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Contributions to *Rubus* sect. *Corylifolii* (Rosaceae) in the Eastern Alps and adjacent regions

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A b s t r a c t : On the basis of comprehensive fieldwork and herbarium studies, this paper provides the revision of 15 species in *Rubus* sect. *Corylifolii* (Rosaceae) in the Eastern Alps and adjacent regions (Austria, western Hungary and northern Slovenia), including an iconography as well as contributions to taxonomy, distribution and ecology for each species. For *Rubus dollnensis*, *R. sendtneri* and *R. sylvulicola*, a full list of revised records in the area is given: the first one occurs in Lower and Upper Austria, the second one in Upper Austria, and the last one in Salzburg, Tyrol, and Upper Austria. *Rubus fasciculatus* is reported here for the first time from Burgenland, Upper Austria and Vienna, moreover from western Hungary and Slovenia. *Rubus franconicus* had formerly a single published record from Austria (Upper Austria); it is presented here as a floristic novelty for Burgenland and Carinthia, and, in addition, for Hungary and Slovenia. *Rubus holosericeus* is reported as a novelty for Burgenland, and at the hitherto easternmost localities of its range in Hungary. An inventory of revised localities of *R. kletensis* in Austria is presented: it occurs in the Innviertel and the Mühlviertel (Upper Austria). *Rubus mollis* is new for Burgenland and Vienna; its occurrence in Styria has been corroborated by an herbarium voucher. *Rubus macrostemonides* is recorded at its second locality in Austria (S Upper Austria), which lies 50 km east of the type locality, near Salzburg. *Rubus orthostachys* is reported for the first time from the Eastern Alps and adjacent regions (Styria and Upper Austria in Austria, and western Hungary S of Lake Neusiedl). A second locality (at the same time, the only current one) of *R. pruinosus* is confirmed in Austria (Upper Austria), at the southern edge of the whole range. A novelty for the flora of Austria is *R. scabrosus*, a widespread west-central European species, recorded also on the southernmost margin of its range, at two localities in the Innviertel (Upper Austria). The status of *R. semitomentosus* was investigated in Carinthia and Lower Austria: in lack of supporting material, its occurrence in Carinthia can only be assumed. For *R. suevicola*, the first reliable data are presented from Vorarlberg, and a new locality (the very southernmost one) is reported from E Carinthia. *Rubus viridilucidus* (a regional species from central Germany) was found far from its locus classicus in Austria (Upper Austria: Innviertel).

K e y w o r d s : *Rubus* sect. *Corylifolii*; apomicts; chorology; distribution patterns

Z u s a m m e n f a s s u n g : **Beiträge zur Kenntnis von *Rubus* sect. *Corylifolii* (Rosaceae) im östlichen Alpengebiet**
In der vorliegenden Arbeit wird auf Basis umfangreicher Feldforschungen und Herbarstudien ein Überblick über die Erforschung von *Rubus* sect. *Corylifolii* (Rosaceae) in den Ostalpen und den angrenzenden Regionen (Österreich, Westungarn und Nordslowenien) gegeben. Darüber hinaus werden eine Ikonographie sowie Beiträge zur Taxonomie, Verbreitung und Ökologie für 15 im Untersuchungsgebiet vorkommende Arten der Sektion vorgestellt. Für *Rubus dollnensis*, *R. sendtneri* und *R. sylvulicola* wird eine vollständige Liste der revidierten Nachweise gegeben: die erste Art kommt in Nieder- und Oberösterreich vor, die zweite in Oberösterreich und die letzte in Salzburg, Oberösterreich und Tirol. *Rubus fasciculatus* wird hier zum ersten Mal aus dem Burgenland, Oberösterreich und Wien gemeldet, außerdem aus Westungarn und Slowenien. *Rubus franconicus* hatte bisher einen einzigen publizierten Nachweis aus Österreich (Oberösterreich); diese Art wird hier als floristische Neuheit für das Burgenland und Kärnten, aber auch für Ungarn bzw. Slowenien vorgestellt.

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Rubus holosericeus ist neu für die Flora des Burgenlandes und das bekannte Verbreitungsgebiet der Art wird durch einen ungarischen Fund Richtung Osten erweitert. Eine Bestandsaufnahme der revidierten Fundorte von *R. kletensis* in Österreich wird vorgestellt: Diese Brombeere kommt im Innviertel und im Mühlviertel in Oberösterreich vor. *Rubus mollis* ist neu für das Burgenland und Wien; das Vorkommen in der Steiermark wurde durch einen Herbarbeleg bestätigt. *Rubus macrostemonides* wurde nach dem Vorkommen an der Typuslokalität bei Salzburg 50 km davon entfernt auch im südlichen Oberösterreich gefunden. *Rubus orthostachys* wurde erstmals aus den Ostalpen und den angrenzenden Regionen (Steiermark und Oberösterreich in Österreich, sowie Westungarn südlich des Neusiedler Sees) gemeldet. Ein zweiter Fundort (gleichzeitig der einzige aktuelle) von *R. pruinosus* wird in Österreich (Oberösterreich), am südlichen Rand des gesamten Verbreitungsgebietes, angegeben und die Art für Österreich bestätigt. Neu für die Flora Österreichs ist *R. scabrosus* aus dem Innviertel (Oberösterreich), ebenso am südlichsten Arealrand der Art. Der Status von *R. semitomentosus* wurde in Kärnten und Niederösterreich untersucht: In Ermangelung von Belegmaterial kann sein Vorkommen in Kärnten nur vermutet werden. Für *R. suevicola* werden die ersten zuverlässigen Daten aus Vorarlberg präsentiert und eine neue Lokalität (die bislang südlichste) aus Ostkärnten gemeldet. *Rubus viridilucidus* (eine regionale Art aus Mitteldeutschland) wurde weit entfernt vom locus classicus in Österreich (Oberösterreich: Innviertel) gefunden.

Introduction

The genus *Rubus* is one of the most taxonomically complicated groups of vascular plants in Europe; its classification is intricate due to high ecomorphological variability, taxonomic complexity, widespread apomixis and hybridization (Weber 1995, Sochor & al. 2015). In order to reduce the amount of the specific names (and the taxa beyond), Weber (1996) suggested to accept only species with "sufficiently large" distribution area. His approach was useful for practical reasons (limiting the number of new descriptions, especially in regions with high diversity of *Rubus*); however, it was contested in detail by Holub (1997), Ryde (2011), and Haveman & De Ronde (2013) for various reasons. Nevertheless, only few new species with a narrower range than 50 km in diameter have been described since 1990. Another issue is the unresolved names in brambles – more than 7000 (!) (mainly European) specific names exist in *Rubus* (IPNI 2021), whereas the number of accepted species in Europe is "only" approx. 800, and that of the unraveled synonyms and local morphotypes is a few hundreds (Kurtto & al. 2010).

Rubus sect. *Corylifolii* is a polyphyletic group, comprising apomictic biotypes created by the hybridization of *R. caesius*, and representatives of other sections of the genus. The distribution centre of the section is in central and northern Germany; the number of species recorded in the Eastern Alps and its surroundings is relatively low (see Kurtto & al. 2010: 250, map AFE 4528). It is worth of mention that checklists of the section presented by Janchen (1956–1960) for Austria, and by Kiss (1966) for Hungary, are merely formal (unrevised) collections of earlier names and cannot be used for taxonomic purposes. The recently increasing batological activities in the Eastern Alps and adjacent regions produced considerable taxonomic and chorological output, but mainly concerned sect. *Rubus* (e.g., Maurer & Drescher 2000, Király & al. 2017, 2019; Sochor & al. 2019, Pagitz & al. 2020).

The Austrian checklist of Weber & Maurer (1991) included only 8 species from sect. *Corylifolii*, partly due to previous studies in neighbouring Bavaria (Weber 1989)

and Switzerland (Weber 1987), and most of the Austrian records rely on herbarium revisions. Willibald Maurer, who made significant contributions to the survey of sect. *Rubus* in Austria, devoted less attention to sect. *Corylifolii*, only mentioning it at section level in his identification keys for both Austria (Maurer 1994) and Styria (Maurer 1996); a detailed key was not presented. Trávníček & Maurer (1998) and Lepší & Lepší (2006) recognized 4 additional species in the section (*R. dollnensis*, *R. fasciculatus*, *R. kletensis*, and *R. kuleszae*) for the Austrian flora. The identification key for *Rubus* of Danner & Fischer (2008) already consisted of 14 species of the section, however, with several taxonomic controversies (e.g., omitting *R. dollnensis*, presenting *R. grossus*, and treating "*R. fasciculatus*" and "*R. laschii*" as different species). Furthermore, their data on the distribution of the species are confusing in many cases. In addition, three species (*R. pruinosus*, *R. sendtneri* and *R. suevicola*) were given for Austria by Kurtto & al. (2010), based on unpublished records but without providing the original data. Pagitz (2013, 2016) and Pagitz & al. (2014, 2019) reported on a few species from Tyrol, Vorarlberg, and Styria. Finally, Király (2019) presented a nomenclatural revision of *R. macrostemonides* (also reporting the first record from Austria), and the clarification of the names *R. holosericeus* and *R. semitomentosus*. Southern Bavaria (with the foothills of the Eastern Alps) is relatively well documented due to the efforts of Heinrich E. Weber; however, his local activities, as well as the mapping of sect. *Corylifolii*, almost stopped around 2000 (see also BIB 2021). Other regions of the area studied (western Hungary and northern Slovenia) were basically unexplored for sect. *Corylifolii* from the point of view of modern batology. The identification keys in the Floras of both countries (Martinčič 2007; Bartha 2009) document the group only at the rank of section. Kurtto & al. (2010) recorded a single species of the section for western Hungary and Slovenia. It should be mentioned that several representatives of sect. *Corylifolii* occurring in the region have not been included in the monograph of Weber (1995), and in many cases it is difficult to access the species' description or iconography (if the latter even exists). Despite the impressive collection of images of living plants and/or herbarium specimens, e.g., by Dressler & al. (2021), Kresken (2021) and Pladias (2021), and the increasing accessibility of virtual collections, the lack of available reference material is a common barrier in batological studies.

In view of all the above, the authors of this study have multiple tasks in the recent paper: we report on some novelties of sect. *Corylifolii* in the flora of Austria, western Hungary, and northern Slovenia; we summarize data and distribution (incl. distribution maps) of certain taxa in Austrian federal states; and we present a conclusive iconography for the species.

Material and Methods

Nomenclature

Nomenclature and taxonomy of *Rubus* generally follow Kurtto & al. (2010) with the exception of *R. holosericeus*, *R. macrostemonides*, *R. semitomentosus* and *R. viridi-*

lucidus, for which we adopted Király (2019), and Drenckhahn & Zonneveld (2017), respectively. The taxonomic treatment of other vascular plants is in accordance with Fischer & al. (2008).

Distribution

Field studies on brambles were conducted by the authors between 2005 and 2020 at more than 1100 localities in Austria, northern Slovenia, and western Hungary. In the here adopted sense, northern Slovenia includes the Alpine, Subalpine and Sub-Pannonian regions after Martinčič (2007), and western Hungary the "Nyugat-magyarországi peremvidék" region after Dövényi (2010), respectively. Localities are grouped by administrative units (states, federal states, and/or counties), and within these in alphabetical order. Nearby localities within 500 m were not considered unless they are situated in a different municipality. For each locality, the altitude, and geo-coordinates in the WGS 84 projection were determined. Distribution maps were compiled using ArcGIS software. Terms used to describe range size were adopted from H. E. Weber in Kurtto & al. (2010). Distribution of the species is generally characterized following Kurtto & al. (2010), with additional data from Pladias (2021) for the Czech Republic, Zieliński (2004) for Poland, and BIB (2021) for Bavaria.

Herbarium studies

Specimens stored in the following herbaria (codes according to Thiers 2021) were examined personally, by accessing their virtual herbaria, or based on high-resolution photographs of previous records of representatives of sect. *Corylifolii*: BP, BRA, DE, GJO, GZU, LI, LJU, M, OL, SAMU, SAV, SLO, W, and WU; in addition, some specimens in private herbaria (collections of M. Hohla, G. Király, M. Lepší, and V. Žíla) were also examined. Earlier literature records (incl. distribution data after Danner & Fischer [2008] in the Austrian federal states) proved to be unreliable after herbarium revisions; thus, we only included data supported by voucher specimens. The specimens collected during recent studies are predominantly deposited in GJO and LI, and the private herbaria of the authors.

Results

Rubus dollnensis (ser. *Hystricopses*, Fig. 1)

A central European species that is widespread in the Czech Republic (especially Bohemia), with several occurrences in adjacent Germany (e.g., Saxony, Thuringia and N Bavaria), and in Polish Silesia. In Austria, it was first reported by Trávníček & Maurer (1998) from the surroundings of Oberretzbach (NW Waldviertel, Lower Austria), an area that is very close to the rich occurrences in SW Moravia. Otherwise, the first Austrian voucher (1984) originates from Upper Austria (S Mühlviertel: Wartberg/Aist, see below); however, it was misidentified and, therefore, overlooked for a long

Fig. 1: *Rubus dollnensis.* A, B, D: first-year stem with leaves, C, E: section of first-year stem, F: flower, G, H: infructescence. (Photos: A, B: M. Hohla, C, D, E, G, H: G. Király, F: J. Velebil) — **Abb. 1:** *Rubus dollnensis.* A, B, D: Schössling mit Blättern, C, E: Schössling, F: Blüte, G, H: Fruchtstand.

time. Grims (2008) reported *R. dollnensis* from Penzenstein (W Mühlviertel); however, his specimens (LI 265023, LI 265024) belong to a local biotype. The unlikely record of Danner & Fischer (2008) from Burgenland (mentioned with a question mark) is not supported by vouchers.

