

Notes on the Naturalized Flora of the Hawaiian Islands.

BY CHARLES N. FORBES.

THE following plants are mainly species not recorded in Hillebrand's Flora,¹ the majority of them having probably become naturalized since 1886. The only record of the naturalized plants which we have had since that time is an addition of a few species in an article by Heller.² In order to make these notes complete these species are again mentioned in this paper. It is the intention to continue the notes at irregular intervals as material accumulates.

The naturalized flora occupies the lower valleys and plains, the number of indigenous plants in these localities at present being insignificant. This flora is rapidly encroaching on the native forest, especially where its conditions are changed by fires or grazing. Introduced weeds appear along new trails through the native forest in from two to three weeks in places where it would be impossible to find them before. In the unforested sections of the islands, as a large proportion of the slopes of Haleakala on Maui, naturalized plants occur to the very summit (10,000 feet). A few of the naturalized plants as *Crepis japonica* are an exception to the rule, in that they occur in the dense forest and are rarely found on the plains; and perhaps a few of the plants considered as indigenous may belong in this category.

¹ W Hillebrand. Flora of the Hawaiian Islands, 1888.

² A. A. Heller. Minnesota Botanical Studies, Bulletin No. 9, pp. 760-922. A portion of Heller's collections are in the Herbarium of the Bishop Museum.

FILICALES.

Ceropteris calomelanos (L.) Und.*Acrostichum calomelanos* L., Sp. Pl., ii, 1753, 1072.*Gymnogramma calomelanos* Kaulf., Enum., 1824, 76.*Ceropteris calomelanos* (L.) Und., Torr. Cl., 1902, 29, 632.

The silver fern is well established on all the islands, generally occurring along roadsides and irrigating ditches.

Ceropteris calomelanos var chrysophylla Link.*Gymnogramme chrysophyllum* Klf., Enum., 1824, 74.*Ceropteris chrysophylla* Link, Sp., 1841, 143.

The gold fern has the same distribution as the former but is less common. On Hawaii it was observed growing in the steam cracks at Kilauea.

HYDROCHARITACEAE.

Halophila ovata Gaud.*Halophila ovata* Gaud., Freyc. Voy. Bot., 1826, 430, t. 40. f.*Halophila ovalis* Hook., Fl. Tas., 1860, ii, 45.

Miss M. Reed showed me a specimen of this plant which she said was identified by Dr. W. A. Setchell. It occurs in brackish ponds in the vicinity of Honolulu.

LEMNACEAE.

Lemna minor L.*Lemna minor* L., Sp. Pl., 1753, 970.

The duck weed is common in ponds and taro patches on all the islands.

CHENOPODIACEAE.

Amaranthus spinosus L.*Amaranthus spinosus* L., Sp. Pl., 1753, 991.

A rather common weed on Oahu, probably occurring on other islands as well.

C. N. F., no. 1060. O. Nuuanu Valley.

POLYGONACEAE.

Rumex acetocella L.*Rumex acetocella* L., Sp. Pl., 1753, 338.

The sorrel occurs on all the islands and at all elevations. First reported from Kauai by Heller.

Rumex patentia L.*Rumex patentia* L., Sp. Pl., 1753, 333.

A few specimens of this species were observed at Nahiku Landing, E. Maui. The plant also occurs as a weed in caue fields on Hawaii.

C. N. F., no. 265. M.

PORTULACACEAE,

Portulaca lutea Sol.*Portulaca lutea* Sol., Ex Forst. f. Pl. Escul., 1786, 72. Seem. Fl. Vit., 9.
Portulaca flava DC., Prod., 1843, iii, 355.

This species occurs as a rather rare shore plant, probably on all the islands. This museum has specimens collected on Marcus, Midway and Laysan islands by W. A. Bryan, while it has been reported from Necker island by W. K. Fisher³ and from Hawaii by Dr. Guppy.⁴ It also occurs on Oahu near Kaena Point, and should be considered as indigenous.

C. N. F., no. 1650. O.

CARYOPHYLLACEAE.

Drymaria cordata (L.) Willd.*Holosteum cordatum* L., Sp. Pl., 1753, 88.
Drymaria cordata Willd., Roem & Schultes, Syst. Veg., 1819, 5, 406.

Observed by Heller on Kauai. Occurs on all the islands.

Polycarpon tetraphyllum L.*Polycarpon tetraphyllum* L., Sp. Pl., 1753, 881.

Observed at Makawao, E. Maui.

