Bisgoeppertia (Gentianaceae) unravelled. Account of a small genus of the Greater Antilles

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Bisgoeppertia (Gentianaceae) unravelled. Account of a small genus of the Greater Antilles

Abstract

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Bisgoeppertia is a genus of herbaceous, short-lived twiners, endemic to the Greater Antilles (Cuba and Hispaniola). It consists of three well characterised species: *B. gracilis* on serpentinite soils in the western half of Cuba, *B. robustior* also on similar substrates in eastern Cuba and *B. scandens* limited to the Dominican Republic in Hispaniola. In spite of being the most often collected of the three, *B. robustior* so far lacked a legitimate name, having been confused with either of the two others; it is described as a new species.

Additional key words: *Bisgoeppertia robustior,* taxonomy, Cuba, Hispaniola, ultramafic rock, serpentinite.

Introduction

Bisgoeppertia is a small genus of *Gentianaceae* only known from Cuba and Hispaniola. It consists of twining herbs, a characteristic habit that is exceptional in the family, being shared only by the unrelated, Asian genus *Crawfurdia* Wall. (Gilg 1895). Its first representative to be described was a plant from Hispaniola collected by Bertero, which Sprengel (1824) named *Lisianthius scandens*. Grisebach (1862a-b) recognised its generic distinctness by creating a new genus *Goeppertia* for it. He was aware of the existence of at least one of several earlier homonyms, *Goeppertia* Nees 1836 in *Lauraceae* (he did not mention the earliest, *Goeppertia* Nees 1831 in *Marantaceae*), but under the habits prevailing at the time, as that name had fallen into synonymy, he felt free to reuse it. Under the current nomenclatural rules *Goeppertia* Griseb. is illegitimate, and Kuntze (1891) was correct when he proposed a substitute name, *Bisgoeppertia*.

Grisebach (1862a-b) originally recognised a single species in *Goeppertia,* which – again illegitimately under the current rules – he named *G. volubilis.* Grisebach did not "invent" the epithet

volubilis, it had been unnecessarily introduced by Martius when transferring *Lisianthius scandens* Spreng. to the genus *Coutoubea* Aubl. (and was also adopted under *Bisgoeppertia* by Kuntze, contrary to his own precepts). The (illegitimate) *G. volubilis* and the (correct) *Bisgoeppertia scandens* (Spreng.) Urb. are both typified by Bertero's plant from Hispaniola. However, Grisebach, who had not seen that type, based his generic and specific descriptions solely on the specimen *Wright 1372* (GOET) from the Monte Verde area in Guantánamo Province, eastern Cuba.

Subsequently another specimen, *Wright 2979* from San Marco in the Pinar del Río Province, western Cuba, came into Grisebach's hands, which he immediately recognised as representing a different species. He described it as *Goeppertia gracilis* and aptly contrasted it against *G. volubilis* as represented by the Monte Verde material. Subsequent authors on the Cuban flora had no problem in reliably distinguishing those two. Alain (1957), in particular, gives accurate descriptions and a functional key, citing *Bisgoeppertia scandens* for the Cuban "Oriente" (plus Hispaniola) and *B. gracilis* for the western and west-central provinces of Pinar del Río, Habana and Las Villas (now shared between Villa Clara and Cienfuegos).

Knoblauch (1894), misled by Martius's somewhat ambiguous description, believed that the Bertero plant (which he had not seen) was indeed a *Coutoubea,* for which he published the (legitimate) combination *C. scandens* (Spreng.) Knobl. He used the names *Bisgoeppertia* and *B. volubilis* for taxa that explicitly excluded their nomenclatural type, thereby in effect validating both names as (illegitimate) later homonyms.

A further and so far last *Bisgoeppertia* species was described by Urban (1902-03) from the Dominican Republic in Hispaniola: *B. prenleloupii.* Urban contrasted it against *B. gracilis,* but from the detailed original description it is obvious that the only substantial difference from *B. scandens* is in its smaller leaves lacking lateral veins. Later Urban (1913) himself reduced *B. prenleloupii* to synonymy under the then newly published *B. scandens,* having realised that the difference resulted from the absence of full-sized stem leaves in the former's type specimen.

