 63: 179. 1987. Syn. nov. TYPE: Hawaiian Islands [U.S.A.]. Maui: F. R. Warshauer 2876 (holotype, BISH not seen). The holotype has been missing since at least October 1987; there is a specimen of *P. macrophylla*: Maui: Hana District, along Koukouai Gulch, SW of Kipahulu Valley, wet koa-‘ohi’a forest, 22 July 1980, Warshauer & McElowney 2867 (BISH-469843), which may be the type if St. John transposed the number.


*Phyllostegia reflexa* H. St. John, Phytologia 63: 180. 1987. Syn. nov. TYPE: Hawaiian Islands [U.S.A.]. Hawai‘i: Hilo Forest Reserve, Laupahoehoe Section, within 100–200 ft. of W boundary of fence line [with] Wai-punalei, 8 Sep. 1981, J. Davis 598 (holotype, BISH [on loan from Hawaiian State Division of Land and Natural Resources]). Although published as at BISH, the holotype is part of a Hawaiian State Division of Land and Natural Resources loan that will hopefully be given to BISH for permanent storage following recommendation 7A of the ICBN (Guerter et al., 1994).


*Phyllostegia manii* is listed as endangered (Yoshioka et al., 1991; Herbst et al., 1992). The information on distribution and populations has not changed since reported by Wagner et al. (1990). It was last collected in 1979 on Moloka‘i. Reports of it from 1985 by Wagner et al. (1990) based on observations rather than collections were apparently a misidentification of *P. hispida*.


When studying the type of this species for this paper I was unable to place it in any other known species of the genus. It has small, elliptic, hirsute leaves 6–10 cm long, 6–8 flowers per verticillaster, and the calyx is only 2.5–2.7 mm long, the smallest in the genus. I therefore provisionally accept it as a distinct species. No other collections are known to me.


*Phyllostegia mollis* as described by Wagner et al.
Phyllostegia paraflora (Gaudichaud) Bentham var. major
Sherff, Amer. J. Bot. 21: 700. 1934. TYPE: Hawaiian Islands [U.S.A.]. O'ahu: Ko'olau Mts., Punalii'u, 14–21 Nov. 1908, J. F. Rock 565 (holotype, BISH-510100). Another sheet at BISH is labeled as Rock 963, but, based on locality and date, it is a possible isotype. Rock would often number duplicate specimens of collections made on the same day and at the same place sequentially or in some cases, such as this one, renumber the duplicates.


Phyllostegia paraflora is listed as an endangered species (Brueggmann, 1995d; Russell & Brueggmann, 1996c). Phyllostegia paraflora var. paraflora was known historically from the Ko'olau Mountains and a single collection from West Maui (type of P. paraflora var. canescens) in 1840. It is currently known from a single population of four plants along North Kaukonahua Stream (Brueggmann, 1995d; Russell & Brueggmann, 1996c). It is also known from a population of about 30 plants collected in 1995 from Pu'u Pauao, between Poamoho and Schofield Trail (Perlman 14705, PTBG, WU).

21b. Phyllostegia paraflora (Gaudichaud) Bentham var. glabriuscula A. Gray, Proc. Amer. Acad. Arts 5: 344. 1862. Phyllostegia glabriuscula (A. Gray) H. St. John, Phytologia 63: 175. 1987. TYPE: Hawaiian Islands [U.S.A.]. Hawai'i: Mount Kaah [Mauna Kea], 15–20 June 1825, J. Macrae s.n. (lectotype, here designated, GH-1430). St. John designated the other Macrae collection (also collected on Mauna Kea, June 1825, GH-1431) as the holotype of P. curta. He annotated this sheet as the lectotype, but did not publish the lectotypification. St. John was correct in distinguishing the two syntypes as separate collections, as the one designated holotype of P. curta is in early flowering and has very few glandular trichomes, whereas the other is in late flowering and has many more glandular trichomes. They do not, however, represent separate taxa in my view.

Phyllostegia parvisflora is listed as an endangered species (Brueggmann, 1995d; Russell & Brueggmann, 1996c). Phyllostegia parvisflora var. glabriscula was known historically from a few collections from Manua Kea and has not been collected since the late 1800s and is presumed extinct.


