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## The four *Rubus* species of the archipelago of Madeira (Portugal)

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With 12 figures

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**ABSTRACT:** Field work and investigation of herbarium specimens of Madeiran brambles were carried out in the years 2014 to 2016. The studies revealed that the *Rubus* flora of Madeira consists of four species: (1) *Rubus serrae* Soldano, (2) *Rubus suspiciosus* Menezes, (3) *Rubus vahlii* Frid., and (4) *Rubus ulmifolius* Schott. Species 1, 2 and 3 are endemic to Madeira.

In contrary to earlier statements, *R. bollei* Focke does not occur in Madeira.

**Keywords:** *Rubus*, Rosaceae, brambles, Madeira.

**RESUMO:** Os silvados da Madeira foram estudados, entre 2014 e 2016, através de trabalhos de campo e de análise de espécimes herborizados. Estes estudos revelaram que o género *Rubus* na Madeira encontra-se representado por quatro espécies: (1) *Rubus serrae* Soldano, (2) *Rubus suspiciosus* Menezes, (3) *Rubus vahlii* Frid., e (4) *Rubus ulmifolius* Schott. As espécies 1, 2 e 3 são endémicas da ilha da Madeira.

Contrariamente ao que se pensava, *Rubus bollei* Focke não ocorre na Madeira.

**Palavras-chave:** *Rubus*, Rosaceae, silvados, Madeira.

## INTRODUCTION

During previous periods of floristic recording the genus *Rubus* in Madeira was registered rather incidentally. Earlier botanists did often not adhere to the requirements of proper *Rubus* sampling (sections of this year's shoots with fully developed leaves, plus a representative inflorescence). The worries about thickness of herbarium specimens misled to cut lateral twigs and young leaves, what made determination difficult. Hence the knowledge about taxonomy and distribution of this genus in the island was not satisfactory.

A typification of the Macaronesian brambles was published 16 years ago (MATZKE-HAJEK, 2001). At that time field studies by the author had been carried out in the Canary Islands and Azores, while samples from the Madeiran archipelago were studied mainly on the base of herbarium material.

In the meantime we took several opportunities to do more detailed observations in Madeira and to gather better material of formerly doubtful *taxa*. We also tried to trace and search historical type localities. On this base we come to new results, especially concerning the identity of *taxa* which were formerly included in *Rubus bollei* Focke.

In the following chapters we illustrate the wild Madeiran *Rubus* species with photos of living plants and we give descriptions of those that have to be discriminated from *Rubus bollei*.

Determination characters are highlighted in an identification key. Lists of herbarium specimens allow a first assessment of the distribution. The localities are given in the order of three zones (north slope, central ridge, south slope), and within these zones from west to east. Nineteenth century specimens, which lack information on their exact provenance, are mentioned at the end of the respective chapters. Public herbaria are quoted with their acronyms following *Index Herbariorum* (THIERS, 2006). The first author's private herbarium is abbreviated as GMH.

## RESULTS

### 1. *Rubus serrae* Soldano (= *R. grandifolius* Lowe, nom. illeg.) (Figs. 1-4)

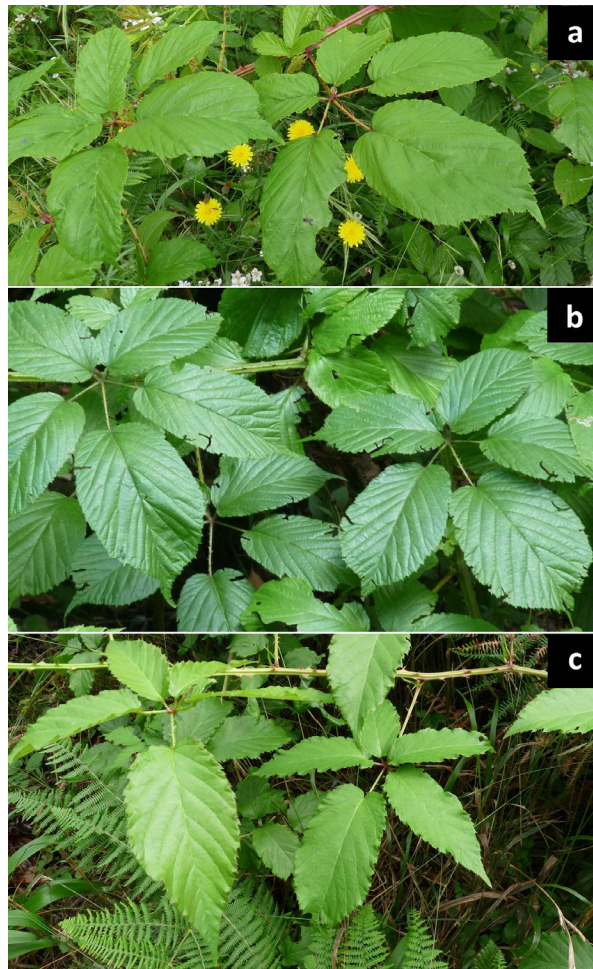
Morphology, taxonomy and nomenclature of *R. serrae* were treated in MATZKE-HAJEK (2001) and must not be repeated here. The description however did not cover the whole variability. For example the frequency of glandular setae on the main stems may vary from none to more than

