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Willdenowia
Annals of the Botanic Garden and Botanical Museum Berlin

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Extending the range of *Rubus* ser. *Micantes* (*Rosaceae*) southward: *Rubus vallis-cembrae*, a unique new species from Italy

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Abstract: *Rubus* ser. *Micantes* Sudre (*Rosaceae*) includes apomictic polyploid species of hybrid origin, which occur in north-western and central Europe, with rare outposts south-east of the Alps. The first regionally distributed representative of the series occurring in Italy, *Rubus vallis-cembrae* Prosser & Király, is described here as a morphologically unique, isolated tetraploid species. The new species is morphologically compared with related taxa of the series. Furthermore, comprehensive iconography and data on distribution and ecology are presented.

Key words: apomixis, blackberry, bramble, distribution, Italy, new species, *Rosaceae*, *Rubus*, *Rubus* ser. *Micantes*, species formation, taxonomy, Trentino-Alto Adige/Südtirol

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Introduction

The blackberries (*Rubus* L. subg. *Rubus*) with about 750 European species are considered to be one of the most taxonomically complicated groups of vascular plants on the continent (Kurtto & al. 2010). The subgenus includes few diploid species and numerous agamospermic polyploids; new biotypes originating as a result of occasional hybridization can be stabilized by renewed apomixis (Weber 1995; Šarhanová & al. 2012; Sochor & al. 2015). To avoid the description of innumerable taxa of blackberries in Europe, a specific taxonomic concept has been developed over the last 40 years ("Weberian reform", see Holub 1997): only stabilized morphotypes are accepted as species, the minimum extent of the "necessary" distribution area of a species has been discussed and classified from several aspects (Weber 1996; Holub 1997; Ryde 2011; Haveman & de Ronde 2012).

Within the subgenus, *Rubus* sect. *Rubus* ser. *Micantes* Sudre includes apomictic species originated via hybridization of glandular and non-glandular brambles (Holub 1992; Weber 1995). The representatives of the series are characterized by the low-arching first-year stem with rather uniform prickles and scattered to numerous stalked glands; the terminal leaflets of the first-year stem are typically elliptic or obovate, the leaves are green to grey-tomentose beneath; and long-stalked glands are always present on the inflorescence axis and pedicels (Weber 1995; Zieliński 2004). The series is, despite its widely accepted morphological delimitation by the experts, certainly polyphyletic, both based on molecular studies (Sochor & al. 2015) and the micromorphology

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of the leaf indumentum (Tomaszewski & al. 2013). The number of species in the series is about 60, the centre of their distribution is situated in NW Europe, and especially many species grow in the British Isles, the Netherlands and the Czech Republic (see the map "AFE 4256" in Kurtto & al. 2010). The southernmost outposts of *R.* ser. *Micantes* were found in southern Slovenia, represented by the isolated occurrence of *R. styriacus* Halácsy (Starmühler 2003). However, excluding this disjunct projection of the distribution area of the series in Slovenia, no reliable records of the series are known south of the Alps. In Italy, Weber (1998) did not report any species of the series when revising the bramble flora of the Trentino region. Doubtful record(s) of *R. clusii* Borbás were mentioned by Kurtto & al. (2010) and Pagitz (2017) from the region of Friuli. Finally (and consequently), no species of *R.* ser. *Micantes* are included in the actual checklist of the Italian flora (Bartolucci & al. 2018). It is noteworthy that non-stabilized individual types (probably local hybrids) bearing the feature-set of *R.* ser. *Micantes* were previously observed at a few localities in northern Italy (pers. obs. of the authors and K. Pagitz), but according to the "Weberian approach" (see above) they have no taxonomic significance.

A characteristic morphotype (= morphologically defined, stable type) of bramble has been found since 2000 at a few sites in Trento province (northern Italy); nevertheless, it has long been assessed to be taxonomically insignificant. The careful re-assessment of the herbarium material kept in ROV and the systematic field surveys of the first author showed that this morphotype (*Rubus vallis-cembrae* Prosser & Király) is quite common in a larger area and represents a hitherto unknown, distinct species of *R.* ser. *Micantes*. Here we describe it as a new, widely isolated species that significantly extends the known range of the series southward, and we discuss its taxonomic position, distribution and ecology.

Material and methods

Field studies and distribution data — The field studies of the first author started in Trento province (Italy) as part of a mapping project (Prosser & Festi 1993) and continued, quite intensively from 2015 onward, covering nearly all sites appropriate for brambles in the area. In addition, the second author visited 2200 localities between 2010 and 2018 in the Pannonian basin, the northern Balkans and the eastern Alps (including northern Italy), so he gained a profound outline of *Rubus* ser. *Micantes* in central and south-eastern Europe. For each locality, the geo-coordinates were determined in WGS 84 projection, and altitude and habitat were noted. Terms on range size are adopted from Weber in Kurtto & al. (2010), also taking the approaches of Holub (1997) and Ryde (2011) into consideration.