What, then, is there left to unravel? Not much perhaps, were it not for the fact that the novel, big "Flora de la República de Cuba" (Thiv 2002) got matters thoroughly scrambled. So far, botanical authors had explicitly or tacitly assumed that the eastern Cuban and plants and those from Hispaniola belonged to one and the same species – but had only one of them at hand and no opportunity to compare. Thiv, having seen both side by side, rightly concluded that they were different. Having noted that the taxon growing on Hispaniola, to which the type of *Bisgoeppertia scandens* belongs, is rather more similar to the western than to the eastern Cuban taxon, he applied the name *B. scandens* to the former. He furthermore unaccountably referred to the eastern Cuban taxon as *"B. gracilis"*. This switch of names between so far well understood species is deplorably confusing.

The present paper is written to set matters straight and to reconsider the so far neglected question of how the Cuban plants relate to those of Hispaniola.

Material and methods

The *Bisgoeppertia* material kept in the herbaria B, GOET (part), HAC, HAJB, HPPR, JBSD, JE, NY (part) and ULV, more than 120 specimens in total, forms the basis of the present account. Label data have been entered into a database in Microsoft® Office Access 2003 format, "Base de Datos de especímenes de la Flora de Cuba", tailored by Mauricio Niño and Frank Specht. These data were integrated with the largely complementary data set produced by Mike Thiv during the preparation of the *Gentianaceae* account for the "Flora de la República de Cuba" (Thiv 2002). The specimen data are not included here but will be made available online (www.bgbm.org/BioDivInf/Projects/Floraofcuba) and on CD in the next version (5.0) of that database, to be released in 2009.

The distribution map was produced directly from the database with the help of an apposite mapping programme written by Ralf Jahn.

Results

There are three clearly delimited species in *Bisgoeppertia,* not two as has been generally believed. One, *B. scandens,* is endemic to Hispaniola. The second, *B. gracilis,* is a rare plant of western and west-central Cuba. The third, that occupies a coherent area in eastern Cuba, lacks a legitimate name and is here described as new. The distribution of the two latter is mapped in Fig. 1. Morphologically, *B. gracilis* is closer akin to *B. scandens* than to the new species. A formal treatment follows.

Bisgoeppertia Kuntze, Revis. Gen. Pl. 1-2: 426. 1891 ≡ *Goeppertia* Griseb. in J. Linn. Soc., Bot. 6: 141. 1862 [non *Goeppertia* Nees in Linnaea 6: 337. 1831 *(Marantaceae)*]. – Type: *Bisgoeppertia volubilis* Kuntze, nom. illeg. (*Goeppertia volubilis* Griseb., nom. illeg., *Lisianthius scandens* Spreng., *B. scandens* (Spreng.) Urb.).
= *Bisgoeppertia* Knobl. in Bot. Centralbl. 60: 355. 1894 [non Kuntze 1891]. – Type (designated here): *Bisgoeppertia volubilis* Knobl. non Kuntze [= *B. robustior* Greuter & Rankin].

A genus of three species occupying a disjunct total area confined to the Greater Antilles, viz., Cuba and Hispaniola.

1. *Bisgoeppertia scandens* (Spreng.) Urb., Symb. Antill. 7: 537. 1913 ≡ *Lisianthius scandens* Spreng., Syst. Veg. 1: 587. 1824 ≡ *Coutoubea volubilis* Mart., Nov. Gen. Sp. Pl. 2: 112. 1827, nom. illeg. ≡ *Goeppertia volubilis* Griseb. in J. Linn. Soc., Bot. 6: 141. 1862, nom. illeg. ≡ *Bisgoeppertia volubilis* Kuntze, Revis. Gen. Pl. 1-2: 426. 1891, nom. illeg. ≡ *Coutoubea scandens* (Spreng.) Knobl. in Bot. Centralbl. 60: 356. 1894. – Lectotype (Thiv 2002): Hispaniola, *Bertero 956* (M!).
= *Bisgoeppertia prenleloupii* Urb., Symb. Antill. 3: 331. 1902. – Lectotype (Thiv 2002): Hispaniola, "Sto. Domingo", *Prenleloup 335* (G!; holotype: B†).

Endemic to the Dominican Republic of Hispaniola. – Fig. 2.

2. *Bisgoeppertia gracilis* (Griseb.) Kuntze, Revis. Gen. Pl. 1-2: 426. 1891 ≡ *Goeppertia gracilis* C. Wright ex Griseb., Cat. Pl. Cub.: 180. 1866. – Lectotype (designated here): Cuba, prov. Pinar del Río, "San Marcos", 22.8.[1862 or 1863], *Wright 601 = 2979* (GOET herb. Griseb. 8116!; possible isotypes: BM, G, GH, GOET herb. Griseb. 8115!, HAC!, K, MO, P).