Here, we summarize the data of this species based on a few extant herbarium specimens and recent field records: it is rather scattered in the northern part of Austria (especially when compared to its abundance in Bohemia), with few outposts south of the Danube in the Dunkelsteinerwald in Lower, and near Altschwendt in Upper Austria, respectively (Fig. 16). It mainly occurs on drier soils, in sunny, acidophilous forest fringes.

Austria

Lower Austria: Emmersdorf an der Donau, 0.8 km SW of Pömling along a forest road, 15°17′25″E 48°14′55″N (7757/4); 324 msm; 11 July 2019: G. Király ("Rubus Workshop") (obs.). – Karnabrunn, 0.5 km W of the village, oak-hornbeam forests along the road to Niederhollabrunn, 16°21′07″E 48°27′38″N (7564/1); 332 msm; 29 July 2016: G. Király ("Rubus Konzil") (Hb. Király). – Lauterbach, 0.9 km NE of the village, spruce forests along the road to Weyersdorf, 15°30′46″E 48°15′51″N (7759/1); 535 msm; 28 July 2016: G. Király ("Rubus Konzil") (Hb. Király).

Upper Austria: Altschwendt, forest S Hausmanning, forest fringes, 13°38′22″E 48°19′58″N (7647/4); 390 msm; 13 July 2007: M. Hohla (LI 902878). – Altschwendt, S Krena, small forest, 13°40′05″E 48°18′39″N (7648/3); 450 msm; 26 July 2011: M. Hohla & M. Lepší (obs.). – Königswiesen, S of the graveyard, Zwettler Str., roadside, 14°50′35″E 48°24′31″N (7555/3); 607 msm; 5 July 2018: G. Király & M. Hohla (Hb. Király & Hb. Hohla). – Wartberg/Aist, "Nördlich der Himmelsstiege", bushes (7653/1); 385 msm; 1 July 1984: J. Danner (LI 069462, LI 069463). – Zell an der Pram, W Krena, forest fringes, 13°39′32″E 48°18′49″N (7647/4); 410 msm; 26 July 2011: M. Hohla & M. Lepší (Hb. Hohla).

Rubus fasciculatus (ser. *Subcanescentes*, Fig. 2)

A widespread central European bramble with a large area of distribution from the Rhine and Danube in the south to S Scandinavia in the north, also frequent in the Western Carpathians (incl. S Poland, Slovakia and NE Hungary). Records of the species are, however, very scarce in the Eastern Alps and its forelands. In Austria, it was first reported by Trávníček & Maurer (1998) from the surroundings of Oberretzbach (NW Waldviertel, Lower Austria). In the southern part of the Eastern Alps, the species was given by Weber (1995) with uncertain status from the area of Milan, and there is a report from E Tyrol (Maier & al. 2001) that was also accepted by Kurtto & al. (2010). Finally, Pagitz (2013, 2016) reported the first localities from Carinthia and N Tyrol, and Pagitz & al. (2014, 2019) from Vorarlberg and Styria, respectively. There are earlier

Fig. 2: *Rubus fasciculatus.* A, C: first-year stem with leaves, B: section of first-year stem, D: infructescence, E, F: inflorescence. (Photos: A, B, D, E, F: G. Király, C: M. Hohla) — **Abb. 2:** *Rubus fasciculatus.* A, C: Schössling mit Blättern, B: Schössling, D: Fruchtstand, E, F: Blütenstand.

records from Upper Austria (see Hohla & al. 2009, partly under the name "*R. laschii*"), but these are not supported by vouchers.

Here, we report on the first revised data of *Rubus fasciculatus* from the Austrian federal states Burgenland and Vienna, corroborate its occurrence in Upper Austria, and we complement its distribution data in Carinthia, Lower Austria, and Styria (Fig. 17). Besides these records, the first observations of the species from Slovenia (Prekmurje), and from W Hungary are presented. In the study area, it is a thermophilous species occurring in sunny sites, mainly in basiphilous forest fringes, often connected to degraded forests (e.g., stands of *Pinus sylvestris* and *Robinia pseudacacia*).

Austria

Burgenland: Unterfrauenhaid, 0.9 km SW of the village, pine forests along the road to Neutal, 16°29′06″E 47°33′49″N (8464/2); 310 msm; 17 June 2014: G. Király (Hb. Király). – Unterrabnitz, 0.2 km E of the village, forest fringes, 16°23′05″E 47°27′07″N (8564/1); 348 msm; 4 June 2017: G. Király & U. Raabe (obs.). – Weppersdorf, 0.7 km SW of the village along road nr. 62, forest fringes, 16°26′57″E 47°34′36″N (8464/2); 335 msm; 17 June 2014: G. Király (Hb. Király).

Carinthia: Bleiburg, 2.2 km N of the village, pine forests along the road to Ruden, 14°46′52″E 46°36′50″N (9354/4); 472 msm; 13 July 2020: G. Király ("*Rubus* Workshop") (Hb. Király).

Lower Austria: Enzersdorf im Thale, 3.2 km SE of the village, forests along the road to Großmugl, 16°13′15″E 48°33′14″N (7463/1); 360 msm; 27 July 2016: G. Király ("*Rubus* Konzil") (obs.). – Gossam, 0.7 km N of the village, forest fringes along the road to Felbring, 15°20′43″E 48°15′48″N (7758/1); 334 msm; 23 August 2015: G. Király, M. Hohla (obs.). – Klement, 1.2 km W of the village, forests S of the road to Enzersdorf im Thale, 16°20′39″E 48°34′21″N (7464/1); 350 msm; 27 July 2016: G. Király ("*Rubus* Konzil") (obs.). – Leiben, 0.4 km SW of Losau, along a forest road, 15°15′00″E 48°14′16″N (7757/4); 298 msm; 11 July 2019: G. Király ("*Rubus* Workshop") (Hb. Király). – Maria Taferl, forest patch 0.3 km S of Unterthalheim, 15°11′07″E 48°13′52″N (7757/3); 360 msm; 11 July 2019: G. Király ("*Rubus* Workshop") (obs.). – Porrau, 2.5 km NW of the village, forest fringes, 16°08′11″E 48°32′45″N (7462/4); 360 msm; 27 July 2016: G. Király ("*Rubus* Konzil") (photo documented).

Styria: Eggersdorf, 0.8 km SW of Gumpersberg, forest fringes, 15°33′55″E 47°07′24″N (8859/3); 510 msm; 21 July 2018: G. Király & K. Zernig (GJO). – Eichberg-Trautenburg, Kleingraben Weg, among spruce plantations, 15°26′41″E 46°42′03″N (9258/4); 460 msm; 16 July 2014: G. Király & K. Zernig (Hb. Király). – St. Margarethen an der Raab, 0.3 km E of Goggitsch, bushes, 15°42′23″E 47°01′56″N (8960/3); 355 msm; 21 July 2018: G. Király & K. Zernig (GJO).

Upper Austria: Waizenkirchen, NW Thall, bushes at the forest fringes, 13°48′04″E 48°20′36″N (7648/4); 436 msm; 9 July 2021: G. Király & M. Hohla (Hb. Hohla). – Zell an der Pram, NW Blümling, bushes at the forest fringes, 13°34′13″E 48°18′57″N (7647/3); 408 msm; 9 July 2018: M. Hohla (LI 02759913).

Vienna: 19th Dist., Döbling, forest fringes S of the Höhenstr. S of the "Fischerhaus", 16°17′54″E 48°16′01″N (7763/2); 360 msm; 22 June 2018: G. Király, H. Niklfeld & L. Schratt-Ehrendorfer (Hb. Király).

Hungary

Győr-Moson-Sopron megye: Csapod, 0.6 km N of Göbösmajor, Scots pine plantations, 16°57′03″E 47°33′09″N (8467/2); 140 msm; 14 September 2015: G. Király (obs.). – Csapod, 0.2 km NW of Göbösmajor, forest fringes, 16°56′36″E 47°32′54″N (8467/4); 138 msm; 20 June 2018: G. Király (obs.).

Vas megye: Horvátzsidány, open forest and fringes 0.3 km E of the cemetery, 16°37′55″E 47°24′26″N (8565/4); 252 msm; 22 July 2016: G. Király (obs.). – Horvátzsidány, 1.3 km SW of the village, bushes, 16°36′47″E 47°23′56″N (8665/2); 290 msm; 24 June and 7 July 2018, G. Király (obs.). – Horvátzsidány, forests 0.5 km S-SW of Péruska Chapel, 16°37′37″E 47°23′12″N (8665/2); 298 msm; 16 September 2019: G. Király (obs.). – Tömörd, 0.6 km N of the village, slope of Fenyves-patak Valley, 16°40′29″E 47°22′29″N (8666/1); 240 msm; 22 September 2019: G. Király (obs.). – Tömörd, 1.5 km N of the village, plateaeu above Fenyves-patak Valley, 16°39′40″E 47°22′45″N (8665/2); 261 msm; 22 September 2019: G. Király (obs.). – Ivánc, Scots pine plantations along the road to Őriszentpéter, 16°28′08″E 46°53′46″N (9164/2); 278 msm; 17 June 2013: G. Király & al. (Hb. Király)

Veszprém megye: Egyházaskesző, 1.5 km E of Kemenesszentpéter, oak forests along the road to Várkesző, 17°15′44.9″E 47°25′18.3″N (8569/4); 133 msm; 8 June 2014: G. Király & al. (Hb. Király). – Magyargencs, 3.5 km SW of Várkesző, forest fringes, 17°16′28.9″E 47°24′19.8″N (8569/4); 133 msm; 8 June and 26 July 2014: G. Király & al. (Hb. Király).

Zala megye: Zalaszentmárton, 1.0 km SE of the village, oak forests, 17°04′21″E 46°41′42″N (9368/1); 196 msm; 10 September 2016: G. Király (obs.). – Újudvar, 0.7 km S of the television tower, along the road to the tower, 17°01′11″E 46°33′19″N (9468/1); 290 msm; 7 July 2014: G. Király (Hb. Király).

Slovenia

Prekmurje: Domanjševci, 0.3 km N of the border crossing to Hungary, shrubbery alongside the state border, 16°18′40″E 46°47′05″N (9263/2); 248 msm; 19 June 2018: G. Király (LJU). – Lendava, 0.7 km N of Dolgovaške Gorice, forest clearings, 16°28′05″E 46°35′05″N (9464/2); 201 msm; 6 September 2013: G. Király & D. Schmidt (Hb. Király).

Rubus franconicus (ser. *Sepincola*, Fig. 3)

A central European species described by Weber (1979) from Bavaria that was found later in other federal states of Germany, as well as in SW Poland, Czech Republic, and W Slovakia. A single record is known from Austria (near Helpfau, Innviertel, Upper Austria, Weber & Maurer 1991).

During field excursions, we discovered a new southern disjunct occurrence in the tri-border area of Burgenland, W Hungary, and NE Slovenia (with the first observations for both Hungary and Slovenia), and a widely isolated southern outpost in E Carinthia. In addition, we expand the list of localities in Upper Austria (Fig. 18). The species occurs (as in other parts of the range) in half-shady fringes and open forests on loose, acidophilous soils.

Austria

Burgenland: Eberau, 1 km E of the village, "Eberauer Wald", oak and *Robinia* stands, 16°29′05″E 47°06′37″N (8864/4); 234 msm; 17 June 2013: G. Király (Hb. Király). – Güttenbach, forest fringes 0.1 km S of the soccer field, 16°16′52″E 47°09′50″N (8863/2); 299 msm; 4 September 2016: G. Király & U. Raabe (Hb. Király).

Carinthia: Völkermarkt, 0.4 km SE of Greuth, forest fringes N of road nr. 70, 14°33′13″E 46°39′16″N (9353/1); 460 msm; 14 July 2020: G. Király & M. Hohla ("*Rubus* Workshop") (LI 02033761, LI 02033778).

Upper Austria: Andorf, Hötzenedt, 13°34′41″E 48°19′58″N (7647/3); 394 msm; 6 September 2020: M. Hohla (LI 03281789, LI 03281796, LI 03281802). – Gurten, Bahndamm nahe Neuratting, 13°21′41″E 48°14′02″N (7746/3); 408 msm; 10 July 2003, M. Hohla, rev. G. Király (LI 121721, LI 121733). – Hartkirchen, Steinwänd, fringes along road nr. 130, 13°57′12″E 48°22′39″N (7649/2); 283 msm; 7 July 2020: G. Király & M. Hohla (Hb. Király). – Mattigtal, N St. Florian, E Uttendorf, Gebüschrand (7844/2); 7 September 1992: F. Grims, rev. G. Király (LI 02706801, LI 02706818). – St. Georgen, SE Steckenbach, alte Schottergrube, 13°01′43″E 48°06′56″N (7844/3); 460 msm; 15 July 1999: G. Kleesadl, rev. G. Király (LI 63733, LI 63745). – Zell an der Pram, NW Blümling, bushes at the forest fringes, 13°34′13″E 48°18′57″N (7647/3); 408 msm; 21 June 2019: M. Hohla (Hb. Hohla).