Herbarium studies — For the study of *Rubus vallis-cembrae*, we examined a few earlier collections and the specimens presented during the recent fieldwork (generally kept in ROV); iso- and paratypes were deposited in B, BP, FI and W (for herbarium codes see Thiers 2018+). Furthermore, the material of the following herbaria was used for comparative morphological studies with other taxa from *R.* ser. *Micantes*: BP, GJO, GZU, LJU, W, WU, ZA and the private herbarium of G. Király.

Morphological investigations — Morphological investigations were based on the revision of 60 specimens of *Rubus vallis-cembrae*, while some characters (e.g. features of flowers) were investigated on living plants in the field. Generally, first-year stems with well-developed leaves were examined together with intact inflorescences; abnormal and injured plants were not included in the assessments. Additional reference material for the comparative study of species from *R.* ser. *Micantes* was derived from the herbaria listed above.

DNA ploidy level estimation — The DNA ploidy level was assessed based on the relative fluorescence of stained nuclei, as determined by flow cytometric measurements of fresh leaves using a Partec CyFlow ML flow cytometer (Sysmex Partec, Görlitz, Germany) in the laboratory of the Department of Botany, Palacký University (Olomouc, Czech Republic). *Zea mays* 'CE-777' was used as internal standard and staining was performed with 4′,6-diamidino-2-phenylindole (DAPI). For more details on the methods used, see Sochor & Trávníček (2016).

Results and Discussion

Rubus vallis-cembrae Prosser & Király, **sp. nov.** – Fig. 1, 2

Holotype: Italy, provincia di Trento, comune di Albiano-Val di Cembra, c. 1 km a SW di Albiano, presso la strada per il Lago di Santa Colomba al bivio per le cave, esp. N, incolto cespugliato, porfido [Trento province, municipality of Albiano-Val di Cembra, c. 1 km SW of Albiano along road to Santa Colomba lake, at crossroads for quarries, N exposure, shrubby wasteland, porphyry], 46°08'10"N, 11°10'54"E, 773 m, 30 Jun 2018, leg. & det. *G. Király, F. Prosser & F. Festi* (ROV 74191; isotypes: BP 00035001, BP 00035002).

Description — Shrub, usually to 80(–150) cm tall. *First-year stems* low-arching or procumbent, bluntly angled and slightly furrowed, (4–)5–8(–10) mm in diam.; sides greyish green or purplish when exposed to sun, dull, somewhat pruinose, with simple and tufted hairs 0.2–1.2 mm long (5–50 hairs per 1 cm length of stem side, mainly on angles), and with scattered (sub)sessile glands; stalked glands and acicles 0.6(–0.8) mm long, 0–3(–5) per 1 cm length of stem side. *Prickles* coloured as stem, somewhat unequal, 5–15 per 5 cm length of

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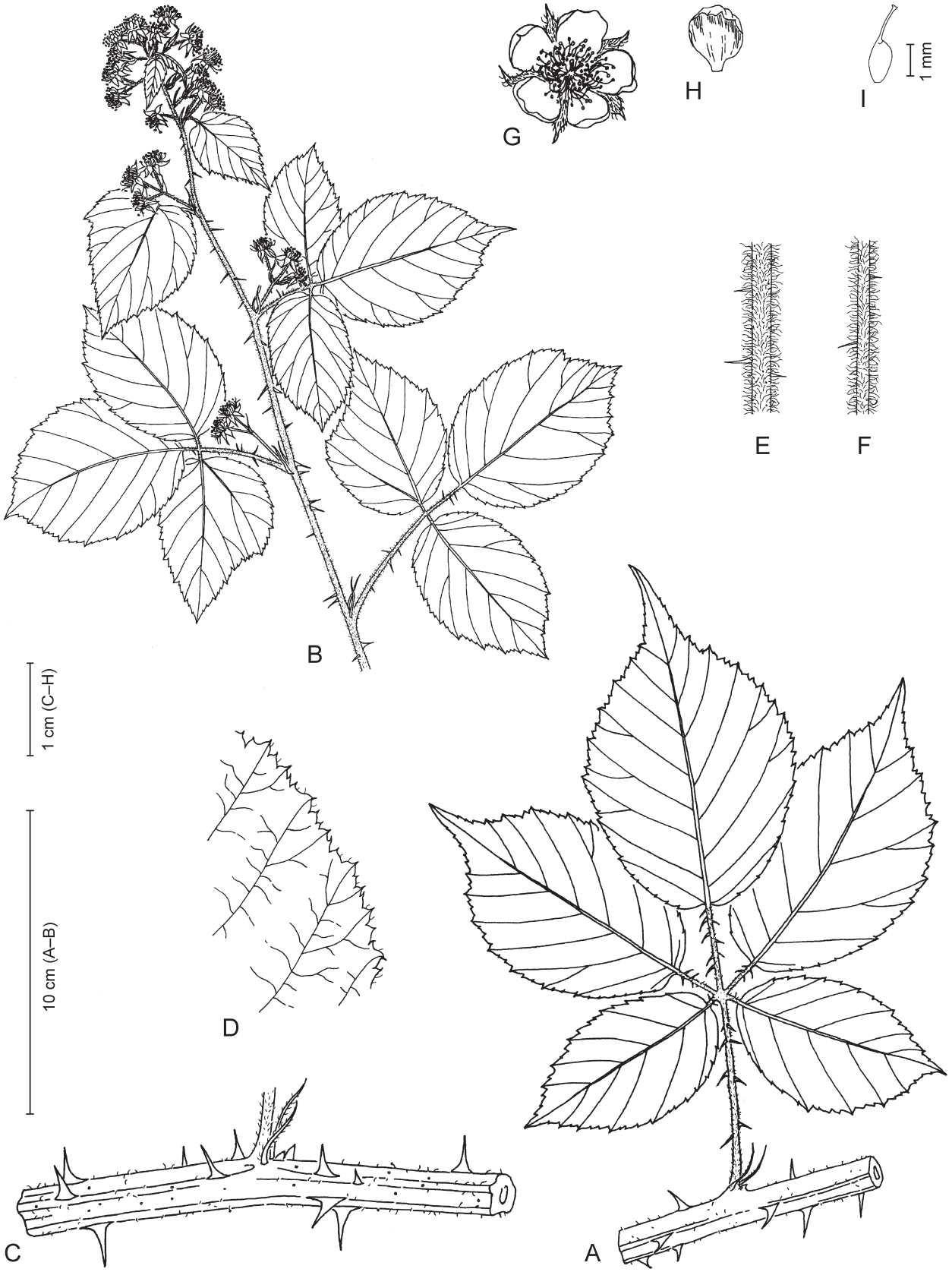