10 per cm stem side (Fig. 1). Plants growing in moist and shaded situations usually have more setae and less prickles, sometimes there are no stem prickles at all. The ability to climb several meters into trees is then due to the hooked prickles on the petiolules. These plants often have very big leaves, with broad obovate leaflets and a delicate lamina. They resemble *Rubus palmensis* Hansen, an endemic of the western Canary Islands. The latter can be distinguished from *R. serrae* by the rareness of glandular setae in the inflorescence. It has no glandular bristles on the sepals and usually only subsessile glands on the pedicels.

*R. serrae* is ecologically the most demanding bramble of Madeira. It is confined to woodland ecosystems, but not necessarily to intact laurisilva. As many brambles, it reaches full vitality in clearings, large treefall gaps, power line lanes and on north-exposed forest edges. A plant community with dominant *Rubus serrae* was recently described as *Diplazio caudati-Rubetum serrae* by VICENTE ORELLANA *et al.* (2016). On Madeira's southern slope, we found the species only above 500 m *a.s.l.*, and preferably in valleys with high humidity. On the northern slope, where fog and rainfall are frequent, it was observed down to about 250 m *a.s.l.*; maximum altitude is reached in the mountains, between Achada do Teixeira and Pico Ruivo, at about 1.600 m *a.s.l.*



Fig. 1 – Variability of stems of *Rubus serrae* from shaded and humid (a) to fully sunny (d).



**Fig. 2** – Variability of leaves of *Rubus serrae*: (a) fully developed leaves from sunny locality; (b) fully developed leaves from shaded, humid locality; (c) leaves of side branch.



**Fig. 3** – Inflorescence of *Rubus serrae*.



**Fig. 4** – Detail of *Rubus serrae* inflorescence. Take notice of stalked glands.

The lectotype of *Rubus grandifolius* Lowe

Lowe's description of 1831 is only a few lines long. It refers to characters of the main stem, the leaves and the inflorescence. Pedicels and sepals exhibit the best determination features. Unfortunately the inflorescence which is mounted on the preliminary lectotype sheet was collected 15 years after the publication and does not belong to the 1827 gathering, which is represented only by untypical thin axis section with young leaves (MATZKE-HAJEK, 2001). These fragments were probably cut from a lateral branch or from the base of an inflorescence. This may explain why the leaf proportions do not correspond to those mentioned in Lowe's description. The length of the petiolules of the terminal leaflets, for example, measure 19,5-28,5% of the lamina length, on the lateral leaflets they are even shorter (12-20% of the lamina length). Compared to other bramble leaves, the petiolules should be characterized as "short", but in the protologue it reads "*foliolis ... longe petiolulatis*". Doubts about the identity usually are dispelled if a population still exists in the lectotype locality and can be studied there, but our endeavour to refind Lowe's plant was of no avail. The ravine west of Alegria (today an outer northern quarter of Funchal), where he collected the plant in 1827, has changed a lot during the last century. Extensive stands of *Eucalyptus globulus* Labill. have replaced the indigenous laurisilva and altered the environmental conditions. The understorey is locally dominated by *Acacia mearnsii* De Wild. and *Solanum mauritanum* Scop.. Scattered *Rubus* populations are more or less confined to the artificial embankments of forest roads.

Therefore we searched for better herbarium material that was collected and labelled by Lowe before his first publication (LOWE, 1831). Fortunately in P (Muséum national d'Histoire naturelle, Paris, France) a more complete specimen could be traced, which encloses a panicle with the characteristic glandular setae. While the preliminary lectotype was only labelled "*R. pedatus*" – a manuscript name, applied by Banks and Solander as mentioned in the protologue –, the specimen P 03134634 bears also the published epithet "*grandifolius*" in Lowe's handwriting. The unambiguous and complete specimen (P 03134634) supersedes the questionable and fragmentary gathering ("Madeira, ravine W of the Alegria" – K) as lectotype. This substitution does not have any nomenclatural consequences, quite in contrary, it secures a solid taxonomic base.