Hungary

Vas megye: Bajánsenye, Dávidháza, shrubbery at the cemetery, 16°22′21″E 46°48′38″N (9164/3); 220 msm; 15 October 2011: G. Király (obs.). – Felsőszölnök, southern slope of "János-hegy" Hill, shrubbery along a small road, 16°10′36″E 46°53′09″N (9163/1); 335 msm; 3 August 2011: G. Király, B. Trávníček & V. Žíla (OL). – Felsőszölnök, 1.3 km E from the border tripoint AU/HU/SLO, "Szetecsi jarek", clearings, 16°07′58″E 46°52′19″N (9162/2); 300 msm; G. Király, B. Trávníček & V. Žíla (obs.). – Kercaszomor, 0.5 km N of the border crossing, shrubbery alongside the state border, 16°18′40″E 46°47′07″N (9263/2); 248 msm; 19 June 2018: G. Király (obs.). – Kétvölgy, along the road to the border crossing E-SE of the village, forest fringes, 16°13′48″E 46°52′46″N (9163/1); 356 msm; 31 August 2014: G. Király (Hb. Király). – Magyarlak, forest edges at the cemetery 0.3 km SW of the village, 16°19′54″E 46°56′49″N (9063/4); 250 msm; 4 August 2011: G. Király, B. Trávníček & V. Žíla (Hb. Király, Hb. Žíla, OL). – Magyarszombatfa, forest patches among abandoned orchards S of the village, 16°20′49″E 46°45′18″N (9264/1); 230 msm; 15 October 2011: G. Király (obs.). – Szentgotthárd, 0.8 km N from Rábafüzes, "Rigó-völgy" Valley, clear-

Fig. 3: *Rubus franconicus*. A, B, C, D: first-year stem with leaves, E, F: section of first-year stem, G: infructescence. (Photos: A, B, C, F: G. Király, D, E: M. Hohla, G: M. Sochor) — **Abb. 3:** *Rubus franconicus*. A, B, C, D: Schössling mit Blättern, E, F: Schössling, G: Fruchtstand.

ings, 16°17′31″E 46°59′20″N (9063/2); 260 msm; 3 August 2011: G. Király, B. Trávníček & V. Žíla (Hb. Király, Hb. Žíla, OL). – Vasszentmihály, 1.3 km N of the village, clearings, 16°24′09″E 46°59′01″N (9064/1); 235 msm; 21 September 2012: G. Király (Hb. Király). – Zala megye: Lenti, 0.4 km S from the town along the road to "Lenti-Szőlőhegy", forest margins, 16°32′24″E 46°36′42″N (9365/3); 180 msm; 30 August 2012: G. Király (obs.). – Valkonya, 0.4 km S of the village, along the public road, 16°48′25″E 46°29′45″N (9566/2); 200 msm; 9 July 2012: G. Király, B. Trávníček & V. Žíla (obs.).

Slovenia
Prekmurje: Domanjševci, 0.3 km N of the border crossing to Hungary, shrubbery alongside the state border, 16°18′40″E 46°47′05″N (9263/2); 248 msm; 19 June 2018: G. Király (Hb. Király, LJU).

Rubus holosericeus (ser. *Subcanescentes*, Fig. 4)

A regional species occurring in the southeastern foothills of the Eastern Alps ("Südöstliches Alpenvorland") around Graz, and the Hungarian-Slovenian border area S of the river Raab. It needs to be mentioned that the name *Rubus holosericeus* had long been erroneously applied to a bramble biotype rich in stalked glands that was not represented in the original material for this name. The series of misunderstandings around the name was unraveled by Király (2019), who typified the name in the original sense of Vest, provided the first comprehensive morphological characterization of the species, and, finally, showed the other biotype (with stalked glands) to be conspecific with *R. semitomentosus*. Therefore, pre-2019 reports on *R. holosericeus* predominantly refer to the latter species. During recent field excursions, we also recorded *R. holosericeus* in Burgenland (in the southernmost corner), and we present two localities from SW Hungary that are more than 20 km east of the formerly known distribution boundary. The species occurs mainly on mesic, loamy or clayey soils, often in somewhat disturbed habitats (e.g., in coniferous plantations or secondary scrub).

Austria
Burgenland: Mühlgraben, 0.3 km N of Pfaffergraben, forest fringes, 16°02′11″E 46°52′59″N (9162/1); 328 msm; 6 September 2019: G. Király & M. Hohla (obs.). – Neumarkt a. d. Raab, 0.7 km E of the village, forests S of the road to the border crossing, 16°10′46″E 46°55′29″N (9063/3); 261 msm; 6 September 2019: G. Király & M. Hohla (Hb. Király).

Hungary
Vas megye: Hegyhátszentjakab, 1.2 km W of the train stop of Felsőjánosfa, scrubs along the railway line, 16°31′37″E 46°50′28″N (9164/4); 204 msm; 17 June 2013: G. Király (Hb. Király).

Fig. 4: *Rubus holosericeus.* A, C: first-year stem with leaves, B: section of first-year stem, D: inflorescence, E: infructescence. (Photos: G. Király) — **Abb. 4:** *Rubus holosericeus.* A, C: Schössling mit Blättern, B: Schössling, D: Blütenstand, E: Fruchtstand.

Zala megye: Nova, 3.0 km N-NW of the village, forest fringe along the road to Szilvágy, 16°40′34″E 46°42′55″N (9266/3); 242 msm; 2 July 2021: G. Király (Hb. Király).

Rubus kletensis (ser. *Sepincola*, Fig. 5)

A regional species that was described by Lepší & Lepší (2006) from numerous localities in S Bohemia and two sites situated in the Mühlviertel and Innviertel regions of Upper Austria. Three further records from Upper Austria were given by Hohla & al. (2009), and the species was recently recorded also in Bavaria (Rotthalmünster SW of Passau, Hohla 2018). In the latter paper, the author provided a distribution map of the total range including several observations from the Innviertel; however, these records have never been published in detail. Recognizing this deficiency, we intend to present here all revised records of *Rubus kletensis* from Austria (Fig. 19). The species mainly occurs in open land habitats (hedges, banquettes), rarely also in forest fringes; its spread along these linear landscape elements is potentially supported by the management of roads and railways.

Austria

Upper Austria: Altheim, E Danglfing, bushes, 13°13′57″E 48°15′42″N (7745/1); 360 msm; 29 August 2014, M. Hohla (LI 02760940, LI 02760957). – Altheim, Kling, creek embankment of "Mühlheimer Ache", 13°14′58″E 48°14′22″N (7745/3); 367 msm; 29 May 2020: M. Hohla (LI 02024721). – Andorf, SW Hof, road embankment, B 137, 13°32′53″E 48°21′22″N (7647/1); 368 msm; 28 August 2020: M. Hohla (LI 03281963, LI 03281970). – Andorf, W Basling, NE Pimpfing, forest fringes, 13°33′37″E 48°20′50″N (7647/3); 373 msm; 6 September 2020: M. Hohla (LI 03282687, LI 03282694). – Aspach, N Badesee Wildenau, bushes, 13°19′35″E 48°12′09″N (7745/4); 430 msm; 22 September 2020: M. Hohla (LI 03277362). – Aurolzmünster, Schöndorf, bushes, 13°26′19″E 48°15′46″N (7746/2); 439 msm; 7 August 2019: M. Hohla (LI 03282045, LI 03282052). – Dorf an der Pram, SW Mitterjebing, railway embankment, 13°38′04″E 48°15′38″N (7747/2); 398 msm; 2 July 2020: M. Hohla (LI 03234457, LI 03234464). – Geinberg, Neuhaus, east of castle pond, ruderal bushes in front of a house, 13°18′54″E 48°15′21″N (7745/2); 389 msm; 1 October 2019: M. Hohla (LI 03237427, LI 03237434). – Geretsberg, NE Heratinger See, bushes, 12°56′38″E 48°04′23″N (7943/2); 430 msm; 27 July 2011: M. Hohla & M. Lepší (Hb. Hohla). – Handenberg, S Handenberg, W St. Georgen am Fillmannsbach, forest, 13°00′30″E 48°07′38″N (7844/3); 465 msm; 28 July 2015: M. Hohla & G. Király (Hb. Király, LI 01311204). – Kirchheim im Innkreis, E Schacher, bushes, 13°20′59″E 48°13′00″N (7746/3); 469 msm; 5 October 2016: M. Hohla (Hb. Hohla). – Mauerkirchen, Wollöster, forest fringes, 13°08′06″E 48°12′05″N (7744/4); 427 msm; 7 July 2017: M. Hohla & G. Király (obs.). – Mining, SE Amberg, forest fringes near a gravel pit, 13°10′31″E 48°15′39″N (7745/1); 355 msm; 18 August 2010: M. Hohla

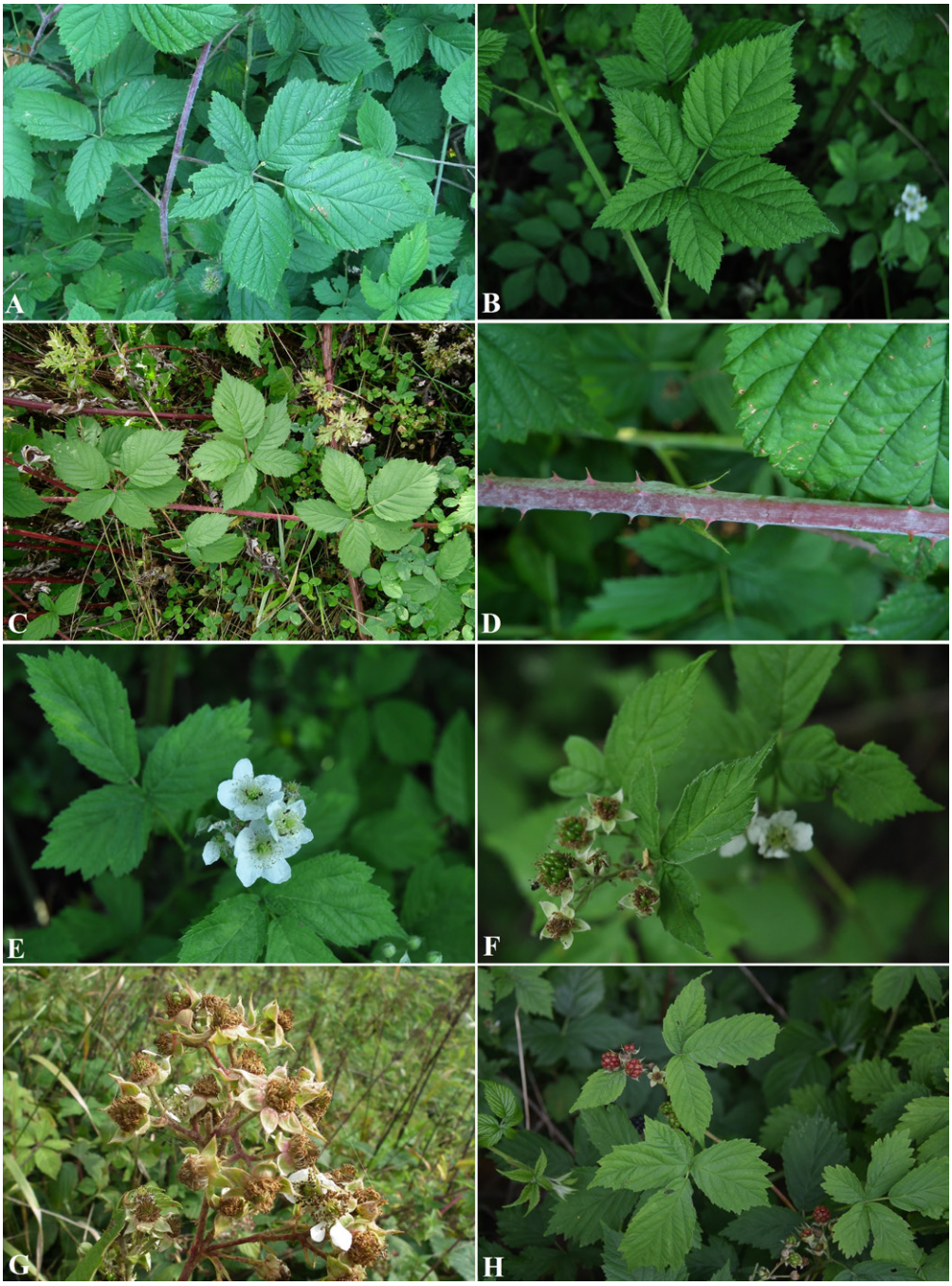

Fig. 5: *Rubus kletensis*. A, B, C: first-year stem with leaves, D: section of first-year stem, E: inflorescence, F, G, H: infructescence. (Photos: A, D, G: G. Király, B, C, E, F, H: M. Hohla) — **Abb. 5:** *Rubus kletensis*. A, B, C: Schössling mit Blättern, D: Schössling, E: Blütenstand, F, G, H: Fruchtstand.