Fig. 1. *Rubus vallis-cembrae* – A: portion of leafy first-year stem; B: inflorescence; C: portion of first-year stem; D: margin of terminal leaflet of leaf on first-year stem; E: axis of inflorescence; F: peduncle; G: flower; H: petal; I: young carpel. – Drawn by J. Táborská after parts of isotype specimens (BP 00035001 and BP 00035002).

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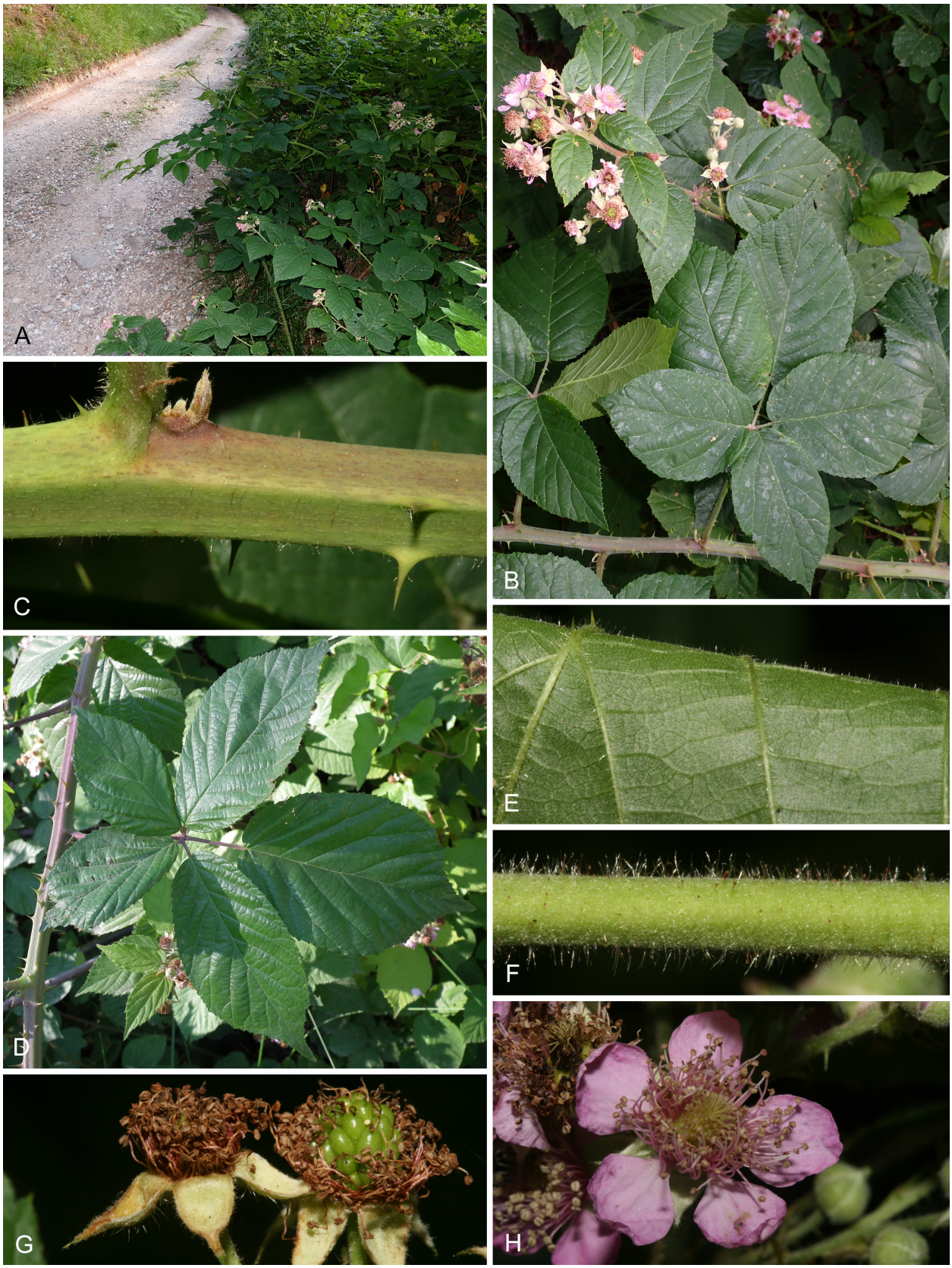