## Studied material

## Herbarium vouchers:

Lombo Barbinhas, Seixal, leg. M. Nóbrega, 3.IX.1957, MADJ 00464, 00465. – Entre o Seixal e São Vicente: margens abruptas da ribeira da Fajã da Eira, leg. Eng. Beliz & R. Santos, 8.VI.1957, MADJ 05175. – Terceira Lombada de Ponta Delgada, no nebrida as..., leg. Nóbrega, 28.IV.1987, MADJ 05179. – Boaventura, leg. ?, IV.1955, MADJ 00466. – Pico do Arco near Boaventura, leg. Matzke-Hajek, 17.VI.2016, Herb. GMH 20160617.1. – Forest road southwest Achada da Felpa, southwest of Sao Jorge, leg. Matzke-Hajek, 17.VI.2016, Herb. GMH 20160617.2. – Vereda da Bica da Cana ao Lombo do Mouro (Paúl da Serra), leg. et det. Juan Silva, 26.VI.2008 MADM 1006, 1007. – Encumeada - Levada between 1<sup>st</sup> and 2<sup>nd</sup> tunnel, leg. et det. Günther Maul, 18.VII.1971, MADM 1063, 1064, 1068, 1069. – Half way between Encumeada Pass and Vargem, left hand of the E228 (32° 45' 46" N 17° 01' 20.5" W), leg. Matzke-Hajek, 10.X.2014, Herb. GMH 20141010.3. – Half way between Encumeada Pass and Vargem, right hand of the E228 (32° 45' 47" N 17° 01' 20" W), leg. Matzke-Hajek, 10.X.2014, Herb. GMH 20141010.4. – 1 km north of Encumeada Pass, next to the E228, leg. Matzke-Hajek, 16.VI.2016, Herb. GMH 20160616.5. – Casa Florestal da Encumeada, Vereda para a Rib.<sup>a</sup> Grande S. Vicente; leg. Nóbrega, Noia, Eng.<sup>a</sup> Glória, Rui Santos e Isidoro, 14.X.1981, det. Nóbrega, MADJ 05178. – Footpath from Encumeada pass to Pico Topeiro, leg. Matzke-Hajek, 07.VI.2015, Herb. Matzke-Hajek 20150607.1. – Forest path to *Eucalyptus* plantation south of Encumeada, leg. Matzke-Hajek, 07.VI.2015, Herb. GMH 20150607.2 and 3. – Levada das Queimadas entre Casas e Caldeirão Verde onde há um caminho que passa abaixo da levada, leg. Günther Maul 5.IV.1964, MADM 1065. – Na Levada do Montado da Ilha para as Queimadas, leg. Eng. R. Vieira & R. Santos, 7.VI.1962, det. Armando Sardinha, MADJ 05182. – Achada do Teixeira - vereda para o Pico Ruivo, leg. Paulo Gouveia, 2.X.2002, MADJ 10.006 – Cova da Roda, leg. Eng. Rui Vieira, 14.5.1958, det. Armando Sardinha, MADJ 05181. – Ribeira da Metade, leg. G. Mandon, Pl. Maderenses no. 99, 15.V.1865 or 1866, P 04342649. – *In sepibus et ad rivulos*, Ribero da Metade, Jardim da Serra, 1000-1500 m, leg. G. Mandon, Pl. Maderenses no. 99, V-IX.1865 or 1866, P 03134641, P 03134642, P 03134648. – Levada Ribeiro Frio - Balcões, leg. Fontinha & R. Jardim, 2.V.1997, MADJ 08618. – *In sepibus*, Ribero Frio, 1500 m, leg. G. Mandon, Pl. Maderenses, 25.VI.1865, P 03134635, P 03134647. – Ribeiro Frio, 900 *m.s.m.*, leg.