C. N. F., Aug. 1910. M.

Tiassa marina (L.) Britton.*Arenaria rubra* var *marina* L., Sp. Pl., 1753, 423.
Spergularia salina Presl., Fl. Cech., 1819, 95.
Buda marina Dumort, Fl. Belg., 1827, 110.
Spergularia media A. Gray, Man., 1867, 5, 95.
Tiassa marina Britton, Bul. Torr. Club, 1889, 16, 126.
Buda marina var *minor* S. Wats., A. Gray, Mau., 1890, Ed. vi, 90.

Near the beach in various places between Diamond Head and Koko Head on Oahu.

C. N. F., no. 1501. O.

³W. K. Fisher. Bul. U. S. Fish Commission, vol. xxiii, pt. iii, 1903, p. 807.

⁴H. B. Guppy. Observations of a Naturalist in the Pacific, vol. ii, p. 555.

RANUNCULACEAE.

Ranunculus parviflorus L.

Ranunculus parviflorus L., Sp. Pl., 1763, Ed. ii, 780.

In the forest below Kaalapuuwale on the slopes of Hualalai on the island of Hawaii, occurs a species of *Ranunculus* which I refer to the above. This diffuse plant with minute yellow flowers and hispid carpels covers many acres; mainly in the dead Koa forest, although some specimens were found in virgin forest. This place is also a locality for *R. mauiensis*, the two species often growing close together; while within a mile can be found *R. hawaiiensis*, the other native species. My determination is based on the description found in Britton and Brown's Flora of the Northern States and Canada.

C. N. F., no. 275. H.

ANONACEAE.

Anona cherimolia Mill.

Anona cherimolia Mill, Gard. Dic. Ed. viii, 1768, n. 5.

The cherimolia is well established on Hawaii, especially in the drier localities.

C. N. F., no. 365. H.

CRUCIFERAE.

Brassica campestris L.

Brassica campestris L., Sp. Pl., 1753, 666.

Rather common on Oahu, also occurring on the other islands. C. N. F., March 18, 1909. Moanalua Valley, Oahu.

Raphanus sativus L.

Raphanus sativus L., Sp. Pl., 1753, 669.

Rare, to be expected on all the islands. Mentioned by Hillebrand as occurring on Kauai.

C. N. F., April 6, 1909. Moanalua Valley, Oahu.

Sisymbrium officinale (L.) Scop.

Erysimum officinale L., Sp. Pl., 1753, 660.

Sisymbrium officinale Scop., Fl. Carn. Ed. ii, 1772, 2, 26.

The hedge mustard was first observed at Puuwaawaa on Hawaii, and later at various places on that island.

C. N. F., no. 9. H.

ROSACEAE.

Rosa sp.

A small flowered multi-petalled rose is well established on Hawaii and in certain places on Maui. On Hawaii it is known as the volcano rose, as it is especially common on the road to the volcano of Kilauea. Dr. W. T. Brigham observed this rose more than forty years ago along the trail to the Kapena Falls on Oahu; and he believes it may have been taken to the other islands from this locality. It has not become naturalized on Oahu.

Rubus jamaicensis L.

Rubus jamaicensis L., Mant., i, 1767, 75.

Rubus jamaicensis Sw., In Griesb. Fl. Brit. W. Ind., 1864, 231.

The so-called thimble-berry is common on Hawaii and in certain places on Maui. It is said to have been introduced from the West Indies.

Dr. W. T. Brigham & C. N. Forbes, Kilauea, 1908. C. N. F. no. 238. M. Keanae, Maui.

LEGUMINOSEAE.

Caesalpinia sappan L.

Caesalpinia sappan L., Sp. Pl., 1753, 381.

Found in gulches near Wahiawa, Oahu.

C. N. F., no. 1443. O.

Cassia chamaecrista L.

Cassia chamaecrista L., Sp. Pl., 1753, 379.

Common about Honolulu, Oahu.

Heller, no. 1969.

Cassia laevigata Willd.

Cassia laevigata Willd., Enum. Hort. Berol., 1813, 441.

Occurs on all the islands. Rather common on Oahu.

Heller, no. 2295.

Crotalaria fulva Roxb.

Crotalaria fulva Roxb., Fl. Ind., 1832, 3, 266.

Crotalaria saltiana Andr.

Crotalaria saltiana Andr., Bot. Rep., 1811, pl. 648.

Crotalaria striata DC., Prod., 1825, ii, 131.

Crotalaria spectabilis Roth.

Crotalaria sericea Retz. (not Burm.), Obs. Bot., 1779-91, 3, 26.