& M. Lepší & al. (Hb. Hohla, Hb. M. Lepší). – Neuhofen im Innkreis, E Rettenbrunn, flood basin, 13°30′25″E 48°11′16″N (7847/1); 458 msm; 18 June 2020: M. Hohla (LI 02025209). – St. Georgen am Fillmannsbach, conglomerate site, bushes, 13°01′39″E 48°06′47″N (7844/3); 468 msm; 21 August 2010: M. Hohla & M. Lepší (Hb. Hohla, Hb. M. Lepší). – St. Stefan am Walde, 700 m SE Raiden (7450/1); 530 msm; 18 September 2006: J. Danner (LI 608187, LI 608188); Suben, E airfield, forest fringes, 13°27′12″E 48°24′08″N (7546/4); 341 msm; 8 August 2020: M. Hohla & G. Király (LI 03282281). – Taiskirchen, N Kamplern, forest fringes, 13°34′16″E 48°18′33″N (7647/3); 432 msm; 6 September 2020: M. Hohla (LI 03282632, LI 03282649). – Tumeltsham, S Rabenberg, road embankment, B 141, 13°30′24″E 48°12′58″N (7747/3); 452 msm; 25 July 2020: M. Hohla (LI 03277140, LI 03277157).

Rubus macrostemonides (ser. *Subcanescentes*, Fig. 6)

Rubus macrostemonides was described from a single locality near Parsch, Salzburg (Fritsch 1888), and the name unobtrusively consigned to oblivion. *Rubus baruthicus* was described with the type locality Mariaburghausen in northern Bavaria and was

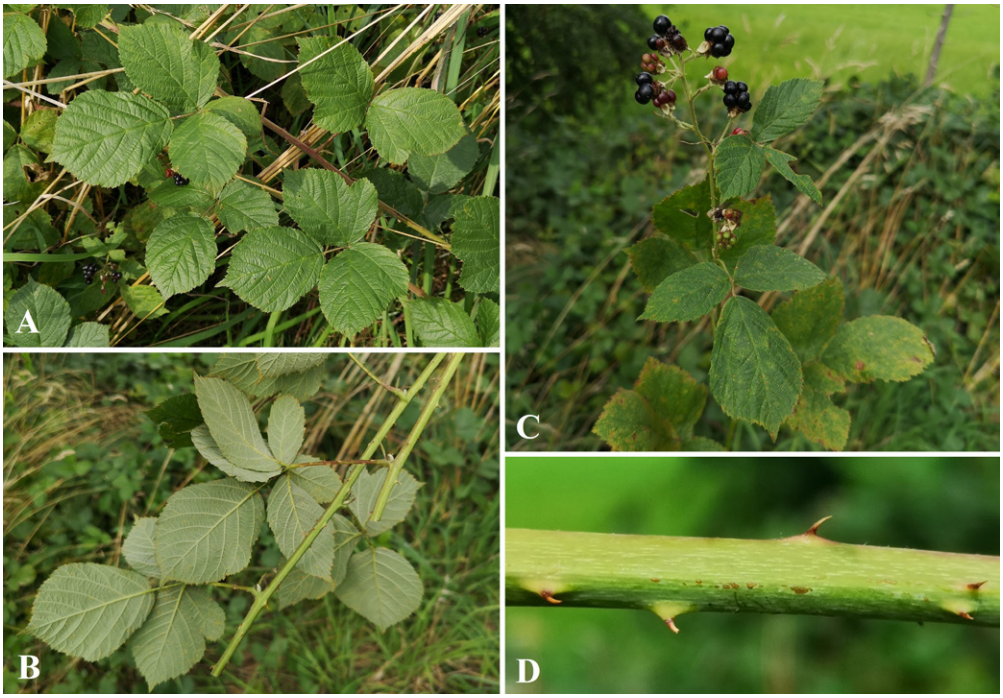

Fig. 6: *Rubus macrostemonides*. A, B: first-year stem with leaves, C: infructescence, D: section of first-year stem (Photos: M. Hohla) — **Abb. 6:** *Rubus macrostemonides*. A, B: Schössling mit Blättern, C: Fruchtstand, D: Schössling.

considered a widespread central European species, with the centre of distribution in Germany, and with some outposts in northeastern France, Luxemburg and northern Switzerland (Weber 1997, Kurtto & al. 2010). The taxonomic identity of both names was proven by Király (2019), consequently, *R. baruthicus* is as a later synonym for *R. macrostemonides*. Here, we present the second locality of this species in Austria (at the same time, the first one in Upper Austria), widening its range about 50 km eastwards. It is a small-growing bramble that often suffers from shadow and natural succession; therefore, it most often occurs in sunny forest fringes, at times at ruderal sites.

Austria

Upper Austria: Altmünster am Traunsee, Nachdemsee, W of nature reserve Hollereck, ruderal site close to "Salzkammergut Straße", bushes, 13°46′19″E 47°53′04″N (8148/2); 532 msm; 3 August 2021: M. Hohla (Hb. Hohla).

Rubus mollis (ser. *Subcanescentes*, Fig. 7)

A widespread south-central European element with a distribution centre in S Germany and the Czech Republic, and scattered occurrences in SW Poland, Slovakia, and Austria. The name has been applied by previous authors in very diverse senses. Its taxonomy and type were clarified relatively late by Weber (1979); hence, older records are unreliable unless supported by vouchers. Holub (1992) mentioned it with a question mark from Hungary; however, all former Hungarian data proved to be erroneous, and the species was recorded only recently at a remote site in the Aggtelek region (NE Hungary, Király 2016).

In Austria, *Rubus mollis* was reported by Weber & Maurer (1991) from Lower and Upper Austria, Styria and Tyrol. In the first two federal states, the species is scattered, from Tyrol, Weber & Maurer (1991) mentioned only a single voucher. We formerly tended to contest its presence in Styria, nevertheless, an unequivocal voucher from 1988, revised by Weber, corroborates this record, and the species was also recently found close to Leoben (see below). In addition, we present the first records from Burgenland and Vienna. *Rubus mollis* is a thermophilous species occurring on dry, sunny forest fringes, predominantly on base-rich soils.

Austria

Burgenland: Steinberg-Dörfl, Dörfl, 0.3 km NW of "Maria-Bründl" Chapel, forest fringes, 16°27′48″E 47°29′22″N (8564/2); 306 msm; 28 June 2013: G. Király (Hb. Király).

Styria: Leoben, Tollinggraben, forest fringes, 15°03′10″E 47°23′58″N (7863/4); 726 msm; 15 July 2021: M. Hohla, G. Király, K. Pagitz, B. Trávníček & al. (Hb. Király, Hb. Hohla, OL). – "südlich Trofaiach bei Leoben" (8655/2); 2 August 1988: W. Maurer (rev. H. E. Weber) (GZU 000240511).

Fig. 7: *Rubus mollis*. A: typical habitat (sunny forest fringe on base-rich soil), B: first-year stem with leaves, C: section of first-year stem, D: first-year stem leaf (abaxial surface), E: inflorescence, F: first-year stem leaf (adaxial surface), G, H: infructescence. (Photos: A, B, C, D, G: G. Király, E, F, H: M. Hohla) — **Abb. 7:** *Rubus mollis*. A: typischer Standort (sonniger, basophiler Waldrand), B: Schössling mit Blättern, C: Schössling, D: Schösslingsblatt (Unterseite), E: Blütenstand, F: Schösslingsblatt (Oberseite), G, H: Fruchtstand.

Vienna: 17th Dist., Hernals, forest fringes S of the Exelberg Str, 16°15′45″E 48°14′30″N (7763/4); 330 msm; 22 June 2018: G. Király, H. Niklfeld, L. Schratt-Ehrendorfer (WU). – 17th Dist., Hernals, forest fringes along the Höhenstr. near the "Häuserl am Roan", 16°17′05″E 48°15′29″N (7763/2); 440 msm; 22 June 2018: G. Király, H. Niklfeld, L. Schratt-Ehrendorfer (obs.). – 19th Dist., Döbling, forest fringes S of the Höhenstr. S of the "Fischerhaus", 16°17′54″E 48°16′01″N (7763/2); 360 msm; 22 June 2018: G. Király, H. Niklfeld, L. Schratt-Ehrendorfer (obs.). – 23rd Dist., St.-Georgen-Berg, 1.3–1.6 km W-SW of Mauer Church, forest fringes, 16°15′13″E 48°08′45″N (7863/4); 320 msm; 27 June 2017: G. Király, H. Niklfeld, L. Schratt-Ehrendorfer (Hb. Király).

Rubus orthostachys (ser. *Suberectigeni*, Fig. 8)

A widespread taxon that occurs from Belgium to E Ukraine in northern-central Europe, and that is frequent in several regions close to Austria (i.e., Czech Republic and the northern Carpathians). On the other hand, its has never been recorded previously in the Eastern Alps and its foothills, its discovery in Austria (Styria and Upper Austria) and W Hungary (few sites S of Lake Neusiedl) is therefore very surprising. In addition, it is the first recorded representative of ser. *Suberectigeni* in both areas. *Rubus orthostachys* occurs in the neighbouring regions of the Czech Republic and Slovakia in submontane and montane beech and oak-hornbeam forests, whereas it was observed at the here reported new sites in strongly disturbed habitats (most often in degraded forests and plantations). These localities were probably established by ornithochory, although, in certain cases, we can neither rule out the possibility of anthropogenic introduction (e.g., by silvicultural products or machines used in forestry).

Austria

Styria: St. Peter am Ottersbach, 1.2 km S-SE of Wittmannsdorf, E of the forest road "Au Bergweg", forest fringes, 15°46′25″E 46°46′01″N (9260/2); 290 msm; 27 June 2012: G. Király & K. Zernig (GJO, Hb. Király), 12 July 2018: G. Király & al. (Hb. Király).
Upper Austria: Neuhofen im Innkreis, stock ground in the centre of the village, 13°28′17″E 48°11′35″N (7846/2); 450 msm; 6 July 2004: M. Hohla (LI 02707792, rev. G. Király).

Hungary

Győr-Moson-Sopron megye: Fertőszéplak, "Rongyos-erdő" Forest, clearings, 16°49′26″E 47°36′25″N (8366/4); 140 msm; 3 June 2018: G. Király (Hb. Király). – Sopron, S of the road to Balf, Potzmann Hill, oak forest, 16°39′07″E 47°39′14″N (8365/2); 212 msm; 12 September 2016: G. Király (Hb. Király). – Sopronkövesd, 2.7 km SW of Röjtökmuzsaj, both sides of the road from Lövő to Röjtökmuzsaj, "Cerina-erdő" Forest, clearings and forest fringes, 16°48′57″E 47°31′55″N (8466/4); 220 msm; 1 August 2011: G. Király, B. Trávníček & V. Žíla (Hb. Király). – Vitnyéd, "Fácános" Forest N of

Fig. 8: *Rubus orthostachys*. A, B: first-year stem with leaves, C, E: section of first-year stem, D: first-year stem leaf (abaxial surface), F, G: inflorescence, H: infructescence. (Photos: A, B, E, H: M. Hohla, C, D, F, G: G. Király) — **Abb. 8:** *Rubus orthostachys*. A, B: Schössling mit Blättern, C, E: Schössling, D: Schösslingsblatt (Unterseite), F, G: Blütenstand, H: Fruchtstand.

road nr. 84, open oak forests, 16°58′04″E 47°35′35″N (8467/3); 126 msm; 12 June 2015: G. Király (photo documented).

Rubus pruinosus (ser. *Subidaeus*, Fig. 9)

Series *Subidaeus* is an Atlantic group of sect. *Corylifolii* with a centre of distribution in the British Isles and the Netherlands, consisting of a single species, *Rubus pruinosus*, which reaches the inner part (central Germany, W Bohemia, and Austria) of the continent. The species was first reported from Austria on the 50 × 50 km UTM grid map in Kurtto & al. (2010). This record is based on a specimen collected by Maurer near Geretsberg (SW Innviertel, Upper Austria, see details below) – at the southernmost margin of the range; it has not been relocated there later. In 2020, a second locality (approx. 30 km NE of the previous one) was found near Aspach at a ruderal site. The species has probably no stable stands in Austria, its short-lived occurrences were established most likely by ornithochory. It should be mentioned that we found about ten different collections in Austrian herbaria, revised by J. Danner as "*R. pruinosus*"; however, all of them represent other biotypes of sect. *Corylifolii*.