et det. J. Bornmüller No. 582, 10.VIII.1900, P 03134643. – Ribeiro Frio, leg. Menezes *sine dat.*, COI 00075212. – Levada northeast Ribeiro Frio, leg. Matzke-Hajek, 08.X.2014, Herb. GMH 20141008.5, 20141008.6. – Levada Moinho north of Ponta do Sol, leg. Matzke-Hajek, 10.VI.2015, Herb. GMH 20150610.4. – Madeira, left hand of the road from Jardim da Serra to Boca da Corrida (32° 42' 18,5" N 16° 59' 12" W), leg. Matzke-Hajek, 20.VI.2016, Herb. GMH 20160620.3. – At the Jardim, leg. R. T. Lowe 391 [or 396?] *Rubus grandifolius* Lowe (pedatus), 27.VII.1827, P 03134634. – Jardim da Serra, bords des ruisseaux dans les hayes, leg. G. Mandon, VII-X, P 03134646. – Ribeira de Sta. Luzia, 1100 *m.s.m.*, leg. et det. J. Bornmüller, *Plantae exsicc. Maderenses* Nr. 583, VIII.1900, P 03134638, P 03134639. – Ilha da Madeira: Rib.<sup>a</sup> de Sta. Luzia, leg. C. d'A. Menezes, 1903, COI 00075211. – Ribeira de Sta. Luzia, leg. C. Menezes, 1906, COI 00075213. – Rib.<sup>a</sup> de Sta. Luzia, leg. C. Menezes, 1906, COI 00075214. – Ribeira de Santa Luzia west of Monte, north of the quarry, leg. Matzke-Hajek, 08.VI.2015, Herb. GMH 20150608.2. – Levada da Serra, leg. M. Nóbrega, VI.1954, "Rubus bollei ulmifolius?" MADJ 00450, 00451. – Ile de Madere, leg. M. Webb, *sine dat.* [1828?], P 03134650. – Madere, leg. Webb, *sine dat.* [1828?], P 03134652. – Madeira, leg. N. H. Mason, 1856, "Rubus fruticosus", P 03134527, P 03134651. – Madere, leg. M. Mason No 166A, 1857, P 03134636, P 03133640. – Madere, leg. M. Mason No 168, 1857, "R. fruticosus", P 03134637. – *sine loc. et dat.*, leg. G. Mandon, *Pl. Maderenses*, P 03134645. – *sine loc.*, leg. G. Mandon, *Pl. Maderenses* no. 99, 1865-1866, P 04342682.

## 2. Does *Rubus bollei* Focke grow in Madeira?

The first citation of *Rubus bollei*<sup>a)</sup> for Madeira, was published by the Danish geographer and botanist Martin Vahl (1869-1946) in his monograph on Madeira's plant cover (VAHL, 1904). The determination was conducted by his compatriot pharmacist Kristian Friderichsen (1853-1932), to whom Vahl had sent some of his *Rubus* specimens collected in 1901/1902. Short time later, FRIDERICHSEN (1905)

published details: Vahl's indication was based on a single "very uncomplete specimen", consisting of one leaf and a rather poor inflorescence, gathered by Vahl on 26.VII.1902 at St. Anna. In his paper of 1910, Menezes quoted this locality and added a second one given by Vahl: "Levada da Fajã dos Vinháticos".

Friderichsen's findings became adopted subsequently by other botanists and were integrated into checklists of the Macaronesian flora.

Earlier own results about the Madeiran bramble flora based on a broad species concept. It was assumed that sexually reproducing *Rubus* species usually have a greater variability than apomicts. Under this general condition three Madeiran taxa were regarded as heterotypic synonyms (MATZKE-HAJEK & WEBER, 1999; MATZKE-HAJEK, 2001) under the oldest legitimate name, *Rubus bollei*.

Our recent observations revealed, that the *R. bollei*-like plants from Madeira have their own specific characters. It is appropriate not to include them into *R. bollei*. In fact, they represent two separate species, both different from *R. bollei*: *R. suspiciosus* Menezes and *R. vahlii* Frid.; *Rubus bollei* is thus absent from Madeira.

## 3. *Rubus suspiciosus* Menezes (Figs. 5-8)

### General description

**Stem:** 8-22 mm in diameter, dark purple, conspicuously glossy, slightly sulcate with five rounded ridges (Fig. 5), without any glandular hairs or setae, glabrous or with very scattered small tufted hairs. Prickles 5-15 per 5 cm, ca. 6-10 mm long, with broad base, slightly inclined, straight or scarcely curved. **Leaves:** with 5 (exceptionally with 7) leaflets, digitate to subpedate, not coriaceous as in *R. bollei*, upper surface glabrous and often shiny (Fig. 6), underside usually with a thin layer of light grey stellate hairs (Fig. 7b), but almost glabrous in shaded stands (Fig. 7a); longer simple hairs absent. Length of terminal petiolule (25-) 36-53 (-60)% of length of terminal lamina. Lamina of terminal leaflet from a rounded or slightly heart-shaped base ovate, broad elliptical to broad obovate, often elongated with almost parallel sides, 90-135 mm long and 40-78 mm wide, with a 6-13 mm long cuspidate apex. Serration sometimes fine and even, sometimes the front margin (just next to the leaf tip) more coarse, 1,5-2,5 (-5) mm deep. Petiole (much) longer than length of lower lateral leaflets, with 9-28 strongly hooked, broad based -6 mm long prickles. Stipules 2-3 mm wide. **Inflorescences:** voluminous, broadly conical (Fig. 8). Basal part of main

<sup>a)</sup> The Canarian *Rubus bollei* was named by Focke (1887) after German naturalist Carl August Bolle (1821-1909). There are two other brambles with similar names which must not be confused with it:

<sup>(1)</sup> *Rubus bollae* Sabransky 1886, *Oesterr. Bot. Zeitschr.* 36: 289, is a bramble from western Slovakia that was named after Slovakian naturalist Johannes Bolla de Csáford-Jobbaháza (1806-1881).