Endemic to western and west-central Cuba. – Fig. 3.

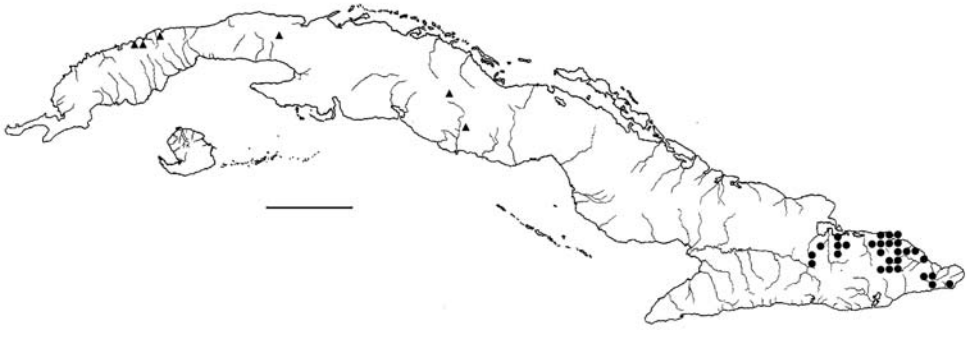

Fig. 1. Map showing the distribution of *Bisgoeppertia* taxa in Cuba – ▲: *B. gracilis;* ●: *B. robustior.* – Scale bar: 100 km.

