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A phylogenetic checklist of *Sorbus* s.l. (Rosaceae) in Europe

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A new checklist of *Sorbus* s.l. in Europe provides an updated classification of this group according to the latest phylogenetic studies. In order to achieve monophyly, five non-hybrid genera are accepted which represent separate evolutionary lineages (*Aria*, *Chamaemespilus*, *Cormus*, *Sorbus* s. str., *Torminalis*), with five hybridogenous genera described here (*Borkhausenia* = *Aria* × *Sorbus* × *Torminalis*, *Hedlundia* = *Aria* × *Sorbus*, *Karpatiosorbus* = *Aria* × *Torminalis*, *Majovskya* = *Aria* × *Chamaemespilus*, *Normeyera* = *Aria* × *Chamaemespilus* × *Sorbus*). The checklist includes 201 taxa accepted at the species level: 5 diploid species, 5 diploid hybrids, 186 apomictic species, and 5 apomictic hybrids. Numerous new binomial combinations are proposed to reflect the phylogenetic position of accepted taxa. The synonymy and nomenclature are revised, and lectotypes are designated for ten plant names. In addition, a new nothogeneric name, *Sorbomeles*, is proposed for hybrids between *Sorbus* and *Micromeles*.

Additional key words: apomictic taxa, hybridogenous taxa, hybrids, Mountain-ash, new names, nomenclature, phylogeny, Rowans, Service Tree, synonymy, taxonomy, typification, Whitebeams

Introduction

Atlas Florae Europaeae (AFE) is not only a large-scale project for mapping vascular plants in Europe. While its original purpose, to serve as a complement to *Flora Europaea* (Tutin et al. 1964–1980), has been surpassed long ago, AFE provides updated taxonomic synopses for the purposes of data collection and mapping and also contributes its taxonomy to larger taxonomic databases like *Euro+Med PlantBase* (Kurtto 2009).

The mapping of Rosaceae has been proven particularly difficult because of the widespread occurrence of polyploidy which is often associated with gametophytic apomixis (e.g. Campbell & Dickinson 1990; Vamosi & Dickinson 2006). Polyploidy and apomixis lead to a higher taxonomic diversity (increased species richness), and the groups that are particularly species-rich received a special attention in AFE: *Alchemilla* L. (Kurtto et al. 2007) and *Rubus* L. (Kurtto et al. 2010). The third genus of Rosaceae with extraordinary taxonomic difficulties to be mapped in Europe is *Sorbus* L. s.l.

The taxonomic diversity of *Sorbus* in Europe is currently being accommodated within a single, traditionally defined genus, although evidence has been increasingly growing that *Sorbus* s.l. includes five main evolutionary lineages and in the current circumscription it is apparently polyphy-

letic (Campbell et al. 2007). Besides these main lineages, intermediate taxa of hybrid origin are not uncommon; these should also be classified correctly in the phylogenetic taxonomy.

The main purpose of the present contribution is to summarise the knowledge on the taxonomy, distribution, synonymy and nomenclature of *Sorbus* s.l. in Europe, augmenting and improving the provisional checklist published by Kurtto (2009). Another purpose is to update the formal taxonomic classification of this group as to reflect the phylogenetic relationships and to achieve monophyletic taxa. The resulting checklist provides a taxonomic backbone for the ongoing mapping of the group in *Atlas Florae Europaeae*.

History of studies at the genus level

The genus *Sorbus*, when validly published by Linnaeus (1753), included only two species (*S. aucuparia*, *S. domestica*) which were distinguished as a genus of its own because of three styles (the character of *S. aucuparia* only, because *S. domestica* is characterized by five styles) and also pinnate leaves. The name and circumscription of the genus were borrowed from Tournefort (1719). Other species of *Sorbus* s.l. known to Linnaeus were classified into other genera: *Crataegus* L. (*Crataegus aria* = *Sorbus aria*, *Crataegus torminalis* = *Sorbus torminalis*) with two styles (and non-pinnate leaves), *Mespilus* L. (*M. chamaemespilus* = *S. chamaemespilus*) with five styles (and subentire leaves). These species, which subsequently formed separate genera, were classified by Linnaeus primarily on the basis of number of styles, the character potentially useful in formal classifications but of limited evolutionary significance.

Other (”natural”) characters in the structure of fruits were observed after Linnaeus. Most notable were works of Medicus who revolutionarily revised the generic taxonomy of many groups including the Rosaceae with apple-like fruits. Medicus (1789) established the genera *Chamaemespilus* Medik. (fruit closed, not fleshy), *Aucuparia* Medik. (fruit open, similar to *Sorbus* = *S. domestica*), and *Torminalis* Medik. (fruit closed, fleshy), of which *Aucuparia* was validly published later (Medicus 1793).

Medicus (1789) restricted the genus *Sorbus* to a single species, *S. domestica*, and his choice was sometimes followed and reflected in the earliest typification of the name (Pfeiffer 1874; Green in Hitchcock & Green 1929). However, most of researchers wished to restrict the genus to *S. aucuparia* and its relatives, and this treatment was formalised in the second generic typification (Rehder 1949) and a conservation proposal (Brizicky 1968; Kovanda & Pouzar 1982; Sennikov 2014), and finally the generic type was recommended for conservation by the Nomenclature Committee for Vascular Plants (Applequist 2016).

The last generic segregate was separated by Host (1831) who erected the genus *Aria* (Pers.) Host on the basis of the subgenus established by Persoon (1806), into which he placed three species with subentire leaves (including *S. chamaemespilus* and its hybrid *S. hostii*). This genus was later restricted according to its type, with many relatives added (Roemer 1847). The monograph of Roemer (1847) was probably the last authoritative work of classical times in which narrow generic segregates of *Sorbus* s.l. were accepted.

Persoon (1806) already collected nearly all the Linnaean members of *Sorbus* s.l. into a single genus, except for *S. chamaemespilus* which was placed into *Aronia* on the basis of five styles (the presence of five styles in *S. domestica* still was neglected, and that species was treated as tristylous also by Persoon). The collective concept of *Sorbus* became dominating by the end of 19th century. But even the broader *Pyrus* L., embracing the whole of Malinae, was preferred by some other authors (e.g. Candolle 1825).

It was only recently that the narrow generic segregates of *Sorbus* s.l. enjoyed acceptance again, firstly on the grounds of morphology (Robertson et al. 1991) and then molecular phylogeny (see below). These narrowly defined genera are still accepted almost exclusively in phylogenetic works, whereas taxonomic synopses have been reluctant to accept splitting because early phylogenies were not well resolved (e.g. Rich et al. 2010).

Although the main taxonomic groups of *Sorbus* s.l. were established early and had been constantly recognized at least at the level of subgenus, intermediate (hybridogenous) taxa were most frequently left unclassified to an infragener-

ic category. It was rather recently when these hybridogenous groups were named at the level of subgenus (Májovský & Bernátová 2001; Rich et al. 2014). At the level of genus these groups were named in Mezhensky et al. (2012).

General notes on phylogeny

Phipps et al. (1990) and Robertson et al. (1991) in their comprehensive generic revision of Maloideae (now Malinae) disassembled *Sorbus* s.l. into five smaller genera (*Aria*, *Chamaemespilus*, *Cormus*, *Sorbus*, *Torminalis*) on the basis of morphological differences in habit, leaves, inflorescences, flowers, and fruits. They noted the extensive intergeneric hybridization which affects 24 of 28 genera, which they recognised (including 4 of 5 genera of *Sorbus* s.l.), and "seems to reflect weak overall barriers to hybridization rather than indicate evolutionary relationships". As a result, Robertson et al. (1991: 381) concluded that "it seems best to discount intergeneric hybridization when setting generic limits".

The first phylogenetic study on Maloideae (Malinae), which used ITS markers (Campbell et al. 1995), included representatives of *Sorbus* s. str., *Aria* s.l. (which was actually a species of *Micromeles*), and *Cormus*. *Cormus* was found distant from *Sorbus* + *Aria* on the phylogenetic tree but with very low bootstrap support. The monophyly of *Sorbus* s.l. was not confirmed but the actual phylogenetic relationships were not established. Nevertheless, Campbell et al. (1995) interpreted their pioneering results in favour of the narrow generic concept.

Campbell et al. (2007) produced a more comprehensive phylogenetic analysis, including 31 genera of Pyrinae (Malinae) and representing all groups of *Sorbus* s.l. but *Aria* s. str., based on six chloroplast regions and five nuclear regions. In this work analyses of particular sequences found clades of *Sorbus* s. str. + *Cormus* and *Aria* s.l. + *Chamaemespilus* or *Torminalis*, although such groups were not recovered in all analyses, and an analysis of the combined dataset gave no support for any group within *Sorbus* s.l. The conflicting topologies of phylogenetic trees were explained by the ancient hybridization, e.g. *Chamaemespilus* having arisen from the crosses between *Aria* and *Torminalis*.

In the latest phylogenetic studies (Lo & Donoghue 2012) the summary tree produced from combined plastid data demonstrated a 70–77% level of bootstrap support for the members of the clade including *Sorbus* s.str., *Cormus* and *Pyrus* s.str., whereas *Aria* s. str. (included for the first time in phylogenetic analyses) was found in another clade with *Aronia*. The combined chloroplast and nuclear ITS-based phylogenetic tree in the same work demonstrated (in spite of the low level of support) the sister position of *Torminalis*, *Aria* s.str. and *Chamaemespilus*, on one side, and *Pyrus* s.str., *Cormus* and *Sorbus* s.str., on the other side, with both branches being situated remotely on the tree. Judging from these data, splitting of *Sorbus* s.l. into at least two groups is inevitable, one with simple leaves and the other with pinnate leaves. However, the phylogenetic proximity of members of those groups would have been not close, and the morphology, genetic data and taxonomic traditions indicate that further splitting is desirable. Combining *Sorbus* and *Cormus* in a single genus makes no practical sense because these groups are clearly distinct in morphology and phylogeny. Comparisons of certain gene markers (Campbell et al. 2007) indicate that *Aria* and *Torminalis* are not necessarily closely related; their casual appearance in a single clade may be caused by the intermediate position of *Chamaemespilus* and more recent hybrids between these two genera. Given the level of morphological difference between *Aria* and *Torminalis* and the low level of support for their common relationship (Campbell et al. 2007; Potter et al. 2007), it would be less confusing to accept them as separate genera instead of forming a polymorphic genus including *Aria*, *Torminalis* and *Chamaemespilus*, for which the generic name *Torminalis* would have been suitable.

For all these reasons we prefer keeping acceptance of the five unambiguous groups constituting *Sorbus* s.l., previously treated as subgenera and sometimes as genera, at the rank of genus. To avoid polyphyletic taxa, separate placement of intergeneric hybrids (Nelson-Jones et al. 2002) is also required.

Another generic segregate, of hybrid origin, was confirmed very recently with a more exten-

sive sampling of European and Asian taxa. The phylogenetic position of *Micromeles* Decne., previously included in *Aria* because of a great similarity in the fruit structure (Robertson et al. 1991), was found changing as being sister to *Aria* or sister to *Sorbus* s. str. (Lo & Donoghue 2012). This discovery makes a strong argument for the intergeneric hybrid origin of *Micromeles* and its taxonomic separation from *Aria* as a genus of its own. Other phylogenetic reconstructions did not trace the hybrid origin of *Micromeles* because European members of *Aria* (with the type of this genus) were not included in those studies (Campbell et al. 2007; Li et al. 2012).

History of studies at the species level

The taxonomy of European *Sorbus* s.l. has been studied very unevenly, depending on botanical traditions in certain countries. Below a brief sketch of the modern history of the *Sorbus* studies in Europe is provided in order to show particular advances and deficiencies in inventories of the *Sorbus* diversity of the continent.

Taxonomic studies are most developed and advanced in the Great Britain and Ireland. The works of A. Ley, A. Wilmott, H. Warburg, P. Sell and others were developed and integrated into a monograph of *Sorbus* s.l. in the British Isles with 52 accepted species or species-level hybrids (Rich et al. 2010), to which additions and corrections followed (Rich et al. 2014). Sell & Murrell (2014) provided a review of the genus in Britain. Taxonomic studies in the British Isles are accompanied with thorough studies of the genetic and evolutionary basis of the taxonomically recognized taxa (Robertson et al. 2010); with these studies, a deep understanding of genetic origin of apomictic taxa in some areas in Britain became possible (Nelson-Jones et al. 2002; Chester et al. 2007; Cowan et al. 2008; Robertson et al. 2010; Pellicer et al. 2012; Ludwig et al. 2013).

In Fennoscandia, the diversity of *Sorbus* s.l. is limited to about 15 described species (Mossberg & Stenberg 2003), although there is increasing evidence for morphological and cytological complexity of hybrids between *S. aucuparia* and *S. aria* s.l. in this territory (Bolstad & Salvesen 1999; Levin 2014). Nowadays it is evident that several new apomictic species of this group should be described from Norway, Sweden and Finland (Lid 1994; Grundt & Salvesen 2011; Salvesen 2011; Levin 2014). The nomenclature of some species described from Norway was recently clarified (Sennikov et al. 2016).

In Germany, a century of research by J. Bornmüller, R. Düll, L. Meierott, N. Meyer and H. Schuwerk resulted in a book on *Sorbus* s.l. in Bayern with 35 accepted species or species-level hybrids (Meyer et al. 2005). Descriptions of new, presumably apomictic species continue to appear (Hammel & Haynold 2014, 2015a, 2015b), with occasional nomenclatural corrections (Meyer 2016b). The latest revision of *Sorbus* s.l. in Germany has been very recently published (Meyer 2016a). Further work is in progress (N. Meyer, pers. comm. 2016).

In the Czech Republic and Slovakia, Kovanda (1961, 1962) contributed a taxonomic revision of *Sorbus* s.l. and then added several new apomictic species from these two countries and Austria (e.g. Kovanda 1996a, 1996b). The disadvantage of Kovanda's work was a collective treatment of the *S. aria* group. Recently, M. Lepší, P. Lepší and their co-authors revised several critical cases in the taxonomy of *Sorbus* s.l. in the Czech Republic (Lepší et al. 2008, 2009, 2013a, 2013b; Velebil 2012; Vít et al. 2012) and provided a detailed revision of the most neglected *S. aria* group (Lepší et al. 2015). With these contributions, the diversity of *Sorbus* in the Czech Republic is among the best known in Europe.

In Slovakia, the latest works of Kovanda (1986), Májovský (1992), Májovský & Bernátová (1996), Mikoláš (1997, 2004, 2015), and Bernátová & Májovský (2003) improved the knowledge but so far no satisfactory detailed inventory of *Sorbus* s.l. in the country has been produced. Besides, many species originally published by Kárpáti (1966) with very brief descriptions and on the basis of very few specimens still remain unclarified in spite of the types having been established (Májovský 1992; Németh 2010) and chromosome numbers counted (Májovský & Uhríková 1990).

In Hungary, a country with very strong traditions in dendrology, taxonomic works on *Sorbus* s.l. were started by V. Borbás, S. Jávorka,

R. Sóo and Á. Boros, but the greatest contribution belongs to Z. Kárpáti who described many apomictic species and summarized the taxonomy and distribution of *Sorbus* s.l. in Hungary and adjacent countries (Kárpáti 1960). Sóo (1937) and Kárpáti (1944, 1960) developed the taxonomy of *Sorbus* s.l. based on the concept of extensive interspecific hybridization, the view that receives strong support nowadays. After Kárpáti, dendrological studies in Hungary revealed a few more new species (Barabits 2007). Recently, C. Németh described a number of additional species (Németh 2007, 2009a), contributed to nomenclature (Németh 2010) and provided an illustrated synopsis of the group in Hungary with 46 accepted species (Németh 2009b, 2011). Although the species of *Sorbus* s.l. in Hungary are rather well known, the studies are still on the way and new taxa and critical revisions continue to appear annually (e.g. Somlyay & Sennikov 2014, 2015, 2016a; Németh 2015a, 2015b; Somlyay et al. 2016a, 2016b, 2017; Németh et al. 2016).

In contrast with Hungary, in the neighbouring Romania only an old treatment based on scarce and partly misinterpreted data exists (Buia 1956); recent contributions are negligibly few (Somlyay & Sennikov 2016b). In other countries of Central Europe, the taxonomy of *Sorbus* s.l. is not well developed and only fragmentary contributions appeared (e.g. Jakubowsky & Gutermann 1996).

In southeastern Europe, all national treatments employ a broad species concept in *Sorbus* s.l., possibly with infraspecific forms recognized (e.g. Micevski 1998; Zieliński & Vladimirov 2013). There are a number of species briefly described by Kárpáti (1968) from Slovenia; for these species no original material is available and some of their names are not validly published because of the absence of type designations (Kovanda 1996c). The taxonomic work on Kárpáti's legacy in this country is nearly inactive (Mikoláš 2000).

The recent work of Hajrudinović et al. (2015) indicates that the diversity of hybrids between *S. aria* and *S. aucuparia* is very high and complicated in the Balkan Peninsula. One may expect that this hybrid group, much neglected in Europe, will bring a significant number of novelties and taxonomic re-arrangements in all regions of the continent.

In Italy, species of *Sorbus* s.l. are still little studied but a couple of recent contributions from Sicily exist (Castellano et al. 2012; Raimondo et al. 2012). Only broadly defined species of *Sorbus* s.l. are currently recognized in France and Spain (Jauzein & Nawrot 2013; Aedo & Aldasoro 1998), although a few recent descriptions of presumably apomictic species exist (Cornier 2009) and these are accepted in some works (Tison & Foucault 2014) but not in the others (Jauzein & Nawrot 2013).

The easternmost extension of the Mediterranean flora is harboured by the Crimea, where a few hybridogenous native taxa of *Sorbus* s.l. occur in isolation from the main European distribution of their taxonomic groups (Zaikonnikova 2001). These species still require taxonomic attention, and recent contributions clarified the status of a single species only (Sennikov & Phipps 2013).

Sorbus s. str. (including *S. aucuparia* s.l.) does not include apomictic taxa but a few poorly delimited races were recognized in this group at the level of species (Komarov 1939) or, most commonly, subspecies (Warburg & Kárpáti 1968; Zaikonnikova 2001; Mossberg & Stenberg 2003; McAllister 2005). The latest monograph of this group (McAllister 2005), still accepting subspecies of *S. aucuparia*, does not treat the taxonomy and distribution of this species in Europe in detail.

Europe-wide taxonomic monographs of *Sorbus* s.l. are few. Hedlund (1901) provided a comprehensive revision of rather broadly defined taxa and their hybrids, since narrowly defined apomictic microspecies had not been established by that time. The latest taxonomic overview of *Sorbus* s.l. at the European scale (with 103 taxa accepted) was performed by Warburg & Kárpáti (1968). But this was compilative and did not include a critical revision of extensive material, except for the countries of the authors' personal interest. Aldasoro et al. (2004) published a detailed taxonomic revision of the most critical and diverse groups of *Sorbus* s.l., *S.* subgen. *Aria* and *S.* subgen. *Torminaria*, but this treatment was significantly flawed because of a very broad species concept under which morphologically similar forms are merged irrespective of their origin and mode of reproduction (Aldasoro et al. 1998).

The recent checklist of *Sorbus* s.l. in Europe was published by Kurtto (1999). After the publication of this checklist, quite much research has been done in Europe as outlined above, especially in Britain, Germany, the Czech Republic and Hungary. This research will clearly bring many more novelties in the near future because the species inventory of *Sorbus* s.l. in Europe is still far from being complete.

Caryosystematic studies

Chromosome counts were proven to be most valuable in the taxonomy of *Sorbus* s.l. long before the era of molecular phylogenetics because they helped understanding the species' relationships and origins. Knowledge of chromosome numbers was also highly important in refining species' limits because apomictic species were treated as existing at a single ploidy level, primary sexual species (*S. aria*, *S. aucuparia*, *S. torminalis*) were considered to be exclusively diploids, and polyploidy was treated as indicative of hybridization and thus being an evidence for taxonomic separation of hybrid entities from presumed parental taxa (e.g. Pellicer et al. 2012). It was only recently that an occasional autopolyploidisation in *S. torminalis* was presumed from the record of a single triploid tree in Britain (Hamston et al. 2015).

Extensive lists of new counts or reviews of chromosome numbers in *Sorbus* s.l. were provided for Britain (Bailey et al. 2008), Slovakia (Májovský & Uhríková 1990), and Germany (mostly without precise identification: Hammel et al. 2015). Modern taxonomic studies (e.g. Rich et al. 2010) and descriptions of new species (e.g. Lepší et al. 2008, 2009, 2013a, 2013b, 2015; Cornier 2009; Velebil 2012; Vít et al. 2012; Németh 2015a, 2015b; Somlyay et al. 2016a, 2016b, 2017; Németh et al. 2016) are accompanied with counts of chromosome numbers or DNA ploidy levels based on flow cytometry.

There had been some reports of diploid chromosome numbers in presumably apomictic taxa of *Sorbus* s.l., although typically apomixis in Rosaceae is associated with polyploidy (Campbell & Dickinson 1990). Such counts from Slovakia (Májovský & Uhríková 1990) were considered unreliable on theoretical grounds (see the note by P. Mráz at the bottom of page 555 in Marhold et al. 2007). One more diploid count in an apomixtic species was recently reported from France (Cornier 2009); this count is no longer considered correct (Cornier, pers. comm. 2016).

It was frequently quoted on the basis of one example, *S. eximia* Kovanda with diploid and tetraploid cytotypes reported (Jankun & Kovanda 1988), that apomictic entities of *Sorbus* s.l. may exist at the diploid level. Vít et al. (2012) revisited the populations of this taxon and found it exclusively triploid, thus rejecting the assumption for a unique diploid apomictic taxon in *Sorbus* s.l.

The identification of ploidy level helps delimiting between sexual diploid hybrids, which are not isolated from each other and their parental species and thus do not form stabilized taxonomic entities, and apomictic polyploids which retain their characters in generations, although being capable of further crossing in hybrid complexes. Thus, seven species described from Germany have been recently reduced to the synonymy of *S.* ×*decipiens* (Bechst.) Petz. & G. Kirchn., a diploid hybrid which recurrently originates in co-occurring populations of its parental species, *S. aria* and *S. torminalis* (Meyer et al. 2014).

Species concept in *Sorbus* s.l.

With further understanding of the apomictic origin and evolutionary stability of intermediate (hybridogenous) taxa in *Sorbus*, in 20th century the majority of researchers accepted such taxa at the level of species, i.e. on the same right as the widespread and sexual parental taxa (e.g. Meyer et al. 2005; Rich et al. 2010). Earlier attempts of classification of intermediates as infraspecific taxa within the most similar parental species (e.g. Soó 1937) are no longer followed, with the exception of Aldasoro et al. (1998, 2004) who argued for acceptance of rather few broadly circumscribed and variable species.