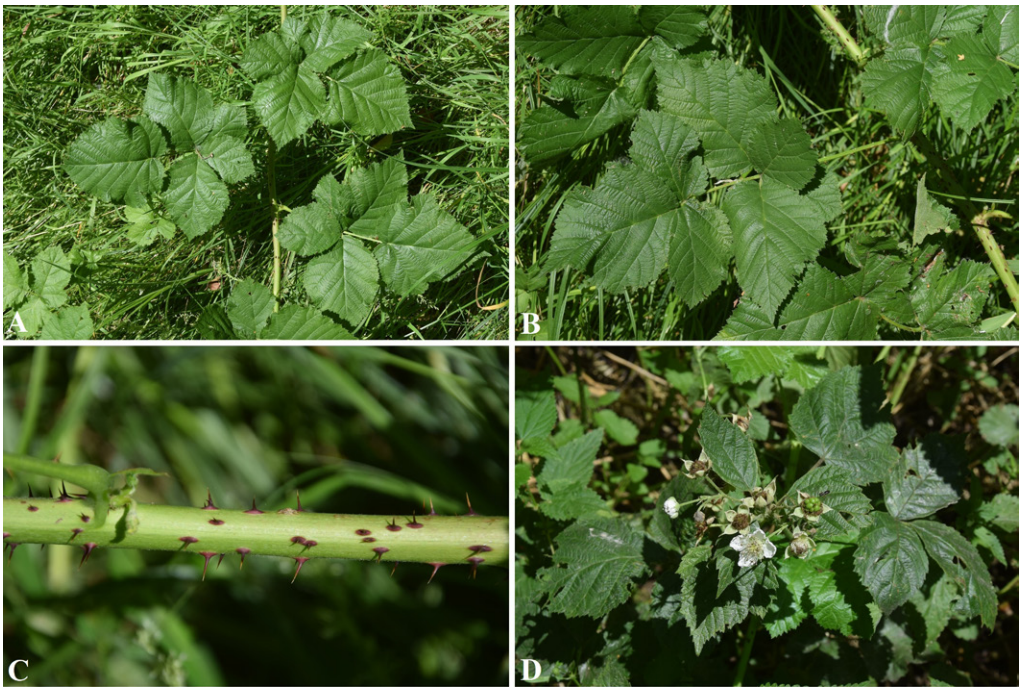

Fig. 9: *Rubus pruinosus*. A, B: first-year stem with leaves, C: section of first-year stem, D: inflorescence. (Photos: M. Hohla) — **Abb. 9:** *Rubus pruinosus*. A, B: Schössling mit Blättern, C: Schössling, D: Blütenstand.

Austria
Upper Austria: Aspach, S "Wildenauer Badesee", bushes on the edge of a ruderal area, 13°19′25″E 48°11′51″N (7845/2); 427 msm; 30 June 2020: M. Hohla, conf. W. Jansen (LI 02021492, LI 02021485, LI 02021478). – Geretsberg NW Ibm (7943/2); 24 July 1987: W. Maurer (det. H. E. Weber) (GZU 000240772, GZU 000240773).

Rubus scabrosus (ser. *Subcanescentes*, Fig. 10)

This taxon was listed as *Rubus visurgianus* in the batological literature for some time (see Weber 1988, 1995); however, Matzke-Hajek (2004) showed the identity with *R. scabrosus*, an overlooked earlier name of P. J. Müller. It is a widespread species in most of Germany, with scattered outposts in neighbouring regions of Czechia, France and Luxemburg (Kurtto & al. 2010).

Recently, we found two localities of the species at the southernmost edge of the distribution area in the southern Innviertel (Upper Austria), about 130 km from both the nearest Bavarian (Regensburg) and Bohemian (Strakonice) sites (BIB 2021, Pladias 2021). In the central part of its range, it occurs mainly on base-rich soils in sunny Pruno-Rubion scrubs and fringes (Weber 1995), often in disturbed, secondary habitats (observations of the authors in Bavaria and Hesse). The new Austrian localities are also markedly disturbed; therefore, an anthropogenic pathway of these stands cannot be ruled out. On the other hand, the stand near Tarsdorf is huge, certainly long established.

Austria
Upper Austria: Eggelsberg, Revier Heimhausen, ruderal site close to Oberinnviertler Landesstraße, bushes, 12°58′58″E 48°05′58″N (7943/2); 508 msm; 7 July 2021: G. Király & M. Hohla (Hb. Hohla). – Tarsdorf, E Döstling, old gravel pit, bushes, 12°50′42″E 48°03′41″N (7943/1); 469 msm; 7 July 2021: G. Király & M. Hohla, conf. W. Jansen & B. Trávníček (Hb. Király, Hb. Hohla).

Rubus semitomentosus (ser. *Subcanescentes*, Fig. 11)

A regional species of the E foothills of the Eastern Alps that occurs at numerous localities in Burgenland and Styria (Austria), W Hungary, and N Slovenia, furthermore at a single locality in N Croatia. It was mentioned in several older sources as "*Rubus holosericeus*", the identity of which with Borbás's taxon *R. semitomentosus* was only recently disentangled by Király (2019).

The northernmost known localities are located W of Sopron in Hungary and N of Sieggraben in Burgenland, the southernmost one is close to Őrtilos in Hungary; in the East, this species nearly reaches Lake Balaton. It is a typical acidofrequent element of oak-hornbeam forests and its derivates mixed with Scots pine, and occurs sometimes in

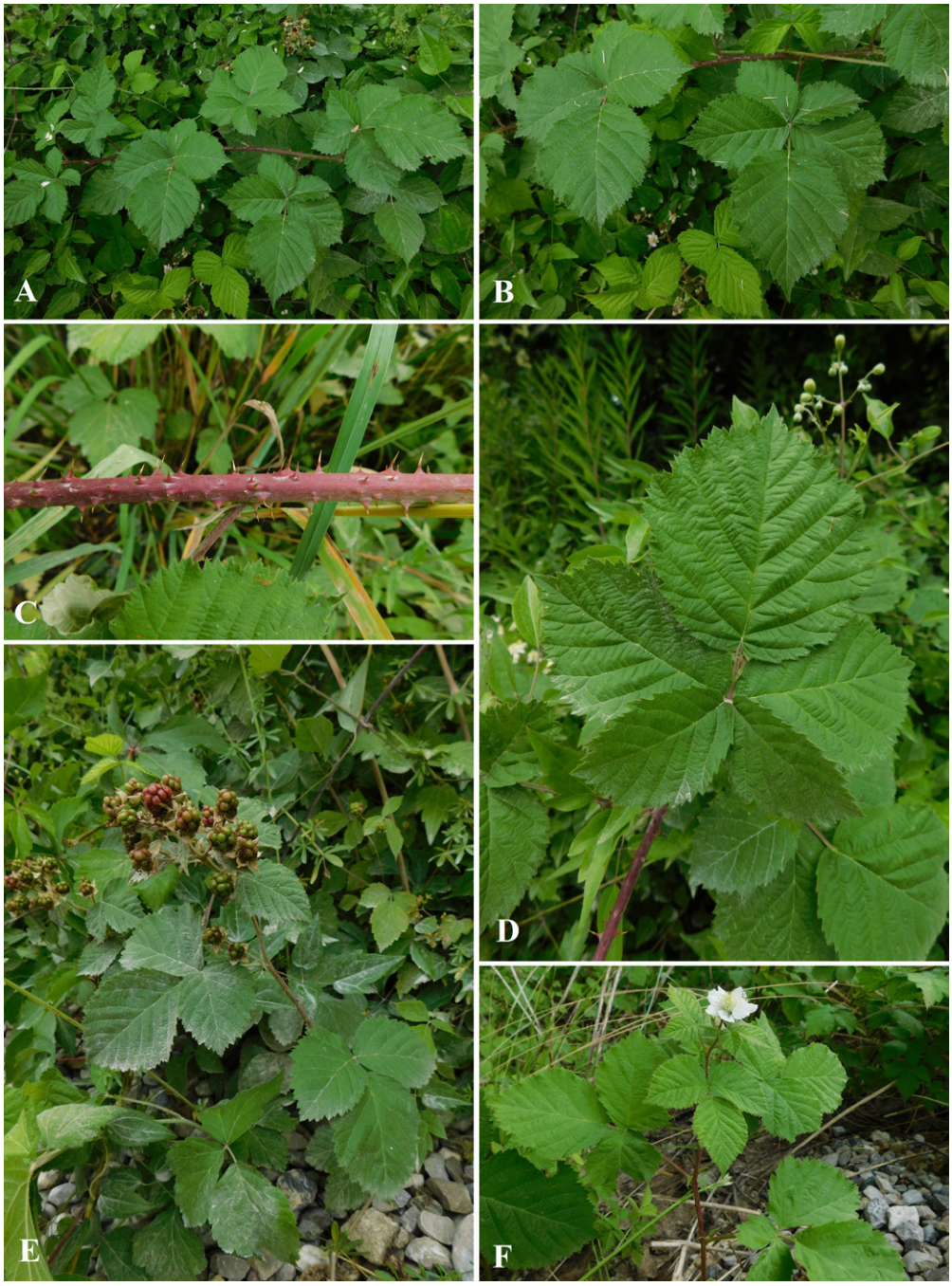

Fig. 10: *Rubus scabrosus*. A, B: first-year stem with leaves, C: section of first-year stem, D: first-year stem leaf, E: infructescence, F: inflorescence. (Photos: G. Király) — **Abb. 10:** *Rubus scabrosus*. A, B: Schössling mit Blättern, C: Schössling, D: Schösslingsblatt, E: Fruchtstand, F: Blütenstand.

Fig. 11: *Rubus semitomentosus*. A, B: first-year stem with leaves, C: a typical clone, D: section of the first-year stem, E: inflorescence, F: section of the inflorescence axis, G: infructescence. (Photos: G. Király). — **Abb. 11**: *Rubus semitomentosus*. A, B: Schössling mit Blättern, C: ein typischer Klon, D: Schössling, E: Blütenstand, F: ein Teil der Blütenstandsachse, G: Fruchtstand.

species-poor pine plantations as well. The species was mentioned by Weber & Maurer (1991) also from Carinthia and Lower Austria, but we could find neither matching vouchers nor exact locality data. Maurer (1984) presented a grid map of Styria with some occurrences of this species in grid squares divided by the border to SE Carinthia and SE Lower Austria. A single site in Lower Austria has been confirmed recently (see below); however, we can only suppose that records from Carinthia originate from unpublished material of W. Maurer.

Austria

Lower Austria: Wartmannstetten, 1.2 km N of Oberdanegg, pine plantations along road nr. L137, 16°02′58″E 47°41′48″N (8362/1); 465 msm; 16 July 2021: G. Király & M. Hohla ("*Rubus* Workshop") (Hb. Hohla).

Rubus sendtneri (ser. *Hystricopses*, Fig. 12)

The species was described by A. Progel from the Upper Palatine Forest (Oberpfälzer Wald, Germany), but was forgotten for a long time afterwards. Its importance (as a regional species) was recognized on the basis of findings by H. Gaggermeier 1995 onwards: Weber (1998) designated the lectotype, and Gaggermeier (2000) presented the first distribution map for E Bavaria, also mentioning an occurrence in the bordering Bohemia (Český les). According to recent distribution maps, this species is restricted to few grid units in the Czech Republic (Pladias 2021), but the range in Bavaria has been extended with the easternmost sites N of Passau (BIB 2021), compared to the initial reports of Gaggermeier (2000).

In Austria, *Rubus sendtneri* has relatively long been known from specimens collected by V. Žíla in 2003 near Taiskirchen im Innkreis; however, this occurrence was published only on the 50 × 50 km UTM grid map of Kurtto & al. (2010). The Žíla collection remained unknown for Austrian botanists; therefore, its observation during the "Rubus-Konzil" 2010 in Upper Austria was a surprise. Since then, its localities were systematically collected by M. Hohla, and based on this knowledge, the species has a continuous distribution centre in the Sauwald and closely adjacent areas, and a southern outpost near Auerbach in SW Innviertel (Fig. 18). Despite its frequency in and around the Sauwald, curiously, it has not been recorded or collected by Grims (2008) in this area. Due to the data listed below, the longest axis of the known distribution area is as long as 180 km. The species mostly occurs on mesic or semi-dry, acidic soils, both in natural broadleaved forests and spruce plantations of the NE part of the Innviertel.