Fig. 2. *Rubus vallis-cembrae* – A: typical stand in a forest fringe; B: leafy first-year stem and inflorescence; C: first-year stem; D: typical leaf of first-year stem; E: underside of leaf of first-year stem; F: axis of inflorescence; G: young collective fruits; H: flowers. – A–C & E–H: Val di Cembra, near Rio di Lona, 1 Jul 2018, photographed by Filippo Prosser; D: Val di Cembra, 1 km SW of Albiano (type locality), 30 Jun 2018, photographed by Gergely Király.

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stem, patent or slightly declining, straight, slender, compressed and 2–3 mm broad at base, ± abruptly tapering, (2–)4–7(–8) mm long. *Leaves* (3–)5-foliolate, indistinctly or distinctly pedate; lamina leathery; upper surface bright, dark green, not hairy to touch (5–15 appressed minute hairs per cm^2 when young, later glabrescent), with scattered 0.2–0.8 mm long hairs on leaf margin; lower surface light green and hairy to touch, with scattered appressed hairs 0.3–1 mm long on veins, not covering entire surface among veins; venation rather strong, veins ± depressed into surface of leaf; indentation unevenly (rarely doubly) serrate, with incisions 1–2.5 mm deep, teeth 2–3 × as wide as long with a distinct, narrow apex c. 0.5 mm long. *Terminal leaflet* usually broadly obovate (rarely broadly ovate), slightly or distinctly cordate at base, apex conspicuous, 18–27 mm long, abruptly narrowed; petiolule 23–32(–40) mm long, 24–30(–35)% as long as lamina. *Basal leaflets* broadly ovate, often expressly asymmetric, (0.8–)0.85–1.05(–1.15) × as long as petiole; petiolules 2–4(–5) mm long. *Petiole* loosely hairy with ± erect, simple and tufted hairs and scattered subsessile and few stalked glands to 0.4 mm long; prickles on petiole 10–16, to 3 mm long, straight, slender, slightly declining. *Stipules* filiform, with scattered longer hairs and fewer stalked glands. *Inflorescence* usually to 25 cm long, broadly paniculate, rounded, terminal part compact (lowermost branch often distinct), leafy near apex (only distal 1–3 cm leafless), lateral branches patent or erecto-patent, to 4.5 cm long, with conspicuous, long, narrow stipules (which sometimes gradually transfer into bracts). Uppermost 2–5(–9) *leaves of inflorescence axis* simple, lanceolate to broadly ovate, lower simple one(s) broader, lowermost ones cordate at base, often with small lobes in basal part; leaves at bottom of inflorescence 3-foliolate. *Inflorescence axis* densely hairy with appressed or erect, shorter, simple and patent, longer hairs to 1.2 mm long; sessile glands rather scattered; stalked glands unevenly distributed, (0–)1–3(–6) per 1 cm length of axis, 0.4–0.8 mm long; prickles yellow or purplish, 4–15 per 5 cm length of axis, slightly declining, straight, slender, (1.5–)2.5–4 mm long. *Inflorescence branches* 1–3(or 4)-flowered; pedicels (5–)10–20 mm long, densely hairy and with scattered (sub)sessile glands, longer stalked glands (0 or)1–5(–20); stipules with a few stalked glands to 0.5 mm among loose, longer hairs; prickles of pedicels 2–6(–8), yellowish, straight, patent, 0.5–2 mm long. *Sepals* reflexed after anthesis, greyish felted, sometimes reddish at base, with a few longer hairs and sessile glands at margin (pricklets absent), ovate to broadly ovate, 5–7 mm long with a narrow, distinct apex to 3 mm long (apex sometimes longer, greenish, leaflike). *Petals* ± touching each other, loosely hairy, spatulate, rounded or slightly emarginate at apex, bright pink, (7–)9–13(–15) mm long. *Stamens* a little longer than yellowish green styles; filaments bright pink; anthers glabrous, yellow. *Carpels* glabrous; receptacle hairy. *Collective fruits* ovoid, with 25–40(–55) drupelets.

