

BOTANY.—*Chaetospermum*, a new genus of hard-shelled citrous fruits. WALTER T. SWINGLE, Bureau of Plant Industry.

The wild relatives of the common orange may be divided into several rather distinct groups. One of these consists of the hard-shelled citrous fruits of which the best known representatives are the bael fruit, *Belou marmelos* (L.) W. F. Wight (*Aegle marmelos* (L.) Corrêa), and the wood apple of India (*Feronia elephantum*, Corrêa). These two were known to Rheede, Rumphius, Hermann and other pre-Linnean botanists as well as to Linnaeus himself.

A number of other plants belonging to this group are known to botanists. Four of them are natives of Africa and have come to light only recently. In the East Indies two species have long been known, but are little understood as yet. One of these, *Feronia lucida* Scheffer, grows in Java and is closely related to the wood apple of India. The other, the subject of the present note, was described in 1837 by Blanco, in the first edition of his *Flora de Filipinas*, under the name *Limonia glutinosa*. He saw it growing on Mt. Arayat, Province of Manila, Luzon Island, and noted that it was called *malacabuyao* or *tabog* by the Tagals.

In the second edition of his *Flora de Filipinas*, published in 1845, Blanco recognized that this plant was related to the wood apple and renamed it *Feronia ternata*.

About 1878, Andrés Naves, in editing a new illustrated edition de luxe of Blanco's *Flora de Filipinas*, recognized that the tabog was more nearly allied to the bael fruit than to the wood apple and accordingly transferred it to the genus *Aegle* making a new specific name *A. decandra*. In 1904 Merrill restored Blanco's original specific name, *Aegle glutinosa* (Bl.) Merrill.

An examination of the typical material in the Botanical Museum at Dahlem bei Berlin, made by the writer in June, 1911, showed *Limonia Engleriana*, Perkins, to be the tabog, as had been noted by E. D. Merrill on one of the paratypes.

In establishing a new genus, *Aeglopsis*,¹ from tropical West

¹ Swingle, Walter T., 1912, Le genre *Balsamocitrus* et un nouveau genre voisin, *Aeglopsis*, in Bull. Soc. bot. de France (1911), 58 (mém. 8d): 225-245, figs. A, B, pls. 1-5 (March 2) also in Chevalier, Aug., Novitates florae africanae, fasc. 4, p. 225-245.



Africa, belonging to the hard-shelled citrus fruits, it became necessary to look up all the known plants of this group. This resulted in bringing to light a new species of wood apple from Indo-China, the type of a new genus² closely related to *Feronia*.

A reëxamination of the tabog, undertaken at the same time was facilitated by a fruiting specimen in the National Herbarium collected by E. D. Merrill (No. 3641, Concepción, Prov. Tárlac,

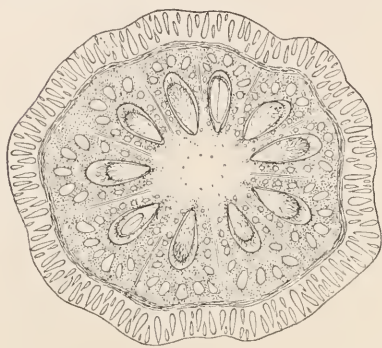


Fig. 1. Cross section of a fruit of *Chaetospermum glutinosa* (Concepción, Luzon, November, 1903, E. D. Merrill, No. 3641). Natural size. Shows the thick rind with long slender pointed oil glands; a thin intermediate layer; and an endocarp composed of spongy vesicular tissue (thickened ovary walls) surrounding the cells. The pith is not vesicular.

Luzon, November, 1903), and showed that this species differs from *Belou marmelos* in flower, fruit, leaf and germination characters so profoundly that it must be put in another genus. The stamens of the tabog are ten in number, being twice as many as the petals instead of very numerous (more than four times as many as the petals) as in the bael fruit. The ovary of the tabog has 8 to 10 cells instead of 10 to 15 commonly found in the bael fruit. The fruit is oblong or long oval with low longitudinal ridges corresponding in number and position to the segments, and has a thick leathery

rind. The bael fruit is spherical or pyriform, never ridged, and has a very hard, woody rind.

The cells of the tabog fruit are lined with a spongy tissue showing very large cavities or vacuoles. Nothing of the sort is found in any other of the hard-shelled citrus fruits (see fig. 1).

The leaves of the tabog are persistent instead of deciduous as in the bael fruit and have smaller, more rounded lateral leaflets. On germination the cotyledons become aerial in the tabog but remain hypogeous in the bael fruit.