<sup>(2)</sup> *Rubus ernesti-bollii* E. H. L. Krause 1886, *Ber. Deutsch. Bot. Ges.* 4: 80 (1886), was named in honor of the German naturalist and geographer Ernst Boll (1817-1886). It is a heterotypic synonym of *R. plicatus* W. & N.

panicle axis dark reddish or purple brown, glossy, with few sessile glands, but only with inconspicuous hairs, per 5 cm with 4-8 broad based, curved, 3-6 mm long prickles. Topmost 20-30 cm usually leafless but more densely hairy; 3- or 5- nate leaves with long elliptical terminal leaflets and fine serration. Stellate hairs of underside often forming a whitish thin layer contrasting to the light brown veins. Pedicels densely hairy, with many (up to 20) small prickles of different size (0,5-2,5 mm long), sepals greyish green, not elongated, often with few very minute prickles, reflexed during and after flowering; petals broadly obovate, white or very light pink only when opening, filaments white, styles light green, anthers, carpels and receptacle glabrous.



Fig. 5 – *Rubus suspiciosus* stems are glossy.



Fig. 6 – Typical stem and leaves of *Rubus suspiciosus*.

Diagnostic field characters: the combination of glandless panicles, glossy stems and leaves with broad based, elongated, often tongue-shaped lateral leaflets is unique in the Madeiran *Rubus* flora. Colour and hairiness of leaf undersides depends much on microclimate (especially on humidity and light conditions) of the locality. Plants from shaded humid places have glabrous leaves (Fig. 7a), while those from sunny and dryer habitats may have dense stellate hairs, that give the leaf undersides a whitish appearance (Fig. 7b) like in members of European series *Discolores*. These plants were often determined as *R. bollei* in the past. We consider it as a good species with unknown derivation. Indeed it resembles the Canarian *R. bollei*, but it differs from it by its delicate, never leathery leaves with a less fine serration and by stronger prickles on the petioles and petiolules. MENEZES (1910) described *R. suspiciosus* as a hybrid between *Rubus bollei* and *R. ulmifolius*, later he changed his interpretation to a hybrid of *Rubus vahlii* and *R. ulmifolius* (MENEZES, 1914). The name *R. suspiciosus* has not really been in use since. Actually we have never seen any herbarium specimens – except for the type – that were identified correctly. The only published photo we know is that in VICENTE ORELLANA *et al.* (2016, p. 193, fig. 4A as *R. bollei*).

The distribution in Madeira is still very insufficiently known. We found it in medium altitudes preferably on the southern and western slope of the island. The observed minimum elevation was 60 m *a.s.l.* at the Ribeira da Ponta do Sol, the maximum was 880 m *a.s.l.* north of Monte.

Interestingly this *taxon* is represented in the herbarium of Linnaeus (LINN number 653.8) with an undated voucher, labelled as "*Rubus fruticosus*" and the source "Madera". This specimen has a 7-nate leaf with the typical strongly hooked prickles of the petiole. WATSON (1958, p. 24) erroneously regarded it as the nomenclatural type of *Rubus fruticosus* L. designated by SMITH (1824, p. 399), but he confused numbers 653.5 and 653.8. Moreover sheet no. 653.8 was not in Linnaeus' herbarium in 1753 when the name *Rubus fruticosus* was published and therefore cannot serve as the lectotype. Most probably it was collected by Francis Masson in or after 1776, when Masson visited Madeira and started sending plants to Linnaeus father and son (FRANCISCO-ORTEGA *et al.*, 2008). A possible provenance of the plant is Monte above Funchal, where a population of plants with 7- nate leaves is still to be found. The type locality of *R. suspiciosus*, "Fonte da Telha" above Monte, is better known today as "Terreiro da Luta" (32° 41' 03" N 16° 53' 56" W). The *Rubus* flora near the Fonte consists mainly of *R. vahlii*, but *Rubus suspiciosus* is still growing a few hundred meters west and southwest of this place.