In the revision by Wagner et al. (1990) the Wa‘ianae Mountain plants were thought to perhaps represent a different variety. The situation was recently evaluated (Wagner, 1999), and the Wa‘ianae Mountain populations were recognized as a distinct variety, P. parvisflora var. lydgatei. It is known at 730–825 m, from Napepeiaulelo Gulch and North Palawai Gulch, Wa‘ianae Mountains, O’ahu. This taxon appears to be restricted to north-facing slopes and is quite rare, with a current estimate of one extant population in North Palawai Gulch with about 20 known individuals. When Phyllostegia parvisflora was listed as endangered (Brueggmann, 1995d; Russell & Brueggmann, 1996c) these populations were included, although a formal name under P. parvisflora was not yet available.


This species was included within Phyllostegia mollis by Wagner et al. (1990) following Sherff (1935), but without seeing any specimens. Later, I studied specimens from Moloka‘i and Maui determining them to represent a different species than the O‘ahu plants. I began using the name Phyllostegia halaiakalae for it as this was the oldest name in the synonymy of P. mollis in the 1990 treatment, but omitted entirely in Sherff’s revision (1935). When I examined an isotype of Phyllostegia halaiakalae I found that it represented an older name for the species treated by Wagner et al. (1990) as P. imminuta. Thus, I have here selected P. pilosa for this species among the names available. It differs from P. mollis, which is restricted to O‘ahu, in several characters, most notably the greater number of flowers per verticillaster, closer spacing of verticillasters, shorter pedicels, smaller flowers, smaller leaves, and shorter petals. The following is a brief diagnosis to contrast P. pilosa with P. mollis, as well as to distinguish it from other species in the genus.

Stems moderately short-hirtellous, the trichomes spreading, usually somewhat antrorse so. Leaves ovate to occasionally elliptic-ovate, up to 8–14 cm long, 3–4.5(–7.5) cm wide, lower surface glandular-dotted and short-hirtellous, densely so along veins, the trichomes erect to somewhat crinkly, 0.2–0.3 mm long, petioles 2.5–3.2(–4.5) cm long, flowers 6–12 per verticillaster, in relatively narrow, usually simple inflorescences 7–12 cm long, pubescent with spreading to erect trichomes usually 0.1–0.2 mm long, pedicels 0.6–1.8 mm long, calyx 3.2–3.6 mm long, short-hispidulous, more densely so toward the apex, and inconspicuously glandular-dotted, the teeth linear-deltate, 0.7–1.6 mm long, apex acute; corolla tube slender, slightly curved, 7.3–10 mm long, short-villous, the trichomes somewhat appressed, and inconspicuously glandular-dotted, lower lip 3.5–5.5 mm long.
Phyllostegia mollis sensu Wagner et al. (1990) was listed as an endangered species in 1991 (Ellshoff et al., 1990, 1991a), and thus included populations from Maui and Moloka‘i, giving P. pilosa protected status. Ellshoff et al. (1991a) reported a population of a few individuals of P. pilosa discovered by R. Hobdy and J. Lau in Waipau Gulch on East Maui; I have not been able to confirm their identification. Other than this population the species was most recently collected in 1989 at Waikamoi, TNCH [The Nature Conservancy of Hawaii] preserve, in 1989 in Honomanu Gulch on East Maui (Perlman et al. 10773, PTBG), and in 1912 on Moloka‘i (Pohoula, Forbes 102.20a, BISH). J. Lau (pers. comm. 1998) reported another population more than 4 km away, in the northwestern corner of Waikamoi Preserve, near the Waikamoi Flume road. He last saw this population in 1997, when there were at least three plants still alive.


Phyllostegia racemosa is listed as endangered (Bruegmann, 1995b, 1996). Historically, it was known to usually grow epiphytically in mesic to wet forests in the Hakalau and Saddle Road areas of Mauna Kea and the Kulani/Keauhou and Kipuka Ahiu areas of Mauna Loa. Currently only four populations are known from Hakalau, Kulani/Keauhou, and in Hawaii Volcanoes National Park with at least 45 individuals (Bruegmann, 1996).


Phyllostegia renovans was discovered in 1989, after the most recent revision of the genus was in press, and was not described until 1999. It is unique in the genus in that the stems resume vegetative growth after flowering. A brief diagnosis is: erect subshrub becoming scandent and the stems up to 3–4 m long, short-hirsute throughout with leaves narrowly to broadly ovate, flowers (4–)6–8 per verticillaster, apparently the stem resuming vegetative growth after flowering, calyx campanulate, 8–12 mm long, the lobes 4–7 mm long, margins with 1 to several coarse teeth, apex acute; corolla white, ca. 19–22 mm long. It is relatively rare with 23 small populations known only from three adjacent valleys on the northeastern part of the island of Kaua‘i, Hawaiian Islands (Hanakoa, Limahuli, and Wainiha), at 680–1040 m; it grows along watercourses and at the bases of waterfalls.


