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Article

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Rubus lentianus, a new species from Austria and Germany—another piece of the puzzle from a European hotspot of *Rubus* series *Radula*

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We dedicate the article to Vojtěch Žíla (* 1942–† 2022), an expert and lover of brambles.

Abstract

A new nemophilous tetraploid bramble species, *Rubus lentianus* of the series *Radula*, occurring in Central Europe (Upper Austria and Lower Bavaria), is described. Deeply incised terminal leaflets of primocane leaves and a long, abruptly narrowing apex separate it from species of this series. An identification key, a distribution map, a list of revised specimens, a scan of the type specimen, pen drawings and photographs of living specimens are provided.

Keywords: Central Europe, chorology, *Rosaceae*, *Rubus* ser. *Radula*, taxonomy

Introduction

Rubus ser. *Radula* (Hook. & Arn.) Focke (1877: 317) belongs to the section *Rubus* L. (1753: 492), one of the most diverse and taxonomically complicated plant groups in Europe. The vast morphological diversity and great number of delimited taxa are a result of hybridization followed by the apomictic stabilization of hybrids. Most species of the series *Radula* are morphologically intermediate between representatives of ser. *Glandulosi* (Wimm. & Grab.) Focke (1877: 355) and ser. *Discolores* (P. J. Müll.) Focke (1914: 394) and have recently been shown to have originated from crosses between these two groups (Šarhanová *et al.* 2012, 2017, Sochor *et al.* 2015). In terms of morphology, the series is characterized by arching, low to medium high primocanes with medium to rather large and ± uniform prickles and numerous stalked glands. Primocane leaves are felted with stellate hairs and greyish-green to whitish-grey beneath.

The series is probably endemic to Europe and includes about forty species (Kurtto *et al.* 2010). It is distributed mainly in Western and Central Europe with significant overlaps into adjacent parts of the continent. There are three diversity centres of the series where the number of recognized taxa reaches up to eight species per mapping grid cell of the Atlas Florae Europaeae (Kurtto *et al.* 2010). These three areas are (i) the southern half of Great Britain, (ii) the Rhineland–Palatinate and adjacent regions in western Germany, and (iii) the northern foothills of the Alps, including the whole range of the Bohemian Forest in Bavaria (Germany), Austria and Bohemia (Czech Republic). From the latter area, which is the subject of batological research by the authors of this paper, a total of twelve species are reported (Kurtto *et al.* 2010, Trávníček *et al.* 2018). These species are *R. epipsilos* Focke (1877: 258), *R. indusiatus* Focke (1877: 284), *R. jarae-cimrmanii* Lepší *et al.* in Trávníček *et al.* (2018: 405), *R. muhelicus* Danner (2003: 165), *R. perpedatus* Žíla & Weber (2005: 433), *R. perpungens* Lepší *et al.* in Trávníček *et al.* (2018: 392), *R. platycephalus* Focke (1877: 329), *R. radula* Weihe ex Boenn. (1824: 152), *R. rudis* Weihe & Nees (1825: 687), *R. salisburgensis*

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Focke (1877: 280), *R. silvae-bavaricae* Gaggerm. (2008: 70) and *R. vatavensis* Žíla & Trávn. in Trávníček *et al.* (2018: 399). This great number of species, together with many singular or local biotypes and several yet to be described taxa co-occurring in the area, indicates the importance of the region for the diversification of the genus *Rubus* and poses a great challenge for ongoing taxonomical research. The main aim of this paper is to present basic information about the morphology, distribution and taxonomy of a new species, *R. lentianus*, discovered in this area during extensive long-term batological research by the authors (e.g. Lepší & Lepší 2006, Trávníček *et al.* 2018, Hohla *et al.* 2021).

Methods

The description of the species is based on approximately 25 herbarium specimens and measurements of some features (i.e. flowers) on living plants. Only mature, well-developed individuals were analysed. Specimens seen were sorted according to the Central European grid system (Ehrendorfer & Hamann 1965). For abbreviations of names of public herbaria, see Thiers (2022). The nomenclature of *Rubus* follows Kurtto *et al.* (2010). The terms pertaining to range size are adopted from Weber in Kurtto *et al.* (2010), also taking into consideration the approaches of Holub (1997) and Haveman & de Ronde (2013). The determination key was created based on the determination key in Trávníček *et al.* (2018). The DNA ploidy level was assessed based on the relative fluorescence of stained nuclei, as determined by flow cytometric analysis of fresh leaves (from the specimen Germany, Bavaria, Otterskirchen, 0.9 km W of Besensandbach, 8 July 2020, herb. G. Király) using a Partec CyFlow ML flow cytometer (Sysmex Partec, Görlitz, Germany). Fresh leaves were preserved and posted in a moist napkin in a plastic bag to the Department of Botany, Palacký University in Olomouc, where analyses were conducted approximately seven days after collection. As an internal standard, *Solanum lycopersicum* L. (1753: 185) 'Stupické polní rané' (2C = 1.96 pg; Temsch *et al.* 2010) was used. For more details on the methods used, see Sochor & Trávníček (2016).

Results and discussion

Rubus lentianus Hohla, Király, M. Lepší & P. Lepší, *spec. nov.* (Figs 1–3)

Type:—AUSTRIA. Upper Austria: distr. Rohrbach, Hintenberg, quadrant 7349bad, ca 1.2 km ESE of chapel in village, in scrub, one large growth, 730 m, 48°40'59.23"N, 13°56'27.56"E, 15 August 2020, *M. Lepší & P. Lepší s.n.* (Holotype: LI 03455388! isotypes: CB 87544!, M 0292443!) (Fig. 1).