**Fig. 7** – Underside of *Rubus suspiciosus* leaves may be glabrous (a) or white-felted (b).



**Fig. 8** – Inflorescence of *Rubus suspiciosus*.

## Studied material

## Herbarium vouchers:

Sant'anna, leg. C. Menezes, 1906, "Rubus vahlii Fried.", COI 00075208, COI 00075209. – Sant'Anna, leg. C. Menezes, 1906, "Rubus vahlii Friederichs. ( $\beta$  estremalis characteribus)", COI 00075208, COI 00075210. – Fayal by roadside, close above the Ch[urc]h, leg. Lowe, 11.III.1861, "879. *Rubus discolor* W. & N.", K. – Forest road east of Portela (32° 44' 50" N 16° 49' 22" W), leg. Matzke-Hajek, 18.VI.2016, Herb. GMH 20160618.3. – Between Lombo do Coelho and Lombo da Velha next to road from Prazeres to Raposeira, leg. Matzke-Hajek, 16.VI.2016, Herb. GMH 20160616.3, 20160616.4. – Levada Nova east of Prazeres, 0,9 km northeast of Estacada, leg. Matzke-Hajek, 09.VI.2015, Herb. GMH 20150609.3. – Lombo dos Moinhos between Calheta and Prazeres, leg. Matzke-Hajek, 16.VI.2016, Herb. GMH 20160616.1. – Road turn of ER222 at the Ribeira San Bartolomeu west of Estrela, leg. Matzke-Hajek, 09.VI.2015, Herb. GMH 20150609.2. – Ribeira San Bartolomeu west of Estrela, north of Calheta, leg. Matzke-Hajek, 09.VI.2015, Herb. GMH 20150609.1. – Road turn of ER 222 at the Ribeira da Madalena north of Madalena do Mar, leg. Matzke-Hajek, 09.VI.2015, Herb. GMH 20150609.1. – Levada Nova northeast of Lombada do Ponta do Sol, leg. Matzke-Hajek, 10.VI.2015, Herb. GMH 20150610.5. – Between Quinta Grande and Jardim da Serra: Lombo do Pau Branco (32° 40' 80,6" N 16° 55' 37,5" W), leg. Matzke-Hajek, 08.VI.2015, Herb. GMH 20150608.1. – Forest road in ravine west of Alegria (32° 40' 80,6" N 16° 55' 37,5" W), leg. Matzke-Hajek, 08.VI.2015, Herb. GMH 20150608.1. – Forest road in ravine west of Alegria, leg. Matzke-Hajek, 12.VI.2015, Herb. GMH 20150612.1. – Ribeira de Santa Luzia west of Monte, north of the quarry, leg. Matzke-Hajek, 8.VI.2015, Herb. GMH 20150608.3. – Caminho do Arrebentão, leg. C. Menezes, VII.1909, "Rubus ulmifolius Schott var. nutritus Mnzs.", COI 00075217. – Caminho do Arrebentão, leg. C. Menezes, VIII.1909, "Rubus suspiciosus Mnzs. (*R. ulmifolius* x *Bollei*)", COI 00075215. – Madeira, ten n van Monte, in bos langs weg ER 201, leg. K. Meijer, 22.VIII.2005, HFN 3375. – Madeira: Monte, leg. C. Menezes, 1906, "Rubus ulmifolius Schott", COI 00075220. – Monte, Caminho das Lajinhas, above the junction into the Caminho do Monte (32° 40' 07" N 16° 59' 59,5" W), leg. Matzke-Hajek, 12.VI.2015, Herb. GMH 20150612.2. – Levada da Bom Sucesso southeast of Monte, leg. Matzke-Hajek, 8.VI.2015, Herb. GMH 20150608.4. – Rib.a de João Gomez, leg. C. Menezes, VII.1914, "Rubus

ulmifolius Schott ssp. rusticanus (Merc.) var. nutritus Mnzs." LISU P41848, LISU P41850. – Madera, [leg. Masson? sine dat.], Herb LINN 653.8. – Madera, leg. Webb [1828?], P 03134526 – Madera, V.1957, "R. ulmifolius ssp. rusticanus var. communis Mnzs.", MADJ 00456.

4. *Rubus vahlii* Frid. (Figs. 9-11)

## General description

**Stem:** 6-12 mm in diameter, dull purple, glabrous, sulcate, without glandular hairs or setae (Fig. 9). Prickles 3-8 per 5 cm, ca. 5-9 mm long, with broad base, slightly inclined and curved. **Leaves:** with 5 slightly convex leaflets, digitate to subpedate, sometimes imbricate, upper surface glabrous or with very few simple hairs near margin, underside green or greyish green, rarely light grey, short hairs slightly palpable. Length of terminal petiolule 30-45% of length of lamina. Lamina of terminal leaflet usually from a rounded base broad obovate, 85-120 mm long and 55-75 mm wide, with a 6-16 mm long cuspidate apex. Leaf margin conspicuously crenulate, biserrate with the main teeth sometimes retrorse, 1,5-3 mm deep. Leaf stalk longer than length of lower leaflets, with 7-12 bent and slightly curved, -6 mm long prickles. Stipules filiform or lineal, 1-1,5 mm wide. **Inflorescences:** voluminous, broadly conical, often with loose thin peduncles. Basal part of main axis dull greyish purple, with dense short tufted hairs, never glossy, with broad based, curved, 3-6 mm long prickles. Topmost 10 to 20 cm usually leafless but more densely hairy; leaves simple, 3- or 5- nate leaves with biserrate leaflets. Stellate hairs of underside often forming a light grey layer. Pedicels densely hairy, 0-8 slender prickles, 1,5-3,5 mm long, sepals light greyish green, loosely reflexed during and after flowering, petals obovate, white or very light pink when opening, filaments white, styles light green, anthers glabrous, young carpels hairy, receptacle slightly hairy.