Austria

Upper Austria: Andorf, W Basling, NE Pimpfing, forest fringes, 13°33′37″E 48°20′50″N (7647/3); 373 msm; 5 September 2020: M. Hohla (LI 03282663, LI 03282670), 6 September 2020: M. Hohla (LI 03282724, LI 03282731). – Andrichsfurt,

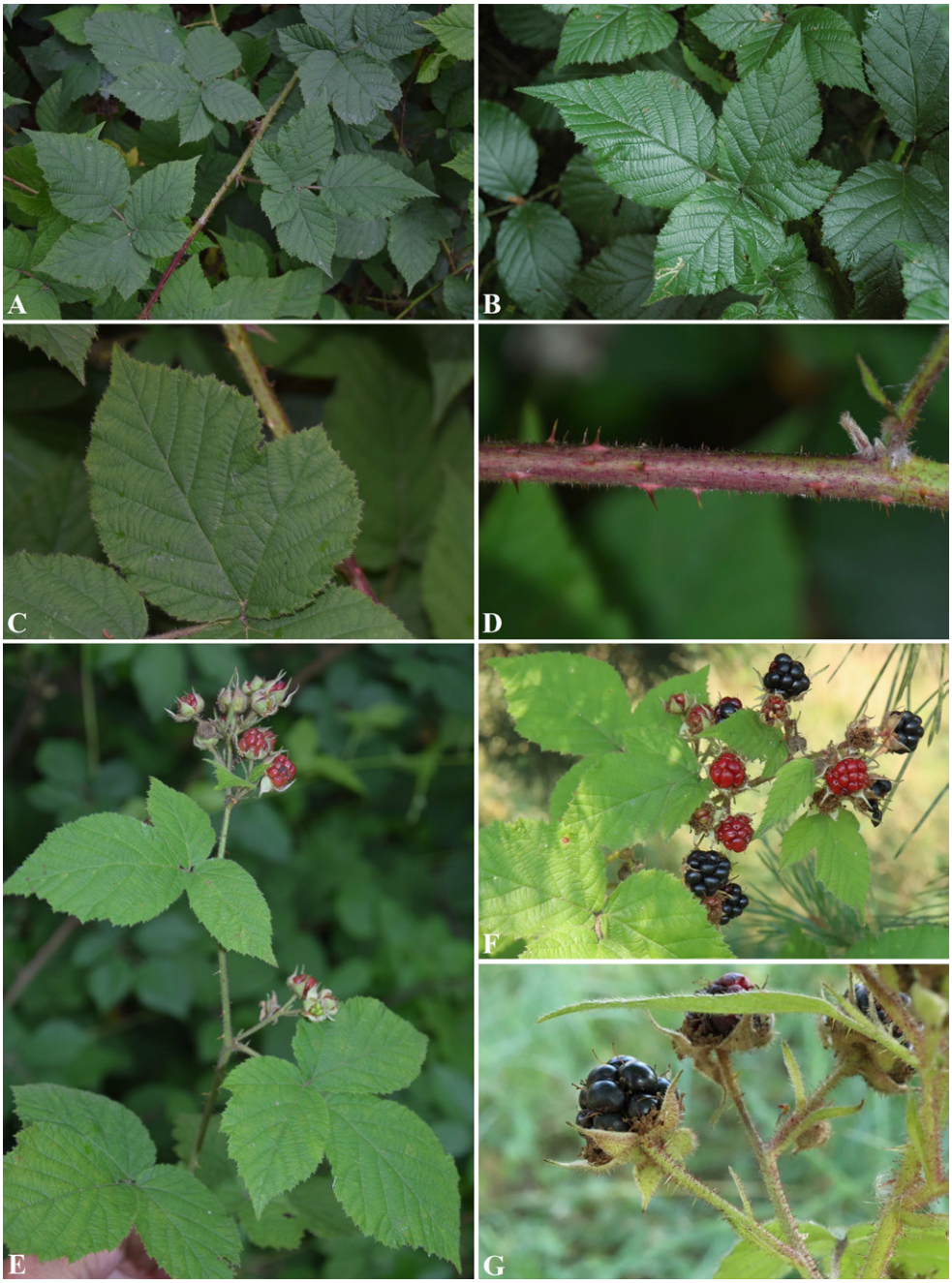

Fig. 12: *Rubus sendtneri*. A, B: first-year stem with leaves, C: margin of leaf on first-year stem, D: section of first-year stem, E, F, G: infructescence. (Photos: A, B, C, D, E: M. Hohla, F, G: A. Lepší) — **Abb. 12:** *Rubus sendtneri*. A, B: Schössling mit Blättern, C: Rand eines Schösslingblattes, D: Schössling, E, F, G: Fruchtstand.

E of the village, forest fringes, 13°31′54″E 48°15′49″N (7747/1); 459 msm; 7 November 2009: M. Hohla (LI 02760865). – Auerbach, N Alterding, forest fringes, 13°04′55″E 48°03′26″N (7944/1); 460 msm; 9 August 2008: M. Hohla (LI 01084511). – Enzenkirchen, SW Oberau, forest fringes, near a fishpond, 13°40′42″E 48°23′44″N (7648/1); 482 msm; 7 August 2019: M. Hohla (LI 02770895, LI 02770901). – Kopfing im Innkreis, Knechtlsdorf, N "Baumkronenweg", forest fringes, 13°40′08″E 48°27′03″N (7548/1); 613 msm; 8 August 2020: M. Hohla (LI 03281154). – Kopfing im Innkreis, N Kechtlsdorf, bushes along a hollow way, 13°39′49″E 48°27′06″N (7547/2); 589 msm; 8 August 2020: M. Hohla (LI 03281147). – Lambrechten, Reichergerhagen, forest fringes, 13°31′46″E 48°19′08″N (7647/3); 398 msm; 5 September 2018: M. Hohla (LI 03123928). – Lambrechten, W Winkl, edge of a gravel pit, 13°32′25″E 48°19′26″N (7647/3); 417 msm; 20 August 2010: M. Hohla (LI 02760490). – Ort im Innkreis, Aichberg, SE Au, forest fringes and on a clearing, 13°26′00″E 48°19′13″N (7646/4); 350 msm; 24 September 2010: M. Hohla (LI 02760476). – Ort im Innkreis, Aichberg, 0.2 km N "Bründlkapelle", forest fringes, 13°26′05″E 48°19′15″N (7646/4); 390 msm; 24 May 2011: M. Hohla (obs.), 27 August 2017: G. Király & M. Hohla (Hb. Király). – Schardenberg, W Schafberg, forest fringes, 13°27′28″E 48°31′21″N (7446/4); 387 msm; 1 October 2016: M. Hohla (obs.). – St. Marienkirchen bei Schärding, NE Lindenedt, forest fringes path, 13°26′38″E 48°22′13″N (7646/2); 378 msm; 22 July 2011: M. Hohla (LI 02760483). – St. Roman, SW Au, forest fringes, 13°37′26″E 48°27′19″N (7547/2); 544 msm; 20 May 2020: M. Hohla (LI 03240946). – Taiskirchen im Innkreis, pagus Lambrechten, vicus Gupfing (7647/3); 400 msm; 30 August 2003: V. Žíla (Hb. Žíla, LI 558782, LI 558783). – Wernstein am Inn, quarry E Neuhauser, bushes at the top of the slope, 13°27′07″E 48°29′50″N (7546/2); 320 msm; 13 August 2010: M. Hohla (LI 02762173). – Wernstein am Inn, W Wimberg, at the edge of a quarry, on rocks, Carpinion, 13°27′10″E 48°29′53″N (7546/2); 384 msm; 1 October 2016: M. Hohla (obs.). – Wernstein am Inn, 0.9 km S of the railway station, forest fringes along the railway line, 13°27′01″E 48°29′52″N (7546/2); 320 msm; 6 July 2018: G. Király & M. Hohla (Hb. Király). – Zell an der Pram, NW Blümling, Wildhag, bushes at the forest fringes, 13°34′13″E 48°18′57″N (7647/3); 409 msm; 21 June 2019: M. Hohla (Hb. Hohla).

Rubus suevicola (ser. *Subthyrsoidei*, Fig. 13)

A regional species that was described by Weber (1997) from Bavaria (with a handful of records from Thuringia and Baden-Württemberg). It was mentioned by Kurtto & al. (2010) also from Switzerland and Austria, but the source of these data remained unclear. The Swiss checklist of vascular plants (Juillerat & al. 2017) simply transferred the record from Kurtto & al. (2010). Weber (1997) presented a locality in Allgäu from the border crossing "Lochersteg/Laiblach", and based on this, he also presumed the species' occurrence in neighbouring Vorarlberg. Because we could not find any later records (nor vouchers) from Vorarlberg, we presume, Weber simply adopted his former assumption

when revising the species' distribution for the "Atlas Florae Europaeae", and the species has not yet been reliably documented from Austria.

During the "*Rubus*-Workshop" in Vorarlberg 2014, a characteristic biotype resembling *Rubus suevicola* was collected at few localities; however, it has not been revised by now. The same biotype was found in E Carinthia in 2020, and a belated revision showed

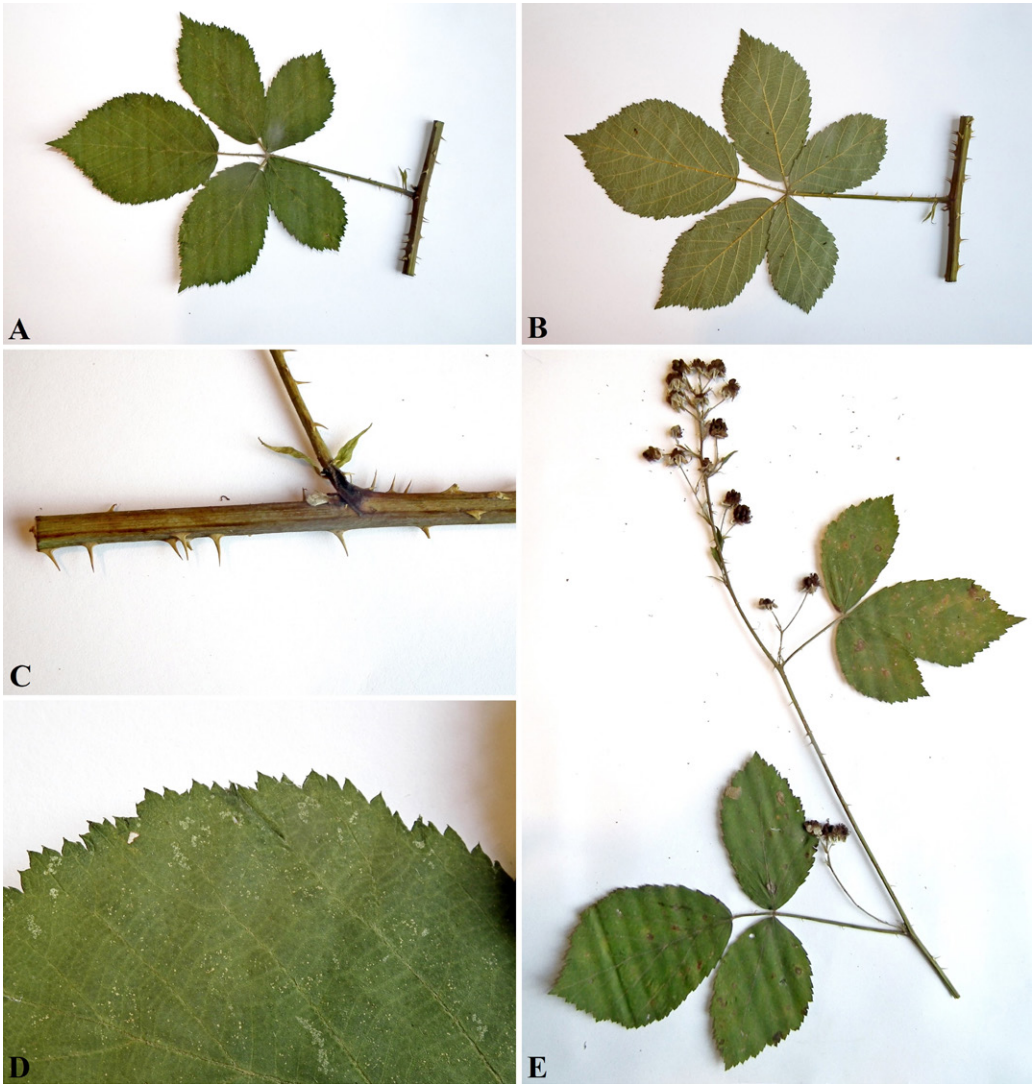

Fig. 13: *Rubus suevicola*. A: first-year stem leaf (adaxial surface), B: first-year stem leaf (abaxial surface), C: section of first-year stem, D: margin of leaf on first-year stem, E: infructescence. (Photos: G. Király) — **Abb. 13:** *Rubus suevicola*. A: Schösslingsblatt (Oberseite), B: Schösslingsblatt (Unterseite), C: Schössling, D: Rand eines Schösslingblattes, E: Fruchtstand.

that the plants from both Vorarlberg and Carinthia are identifiable as *R. suevicola* (Fig. 19). All known sites in Austria are in disturbed habitats, along open-land hedges, roadsides, or coniferous plantations.

Austria

Carinthia: Völkermarkt, 0.4 km SE of Greuth, forest fringes N of road nr. 70, 14°33′13″E 46°39′16″N (9353/1); 460 msm; 14 July 2020: G. Király ("*Rubus* Workshop") (Hb. Király).

Vorarlberg: Dornbirn, Kehlerstraße, forest fringes, 9°45′21″E 47°25′19″N (8524/4); 540 msm; 6 August 2014: G. Király ("*Rubus* Workshop") (Hb. Király). – Feldkirch, Ardetzenberg, forest fringes around the "Wildpark", 9°35′48″E 47°14′40″N (8723/4); 585 msm; 6 August 2014: G. Király ("*Rubus* Workshop") (Hb. Király). – Koblach, fringes of the forest E-NE of the village (Kummenberg), 9°36′23″E 47°20′02″N (8623/4); 450 msm; 6 August 2014: G. Király ("*Rubus* Workshop") (Hb. Király). – Lochau, along the road to Eichenberg, spruce plantations and forest fringes, 9°46′09″E 47°32′18″N (8424/4); 668 msm; 7 August 2014: G. Király ("*Rubus* Workshop") (Hb. Király).