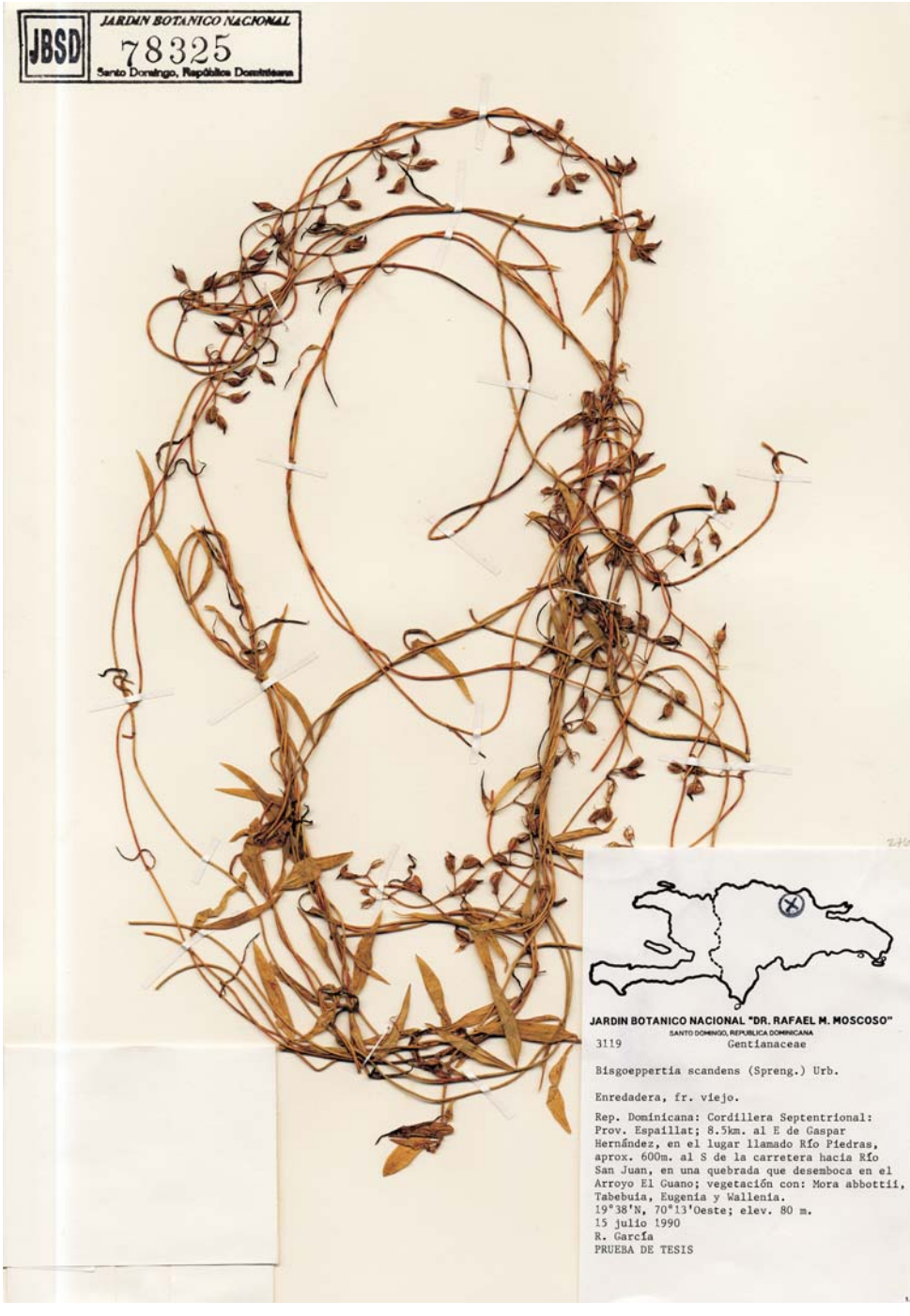

Fig. 2. A representative specimen of *Bisgoeppertia scandens, García 3119* (JBSD) from Espaillat Province in the Dominican Republic.