Fig. 9 – Stems of *Rubus vahlii* are dull.





**Fig. 10** – Typical stem and leaves of *Rubus vahlii*. Take notice of crenulate margin.



**Fig. 11** – Inflorescence of *Rubus vahlii*.



**Fig. 12** – *Rubus ulmifolius*: (a) pruinose stem with leaves; (b) inflorescence with pink flowers.

Diagnostic field characters: The terminal leaflets are constantly broad obovate (Fig. 10); on the living plant, they are convex and have a crenulate margin with somewhat fringed teeth. Without consideration of the apex, the lamina of fully developed terminal leaflets is sometimes almost as wide as long. Colour and hairiness of leaf undersides can vary from green and almost glabrous to light grey and densely felted with stellate hairs. Panicles are very broad with sometimes extremely loose lateral branches and thin peduncles (Fig. 11).

Distribution: Endemic. *R. vahlii* is by far the most frequent bramble in Madeira, found in all elevations. It was first described by LOWE (1868) under the illegitimate name *Rubus concolor* (MATZKE-HAJEK, 2001).

#### Studied material

#### Herbarium vouchers:

Porto Moniz, leg. ?, VI.1922, "Rubus ulmifolius ssp. rusticanus var. concolor Lowe", MADJ 00457. – Porto Moniz, leg. ?, VII.1922, "Rubus bollei x ulmifolius var. concolor Lowe", MADJ 00458, 00459. – Santa - Porto Moniz, leg. ?, *sine dat.*, "R. ulmifolius Schott ssp. rusticanus var. nutritus Mnzs.", MADJ 00461. – Santa - Porto Moniz, leg. ?, *sine dat.*, "R. bollei Focke", MADJ 00452. – Roche das Vinhas, Santana, leg. *et det.* L. Carvalho & M. Sequeira, 21.V.2004, "Rubus ulmifolius Schott", MADJ 10.534. – Lombo do Risco, leg. K. Meijer, 25.VIII.2005, HFN 3388, 3389. – Rabaçal, langs voetpad, leg. K. Meijer, 25.VIII.2005, HFN 3390. – Voetpad naar Rabaçal, wegrand, leg. K. Meijer, 25.VIII.2005, HFN 3392. – Rabaçal region, Levada da Ribeira Grande, at about 1300 m NN, leg. Wolfgang & Rosemarie Jäger, 6.I.2015, Herb. GMH Jä S 03/15. – Road from ER 110 to Rabaçal northwest Urze (plateau of Paul da Serra), leg. Matzke-Hajek, 06.VI.2015, Herb. GMH 20150606.1. – Next to road ER 209 between Barreiro and Cristo Rei, 950 m, leg. Matzke-Hajek, 06.VI.2015, Herb. GMH 20150606.1. – Central Fajã da Nogueira, langs wegrand, riviértje, leg. K. Meijer, 23.VIII.2005, HFN 3380, 3381, 3383. – Pico do Ariero, langs voetpad, leg. K. Meijer, 24.VIII.2005, HFN 3385, 3386. – Ribeira Metade, leg. Matzke-Hajek, 13.X.2014, Herb. GMH 20141013.1, 20141013.2. – Ribeiro Frio, leg. K. Meijer, 23.VIII.2005, HFN 3379. – Ribeiro Frio, paved ramp below the pisciculture, leg. Wolfgang & Rosemarie Jäger, 3.I.2015, Herb. GMH Jä S 01/15. – Langs weg naar Portela, leg. K. Meijer, 26.VIII.2005, HFN 3393. – Forest road 0,5 km east of Portela (32° 44' 44,5" N 16° 49' 15,8" W), leg. Matzke-Hajek, 18.VI.2016, Herb. GMH 20160618.2. – Levada Nova