Description:—Shrub, usually up to 100 cm tall. First-year stems low to medium-arching, rooting at the apex, angled with ± flat sides, (3.0–)4.0–6.0 mm in diameter; dull greenish purple to conspicuously suffused with dark brown-red when exposed to the sun; with 0.1–0.5 mm long, adpressed to erect simple, fasciculate (mostly with two arms) and rarely stellate hairs, (5–)15–30(–50) hairs per 1 cm of stem side. Sessile and subsessile glands scattered, stalked glands uneven, up to 0.5 mm long, (1–)4–10(–15) per 1 cm of stem side, acicles scattered, 0.3–0.8 mm long, bristles rare. Prickles suffused with dark brown-red with a long, yellowish tip, ± equal, straight, slightly to distinctly declining (rarely patent), (6–)10–18(–22) per 5 cm of stem length, (4–)5–7(–9) mm long, compressed with a flattened base (3–)4–5(–6) mm broad. Primocane leaves pedate, usually 5-foliolate, but also 3- or 4-foliolate leaves present, leaflets remote to contiguous. Laminas flat, somewhat leathery, dark green above with (1–)3–10(–25) hairs per 1 cm^2, hairy to the touch beneath, greenish-grey felted, with dense stellate and few longer simple hairs. Venation medium weak, veins slightly depressed into the surface of the leaf.

Terminal leaflets obovate to broadly obovate, rounded or truncate at the base, abruptly narrowing into a (10–)15–22(–26) mm long apex, petiolule (22–)28–34(–40) % as long as its lamina; margin slightly undulate, ciliate, indentation periodical, coarse, with partly recurved 2–4 mm long teeth, incisions (2.5–)4.0–5.0(–6.0) mm deep. Basal leaflets elongate, oblong or narrowly obovate, on ternate or quinate leaves often irregularly lobed or incised; petiolules (1.5–)2.5–4.5(–5.5) mm long. Petioles shorter than basal leaflets, loosely to densely hairy, with scattered subsessile and stalked glands, rare acicles and bristles, and with (6–)10–15(–18) hooked prickles. Stipules filiform, with scattered mostly simple hairs and sessile and stalked glands, usually (0.5–)0.7–0.9(–1.3) mm wide.

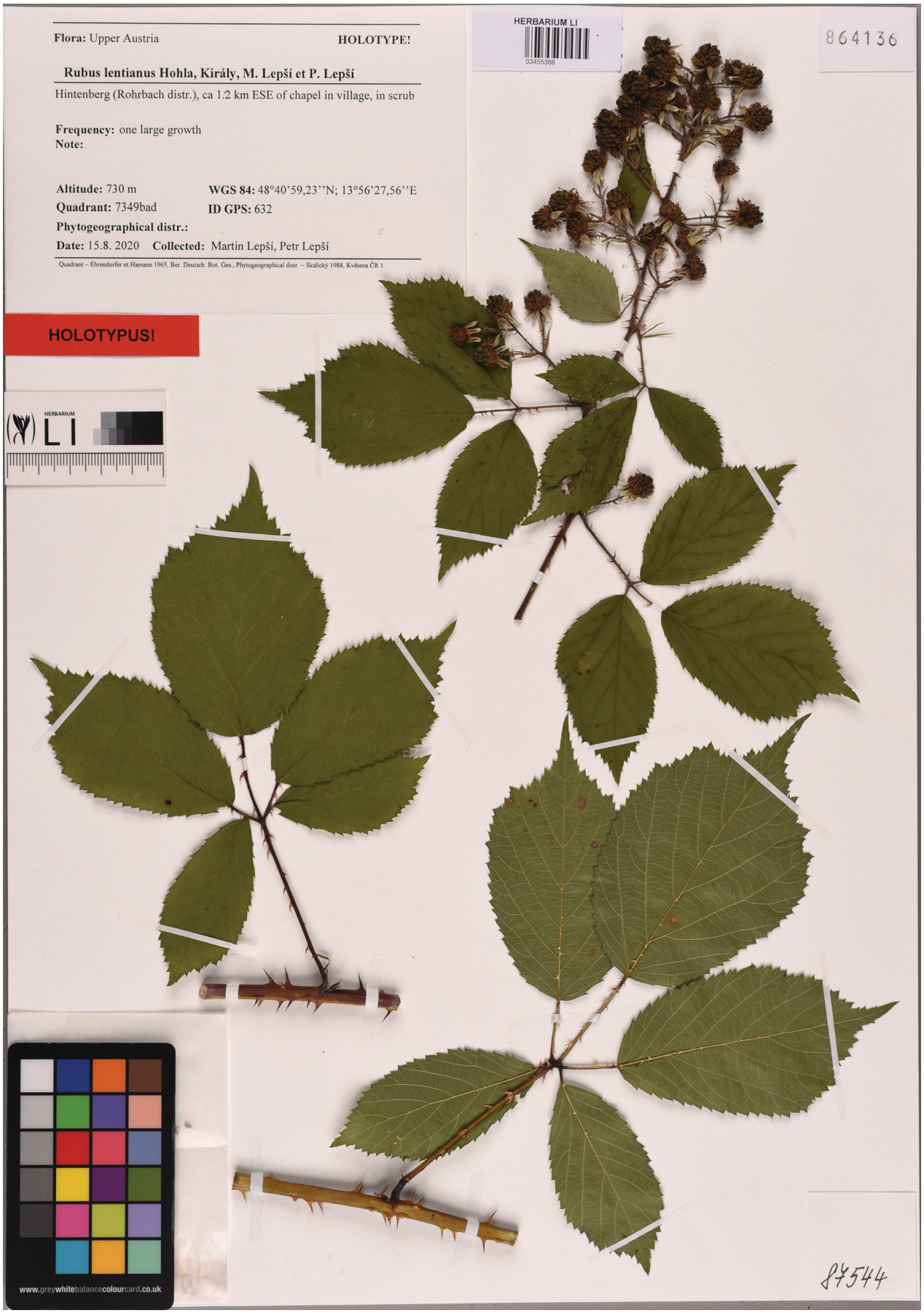

FIGURE 1. Holotype of *Rubus lentianus* (LI—No 03455388).