In the current understanding, the apomictic species of *Sorbus* s.l. are allopolyploid (triploid or tetraploid) with typically restricted areas, sometimes confined to a single locality in which they had possibly originated. They are either single clones or lineages descending from single clones, thus having very narrow genetic basis. The mor-

phological variability of apomictic species is very limited and is mostly phenotypic (modification).

The sexual species of *Sorbus* s.l. are variable in morphology and include a great diversity of genotypes. Similarly, interspecific hybrids that are diploid (allodiploid) and sexual are treated as a single taxon thus embracing all possible morphotypes of the same origin and at the same ploidy level, as long as there is no evidence of their reproductive isolation. In diploid hybrids between *S. aria* and *S. torminalis*, introgression accounts for continuous gene flow from one species to another, e.g. in Britain from *S. aria* into *S. torminalis* (Price & Rich 2007).

Nomenclature of hybridogenous species

Hybrid taxa are a special challenge not only in taxonomy but also in nomenclature. Since hybridization occurred frequently many times and in many branches of the plant evolutionary tree, being traceable in as high-ranked evolutionary branches as groups of orders (e.g. APG IV 2016), and is one of main modes of plant speciation and evolution (e.g. Rieseberg 1997), it is difficult to determine the difference between casual hybrids and established hybridogenous entities (taxa). Hybridogenous species are regularly treated similarly to other species of presumably non-hybrid origin, whereas casual or recurrently formed hybrids are often sterile or, if fertile, do not form an established taxon with its own evolutionary fate and thus are not equivalent to species (Baker & Bradley 2006).

It has been said that all variants of hybridization between two species should receive a single and the only one name, based on the regulations of Art. H.4.1 (e.g. Zieliński & Vladimirov 2013). While saying so, the researchers failed to observe that this provision applies only to hybrid taxa designated as nothotaxa. The category of nothotaxon is not designed for plants reproducing themselves and having established populations (e.g. Wagner 1984), and treating the latter as nothotaxa is a misuse of the terminology. If hybridogenous taxa are considered evolutionarily established and are not designated as nothotaxa, consequently any number of species-level taxa with the same parentage may be formally recognized and correctly named.

There are several examples in taxonomic treatments of hybrid complexes when interspecific hybrids of the same origin, genetically confirmed, have been recognized as separate taxa (both hybridogenous species and nothospecies) when hybridization led to reproductive isolation and different evolutionary fate of the established taxa. In *Sorbus* s.l., facultatively apomictic offsprings of backcrossing of *Sorbus rupicola* with *S. aucuparia* in Britain were treated as hybridogenous taxa and recognized as *S. arranensis* Hedl. (primary hybrid, *Sorbus rupicola* × *S. aucuparia*, triploid), *S. pseudofennica* E.F. Warb. (secondary hybrid, *S. arranensis* × *S. aucuparia*, tetraploid), and *S. pseudomeinichii* Ashley Robertson (further hybrid, *S. pseudofennica* × *S. aucuparia*, triploid) (Nelson-Jones et al. 2002; Robertson et al. 2004; Robertson & Sydes 2006; Rich et al. 2010). In *Senecio*, the hybrids between *Senecio squalidus* L. and *S. vulgaris* L. were taxonomically recognized as *S.* ×*baxteri* Druce (infertile triploid), *S. eboracensis* R.J. Abbott & A.J. Lowe (fertile tetraploid) and *S. cambrensis* Rosser (fertile hexaploid) (Abbott & Lowe 2004; Hegarty et al. 2006).

Notes on the nomenclature of hybridogenous genera

The nomenclature rules make difference between names of nothotaxa at the rank of genus and between genus and species, and names of similarly ranked taxa that are not designated as nothotaxa. The latter may be of hybrid origin (Art. H.3 Note 2), but also in such cases they need to conform with the rules of valid publication of generic names, whereas for a name of nothogenus a statement of parentage is sufficient in order to make the name validly published (Art. H.9.1).

Májovský & Bernátová (2001) published four names of subgenera that accommodated intersubgeneric hybrids. Three of the four were published with fulfilled conditions for valid publication of subgenera and nothosubgenera, each with the epithet being a condensed formula and accompanied with a statement of parentage, a description in Latin and a type designation. The Code does

not provide for a solution which of the statuses take priority and which of the names was validly published, that of subgenus or of nothogenus. In this case we take into account a statement of intent: Májovský & Bernátová mentioned that they describe "hybridogenous subgenera", which they flagged as "subgen. nov." For this reason we take these names as validly published for subgenera. The fourth of these subgeneric names is also supplied with a description and a type statement but is not a correct condensed formula, being formed with the first part of one subgeneric name contracted and the last part of the other subgeneric name (contrary to Art. H.6.2). It was validly published as the name of a subgenus, too.

Sorbomeles* ×*rikuchuensis (Makino) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus rikuchuensis* Makino in J. Jap. Bot. 6: 7. 1929.

Parentage: *Sorbus commixta* Hedl. × *Micromeles japonica* (Decne.) Koehne

Sorbomeles* ×*kawashiroi (Murata) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus kawashiroi* Murata in Acta Phytotax. Geobot. 35: 36. 1984.

Parentage: *Sorbus commixta* Hedl. × *Micromeles alnifolia* (Sieb. & Zucc.) Koehne

Notes on *Ariosorbus*

The name *Ariosorbus* was validly published for a genus ("gen. nov.") rather than a nothogenus, although presumably of hybrid origin between *Aria* and *Sorbus*. Its protologue includes a description in Latin but no type designation. Neither does it include any statement of parentage (H.3.2), which is a requirement for valid publication of nothogeneric names (Art. H.9.1). Rich et al. (2010) designated the lectotype of this name, again treating it as the name of a genus.

According to the latest phylogenetic results (Lo & Donoghue 2012), the type species of this generic name belongs to hybrids between *Micromeles* and *Sorbus*, not *Aria* and *Sorbus* as the name suggests and as it was used by Mezhensky et al. (2012). Hybrids between various species of *Micromeles* and *Sorbus* are commonly treated as nothotaxa, not as stabilized hybridogenous species (Ohashi et al. 1991). For this reason a new nothogeneric name is required for such intergeneric hybrids (Art. H.8.1).

×***Sorbomeles*** Sennikov & Kurtto, **nothogen. nov.**

Parentage: *Sorbus* L. × *Micromeles* Decne.

= *Ariosorbus* Koidz. in Acta Phytotax. Geobot. 3: 146. 1934, pro gen.

Type: *Ariosorbus uzenensis* Koidz. (designated by Rich et al. (2010: 30)) [= *Sorbus rikuchuensis* Makino; *Sorbus commixta* Hedl. × *Micromeles japonica* (Decne.) Koehne].

Notes on *Azarolus* and *Lazarolus*

The genus *Lazarolus* Medik. was established by Medikus (1789) as including a single species, *Pyrus pollveria* L., which is the only hybrid variant for hybrids between *Pyrus communis* L. and *Sorbus aria* L. (Schneider 1906). This genus was later renamed as *Azarolus* Borkh. and expanded by Borkhausen (1803), who added several species including those of *Sorbus* s.l. and *Crataegus azarolus* L. but also retained the earlier original type of *Azarolus*. Borkhausen's name is consequently superfluous and illegitimate under Art. 52.1.

Such hybrids later received a nothogeneric name, ×*Sorbopyrus* C.K. Schneid. (*Sorbus* × *Pyrus*), under a broad generic concept of *Sorbus*. Under a narrow generic concept, its correct nothogeneric name is ×*Pyraria* A. Chev. (*Pyrus* × *Aria*), with ×*P. irregularis* (Münchh.) C.A. Wimm. (= *Pyrus irregularis* Münchh.) being the only nothospecies included (Wimmer 2014). Its correct synonymy, nomenclature and typification are as follows.

×***Pyraria*** A. Chev. in Rev. Int. Bot. Appl. Agric. Trop. 5: 729. 1925.

Parentage: *Aria* (Pers.) Host × *Pyrus* L.

= *Lazarolus* Medik., Philos. Bot. 1: 155. 1789, pro gen. ≡ *Azarolus* Borkh., Theor. Prakt. Handb. Forstbot. 2: 1224. 1803, nom. illeg. superfl.

Type: *Pyrus pollveria* L.

= *Bollwilleria* Zabel in Mitt. Deutsch. Dendrol. Ges. 16: 76. 1907, pro nothogen., nom. inval. (Art. H.6.1).

Pyraria* ×*irregularis (Münchh.) C.A. Wimm. in Zandera 29: 68. 2014 ≡ *Pyrus* ×*irregularis* Münchh., Hausvater 5: 246. 1770, pro sp.

Described from cultivation (Germany). Type: [icon] *Pirus polwileriana* in Bauhin (1650: 59) (lectotype designated by N. Kilian & C.A. Wimmer in Wimmer (2014: 68)).

≡ *Pyrus* ×*auricularis* K. Koch, Dendrol.: 219. 1869, nom. illeg. superfl. ≡ *Sorbopyrus* ×*auricularis* [K. Koch] C.K. Schneid., Ill. Handb. Laubholzk. 1: 666. 1906, nom. illeg. superfl. ≡ *Bollwilleria* ×*auricularis* [K. Koch] Zabel in Mitt. Deutsch. Dendrol. Ges. 16: 76. 1907, nom. inval. (Art. 35.1) ≡ *Pyraria* ×*auricularis* [K. Koch] A. Chev. in Rev. Int. Bot. Appl. Agric. Trop. 5: 730. 1925, nom. illeg. superfl.

Type: same as for *Pyrus* ×*irregularis* Münchh.

= *Pyrus pollveria* L., Mant. Pl. Alt.: 244. 1771 ≡ *Lazarolus pollveria* (L.) Medik., Gesch. Bot.: 81. 1793 ≡ *Pyrus tomentosa* Moench, Meth.: 680. 1794, nom. illeg. superfl. ≡ *Lazarolus pollvilleriana* Borkh. in Arch. Bot. 1: 88. 1798, nom. illeg. superfl. ≡ *Azarolus pollvilleriana* Borkh., Theor. Prakt. Handb. Forstbot. 2: 1251. 1803, nom. illeg. superfl. ≡ *Pyrus bollwylleriana* DC. in Lamarck, Fl. Franc. (ed. 3) 6: 530. 1815, nom. illeg. superfl. ≡ *Sorbus bollwilleriana* [DC.] Beissn. et al., Handb. Laubholz-Benennung: 197. 1903, nom. illeg. superfl. ≡ *Sorbopyrus* ×*bollwilleriana* [DC.] P. Fourn., Quatre Fl. France: 518. 1936, nom. illeg. superfl.

Described from cultivation (Germany). Type: O.F. von Münchhausen in Herb. Linn. 647: 2 (LINN, lectotype **designated here**). Superseded lectotype: [icon] *Pirus polwileriana* in Bauhin (1650: 59) (designated by Aldasoro & Aedo in Cafferty & Jarvis (2002: 543)). Superseded epitype: Cultivated material, Jardin des Plantes, Paris, 4–8 Apr. 1815, Herb. J. Gay (K) (designated by Aldasoro & Aedo in Cafferty & Jarvis (2002: 543)).

Notes on nomenclature. — Aldasoro & Aedo (in Cafferty & Jarvis 2002) designated an illustration of ”Pirus polwileriana” in Bauhin (1650: 59) as the lectotype of *Pyrus pollveria* L. Although this illustration can be found via a reference to Bauhin (1650) included in the protologue of *P. pollveria* (Linnaeus 1771) and thus may be treated as part of the original material of this name, Linnaeus also explicitly referred to a specimen which he received from O. von Münchhausen. This specimen is still in existence in the Linnaean collection at LINN and should be selected as the lectotype of this name because cited specimens are syntypes which take precedence over illustrations (Art. 9.12).

Notes on the nomenclature used in Hedlund (1901)

The nomenclature of Hedlund (1901) has been treated controversially. Some authors accepted all the binomials published in this work as names at the rank of species (e.g. Hylander 1945; Rich & al. 2006, 2010), whereas some others (e.g. Kovanda 1997a; Kurtto 2009) reported that Hedlund’s nomenclature was not uniform and some of his names were actually accepted at the rank of subspecies. Our examination of Hedlund (1901) has shown that Kovanda (1997) was correct.

Hedlund (1901) provided an elaborated theoretical background for his monographic revision of *Sorbus* in the world, stating that his concept is based on the principles laid down by Wettstein (1898). In this taxonomic concept, species as a taxonomic entity was treated as a system of subordinated taxa in the same manner as genera included species (Hedlund 1901: 11). Species may include ”races” (Sippen) which have their own distribution areas in nature (Hedlund 1901: 5), thus differing from varieties and other forms of infraspecific variability (”Spielform oder Lusus”, ”Varietät”, ”Abart”, etc.) which are either non-inheritable modifications or morphologically deviating individuals of the same race (Hedlund 1901: 5). A species may contain one or more races, in the same way as a genus may contain one or more species (Hedlund 1901: 11). Races were considered primary entities of classification by Hedlund (1901: 6): ”Das Studium der einzelnen Sippen bildet die Grundlage der Systematik einer Pflanzengruppe” – and it was races, not species, that were numbered in the taxonomic synopsis of Hedlund’s monograph.

Races (Sippen) and even varieties of Hedlund’s system appear consistently as binomials in

his text. In spite of the use of binomial combinations, Hedlund (1901: 11, 121) explained that the races should be ranked as subspecies ("Die einzelnen Sippen einer Species werden Subspecies genannt"), and he used the term subspecies in respect of such taxa e.g. in some lists (l.c.: 134). Although Hedlund made no distinction between species and subspecies names in the typeset (Hedlund 1901: 12) and otherwise in discussions, his subordination of particular races to the "collective" species make it clear that such subordinated taxa are intended to be subspecies. Hedlund used the same style of citations of plant names also in subsequent publications, e.g. in Hedlund (1907).

Hedlund's subspecies names were listed as accepted species names in Prain (1908), who therefore validly published the species combinations because of his technical misunderstanding of the structure and taxonomy of Hedlund's monograph.

The personal *Sorbus* collection of Hedlund is kept at UPS and contains most of original material of Hedlund's *Sorbus* names, along with the main collections of UPS which he used. The tricky nomenclature of Hedlund's *Sorbus* was subject of separate contributions (Wilmott 1939; Rich et al. 2006; Sennikov et al. 2016).

Notes on the nomenclature in Kárpáti (1968)

Kárpáti (1968) published a number of new taxa from Slovenia, with validating descriptions in Latin but without type designations. However, Kárpáti indicated specimens via citations of localities, dates and persons who participated in excursions; Kárpáti (1968: 17) also mentioned in the text that specimens ("Belege") were actually collected ("eingesammelt wurden"). In those cases when it was a single specimen indicated, names of new taxa have been validly published by Kárpáti (Art. 40.3).

Taxonomic synopsis of *Sorbus* s.l. in Europe

In this synopsis, we provide a generic arrangement of all the species of *Sorbus* s.l. described or reported from Europe, according to the latest phylogenetic studies and morphological characters. Within genera, species are organised according to their distribution areas. No descriptions are provided for species; the descriptions of genera are abbreviated and based on Aldasoro et al. (2004), Meyer et al. (2005), McAllister (2005) and Rich et al. (2010, 2014). A list of synonyms is provided for each taxon, with most of the names at the level of subspecies and above; little attention is paid to varieties and formae. References to the *International Code of Nomenclature for algae, fungi and plants* (ICN) are provided according to its Melbourne edition (McNeill *et al*. 2012). References to protologues are strictly according to the ICN. Type citations are provided for every name; when a type has not been designated or traced, relevant portions of protologues are quoted. Chromosome counts are cited from the most recent sources; a more complete list with older references can be found in the forthcoming volume of *Atlas Florae Europaeae*. Species distributions are indicated according to countries. Notes on nomenclature and synonymy are supplied when necessary.

***Sorbus* L.**

Sorbus L., Sp. Pl.: 477. 1753, nom. cons. prop. ≡ *Pyrus* sect. *Sorbus* (L.) DC., Prodr. 2: 636. 1825 ≡ *Pyrus* subgen. *Sorbus* (L.) Reichenb., Consp. Regni Veg. 1: 168. 1828.

Type: *Sorbus aucuparia* L., typ. cons. prop.

= *Aucuparia* Medik., Gesch. Bot.: 86. 1793 ≡ *Sorbus* sect. *Aucuparia* (Medik.) Fritsch in Oesterr. Bot. Z. 48: 167. 1898 ≡ *Sorbus* subgen. *Aucuparia* (Medik.) Düll in Ber. Bayer. Bot. Ges. 34: 23. 1961.

Type: *Aucuparia silvestris* Medik. ≡ *Sorbus aucuparia* L. [the only species included]

Description. — Trees or shrubs. Leaves pinnate, whitish-tomentose or glabrous underneath with 7–20 pairs of leaflets, the leaflets attenuate, acute

to obtuse with a various number of teeth. Petals white to pink to crimson. Styles (2)3–5. Fruit small to big, orange-red or crimson or yellow to white, without lenticels.

Species number. — In Europe only one species with 4 subspecies is recognized.

Notes on nomenclature. — The generic name *Aucuparia* was first published by Medikus (1789: 138) as ”Aucuparia. *Rivin*.” without any descriptive matter. The mention of ”Rivin.” may constitute an indirect reference to the entry of ”Aucuparia rivini” in Ruppius (1726) in which no description of the genus appears. Medikus (1793) is the earliest instance where conditions for valid publication of this generic name were fulfilled.

The generic name *Sorbus* L. was proposed for conservation (Sennikov 2014) because the earliest effective type designation (Pfeiffer 1874: 1200) was *S. domestica* L.

The combination *Sorbus* sect. *Aucuparia* was sometimes credited to Koch (1869: 188) who ranked it as ”Gruppe”.

1.

Sorbus aucuparia L., Sp. Pl.: 477. 1753 ≡ *Mespilus aucuparia* (L.) Scop., Fl. Carniol., ed. 2, 1: 346. 1771 ≡ *Pyrus aucuparia* (L.) Gaertn., Fruct. Sem. Pl. 2(1): 45, t. 87. 1790 ≡ *Aucuparia silvestris* Medik., Gesch. Bot.: 86. 1793 ≡ *Crataegus aucuparia* (L.) Salisb., Prodr. Stirp. Chap. Allerton: 357. 1796 ≡ *Pyrenia aucuparia* (L.) Clairv., Man. Herb. Suisse: 162. 1811 ≡ *Aucuparia pinnata* Fourr. in Ann. Soc. Linn. Lyon, n.s., 16: 378. 1868, nom. illeg. superfl.

Type: Herb. Linnaeus 644.1 (LINN!, lectotype designated by Sennikov (2016: 364)). Previously designated type superseded under Art. 9.19(a): *Sorbus* 1, sheet A, Herb. Clifford: 188 (BM000628622!, neotype designated by Düll in Jarvis & al. (1993: 89), as ”lectotype”).

Distribution. — All Europe, except for high Arctic and parts of the extreme south. The total distribution covers also North Africa (mountains of Morocco), the Caucasus, Turkey and Asia Minor, and Northern Asia up to the border with Central Asia and China.

Ploidy level. — Mostly diploid, 2n=34 (Sorsa 1962; Löve & Löve 1982; Uotila & Pellinen 1985; Semerenko 1990; Al-Bermani et al. 1993; Aldasoro et al. 1998; Bolstad & Salvesen 1999; Goranova et al. 2006; Petrova et al. 2006; Pellicer et al. 2012); rarely aneuploid, 2n=30 (López Pacheco et al. 2002) and 2n=33 (Bolstad & Salvesen 1999).

1a.

Sorbus aucuparia subsp. ***aucuparia***

= *Sorbus lanuginosa* Kit. in Schultes, Österr. Fl. 2: 50. 1814; Kit. in Kanitz, Linnaea 32: 584. 1863, isonym ≡ *Pyrus lanuginosa* (Kit.) DC., Prodr. 2: 637. 1825 ≡ *Sorbus domestica* var. *lanuginosa* (Kit.) Maly, Enum. Pl. Phan. Austriac.: 333. 1848 ≡ *Sorbus aucuparia* var. *lanuginosa* (Kit.) Schur in Verh. Naturf. Vereins Brünn 15(2): 200. 1877 ≡ *Sorbus aucuparia* subsp. *lanuginosa* (Kit.) Fritsch in Oesterr. Bot. Z. 48: 170. 1898.

Type: Hungary. Budapest: ”In Auwinkel [Zugliget] Budae”, *Kitaibel* [Herb. Kitaibel XIV: 187] (BP!, lectotype designated by Velebil & Businský (2016: 357)).

= *Sorbus subserrata* Opiz in Flora 7(Beil. 1): 83. 1824 ≡ *Sorbus aucuparia* f. *subserrata* (Opiz) Beck, Fl. Nieder-Österreich 2(1): 713. 1892.

Described from the Czech Republic (”bei Woleschna [Olešná nad Vltavou?]”). Type not designated.

= *Sorbus cordata* Gand., Fl. Lyon.: 88. 1875.

Described from France (”bois de Talencé, à Arnas (Rhône)”). Type not designated.

= *Sorbus monticola* Gand., Fl. Lyon.: 88. 1875.

Described from France (”bois à la Grande-Chartreuse”). Type not designated.

= *Sorbus vasconica* Gand., Herb. Pyr.: 68. 1884.

Described from France (”Basses-Pyrénées, Corbères: dans les bois”). Type not designated.

= *Sorbus aucuparia* var. *edulis* Dieck, Nachtr. 1. Haupt.-Verz. Zöschen: 26. 1887 (n.v.).

Described from cultivation (Arboretum in Zöschen, now Leuna, Germany), originally from the Czech Republic (Moravia). Type not designated.

= *Sorbus aucuparia* var. *dulcis* Kraetzl, Süsse Eberesche: 11. 1890 ≡ *Pyrus aucuparia* var. *dulcis* (Kraetzl) Asch. & Graebn., Syn. Mitteleur. Fl. 6(2, 1): 87. 1906.

Described from cultivation, originally from the Czech Republic (Olomouc Region: ”Gemeinde Spornhau [munici-

pality Ostružná] und Gemeinde Peterswald [Petříkov, now also belonging to municipality Ostružná]"). Type not designated.

= *Sorbus aucuparia* var. *moravica* Dippel, Handb. Laubhk. 3: 367. 1893.