Already in 1846 Roemer in his *Synopses monographicae* made a subgenus, *Chaetospermum*, under the genus *Limonia*, for this

² This will appear shortly in the Bulletin de la Société botanique de France

species, stating that he believed this to be the type of a new genus “-Typum novi generis certe format, ex ordine forsan excludendi.”³

In view of Roemer's conviction that the plant constitutes a new genus it seems fitting to raise his subgenus to generic rank.

Chaetospermum (Roem.) n. gen.

Chaetospermum Roemer, M. J., 1846, Synop. Monogr. 1: 39, as subgenus of *Limonia*.

Type species *Limonia glutinosa*, Blanco, M., 1837, *Flora de Filipinas*, p. 358.

A genus related to *Belou*, from which it differs in having persistent leaves with small rounded sessile lateral leaflets, fewer stamens (twice as many as the petals), fewer ovarian cells (8 to 10), an oblong ribbed fruit with a thick leathery rind and cells lined with a spongy tissue containing many large cavities or vacuoles (see fig. 1).

Leaves persistent, trifoliolate, lateral leaflets small, sessile, usually less than one-third as long as the median, more or less blunt at the base or even rounded. Terminal leaflet gradually narrowed at the base. *Petioles* narrowly winged with a joint at the point of attachment of the leaflets. *Spines* slender, straight, sharp, in pairs at the axils or else one of the spines is replaced by a branch. *Inflorescences* axillary, composed of from one to several flowers on rather long, slender pedicels. *Flowers* perfect, 5-merous; calyx 5-lobed, petals 5, stamens 10, free. *Pistil* with a well developed style and a thick rounded stigma. *Ovary* with 8 to 10 cells, each containing numerous ovules. *Fruit*, oblong, longitudinally ribbed, with a very thick leathery rind, and with cells (filled with gum?) surrounded with watery tissue containing large cavities or vacuoles. *Seeds* numerous in the long narrow cells, flattened ovate, hairy. *Germination*—Cotyledons aerial, not increasing in size; first foliage leaves opposite, broadly ovate, subseriate, sessile, abruptly narrowed at base.

A small tree native to the Island of Luzon, Philippine Archipelago.

Chaetospermum resembles *Belou* in having trifoliolate leaves, a many-celled ovary, and hairy seeds, but differs in many essential characters as noted above.

It agrees with *Feronia* in having aerial cotyledons which do not, however, show any increase in size during germination as in this latter genus. It agrees with *Aeglopsis* in having fruits with a leathery rather than a woody cortex, altho there are woody elements in the rind of an *Aeglopsis* fruit which seem to be lacking in *Chaetospermum*.

³ Roemer, M. J., 1846, Syn. monogr. Fasc. 1: 39.

Chaetospermum differs widely from all the other hard-shelled citrous fruits and constitutes a striking new genus. It undoubtedly belongs to the hard-shelled group of citrous fruits tho it alone does not (so far as known) have woody elements in the cortex.

Only one species is known; its synonymy is as follows:

Chaetospermum glutinosa (Blanco) n. comb.

Limonia Glutinosa Blanco, 1837, Fl. Filip. Ed. I, p. 358.

Feronia ternata Blanco, 1845, Fl. Filip. Ed. II, p. 252.

Ægle decandra, Naves, 1878 (?), in Blanco, Fl. Filip. Ed. III, pl. 124.

Ægle glutinosa (Blanco), Merrill, 1904, in Phillip. Gov. Lab. Bur. Bull. n. 6, p. 12.

Limonia Engleriana, Perkins, 1905, Frag. Fl. Phillip. Fasc. III, p. 163.

Belou glutinosa (Blanco) Skeels, 1909, Bull. 162 Bur. Pl. Ind. Dept. Agr. p. 26.

Illustrations:

Naves 1878 (?) in Blanco, M., Flora de Filipinas, Ed. 3. vol. 2, pl. 124 (Lvs. fls. and fts.)

Vidal y Soler, S., 1883, Sinopsis de familias y generos de plantas leñosas de Filipinas, pl. 25, fig. J, 1-5 (Fls. fts. and seed).

Swingle, Walter T., 1912, Le genre *Balsamocitrus*, etc., l. c., pl. 5 (Young plant).

The tabog is a small tree native to the central part of Luzon, Philippine Islands. This species has been reported from the provinces of Tárlac, Pampanga (the type locality is Monte Aráyat in this province), Bataán, Manila, and Mórong. I have seen specimens from all of these provinces except Pampanga and Mórong, and have also seen a specimen in Herb. Kew collected by Vidal y Soler in 1886 at Angat, Prov. Bulacán. Young plants from one to three years old are now growing in the greenhouses of the Bureau of Plant Industry.

It has been found that oranges, lemons, grape-fruits, kumquats and other citrous fruits grow well when budded or grafted on such young tabog plants.