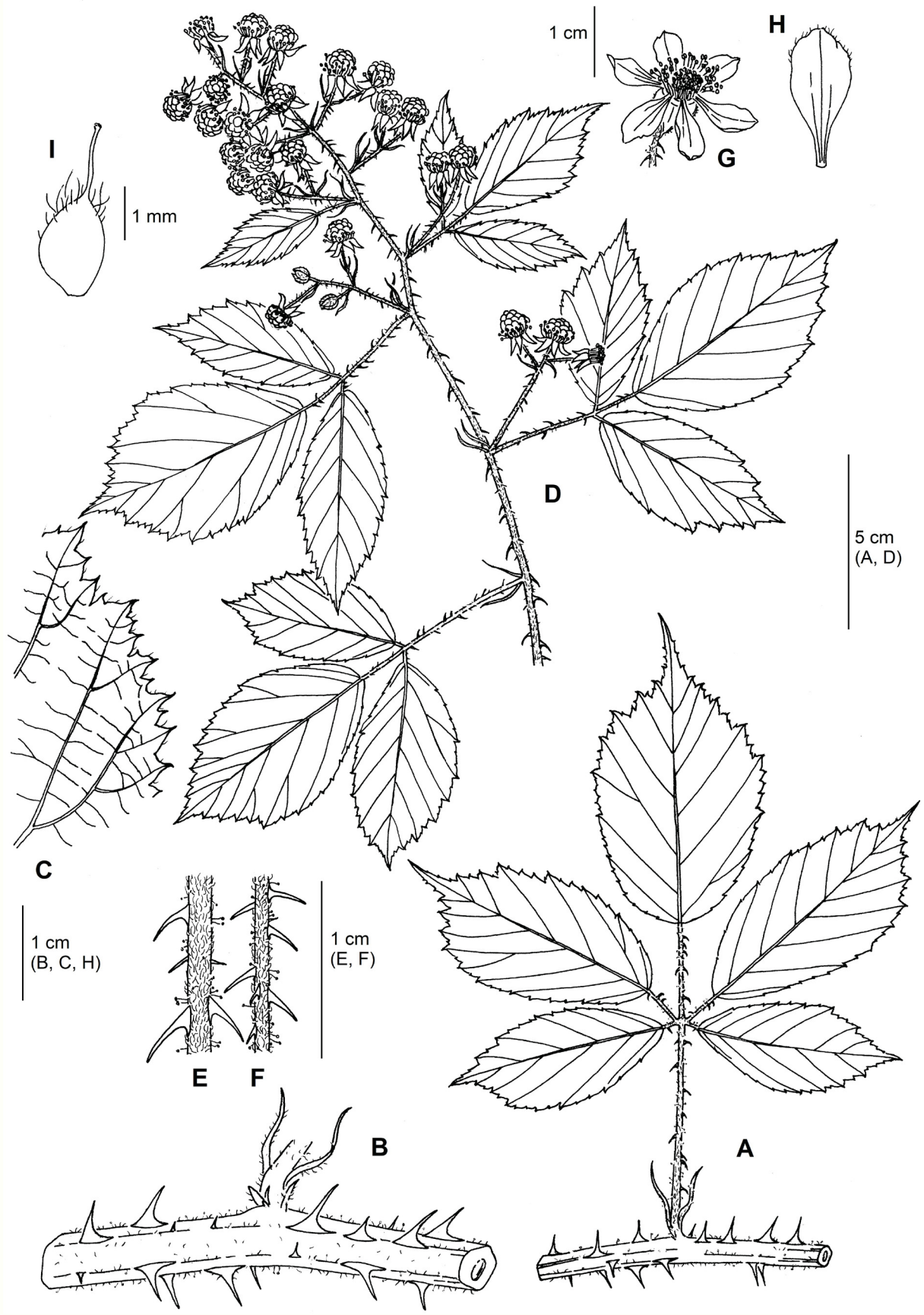

FIGURE 2. *Rubus lentianus*: A: section of leafed first-year stem; B: detail of first-year stem; C: margin of terminal leaflet; D: infructescence; E: inflorescence axis; F: peduncle; G: flower; H: petal; I: young carpel. Del. J. Táborská.