Crotalaria spectabilis Roth., Nov. Pl. Sp., 1821, 341.

The *Crotalaris* form a conspicuous portion of the naturalized flora of the islands.

Fleminga strobilifera R. Br.

Fleminga strobilifera R. Br., Ait. Hort. Kew. Ed. ii, 1810-13, 350.

Fleminga bracteata Wight, Ic., 1840-53, 268.

Fleminga fruticulosa Wall, Cat., 1828, 5754.

Fleminga abrupta Wall, Cat., 1828, 5755.

I am indebted to Mr. C. J. Austin for showing me this plant. It occurs in company with *Psidium guajava* at Nahiku, East Maui. The plant is widely spread in India, where it is said to be very variable. It is a small shrub, and can be distinguished by the conspicuous folded bracts which hide the small flowers.

Medicago apiculata Willd.

Medicago apiculata Willd., Sp. Pl., iii, 1803, 1414.

Rather rare but probably has the same range as the next species. It can be recognized by the unarmed pods. In the Index Kewensis it is regarded as being synonymous with the next. C. N. F., no. 1718. O. Honolulu, Oahu.

Medicago denticulata Willd.

Medicago denticulata Willd., Sp. Pl., iii, 1803, 1414.

The bur clover is more or less common on all the islands. According to Van Dine,⁵ it was introduced on Maui in 1882.

Medicago intertexta Mill.

Medicago intertexta Mill, Gard. Dict. Ed. viii, 1768, n. 4.

The above species is reported to be common about Honolulu, by Heller.

Melilotus indica (L.) All.

Trifolium melilotus L., Sp. Pl., 1753, 764.

Trifolium indicum Thunb., Prod. Pl. Cap., 1800, 136.

Melilotus indica All., Fl. Pedem I, 1785-89, 308.

Melilotus parviflora Desf., Fl. Atlant., 1800, ii, 187.

Melilotus minima Roth., Nov. Pl. Sp., 1821, 361.

Melilotus occidentalis Nutt., ex Torr & Gray, Fl. N. Am., 1838, i, 321.

Melilotus regulosa Willd., Enum. Hort. Berol., 1809, 789.

Rather common on Oahu and Hawaii; probably on all islands.

Trifolium repens L.

Trifolium repens L., Sp. Pl., 1753, 767.

The white clover is common in the pastures on Haleakala, Maui.

GERANIACEAE.

Erodium cicutarium (L.) L'Her.

Geranium cicutarium L., Sp. Pl., 1753, 680.

Erodium cicutarium L'Her., Ait. Hort. Kew., 1789, 2, 414.

Oahu, not common.

⁵Hawaii Agr. Exp. Station Rept., 1908, p. 25.

Geranium carolinianum L.*Geranium carolinianum* L., Sp. Pl., 1753, 683.

This plant not only occurs on Hawaii as stated by Hillebrand; but is also common on Haleakala, Maui.

C. N. F., no. 218. M.

MALVACEAE.

Modiola caroliniana (L.) Don.*Malva caroliniana* L., Sp. Pl., 1753, 688.*Modiola multifida* Moench, Meth., 1791, 620.*Modiola caroliniana* Don., Gen. Hist. Pl., 1831, i, 466.

Rather common on the slopes of Mauna Kea, Hawaii.

C. N. F., no. 458. H.

Two species of *Abutilon* not yet identified are very common on all the islands.

PASSIFLORACEAE.

Passiflora edulis Sims.*Passiflora edulis* Sims., Bot. Mag., 1818, 1989.

Sometimes plentiful, and to be expected in the forests of all the islands. Hillebrand says in his flora, 1871, "already escaped into the woods of East Maui." Native name, *liliko'i*.

Passiflora foetida L.*Passiflora foetida* L., Sp. Pl., 1753, 959.

An occasional roadside plant.

ONAGRACEAE.

Epilobium Billardierianum ? Ser.*Epilobium Billardierianum* Ser., DC. Prod., 1843, iii, 41.

A species of *Epilobium* which I have provisionally referred to the above, is very common on Haleakala.

C. N. F., no. 173. M.

UMBELLIFERAE.

Apium leptophyllum (DC.) F. Mull.*Sison Ammi* L., Sp. Pl., 1753, 252.*Helioscadium leptophyllum* DC., Prod., 1830, iv, 105.*Apium leptophyllum* F. Mull., Benth. Fl. Aust., 1866, iii, 372.*Apium Ammi* Urban., Mart. Fl. Bras., 1879, ii, pt. i, 341.