northeast of Lombada do Ponta do Sol, leg. Matzke-Hajek, 10.VI.2015, Herb. GMH 20150610.1, 20150610.2. – Northeast of Ribeira Brava: Levada Nova, just before the tunnel between Ribeira da Tabua and Corujeira, at about 420 m NN, leg. Wolfgang & Rosemarie Jäger, 4.I.2015, Herb. GMH Jä S 02/15. – *In dumetosis*, Jardim da Serra, 1200-1300 m, leg. G. Mandon, VII-IX, Pl. Maderenses, 1865-1866 100. "Rubus discolor Weihe et Nees; Lowe Man 847.", P03134535, P04172201. – Arrebetões, leg. C. Menezes, VIII.1914, "Rubus ulmifolius Schott subsp. rusticanus (Merc.) var. concolor (Lowe)", LISU P41845, LISU P41843, LISU P41847. – Fonte da Telha, leg. C. Menezes, VIII.1914, "Rubus vahlii, K. Frid." LISU P41841, LISU P41842. – Arrebetões, leg. C. Menezes, VIII.1914, "Rubus ulmifolius Schott subsp. rusticanus (Merc.) var. concolor (Lowe)" LISU P41846. – Arrebetão, leg. C. Menezes, VIII.1914, "Rubus ulmifolius Schott subsp. rusticanus (Merc.) var. concolor (Lowe)" LISU P41844. – Fonte da Telha = Caminho dos Pretos (ER 201) next to Terreiro da Luta (32° 41' 03" N 16° 53' 56" W), leg. Matzke-Hajek, 20.VI.2016, Herb. GMH 20160620.2. – Ten n van Monte, in bos langs weg, leg. K. Meijer, 22.VIII.2005, HFN 3376, 3377. – Ten n van Monte, in bosrand, langs weg ER 201, leg. K. Meijer, 22.VIII.2005, HFN 3378. – Quinta do Palheiro, leg. Eng. Beliz & R. Santos, 1.VI.1957, det. Armando Sardinha: "R. ulmifolius var. communis Mnzs./Rubus inermis Pourr.", MADJ 05183.

#### 5. *Rubus ulmifolius* Schott (Fig. 12)

The taxonomy of *R. ulmifolius* has been studied in detail by MONASTERIO-HUELIN & WEBER (1996), hence we restrict the portrait to two representative photos (Fig. 12a, b) and abstain from an elaborate description. *Rubus ulmifolius* is recognized as an invasive plant, growing worldwide in oceanic-subtropical vegetation, particularly in man-made habitats. Its distribution in Europe was outlined by KURTTO *et al.* (2010). In Madeira, the xerotolerant *R. ulmifolius* is a frequent plant especially in lowland hedgerows, along road banks, walls and human settlements. In small numbers it grows also in less influenced vegetation and higher altitudes. We collected only very few specimens.

#### Studied material

#### Herbarium vouchers:

Porto Moniz, leg. VI.1922, "Rubus ulmifolius Schott ssp. rusticanus (Merc.) var. communis Mnzs", MADJ 00453. – Levada Nova north of Lombada do Ponta do Sol, leg.

## 6. Identification key for Madeiran *Rubus* species

Stem characters must be checked in the middle segment of this year's main stems (not side branches!), preferably on plants from open sites. Leaf characters must be checked on differentiated 5-nate leaves from the middle of this year's stems. Please look for leaves from open sites (wood margins, clearings), not from the shade.

1. Pedicels and sepals with (dense) glandular setae (Fig. 4) ----- **serrae**  
 Pedicels and sepals without glandular setae (check on more than 5 flowers in the whole inflorescence, not only on one!) ----- 2
2. Main stems pruinose (Fig. 12a), greyish lilac or densely covered with minute stellate hairs, terminal leaflets of 5-nate leaves usually less than 8 cm long, inflorescences narrow and cylindrical, flowers deep pink or light magenta (Fig. 12b) ----- **ulmifolius**  
 Main stems either glabrous and glossy or dull, but not pruinose or greyish from a dense cover of stellar hairs, terminal leaflets more than 8 cm long, inflorescences very broad conical with long peduncles at least at base, flowers white (only petals of freshly opening flower buds may be light pink) ----- 3
3. Young carpels glabrous, main stems glabrous and glossy (Fig. 5), lateral leaflets of 5-nate leaves with rounded or slightly cordate base, leaf margin  $\pm$ flat (Fig. 6), prickles of petioles strongly hooked, so that yellow prickle tips point backwards parallel to petiole ----- **suspiciosus**  
Young carpels hairy, main stems dull (Fig. 9), lateral leaflets of 5-nate leaves with cuneate base, leaf margin conspicuously crenulate (Fig. 10) with main teeth pointing downwards, prickles of petioles bent and curved, but usually not strongly hooked, yellow prickle tips point diagonally backwards, but not parallel to petiole ----- **vahliei**

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