NOTES ON MALVACEAE[1] III. ABUTILON AND PSEUDABUTILON IN THE GALÁPAGOS ISLANDS

THOMAS H. KEARNEY

Many specimens, similar in habit and appearance to *Abutilon umbellatum* (L.) Sweet, have been collected in the Galápagos Islands. One of these, collected on Charles Island by Darwin, was described as *Sida depauperata* Hook. f. and was transferred by Andersson (1853, p. 230) to the genus *Abutilon,* although the combination *Abutilon depauperatum* (Hook. f.) Andersson seems to have been effectively published first by Robinson (1902, p. 173). Garcke (in Andersson ibid.) described as another species *Abutilon Anderssonianum,* based on collections by Andersson on Chatham and Charles islands. This he distinguished from *A. depauperatum* as having acute calyx lobes and fruits of 8 or 9 3-seeded carpels, whereas J. D. Hooker had described *Sida depauperata* as having obtuse calyx lobes and 5 or 6 carpels, these 3–5-seeded. The present writer has seen no specimens of *Abutilon* or *Pseudabutilon* from the Galápagos Islands having obtuse calyx lobes or carpels containing more than 3 seeds.

Robinson (ibid.) listed both *A. Anderssonianum* and *A. depauperatum,* remarking, however, that the latter is "perhaps only a dry soil form of *A. Anderssonianum.*" (The statement should have been reversed, *Sida depauperata* Hook. f. having been the earliest published name of a Galápagos Island *Abutilon* or *Pseudabutilon.)* Under these two names Robinson listed specimens from eight of the islands. Stewart (1911, p. 100) questioned the validity of the characters given by Garcke for distinguishing *A. Anderssonianum,* and reduced the latter to synonymy under *A. depauperatum.* Svenson (1935, p. 243; 1946, p. 465) went farther, reducing both *A. depauperatum* and *A. Anderssonianum* to synonymy under *A. umbellatum* (L.) Sweet, a somewhat polymorphic species that is widely distributed in tropical America, from Mexico and the West Indies to Bolivia.

The present writer would refer to *A. umbellatum* all specimens of true *Abutilon* from the Galápagos Islands which he has had opportunity to examine. These are mostly fewer-flowered and with less umbelliform ultimate divisions of the inflorescence than in what may be regarded as typical *A. umbellatum.* Otherwise they do not seem to differ in any essential character from that species as described by Cavanilles (1785–90, pp. 28–29, t. 6, fig. 3 and t. 129, fig. 2, as *Sida umbellata* L.),

[1]Previous papers with this title were published in Leafl. of Western Bot. 6:51–52 (1950) and 6:165–172 (1952).

MADROÑO, Vol. 11, No. 7, pp. 253-284. July 28, 1952.

Grisebach (1859–64, p. 78), Schumann (1891, p. 373), Standley (1923, p. 750) and Fawcett and Rendle (1926, p. 97), although some of these authors indicated that there may be as many as 10 or 11 carpels in the fruit.

It was discovered by John Thomas Howell that in the type of *Sida depauperata* Hook. f. at Cambridge University, and in several other *Abutilon*-like specimens collected in the Galápagos Islands by himself and by Alban Stewart, the carpels have an internal, tongue-like, horizontal "intrusion" of the dorsal wall more or less completely dividing the cavity, in other words an endoglossum. No trace of such a structure could be found in numerous other specimens from these islands which the writer, following Svenson, would refer to *Abutilon umbellatum*, although, in habit and appearance, the plants with and without an endoglossum are remarkably similar.

The specimens possessing an endoglossum belong, technically, to the genus *Pseudabutilon* R. E. Fries (1908) and, the 3 seeds in the carpels being in one vertical series, to subgenus *Abutilastrum* (E. G. Baker) R. E. Fries. The endoglossum is, however, usually less developed than in most species of *Peudabutilon*, so that, in most of the specimens, it does not divide the cavity into two nearly closed compartments. In general, it is more like the endoglossum found in several species of *Sphaeralcea*, in which genus the occurrence of this structure seems to be sporadic, as noted by Kearney (1935, p. 13) and by Krapovickas (1949, p. 191).

The Galápagos specimens with an endoglossum, although more like *Abutilon* than *Sphaeralcea* in most of their characters, resemble the latter genus also in having the basal part of the mericarps reticulate. Fries did not mention reticulation in his descriptions of the genus *Pseudabutilon* or of any of the species described in his monograph, although it is indicated in his illustration of a mericarp of *P. longepilosum* R. E. Fries (1908, t. 7, fig. 21). In numerous specimens from Argentina identified by the present writer as *Pseudabutilon callimorphum* (Hochr.) R. E. Fries and *P. Stuckertii* R. E. Fries, the basal portion of the carpel (below the septum) is distinctly although sometimes rather faintly reticulate.