Described from cultivation, originally from the Czech Republic (Moravia). Type not designated.

= *Sorbus aucuparia* var. *rossica* Späth ex Koehne in Gartenfl. 50: 412. 1901.

Described from cultivation ("Russland"). Type not designated.

= *Sorbus aucuparia* subsp. *fenenkiana* T. Georgiev & Stoj. in Izv. Bulg. Bot. Druzh. 5: 101. 1932 ≡ *Pyrus aucuparia* subsp. *fenenkiana* (T. Georgiev & Stoj.) T. Georgiev & Stoj. in Stojanov & Stefanoff, Fl. Bulg., ed. 2: 516. 1933.

Described from Bulgaria ("auf felsigen Bachufern in der Schlucht von Bistrica des Rila-Gebirges, im Bezirke von Gorna-Džumaja, zwischen 900 und 1100 m. Meereshöhe"). Type not traced.

Distribution. — Same as of *Sorbus aucuparia* s.l.

Ploidy level. — Diploid, 2n=34 (Uotila & Pellinen 1985; Májovský & Uhríková 1990; Měsíček & Javůrková-Jarolímová 1992; Marhold et al. 2007; Bailey et al. 2008), with aneuploidy, 2n=33 (Bolstad & Salvesen 1999).

Notes on nomenclature. — *Sorbus aucuparia* var. *moravica* Dippel was described as the same taxon as *S. aucuparia* var. *dulcis* Kraetzl, with the latter name in synonymy. Yet the later name is not nomenclaturally superfluous because Dippel (1893) made no reference to Kraetzl (1890), citing the authority of *S. aucuparia* var. *moravica* as "hort." In its turn, *S. aucuparia* var. *dulcis* is a later synonym of *S. aucuparia* var. *edulis*, to which no reference has been provided in the protologue of the first name.

Notes on taxonomy. — The subspecies is extremely variable in respect of the size, shape, dentation and pubescence of its leaflets. Many infraspecific taxa has been recognized in the past (e.g. Brenner 1907), which hardly merit recognition because of the abundance of combinations of different states of those characters. Of these infraspecific taxa, *Sorbus aucuparia* subsp. *fenenkiana* T. Georgiev & Stoj. was recognized in *Flora Europaea* (Warburg & Kárpáti 1968) but is not accepted here.

1b.

Sorbus aucuparia subsp. ***glabrata*** (Wimm. & Grab.) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 45. 1901 ≡ *Pyrus aucuparia* var. *glabrata* Wimm. & Grab., Fl. Siles. 2(1): 21. 1829 ≡ *Sorbus aucuparia* var. *glabrata* (Wimm. & Grab.) Wenzig in Linnaea 38: 71. 1874 ≡ *Pyrus aucuparia* subsp. *glabrata* (Wimm. & Grab.) Cajander, Suomen Kasvio, ed. 5: 360. 1906 ≡ *Sorbus glabrata* (Wimm. & Grab.) Prain, Index Kew. Suppl. 3: 168. 1908, non G. Kirchn. in Wochenschr. Gärtnerei Pflanzenk. 2(48): 382. 1859.

Described from Poland ("am kleinen Teich [Mały Staw] im Riesengebirge [Krkonoše mountains]" and the Czech Republic ("am Altvater [Hrubý Jeseník] im Gesenke [Ostsudeten = Jeseníky]"). Type not designated.

= *Sorbus aucuparia* var. *alpestris* Wimm., Fl. Schles: 127. 1840.

Described from Poland and the Czech Republic ("am kl. Teiche [Mały Staw], im Elbgrunde [Labský důl], im Riesengeb. [Krkonoše mountains], am Altvater [Hrubý Jeseník] und im Kessel [Glatzer Kessel = Kłodzko Valley] im Gesenke [Ostsudeten = Jeseníky]"). Type not designated.

= *Sorbus aucuparia* var. *alpina* Blytt in Nyt Mag. Naturvidensk. 16: 254. 1869.

Described from Norway ("paa Fjeldene, saasom i Helgedalen ved Horungerne"). Type not designated.

= *Sorbus aucuparia* subsp. *sibirica* Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 44. 1901; McAll., Gen. Sorbus: 236. 2005, isonym ≡ *Sorbus sibirica* (Hedl.) Prain, Index Kew. Suppl. 3: 168. 1908.

Described from Russia (Siberia: Yenisei River). Type not designated.

= *Sorbus polaris* Koehne in Feddes Repert. 10: 502. 1912.

Described from Russia (Yamal-Nenets Autonomous District): "Westsibirien: An der Schtschutschja (nahe der Obmündung nördlich vom Polarkreise), 21.06.1876, Graf Waldburg-Zeil 35". Type not located.

= *Sorbus gorodkovii* Pojark. in Pojarkova, Fl. Murmansk. Oblasti 5: 534. 1966, nom. inval. (Art. 39.1, 40.1) ≡ *Sorbus aucuparia* subsp. *gorodkovii* [Pojark.] Korovina in Byull. Vsesoyuzn. Inst. Rasteniev. 81: 37. 1978, nom. inval. (Art. 41.1).

Distribution. — Mountains and subarctic areas

within the distribution area of *Sorbus aucuparia* subsp. *aucuparia*.

Ploidy level. — Diploid, 2n=34 (Májovský et al. 1978; Zaikonnikova 1982; Májovský & Uhríková 1990; Marhold et al. 2007: 556).

Notes on nomenclature. — Although Wimmer (1840) published *Sorbus aucuparia* var. *alpestris* as a superfluous name, replacing the previous *Pyrus aucuparia* var. *glabrata*, the new name was not illegitimate because he provided no reference, even cryptic, to the earlier name.

When published the name *Sorbus gorodkovii*, Pojarkova (1966) made a full and direct reference to the intended replaced synonym *S. glabrata* (Wimm. & Grab.) Hedl. but explicitly excluded its type (Art. 41.7, Note 3) by indicating that the species circumscription is restricted to the plants of Fennoscandia, whereas the type material of *S. glabrata* is Central European plants. As Pojarkova provided neither a Latin description nor a type citation, *S. gorodkovii* was not validly published.

1c.

Sorbus aucuparia subsp. ***maderensis*** (Lowe) McAll., Gen. Sorbus: 236. 2005 ≡ *Sorbus aucuparia* var. *maderensis* Lowe, Man. Fl. Madeira 1: 259. 1868 ≡ *Sorbus maderensis* (Lowe) Dode in Bull. Soc. Dendrol. France 1907: 206. 1907.

Described from the Madeira, Portugal (syntypes cited). Type not designated.

Distribution. — Portugal (Madeira).

1d.

Sorbus aucuparia subsp. ***praemorsa*** (Guss.) Nyman, Consp. Fl. Eur. 2: 241. 1879 ≡ *Pyrus praemorsa* Guss., Fl. Sicul. Prodr. 1: 571. 1827 ≡ *Sorbus praemorsa* (Guss.) K. Koch, Hort. Dendrol.: 178. 1853 ≡ *Sorbus aucuparia* var. *praemorsa* (Guss.) Ces. et al., Comp. Fl. Ital. 2(28): 654. 1881 ≡ *Pyrus aucuparia* subsp. *praemorsa* (Guss.) Arcang., Comp. Fl. Ital.: 233. 1882 ≡ *Pyrus aucuparia* f. *praemorsa* (Guss.) Fiori, Fl. Italia 1(2): 601. 1898.

Described from Italy ("in sylvis montosis; Madonie nel bosco sopra il Passo del Canale, bosco di Caronia"). Type not designated.

Distribution. — Italy and neighbouring islands.

Aria (Pers.) Host

Aria (Pers.) Host, Fl. Austriac. 2: 7. 1831 ≡ *Sorbus* subgen. *Aria* Pers., Syn. Pl. 2: 38. 1806 ≡ *Pyrus* sect. *Aria* (Pers.) DC., Prodr. 2: 635. 1825 ≡ *Sorbus* sect. *Aria* (Pers.) Dumort., Fl. Belg.: 93. 1827.

Type: *Crataegus aria* L. (Art. 22.6).

Description. — Trees or shrubs. Leaves simple, variably whitish-tomentose underneath, with 9–20 pairs of lateral veins, entire or basally with a few indistinct lobes, subacute to obtuse with a various number of teeth. Petals white to yellowish. Styles 2–3. Fruit rather big, red or crimson or orange, with few to scattered small to medium-sized lenticels.

Species number. — One sexual diploid species and 51 apomictic species with one hybrid are currently recognized in Europe.

Primary diploid species

1.

Aria edulis (Willd.) M. Roem., Fam. Nat. Syn. Monogr. 3: 124. 1847 ≡ *Pyrus edulis* Willd., Enum. Pl. Hort. Berol. 1: 527. 1809 ≡ *Sorbus edulis* (Willd.) K. Koch, Hort. Dendrol.: 176. 1853 ≡ *Sorbus aria* var. *edulis* (Willd.) Wenzig in Linnaea 38: 54. 1874 ≡ *Hahnia aria* var. *edulis* (Willd.) Dippel, Handb. Laubholzk. 3: 375. 1893 ≡ *Sorbus aria* f. *edulis* (Willd.) Jáv., Magyar Fl. [2]: 481. 1924.

Type: France (but described from cultivation in Germany). "In Gallia australi; Hort. Bot. Berol.", Herb. Willdenow (B-W09688-01, holotype).

= *Crataegus aria* L., Sp. Pl.: 475. 1753 ≡ *Sorbus aria* (L.) Crantz, Stirp. Austr. Fasc. 2: 46. 1763 ≡ *Pyrus aria* (L.) Ehrh. in Hirschfeld, Gartenkalender 4: 195. 1784 ≡ *Hahnia aria* (L.) Medik., Gesch. Bot.: 81. 1793 ≡ *Crataegus pallida* Salisb., Prodr. Stirp. Chap. Allerton: 357. 1796, nom. illeg. superfl. ≡ *Lazarolus aria* (L.) Borkh. in Arch. Bot. 1(3): 88. 1798 ≡ *Azarolus aria* (L.) Borkh., Theor. Prakt. Handb. Forstbot. 2: 1229. 1803 ≡ *Pyrenia aria* (L.) Clairv., Man.

Herb. Suisse: 162. 1811 ≡ *Crataegus alpina* Gray, Nat. Arr. Brit. Pl. 2: 564. 1821, nom. illeg. superfl., non Mill. 1768 ≡ *Malus aria* (L.) Risso, Hist. Nat. Prod. Eur. Mérid. 2: 425. 1826 ≡ *Aria nivea* Host, Fl. Austriac. 2: 8. 1831 ≡ *Aria vulgaris* Decne, Jard. Fruit 1: 125. [1858], nom. illeg. superfl.

Type: *Crataegus* 1, Herb. Clifford 187 (BM000628615, lectotype designated by Aldasoro & al. (2004: 108)). Epitype: Austria. Lower Austria: Hardegg, "pine forest I" on slopes of Dyje valley, ca 180 m SE of bridge over Dyje river, pine forest with *Sesleria*, 390 m a.s.l., scattered, 12.09.2011, *M. Lepší & P. Lepší s. n.* (CB 79814, designated by Lepší et al. (2015: 122–123)).

= *Sorbus aria* var. *longifolia* Pers., Syn. Pl. 2(1): 38. 1806 ≡ *Sorbus aria* subsp. *longifolia* (Pers.) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 82. 1901 ≡ *Sorbus longifolia* (Pers.) Prain, Index Kew. Suppl. 3: 168. 1908 ≡ *Sorbus aria* f. *longifolia* (Pers.) Rehder in J. Arnold Arbor. 26: 474. 1945.

Described without indication of provenance. Type not traced.

= *Pyrus alpina* Willd., Enum. Pl. Hort. Berol. 1: 527. 1809 ≡ *Sorbus alpina* (Willd.) Heynh., Nom. Bot. Hort. 2: 684. 1841 ≡ *Aria alpina* (Willd.) M. Roem., Fam. Nat. Syn. Monogr. 3: 124. 1847.

Described without indication of provenance. Type: Herb. Willdenow (B-W09687-01, holotype).

= *Pyrus aria* var. *acutifolia* DC., Prodr. 2: 636. 1825 ≡ *Pyrus aria* var. *acutifolia* (DC.) Lindl., Trans. Hort. Soc. London 7: 235. 1830 ≡ *Aria nivea* var. *acutifolia* (DC.) M. Roem., Fam. Nat. Syn. Monogr. 3: 124. 1847 ≡ *Sorbus aria* var. *acutifolia* (DC.) Jáv. in Bot. Közlem. 14: 104. 1915.

Described from cultivation without indication of provenance. Type: [France.] Tab. 34 in Duhamel, Traité Arbr. Arbust. 4 (1809) (lectotype **designated here**).

= *Pyrus aria* var. *undulata* Lindl., Trans. Hort. Soc. London 7: 234. 1830 ≡ *Aria nivea* var. *undulata* (Lindl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 126. 1847.

Described from cultivation in London, United Kingdom ("received from Mr. Ronalds of Brentford"). Type not traced.

= *Pyrus aria* var. *angustifolia* Lindl., Trans. Hort. Soc. London 7: 235. 1830 ≡ *Aria nivea* var. *angustifolia* (Lindl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 126. 1847 ≡ *Hahnia aria* var. *angustifolia* (Lindl.) Dippel, Handb. Laubholzk. 3: 375. 1893.

Described from cultivation in Paris, France ("received from M. Godefroy of Ville d'Avray, near Sevres"). Type not traced.

= *Pyrus aria* var. *rugosa* Lindl., Trans. Hort. Soc. London 7: 235. 1830 ≡ *Aria nivea* var. *rugosa* (Lindl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 126. 1847.

Described from cultivation in Hackney, United Kingdom ("received from Messrs. Loddiges"). Type not traced.

= *Pyrus aria* var. *bullata* Lindl., Trans. Hort. Soc. London 7: 236. 1830 ≡ *Aria nivea* var. *bullata* (Lindl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 127. 1847.

Described from cultivation in United Kingdom ("received from Messrs. Backhouse of York"). Type not traced.

= *Sorbus aria* var. *incisa* Mutel, Fl. Franç. 1: 361. 1834 ≡ *Aria nivea* var. *incisa* (Mutel) M. Roem., Fam. Nat. Syn. Monogr. 3: 127. 1847 ≡ *Sorbus aria* subsp. *incisa* (Mutel) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 82. 1901 ≡ *Sorbus incisa* (Mutel) Prain, Index Kew. Suppl. 3: 168. 1908 ≡ *Sorbus aria* f. *incisa* (Mutel) Jáv., Magyar Fl. [2]: 481. 1924.

Described from France (locality not specified). Type not designated.

= *Sorbus aria* var. *carpinifolia* Petz. & G. Kirchn., Arbor. Muscav.: 298. 1864 ≡ *Sorbus aria* subsp. *carpinifolia* (Petz. & G. Kirchn.) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 85. 1901 ≡ *Sorbus carpinifolia* (Petz. & G. Kirchn.) Prain, Index Kew. Suppl. 3: 168. 1908 ≡ *Sorbus aria* f. *carpinifolia* (Petz. & G. Kirchn.) Kovanda in Dendrol. Sborn. 3: 45. 1962.

Described from cultivation (Germany & Poland, Muskau Park). Type not designated.

= *Sorbus acutiloba* Gand., Fl. Lyon.: 89. 1875, non (Irmisch) Petz. & G. Kirchn. 1864.

Described from France ("bois dans le Bugey (Ain)"). Type not designated.

= *Sorbus ararica* Gand., Fl. Lyon.: 89. 1875.

Described from France ("bois à Couzon (Rhône)"). Type not designated.

= *Sorbus arvernensis* Gand., Dec. Pl. Nov. 1: 24. 1875.

Described from France (”in Arverniâ Galliae: Le Cantal (frère Boileau)”). Type not designated.

= *Sorbus bellojocensis* Gand., Fl. Lyon.: 89. 1875.

Described from France (”Montmelas (Rhône), bois sur le pie de Saint-Bonnet”). Type not designated.

= *Sorbus controversa* Gand., Dec. Pl. Nov. 1: 23. 1875.

Described from cultivation (”in Europae centralis silvis nemoribusque; colitur in horto Lugdunensi Galliae”). Type not designated.

= *Sorbus oblonga* Gand., Fl. Lyon.: 89. 1875.

Described from France (”bois des montagnes de Chalier è Liergues (Rhône)”). Type not designated.

= *Sorbus pallidifolia* Gand., Fl. Lyon.: 89. 1875.

Described from France (”bois à Pierre-sur-Haute (Loire)”). Type not designated.

= *Sorbus reverchonii* Gand., Dec. Pl. Nov. 1: 24. 1875.

Described from France (”in alpibus Delphinatus: Le Monestier prope Briançon (Reverchon)”). Type not designated.

= *Sorbus sphaerocarpa* Gand., Fl. Lyon.: 89. 1875.

Described from France (”bois à Couzon (Rhône)”). Type not designated.

= *Sorbus turbinata* Gand., Fl. Lyon.: 89. 1875.

Described from France (”bois à Couzon (Rhône)”). Type not designated.

= *Aria decaisneana* Lavallée, Icon. Sel. Arb. [3]: 61, t. 18. 1881 ≡ *Hahnia aria* var. *majestica* Lavallée ex Dippel, Handb. Haubholzk. 3: 374. 1893 ≡ *Pyrus decaisneana* (Lavallée) Nichols in Kew Hand-List Trees 1: 187. 1894 ≡ *Sorbus aria* var. *majestica* (Lavallée ex Dippel) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 688. 1906 ≡ *Pyrus aria* var. *majestica* (Lavallée ex Dippel) Prain in Curtis, Bot. Mag. 134(4): ad tab. 8184. 1908.

Described from cultivation. Type not designated.

= *Sorbus aria* var. *lanifera* A. Kern. ex Borbás in Földmiv. Erdek. 10: 520. 1882 ≡ *Sorbus aria* subsp. *lanifera* (A. Kern. ex Borbás) Jáv., Magyar Fl. [2]: 481. 1924.

Described from Croatia and Bosnia & Herzegovina (Klek Mt., Vratnik Mt., Visočica Mt.). Type not designated.

= *Sorbus aria* f. *meridionalis* Strobl in Oesterr. Bot. Z. 36: 238. 1886.

Described from Italy (Sicily: ”auf steinigen und felsigen Abhängen der Bergregion (4–5000’) in den Nebroden ziemlich häufig, am Etna aber nur von Raf. und Scud. ohne näheren Standort angegeben und von Giannicola (5232’) durch Philippi bekannt geworden”). Type not designated.

= *Aria nivea* f. *cyclophylla* Beck, Ann. K. K. Naturhist. Hofmus. 11: 47. 1896 ≡ *Sorbus aria* var. *cyclophylla* (Beck) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 688. 1906 ≡ *Sorbus aria* f. *cyclophylla* (Beck) Jáv., Magyar Fl. [2]: 481. 1924 ≡ *Sorbus aria* subsp. *cyclophylla* (Beck) Soó in Acta Geobot. Hung. 1: 220. 1937.

Described from Bosnia and Herzegovina (”in valle Vogosča supra Jasekovice prope Sarajevo (Beck)”). Type not traced.

= *Sorbus aria* subsp. *tomentosa* Rouy & E.G. Camus in Rouy, Fl. France 7: 21. 1901 ≡ *Sorbus tomentosa* (Rouy & E.G. Camus) Issler in Bull. Soc. Dendrol. France 1933: 71. 1933, non Hedl. 1901 ≡ *Sorbus aria* var. *tomentosa* (Rouy & E.G. Camus) P. Fourn., Quatre Fl. Fr.: 517. 1936.

Described from France (”Hautes-Alpes: bois de Devez-de-Rabou (Alph. Faure in herb. Rouy)”. Type not traced.

= *Sorbus aria* (L.) Crantz var. *carpatica* Soó in Tisia 2: 222. 1937 ≡ *Sorbus carpatica* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944, nom. illeg., non Andrz. 1845; Borbás ex C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 688. 1906, nom. nud.

Described from Slovakia and Hungary (several syntypes cited). Type not designated.

= *Sorbus austriaca* subsp. *serpentini* Kárpáti in Feddes Repert. Spec. Nov. Regni Veg. 62: 177. 1960.

Type: Austria. Burgenland: ”Borostyánkő” = Bernstein, *Á. Boros* (BP 702649, holotype).

= *Sorbus huljakii* Kárpáti in Németh, Acta Bot. Hung. 52: 386. 2010, **syn. nov.**; Kárpáti in Feddes Repert. 62: 196. 1960, nom. inval. (Art. 40.1).

Type: Hungary. Mts. Bükk, ”in silvaticis montis Kerekhegy supra pagum Ómassa, alt. ca. 800 m s.m.”, 19.09.1953, *Z.Kárpáti, Z.Baráth & A.Terpó* (BP 704360, holotype; isotype BP 704359).

= *Sorbus budaiana* Kárpáti in Németh, Acta Bot. Hung. 52: 382. 2010, **syn. nov.**; Kárpáti in Feddes Repert. 62: 196. 1960, nom. inval. (Art. 40.1).

Type: Hungary. Mts. Bükk, ”in silvaticis montis Jávorhegy supra pagum Ómassa, alt. ca. 700 m s.m.”, 19.09.1953, *Z.Kárpáti, Z.Baráth & A.Terpó* (BP 698433, holotype; isotypes BP).

Distribution. — Albania, Austria, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Kosovo, Luxembourg, Macedonia, Montenegro, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, United Kingdom; established alien in Denmark, Ireland, Norway, Russia (Kaliningrad region), Sweden, Ukraine. Outside Europe the species occurs in North-West Africa.

Ploidy level. — Diploid, 2n=34 (Warburg 1957; Skalińska et al. 1976; Májovský et al. 1978; Jankun & Kovanda 1988; Jankun 1993; Drušković & Lovka 1995; Aldasoro et al. 1998; Bailey et al. 2008; Houston et al. 2009; Pellicer et al. 2012; Lepší et al. 2015). Tetraploid counts (e.g. Aldasoro et al. 1998) apparently do not belong to this exclusively diploid species.

Notes on nomenclature. — For their infraspecific taxa Petzold & Kirchner (1864) used the rank of variety (”Spielart”). Their references to those infraspecific taxa as ”Formen” in the text is informal usage of this term. The name *Sorbus aria* var. *carpinifolia* was published with a reference to ”Booth. Cat.” that may be a garden catalogue of the Flottbecker Baumschulen bei Altona (now in Hamburg, Germany) which was run as the enterprise ”Booth & Söhne” by members of the Booth family.