DNA-ploidy — 4*x* (examined in isotype specimens BP 00035001 and BP 00035002). Because all taxa (21 species) of *Rubus* ser. *Micantes* investigated by now for ploidy level proved to be tetraploid (Krahulcová & al. 2013), this count on ploidy is not unexpected.

Phenology — Flowering in June and July.

Distribution — *Rubus vallis-cembrae* was found in about 50 localities in two different areas of Trentino-Alto Adige/Südtirol region in northern Italy (Fig. 3). The larger part of the range is located on the porphyritic outcrops east of the river Adige between Laives/Leifers and Pergine. Furthermore, it was observed in a second, smaller area in Val Rendena near Bocenago and Carisolo. This region is separated from the core area of the distribution by the Adige Valley, and by the Paganella chain and Brenta Group, both composed of dolomite and limestone. The longest diameter of the distribution area is 58 km; therefore, the species can be considered (in accordance with the "Weberian approach", see Introduction) as a regionally distributed bramble.

Ecology — *Rubus vallis-cembrae* was found from 689 to 1285 m above sea level; however, about half of the specimens were collected between 900 and 1100 m. At the lower limit it usually grows in gullies or slopes with northern exposure, whereas toward the upper limit southern slopes prevail. The species is explicitly acidophilous and occurs solely on silicate substrates, mainly on porphyry. It generally grows on semi-dry to mesic soils, in sunny or half-shady fringes or open forests, practically in every natural forest community (most often in associations of *Erico-Pinetalia*, *Fagetalia* and *Quercetalia pubescenti-petraeae* orders), and their derivates of the submontane and montane altitudinal belt of the area.

Taxonomy — *Rubus vallis-cembrae* is considered a representative of *R.* ser. *Micantes* based on the presence of scattered stalked glands on the first-year stem and the inflorescence axis, and furthermore due to the leaf shape typical for this series (broadly obovate terminal leaflets cordate at the base, apex conspicuous). Nevertheless, it has a slightly transitional position to *R.* ser. *Sylvatici* (P. J. Müll.) Focke because of the green underside of the leaves and the relatively low number of stalked glands on the first-year stem. The bright pink petal colour is very rare in both above-mentioned series; it could refer to *R. ulmifolius* Schott as a putative ancestor. See Table 1 for comparison with two members of *R.* ser. *Micantes* occurring in neighbouring Austria and Slovenia (*R. clusii* and *R. styriacus*).

Etymology — The epithet "*vallis-cembrae*" derives from Val di Cembra (Cembra Valley) in Trentino, Italy, which comprises the main growing area of the species.

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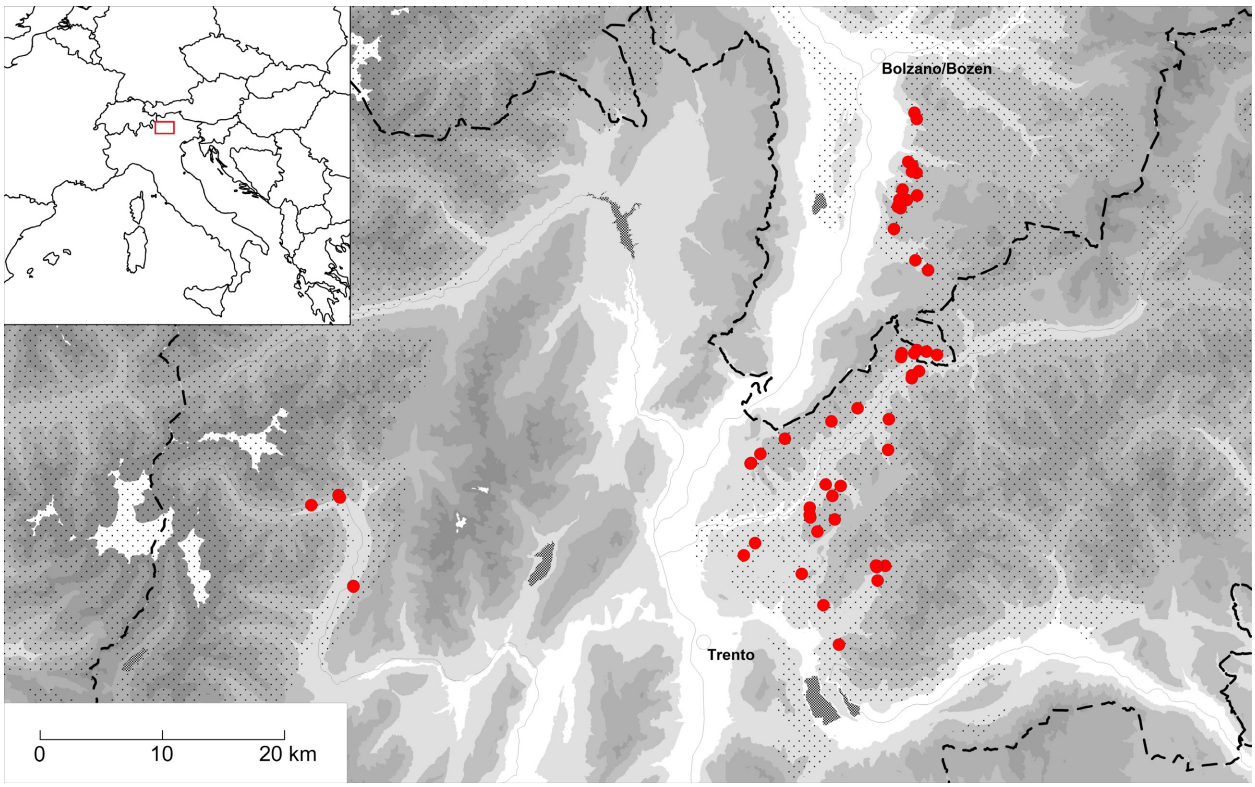