It seems necessary, therefore, to regard *Sida depauperata* as a species of *Pseudabutilon*, differing from the otherwise remarkably similar *Abutilon umbellatum* in the presence of an endoglossum and of reticulation on the basal portion of the mericarps, these being also longer and narrower than in most specimens of *A. umbellatum*[2]. It is not referable to any of the previously published species of *Pseudabutilon*.

---

[2]Carpels 7–8 mm. long and less than 2/5 as wide in the Galápagos *Pseudabutilon*, 5–7 mm. long and usually at least half as wide in specimens of *Abutilon umbellatum* from the Galápagos Islands and elsewhere in western South America.

Pseudabutilon depauperatum (Hook. f.) comb. nov. *Sida depauperata* Hook. f., Trans. Linn Soc. London 20: 232 (1847). *Abutilon depauperatum* Anderss. ex Robinson, Proc. Amer. Acad. 38: 173 (1902).

Plant shrubby or suffrutescent; stems up to 1.2 m. long, much-branched, with strictly ascending branches; young stems, petioles, and peduncles more or less densely stellate-tomentose, the old bark pale brown and becoming fissured; leaf blades (the lower ones) up to 18 cm. long and wide, the upper ones successively smaller, from nearly orbicular to deltoid-ovate, acutish to bluntly acuminate, crenulate to crenate-dentate, sometimes obscurely 3-lobed, thin to rather thick, yellowish- or brownish-green when dry, stellulate-pubescent on both surfaces, rather sparsely so above when mature, copiously to densely so beneath especially when young, 7-veined from the base, the veins and veinlets somewhat prominent beneath; petioles of the lower leaves nearly as long as the blades, those of the upper leaves much shorter than the blades; stipules subulate or very narrowly oblanceolate, 4 to 10 mm. long, caducous; inflorescence a leafy open panicle, the flowers mostly in subumbellate clusters of 2 to 6 at the end of ascending peduncles up to 3 cm. long, the pedicels mostly 1–2 cm. long, articulate above the middle; calyx somewhat angulate in bud, 4–5 mm. long in flower, slightly accrescent, densely stellulate-tomentose, cleft to below the middle, the lobes deltoid-ovate, acutely acuminate; petals yellow fading whitish, about 8 mm. long, 5 mm. wide near apex, cuneate-obovate, scarcely clawed, united at base and with the base of the stamen column, veiny, ciliate at base, otherwise glabrous; column stout, glabrous, 3.5–4 mm. long; stamens numerous, apical, the filaments very slender, 1.5–2 mm. long; styles slender, elongate; stigmas small, capitate; fruit short-cylindric, considerably surpassing the calyx, 7-merous, densely stellate-pilose or subhirsute dorsally and on the awns; carpels subgaleate, 2.5–3 mm. wide above the notch, 7–8 mm. long excluding the awns, these 1–2 mm. long, rather stout, erect or somewhat divergent, the carpels with a tongue-like endoglossum at the lower third extending from about one-half way to nearly across the cavity, inconspicuously reticulate on the basal portion, from completely dehiscent on both sutures to indehiscent below the endoglossum both dorsally and ventrally; seeds 3 in one vertical series or sometimes only 2 developing, triangular-reniform, sparsely to copiously papillate, the papillae sometimes in chains.

Known only from the Galápagos Islands, the type (of *Sida depauperata* Hook. f.) from Charles or Santa Maria (Floreana) Island *(C. Darwin* in 1835, Herbarium of Cambridge University); Duncan or Pinzon Island *(J. T. Howell 9822* and ? *Stewart 1965);* Hood or Española Island *(Stewart 1966, J. T. Howell 8716* and ? *8749)*; Jervis or Rabida Island *(J. T. Howell 9764);*

Tower or Genovesa Island *(J. T. Howell 10107)*. The specimens queried are immature.

Pseudabutilon depauperatum seems to form a connecting link between the genera *Abutilon* and *Pseudabutilon*. (It is assumed that an endoglossum is always wanting in *Abutilon*, but until this very large genus has been thoroughly canvassed, this remains an assumption.) The doubts expressed by Hochreutiner (1920, pp. 422, 423) as to the importance of the endoglossum as a generic character and the tenability of *Pseudabutilon* as a genus appear to be more or less justified by the discovery of this species which is so *Abutilon*-like in most of its characters.