The name *Sorbus aria* var. *incisa* is often ascribed to Reichenbach (1832: 628) who, however, accepted and named the taxon but provided no description or diagnosis and only mentioned its similarity with the main variety of the species. This variety was accepted and supplied with a brief description in French by Mutel (1834). As evident from the list of synonyms, Mutel apparently adopted the nomenclature of *S. aria* from Reichenbach (1832) whose book was also cited elsewhere in the text but not directly under *S. aria*.

Notes on taxonomy. — The present circumscription of *Aria edulis* (*Sorbus aria*) is collective. Besides the diploid forms, to which this name should properly apply (e.g. Rich et al. 2010), it apparently includes a number of superficially similar forms of hybrid origin that will be separated when populational observations and chromosome data become available.

The original collection of *S. austriaca* subsp. *serpentini* belongs to the taxon known otherwise as *S. aria* subsp. *cyclophylla*, not to the hybrids between *A. edulis* and *S. aucuparia* as assumed by Kárpáti (1960).

The numerous taxa described by Gandoger (1875a, 1875b) are included in the synonymy without assessment, by tradition. The same holds for the varieties described by earlier authors. The taxonomic identity of these names should be assessed along with their typifications.

The original specimens of *Sorbus budaiana* and *S. huljakii* were collected on the same day from neighbouring hills around the same village. Both specimens represent narrow-leaved forms with *aria*-like leaves having minor incisions on sides and a subacute apex. *Sorbus huljakii* has more obtuse leaves with less expressed incisions, whereas *S. budaiana* has subacute leaves. When we visited the vicinity of Ómassa, numerous individual of *S. aria* were observed, which displayed a great variability in the shape of leaf apices and dentation. For this reason both taxa are provisionally included in *A. edulis* here.

The morphotypes with very sparsely and shallowly incised leaves, which are rather obtuse at the apex, were described as *S. aria* var. *incisa* and later as *S. carpatica*. Such records may refer to more incised forms of *A. edulis* (*S. aria*) s. str., which is diploid and variable, or to similar morphotypes originated from introgression of *S. aucuparia* into *A. edulis* (Rich et al. 2010). These morphotypes are largely unresolved but some recent reports confirm that they are part of the variability of *A. edulis* s.str. (cf. Lepší et al. 2015).

Apomictic taxa, British Isles

2.

Aria leptophylla (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus leptophylla* E.F. Warb. in Watsonia 4: 44. 1957.

Type: United Kingdom. Wales: Lower rocks above Coed Pentwyn, Mynydd Llangattock, v.c. 42 Brecon, 19.09.1933, *A.J. Wilmott 4495* (BM, holotype).

Distribution. — United Kingdom (Wales: Breconshire).

Ploidy level. — Tetraploid, 2n=68 (Warburg 1957; Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012).

3.

Aria arvonicola (P.D. Sell) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus arvonicola* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 522. 2014.

Type: United Kingdom. Wales: Nant Porth Nature Reserve, Bangor, Caernarvonshire, v.c. 49, 01.10.1980, *R. Hattey* (CGE, holotype).

Distribution. — United Kingdom (Wales: Caernarvonshire).

Ploidy level. — Tetraploid, 2n=68 (Sell & Murrell 2014).

4.

Aria stirtoniana (T.G.C. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus stirtoniana* T.G.C. Rich in Watsonia 27: 215. 2009.

Type: United Kingdom. Wales: West Crags, Craig Breidden, Wales, SJ288139, 19.06.2001, *T.C.G. Rich, A. Law, L. Houston, C. Charles & A.C. Tillotson* (NMW, holotype).

Distribution. — United Kingdom (Wales: Montgomeryshire).

Ploidy level. — Tetraploid, 2n=68 (Bailey et al. 2008).

5.

Aria herefordensis (D. Green) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus herefordensis* D. Green in New J. Bot. 4(1): 4. 2014.

Type: United Kingdom. England: Miners Rest, Great Doward, Herefordshire v.c. 36, 155 m, 16.10.2013, *T.C.G. Rich* (NMW V.2013.1.182, holotype; isotype BM).

Distribution. — United Kingdom (England: Herefordshire).

Ploidy level. — Triploid, 2n=51 (Rich et al. 2014).

6.

Aria richii (L. Houston) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus richii* L. Houston in New J. Bot. 4(1): 5. 2014.

Type: United Kingdom. England: Top of cliff above shore by Fisherman's Steps, Kilkenny Bay, Portishead, Somerset (v.c. 6), England, ST4977176798, 15.10.2013, *T.C.G. Rich, L. Houston & C.M. Lovatt* (NMW V.2013.1.186, holotype; isotypes BRISTM, BM).

Distribution. — United Kingdom (England: Somerset).

Ploidy level. — Tetraploid, 2n=68 (Pellicer et al. 2012; Rich et al. 2014).

7.

Aria eminens (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eminens* E.F. Warb. in Watsonia 4: 44. 1957.

Type: United Kingdom. England: Offa's Dyke, Tidenham, v.c. 34, 09.1935, *E.F. Warburg 150* (BM, holotype).

= *Sorbus subeminens* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 522. 2014, **syn. nov.**

Type: United Kingdom. England: Woods on the Wynd Cliff, Monmouthshire, v.c. 35, 29.06.1895, *E.S. Marshall* (CGE, holotype).

Distribution. — United Kingdom (England and Wales).

Ploidy level. — Tetraploid, 2n=68 (Bailey et al. 2008; Houston et al. 2009; Pellicer et al. 2012; Sell & Murrell 2014).

Notes on taxonomy. — Sell's new name is based on a different interpretation of the *Sorbus eminens* holotype (BM) than that of Rich et al. (2009, 2010); the holotype could represent either *S. eminens* E.F. Warb. em. T.C.G. Rich or *S. eminentiformis* T.C.G. Rich. It would be possible to resolve this by analysis of its chloroplast type (cf. Chester et al. 2007); the limited existing chloroplast data of trees from the type locality at Tidenham (but not necessarily of the type specimen/type tree whose location is unknown) currently support Rich's interpretation (T.C.G. Rich, pers. comm. 2016).

8.

Aria* ×*robertsonii (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus* ×*robertsonii* T.C.G. Rich in Watsonia 27: 370. 2009.

Type: United Kingdom. England: Great Fault, Avon Gorge, Bristol, v.c. 34 West Gloucestershire, ST564733, 19.09.2007, *T.C.G. Rich & L. Houston* (NMW, holotype; isotypes BM, CGE, OXF).

Distribution. — United Kingdom (England: Gloucestershire).

Ploidy level. — Triploid, 2n=51 (Pellicer et al. 2012).

Taxonomic note. — This taxon is considered to be a hybrid between *A. edulis* and *A. eminens*. It has not formed established populations (Rich et al. 2010) and consequently has not been mapped for *Atlas Florae Europaeae*.

9.

Aria eminentiformis (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eminentiformis* T.C.G. Rich in Watsonia 27: 210. 2009.

Type: United Kingdom. England: Coppiced tree in woodland, Seven Sisters, Great Doward, v.c. 36 Herefordshire, SO546153, 23.09.2002, *T.C.G. Rich* (NMW, holotype).

Distribution. — United Kingdom (Wye Valley in England and Wales).

Ploidy level. — Tetraploid, 2n=68 (Rich et al. 2010; Pellicer et al. 2012).

10.

Aria eminentoides (L. Houston) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eminentoides* L. Houston in Watsonia 27: 290. 2009.

Type: United Kingdom. England: Cheddar Gorge, v.c. 6 North Somerset, ST466539, 19.09.2007, *T.C.G. Rich & L. Houston 261* (NMW, holotype; isotypes BM, CGE, E, OXF).

Distribution. — United Kingdom (England: Somerset).

Ploidy level. — Tetraploid, 2n=68 (Houston et al. 2009; Rich et al. 2010; Pellicer et al. 2012).

11.

Aria hibernica (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus hibernica* E.F. Warb. in Watsonia 4: 44. 1957.

Type: Ireland. Ballynahinch near Recess, v.c. H16 West Galway, 26.09.1938, *E.F. Warburg 247* (BM, holotype).

Distribution. — Ireland, United Kingdom (Northern Ireland).

Ploidy level. — Triploid, 2n=51 (Bailey et al. 2008).

12.

Aria lancastriensis (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus lancastriensis* E.F. Warb. in Watsonia 4: 45. 1957.

Type: United Kingdom. England: Humphrey Head, v.c. 69 Westmorland, 09.1937, *E.F. Warburg 234* (BM, holotype).

Distribution. — United Kingdom (England: Lancashire and Westmorland).

Ploidy level. — Tetraploid, 2n=68 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012).

13.

Aria porrigentiformis (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus porrigentiformis* E.F. Warb. in Watsonia 4: 45. 1957.

Type: United Kingdom. England: Offa's Dyke, Tidenham, v.c. 34 West Gloucestershire, 18.09.1933, *A.J. Wilmott 4484* (BM, holotype).

= *Sorbus humphreyana* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 522. 2014, **syn. nov.**

Type: United Kingdom. England: Cultivated on the Ecological Mound, University Botanic Garden, Cambridge, v.c. 29, 52/435572, 04.09.2002, *P.D. Sell 02/158a* (CGE, holotype). Origin: Seed collected from a tree on cliffs between Babbacombe and Oddicombe, S. Devon, v.c. 3, 09.09.1953.

Distribution. — United Kingdom (England, Wales).

Ploidy level. — Tetraploid, 2n=68 (Proctor & Groenhof 1992; Bailey et al. 2008; Pellicer et al. 2012; Rich et al. 2014). Earlier triploid counts may not belong to this species (Bailey et al. 2008). Its pentaploid counts also belong to different taxa (Pellicer et al. 2012).

Taxonomic note. — S*orbus humphreyana* is not morphologically separated from the other populations of this species (T.C.G. Rich, pers. comm. 2016).

14.

Aria avonensis (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus avonensis* T.C.G. Rich in Watsonia 27: 370. 2009.

Type: United Kingdom. England: England: St. Vincent's Rocks South, Avon Gorge, v.c. 34 West Gloucestershire, 19.09.2007, *T.C.G. Rich & L. Houston* (NMW, holotype; isotypes BM, CGE).

Distribution. — United Kingdom (Avon Gorge in England and Wales).

Ploidy level. — Triploid, 2n=51 (Pellicer et al. 2012).

Taxonomic note. — This taxon was considered a hybrid by Rich et al. (2010) and Pellicer et al. (2012), without established populations. Since then, more individuals of the same taxon were discovered, and the taxon is considered a species now (Rich, pers. comm. 2016).

15.

Aria cheddarensis (L. Houston & Ashley Robertson) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cheddarensis* L. Houston & Ashley Robertson in Watsonia 27(4): 288. 2009.

Type: United Kingdom. England: Cheddar Gorge, v.c. 6 North Somerset, ST472544, 19.09.2007, *T.C.G. Rich & L. Houston* (NMW, holotype).

Distribution. — United Kingdom (England: Cheddar Gorge in Somerset).

Ploidy level. — Triploid, 2n=51 (Houston et al. 2009; Rich et al. 2010; Pellicer et al. 2012).

16.

Aria leighensis (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus leighensis* T.C.G. Rich in Watsonia 27: 370. 2009.

Type: United Kingdom. England: Quarry 4, Leigh Woods, v.c. 6 North Somerset, ST561739, 19.09.2007, *T.C.G. Rich & L. Houston* (NMW, holotype; isotypes BM, CGE).

Distribution. — United Kingdom (England: Avon Gorge in North Somerset).

Ploidy level. — Triploid, 2n=51 (Rich et al. 2010; Pellicer et al. 2012).

17.

Aria evansii (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus evansii* T.C.G. Rich in New J. Bot. 4(1): 2. 2014.

Type: United Kingdom. England: Carboniferous Limestone outcrop, Seven Sisters, Great Doward, Herefordshire (v.c. 36), SO5470215312, 100 m, 16.10.2013, *T.C.G. Rich* (NMW V.2013.1.185, holotype).

Distribution. — United Kingdom (England: Herefordshire and Gloucestershire).

Ploidy level. — Triploid, 2n=51 (Pellicer et al. 2012, as *S. porrigentiformis* 'Symonds Yat clone'; Rich et al. 2014).

18.

Aria saxicola (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus saxicola* T.C.G. Rich in Watsonia 27: 307. 2009.

Type: United Kingdom. England: Hollow Rock, Symonds Yat, v.c. 34 West Gloucestershire, 21.05.2004, *T.C.G. Rich* (NMW, holotype).

Distribution. — United Kingdom (England: lower Wye Valley).

Ploidy level. — Triploid, 2n=51 (Pellicer et al. 2012).

19.

Aria whiteana (T.C.G. Rich & L. Houston) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus whiteana* T.C.G. Rich & L. Houston in Watsonia 26: 2. 2006.

Type: United Kingdom. England: Quarry 3, Leigh Woods, v.c. 6 North Somerset, 21.08.2002, *T.C.G. Rich & L. Houston* (NMW, holotype; isotype BM).

Distribution. — United Kingdom (Avon Gorge and Wye Valley in England and Wales).

Ploidy level. — Triploid, 2n=51 (Rich & Houston 2006; Bailey et al. 2008; Pellicer et al. 2012).

20.

Aria wilmottiana (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus wilmottiana* E.F. Warb. in Watsonia 6: 296. 1967.

Type: United Kingdom. England: Clifton, edge of the greensward at the top of the Avon Gorge cliffs, 04.10.1958, *R.A. Graham, R.M. Harley, D.H. Lewis & E.F. Warburg 5841 B* (OXF, holotype; isotypes K, RNG).

Distribution. — United Kingdom (England: Avon Gorge in Somerset and Gloucestershire).

Ploidy level. — Triploid, 2n=51 (Nelson-Jones et al. 2002; Bailey et al. 2008).

21.

Aria spectans (L. Houston) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus spectans* L. Houston in New J. Bot. 4(1): 2. 2014.

Type: United Kingdom. England: Edge of cliffs overlooking Avon Gorge, tree no. 22 of Observatory clone, Observatory, Clifton, Bristol, ST565732, 15.10.2013, *L. Houston & T.C.G. Rich* (NMW V.2013.1.184, holotype; isotype BM).

Distribution. — United Kingdom (England: Avon Gorge in Bristol).

Ploidy level. — Triploid, 2n=51 (Pellicer et al. 2012; Rich et al. 2014).

22.

Aria cambrensis (M. Proctor) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cambrensis* M. Proctor in Watsonia 27: 208. 2009.

Type: United Kingdom. Wales: face of railway cutting cliff, Cwm Clydach, 09.07.2001, *T.C.G. Rich, R. Preece & G. Motley* (NMW, holotype).

Distribution. — United Kingdom (Wales: Breconshire).

Ploidy level. — Pentaploid, 2n=85 (Pellicer et al. 2012). Triploid and tetraploid levels were reported (Bailey et al. 2008; Pellicer et al 2012) but not accepted for this species (Rich et al. 2014).

23.

Aria stenophylla (M. Proctor) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus stenophylla* M. Proctor in Watsonia 27: 214. 2009.

Type: United Kingdom. Wales: Tarren yr Esgob, v.c. 42 Breconshire, SO252305, 06.09.1970, *M. Porter* (NMW, holotype).

Distribution. — United Kingdom (Wales: Monmouthshire and Breconshire).

Ploidy level. — Pentaploid, 2n=85 (Pellicer et al. 2012).

24.

Aria greenii (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus greenii* T.C.G. Rich in New J. Bot. 4(1): 3. 2014.

Type: United Kingdom. England: Car Park Quarry, Great Doward, v.c. 36 Herefordshire, SO5471615669, 147 m, 16.10.2013, *T.C.G. Rich* (NMW V.2013.1.183, holotype; isotype BM).

Distribution. — United Kingdom (England: Herefordshire).

Ploidy level. — Triploid, 2n=51 (Rich et al. 2014).

25.

Aria rupicola (Syme) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012 ≡ *Pyrus aria* subsp. *rupicola* Syme, Eng. Bot., ed. 3[B], 3: 244. 1864 ≡ *Pyrus rupicola* (Syme) Bab., Man. Brit. Bot., ed. 7: 126. 1874 ≡ *Sorbus scandica* subsp. *rupicola* (Syme) Nyman, Consp. Fl. Eur. [2]: 242. 1879 ≡ *Sorbus aria* subsp. *rupicola* (Syme) Hedl. in Nyt Mag. Naturvidensk. 49: 199. 1911 ≡ *Sorbus rupicola* (Syme) Hedl. in Nyt Mag. Naturvidensk. 52: 256. 1914.

Type: United Kingdom. England: Matlock Bath, 06. 1864, *J. Whittaker* (BM, lectotype designated by Wilmott (1939: 204–207); isolectotype MANCH).

= *Sorbus aria* var. *salicifolia* Myrin, Årsberätt. Bot. Arbeten Upptäckter 1834: 179. 1835; Hartm., Skand. Fl., ed. 3: 116. 1838 ≡ *Sorbus aria* subsp. *salicifolia* (Myrin) Hedl. in Kongl. Svenska Vetensk. Akad. Handl., nov. ser. 35(1): 78. 1901 ≡ *Sorbus salicifolia* (Myrin) Prain, Index Kew. Suppl. 3: 168. 1908.

Described from Norway: ”tillhörande hafs-klipporne i Bergens Stift” [Bergen Peninsula: seashore rocks, 16.09.1834, *C.G. Myrin*]. Type not traced.

Distribution. — Denmark, Estonia, Ireland, Latvia, Norway, Sweden, United Kingdom.

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1934, 1953; Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012).

Notes on nomenclature. — The name *Sorbus aria* var. *salicifolia* Myrin was validly published in a report on the travel of C.G. Myrin to Norway (Wikström 1835) with a minimalistic description providing the dimensions of leaves only (”qvarters långa, 2 tums breda blad” = leaves a quarter long, 2 inches wide”, about 15 × 5 cm). These measures are at the extreme side of the characters of the leaves of *Sorbus rupicola* (Rich & al. 2010) but probably are indicative of this species only, because other taxa of the *Aria* group occurring in Norway (Mossberg & Stenberg 2003) have a smaller ratio of length to width of the leaves. The same form was mentioned in the travel diary of Myrin (1835) as *S. aria* ”with particularly long leaves” (”med särdeles långa blad”).

26.

Aria rupicoloides (L. Houston & T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus rupicoloides* L. Houston & T.C.G. Rich in Watsonia 27: 291. 2009.

Type: United Kingdom. England: Cheddar Gorge, v.c. 6 North Somerset, England, ST467539, 19.09.2007, *T.C.G. Rich & L. Houston 254* (NMW, holotype; isotype BM).

Distribution. — United Kingdom (England: Cheddar Gorge in Somerset).

Ploidy level. — Tetraploid, 2n=68 (Houston et al. 2009; Rich et al. 2010; Pellicer et al. 2012).

27.

Aria vexans (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus vexans* E.F. Warb. in Watsonia 4: 46. 1957.

Type: United Kingdom. England: wood between Lynmouth and Watersmeet, v.c. 4 North Devon, 09.1935, *E.F. Warburg 122* (BM, holotype).

Distribution. — United Kingdom (England: Devon and Somerset).

Ploidy level. — Tetraploid, 2n=68 (Bailey et al. 2008; Pellicer et al. 2012). Earlier triploid counts (Nelson-Jones et al. 2002) have not been confirmed (Rich et al. 2010).

28.

Aria margaretae (M. Proctor) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus margaretae* M. Proctor in Watsonia 27: 210. 2009.

Type: United Kingdom. England: Desolate, v.c. 4 North Devon, SS7849, 31.05.1997, *M.C.F. Proctor* (NMW, holotype).

Distribution. — United Kingdom (England: Devon and Somerset).

Ploidy level. — Tetraploid, 2n=68 (Rich et al. 2010; Pellicer et al. 2012).

Apomictic taxa, Northern Europe

29.

Aria obtusifolia (DC.) Sennikov & Kurtto, **comb. nov.** ≡ *Pyrus aria* var. *obtusifolia* DC., Prodr. 2: 636. 1825 ≡ *Aria nivea* var. *obtusifolia* (DC.) M. Roem., Fam. Nat. Syn. Monogr. 3: 126. 1847 ≡ *Sorbus aria* var. *obtusifolia* (DC.) Wenzig in Linnaea 38: 55. 1874 ≡ *Sorbus aria* subsp. *obtusifolia* (DC.) Hedl. in Kongl. Svenska Vetensk. Akad. Handl., nov. ser. 35(1): 80. 1901 ≡ *Sorbus obtusifolia* (DC.) Prain, Index Kew. Suppl. 3: 168. 1908 ≡ *Sorbus norvegica* Hedl. in Nyt Mag. Naturvidensk. 52: 254. 1914, nom. illeg. superfl.

Described without indication of provenance. Type: [icon] Norway. Herad [”The Shire”] in Vanse parish (Lista, VA). Flowering branch on tab. 302 in Oeder, Flora Danica, vol. 2(6). 1767 (lectotype **designated here**).

Distribution. — Norway, Sweden.

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1934, 1953).

Notes on nomenclature. — The illustration of *Crataegus aria* in Flora Danica (Tab. 302) has long served as the interpretative basis for *Pyrus aria* var. *obtusifolia* DC. This illustration is designated as the lectotype of this name here in order to fix its application to the taxon otherwise known as *Sorbus norvegica* Hedl., a species similar to *S. rupicola* (Syme) Hedl. but different in broader, more widely obovate leaves (Mossberg & Stenberg 2003).

As noted by Hornemann (1827), Lange (1887) and Salvesen (2011), the numbers of Plate 301 and Plate 302 were mixed up when the work went into print, so that in the text the stated provenance of Plate 301 is the correct one for Plate 302.

Apomictic taxa, Central Europe

30.

Aria danubialis (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus danubialis* (Jáv.) Prodan, Fl. Român. 1: 553. 1923 ≡ *Sorbus cretica* f. *danubialis* Jáv. in Bot. Közlem. 14: 104. 1915 ≡ *Sorbus cretica* subsp. *danubialis* (Jáv.) Jáv., Magyar Fl. [2]: 481. 1924 ≡ *Sorbus aria* var. *danubialis* (Jáv.) Soó in Tisia 2: 223. 1937 ≡ *Sorbus cretica* var. *danubialis* (Jáv.) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 254. 1956 ≡ *Sorbus graeca* var. *danubialis* (Jáv.) Kovanda in Dendrol. Sborn. 3: 58. 1962.