First observed at Makawao, Maui. Not common on the islands.

C. N. F., Makawao, Maui.

Apium petroselinum L.*Apium petroselinum* L., Sp. Pl., 1753, 264.*Petroselinum sativum* Hoffm., Gen. Umb., 1814, 177.

Common parsley. A coarse leaved form occurs along irrigating ditches on West Maui. Reported from Hanapepe Valley, Kauai, by Heller.

C. N. F., no. 74. M. Wainee Gulch, Maui.

Foeniculum vulgare (L.) Gaertn.*Anethrum foeniculum* L., Sp. Pl., 1753, 263.*Foeniculum vulgare* Gaertn., Fruct. & Seem., 1788, i, 105.*Foeniculum foeniculum* Karst., Deutsch. Fl., 1880-83, 837.

The fennel is very common on Maui and in certain localities on Hawaii. Mentioned in Mann's Flora,⁶ but overlooked by Hillebrand.

PRIMULACEAE.

Anagallis arvensis L.*Anagallis arvensis* L., Sp. Pl., 1753, 148.

Occurs on all the islands.

LOGANIACEAE.

Buddleia asiatica Lour.*Buddleia asiatica* Lour., Fl. Cochinc., 72. Benth in DC. Prod., x, 416.

This plant is very common in the valleys of the Waianae range on Oahu, sometimes occurring as small trees six to ten feet high, while at other places it occurs as a subherbaceous plant of three to four feet. It also occurs in the dense forests of the Koolauloa range, and has all the appearances of an indigenous plant. One form is nearly glabrous.

C. N. F., Sept., 1908, Punaluu Mts. C. N. F., Makaha Valley, Kaala Mts., Feb. 12-19, 1909.

GENTIANACEAE.

Erythraea centaurium (L.) Pers.*Gentiana centaurium* L., Sp. Pl., 1753, 229.*Erythraea centaurium* Pers., Syn., 1805, i, 283.

This plant is well established on East Maui and Hawaii. It is generally found on grazing land.

C. N. F., no. 180. M. Paia, Maui.

⁶ Horace Mann. Flora of the Hawaiian Islands. Communications Essex Institute, Salem, Mass., vi, 1871.

CONVOLULACEAE.

Ipomaea chryseides* Ker-Gaul.Ipomaea chryseides* Ker-Gaul., Bot. Reg., 270.

Nuuanu Valley, Oahu. Not common.

C. N. F., no. 1360. O.

Ipomaea grandiflora* Lam.Ipomaea glaberrima* Boj., Hook. Journ. Bot., 1834, 357.*Ipomaea grandiflora* Lam., Tab. Ency., i, 467. Roem. & Schult., Syst., iv, 240.

Dr. Guppy⁷ records his species for the first time from Hawaii. His localities were a mile west of Kapa-ahu and the coasts of Kalae. There are no specimens in this herbarium.

Ipomaea peltata* Chois.Convolvulus peltatus* L., Sp. Pl., 1753, 121.*Ipomaea peltata* Chois., Conv. Or., (?), 70. DC. Prod., ix, 359.

This species were observed by Mr. J. M. Lydgate a number of years ago in Wainiha Valley on Kauai, and judging from the locality in which he observed it, he had no hesitation in calling it indigenous. The flowers of our plant are yellow and all the leaves are peltate.

J. M. Lydgate, Wainiha Valley, Kauai, 1909.

LABIATAE.

Prunella vulgaris* L.Prunella vulgaris* L., Sp. Pl., 1753, 600.

Very common on the cattle ranges of Haleakala, Maui. Also occurs on Hawaii but has not spread to any extent on this island.

SOLANACEAE.

Cestrum diurnum* L.Cestrum diurnum* L., Sp. Pl., 1753, 191.

This species has escaped from cultivation and has become established in several places on Oahu. Several species of *Cestrum* have been in cultivation on these islands for a long time. I have heard the name Chinese ink-berry applied to this plant.

Nicotiana tabacum* L.Nicotiana tabacum* L., Sp. Pl., 1753, 180.

Naturalized in various parts of Maui, especially on the north-east side.

⁷H. B. Guppy. Observations of a Naturalist in the Pacific, vol. ii, pp. 52, 554.

Solanum sodomium L.

Solanum sodomium L., Sp. Pl., 1753, 187.

This African species is rather common on Oahu. First recorded by Heller.

ACANTHACEAE.

Thunbergia alata Boj.

Thunbergia alata Boj., Sims. Bot. Mag., 2591.

A troublesome garden weed in Honolulu.