The species, as indicated in the description, is quite variable. Variation in thickness of the leaves, density of the indument etc. may be attributed to differences in the habitat, but it is less easy to account for variations in the dehiscence of the mericarps. R. E. Fries (1908, p. 96) in his description of the genus *Pseudabutilon* stated that the mericarps are dehiscent to the base ventrally, to the dissepiment (endoglossum) dorsally. The present writer found, however, that in fifteen specimens from Argentina identified by him as *P. callimorphum* and *P. Stuckertii*, eleven had the mericarps indehiscent or only partially dehiscent below the endoglossum both ventrally and dorsally, the remaining four specimens conforming to Fries' description. *Pseudabutilon nigripunctulatum* (Ulbr.) *R. E.* Fries, of Peru, is related to *P. depauperatum*, but has more acuminate and more deeply dentate, black-punctate leaves.

A specimen of *Abutilon Anderssonianum* Garcke in the herbarium of the Riksmuseum at Stockholm, collected by Andersson and presumably part of the type material, was examined by J. T. Howell and by the writer, and the carpels were found to be without an endoglossum. It would appear, therefore, that Svenson was right in regarding *A. Anderssonianum* as closely related to (perhaps only a few-flowered form of) *Abutilon umbellatum* (L.) Sweet. This conclusion was reached also by Prof. Dr. E. Ulbrich, who wrote to Mr. J. T. Howell on December 2, 1935 (translated): "I have again compared *Abutilon Anderssonianum* Garcke with *A. umbellatum* (L.) Sweet. The type material, which Garcke described, is very scanty in our herbarium, but it is undoubtedly identical with *A. umbellatum* (L.) Sweet. I must, therefore, concur with Svenson in referring *A. Anderssonianum* to *A. umbellatum*."

California Academy of Sciences,
San Francisco, California.

Literature Cited

Andersson, N. J. 1855. Om Galápagos-oarnes Vegetation.S. Vet. Akad. Handl. 1853: 63-256.

Cavanilles, Ant. Joseph. 1785–1790. Monadelphiae classis dissertationes decem.

FAWCETT, WILLIAM AND ALFRED BARTON RENDLE. 1926. Flora of Jamaica. Volume 5. 305 pp. Longmans & Co. London.
FRIES, ROB. E. 1908. Entwurf einer Monographie der Gattungen Wissadula und Pseudabutilon. Sv. Vet. Akad. Handl. series 2, 43[4]: 1-114.
GRISEBACH, A. 1859–1864. Flora of the British West Indian Islands. 780 pp. Lovell Reeve & Co., London.
HOCHREUTINER, B.P.G. 1920. Notes sur les genres Cristaria, Bakeridesia, Malvastrum. Ann. Conserv. et Jard. Bot. Geneve 21: 405-428.
KEARNEY, THOMAS H. 1935. The North American species of Sphaeralcea subgenus Eusphaeralcea. Univ. Calif. Publ. Bot. 19: 1-127.
KRAPOVICKAS, ANTONIO. 1949. Las especies de Sphaeralcea de Argentina y Uruguay. Lilloa 17: 179-221.
ROBINSON, B. L. 1902. Flora of the Galápagos Islands. Proc. Am. Acad. 38: 75-270.
SCHUMANN, CAROLUS (K.) 1891. Malvaceae I in Martius, Fl. Bras. 12[3]: 253-456.
STANDLEY, PAUL C. 1923. Trees and shrubs of Mexico. Malvaceae. Contr. U.S. Nat. Herb. 23: 746-786.
STEWART, ALBAN. 1911. A botanical survey of the Galápagos Islands. Proc. Calif. Acad. ser. 4, 1: 7-288.
SVENSON, HENRY K. 1935. Plants of the Astor expedition, 1930 (Galápagos and Cocos Islands). Am. Jour. Bot. 22: 208-268.
————. 1946. Vegetation of the coast of Ecuador and Peru and its relation to that of the Galápagos Islands. II. Catalogue of Plants. *ibid.* 33: 427-498.

PLANKTON ALGAE OF SOME LAKES OF WHATCOM COUNTY, WASHINGTON

GEORGE J. SCHUMACHER AND W. C. MUENSCHER

Whatcom County, Washington, is the extreme northwestern county of the United States. It is bordered on the west by Puget Sound, on the north by British Columbia, on the east by the main divide of the Cascade Mountains and on the south by Skagit County. In general topography, the ruggedness increases from west to east and varies in elevation from the low coastal area of the Puget Sound Basin to Mount Baker which towers 10,780 feet above sea level. The western part is mostly rolling uplands and alluvial stream valleys, which are replaced by the low rounded foothills in the central area, while Mount Baker and the Cascade Range dominate the western portion.

Three main rivers drain the county (Muenscher, 1941). The western part is drained by the Nooksack River and its three tributaries which originate in the glaciers of Mount Baker and empty into Bellingham Bay. The central and eastern parts of the county are drained southward by the Skagit River and the Baker River system while several streams drain to the north into the Fraser River. Lake Whatcom, the largest natural lake in the county, is drained directly into Bellingham Bay by Whatcom Creek.