Fig. 3. Distribution of *Rubus vallis-cembrae* (red circles) based on localities supported by herbarium vouchers. The black-dotted areas represent the cover of siliceous bedrock.

Selected specimens seen — **Italy: Trentino-Alto Adige/Südtirol region: Bolzano/Bozen Province:** Municipality of Aldein/Aldino: c. 1 km a WSW di Aldein/Aldino, presso l'Hotel Aldeinerhof, esp. SW, boscaglia al margine di canneto, porfido, 1080 m, 46°21'45"N, 11°20'15"E, 11 Jul 2018, *F. Prosser* (ROV 74161); tra Aldain/Aldino e Petersberg/Monte San Pietro, lungo la strada che scende a Maso Hofer, bordo strada in bosco con *Pinus sylvestris*, stazione piuttosto luminosa, porfido, 1285 m, 46°23'11"N, 11°21'47"E, 15 Jul 2018, *F. Prosser* (ROV 74176); c. 2.5 km a NNW di Aldein/Aldino, tra Matznell/Mazzanella e Rosssprung/Salto del Cavallo, lungo la strada al margine N del prato, esp. NW, margine boschivo umido, in punto al sole, porfido, 1105 m, 46°23'28"N, 11°20'52"E, 15 Jul 2018, *F. Prosser* (ROV 74178); c. 1.8 km a NNW di Aldein/Aldino, lungo il sentiero 6a che scende all'Aldeiner Bach/Rio di Aldino, esp. W, radura di pecceta, in punto al sole, porfido, 1050 m, 46°23'01"N, 11°20'39"E, 15 Jul 2018, *F. Prosser* (ROV 74180); tra Branzoll/Bronzolo e Aldein/Aldino, nella valle di Aldein/Aldino, oltre il rudere dell'Osteria Mezza Strada/Bachkessler, esp. W, boscaglia nitrofila umida, con *Rubus idaeus*, porfido, 920 m, 46°22'39"N, 11°20'42"E, 15 Jul 2018, *F. Prosser* (ROV 74182). Municipality of Altrei/Anterivo: A SE di Altrei/Anterivo, subito a W del Wasserlehof/Maso Trenta, esp. S, siepe al margine della strada, stazione luminosa, porfido, 1155 m, 46°16'11"N, 11°22'44"E, 5 Jul 2018, *F. Prosser* (ROV 74166); a WSW di Altrei/Anterivo, loc. Mühlen/Molini, esp. W, scarpata rocciosa cespugliata, stazione luminosa, porfido, 1065 m, 46°16'25"N, 11°21'28"E, 5 Jul 2018, *F. Prosser* (ROV 74168). Municipality of Laifers/Laives: A SE di Laifers/Laives, lungo la strada forestale tra Unterrain e Buchnerhof/Ai Faggi, esp. N, canalone boscato nitrofilo esposto a N, porfido, 965 m, 46°24'41"N, 11°21'17"E, 15 Jul 2018, *F. Prosser* (ROV 74172); a NE di Steinmannwald/Pineta, poco a monte della Altebnerhof, esp. SW, castagneto da frutto, stazione ombrosa, porfido, 770 m, 46°26'49"N, 11°21'46"E, 19 Jul 2018, *F. Prosser* (ROV 74159). Municipality of Montan/Montagna: Presso Kaltenbrunn/Fontanefredde verso Montan/Montagna, 350 m a NW dell'Hotel Pausa, esp. E, siepe al margine del bosco, stazione luminosa, porfido, 900 m, 46°20'21"N, 11°21'33"E, 11 Jul 2018, *F. Prosser* (ROV 74162); Municipality of Deutschnofen/Nova Ponente: A SE di Laifers/Laives, bordo laghetto artificiale 630 m a NE del Franzenberg/M. Francesco, esp. N, sponda cespugliata umida zona luminosa, porfido, 1205 m, 46°24'30"N, 11°21'32"E, 15 Jul 2018, *F. Prosser* (ROV 74173); loc. Unterrain a WNW di Petersberg/Monte San Pietro, sotto la linea dell'alta tensione lungo la strada per Lientner/Maso Casera, terreno disboscato invaso da rovi in piena luce, porfido, 1225 m, 46°24'14"N, 11°21'29"E, 15 Jul 2018, *F. Prosser* (ROV 74175). — **Trento Province:** Municipality of Albiano: Sopra Civezzano a E di Pra Cesare, al bivio del sentiero SAT per Lago Santo, esp. NW, bosco rado piano con *Pinus sylvestris*, silice, 883 m, 46°07'39"N, 11°10'10"E, 2 Sep 2017,