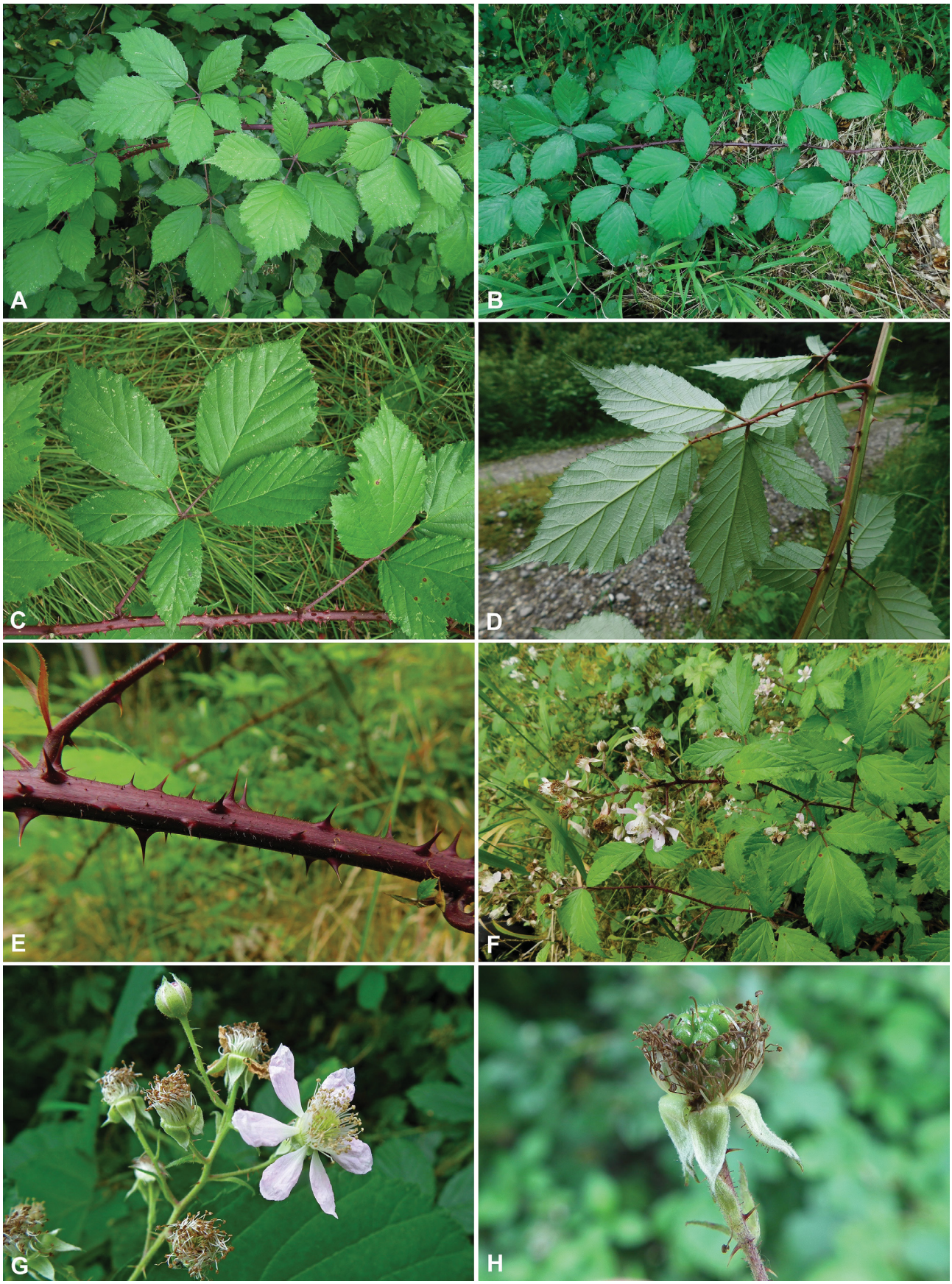

FIGURE 3. *Rubus lentianus*. A, B: middle section of first-year stem with leaves; C: leaf of first-year stem (upper side); D: leaf of first-year stem (lower side); E: section of first-year stem; F: inflorescence; G: part of inflorescence with a close-up of a flower; H: young collective fruit. Austria, Upper Austria, A–G: Tarsdorf, 7 July 2021, H: Aschach a. d. Donau, 7 July 2020, phot. G. Király.

Inflorescence usually 15–20(–30) cm long, conical, narrow to medium wide, truncate at the apex, with erecto-patent or (in upper part) patent branches, distal (5–)7–10(–16) cm long part leafless. Inflorescence leaves greenish-grey and felted beneath, predominantly ternate, the uppermost 1(–2) simple. Inflorescence axis flexuous, densely hairy, with scattered stalked glands and fewer acicles and bristles, and with (7–)9–13(–15) prickles per 5 cm of axis length. Prickles unequal, declining, slender, straight to slightly curved, (3.0–)3.5–4.5(–5.5) mm long. Inflorescence branches 1–3-flowered; pedicels (5–)10–20 mm long, felted, with scattered stalked glands or acicles up to 0.6 mm long, the longest ones longer than hairs, and with (4–)6–10(–14) ± equal, slightly curved, (1.0–)1.5–2.0(–3.0) mm long prickles. Sepals (5–)6–7(–8) mm long (including the short filiform appendix), first spreading to slightly reflexed and reflexed after anthesis, green-grey felted with whitish margins, with scattered simple hairs, scattered red subsessile and stalked glands and absent to rare short, red-suffused pricklets on the abaxial surface. Petals pink, hairy to densely hairy, spathulate, not touching each other, 8–10 mm long. Stamens significantly longer than styles, filaments white, anthers yellow, glabrous. Carpels hairy, styles yellowish green. Receptacle sparsely to densely hairy, with hairs up to 1.2 mm long. Collective fruits semiglobose to globose. Flowering (VI–)VII(–VIII).

DNA-ploidy level:—Flow cytometric analysis has shown that *Rubus lentianus* is tetraploid (2n = 4x ~ 28). Because all taxa (ca. 15 species) of *Rubus* ser. *Radula* investigated so far have proved to be tetraploid (Krahulcová *et al.* 2013), this ploidy was expected.

Etymology:—The epithet '*lentianus*' derives from the Roman name of the city of Linz ('*Lentia*'), the provincial capital of Upper Austria.

Diagnostic characters:—Primocanes conspicuously dark, dull greenish purple to suffused with dark brown-red when exposed to the sun, scattered to medium densely hairy, with scattered stalked glands, rare to scattered acicles or bristles and (6–)10–18(–22) prickles per 5 cm of stem length; prickles suffused with dark brown-red, with a long, yellowish tip; leaves on primocanes mostly pedate (3–4–)5-foliolate, hairy to the touch beneath; indentation periodical, conspicuously coarse, with some recurved 2–4 mm long teeth and incisions (2.5–)4.0–5.0(–6.0) mm deep; terminal leaflet abruptly narrowing into a distinctive (10–)15–22(–26) mm long apex. Pedicels felted, with scattered stalked glands or acicles up to 0.6 mm long, the longest ones longer than hairs.