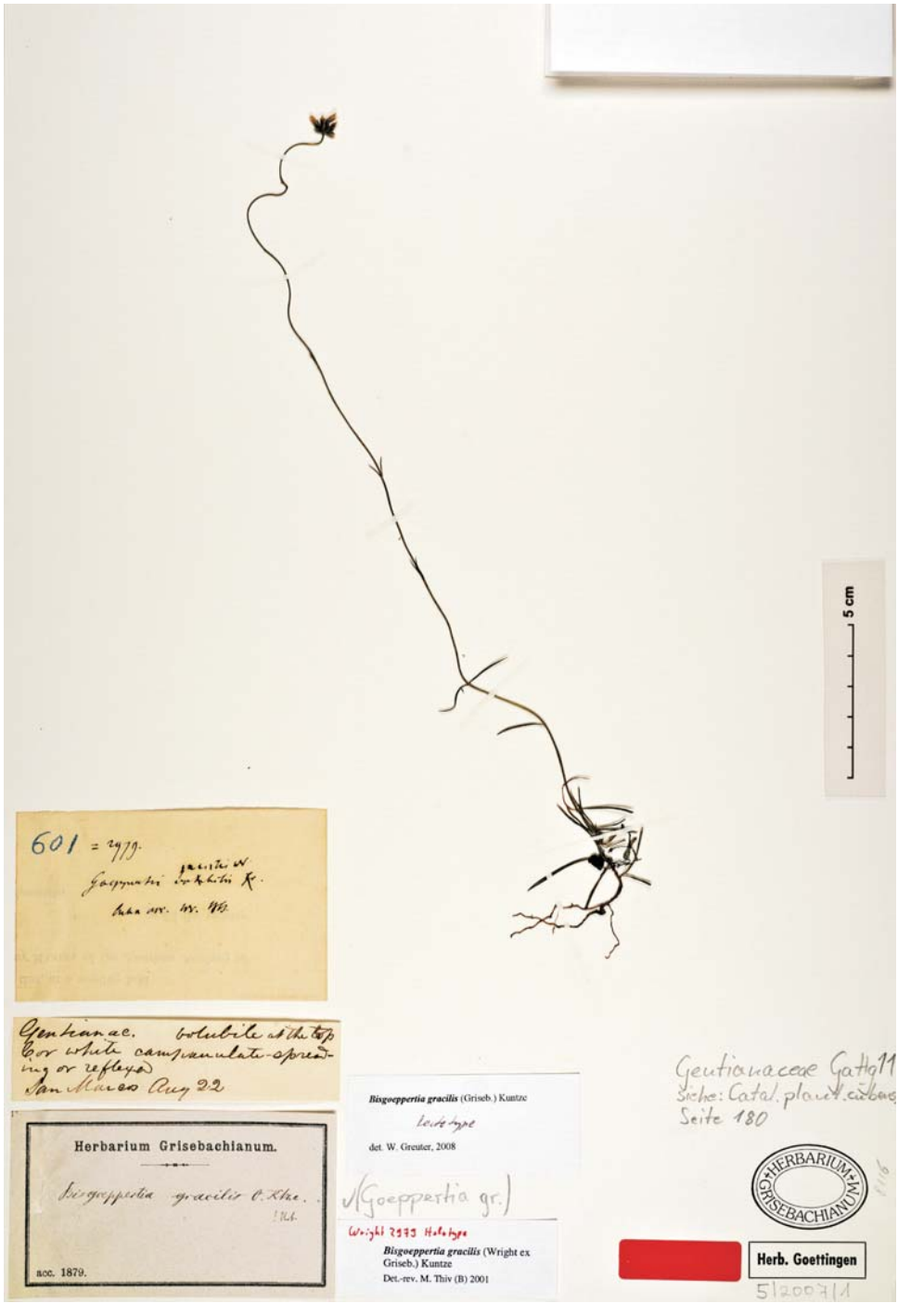

Fig. 3. Lectotype specimen of *Bisgoeppertia gracilis, Wright 601 = 2979* (GOET).

Fig. 4. Isotype specimen of *Bisgoeppertia robustior, Arias & al. HFC 53216* (B).

3. *Bisgoeppertia robustior* Greuter & Rankin, **sp. nov.**

Holotype: Cuba, Guantánamo Province, Sierra de Imías, charrascos y pinar en la cima de la Loma Majagua Hueca, 16.4.1984, *Bisse, Gutiérrez, Günther, Meyer, Mory, Sánchez, Rankin & Arias HFC 53216* (HAJB; isotypes: B, HAJB [3×], JE).
= *Bisgoeppertia volubilis* Knobl. in Bot. Centralbl. 60: 355. 1894 [non Kuntze 1891]. – Holotype: East Cuba, prov. Guantánamo, "prope villam Monte Verde dictam", 1859, *Wright 1372* (GOET; possible isotypes: G, GH, HAC!, K, MO, NY).

A ceteris speciebus hujus generis differt calyce minuto 2.5-3 mm tantum longo, corollae tubo et capsula e calyce bene exsertis et sepalis acutis apice recurvis saepe uncinatis; a *Bisgoeppertia gracili* insuper foliis latioribus anguste lanceolatis (explanatis ad 5 mm latis) et inflorescentia multiflora elongata divaricatim ramosa, et a *B. scandente* foliis caulinis brevioribus (ad 3 cm longis).

Endemic to eastern Cuba. – Fig. 4.

Key for identification of the species of *Bisgoeppertia*

1. Calyx 2.5-3 mm long, much shorter than capsule and corolla tube; sepals acute, with recurved, often hooked tips . . . . . 3. *B. robustior*
– Calyx at least 4.5 mm long, equalling or exceeding capsule and corolla tube; sepals acuminate, with subulate, straight or slightly arched tip 2
2. Larger stem leaves narrowly lanceolate, flat, 3-5 cm × 2-8 mm, with 3-5 longitudinal veins; dichasia lax, flowers distinctly stalked . . . . . 1. *B. scandens*
– Stem leaves narrowly linear, often convoluted, 1-3 cm × 0.5-1.2 mm, lacking distinct lateral veins; dichasia condensed, flowers (in dichasia) sessile or shortly (< 1 mm) stalked . . . . . 2. *B. gracilis*

Discussion

Bisgoeppertia is a genus of short-lived herbs with little if at all branched and very slender, twining stems that according to Alain (1957) can reach a height of 2 m above the ground. The leaves are opposite, widely spaced, linear to lanceolate, becoming bracteiform in the inflorescence.

The flowers are small, 5-merous, white to yellowish or greenish, forming simple or compound thyrsoid inflorescences. The flowers are often sessile or, if stalked, the lateral ones are bi-bracteolate apically, just below the calyx. The corolla has a tubular base and 5 elliptic lobes, which are spreading (or according to a field note by Wright, even reflexed) during anthesis, but normally upright and enclosing the anthers, persisting until the fruit matures. The stamens are inserted near the tip of the corolla tube, the linear-sagittate, straight anthers being exerted from the tube but overtopped by the lobes.

The shape of the stigma is an important generic characteristic. Seen from the outside it is cylindrical in shape, with a blunt tip. In fact the cylinder is hollow, being apically attached to the tip of the style and gloving its distal portion. This description matches *Bisgoeppertia gracilis* (Fig. 5) better than *B. robustior,* in which the stigmatic cylinder is relatively short and stout, massive distally and with a membranous, two-lobed basiscopic collar below. *B. scandens* has a similar stigma as pointed out by Urban (1902). Knoblauch's (1894) assumption that the latter's style ends in two ovate-orbicular, flattened stigmatic lobes, as in *Coutoubea,* rests on a misunderstanding.