Rubus sylvulicola (ser. *Hystricopses*, Fig. 14)

A regional species described from the Chiemgau in Bavaria that arrived in modern batology by the typification and taxonomic interpretation of Weber (1989). At that time, its known distribution area was rather narrow (barely 50 km in diameter), consisting of two Austrian localities: Geretsberg in Upper Austria and Stierling in Salzburg (these records were also cited by Weber & Maurer 1991). The range was extended by Pagitz (2016) with a record from North Tyrol (Niederndorf). Recently, we found several new localities in the border area of the SW Innviertel und N Salzburg (approximately in the triangle of Salzburg – Mattighofen – Burghausen) that is closely connected to the distribution in the Chiemgau. Moreover, we found a smaller, second disjunction of the range S of Wels around Kremsmünster (SE Upper Austria) (Fig. 16). *Rubus sylvulicola* is a nemophilous species that prefers mesic or moist, loamy-clayey soils established on tertiary sediments, and frequently occurs in coniferous stands; therefore, we believe its spread was largely supported by the creation of these homogeneous plantations, where it often establishes large clones.

Austria

Salzburg: Acharting, 1.6 km NW of the village, forest fringes E of road nr. 157, 12°58′46″E 47°54′08″N (8043/4); 425 msm; 31 July 2015, G. Király, M. Hohla & al. (obs.). – Bergheim, W of basilika Maria Plain, forest fringes, 13°02′04″E 47°50′21″N (8144/3); 487 msm; 30 July 2015: M. Hohla, G. Király & al. (LI 01311105). – Lamprechtshausen, NW Bruck, forest fringes, 12°56′45″E 48°00′08″N (7943/4); 439 msm; 30 June 2014: M. Hohla (LI 02487816). – Mattsee, along a path near the lake, 13°06′34″E

47°59′10″N (8044/2); 503 msm; 22 August 2014: M. Hohla (obs.). – Michaelbeuern, 0.2 km N of the monastery, forest fringes, 13°01′50″E 48°01′21″N (7944/3); 530 msm; 31 July 2015: G. Király, M. Hohla & al. (obs.). – Schlössl, 0.4 km S of the village, forest fringes S of road nr. L251, 12°59′04″E 47°55′38″N (7844/3); 500 msm; 29 July 2015: G. Király & M. Hohla (obs.).

Upper Austria: Eggelsberg, forest near Seeleiten, 12°58′34″E 48°03′30″N (7943/2); 480 msm; 7 August 2007: M. Hohla (LI 829281, LI 829328). – Feldkirchen bei Mattighofen, 0.2 km N of Quick settlement, forest fringes, 13°02′55″E 48°04′38″N (7944/1); 520 msm; 3 July 2018, G. Király & M. Hohla (obs.). – Franking, E Franking, small forest, 12°55′05″E 48°03′18″N (7943/2); 440 msm; 20 July 2007: M. Hohla (LI 832243). – Franking, Oberfranking, forest fringes and bushes, 12°54′06″E 48°03′59″N (7943/1); 467 msm; 4 September 2011: M. Hohla (obs.). – Geretsberg, Großschäding, bushes, 12°59′19″E 48°04′02″N (7943/2); 460 msm; 27 July 2011: M. Hohla & M. Lepší (obs.). – Geretsberg, N Mühlberg, forest fringes, 12°56′13″E 48°05′02″N (7943/2); 456 msm; 27 July 2011: M. Hohla & M. Lepší (obs.), 4 July 2014: M. Hohla (obs.). – Geretsberg, Oberer Weilhartsforst, SW Geretsberg, forest fringes, 12°55′44″E 48°05′04″N (7943/2); 480 msm; 4 July 2014: M. Hohla (LI 02487861). – Geretsberg, Oberer Weilhartsforst, W Weißplatz, forest fringes, 12°54′25″E 48°04′11″N (7943/1); 460 msm; 4 August 2015: M. Hohla (LI 1312485, LI 01312508). – Geretsberg, S Henkham, forest fringes, 12°57′18″E 48°05′00″N (7943/2); 460 msm; 21 August 2006: M. Hohla (LI 01120233). – Geretsberg, W Geretsberg, forest fringes, 12°55′52″E 48°05′15″N (7943/2); 480 msm; 21 August 2006: M. Hohla (LI 01120110, LI 01119862). – Gilgenberg, gravel pit near "Gummiwerk Kraiburg", forest fringes near a gravel pit, 12°56′55″E 48°06′33″N (7843/4); 480 msm; 30 June 2014: M. Hohla (obs.). – Haigermoos, N Pfaffing, forest fringes, 12°53′23″E 48°02′18″N (7943/3); 460 msm; 27 July 2011: M. Hohla & M. Lepší (obs.). – Handenberg, S Handenberg, W St. Georgen am Fillmannsbach, forest fringes, 13°00′30″E 48°07′38″N (7844/3); 465 msm; 28 July 2015: M. Hohla (LI 01311167, LI 01311174). – Hochburg-Ach, Wanghausen, SE graveyard, bushes at forest fringes, 12°49′22″E 48°08′44″N (7842/4); 444 msm; 12 September 2015: M. Hohla (LI 01528862, LI 01528879). – Jeging, E Jeging, forest, 13°09′25″E 48°02′37″N (7944/4); 501 msm; 31 July 2015: M. Hohla (obs.); Kirchberg bei Mattighofen, Aigen, forest fringes, 13°06′36″E 48°02′11″N (7944/4); 553 msm; 31 July 2019: M. Hohla (obs.). – Kirchberg bei Mattighofen, W Wendling, forest fringes, 13°06′22″E 48°01′56″N (7944/4); 536 msm; 31 July 2019: M. Hohla (LI 02770529, LI 02770536). – Kremsmünster, 0.9 km NW of the village, forest patch at road nr. 122, 14°06′35″E 48°03′32″N (7950/2); 465 msm; 4 July 2018: G. Király & M. Hohla (Hb. Király). – Kremsmünster, forests S of Schacherteich along the road to Sipbachzell, 14°07′06″E 48°04′42″N (7950/2); 400 msm; 4 July 2018: G. Király & M. Hohla (obs.). – Lochen, N Petershamer, forest, 13°10′17″E 47°59′47″N (8045/1); 540 msm; 19 July 2007: M. Hohla (LI 829489, LI 829526). – Moosdorf, SW Furkern, forest fringes, 12°58′11″E 48°01′40″N (7943/4); 430 msm; 27 July 2011: M. Hohla & M. Lepší (obs.). – Ostermiething, E Ernsting, forest fringes, 12°51′38″E 48°03′09″N (7943/1); 485 msm; 4 July 2014: M. Hohla (LI 02487823). – Palting,

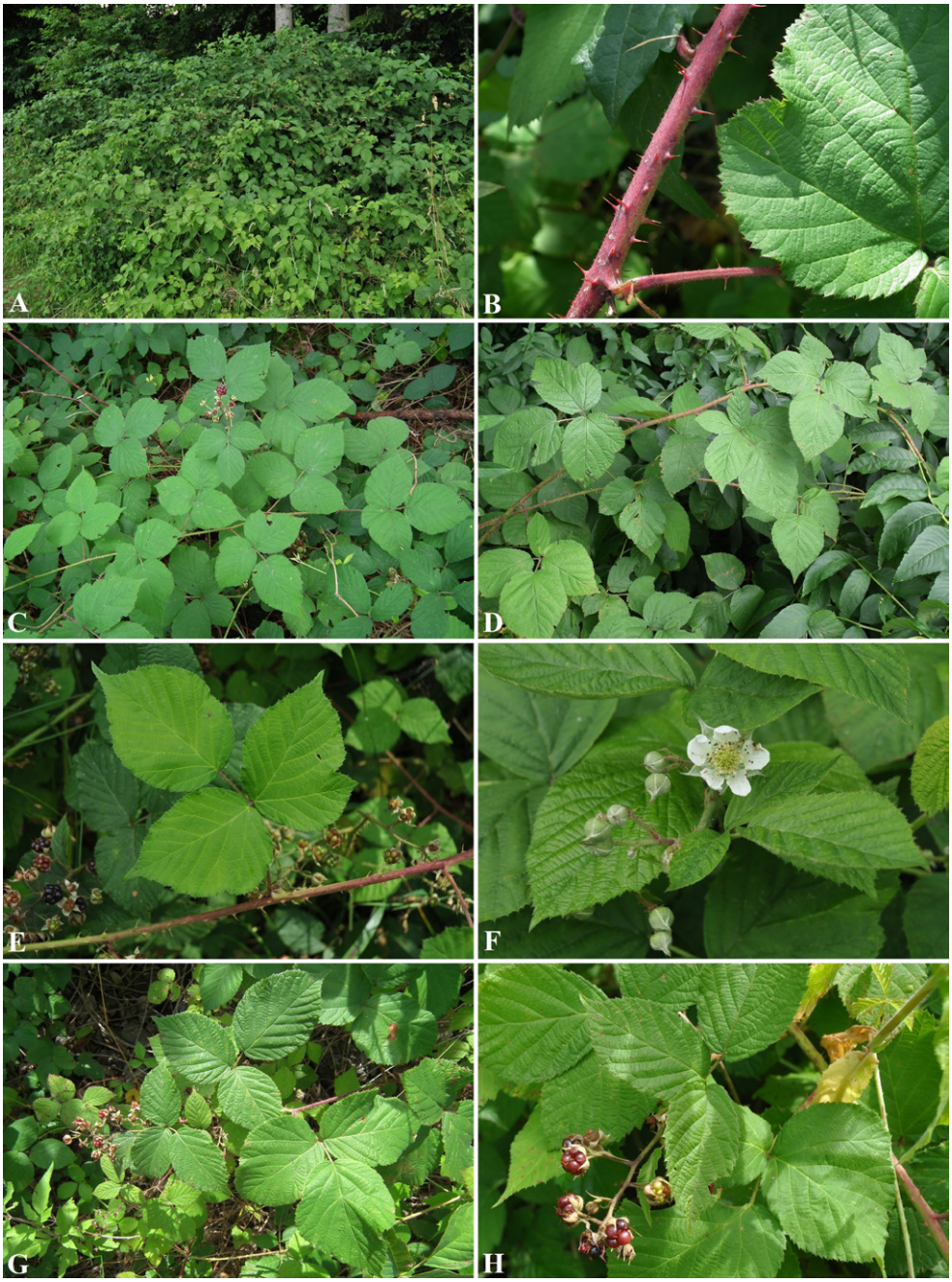

Fig. 14: *Rubus sylvulicola*. A: typical clone, B: section of first-year stem, C, D: first-year stem with leaves, E: first-year stem leaf (adaxial surface), F: inflorescence, G, H: infructescence. (Photos: A, E, F: M. Hohla, B, C, D, G, H: G. Király) — **Abb. 14:** *Rubus sylvulicola*. A: ein typischer Klon, B: Schössling, C, D: Schössling mit Blättern, E: Schösslingsblatt (Oberseite), F: Blütenstand, G, H: Fruchtstand.

N Macking, W Mundenham, forest fringes, 13°07′01″E 48°00′22″N (7944/4); 501 msm; 30 June 2014: M. Hohla (obs.). – Palting, NE Weikertsham, forest clearing, 13°06′14″E 48°01′34″N (7944/4); 541 msm; 30 June 2014: M. Hohla (obs.). – St. Pantaleon, 0.3 km NE of the village, forest along the road to Laubenbach, 12°53′52″E 48°00′48″N (7943/3); 475 msm; 3 July 2018: G. Király & M. Hohla (Hb. Király). – St. Pantaleon, E Wildshut, forest fringes, 12°52′34″E 48°00′28″N (7943/3); 430 msm; 27 July 2011: M. Hohla & M. Lepší (obs.). – St. Pantaleon, forest block W of Seeleitenstr. near Pirach, 12°53′13″E 48°01′00″N (7943/3); 456 msm; 3 July 2018: G. Király & M. Hohla (obs.). – St. Pantaleon, forest near Wildshut, 12°52′06″E 48°00′35″N (7943/3); 420 msm; 21 August 2006: M. Hohla (LI 01119794). – St. Pantaleon, N Vorderberger Siedlung, forest fringes, 12°52′19″E 48°01′30″N (7943/3); 440 msm; 9 August 2008: M. Hohla (LI 01084528). – St. Pantaleon, N-NW Pirach, forest fringes, 12°52′41″E 48°01′18″N (7943/3); 450 msm; 27 July 2011: M. Hohla (obs.). – St. Pantaleon, W Loidersdorf, forest fringes, 12°54′16″E 48°01′53″N (7943/3); 480 msm; 27 July 2011: M. Hohla & M. Lepší (obs.). – Steckenbach, 0.2 km SE of Emerding settlement, bushes on the roadside, 13°02′09″E 48°05′39″N (7944/1); 485 msm; 3 July 2018: G. Király & M. Hohla (obs.). – Tarsdorf, Hofstadt, forest fringes, 12°51′02″E 48°05′08″N (7943/1); 470 msm; 4 September 2011: M. Hohla (obs.). – Tarsdorf, NE Ölling, forest fringes, 12°48′44″E 48°04′24″N (7942/2); 418 msm; 12 August 2008: M. Hohla (LI 01085280).

Rubus viridilucidus (ser. *Subcanescentes*, Fig. 15)

A very recently described species reportedly occurring in a relatively small area around Würzburg (N Bavaria and NE Baden-Württemberg) (Drenckhahn & Zonneveld 2017). The newly discovered Austrian locality lies at 300 km from the locus classicus, at a roadside in a very busy traffic corridor; thus, it seems to be obvious that the species was introduced here by some anthropogenic pathway. We found a single clone at this site in 2018, which still (2021) exists, but no signs of any local spread have been observed. The story of this discovery resembles that of *Rubus macrostemonides* (syn. *R. baruthicus*, ser. *Subcanescentes*), which was recorded near Salzburg, approximately 200 km away from its nearest Bavarian localities (Király 2019).