Taxonomy:—Due to ± equal, uniform prickles and scattered stalked glands on primocanes and a greenish-grey indumentum of primocane leaves beneath, *Rubus lentianus* is a typical member of the series *Radula*. Deeply incised terminal leaflets of primocane leaves with a long and abruptly narrowing apex separate the species from all other members of the series *Radula* recorded within the distribution area of *R. lentianus* and adjacent regions. Most of all it resembles *R. perpedatus*, which differs in having 3–20 hairs per 1 cm of primocane side, primocane leaves (very) distinctly pedate, incisions of the terminal leaflet only 2–4 mm deep and pedicels with stalked glands shorter than the longest hairs. Another similar species, *R. rudis*, has, in contrast to *R. lentianus,* incisions of terminal leaflets of primocane leaves only 1.5–2.5(–3.0) mm deep, primocanes almost glabrous, with numerous short stalked glands and with smaller, (3–)4–6(–7) mm long prickles. To ease the separation of *R. lentianus* from all other members of ser. *Radula* actually or possibly co-occurring with the new species, we present a determination key below. The key does not include *R. indusiatus* and *R. platycephalus*, whose distribution, morphology and taxonomy is insufficiently known, as indicated by our research and other published data (cf. Trávníček *et al.* 2018). However, it is apparent from the type material and published descriptions (Weber 1997) that both taxa differ significantly from the new species. *Rubus platycephalus* can be distinguished mainly by 3-foliolate primocane leaves with shallower, 2–2.5 mm long incisions and shorter, 10–12 mm long apex; *R. indusiatus* differs in having primocane leaves with shallower, 1.5–2 mm long incisions and a narrow, ± cylindrical and racemose inflorescence.

Ecology:—The species has been found in the colline and submontane vegetation belts between 260 and 730 m above sea level. It generally grows on mesic, acidic soils developed on siliceous bedrock, but it occurs also on slightly alkaline, semi-dry soils over gravel or clay subsoils. The species grows particularly frequently in coniferous forests (often *Picea abies* plantations). It prefers semi-shaded habitats such as forest fringes, reforested areas or edges of forest roads, in turn avoiding exposed sunny sites.

Distribution:—*Rubus lentianus* was found at sixteen localities in Austria (in the federal state of Upper Austria) and ten localities in Germany (Bavaria). There are two main distribution areas: (i) the valley of the Danube between Vilshofen an der Donau (Bavaria) and Linz (Upper Austria) and (ii) the regions Innviertel and Hausruckviertel in Upper Austria (Alpine Foreland) with occurrences in the hilly area south of Sauwald. In addition, there are scattered localities in the Weilhartforst near the border with the federal state of Salzburg and in the region Mühlviertel north of the Danube (Fig. 4). The distance between the two furthermost localities exceeds 130 km, so the species can be considered a regionally distributed bramble (Kurtto *et al.* 2010). However, *Rubus lentianus* can be assumed to have a greater frequency and wider distribution in the southeastern part of Bavaria and Upper Austria. The species had

probably been overlooked in the past because of its similarity with other species and singular biotypes of *Rubus* ser. *Radula*.

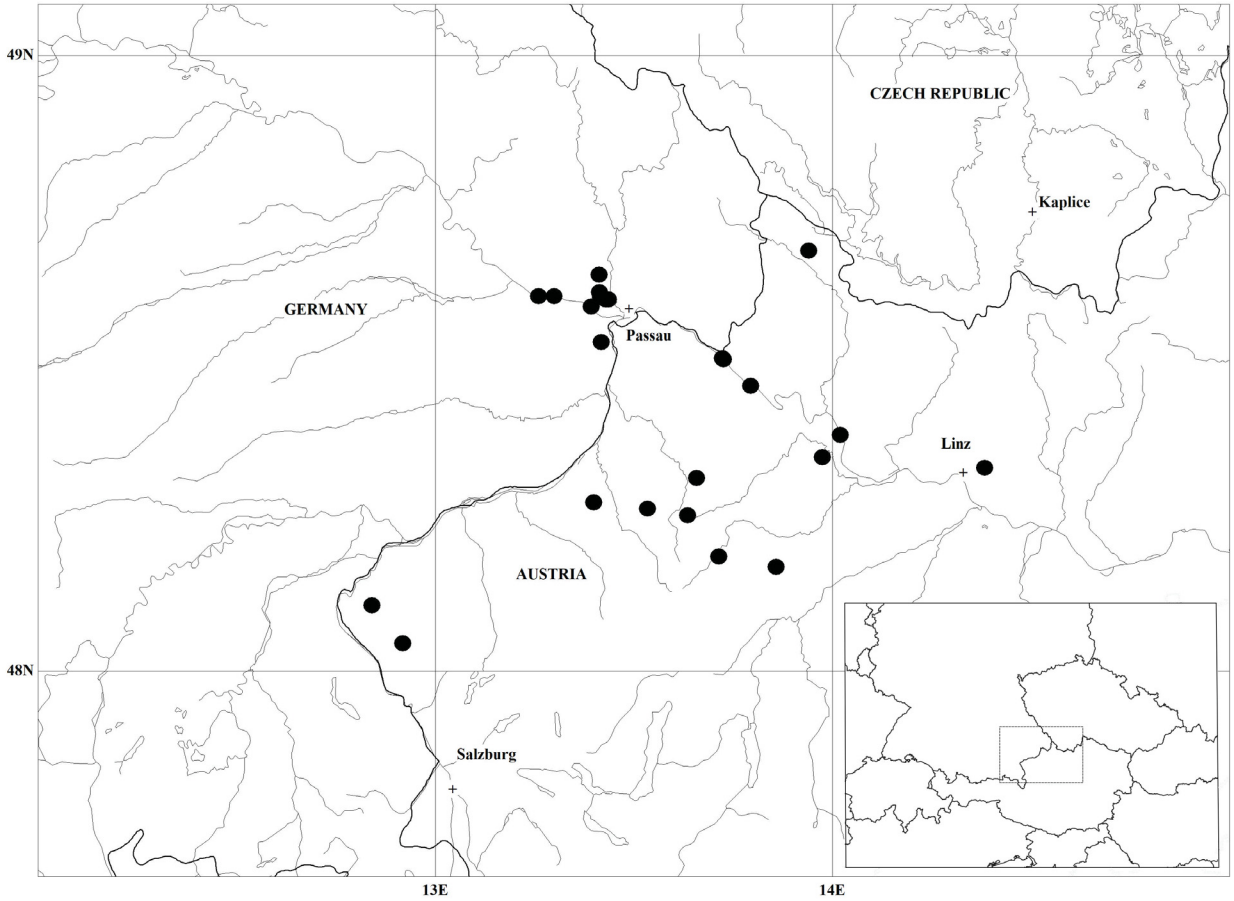

FIGURE 4. Distribution map of *Rubus lentianus*.