Type: Hungary. Buda Mts., Budapest, ”in monte Sashegy”, 5 May 1911, *S. Jávorka* (BP 562679, lectotype designated by Kováts (1998: 118) as ”neotype”, correctable to lectotype under Art. 9.9).

= *Sorbus javorkae* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944 ≡ *Sorbus aria* subsp. *javorkae* Soó in Tisia 2: 222. 1937 ≡ *Sorbus aria* var. *javorkae* (Soó) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 250. 1956.

Type: Hungary. Medves region. "Comit. Nógrád, in rupestribus basalticis montis Nagysalgó prope Salgóbányatelep", 18.06.1936, *Á. Boros* (BP 711398, lectotype designated by Somlyay & Sennikov (2016: 82)).

= *Sorbus sooi* (Soó) Soó in Jávorka & Soó, A magyar növényvilág kézikönyve 1: 248. 1951; Máthé in Soó, A Mátrahegység és környékének flórája: 35. 1937, nom. nud. ≡ *Sorbus aria* subsp. *sooi* Soó in Tisia 2: 223. 1937 ≡ *Sorbus hungarica* "positio" *sooi* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944.

Type: Hungary. Bükk Mts., Cserépfalu, "Ódor-vár", 7.06. 1930, *A. Bartha* (BP 595257, lectotype designated by Somlyay & Sennikov (2016: 82)).

= *Sorbus graeca* var. *apiculata* Kovanda in Dendrol. Sborn. 3: 60. 1962 ≡ *Sorbus apiculata* (Kovanda) Mikoláš in Thaiszia 13: 130. 2004.

Type: Czech Republic. "Bohemia centralis: in declivibus rupestribus collis Hradiště supra flumen Vltava prope opp. Zbraslav, exp. occid., alt. ca 300 m s.m., solo phyllitico, 05.1957, *M. Kovanda*" (PRC, holotype).

= *Sorbus pseudodanubialis* Kárpáti in Németh in Acta Bot. Hung. 52: 390. 2010; Kárpáti in Feddes Repert. 62: 188. 1960, nom. inval. (Art. 40.1).

Type: Hungary. Keszthely Mts., Vállus, "Kisláztető", 6.06.1950, *Á. Boros* (BP 432414, holotype; isotype BP 432413).

Distribution. — Austria, Czech Republic, Germany, Hungary, Slovakia.

Ploidy level. — Tetraploid, 2n=68 (Mikoláš 2004; Lepší et al. 2015; Somlyay et al. 2016a). Earlier reports of diploids (Jankun & Kovanda 1987) are erroneous (Lepší et al. 2015).

Notes on nomenclature and taxonomy. — The history of nomenclature and synonymy of this species is presented in detail in Somlyay & Sennikov (2016a).

Kovanda (1961) and Mikoláš (2004) separated *Sorbus apiculata* on the belief that *S. danubialis* may not have acute to attenuate lobes and apices of leaves. However, such forms can be found even in Budapest, in the lectotype locality of *S. danubialis*. The alleged difference in chromosome numbers between *S. danubialis* and *S. apiculata* has not been confirmed, and we consider *S. apiculata* as part of the variability of *S. danubialis* (= *A. danubialis*).

31.

Aria cucullifera (M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cucullifera* M. Lepší & P. Lepší in Preslia 87: 125. 2015.

Type: Czech Republic. Southern Moravia, Čižov (distr. Znojmo), Dyje valley, Sloní hřbet ridge, ca. 2.1 km SSE of chapel in village, on cliff, 340 m, 13.06.2011, *M. Lepší & P. Lepší* (CB [83095], holotype; isotypes PR, PRA, W).

Distribution. — Austria (Lower Austria), Czech Republic (Southern Moravia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2015).

32.

Aria moravica (M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus moravica* M. Lepší & P. Lepší in Preslia 87: 133. 2015.

Type: Czech Republic. Southern Moravia, Lažánky (distr. Blansko), Suchý žleb gorge, S slope, 440 m, 22.07.2011, *M. Lepší* (CB [79868], holotype; isotype PR [79868/a]).

Distribution. — Czech Republic (Southern Moravia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2015).

33.

Aria pontis-satanae (M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pontis-satanae* M. Lepší & P. Lepší in Preslia 87: 137. 2015, "*pontis-satani*".

Type: Czech Republic. Southern Moravia, Lažánky (distr. Blansko), S slope of Suchý žleb gorge, above entrance of Kateřinská jeskyně cave, 390 m, 16.08.2013, *M. Lepší* (CB [83096], holotype; isotype PR [83096/a]).

Distribution. — Czech Republic (Southern Moravia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2015).

Notes on nomenclature. — The species epithet is derived from a place name called Čertův most (Devil's bridge), which is to be translated into Latin as Pons Satanae, hence the epithet *pontis-*

satanae. The original spelling of the epithet is grammatically incorrect and can be changed under Art. 60.1.

34.

Aria collina (M. Lepší, P. Lepší & N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus collina* M. Lepší, P. Lepší & N. Mey. in Preslia 87: 145. 2015.

Type: Czech Republic. Central Bohemia, Nalžovické Podhájí (distr. Příbram), ca 130 m NNE of summit of Na Vyhlídce hill, edge of woodland; 390 m a.s.l., 07.08.2013, *M. Lepší & P. Lepší* (CB [83296], holotype; isotypes BP [83296/f], LI [83296/e], M [83296/g], PR [83296/a], PRA [83296/b], PRC [83296/c], W [83296/d]).

Distribution. — Austria (Lower and Upper Austria), Czech Republic (Bohemia), Germany (Bayern), Hungary (northwest).

Ploidy level. — Tetraploid, 2n=68 (Lepší et al. 2015).

35.

Aria thayensis (M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus thayensis* M. Lepší & P. Lepší in Preslia 87: 148. 2015.

Type: Czech Republic. Southern Moravia, Čížov (distr. Znojmo), Hardeggská vyhlídka outlook, ca 630 m NNW of bridge over Dyje river, acid cliff, 15.06.2011, *M. Lepší & P. Lepší* (CB [83094], holotype; isotypes PR [83094/a], PRA [83094/b]).

Distribution. — Austria (Lower Austria), Czech Republic (Southern Moravia).

Ploidy level. — Tetraploid, 2n=68 (Lepší et al. 2015).

36.

Aria vajdae (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus vajdae* Boros in Agrártud. Egyet. Kert-Szölögazdaságtud. Karának Közlem. 13: 154. 1949.

Type: Hungary. Borsod-Abaúj-Zemplén county, "in rupestribus andesiticis montis Vár-hegy prope pag. Füzér", 400–500 m a.s.l., 07.09.1947, *Á. Boros* (BP 432097, lectotype designated by Németh (2010: 395); isolectotypes BP 432439, BP 432571, BP 432572).

Distribution. — Hungary (Zemplén Mts.).

Notes on taxonomy. — This local species was regarded as a hybrid between "*Sorbus cretica* f. *cuneifolia*" and "*S. austriaca* subsp. *hazslinszkyana*" (Kárpáti 1960). These plants demonstrate regular minor incisions on the leaf sides, which are similar to those occurring in *S. aria* (= *A. edulis*) rather than indicative of hybridization with *S. aucuparia*. In the absence of other evidence, *S. vajdae* is treated as a member of *Aria* here.

37.

Aria subdanubialis (Soó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* f. *subdanubialis* Soó in Tisia 2: 222. 1937 ≡ *Sorbus subdanubialis* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944.

Type: Slovakia. Slovenský kras: Zádielska dolina ("Szádelői-völgy"), 24.08.1907, *S. Jávorka* (BP 211651, lectotype designated by Somlyay et al. (2016: 353); isolectotype BP 199919).

Distribution. — Hungary (western part), Slovakia.

Ploidy level. — Triploid, 2n=51 (Somlyay et al. 2016a).

38.

Aria javorkana (Somlyay, Sennikov & Vojtkó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus javorkana* Somlyay, Sennikov & Vojtkó in Ann. Bot. Fenn. 54: 230. 2017.

Type: Slovakia. Gömör – Torna (Gemer – Turňa) Karst, Zádiel (Szádelő): Zádielska dolina (Szádelői-völgy), 48°37′3.89″ N, 20°49′58.70″ E, 28.08.2015, *L. Somlyay, G. Sramkó & A. N. Sennikov s. n.* (BP 744894, holotype; isotypes BP 744893, BP 744895).

Distribution. — Hungary and Slovakia (Gömör–Torna / Gemer–Turňa Karst).

Ploidy level. — Triploid, 2n=51 (Somlyay et al. 2017).

39.

Aria ujhelyii (Somlyay & Sennikov) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus ujhelyii* Somlyay & Sennikov in Ann. Bot. Fenn. 53: 363. 2016.

Type: Hungary. Hungary. Buda Mts., Budapest: Hármashatárhegy, 12.05.2015, *L. Somlyay* (holotype on two sheets: BP 744708 (sheet 1), BP 744709 (sheet 2).

Distribution. — Hungary (Budapest and Pest county).

Ploidy level. — Triploid, 2n=51 (Somlyay et al. 2016a, 2016b).

40.

Aria keszthelyensis (Somlyay & Sennikov) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus keszthelyensis* Somlyay & Sennikov in Ann. Bot. Fenn. 53: 368. 2016.

Type: Hungary. Keszthely Mts., Balatongyörök: Szoba-kő, 46°47’51.32” N, 17°20’29.95” E, 15.09.2011, *L. Somlyay & N. Bauer* (BP 711375, holotype; isotype BP 711376).

Distribution. — Hungary (western part: Zala and Veszprém counties).

Ploidy level. — Triploid, 2n=51 (Somlyay et al. 2016a, 2016b).

41.

Aria pannonica (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pannonica* Kárpáti in Borbásia Nova 25: 10. 1944.

Type: Hungary. Bakony Mts.: Isztimér, ”Burok-völgy”, 24.05.1936, *L. Vajda* (BP 390405, lectotype designated by Somlyay & Sennikov (2015: 281)).

= *Sorbus aria* f. *pseudaria* Soó in Tisia 2: 222. 1937.

Type: Hungary. Bakony Mts.: ”Mons Tobán, in calcareis apricis ca 390 m s. m.”, 04.07.1932, *S. Polgár 4092* (DE, lectotype designated by Somlyay & Sennikov (2015: 281)).

Distribution. — Hungary (western part).

Ploidy level. — Triploid, 2n=51 (Somlyay & Sennikov 2015; Lepší et al. 2015). A triploid count from Germany (Feulner et al. 2013) may belong to another, yet undescribed taxon (Somlyay & Sennikov 2015).

Notes on taxonomy. — Endemic to Hungary. Records from other countries refer to similar apomictic taxa or are erroneous (Somlyay & Sennikov 2015).

42.

Aria ulmifolia (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus ulmifolia* Kárpáti in Németh in Acta Bot. Hung. 52: 394. 2010; Kárpáti in Feddes Repert. 62: 185. 1960, nom. inval. (Art. 40.1).

Type: Hungary. Vértes, Fejér megye, Vérteskozma, Fánivölgy, Fago-Ornetum, 320 m, 22.06.2002, *Cs. Németh* (BP 641935, holotype).

Distribution. — Hungary (Vértes Mts.).

Ploidy level. — Unknown.

43.

Aria thaiszii (Soó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* f. *thaiszii* Soó in Tisia 2: 223. 1937 ≡ *Sorbus thaiszii* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944 ≡ *Sorbus cretica* f. *thaiszii* (Soó) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 254. 1956.

Described from Hungary and Slovakia (syntypes cited). Type not designated.

Distribution. — Hungary (eastern part), Slovakia.

Ploidy level. — Unknown.

44.

Aria zolyomii (Soó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* f. *zolyomii* Soó in Tisia 2: 220. 1937 ≡ *Sorbus zolyomii* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944.

Described from Hungary (syntypes cited). Type not designated.

Distribution. — Hungary (eastern part), Slovakia.

Ploidy level. — Unknown. A diploid count from Slovakia (Marhold et al. 2007) is unreliable both on taxonomic and theoretical grounds.

45.

Aria hungarica (Bornm.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* f. *hungarica* Bornm. in Mitth. Thüring. Bot. Vereins 30: 54. 1913 ≡ *Sorbus hungarica* (Bornm.) Hedl. ex C.E.Salmon in J. Bot. 68: 174. 1930 ≡ *Sorbus aria* var. *hungarica* (Bornm.) Soó in Tisia 2: 223. 1937 ≡ *Sorbus cretica* var. *hungarica* (Bornm.) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 254. 1956.

Described from Romania (Eastern Carpathians, Piatra Mare Mts., ”Kronstadt [Brassó, Braşov], Hohenstein, an Felswänden des Bärenloches bei ca. 13–1400 m”). Type not designated.

Distribution. — Romania (southern Carpathians; probably endemic).

Ploidy level. — Unknown.

Notes on taxonomy and distribution. — *Sorbus hungarica* was originally described (Bornmüller 1913) and further treated (e.g., Soó 1972) as part of the *S. austriaca* complex. However, it has all the characters of *S. graeca* s.l. (= *A. graeca*), showing the greatest similarity to *S. danubialis* (=

A. danubialis) (Soó 1937) but no resemblance to hybrids with *S. aucuparia* (Kovanda 1961).

This taxon was erroneously reported from Slovakia and Hungary (Kárpáti 1960; Májovský 1992), and also from Slovenia (Kárpáti 1966).

Apomictic taxa, Balkans and Central Mediterranean

46.

Aria tergestina (H. Lindb.) Sennikov & Kurtto, **comb. & stat. nov.** ≡ *Pyrus aria* subsp. *tergestina* H. Lindb., Öfvers. Finska Vetensk.-Soc. Förh. 48(13): 45. 1906.

Description. — Leaves simple, flat, thin (rather papery), bright-green (?) and glabrous above, white and rather densely tomentose beneath, petioles ca. 15 mm long; leaf blades on sterile short shoots unknown; leaf blades on fertile short shoots 5–7 × 3.3–4.5 cm at anthesis, ovate (ratio length/width = 1.3–1.5), widest at the lower third of lamina length (asymmetry index 0.4–0.45), apex obtuse, broadly rotund, with arched sides, with 3–5 apical teeth reaching the same level at the top, base variably cuneate with straight sides, completely unlobed, minutely but densely dentate, toothed until the half of the cuneate basal part, veins 7–8 on each side. Inflorescence corymbose, branchlets densely tomentose. Sepals narrowly triangular, densely tomentose on both surfaces; hypanthia densely lanate; petals white, clawed, elliptic; stamens ca. 20. Fruits unknown. Flowering the first half of May.

Type (Fig. 1): Italy. Istria, Triest, Mt. Spaccato, karst, 12.05.1905, *H. Lindberg* (H1516061, lectotype designated by Väre (2012: 72)).

Distribution. — Italy (known from the type locality only).

Ploidy level. — Unknown.

Notes on taxonomy This taxon is characterised by the leaves regularly ovate (vs. almost regularly oblong in *S. aria*), with about 8 pairs of primary lateral nerves (vs. 9–13 pairs in *S. aria*). Because of the short and rather small leaves with a lesser number of lateral nerves, *Aria tergestina* belongs to *A. graeca* s.l.; it differs from *A. graeca* s. str. in ovate (vs. suborbicular to obovate) leaves.

47.

Aria graeca (Spach) M. Roem., Fam. Nat. Syn. Monogr. 3: 127. 1847 ≡ *Crataegus graeca* Spach, Hist. Nat. Vég. 2: 102. 1834 ≡ *Sorbus aria* var. *graeca* (Spach) Griseb., Spic. Fl. Rumel. 1: 93. 1843 ≡ *Sorbus graeca* (Spach) Schauer in Übers. Arbeiten Veränd. Schles. Ges. Vaterl. Cult. 1847: 292. 1848 ≡ *Sorbus aria* subsp. *graeca* (Spach) Nyman, Consp. Fl. Eur. Suppl. 2(1): 118. 1889 ≡ *Hahnia aria* var. *graeca* (Spach) Dippel, Handb. Laubholzk. 3: 375. 1893 ≡ *Aria nivea* var. *graeca* (Spach) Formánek in Verh. Naturf. Vereins Brünn 35: 202. 1897.

Type: Turkey. ”Ex monte Ida”, Herb. Tournefort 6150 (P barcode P00680357, lectotype designated by Aldasoro & al. (2004: 106)).

= *Pyrus aria* var. *cretica* Lindl., Trans. Hort. Soc. London 7: 236. 1830 ≡ *Aria nivea* var. *cretica* (Lindl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 126. 1847 ≡ *Sorbus cretica* (Lindl.) Fritsch in Kerner, Sched. Fl. Exs. Austro-Hung. 7: 18. 1896 ≡ *Sorbus aria* var. *cretica* (Lindl.) Halácsy, Consp. Fl. Graec. 1: 541. 1900 ≡ *Sorbus umbellata* var. *cretica* (Lindl.) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 690. 1906 ≡ *Sorbus aria* subsp. *cretica* (Lindl.) Holmboe, Stud. Veg. Cyprus: 100. 1914.

Type: Cultivated in the garden of the Horticultural Society at Chiswick, London, United Kingdom (CGE, lectotype designated by Gabrielian (1978: 170)).

= *Pyrus meridionalis* Guss., Fl. Sicul. Syn. 2(2): 831. 1844, nom. inval. provis. ≡ *Sorbus meridionalis* Simonk., Enum. Fl. Transsilv.: 7. 1887 ≡ *Sorbus aria* var. *meridionalis* (Simonk.) Nyman, Consp. Fl. Eur. Suppl. 2(1): 118. 1889 ≡ *Sorbus aria* subsp. *meridionalis* (Simonk.) Murb. in Acta Univ. Lund. Afd. 2, ser. 2, 2(1): 45. 1905 ≡ *Pyrus aria* subsp. *meridionalis* (Simonk.) H. Lindb., Öfvers. Finska Vetensk.-Soc. Förh. 48(13): 45. 1906 ≡ *Sorbus umbellata* subsp. *meridionalis* (Simonk.) Vălev in Jordanov, Fl. Narodna Republ. Bulg. 5: 365. 1973.

Described from Italy (Sicily: ”in saxosis calcareis montosis; Monte Gebbia presso Palazzo Adriano (Gasparrini), Pizzuta (Parlatore): Madonie, Busambra, Mistretta, Boschi di Caronia”). Type not designated.



Fig. 1. Lectotype of *Pyrus aria* subsp. *tergestina* H. Lindb.

Distribution. — Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Greece, Hungary, Italy (mainland and Sicily), Kosovo, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia. Naturalized in Sweden (Gotland) (Högström & Fåhraeus 1993).

Ploidy level. — No reliable chromosome counts so far. The diploid report of "*S. cretica*" (Baksay 1956) should belong to *S. aria* s. str.

Notes on nomenclature. — The name *Pyrus meridionalis* was published by Gussone (1844) in the following sentence, making a note on the occurrence of *Sorbus aria* in Sicily: "Forsan species propria et *P. meridionalis* appellanda". We treat this statement as provisional acceptance of the name (Art. 36.1b).

The next instance of acceptance of this epithet (as *Sorbus aria* f. *meridionalis*) was probably Strobl (1886) who, however, although citing Gussone (1844) in synonymy, applied the name to a different taxon from Mt. Etna of Sicily. The second was Simonkai (1887) who accepted the species as *Sorbus meridionalis* and credited its name to Gussone; by doing this he validated Gussone's provisional name with the description of *S. aria* auct. in Gussone (1843: 560).

The original material of *Crataegus graeca* Spach includes specimens collected by Tournefort and examined by Spach, kept at P, and the illustration of *Pyrus aria* that was published as Tab. 479 in *Flora graeca* of Sibthorp & Smith. Most probably it also includes the material collected from cultivation in the the Jardin des Plantes, Paris, France (P02550213), which was indicated by Spach via a reference to "Lodd. Cat." and a mention of cultivated plants in the protologue. Gabrielian (1958) cited a specimen collected by Sibthorp in the Athos Mt. of Greece and kept at P as the type of *C. graeca*. This reference is wrong and cannot be accepted as effective typification because the material of Sibthorp is kept at OXF (Strid 1986: xii) and this specimen was neither examined nor cited by Spach. The first effective type designation was published by Aldasoro & al. (2004) who correctly selected a specimen of Tournefort that was examined by Spach.

Notes on taxonomy. — It makes no surprise that the three elements included in the protologue of *C. graeca*, namely the material of Tournefort, the specimen and illustration of Sibthorp, and the cultivated plants of Loddiges, belong to three different species. By lectotypification, Aldasoro & al. (2004) restricted the application of the name to the morphotype with broadly elliptic to slightly rhombic leaves with shortly acute apex and long cuneate base (devoid of teeth at about 1/3 of the lamina), the margin of which is double serrate with rather acute teeth.

As currently accepted, this species is highly variable and apparently contains a number of taxa that should be separated in the future. In spite of existing records, most likely it does not occur in Central Europe.

48.

Aria baldaccii (C.K. Schneid.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus umbellata* var. *baldaccii* C.K. Schneid., Ill. Handb. Laubholzk. 1: 691. 1906 ≡ *Sorbus cretica* subsp. *baldaccii* (C.K. Schneid.) Jáv., Magyar Fl. [2]: 482. 1924 ≡ *Sorbus meridionalis* subsp. *baldaccii* (C.K. Schneid.) Bordz. in Izv. Kievsk. Bot. Sada 12–13: 130. 1931 ≡ *Sorbus baldaccii* (C.K. Schneid.) Zinserl. in Komarov, Fl. USSR 9: 398. 1939 ≡ *Sorbus umbellata* subsp. *baldaccii* (C.K. Schneid.) K.I. Chr. in Willdenowia 41: 323. 2011.

Type: Albania. Vlorë County & District: "in summo jugo m. Čepin [Çipini Mount] distr. Kuč", 26.06.1892, *A. Baldacci 128* (W1892-0012656, lectotype designated by Aldasoro & al. (2004: 106); isolectotype M0213799).

Distribution. — Albania, Bosnia & Herzegovina, Croatia, Greece, Montenegro.

Notes on taxonomy. — Aldasoro & al. (2004) synonymized *Sorbus baldaccii* with *S. umbellata*, circumscribed very broadly, from which it apparently differs in narrowly elliptic (vs. broadly obovate) leaves that are not incised but double serrate. A taxon most similar to *S. baldaccii* is *S. graeca* (= *A. graeca*), in which the incised leaves, stated to be distinctive of *S. umbellata* var. *baldaccii* in its protologue (Schneider 1906), are also quite common. The original identification of Baldacci (1894: 172) was indeed *S. aria* var. *graeca*. According to the type specimens, *S. baldaccii* differs from *S. graeca* in its narrowly oblong leaves (vs. the leaves elliptic, significanty broader in *S.*

graeca). We assume this difference is connected with apomixis, for which reason the two morphotypes are recognized as separate species here.