Austria

Upper Austria: St. Marienkirchen bei Schärding, roundabout at road nr. 149, 1 km S of the border station of highway A8, bushes along a fence, 13°25′42″E 48°23′39″N (7646/2); 340 msm; 6 July 2018: G. Király & M. Hohla, conf. D. Drenckhahn (Hb. Király, LI 03127933).

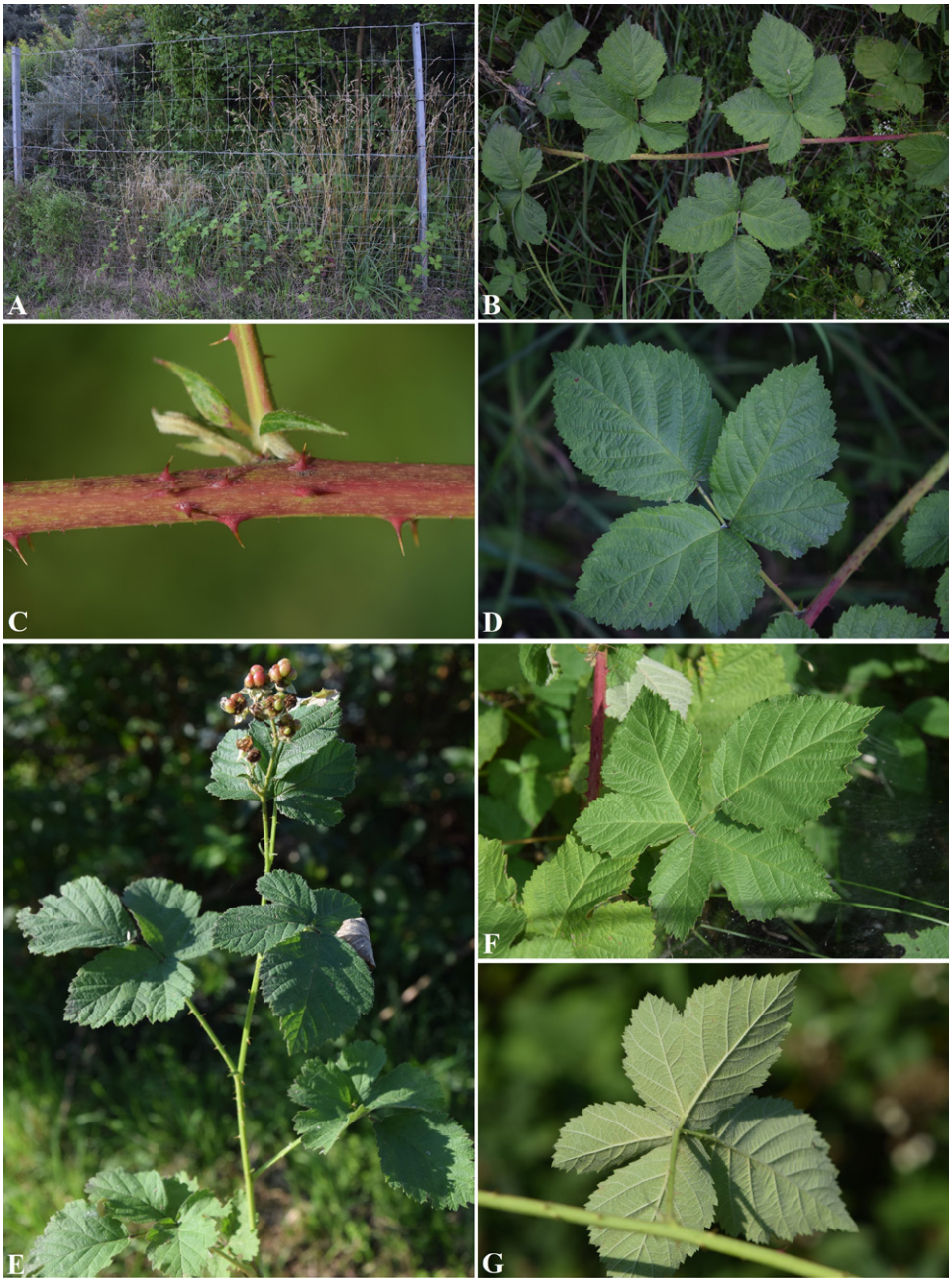

Fig. 15: *Rubus viridilucidus*. A: habitat near St. Marienkirchen, B: first-year stem with leaves, C: section of first-year stem, D, F: first-year stem leaf (adaxial surface), E: infructescence, G: first-year stem leaf (abaxial surface). (Photos: M. Hohla) — **Abb. 15:** *Rubus viridilucidus*. A: Standort von *R. viridilucidus* bei St. Marienkirchen, B: Schössling mit Blättern, C: Schössling, D, F: Schösslingsblatt (Oberseite), E: Fruchtstand, G: Schösslingsblatt (Unterseite).

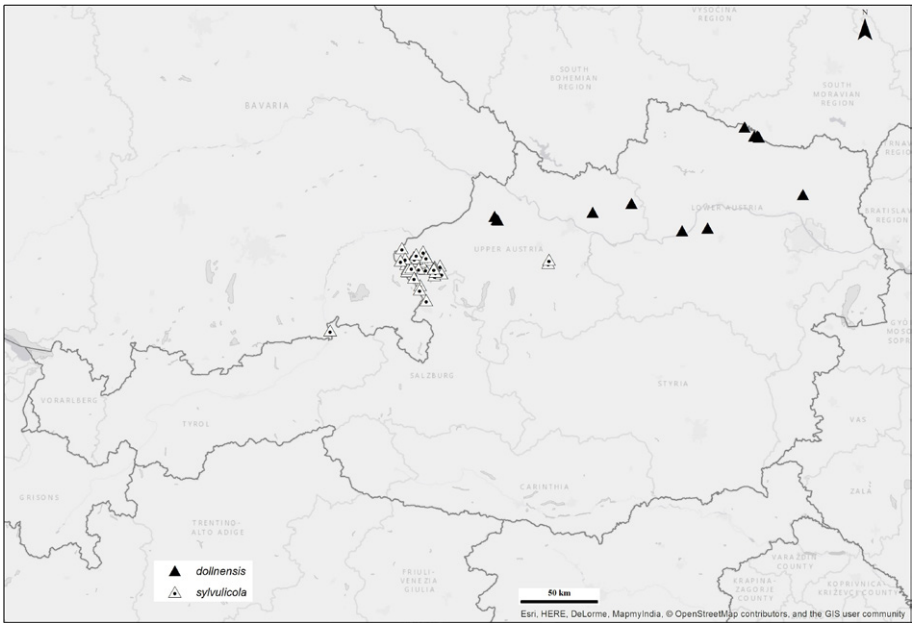

Fig. 16: Distribution of *Rubus dollnensis* and *R. sylvulicola* in Austria. — **Abb. 16:** Die Verbreitung von *Rubus dollnensis* und *R. sylvulicola* in Österreich.

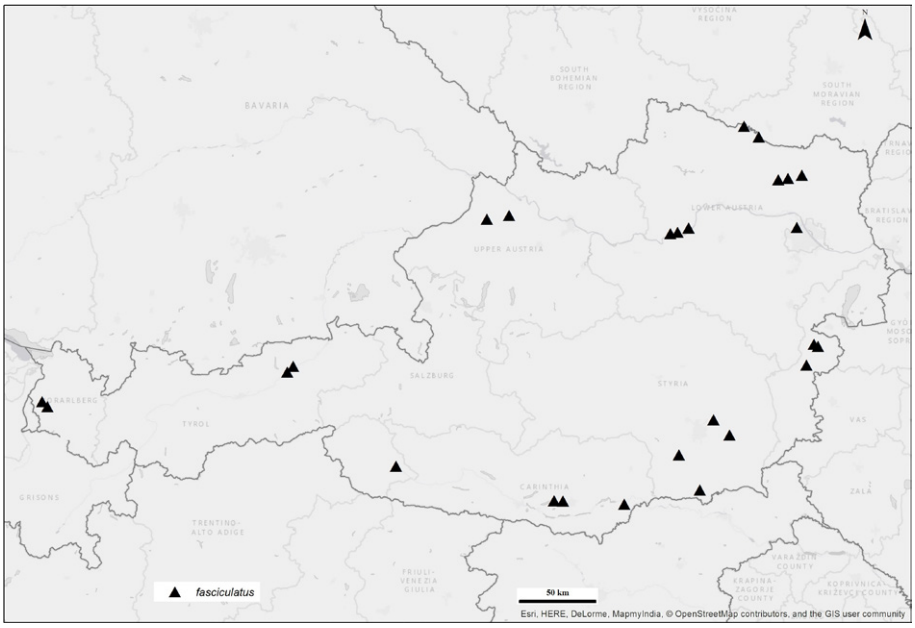

Fig. 17: Distribution of *Rubus fasciculatus* in Austria. — **Abb. 17:** Die Verbreitung von *Rubus fasciculatus* in Österreich.

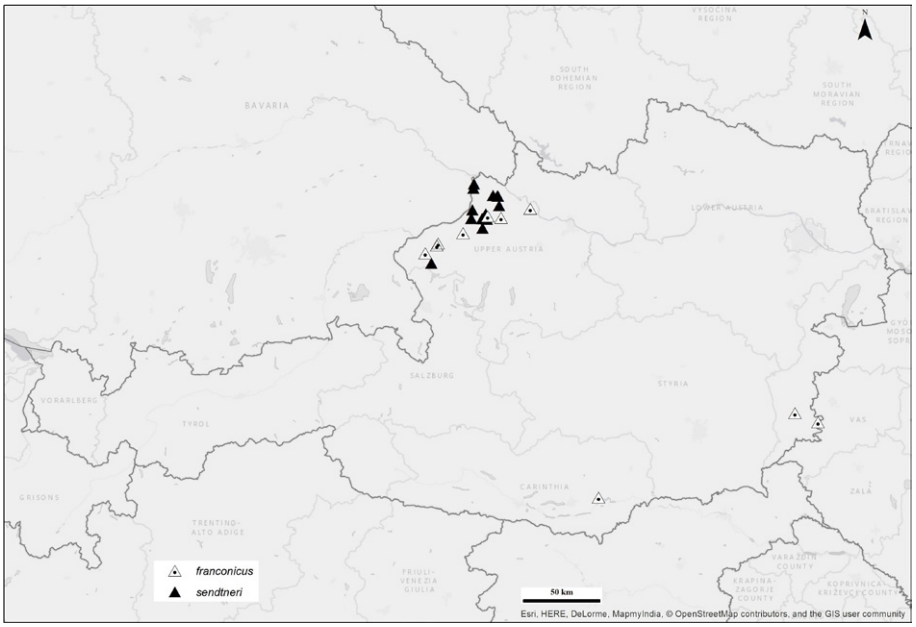

Fig. 18: Distribution of *Rubus franconicus* and *R. sendtneri* in Austria. — **Abb. 18:** Die Verbreitung von *Rubus franconicus* and *R. sendtneri* in Österreich.

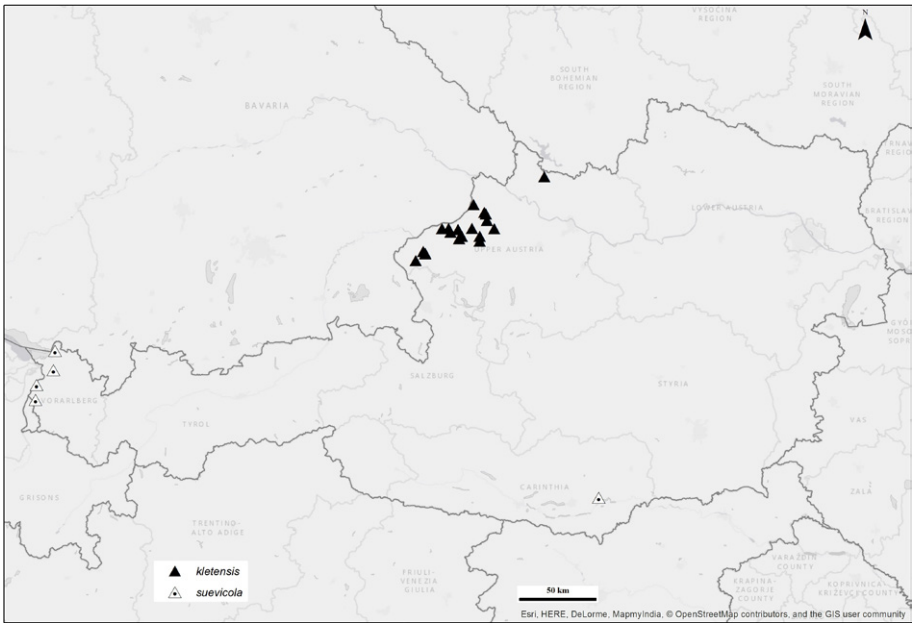

Fig. 19: Distribution of *Rubus kletensis* and *R. suevicola* in Austria. — **Abb. 19:** Die Verbreitung von *Rubus kletensis* and *R. suevicola* in Österreich.

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