History of the discovery:—Vojtěch Žíla was the first to notice the species, as documented by his herbarium specimens stored in CB under two provisional names—'*Rubus paraprogelopsis*' and '*Rubus bobii*', nom. invalid. in schedis. To our knowledge, the oldest records of the species documented by herbarium specimens come from 2004 and were collected by V. Žíla near the town of Grieskirchen and the village of Weibern in Upper Austria (CB).

Additional specimens examined (paratypes):—AUSTRIA. Upper Austria: Hintenberg (Rohrbach distr.), ca 1.2 km ESE of chapel in village, in scrub, one large growth, 730 m a.s.l., 48°40'59.2"N, 13°56'27.5"E, 15 August 2020, *M. Lepší & P. Lepší s.n.* (CB 87544); Engelhartszell, in the big curve of the road nr. 136 above the village, forest fringes, 362 m a.s.l., 48°30'24.1"N, 13°43'33.9"E, 6 July 2020, *Király & Hohla s.n.* (LI 862885, barcode 03361467; LI 862886 barcode 03361474; herb. *Király*); Engelhartszell, in the big curve of the road nr. 136 above the village, forest fringes, 392 m a.s.l., 48°30'29.9"N, 13°43'24.9"E, 9 July 2021, *Király & Hohla s.n.* (LI 862887, barcode 03361481; LI 862888, barcode 03361498; LI 862889, barcode 03361504; herb. *Király*); Wesenufer, slope 0.2 km SW of the bridge at Niederranna, forest fringes, 326 m a.s.l., 48°27'48.9"N, 13°47'38.8"E, 6 July 2020, *Király & Hohla s.n.* (LI 862882, barcode 03361436; LI 862883, barcode 03361443; LI 862884, barcode 03361450; herb. *Király*); Krena, 0.6 km W of the village, along the road to Zell an der Pram, 421 m a.s.l., 48°18'48.9"N, 13°39'29.9"E, 9 July 2021, *Király & Hohla s.n.* (LI 862871, barcode 03361320; LI 862872, barcode 03361337); Urbs Linz, pagus Rienberg, margo silvae apud viam publicam, ad marginem merid. pagi, 300 m a.s.l., 48°20'50.3"N, 13°58'29.4"E, 12 August 2008, *Žíla s.n.* (CB); Aschach a. d. Donau, at the hydroelectric power station, fringes on the right bank of the river, 287 m a.s.l., 48°23'01.3"N, 14°01'12.4"E, 7 July 2020, *Király & Hohla*, *s.n.* (LI 862880, barcode 03361412; LI 862881, barcode 03361429; herb. *Király*); Engerwitzdorf, Obertreffling, forest patch at the Alte Linzer Str, 425 m a.s.l., 48°19'49.4"N, 14°22'59.2"E, 5 July 2018, *Király & Hohla s.n.* (herb. *Király*); Ried im Innkreis, Senftenbach, ca 1.5 km sz. od osady, 480 m a.s.l., 48°16'27.9"N, 13°23'58.3"E, 21 July 2006, *M. Lepší, P. Lepší s.n.* (CB 51228); Andrichsfurt, forest E of the sports ground, 466 m a.s.l., 48°15'50.4"N, 13°32'05.6"E, 10 July 2021, *Király & Hohla s.n.* (LI 863471, barcode 03446805; LI 863472, barcode 03446812); Schatzdorf, oppidum Riedau, pagus Schatzdorf, ad marginem silvae apud

viam publicam, situ merid.-orient. a pago, 445 m a.s.l., 48°15'11.7"N, 13°38'08.7"E, 17 October 2004, *Žíla s.n.* (CB); Tumeltsham, Walchshausen, road embankment, bushes, 453 m a.s.l., 48°14'17.7"N, 13°30'38.7"E, 11 August 2014, *Hohla* (obs. et photo); Tarsdorf, 2.8 km NE of the village, spruce plantations along the road to Hochburg-Ach, 493 m a.s.l., 48°06'24.5"N, 12°50'26.2"E, 7 July 2021, *Király & Hohla s.n.* (LI 862890, barcode 03361511; LI 862891, barcode 03361528; herb. *Király*); Weibern, oppidum Haag am Hausruck, pagus Weibern: ad marginem silvae, apud viam publicam, situ orient. a pago Weibern, 446 m a.s.l., 48°11'10.9"N, 13°42'50.0"E, 17 October 2004, *Žíla s.n.* (CB); Wels, Kematen, okraj lesa již. od obce, 420 m a.s.l., 48°10'08.9"N, 13°51'29.3"E, 20 July 2006, *M. Lepší & P. Lepší s.n.* (CB 51226); Franking, 0.3 km S of Eisengöring, forest fringes, 433 m a.s.l., 48°02'43.2"N, 12°55'05.1"E, 7 July 2021, *Király & Hohla s.n.* (LI 862892, barcode 03361535; herb. *Király*). **GERMANY.** Bavaria: Otterskirchen, 0.7 km S of Stampfing, forest fringes on the left bank of the Danube, 312 m a.s.l., 48°36'36"N, 13°17'59"E, 8 July 2020, *Király & Hohla s.n.* (LI 862873, barcode 03361344; LI 862874, barcode 03361351; LI 862875, barcode 03361368); Otterskirchen, 0.9 km W of Besensandbach, forest fringes on the left bank of the Danube, 318 m a.s.l., 48°36'32.4"N, 13°15'38.5"E, 8 July 2020, *Király & Hohla s.n.* (LI 862877, barcode 03361382; LI 862878, barcode 03361399; LI 862879, barcode 03361405; herb. *Király*); Tiefenbach, 0,3 km S of Alerting, coniferous forests, 420 m a.s.l., 48°36'55.6"N, 13°24'50.7"E, 6 July 2018, *Király & Hohla s.n.* (herb. *Király*); Urbs Passau, pagus Patriching, margo silvae, ad marginem orient. [coordinates point to the western edge of Patriching village] pagi, 440 m a.s.l., 48°36'26.2"N, 13°24'59.7"E, 31 August 2008, *Žíla s.n.* (CB, three specimens); Urbs Passau, pagus Ruderting, margo silvae apud viam publicam, ad marginem merid. pagi, 455 m a.s.l., 48°38'39.0"N, 13°24'46.6"E, 31 August 2008, *Žíla s.n.* (CB, two specimens); Passau, 0.5 km E of Burgholz, coniferous forests, 424 m a.s.l., 48°36'16.6"N, 13°25'42.6"E, 6 July 2018, *Király & Hohla s.n.* (herb. *Király*); Urbs Passau, pagus Patriching, margo silvae ad viam publicam, ca 1 km situ merid.-orient. a pago, 430 m a.s.l., 48°36'13.6"N, 13°25'46.9"E, 31 August 2008, *Žíla s.n.* (CB, two specimens); Patriching (Passau distr.), ca 1.4 km ENE of St. Korona church in village, edge of forest road, one large shrub, 420 m a.s.l., 48°36'14.1"N, 13°26'11.7"E, 5 September 2020, *M. Lepší et al. s.n.* (CB 87508); Oppidum Passau, ad viam publicam trans oppidum Passau versus oppidum Regen. 48°35'33.2"N, 13°24'56.3"E, 2 October 1999, *Žíla s.n.* (CB); Passau, 0.5 km NW of Wörth, shrubbery on the left bank of the Danube, 302 m a.s.l., 48°35'31.2"N, 13°23'35.5"E, 8 July 2020, *Király & Hohla s.n.* (LI 862876, barcode 03361375; herb. *Király*); Dommelstadl (Passau distr.), ca 3.1 km NW of church in village, edge of forest road, one large shrub, 460 m a.s.l., 48°32'03.9"N, 13°25'06.2"E, 5 September 2020, *M. Lepší et al. s.n.* (CB 87509).