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F. Prosser (ROV 73579). Municipality of Altavalle: Val di Cembra, lungo il Rio del Molino a W di Grauno presso il rudere di un mulino, esp. S, bosco di forra umido, su silice, 900 m, 46°13'57"N, 11°17'37"E, 18 Oct 2013, *F. Prosser*, *A. Bertolli* (ROV 66670). Municipality of Baselga di Pinè: Riserva Naturalistica del Laghestel di Pinè, 350 m a SE del Laghestel, bosco di *Pinus sylvestris* e *Alnus glutinosa*, 910 m, 46°06'46"N, 11°13'48"E, 2 Aug 2017, *F. Prosser* (ROV 73525); Pinè, a NW di Sternigo in loc. La Capannina, esp. NW, margine boschivo, porfido, 1123 m, 46°08'36"N, 11°14'51"E, 30 Jun 2018, *G. Király*, *F. Prosser*, *F. Festi* (ROV 74197, herb. G. Király). Municipality of Bocenago: c. 300 m a S di Bocenago, alla cascata dal Masanel lungo il sentiero, esp. W, radura boschiva umida in pendio, silice, 830 m, 46°06'43"N, 10°45'29"E, 13 Aug 2018, *F. Prosser* (ROV 74153). Municipality of Capriana: Val di Cembra, lungo il Rio Bianco tra Capriana e Carbonare, loc. La Sega, esp. SE, boscaglia nitrofila presso il torrente, porfido, 942 m, 46°16'18"N, 11°20'30"E, 5 Jul 2018, *F. Prosser* (ROV 74170); Val di Cembra, lungo la strada tra Capriana e loc. La Sega, esp. E, scarpata cespugliato-nitrofila a valle della strada, porfido, 982 m, 46°16'08"N, 11°20'28"E, 5 Jul 2018, *F. Prosser* (ROV 74171). Municipality of Carisolo: Sentiero da Carisolo per l'eremo di S. Martino, esp. S, margine di pietraia esposta a sud, in piena luce, silice, 1044 m, 46°10'37"N, 10°44'45"E, 14 Aug 2018, *F. Prosser* (ROV 74157). Municipality of Cembra: Da Vegiose verso Passo Zise (Cisa) lungo la strada forestale, versante atesino, esp. W, margine strada forestale in bosco misto su silice, 1220 m, 46°12'42"N, 11°12'57"E, 9 Aug 2016, *F. Prosser* (ROV 72691). Municipality of Fierozzo: Val dei Mocheni, sotto San Francesco in loc. Rodleri, presso una fattoria, esp. W, siepe umida, silice, 942 m, 46°06'22"N, 11°18'34"E, 23 Jul 2018, *F. Prosser* (ROV 74158). Municipality of Giovo: Val di Cembra: Palù Longa 1.4 km a WNW del Lago Santo, esp. SW, margine siepe su ex prato su silice, 1002 m, 46°12'04"N, 11°11'23"E, 20 Aug 2017, *F. Prosser* (ROV 73567); Palù Sovina a E di Faedo, lungo il sentiero SAT E417, esp. W, tagliata sotto la linea dell'alta tensione, silice, 944 m, 46°11'41"N, 11°10'47"E, 20 Aug 2017, *F. Prosser* (ROV 73570). Municipality of Giustino: Sentiero per Malga Nardis, esp. S, radura boschiva, c. 1200 m, 46°10'19"N, 10°42'56"E, 2 Jul 2002, *F. Festi* (ROV 43356, W, FI). Municipality of Lona-Lases: Val di Cembra, c. 200 m a E di Lona presso il parcheggio presso il bivio delle stradine, esp. NW, pista d'esbosco abbandonata nella boscaglia di latifoglie esposta a NW, stazione piuttosto ombrosa, porfido, 733 m, 46°09'39"N, 11°14'25"E, 1 Jul 2018, *F. Prosser* (ROV 74186); Val di Cembra, strada forestale sulla dx idrografica del Rio di Lona, esp. W, scarpata di pista forestale in zona luminosa, porfido, 898 m, 46°09'21"N, 11°14'24"E, 1 Jul 2018, *F. Prosser* (B101013001, B101013002); Val di Cembra, a SE di Lona, Val di Nao nell'impluvio, esp. N, impluvio umido-paludoso cespugliato, con alte erbe, porfido, 933 m, 46°09'14"N, 11°14'26"E, 1 Jul 2018, *F. Prosser* (ROV 74190). Municipality of Pergine Valsugana: c. 1.2 km a NW di Viarago lungo la strada per