Phyllostegia rockii is known from only three collections from East Maui, the most recent of which was made in 1912; it is almost certainly extinct (Wagner et al., 1990).


Phyllostegia stachyoides is now quite rare and is probably endangered, despite its three-island distribution on eastern Molokai‘i, West Maui, and Hawai‘i. The most recent collections are from Molokai‘i (Wawaia Gulch in 1997, Wood 6280, AD, BISH, NY, PTBG, US) and collections from West Maui (Honokohau Falls in 1996, Wood 5555, PTBG, US, and in 1997, Perlman & Wood 15768, AD, BISH, HAST, K, NY, US; Lihau in 1992, Welton & Haus 1571, BISH; Hanuola in 1985, Hobdy 2399, BISH; Pu‘u Kukui in 1996, Perlman et al. 15368, BISH, PTBG, US). I am unaware of any recent collections from the island of Hawai‘i; however, J. Lau (pers. comm. 1998) indicated that The Nature Conservancy records show the most recent collection was in 1978 (North Kona, Keauhou 1).


This species is apparently known only from the type collection and is almost certainly extinct. Sherff (1935) provided a description.


Phyllostegia variabilis is extinct; it was last observed in 1961 (Wagner et al., 1990).


Phyllostegia velutina was raised to specific level by St. John, and was accepted in the most recent revision (Wagner et al., 1990). It is listed as endangered (Bruegmann, 1995b, 1996). Historically, it occurred on the southern slopes of Hualalai and the eastern, western, and southern slopes of Mauna Loa. Currently, it is known from populations in three areas (Pu‘u-‘uwa‘a‘a, Honualu Forest Reserve, and Kulani/Keauhou area) with estimates of up to 116 individuals (Bruegman, 1995b, 1996; U.S. Fish and Wildlife Service, 1998). Another population is presumably at Waiakea Tract, but its location and status are unknown (Bruegman, 1995b, 1996). Among the remaining populations I have seen specimens only from the Kulani population.


Phyllostegia waimeae is listed as endangered (Ellshoff et al., 1991b; Merhoff et al., 1994). It was historically known only from the western part of the Waimea Canyon drainage, including Halemanu, Ka‘a‘a, Kaholualuanu, and Kaua‘i’ki, but was undoubtedly more widespread in the Koke‘e area. By 1969 it was known from a single individual in Waimea Canyon (Merrhoff et al., 1994). Its current status is unknown, and it is perhaps extinct.


Phyllostegia ambiguca (A. Gray) Hillebrand var. longipes Hillebrand, Fl. Hawaiian Isl. 350. 1888. Phyllostegia brendiens A. Gray var. longipes (Hillebrand) Sherff, Amer. J. Bot. 21: 699. 1934. TYPE: Hawaiian Islands [U.S.A.]. Hawai‘i: s.d., J. M. Lydgate s.n. (holotype, BISH, MEL not seen [photo BISH]). This plant is presently known only from Hawai‘i, and there is strong doubt that the type was collected on Maui, although the original label says “probably E. Maui.”

Phyllostegia warshaueri was raised to specific level by St. John and was accepted in the most recent revision (Wagner et al., 1990). It is listed as endangered (Bruegmann, 1995b, 1996). Historically, it occurred on the northern slopes of Mauna Kea (Laupahoehoe) and from the northern slopes of the Kohala Mountains. Currently, it is known from two populations in the Kohala Mountains, with estimates of 5 to 10 individuals (Bruegmann, 1995b, 1996), and Hamakua (O‘okala Trail). Since listing, it has been rediscovered in Laupahoehoe near Kilau Stream (3 to 10 plants, Perlman et al. 14185, 14691, both US).