Key to the identification of *Rubus lentianus* and similar species

1. Indentation on terminal leaflet of primocane leaves regular, crenate-serrate ..... 2.
- Indentation on terminal leaflet of primocane leaves periodical, serrate ..... 3.
2. Prickles 3–10 per 5 cm of primocane length, 3–4(–5) mm long; apex of terminal leaflet of primocane leaves 5(–8) mm long ..... *R. salisburgensis*
- Prickles (19–)24–29(–34) per 5 cm of primocane length, (6.5–)7–8(–8.5) mm long; apex of terminal leaflet of primocane leaves (12–)15–17(–21) mm long ..... *R. perpungens*
3. Terminal leaflet of primocane leaves with incisions (2.5–)4.0–5.0(–6.0) mm deep, apex of terminal leaflet (16–)21–23(–26) mm long ..... *R. lentianus*
- Terminal leaflet of primocane leaves with incisions 1–4 mm deep, apex of terminal leaflet 10–20(–25) mm long ..... 4.
4. Primocane with 150–280 hairs, 40–120 stalked glands per 1 cm of stem side and very slender prickles, colour of leaves beneath noticeably variable along the length of the primocane, green at the base and white-greyish at the top ..... *R. silvae-bavaricae*
- Primocane with fewer hairs (8–250) or fewer stalked glands (1–140) per 1 cm of stem side and with thicker prickles, colour of leaves beneath less variable along the length of the primocane ..... 5.
5. Primocanes with transitions between stalked glands and prickles, i.e. unequal stalked glands, acicles, bristles and sometimes also pricklets present; leaves distinctly hairy to the touch beneath and hairy or glabrous above ..... 6.
- Primocanes usually without transitions between stalked glands and prickles, stalked glands usually short; leaves usually not distinctly hairy to the touch beneath (except for *R. muhelicus*, see 9) and glabrous above ..... 8.
6. Primocanes sharply angled with (30–)40–100(–250) hairs per 1 cm of stem side and with prickles ± patent, straight; pedicels with stalked glands longer than the longest simple hairs; leaves usually with scattered hairs above ..... *R. jarae-cimrmanii*
- Primocanes angled or bluntly angled with 3–20 hairs per 1 cm of stem side and with prickles declining, often slightly curved; pedicels with stalked glands shorter than the longest simple hairs; leaves glabrous or almost glabrous above ..... 7.
7. Primocane leaves (very) distinctly pedate, with an ovate or obovate terminal leaflet abruptly narrowing into a (15–)20(–25) mm long apex, with a slightly cordate (rarely rounded) base and with distinctly periodical indentation; petals pale pink ..... *R. perpedatus*
- Primocane leaves not distinctly pedate, with a broadly ovate to broadly obovate terminal leaflet abruptly narrowing into a 10–15(–20) mm long apex, with a distinctly cordate base and with slightly periodical indentation; petals white ..... *R. epipsilos*
8. Primocane leaves 3–4(–5)-foliolate, terminal leaflet oblong obovate to broadly obovate; primocanes bluntly angled; carpels densely hairy; petals white to slightly pinkish ..... *R. vatavensis*

- Primocane leaves (3–)5-foliolate, terminal leaflet of a different shape; primocanes angled to sharply angled; carpels glabrous or with few hairs; petals pale pink to pink ..... 9.

9. Primocane leaves ± palmate, terminal leaflet broadly ovate to round with a distinctly undulating margin; prickles (9–)11–20(–22) per 5 cm of primocane length ..... *R. muhelicus*

- Primocane leaves distinctly pedate, terminal leaflet elliptical to broadly elliptical, ovate or rhombic with a rather flat margin; prickles 5–12(–16) per 5 cm of primocane length ..... 10.