Table 1. Main distinctive features of *Rubus clusii*, *R. styriacus* and *R. vallis-cembrae*. All data are based on recent investigations and, for the first two species, partly on some measurements of Király & al. (2013) and Király (2017).

Characters	***Rubus clusii***	***Rubus styriacus***	***Rubus vallis-cembrae***
No. of stalked glands of first-year stem (per 1 cm of stem side)	(3–)5–20	3–10	0–3(–5)
No. of prickles of first-year stem (per 5 cm of stem)	8–12	15–25	5–15
Length (mm) and shape of prickles on first-year stem	(3–)4–7(–9); straight or faintly curved, strong, slightly declining	(3–)4–6; faintly curved, stout, slightly or strongly declining	(2–)4–7(–8); straight, slender, patent or slightly declining
Ratio (%) of length of petiole and basal leaflets of leaves on first-year stem	(70–)85–115(–120)	(110–)130–170(–200)	(80–)85–105(–115)
Ratio (%) of length of petiolule and lamina of terminal leaflet on first-year stem	(21–)30–37	33–45(–55)	24–30(–35)
Length (mm) of teeth of leaves on first-year stem	1.5–3(–4)	2–4(–5)	1–2.5
Number and shape of prickles of petioles on first-year stem	17–30, curved, stout, strongly curved	15–30; curved, slender, strongly declining	10–16, straight, slender, slightly declining
Number of prickles per 5 cm length on inflorescence axis	8–12(–20)	10–30	4–15
Number of stalked glands on pedicel	30–100	5–20	(0–)1–5(–20)
Length (mm) and colour of petals	10–13; white	8–11; bright pink	(7–)9–13(–15); bright pink
Carpels	sparsely hairy	glabrous	glabrous

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Pratond appena oltre il bivio per Tenrabi, esp. S, siepe/margine bosco, silice, 931 m, 46°05'22"N, 11°15'06"E, 21 Oct 2017, *F. Prosser* (ROV 73483). Municipality of Sant'Orsola Terme: Destra Fersina presso i Masetti, esp. S, incolto umido, 950 m, 46°06'59"N, 11°19'02"E, 7 Aug 2000, *F. Festi* (ROV 35865); Sant'Orsola (Val dei Mocheni), lungo il torrente 150 m a NE di Pizoi, poco a valle della strada, esp. SE, cespuglieto umido, silice, 1065 m, 46°07'02"N, 11°18'29"E, 26 Jul 2017, *F. Prosser* (ROV 73414). municipality of Segonzano: Val di Cembra: presso il Rio Regnana, imboccatura della strada forestale per Sevignano, esp. N, scarpata umida sassosa presso il greto, silice, 689 m, 46°10'34"N, 11°16'24"E, 27 Jul 2017, *F. Prosser* (ROV 73605); Val di Cembra: 900 m a NE di Sevignano in loc. Prada, presso il parco giochi, esp. NW, margine del bosco, silice, 768 m, 46°10'39"N, 11°15'28"E, 27 Jul 2017, *F. Prosser* (ROV 73612). Municipality of Sover: Da Montesover a Monte Alto, esp. NW, margine di bosco, silice, 1114 m, 46°13'26"N, 11°19'34"E, 2 Aug 2016, *F. Prosser* (ROV 72680); Val di Cembra, Montesover, lungo la strada c. 200 m a NW di Sette Fontane, esp. SW, margine stradale verso il bosco, porfido, 1097 m, 46°12'05"N, 11°19'28"E, 30 Jun 2018, *G. Király*, *F. Prosser*, *F. Festi* (ROV 74192). Municipality of Valfloriana: Barcatta di Valfloriana, a NE delle case, esp. W, coltivi abbandonati, margine bosco, silice, 960 m, 46°15'11"N, 11°21'06"E, 28 Oct 2017, *F. Prosser* (ROV 73493). Municipality of Vignola-Falesina: A E di Pergine, 570 m a S di Doss sul tornante della strada forestale, esp. W, siepe al margine della strada, stazione luminosa, silice, 1008 m, 46°03'37"N, 11°16'00"E, 8 Jul 2018, *F. Prosser* (ROV 74165).

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