49.

Aria umbellata (Desf.) Sennikov & Kurtto, **comb. nov.** ≡ *Crataegus umbellata* Desf., Cat. Pl. Hort. Reg. Paris.: 408. 1829 ≡ *Sorbus umbellata* (Desf.) Fritsch in Kerner, Sched. Fl. Exs. Austro-Hung. 7: 18. 1896, non Maratti 1822 ≡ *Sorbus aria* var. *umbellata* (Desf.) Halácsy, Consp. Fl. Graec. 1: 541. 1900.

Described from cultivation in the Jardin des Plantes, Paris, France. Type: Turkey. Gümüshane to Bayburt, 26.06. 2001, *Nisa et al. 564* (MA687050, neotype designated by Aldasoro & al. (2004: 105)).

≡ *Crataegus flabellifolia* Spach, Hist. Nat. Vég. 2: 103. 1834 ≡ *Aria flabellifolia* (Spach) M. Roem., Fam. Nat. Syn. Monogr. 3: 127. 1847 ≡ *Sorbus flabellifolia* (Spach) Schauer in Übers. Arbeiten Veränd. Schles. Ges. Vaterl. Cult. 1847: 292. 1848 ≡ *Sorbus aria* var. *flabellifolia* (Spach) Wenzig in Linnaea 38: 55. 1874 ≡ *Hahnia aria* var. *flabellifolia* (Spach) Dippel, Handb. Laubholzk. 3: 375. 1893 ≡ *Sorbus umbellata* subsp. *flabellifolia* (Spach) Kárpáti in Feddes Repert. Spec. Nov. Regni Veg. 62: 182. 1960.

Described from cultivation (France) of unknown origin. Type not designated.

= *Sorbus cretica* f. *banatica* Jáv. in Bot. Közlem. 14: 104. 1915 ≡ *Sorbus banatica* (Jáv.) Prodan, Fl. Român.: 553. 1923 ≡ *Sorbus cretica* subsp. *banatica* (Jáv.) Jáv., Magyar Fl. [2]: 481. 1924 ≡ *Sorbus cretica* var. *banatica* (Jáv.) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 254. 1956 ≡ *Sorbus umbellata* subsp. *banatica* (Jáv.) Kárpáti in Feddes Repert. Spec. Nov. Regni Veg. 62: 179. 1960 ≡ *Sorbus graeca* var. *banatica* (Jáv.) Kovanda in Dendrol. Sborn. 3: 62. 1962.

Type: Romania. Hunedoara: ”c. Hunyad in rup. calc. montis ”Piatra Macestelor” ad pagum Paros-Pestere, sub. alp. Retyezát”, 03.08.1910, *S. Jávorka* (BP592460, lectotype designated by Kováts (1998: 118)).

= *Sorbus aria* subsp. *koevessii* Pénzes in Borbásia 1(10): 164. 1939 ≡ *Sorbus umbellata* subsp. *koevessii* (Pénzes) Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Közlem. 12: 146. 1948.

Described from Bulgaria (”prope opp. Nevrokop Bulgariae in mont. Pirin, alt. ca. 6–800 m s. m., solo calcareo, 07.1936, *A. Pénzes* (hb. meo et in hb. mus. Budapest)”. Type not traced.

Distribution. — Albania, Bulgaria, Greece, Kosovo, Macedonia, Romania, Serbia. Outside Europe the species is present in the Caucasus and Anatolia.

Ploidy level. — No reliable counts or estimations.

Notes on nomenclature. — Németh (2010: 394) attempted to designate a new lectotype of *Sorbus cretica* f. *banatica* Jáv. because the previously designated lectotype was not the very specimen used for the illustration in the protologue, and the illustrated specimen was of a better quality of preservation. This change of the type cannot be accepted under Art. 9.19.

Aldasoro et al. (2004) stated that *Crataegus flabellifolia* Spach is a superfluous name for *C. umbellata* Desf. However, Spach (1834) included no type of any earlier name to be accepted under the rules (Art. 52.1 & 52.2) and also expressed the intention to describe a new species, so that *C. flabellifolia* should be treated as legitimate. Moreover, if the currently accepted synonymy is correct, it is the basionym for the correct name of this species in *Sorbus*, since the name accepted by Aldasoro et al. (2004) and Kurtto (2009), *S. umbellata* (Desf.) Fritsch, is a later homonym of the obscure and overlooked *S. umbellata* Maratti.

Sorbus porrigens Hedl. was treated as a synonym of *S. umbellata* by Aldasoro et al. (2004). It differs from *S. umbellata* and *S. graeca* (also placed into the synonymy of *S. umbellata* by Aldasoro et al. (2004)), by long and acute teeth of leaf blades (Hedlund 1914; Wilmott 1939). Wilmott (1939) designated the lectotype of *S. porrigens*, *Sintenis 5128*, which was collected from Turkey. Most probably, this species does not occur in Europe.

50.

Aria madoniensis (Raimondo & al.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus madoniensis* Raimondo, G. Castellano, Bazan & Schicchi in Pl. Biosystems 146(Suppl.): 347. 2012.

Type: Italy. Sicily: Monti Madonie, in Località Macchia

dell'Inferno sopra Castelbuono, su litosuolo calcareo, 1385 m, 05.06.2010, *F. Raimondo & G. Castellano* (PAL, holotype; isotypes B, FI, G).

Distribution. — Italy (Sicily: Monti Madonie).

Ploidy level. — Unknown.

Notes on taxonomy. — Judging from the leaf shape and the number of lateral veins, this taxon seems to be most closely related to *Aria umbellata*, which is otherwise not known from Italy (Aldasoro & al. 2004).

51.

Aria busambarensis (G. Castellano & al.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus busambarensis* G. Castellano, P. Marino, Raimondo & Spadaro in Pl. Biosystems 146(Suppl.): 339. 2012.

Type: Italy. Sicily: Rocca Busambra (Palermo Prov.), Godrano territory, carbonatic cree above Piano della Tramontana, 1315 m, 17.10.2009, *G. Castellano & F. Raimondo* (PAL, holotype; isotype FI).

Distribution. — Italy (Sicily: Monti Sicani).

Ploidy level. — Unknown.

Notes on taxonomy. — This taxon may be closely related to *Aria graeca*, from which it differs in the leaf shape (elliptic vs. slightly obovate) and dentation at the leaf base (present vs. largely absent) (Castellano & al. 2012).

Apomictic taxa, Crimea

52.

Aria taurica (Zinserl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus taurica* Zinserl. in Komarov, Fl. USSR 9: 497. 1939 ≡ *Sorbus graeca* var. *taurica* (Zinserl.) Gabrielian in Notes Roy. Bot. Gard. Edinburgh 23(4): 492. 1961 ≡ *Sorbus umbellata* var. *taurica* (Zinserl.) Gabrielian in Davis, Fl. Turk. 4: 154. 1972.

Type: Crimea. Mt. Krestovaya near Alupka, 12[24].05. 1900 [fl.], *D. Syreitschikov* in Herbarium Florae Rossicae 969 (LE, lectotype designated by Buzunova & Kuziarin (2001: 129); isolectotypes in many herbaria).

Distribution. — Crimea. Outside Europe the species is present in Russia (Krasnodar Region).

Ploidy level. — Tetraploid, 2n=68 (Zaikonnikova 1982, as *S. turcica*).

Notes on taxonomy. — This taxon is most similar to *S. graeca* (= *A. graeca*) in the obovate shape of small leaves with very few lateral nerves but differs in the leaves with regularly suborbiculate (vs. triangular) apex and a different dentation. In the past it has been included in *S. turcica* Zinserl. (Warburg & Kárpáti 1968; Zaikonnikova 2001), *S. graeca* (Gabrielian 1961) or *S. umbellata* (Gabrielian 1972, 1978; Aldasoro et al. 2004).

53.

Aria stankovii (Juz.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus stankovii* Juz. in Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 12: 7. 1950.

Type: Crimea. Descent from Nikita Yaila, mixed forest below Krasnyi Kamen, 15.08.1946, *S. Juzepczuk 442* (LE, holotype; isotypes LE).

Distribution. — Crimea. Outside Europe the species is present in the Caucasus and Anatolia.

Ploidy level. — Tetraploid, 2n=68 (Zaikonnikova & Kipiani 1980).

Chamaemespilus **Medik.**

Chamaemespilus Medik., Philos. Bot. 1: 155. 1789 ≡ *Pyrus* sect. *Chamaemespilus* (Medik.) DC., Prodr. 2: 637. 1825 ≡ *Sorbus* sect. *Chamaemespilus* (Medik.) Schauer, Übers. Arb. Veränd. Schles. Ges. Vaterl. Kultur 1847: 295. 1848 ≡ *Sorbus* subgen. *Chamaemespilus* (Medik.) K. Koch, Hort. Dendrol. 176. 1853 ≡ *Sorbus* subsect. *Chamaemespilus* (Medik.) Rouy & Camus, Fl. Fr. 7: 24. 1901.

Type: *Mespilus chamaemespilus* L. [the only species included]

Description. — Shrubs. Leaves simple, glabrous underneath (forms with villous pubescence may belong to intergeneric hybrids), with 4–8 pairs of lateral veins, entire, subacute, minutely serrate. Petals pink. Styles 2(3). Fruit medium-sized, red, with scattered small to medium-sized lenticels.

Species number. — One sexual species.

1.

Chamaemespilus alpina (Mill.) K.R. Robertson & J.B. Phipps in Syst. Bot. 16: 390. 1991 ≡ *Crataegus alpina* Mill., Gard. Dict., ed. 8: Crataegus no. 3. 1768 ≡ *Pyrus alpina* (Mill.) Du Roi, Harbk. Baumz. 2: 192. 1772 ≡ *Azarolus alpina* (Mill.) Borkh., Theor. Prakt. Handb. Forstbot. 2: 1234. 1803.

Type: Italy. "Ex Baldo [Monte Baldo, Italian Alps]"), *Ph. Miller* (BM000602282, lectotype **designated here**).

= *Mespilus chamaemespilus* L., Sp. Pl.: 479. 1753 ≡ *Crataegus chamaemespilus* (L.) Jacq., Enum. Stirp. Vindob: 86. 1762 ≡ *Sorbus chamaemespilus* (L.) Crantz, Stirp. Austr. Fasc. 2: 40. 1763 ≡ *Crataegus humilis* Lam., Fl. Franç. 3: 485. 1779, nom. illeg. superfl. ≡ *Pyrus chamaemespilus* (L.) Ehrh. in Hirschfeld, Gartenkalender 4: 193. 1784 ≡ *Hahnia chamaemespilus* (L.) Medik., Gesch. Bot.: 82. 1793 ≡ *Lazarolus chamaemespilus* (L.) Borkh. in Arch. Bot. 1: 88. 1798 ≡ *Azarolus chamaemespilus* (L.) Borkh., Theor. Prakt. Handb. Forstbot. 2: 1227. 1803 ≡ *Aronia chamaemespilus* (L.) Pers., Syn. Pl. 2(1): 39. 1806 ≡ *Pyrenia chamaemespilus* (L.) Clairv., Man. Herb. Suisse: 162. 1811 ≡ *Crataegus sorbifolia* Desf., Cat. Pl. Hort. Reg. Paris.: 288. 1829, nom. illeg. superfl. ≡ *Aria chamaemespilus* (L.) Host, Fl. Austriac. 2: 8. 1831 ≡ *Chamaemespilus humilis* M. Roem., Fam. Nat. Syn. Monogr. 3: 131. 1847 ≡ *Sorbus purpurea* Dulac, Fl. Hautes-Pyrénées: 318. 1867, nom. illeg. superfl.

Type: Herb. Burser XXIII: 74 (UPS, lectotype designated by Aldasoro & al. (2004: 118)).

= *Sorbus carpatica* Andrz. in Giżycki, Badania: 211. 1845, syn. provis.

Described from Poland ("rośnie tylko v Karpatach w znacznéj wysokości"). Type not designated.

= *Sorbus cerasoides* Gand., Fl. Lyon.: 88. 1875.

Described from France ("bois autour de Lyon et dans le Bugey"). Type not designated.

= *Sorbus dentosa* Gand., Fl. Lyon.: 88. 1875.

Described from France ("bois à la Grande-Chartreuse"). Type not designated.

= *Sorbus pilosula* Gand., Fl. Lyon.: 88. 1875.

Described from France ("bois à Pierre-sur-Haute (Loire), entre Coleigne et Porché"). Type not designated.

Distribution. — Albania, Austria, Bosnia & Herzegovina, Bulgaria, Croatia, Germany, Greece, France, Italy, Kosovo, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland.

Ploidy level. — Diploid, 2n=34 (Liljefors 1953; Pogan et al. 1985; Marhold et al. 2007; Pellicer et al. 2012); triploid, 2n=51 (Liljefors 1953); tetraploid, 2n=68 (Pogan et al. 1985; Jankun 1993; Aldasoro et al. 1998; Pellicer et al. 2012). At least some triploid and tetraploid counts may belong to hybrids.

Notes on nomenclature. — There is a specimen at BM that was collected by Miller and has the same provenance as indicated in the protologue of *Crataegus alpina* Mill.; this specimen was intended to be the lectotype of this name by Aldasoro et al. (2004: 118) who, however, failed to meet the requirements of Art. 7.10 (the statement "designated here" was missing). Since the typification was not effected in 2004, this choice is formally effected here.

Both *Sorbus purpurea* Dulac and *Aria crantzii* Beck included a reference to "*Sorbus chamaemespilus* Crantz". Whereas the protologue of Dulac (1867) made no exclusion of the Linnaean type as required by Art. 52.2d, Beck (1892) accepted a separate species *Aria chamaemespilus* based on *Mespilus chamaemespilus*, and thus published a legitimate species name intended for a taxon of the *Chamaearia* group.

Sorbus carpatica Andrz. (Giżycki 1845) was validly published with a minimalistic statement "z podlugowatemi jagodami" ("with oblong berries" in Polish). Shape of fruits was not routinely mentioned in other parts of the long list of arboreous plants provided in this work, and it may have been considered by Andrzejowski as peculiar of the species and thus being diagnostic. The identity of this taxon is mysterious; from the mention of its altitude preferences ("rośnie … w znacznéj wysokości, po za zwyklą granicą drzew wysokopniowych" = "occurs … at considerable altitudes, above the usual tree line") we conclude that this name likely belongs to *Sorbus chamaemespilus* (= *Chamaemespilus alpina*) rather than to *Sorbus aria* s.l. (= *Aria edulis*) as applied by later authors (Schneider 1906; Jávorka 1915; Soó 1937).

Cormus Spach

Cormus Spach, Hist. Nat. Vég. Phan. 2: 96. 1834 ≡ *Sorbus* subgen. *Cormus* (Spach) Duch. in D'Orbigny, Dict. Univ. Hist. Nat. 11: 685. 1848 ≡ *Sorbus* sect. *Cormus* (Spach) Boiss., Fl. Orient. 2: 657. 1872.

Type: *Cormus domestica* (L.) Spach [the only species included]

Description. — Trees. Leaves pinnate, slightly greyish-green-tomentose or glabrescent underneath, with 5–10 pairs of leaflets, leaflets acute to obtuse with minute teeth. Petals cream-white. Styles 5(–7). Fruit rather big, brownish-green or -red, with sparse to numerous medium-sized lenticels.

Species number. — One sexual species.

1.

Cormus domestica (L.) Spach, Hist. Nat. Vég. 2: 97. 1834 ≡ *Sorbus domestica* L., Sp. Pl.: 477. 1753 ≡ *Mespilus domestica* (L.) All., Fl. Pedem. 2: 142. 1785 ≡ *Pyrus sorbus* Gaertn., Fruct. Sem. Pl. 2(1): 45, t. 87. 1790 ≡ *Pyrus domestica* (L.) Ehrh., Beitr. Naturk. 6: 95. 1791 ≡ *Crataegus austera* Salisb., Prodr. Stirp. Chap. Allerton: 357. 1796, nom. illeg. superfl. ≡ *Malus sorbus* (Gaertn.) Borkh. in Arch. Bot. 1: 89. 1798 ≡ *Prunus sorbus* (Gaertn.) P. Gaertn. & al., Oekon. Fl. Wetterau 2: 214. 1800 ≡ *Pyrenia sorbus* (Gaertn.) Clairv., Man. Herb. Suisse: 162. 1811.

Type: Herb. Burser XXII: 82 (UPS, lectotype designated by Aldasoro & Aedo in Cafferty & Jarvis (2002: 544)).

= *Sorbus syrmiensis* Kit. in Kanitz, Linnaea 32: 585. 1863.

Type: Croatia. "Ad Illok" [Ilok], "Majo" [year unknown], *Kitaibel* [Herb. Kitaibel XIV: 188] (BP, holotype).

Distribution. — Albania, Austria (possibly not native), Bosnia & Herzegovina, Bulgaria, Crimea, Croatia, France, Germany, Greece, Hungary, Italy, Kosovo, Luxembourg, Macedonia, Moldova, Montenegro, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey. Naturalised in Czech Republic, Portugal, United Kingdom and Ukraine. Outside Europe the species is present in North-Western Africa, Anatolia and the North-Western Caucasus.

Ploidy level. — Diploid, 2n=34 (Májovský et al. 1974; Verlaque et al. 1987; Májovský & Uhríková 1990; Marhold et al. 2007; Rich et al. 2010).

Notes on nomenclature. — The protologue of *Pyrus sorbus* Gaertn. does not include a citation of the earlier name *Sorbus domestica* L., although it refers to this name via the corresponding descriptive phrase-name. For this reason Art. 52.2 does not apply and Gaertner's name, still superfluous, is not illegitimate.

Notes on Distribution. — This species has been widely cultivated from ancient times for its edible fruits. For this reason its distribution has been considerably obscured by the presence of naturalised populations. In Britain, there were reports on isolated native occurrences of the species (e.g., Hampton & Kay 1995), but these assumptions have not been confirmed (Rich et al. 2010).

Torminalis Medik.

Torminalis Medik., Philos. Bot. 1: 155. 1789.

Type: *Crataegus torminalis* L. [the only species included]

= *Hahnia* Medik., Gesch. Bot.: 81. 1793, nom. illeg. superfl. ≡ *Pyrus* subgen. *Hahnia* Focke in Engler, Nat. Pflanzenfam. 3(3): 24. 1888, nom. illeg. superfl. ≡ *Sorbus* sect. *Hahnia* C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 684. 1906, nom. illeg. superfl. ≡ *Sorbus* subgen. *Hahnia* Zinserl. in Komarov, Fl. USSR 9: 387. 1939, nom. illeg. superfl.

Type: (designated by Pfeiffer (1874: 1544)): *Crataegus torminalis* L.

= *Torminaria* (DC.) Opiz, Oekon. Neuigk. Verh. 58: 522. 1839; M. Roem., Fam. Nat. Syn. Monogr. 3: 101, 130. 1847, isonym ≡ *Pyrus* sect. *Torminaria* DC., Prodr. 2: 636. 1825 ≡ *Sorbus* sect. *Torminaria* (DC.) Dumort., Fl. Belg.: 93. 1827 ≡ *Pyrus* subgen. *Torminaria* (DC.) Reichenb., Consp. Regni Veg. 1: 168. 1828 ≡ *Sorbus* subgen. *Torminaria* (DC.) K. Koch, Hort. Dendrol. 178. 1853.

Type: *Crataegus torminalis* L. (Art. 22.6).

Description. — Trees. Leaves simple, pinnatilobate or basally pinnatisect, sparsely greenish-tomentose to glabrescent underneath, with 5–7

pairs of lateral veins, with prominent, long, acute lobes that can be nearly separated at base, with a low number of teeth. Petals white. Styles 2. Fruit rather big, dark brown, with dense small to large lenticels.

Species number. — One sexual species.

Notes on nomenclature. — The protologue of *Hahnia* Medik. included the earlier and monospecific *Torminalis* Medik. 1789, *Chamaemespilus* Medik. 1789 and *Aronia* Medik. 1789 (the latter name was illegitimate when published). Either of the two generic names, *Torminalis* or *Chamaemespilus*, should have been adopted by Medikus in 1793, making the generic name *Hahnia* superfluous and illegitimate. The first to publish the choice between the two earlier names was Pfeiffer (1874) who designated the type of *Hahnia*, *Crataegus torminalis* L. Pfeiffer designated the type with a reference to "*Crataegus torminalis* Jacq." that is *Crataegus torminalis* L. in Jacquin (1778); this reference is acceptable in type designations (Sennikov 2015).

1.

Torminalis glaberrima (Gand.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus glaberrima* Gand., Fl. Lyon.: 90. 1875 ≡ *Sorbus torminalis* f. *glaberrima* (Gand.) Hegi, Illustr. Fl. Mitteleur., 4(2): 720. 1923.

Described from France ("bois à Dardilly, Charbonnières, Saint-Bonnet-le-Froid (Rhône)"). Type not designated.

= *Sorbus torminalis* (L.) Crantz, Stirp. Austr. Fasc. 2: 45. 1763 ≡ *Crataegus torminalis* L., Sp. Pl.: 476. 1753 ≡ *Mespilus torminalis* (L.) F.H. Wigg., Prim. Fl. Holsat.: 38. 1780 ≡ *Pyrus torminalis* (L.) Ehrh., Beitr. Naturk. 6: 92. 1791 ≡ *Hahnia torminalis* (L.) Medik., Gesch. Bot.: 81. 1793 ≡ *Lazarolus torminalis* (L.) Borkh. in Arch. Bot. 1: 88. 1798 ≡ *Azarolus torminalis* (L.) Borkh., Theor. Prakt. Handb. Forstbot. 2: 1235. 1803 ≡ *Pyrenia torminalis* (L.) Clairv., Man. Herb. Suisse: 162. 1811 ≡ *Pyrus septiloba* Stokes, Bot. Mat. Med. 3: 121. 1812, nom. illeg. superfl. ≡ *Malus torminalis* (L.) Risso, Hist. Nat. Prod. Eur. Mérid. 2: 425. 1826 ≡ *Torminaria clusii* M. Roem., Fam. Nat. Syn. Monogr. 3: 130. 1847, nom. illeg. superfl. ≡ *Torminaria vulgaris* Schur, Enum. Pl. Transsilv.: 207. 1866, nom. illeg. superfl. ≡ *Aria torminalis* (L.) Beck, Fl. Nieder-Österreich 2(1): 713. 1892 ≡ *Torminaria torminalis* (L.) Dippel, Handb. Laubholzk. 3: 387. 1893 ≡ *Torminalis clusii* K.R. Robertson & J.B. Phipps in Syst. Bot. 16: 390. 1991.