10. Pedicels with stalked glands shorter than long simple hairs; primocanes sparsely to intermediately densely hairy, with slightly declining prickles; prickles on inflorescence rachis 7–8 mm long; inflorescence conical, its branches rather thick ..... *R. radula*

- Pedicels with stalked glands as long as short simple hairs; primocanes glabrous or with very few hairs, with distinctly declining prickles; prickles on the inflorescence rachis 3–4 mm long; inflorescence broadly conical, diffuse, with rather thin branches .... *R. rudis*

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References

Bluff, M.J. & Fingerhuth, C.A. (1825) *Compendium florae Germaniae. Plantae Phanerogamicae seu Vasculosae, Tomus 1*, I. L. Schrag, Norimbergae, 755 pp.
https://doi.org/10.5962/bhl.title.6676

Bönninghausen, C.M.F. (1824) *Prodromus florae Monasteriensis Westphalorum Phanerogamia*. Monasterii, F. Regensberg, 928 pp.
https://doi.org/10.5962/bhl.title.6344

Danner, J. (2003) *Rubus muhelicus*, sp. nova, eine neue Art der ser. *Radulae*, nebst einem Vorschlag zur batologischen Arealgrößenterminologie. *Neilreichia* 2–3: 165–176.

Ehrendorfer, F. & Hamann, U. (1965) Vorschläge zu einer floristischen Kartierung von Mitteleuropa. *Berichte der Deutschen Botanischen Gesellschaft* 78: 35–50.
https://doi.org/10.1111/j.1438-8677.1965.tb02004.x

Focke, W.O. (1877) *Synopsis Ruborum Germaniae*. Müller, Bremen, 434 pp.

Focke, W.O. (1914) Species ruborum: Monographiae generis rubi prodromus. *Bibliotheca Botanica* 17: 1–274.

Gaggermeier, H. (2007) *Rubus silvae-bavaricae*, eine neue Brombeerart aus dem Bayerischen Wald. *Hoppea, Denkschriften der Regensburgischen Botanischen Gesellschaft* 68: 69–80.

Haveman, R. & Ronde, I. de (2013) The role of the Weberian reform in European *Rubus* research and the taxonomy of locally distributed species – which species should we describe? *Nordic Journal of Botany* 31: 145–150.
https://doi.org/10.1111/j.1756-1051.2012.01558.x

Hohla, M., Pagitz, K. & Király, G. (2021) Hidden on both sides of the Alps: *Rubus noricus*, a new species of bramble (Rosaceae) from Austria and Germany. *Phytotaxa* 489 (1): 1–9.
https://doi.org/10.11646/phytotaxa.489.1.1

Holub, J. (1997) Some considerations and thoughts on the pragmatic classification of apomictic *Rubus* taxa. *Osnabrücker Naturwissenschaftliche Mitteilungen* 23: 147–155.

Krahulcová, A., Trávníček, B. & Šarhanová, P. (2013) Karyological variation in the genus *Rubus*, subgenus *Rubus*: new data from the Czech Republic and synthesis of the current knowledge of European species. *Preslia* 85: 19–39.

Kurtto, A., Weber, H.E., Lampinen, R. & Sennikov, A.N. (eds.) (2010) *Atlas Florae Europaeae. Distribution of vascular plants in Europe. 15. Rosaceae (Rubus)*. The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo, Helsinki.

Lepší, M. & Lepší, P. (2006) *Rubus kletensis*, a new species from South Bohemia and Upper Austria. *Preslia* 78: 103–114.

Lepší, M. & Lepší, P. (2009) *Rubus silvae-norticae*, a new species from Bohemia, Austria and Bavaria and the significance of brambles for regional migrations and phytogeography. *Preslia* 81: 43–62.

Linnaeus, C. (1753) *Species Plantarum 1*. Impensis Laurentii Salvii, Holmiae, 560 pp.

Sochor, M. & Trávníček, B. (2016) Melting pot of biodiversity: first insights into the evolutionary patterns of the Colchic bramble flora (*Rubus* subgenus *Rubus*, Rosaceae). *Botanical Journal of the Linnean Society* 181: 610–620.

https://doi.org/10.1111/boj.12436
Sochor, M., Vašut, R.J., Sharbel, T.F. & Trávníček, B. (2015) How just a few makes a lot: speciation via reticulation and apomixis on example of European brambles (*Rubus* subgen. *Rubus*, Rosaceae). *Molecular Phylogenetics and Evolution* 89: 13–27. https://doi.org/10.1016/j.ympev.2015.04.007
Šarhanová, P., Sharbel, T.F., Sochor, M., Vašut, R.J., Dančák, M. & Trávníček, B. (2017) Hybridization drives evolution of apomicts in *Rubus* subgenus *Rubus*: evidence from microsatellite markers. *Annals of Botany* 120: 317–328. https://doi.org/10.1093/aob/mcx033
Šarhanová, P., Vašut, R.J., Dančák, M., Bureš, P. & Trávníček, B. (2012) New insights into the variability of reproduction modes in European population of *Rubus* subgen. *Rubus*: how sexual are polyploid brambles? *Sexual Plant Reproduction* 25: 319–335. https://doi.org/10.1007/s00497-012-0200-9
Temsch, E.M., Greilhuber, J. & Krisai, R. (2010) Genome size in liverworts. *Preslia* 82: 63–80.
Thiers, B. (2022) *Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium*. Available from: http://sweetgum.nybg.org/science/ih/ (accessed: 15 May 2022).
Trávníček, B., Lepší, M., Lepší, P. & Žíla, V. (2018) Taxonomy of *Rubus* ser. *Radula* in the Czech Republic. *Preslia* 90: 387–424. https://doi.org/10.23855/preslia.2018.387
Weber, H.E. (1997) Untersuchungen zur Gattung *Rubus* im Chiemgau. *Berichte der Bayerischen Botanischen Gesellschaft* 68: 67–96.
Žíla, V. & Weber, H.E. (2005) A new species of *Rubus* from Bavaria, Bohemia and Austria. *Preslia* 77: 433–437.