The least collected of the three species is the first to have been discovered, *Bisgoeppertia scandens.* According to Alain (1989) it is absent from Haiti and only known from two places in the Dominican Republic. Apart from Bertero's and Prenleloup's specimens listed above as types, which lack locality data, we have studied four modern specimens, all from low altitudes (< 500 m) in the northern half of the country (Provinces of Espaillat, Samaná and La Vega). The label data do not indicate preference for a given lithological substratum, but the localities do not suggest any affinity to the country's scant serpentinite areas.

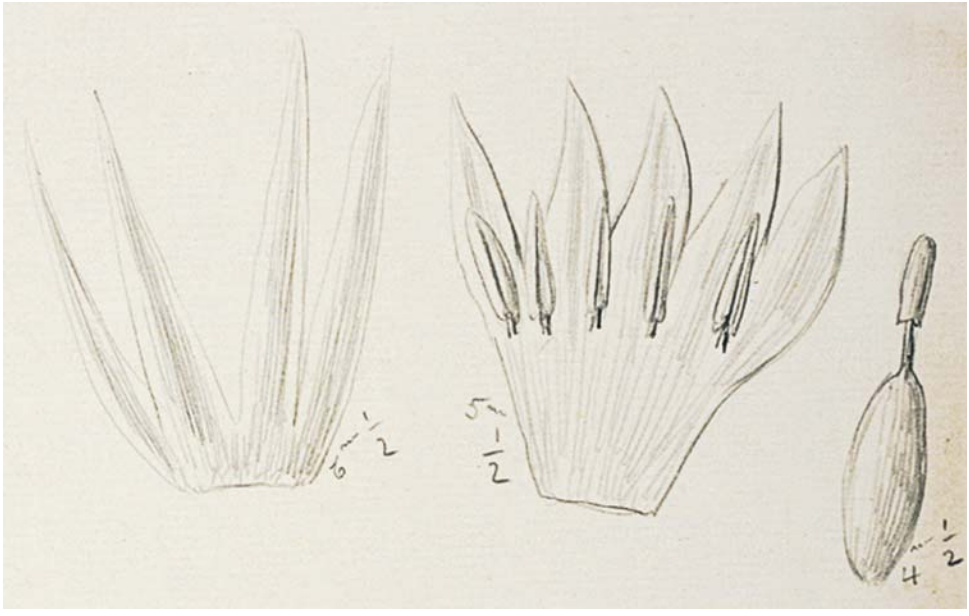

Fig. 5. Analysis of floral details of *Bisgoeppertia gracilis,* showing stigma shape (right) in particular. Drawing (presumably by N. L. Britton) associated with the specimen *Britton & al. 702* (NY) from Cuba, Habana Province, near Madruga.

Bisgoeppertia gracilis is also a rare and infrequently collected plant. Six localities are known to us, mostly at altitudes between 200 and 400(-700) m: three close together near the northern coast of the Pinar del Río Province, the other three widely scattered over the western half of Cuba (Fig. 1). As far as is known, *B. gracilis* grows only in areas in which with ultramafic bedrock is present, and it probably is a strict "serpentinophyte". In two of the three western localities, including the type population, the plants show a striking appearance, being uniformly annual, completely unbranched and with most of the leaves crowded near the stem base. This initially suggested to us the existence of two different taxa. However the therophyte syndrome is poorly correlated with distribution, and we now suspect that it is the result of synchronous germination – perhaps following heavy rainfall and/or burning – and speedy flowering of large numbers of individuals, when the species under normal conditions survives only as seeds. This hypothesis would explain the paucity of collections, and also our recent failure to find the species in one of its known localities.

Bisgoeppertia robustior, so far confused with *B. scandens* (by most authors) or *B. gracilis* (by Thiv 2002), is a well characterised species that occupies a coherent, fairly large territory in easternmost Cuba (provinces of Guantánamo, Holguín and Santiago de Cuba), which coincides almost exactly with the largest single serpentinite area of the Caribbean. Although some label data mention an occurrence on limestone bedrock, this would at best be a local extension or more likely, inaccurate. Within its limited geographical range the species is obviously fairly frequent; recorded altitudes range from 200 to 800 m.

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