Type: Herb. Burser XXIV: 4 (UPS, lectotype designated by Jonsell & Jarvis (2002: 74)).

= *Sorbus perincisa* Borbás & Fekete in Oesterr. Bot. Z. 39: 223. 1889 ≡ *Sorbus torminalis* var. *perincisa* (Borbás & Fekete) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 696. 1906 ≡ *Sorbus torminalis* subsp. *perincisa* (Borbás & Fekete) Jáv., Magyar Fl. [2]: 481. 1924.

Described from Budapest, Hungary ("Auwinkel [Zugliget] bei Ofen [Buda]"). Type not designated.

= *Sorbus guadarramica* Pau in Bol. Soc. Aragonesa Ci. Nat. 15: 161. 1916.

Described from Spain ("Paular: VIII.1912 (*Vicioso y Beltrán*)"). Type not traced.

= *Sorbus torminalis* subsp. *kissii* Jáv. in Bot. Közl. 34: 220. 1939 ≡ *Sorbus torminalis* var. *kissii* (Jáv.) Soó in Jávorka & Soó, A magyar növényvilág kézikönyve 1: 245. 1951.

Described from Hungary ("ad Sárospatak in declivibus montis Sinka"). Type: (BP 595344, lectotype, designated by Kováts (1998: 122) but probably to be treated as holotype).

= *Sorbus orientalis* Schönb.-Tem. in Rechinger, Fl. Iranica 66: 47. 1969 ≡ *Sorbus torminalis* var. *orientalis* (Schönb.-Tem.) Gabrielian in Davis, Fl. Turkey 4: 156. 1972 ≡ *Sorbus torminalis* f. *orientalis* (Schönb.-Tem.) Browicz in Arbor. Kórnickie 19: 26. 1974 ≡ *Torminalis orientalis* (Schönb.-Tem.) K.R. Robertson & J.B. Phipps in Syst. Bot. 16: 390. 1991.

Type: Iran. Mazandaran Province: "Inter Kinch et Dasht Nazir, 800–1300 m", *K. Rechinger 6647* (W, holotype).

Distribution. — Albania, Austria, Belgium, Bosnia & Herzegovina, Bulgaria, Crimea, Czech Republic, Croatia, Denmark, France, Germany, Greece, Hungary, Italy, Kosovo, Luxembourg, Macedonia, Moldova, Montenegro, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine, United Kingdom. Outside Europe the species is present in North-West Africa, Anatolia, Asia Minor, the Caucasus and northern Iran.

Ploidy level. — Diploid, 2n=34 (Pogan et al. 1980; Uhríková & Feráková 1980; Jankun & Kovanda 1987, 1988; Měsíček & Javůrková-Jarolímová 1992; Dobeš et al. 1997; Aldasoro et al. 1998; Marhold et al. 2007; Pellicer et al. 2012). Casually triploid (Hamston et al. 2015). Tetraploid counts (e.g. Aldasoro et al. 1998) are referable to different apomictic species of hybrid origin.

Notes on nomenclature. — The name *Sorbus perincisa* is sometimes cited as validly published in Fekete (1889) who, however, described (in Hungarian) an unnamed infraspecific variant of *S. torminalis* that was discovered in a common excursion in the Buda Mts. with other botanists including V. Borbás. The first instance of fulfilling conditions for valid publication of *S. perincisa* is Borbás & Fekete (1889) which was supposed to be a bibliographic review of Fekete (1889) but went far beyond the purpose by contributing an accepted name at the rank of species, a brief description of the taxon in German, and a precise indication of the original locality. This makes the text of Borbás & Fekete (1889) not a review but an original contribution with its own scientific content. The authorship of Borbás & Fekete (1889) was not explicitly stated in the place of publication. It appeared under the collective title of "Litteratur-Uebersicht" along with a number of other short contributions, of which only the last was signed. This authorship is determined by the authorship of the species name, on the assumption that it was most likely Borbás who contributed the entry to the journal.

Notes on taxonomy. — Many infraspecific taxa at the level of variety and forma have been separated on the basis of minor variations in the leaf shape and pubescence (e.g. Kárpáti 1960; Kovanda 1997b). Since such forms have no taxonomic significance in this widespread and sexual species, they are not listed in the synonymy here.

Hedlundia **Sennikov & Kurtto [*Aria* × *Sorbus*]**

Hedlundia Sennikov & Kurtto, **gen. nov.**
Type: *Crataegus hybrida* L. ≡ *Sorbus hybrida* (L.) L.

= *Sorbus* sect. *Lobatae* Gabrielian, Ryabiny Zapadnoi Azii i Gimalaev: 119. 1978.
Type: *Sorbus persica* Hedl.

= *Sorbus* sect. *Duales* Zaik. in Bot. Zhurn. 71: 813. 1986.
Type: *Sorbus roopiana* Bordz.

= *Sorbus* subgen. *Soraria* Májovský & Bernátová in Acta Horticult. Regiotect. 4: 21. 2001, pro subgen.
Type: *Sorbus mougeotii* Soy.-Will. & Godr.

Etymology. — The new genus is dedicated to Johan Teodor Hedlund (1861–1953), the renowned Swedish expert in *Sorbus*, who contributed very much to the early understanding of the *Sorbus hybrida* aggr. in Scandinavia and Britain.

Description. — Small trees or shrubs. Leaves simple, pinnatilobate or basally pinnate, white- or greenish-tomentose underneath, with 7–15 pairs of lateral veins, with small to prominent, long, subacute to obtuse lobes or basally leaflets, with a variable number of teeth. Petals white. Styles 2–3. Fruit medium-sized, red to crimson, with few to sparse small lenticels.

Origin. — *Aria* (Pers.) Host × *Sorbus* L.

Species number. — One sexual hybrid and 39 apomictic species with 2 hybrids are currently recognized in Europe.

Notes on nomenclature. — The nothogeneric name *Ariosorbus* Koidz. was used for nothospecies and hybrids between representatives of *Aria* and *Sorbus*. Since this name was validly published as the name of a new genus rather than a nothogenus (Koidzumi 1934), it cannot be used solely for nothotaxa.

The name *Sorbus* subgen. *Soraria* Májovský & Bernátová was validly published as the name of a subgenus, as correctly accepted by Rich et al. (2010), rather than of a nothosubgenus, as interpreted by Mezhensky et al. (2012).

This new generic name is established to accommodate hybridogenous taxa which originated from crosses between various species of *Aria* and *Sorbus*. This taxon is treated as a genus, not as a nothogenus. When the genus *Micromeles* is acepted as separate from *Aria*, as the latest phylogeny suggests (Lo & Donoghue 2012), the name *Ariosorbus* cannot be applied to hybrids between members of *Aria* and *Sorbus*, and a new generic name is required.

Sexual diploid hybrid

1.

Hedlundia* ×*thuringiaca (Nyman) Sennikov & Kurtto, **comb. nov.** ≡ ”*Pyrus thuringiaca*” Ilse in Jahrb. Königl. Akad. Gemeinnütz. Wiss. Erfurt, nov. ser. 4: 109. 1866, nom. inval. (Art. 24.1) ≡ *Sorbus hybrida* var. *thuringiaca* Nyman, Consp. Fl. Eur. [2]: 241. 1879 ≡ *Pyrus thuringiaca* (Nyman) Ruhmer in Jahrb. Königl. Bot. Gart. Berlin 1: 232. 1881 ≡ *Aria thuringiaca* (Nyman) Beck, Fl. Nieder-Österreich 2: 711. 1892 ≡ *Sorbus thuringiaca* (Nyman) Fritsch in Kerner, Sched. Fl. Exs. Austro-Hung. 7: 16. 1896 ≡ *Sorbus semipinnata* var. *thuringiaca* (Nyman) Hedl. in Kongl. Svenska Vetensk. Acad. Handl. 35(1): 57. 1901.

Type: Germany. Thuringia: ”Walperholz bei Arnstadt”, 1868, *Wiessner* (LUX No. 7156 A, lectotype designated by Velebil & Businský (2016: 353); isolectotype JE).

= *Sorbus semipinnata* Hedl. in Kongl. Svenska Vetensk. Acad. Handl. 35(1): 55 (1901), nom. illeg., non Borbás 1883 ≡ *Sorbus pinnatifida* Düll in Ber. Bayer. Bot. Ges. 34: 58. 1961.

Described from Central Europe. Type: [illustration in] Kongl. Svenska Vetensk. Acad. Handl. 35(1): 56, fig. 10b. 1901 (neotype designated by Velebil & Businský (2016: 353), as ”lectotype”).

= *Sorbus quercifolia* Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 45. 1901

Type: Cultivated in Uppsala Botanic Garden, 01.06. 1894, *T. Hedlund 642* (UPS, lectotype designated by Rich et al. (2006: 204)).

Distribution. — France, Switzerland, Germany, Austria, Hungary, Slovakia, Romania, United Kingdom. It can be found in other countries with the co-occurrence of the parental species.

Ploidy level. — Diploid, 2n=34 (Pellicer et al. 2012).

Notes on nomenclature. — ”*Pyrus thuringiaca*” Ilse (1866: 109) was described as an unranked infraspecific taxon subordinated to the hybrid formula *P. aria* × *P. aucuparia*. It was not validly published under Art. 24.1 and 32.1.

The name *Sorbus thuringiaca* is sometimes credited to H. Schönach (http://www.ipni.org/ipni/idPlantNameSearch.do?id=742012-1) who was only the collector of the specimen that was identified and named by K. Fritsch (Fritsch 1896).

Velebil & Businský (2016) intended to validly publish the name *Sorbus pinnatifida* Düll on the belief that it was not validly published by Düll. Düll (1961) wrote that his new name is a combination based on ”*Pyrus pinnatifida* Smith, Engl. Bot. 33 (1796), t. 2331 (excl. const. spec.)” that is a re-use of Ehrhart’s name by Smith (Velebil & Businský 2016). At the same time Düll also cited a number of other names in synonymy, all but one (*Sorbus semipinnata* Hedl.) as misapplications and excluding original types. Technically Düll’s name was validly published as a replacement (nomen novum) for Hedlund’s name, based on the same type and description. Velebil & Businský (2016) published no nomenclatural novelty because they did not accept the presumed new name (Art. 33.1), which otherwise would have been an isonym.

Sorbus pinnatifida Düll is not an illegitimate name. Although Düll subordinated *S. thuringiaca* to this species at the rank of nothomorph, for its name he provided a full and direct reference to Ilse (1866) which is not the actual place of valid publication of the intended basionym.

Notes on taxonomy. — This taxon is confirmed to be a hybrid between *Aria edulis* and *Sorbus aucuparia*. Its plants are morphologically variable, and originated many times independently in various places. It has not been mapped for *Atlas Florae Europaeae*.

Apomictic taxa, British Isles

2.

Hedlundia minima (Ley) Sennikov & Kurtto, **comb. nov.** ≡ *Pyrus minima* Ley in J. Bot. 33: 84. 1895 ≡ *Sorbus minima* (Ley) Hedl. in Kongl. Svenska Vetensk. Akad. Handl. 35(1): 61. 1901.

Type: United Kingdom. Wales: Blaen Onnon, Breconshire, limestone rocks (at 800–1000 ft), 12.06.1893, *A. Ley* (BIRM, lectotype designated by Rich et al. (2006: 204)).

Distribution. — United Kingdom (Wales: Breconshire).

Ploidy level. — Triploid, 2n=51 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012).

An earlier tetraploid report (Bailey et al. 2008) has not been accepted (Rich et al. 2010).

Notes on nomenclature. — The earlier type designation by Aldasoro et al. (2004: 117–118) has the status of neotype and has been superseded by Rich et al. (2006).

3.

Hedlundia arranensis (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus arranensis* Hedl. in Kongl. Svenska Vetensk. Akad. Handl. 35(1): 60. 1901 ≡ *Pyrus arranensis* (Hedl.) Druce, British Plant List, ed. 2: 41. 1928.

Type: United Kingdom. Scotland: Glen es na Verach, Arran, 10.09.1897, *A. Craig-Christie* [sheet with complete specimen] (UPS, lectotype designated by P.D. Sell in Rich et al. (2006: 204)).

Distribution. — United Kingdom (Scotland: Isle of Arran).

Ploidy level. — Triploid, 2n=51 (McAllister in Bignal 1980; Nelson-Jones et al. 2002; Bailey et al. 2008).

4.

Hedlundia leyana (Wilmott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus leyana* Wilmott in Proc. Linn. Soc. Lond. 146: 78. 1934.

Type: United Kingdom. Wales: Above Dan-y-Graig near Merthyr Tydfil, Breconshire, 20.06.1932, *A.J. Wilmott 4088* (BM, holotype; isotype NMW).

Distribution. — United Kingdom (Wales: Breconshire).

Ploidy level. — Triploid, 2n=51 (Nelson-Jones et al. 2002; Pellicer et al. 2012).

5.

Hedlundia ×motleyi (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus ×motleyi* T.C.G. Rich in Watsonia 27: 211. 2009.

Type: United Kingdom. Wales: Coed Penmaillard, Brecon (v.c. 42), 11.06.2002, *T.C.G. Rich* (NMW, holotype),

Distribution. — United Kingdom (Wales: Breconshire).

Ploidy level. — Tetraploid, 2n=68 (Pellicer et al. 2012).

Notes on taxonomy. — This taxon is considered to be a hybrid between *Hedlundia leyana* and *Sorbus aucuparia* (Rich et al. 2010). It is not established and has not been mapped for *Atlas Florae Europaeae*.

6.

Hedlundia anglica (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus anglica* Hedl. in Nyt Mag. Naturvidensk. 52: 258. 1914, nom. altern. ≡ *Sorbus mougeotii* subsp. *anglica* Hedl. in Nyt Mag. Naturvidensk. 52: 258. 1914, nom. altern. ≡ *Sorbus mougeotii* var. *anglica* (Hedl.) C.E. Salmon in J. Bot. 68: 173. 1930.

Type: United Kingdom. Wales: ”Craig Cille” [Craig y Cilau], 04.06.1895, *A. Ley 17* in Herb. Hedlund 155 (UPS, lectotype designated by Rich et al. (2006: 203)).

= *Sorbus waltersii* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 521. 2014, **syn. nov.**

Type: United Kingdom. England: Cultivated on the Ecological Mound, University Botanic Garden, Cambridge, v.c. 29, 52/435572, 19.09.2002, *P.D. Sell 02/1406* (CGE, holotype). Origin: Seed collected from a tree at Kingskerswell, S. Devon, v.c. 3, *S.M. Walters 314/53*.

Distribution. — United Kingdom (England, Wales), Ireland.

Ploidy level. — Tetraploid, 2n=68 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012). Earlier reports of triploid counts (Bailey et al. 2008; Houston et al. 2009) are considered unreliable (Pellicer et al. 2012).

Notes on nomenclature. — The earlier choice of the lectotype published by Wilmott (1939) has been superseded by Rich & al. (2006).

Notes on taxonomy. — When originally described (Sell & Murrell 2014), *Sorbus waltersii* was distinguished from *S. anglica* in its ”scarcely” (vs. ”obviously” in *S. anglica*) lobed leaves. Morphological analysis, including material from the cultivated type tree in CGE which is significantly more lobed than illustrated, indicates that this simply part of the variation in the widespread *S. anglica* (= *H. anglica*) and the South Devon plant cannot be consistently separated from all the other populations (T.C.G. Rich, pers. comm. 2016).

7.

Hedlundia cuneifolia (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cuneifolia* T.C.G. Rich in Watsonia 27: 209. 2009.

Type: United Kingdom. Wales: Creigiau Eglwyseg (Cefn Fedw), Llangollen, v.c. 50 Denbighshire, 10.07.2002, *T.C.G. Rich & S.O. Hand* (NMW, holotype).

Distribution. — United Kingdom (Wales).

Ploidy level. — Tetraploid, 2n=68 (Pellicer et al. 2012).

8.

Hedlundia scannelliana (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus scannelliana* T.C.G. Rich in Watsonia 27: 213. 2009.

Type: Ireland. Wooded limestone ridge east of Blue Pool, Ross Island, Killarney, V946881, v.c. H2 North Kerry, 09.09.2008, *R. Hodd, A. McVeigh & T.C.G. Rich* (NMW, holotype; isotypes BEL, BM, DBN, TCD).

Distribution. — Ireland (North Kerry).

Ploidy level. — Possibly triploid, not confirmed (Rich et al. 2010).

9.

Hedlundia pseudofennica (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudofennica* E.F. Warb. in Watsonia 4: 43. 1957.

Type: United Kingdom. Scotland: v.c. 100, Clyde Is., Arran, Glen Catacol, 09.1937, *E.F. Warburg* 224 (BM, holotype).

Distribution. — United Kingdom (Scotland: Isle of Arran).

Ploidy level. — Tetraploid, 2n=68 (Bignal 1980; Bailey et al. 2008).

10.

Hedlundia pseudomeinichii (Ashley Robertson) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudomeinichii* Ashley Robertson in Watsonia 26: 9. 2006.

Type: United Kingdom. Scotland: Arran (v.c. 100), Glen Catacol, main burn, east bank, 01.06.2004, *A. Robertson* (NMW V.2004.017.21, holotype).

Distribution. — United Kingdom (Scotland: Isle of Arran).

Ploidy level. — Possibly triploid, not confirmed (Rich et al. 2010).

11.

Hedlundia neopinnatifida (P.D. Sell) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus neopinnatifida* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 523. 2014.

Type: United Kingdom. Cult. in University Botanic Garden, Cambridge, v.c. 29, 05.10.2001, *P.D. Sell 01/260* (CGE, holotype). Origin: Seed collected from a tree planted by a road at right angles to Bancks Street, Minehead, S. Somerset, v.c. 5, 21/971461, *J. Bevan*.

Distribution. — United Kingdom (cultivation).

Ploidy level. — Triploid, 2n=51 (Sell & Murrell 2014).

Notes on Distribution. — This taxon is an established apomictic hybrid described recently from cultivation in the Great Britain. It regularly escapes from cultivation but is not considered naturalised anywhere (T. Rich, pers. comm. 2016), and has consequently not been mapped for *Atlas Florae Europaeae*.

Apomictic taxa, Northern Europe

12.

Hedlundia subarranensis (Hyl. ex Sennikov, Hjertson & Salvesen) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus subarranensis* Hyl. ex Sennikov, Hjertson & Salvesen in Ann. Bot. Fenn. 53: 9. 2016; Hyl., Fört. Nordens Växter 1: 80. 1955, nom. inval. (Art. 38.13).

– *Sorbus arranensis* auct.: Hedlund (1914: 181), p.p.

Type: Norway. Hardanger: Strandebarm, Tuften, 12.06. 1912, *T. Lillefosse* (UPS, holotype).

Distribution. — Norway (Hordaland).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953: 280, as *Sorbus arranensis*).

Notes on nomenclature and taxonomy. — This apomictic taxon was originally included in *S. arranensis* Hedl. (Hedlund 1914). Hylander (1955), who was the first to recognize the difference, coined the new species name but failed to provide a full and direct reference to the Latin description in Hedlund (1914). Further on the species was largely accepted (e.g. Elven 2005; Grundt & Salvesen 2011) but with descriptions in Norwegian language only. In order to make the species name formally available for the taxon, Sennikov et al. (2016) provided a brief diagnosis based on

the description in Grundt & Salvesen (2011). The distribution area is according to the same authors.

13.

Hedlundia sognensis (Hedl. ex Sennikov, Hjertson & Salvesen) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus sognensis* Hedl. ex Sennikov, Hjertson & Salvesen in Ann. Bot. Fenn. 53: 7. 2016; Hedl. in Bot. Not. 1948: 382. 1948, nom. inval. (Art. 39.1) ≡ *Sorbus lancifolia* f. *sognensis* [Hedl.] Lid, Norsk Svensk Fl., ed. 2: 414. 1974, nom. inval. (Art. 39.1).

Type: Norway. Sogn [Sogn and Fjordane]: Amble, 16.07. 1923, *G.F. Heiberg* in Herb. Hedlund 78 (UPS, holotype); Herb. Hedlund 79, 80 (UPS, isotypes).

Distribution. — Norway (Sogn og Fjordane).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953).

Notes on nomenclature and taxonomy. — Hedlund (1948) published a brief diagnosis of this species in the Swedish language. Further treatments (e.g. Elven 2005; Grundt & Salvesen 2011) accepted the species but were accompanied with descriptions in the Norwegian language. In order to make the species name formally available for the taxon, Sennikov et al. (2016) provided a brief diagnosis based on the description in Grundt & Salvesen (2011). The distribution area is according to the same authors.

14.

Hedlundia subpinnata (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus subpinnata* Hedl. in Nyt Mag. Naturvidensk. 49: 198. 1911.

Type: Norway. Telemark county: ”Porsgrund [Porsgrunn municipality], inter Kulletangen et Øienkast”, 16.07.1901, *J. Dyring* in Herb. Hedlund 73 (UPS, lectotype designated by Sennikov et al. (2016: 11)); Herb. Hedlund 74, 75 (UPS, isolectotypes).

Distribution. — Norway (south).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953).

15.

Hedlundia neglecta (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus arranensis* [unranked] *neglecta* Hedl. in Skr. Vidensk.-Selsk. Kristiania. Mat.-Naturvidensk. Kl. 1914(4): 181. 1915 ≡ *Sorbus arranensis* subsp. *neglecta* (Hedl.) O.C. Dahl in Skr. Vidensk.-Selsk. Kristiania. Mat.-Naturvidensk. Kl. 1914(4): 115. 1915 ≡ *Sorbus arranensis* f. *neglecta* (Hedl.) Nordh., Norsk Fl. Textbind: 340. 1940 ≡ *Sorbus neglecta* (Hedl.) Hedl. in Uppsala Univ. Årsskr. 1945: 221. 1945.

Type: Norway. Helgeland: Bindalen, Reppen, 12.06. 1913, *O. Dahl* in Herb. Hedlund 119 (UPS, lectotype designated by Sennikov et al. (2016: 5)); Herb. Hedlund 118 (UPS, isolectotype).

Distribution. — Norway (Nordland).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953).

16.

Hedlundia lancifolia (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus lancifolia* Hedl. in Skr. Vidensk.-Selsk. Kristiania. Mat.-Naturvidensk. Kl. 1911(6): 166. 1912.