Considered extinct by Wagner et al. (1990), this Kaua‘i endemic species was known only from four collections from Hanalei, Koke‘e Stream, and the Koke‘e area and was last collected in 1926. Recent collecting efforts by the National Tropical Botanical Garden (Lorenz et al., 1995) resulted in discovery of five populations of Phyllostegia wawarana: a Makaleha Plateau site with about 20–30 plants in two populations in a lowland wet forest; a few individuals in Wainiha Valley, below Hinalele Falls in a lowland wet forest; three plants in the upper Hanakoa drainage in a montane wet forest with riparian vegetation; and a population of 5–6 individuals in the back of Honopu Valley growing along a stream bed in Metrosideros–Dicranopteris montane wet forest; and Nuololo, Kuia Natural Area Reserve, in a Metrosideros–Dicranopteris montane mesic forest with a few individuals. It was listed as endangered based on these rediscoveries (Bruegmann, 1995a; Russell & Bruegmann, 1996a). Phyllostegia wawarana appears to be closely related to P. helleri but differs in the longer, stoutier trichomes of the stem and inflorescences (0.6–0.8–1.3 mm long, longer pedicels 9–11 mm long, conspicuous veins on the calyx, and in having inflorescences axillary and sometimes also terminal. This species, along with P. knudsenii and P. floribunda, was placed in Phyllostegia sect. Lateriflorae A. Gray by Sherff (1935). The same delimitation was followed by Wagner et al. (1990). Based on the ample material now at hand I exclude all but the type, P. floribunda, from the section, because the others have both axillary and terminal inflorescences. With the exclusion of these two white-flowered species the section can now also be characterized by red corollas.

Doubtful Names:


Phyllostegia glandulosa H. St. John, Phytologia 63: 175. 1987. St. John did not adequately designate a unique collection as the type, as no specific locality, no date, and no collector number were given, and Rock made numerous collections in Kona. St. John only cited
"Hawai'i, Kona, J. F. Rock." No Rock collection of *Phyllostegia* from Kona could be located. = Probably *P. stachyoides* A. Gray based on the description.

*Phyllostegia insignis* H. St. John, Phytologia 63: 175. 1987. St. John did not adequately designate a unique collection as the type, as no locality, no date, and no collector number were given. He only cited "Mauio. A. Medeiros." = *P. ambigua* (A. Gray) Hillebrand based on the description.

*Phyllostegia kilaeuensis* H. St. John, Phytologia 63: 176. 1987. TYPE: Hawaiian Islands [U.S.A.]. Hawai'i: Kiluea Forest Reserve, F. R. Warshauer & R. I. Stemmermann s.n. (holotype, BISH not seen). No specimen matching the given information was found. = Probably *P. retulata* (Sherff) H. St. John based on the description. St. John did not adequately designate a unique collection as the type, as no specific locality, no date, and no collector number were given.

*Phyllostegia secunda* H. St. John, Phytologia 63: 181. 1987. TYPE: Hawaiian Islands [U.S.A.]. Kaua'i: Kaholoamano, J. F. Rock s.n. (holotype, BISH not seen). St. John did not adequately designate a unique collection as the type, as no specific locality, no date, and no collector number were given, and Rock made numerous collections in Kaholoamano. St. John only cited "Kaua'i, Kaholoamano, J. F. Rock." No Rock collection of *Phyllostegia* from Kaholoamano, Kaua'i, could be located. The short description was not adequate to determine the species.

**EXCLUDED NAMES:**


**HYBRIDS:**

*Phyllostegia covanii* H. St. John, Phytologia 63: 174. 1987. TYPE: Hawaiian Islands [U.S.A.]. O'ahu: Ridge Trail to Palikea, Honouliuli Forest Reserve, Wai'anae Range, 3000 ft., 4 Feb. 1948, R. S. Cowan 808 (holotype, BISH-76011). = *P. glabra* (Gaudichaud) Bentham var. glabra × *P. hirsuta* Bentham. Another collection (Wai'anae Ms., Honouliuli Preserve, below Pu'u Kaua, 2770 ft., 9 May 1996, Wood 5216, BISH, PTBG, US) also appears to represent a hybrid of this combination. It differs, however, in its closer resemblance to *P. hirsuta*, differing from it primarily in its narrower leaves, less pubescent leaves and stems with somewhat retrorse trichomes, longer pedicels, and larger calyx. This gives the plant a superficial appearance of *P. parviflora*, but it does not have any glandular trichomes, and the non-glandular ones are much longer than in *P. parviflora*. Both putative parents occur in the general area. *Phyllostegia glabra* was growing with Wood 5216 (according to his label), and I found collections (Perlman 5227, BISH, PTBG, US) of *P. hirsuta* growing at least as close as the summit crest between Pu'u Kaua and Pu'u Kanehoa.


**INVALIDLY PUBLISHED NAMES:**


*Phyllostegia parviflora* (Gaudichaud) Bentham var. gaudichaudiana A. Gray, Proc. Amer. Acad. Arts 5: 344. 1862. Not validly published, as this should have been the autonymic variety (ICBN Art. 26.2; Greuter et al., 1994). = *P. parviflora* (Gaudichaud) Bentham var. parviflora.

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