Thunbergia alata var aurantiaca Ktz.

This variety occurs as a roadside plant in Pauoa Valley on Oahu.

PLANTAGINACEAE.

Plantago lanceolata L.

Plantago lanceolata L., Sp. Pl., 1753, 113.

This species usually occurs at rather high elevations, 2000 to 3000 feet. Observed on all the islands.

RUBIACEAE.

Sherardia arvensis L.

Sherardia arvensis L., Sp. Pl., 1753, 102.

Maui, slopes of Haleakala.

C. N. F., no. 217, M.

CUCURBITACEAE.

Momordica charantia L.

Momordica charantia L., Sp. Pl., 1753, 1009.

Met with on all the islands, especially in rather dry localities where it climbs over rocks and stone walls. Near Kailua on Hawaii, it covers acres of rough aa flows, and is regarded as a bad pest.

Another cucurbit with spiny fruits not yet identified is fairly common on all the islands.

COMPOSITAE.

Carduus lanceolatus L.

Carduus lanceolatus L., Sp. Pl., 1753, 821.

Cirsium lanceolatum Scop., Fl. Carn. Ed. ii, 1772, 2, 130.

Cnicus lanceolatus Willd., Prodr. Fl. Berol., 1789, 259.

The common bur-thistle is well established on Hawaii and in several places on Maui.

C. N. F., no. 116, M. Hanaula W. Maui.

Chrysanthemum leucanthemum L.*Chrysanthemum leucanthemum* L., Sp. Pl., 1753, 888.*Leucanthemum vulgare* Lam., Fl. Fr., 1778, 2, 137.

The white daisy is rather common on Hawaii where it was observed growing on the slopes of Hualalai to the summit, and on the slopes of Mauna Loa.

Emilia flammea Cass.*Emilia flammea* Cass., Dict. Sc. Nat., 1819, 14, 406.

A roadside plant on Oahu, first recorded by Heller. There are specimens in the Museum herbarium collected several years before Heller's collection.

Eupatorium sp.

A species of *Eupatorium* has lately become one of the most common plants on Maui.

C. N. F., no. 46. M. Hanakaoo, W. Maui. Dr. W. T. Brigham, Haleakala, E. Maui.

Hypochaeris radicata L.*Hypochaeris radicata* L., Sp. Pl., 1753, 811.

Rather common on Haleakala, Maui, Probably on Hawaii. Reported from Kauai by Heller.

Lapsana communis L.*Lapsana communis* L., Sp. Pl., 1753, 811.

Rather common on Maui and Hawaii.

Taraxacum officinale (L.) Weber.*Leontodon taraxacum* L., Sp. Pl., 1753, 798.*Taraxacum officinale* Weber, Prim. Pl. Holst., 1780, 56*Taraxacum dens-leonis* Desf., Fl. Atlant., 1800, 2, 228.*Taraxacum taraxacum* Karst., Deutsch. Fl., 1880-83, 1138.

The dandelion occurs on all the islands. It appears to have been introduced on the different islands from different sources. It has been observed on Kauai for at least twenty-five years, while a gentleman on Maui says it was introduced to that island very recently from New Zealand.

Zinnia pauciflora L.*Zinnia pauciflora* L., Sp. Pl., 1753, Ed. ii, 1269.

This species in company with *Verbesina enceloides* (Cav.) A. Gray, is very common about the cane fields in the vicinity of Lahaina, Maui.

C. N. F., Aug., 1910.

ADDENDA.

FICOIDEAE.

Tetragonia expansa Murr.

Tetragonia expansa Murr., Comm. Gotting., 1783, vi, 13.

Tetragonia halimifolia Forst., Prod. 1786, 39.

Tetragonia cornuta Gaertn., Fruct., 1788, ii, 483.

Tetragonia inermis F. Mull., Linnæa., 1852, xxv, 384.

Tetragonia quadricornis Stokes, Bot. Mat. Med., (?), iii, 127.

This plant, generally known as the New Zealand Spinach was collected on the beach near Makapu point on Oahu. This is one of the localities where logs from the north-west coast of America are washed on to the beach. The plant is rather widely distributed on the shores of the Pacific, and has been cultivated in Europe.

C. N. F., no. 1406. O.

COMPOSITAE.

Senecio vulgaris L.

Senecio vulgaris L., Sp. Pl., 1753, 867.

The groundsel probably occurs on all the islands. It generally grows in partly forested sections. There are specimens in the herbarium from Maui, Hawaii and Oahu.

C. N. F., nos. 202. M. and 1695. O.

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