Type: Norway. Helgeland: Tomma, Langaasen paa kalk, 22.08.1909, *O. Dahl* in Herb. Hedlund 62 (UPS, lectotype designated by Sennikov et al. (2016: 4)).

Distribution. — Norway (Nordland).

Ploidy level. — Triploid, 2n=51 (Liljefors 1934, 1953).

17.

Hedlundia subsimilis (Hedl.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus subsimilis* Hedl. in Nyt Mag. Naturvidensk. 52: 257. 1914.

Type: Norway. Elven vest fra Aamot, Sogndal, *J. Dyring* in Herb. Hedlund 166 (UPS, lectotype designated by Rich et al. (2006: 205); isolectotype O).

Distribution. — Norway (south).

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1953).

18.

Hedlundia hybrida (L.) Sennikov & Kurtto, **comb. nov.** ≡ *Crataegus hybrida* L., Fauna Suec.: 557. 1761 ≡ *Sorbus hybrida* (L.) L., Sp. Pl., ed. 2, 1: 684. 1762 ≡ *Pyrus hybrida* (L.) Sm., Fl. Brit. 2: 534. 1800, non Moench 1785 ≡ *Pyrus semipinnata* Roth, Enum. Pl. Phaen. Germ. 1(2): 438. 1827, nom. illeg., non Bechst. 1821 ≡ *Aria hybrida* (L.) Beck, Fl. Nieder-Österreich 2(1): 711. 1892 ≡ *Sorbus aucuparia* subsp. *hybrida* (L.) Bonnier & Layens, Tabl. Syn. Pl. Vasc. France: 103. 1894 ≡ *Ariosorbus hybrida* (L.)

Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012, pro hybr.

Type: Herb. Linnaeus no. 644.4 (LINN, neotype designated by Jonsell & Jarvis (2002: 76), as ”lectotype”).

= *Crataegus fennica* Kalm, Fl. Fenn. 1: 6. 1765 ≡ *Pyrus pinnatifida* Ehrh., Beitr. Naturk. 6: 93. 1791, nom. illeg. superfl. ≡ *Hahnia pinnatifida* [Ehrh.] Medik., Gesch. Bot.: 82. 1793, nom. illeg. superfl. ≡ *Lazarolus pinnatifida* [Ehrh.] Borkh. in Arch. Bot. 1: 88. 1798, nom. illeg. superfl. ≡ *Azarolus pinnatifida* [Ehrh.] Borkh., Theor. Prakt. Handb. Forstbot. 2: 1245. 1803, nom. illeg. superfl. ≡ *Pyrus aria* var. *pinnatifida* [Ehrh.] Hook., Brit. Fl., ed. 4, 1: 197. 1838 ≡ *Sorbus fennica* (Kalm) Fr., Summa Veg. Scand.: 42. 1845 ≡ *Pyrus fennica* (Kalm) Bab., Man. Brit. Bot., ed. 3: 111. 1851 ≡ *Pyrus aria* subsp. *fennica* (Kalm) Syme, Engl. Bot., ed. 3B, 3: 247. 1864 ≡ *Aria pinnatifida* [Ehrh.] Lavallée, Énum. Arbres: 101. 1877, nom. illeg. superfl.

Type: Herb. Linnaeus no. 644.4 (LINN, neotype designated by Velebil & Businský (2016: 356), as ”lectotype”).

Distribution. — Denmark, Estonia, Finland, Latvia, Norway, Sweden, United Kingdom (Great Britain). Naturalized in Italy.

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1934, 1953; Pellicer et al. 2012). A tetraploid count from Spain (Aldasoro et al. 1998) may not belong to this species.

Notes on nomenclature. — The nomenclature of ”*Sorbus hybrida*” is controversial. Hensen (1958) traced that the earliest description of this taxon appeared under ”*Crataegus fennica* Kalmii” in Linnaeus (1755), and the first name applicable to this taxon is *Crataegus hybrida* in Linnaeus (1761), which apparently predates *Sorbus hybrida* in Linnaeus (1762b). Sell (1989) was aware of the latter name but decided that *C. hybrida* was not validly published in Linnaeus (1761) because this name was not accompanied by any descriptive matter in that book. This conclusion was accepted by Jarvis (2007).

Although Linnaeus (1761) provided no description or diagnosis of his *C. hybrida*, he stated in its entry that this plant is a hybrid between ”*Sorbus* 435” and ”*Crataegus* 433”, thus providing indirect references to the accounts of *Crataegus aria* and *Sorbus aucuparia* in Linnaeus (1755: 166–168). Of these two, the treatment of *C. aria* includes the unnamed variety γ that is said to have pinnate leaves with the apical leaflets connate, being seemingly intermediate between those of *Sorbus* and *Crataegus* (”Folia […] foliolis pinnatis & distinctis, sed extima confluunt in unum; […] haec Folia quasi media inter Sorbum & Crataegum sunt”). This statement matches the postulated hybrid origin of *C. hybrida*, further corroborated with a reference to the material collected by Kalm that is common to both accounts, of *C. hybrida* and *C. aria* var. γ. This match makes strong evidence that *C. hybrida* and *C. aria* var. γ were considered to belong to the same taxon by Linnaeus (1761, 1762b), and his mention of the presumed parental species of *C. hybrida* constitutes an indirect reference to the diagnosis of *C. aria* var. γ in Linnaeus (1755). Since the name *C. hybrida* is therefore accompanied by an indirect reference to a description of the taxon, it is validly published in Linnaeus (1761). The name *S. hybrida* should be treated as a new combination based on *C. hybrida*.

The original material of *C. hybrida* is determined by Art. 7.7. The account of *C. aria* var. γ in Linnaeus (1755) is accompanied with mention of some material from ”Finland” that was sent to Linnaeus by Pehr Kalm. The precise origin of this material can be found in Linnaeus filius (1767: 11), in which there is a statement that the plants were collected by Kalm at Åbo (Turku, Finland) in 1753. Later material of this species from Gotland, Sweden, mentioned in Linnaeus (1761) and Linnaeus filius (1767), is not linked to the context of the validating diagnosis and cannot be considered in lectotypification.

There are two specimens in the Linnaean Herbarium (LINN) that belong to *S. hybrida*. The specimens were collected in Gotland, most likely by Kalm as specified in Linnaeus (1761). One of those specimens, Herb. Linnaeus 644.4, was designated as the lectotype of *S. hybrida* by Jonsell & Jarvis (2002). Since this type was selected from the context of Linnaeus (1762b), not that of Linnaeus (1755), it has the status of neotype (Art. 9.9). The original specimen collected by Kalm in Finland has not been traced and likely is no longer in existence; for this reason the type designation of Jonsell & Jarvis (2002) may stand (Art. 9.7).

Crataegus aria var. γ in Linnaeus (1755) is sometimes treated as validly published as "*C. aria* var. *fennica*". This varietal name did not appear in print in Linnaeus (1755); instead, Linnaeus cited "*Crataegus fennica* Kalmii" as a synonym of this unnamed variety, thus indicating the unpublished name under which he had received the original specimen of this taxon from Kalm under the unpublished species name *C. fennica*. The name *C. fennica* was validly published later in a dissertation defended by Wilhelm Granlund but superwised and written by Kalm (1765), solely by reference to "433 γ" that is the taxon's number in Linnaeus (1755). The original material of *C. fennica* is thus the same as that of *C. hybrida*; the name *C. fennica* is taxonomically superfluous but not illegitimate under Art. 52.1. For convenience the same neotype is designated for this name as that of *C. hybrida*.

The protologue of *Pyrus pinnatifida* Ehrh. included citations of two earlier legitimate species names, *S. hybrida* and *C. fennica*, of which the second should have been adopted under the rules. Ehrhart's species name is therefore illegitimate on the account of its superfluity (Art. 52.1).

19.

Hedlundia meinichii (Lindeb. ex Hartman) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aucuparia* subsp. *meinichii* Lindeb. ex Hartman, Handb. Skand. Fl., ed. 11: 271. 1879 ≡ *Sorbus meinichii* (Lindeb. ex Hartman) Hedl. in Kongl. Svenska Vetensk. Akad. Handl. 35(1): 139. 1901.

Type: Norway. Hordaland: Mosterö, 1875, *R. Hartman* (UPS 73205, lectotype designated by Bolstad & Salvesen (1999: 555)).

Distribution. — Norway (south-west).

Ploidy level. — Triploid, 2n=48–51 for the species *sensu stricto* (Bolstad & Salvesen 1999). Tetraploid counts, 2n=68 (Liljefors 1953; Bolstad & Salvesen 1999) likely belong to other closely related taxa.

Notes on taxonomy. — Populations occurring in Norway (south), Sweden, Finland and Latvia were included in *S. meinichii* in the past. They belong to a number of entities to be recognized at the species level in the future.

20.

Hedlundia teodori (Liljef.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus teodori* Liljef. in Acta Horti Berg. 16: 283. 1953.

Type: Sweden. Gotland: in insula Fårö, 09.1950, *A. Liljefors 16* (S, holotype).

Distribution. — Sweden (Gotland).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953, 1972).

Notes on taxonomy. — This species was reported from other territories of Sweden, as well as from Finland (Åland Islands) and Latvia. These records belong to *S. meinichii* s.l. (= *H. meinichii* s.l.) or other hybrids, and their identity has not been resolved.

Apomictic taxa, Central Europe

21.

Hedlundia gauckleri (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus gauckleri* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 96. 2005.

Type: Germany. Kiefernforst am "Hohen Berg" auf der Houbirg bei Happurg, (6534/22), 01.07.2001, *N. Meyer & O. Angerer* (M, holotype).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

22.

Hedlundia pseudothuringiaca (Düll) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudothuringiaca* Düll in Ber. Bayer. Bot. Ges. Sonderband: 93. 2005; Düll in Ber. Bayer. Bot. Ges. 34: 55. 1961, nom. inval. (Art. 40.1).

Type: Germany. Bayern: Westlich Treuf oberhalb des Weges nach Hohenstein im lichten Wald über Weißjura (Dolomit) bei ca. 500 m, 14.09.1960, *R. Düll* (M, holotype).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

Notes on nomenclature. — Düll (1961) published the designation "*Sorbus pseudothuringiaca*" with two gatherings as types, one in fruit and the other in flower. Meyer et al. (2005) stated that the gathering in fruit is the type and the other in flower is the paratype, ascribed the species name to Düll, and provided a full and direct reference to the val-

idating description of Düll. The name *S. pseudothuringiaca* has therefore been validly published in Meyer et al. (2005) on behalf of Düll (Art. 46.2).

23.

Hedlundia harziana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus harziana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 100. 2005.

Type: Germany. Bayern: Dolomitfelsen am Geierstein südlich Neudorf (5933/23), 19.05.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

24.

Hedlundia hohenesteri (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus hohenesteri* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 103. 2005.

Type: Germany. Bayern: Felsbänder auf den "Katzenköpfen" östlich Leutenbach (6233/3), 19.05.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

25.

Hedlundia pulchra (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pulchra* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 106. 2005.

Type: Germany. Bayern: Waldsaum zwischen Ezdorf und Gößweinstein westlich des Aussichtsfelsens, (6233/2), 19.05.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

26.

Hedlundia schwarziana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus schwarziana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 110. 2005.

Type: Germany. Bayern: Steinhügel im Grasland südwestlich Frechetsfeld (6535/41), 01.07.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG, STU, private herbarium of Meyer).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

27.

Hedlundia lonetalensis (S. Hammel & Haynold) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus lonetalensis* S. Hammel & Haynold in Jahresh. Ges. Naturk. Württemberg 171: 79. 2015.

Type: Germany. Baden-Württemberg, Schwäbische Alb: MTB 7427/1, R-H 3586358/5380085, Waldsaum im Gewann Gemeindle südlich von Herbrechtingen-Bissingen ob Lonetal, 480 m ü NN, 09.09.2014, *S. Hammel* (STU, holotype; isotype ULM).

Distribution. — Germany (Baden-Württemberg).

Ploidy level. — Tetraploid, 2n=68 (Hammel et al. 2015).

28.

Hedlundia pekarovae (Májovský & Bernátová) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pekarovae* Májovský & Bernátová in Biologia (Bratislava) 51: 25. 1996.

Type: Slovakia. Veľká Fatra, l. d. Pekárová (1,067 m) (saxum), ca 820–1066 m s. m. in declivibus meridionali-occidentalibus frequentissima, 04.10.1992, *J. Májovský & D. Bernátová* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Žilina Region, Blatnica District).

Ploidy level. — Reported as diploid (Májovský & Bernátová 1996) but apparently in error (see the note by P. Mráz at the bottom of page 555 in Marhold et al. 2007).

29.

Hedlundia austriaca (Beck) Sennikov & Kurtto, **comb. nov.** ≡ *Aria mougeotii* var. *austriaca* Beck, Fl. Nieder-Österreich 2(1): 714. 1892 ≡ *Sorbus mougeotii* subsp. *austriaca* (Beck) Hedl. in Kongl. Svenska Vetensk. Akad. Handl. 35(1): 65. 1901 ≡ *Sorbus austriaca* (Beck) Hayek, Sched. Fl. Stir. Exs. 3: 9. 1905 ≡ *Pyrus austriaca* (Beck) H. Lindb., Öfvers. Finska Vetensk.-Soc. Förh. 48(13): 46. 1906, non A. Kerner 1896 ≡ *Sorbus mougeotii* var. *austriaca* (Beck) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 694. 1906 ≡ *Sorbus aria*

subsp. *austriaca* (Beck) Bornm. in Mitth. Thüring. Bot. Vereins 30: 54. 1913.

Type: Austria. Niederösterreich: Im Rettenbachgraben bei Prein, 05.08.1882, *G. Beck* (PRC 455074, lectotype designated by M. Lepší [ined.]; isolectotype PRC 455073).

Distribution. — Albania, Austria, Bosnia and Herzegovina, Bulgaria, Montenegro, Croatia, Germany, Greece, Italy, Kosovo, Macedonia, Romania, Serbia, Slovenia. Naturalized in Czech Republic.

Ploidy level. — Tetraploid, 2n=68 (Hajrudinović et al. 2015). Reported as diploid but apparently in error (see the note by P. Mráz at the bottom of page 555 in Marhold et al. 2007).

Notes on taxonomy. — This species stands very close to *Hedlundia mougeotii*, from which it differs in the leaf blades regularly broadly ovate with the widest part being much below the middle (vs. nearly elliptic, with the widest part only slightly below the middle), broadly cuneate to subrotund (vs. cuneate) at base, and more expressed lobes.

30.

Hedlundia hazslinszkyana (Soó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* var. *hazslinszkyana* Soó in Tisia 2: 218. 1937 ≡ *Sorbus hazslinszkyana* (Soó) Boros in Agrártud. Egy. Kert- és Szőlőgazdaságtud. Karának Közlem. 13: 154. 1949; Májovsky in Acta Fac. Rerum Nat. Univ. Comen., Bot. 37: 10. 1990, isonym ≡ *Sorbus austriaca* subsp. *hazslinszkyana* (Soó) Kárpáti in Agrártud. Egy. Kert- Szőlőgazdaságtud. Karának Évk. 1: 46 & 51. 1950.

Type: Slovakia. Slovenský kras: Zádielska dolina (”Szádelői-völgy”), 06.10.1929, *Á. Boros* (BP 432396, lectotype **designated here** by L. Somlyay & Sennikov; isolectotype BP 702630).

Distribution. — Hungary (north-eastern part), Slovakia.

Ploidy level. — Tetraploid, 2n=68 (Marhold et al. 2007). Also reported as diploid (Májovský 1992; Marhold et al. 2007) but apparently in error (see the note by P. Mráz at the bottom of page 555 in Marhold et al. 2007).

Notes on nomenclature. — Boros (1949) was the first to elevate the variety of Soó to the rank of species, which he did in the comments to his new species *Sorbus vaidae* Boros. This nomenclatural act had passed unnoticed, and Májovský (Májovský & Uhríková 1990: 10) published an isonym.

Notes on taxonomy. — *Sorbus hazslinszkyana* is endemic to the Carpathians. It is most similar to *S. austriaca* (= *H. austriaca*) from which it differs in less prominent and narrower lobes of the leaves. The validating diagnosis of *S. aria* var. *hazslinszkyana*, although minimalistically brief, highlights the same character: ”planta carpatica foliis minus profunde lobatis” (Soó 1937).

31.

Hedlundia scepusiensis (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus scepusiensis* Kovanda in Willdenowia 16: 119. 1986.

Type: Slovakia. Gelnica: Gelnické hory, Folkmarská skala nad Kojšovem, váp. skály, 900 m, 13.08.1932, *P. Sillinger* (PRC 454418–454421, holotype).

Distribution. — Slovakia (Košice Region).

Ploidy level. — Unknown.

32.

Hedlundia hornadensis (Mikoláš) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus hornadensis* Mikoláš in Thaiszia 25: 22. 2015.

Type: Slovakia. Kysak village, ca. 0.5–0.6 km (S)EE in forest-steppe near little rocks, 335 m, 48°51′06″ N, 21°13′50″ E, 15.05.2012, *V. Mikoláš* (KO 31137, holotype).

Distribution. — Slovakia (Košice Region).

Ploidy level. — Tetraploid, 2n=68 (Mikoláš 2015).

33.

Hedlundia semipinnata (Borbás) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus semipinnata* Borbás, Math. Természettud. Értes. 1: 85. 1883, non *Pyrus semipinnata* Bechst. 1821, nec *Pyrus semipinnata* Roth 1827 ≡ *Sorbus dacica* Borbás in Österr. Bot. Z. 37: 404. 1887, nom. illeg. superfl.

Type: Romania. Turda: ”in rupestribus calcareis montis ‘Hegyhasadék’ ad Torda”, 09.07.1878, *V. Borbás* (M barcode M-0213775, lectotype designated by Somlyay & Sennikov (2016b: 46)).

Distribution. — Romania.

Ploidy level. — Unknown.

Notes on taxonomy. — The only record of this taxon (Kovanda 1961) from Slovakia (Torna Karst region) belongs to a different, yet unidentified taxon.

Notes on nomenclature. — The nomenclature of this species has been clarified by Somlyay & Sennikov (2016b).

34.

Hedlundia pauca (M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pauca* M. Lepší & P. Lepší in Preslia 85: 69. 2013.

Type: Czech Republic. Bohemia septentrionalis, distr. Česká Lípa, pagus Bezděz (5454c): in rupe phonolithica sub cacumine collis Bezděz; 580 m s. m., 50°32’23.3” N, 14°43’18.0” E; raro; 23.07.2011, *M. Lepší & P. Lepší* (CB [79599], holotype; PR [79599a], isotype).

Distribution. — Czech Republic (North Bohemia).

Ploidy level. — Tetraploid, 2n=68 (Lepší et al. 2013a).

35.

Hedlundia ×abscondita (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus ×abscondita* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 339. 1996.

Type: Czech Republic. Bohemia occid.-centr.: in angulo clivi Pochvalovská stráň dicti situ septentr.-orient. a pago Pochvalov (distr. Louny); solo calcifero-schistaceo, alt. 490 m, 25.05.1992, *M. Kovanda* (WU, holotype; isotypes PR).

Distribution. — Czech Republic (Bohemia).

Ploidy level. — Unknown.

Note. — A rare hybrid between *Sorbus aucuparia* and *Aria danubialis* (Kovanda 1996a). It is not considered established (Kovanda 1996a; Kaplan et al. 2016) and consequently it has not been mapped for *Atlas Florae Europaeae*.

36.

Hedlundia buekkensis (Soó) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus buekkensis* (Soó) Soó in Jávorka & Soó, A magyar növényvilág kézikönyve 1: 248. 1951 ≡ *Sorbus aria* subsp. *buekkensis* Soó in Tisia 2: 222. 1937, ”bükkensis” ≡ *Sorbus carpatica* var. (”positio”) *buekkensis* (Soó) Kárpáti in Borbásia Nova 25: unnumbered page. 1944 ≡ *Sorbus aria* var. *buekkensis* (Soó) Buia in Săvulescu, Fl. Rep. Pop. Romîne 4: 250. 1956 ≡ *Sorbus aria* f. *buekkensis* (Soó) Kovanda in Dendrol. Sborn. 3: 45. 1962.

Described from Hungary (syntypes cited). Type not designated.

Distribution. — Hungary, Slovakia.

Ploidy level. — Unknown. A diploid count from Slovakia (Marhold et al. 2007) is unreliable both on taxonomic and theoretical grounds.

Notes on taxonomy. — The distribution and circumscription of this taxon still should be properly clarified.

37.

Hedlundia borbasii (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus borbasii* Jáv. in Bot. Közlem. 14: 99. 1915.

Type: Romania. ”In monte Suskuluj, ad Thermas Herculis [Băile Herculane]”, 14.06.1901, *L. de Thaisz* (BP 209070, lectotype designated by Kovács (1998: 117); isolectotypes BP 209063, BP 209072).

Distribution. — Bulgaria, Greece, Romania.

Ploidy level. — Tetraploid, 2n=68 (Hajrudinović et al. 2015).

Notes on taxonomy. — This taxon is most similar to *Sorbus hybrida* (= *H. hybrida*) of Scandinavia and the Baltic countries, but apparently is of different origin.

Apomictic taxa, Western Europe

38.

Hedlundia legrei (Cornier) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus legrei* Cornier in Bull. Mens. Soc. Linn. Lyon 78(1–2): 29. 2009.

Type: France. Basses-Alpes (aujourd’hui Alpes-de-Haute-Provence), montagne de Lure, ubac du Pas de la Graille, niveau hêtraire, clairière sur éboulis vers 1400 m, 12.08. 1968, *P. Lieutaghi* (Herb. Bruno Cornier 1968/001, holotype; isotype Herb. Pierre Lieutaghi).

Distribution. — France (Alpes-de-Haute-Provence).

Ploidy level. — Triploid, 2n=51 (Cornier 2009).

39.

Hedlundia mougeotii (Soy.-Will. & Godr.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus mougeotii* Soy.-Will. & Godr. in Bull. Soc. Bot. France 5: 447. 1859 ≡ *Aria mougeotii* (Soy.-Will. & Godr.) Fourr. in Ann. Soc. Linn. Lyon, ser. 2, 16: 378. 1868 ≡ *Sorbus scandica* var. *mougeotii* (Soyer-Willemet & Godron) Nyman, Consp. Fl. Eur. [2]: 241. 1879 ≡ *Pyrus mougeotii* (Soy.-Will. & Godr.) Beck in M.A. Becker, Fl. Hernst. Kl. Ausg. 2: 392. 1886 ≡ *Hahnia suecica* var. *mougeotii* (Soy.-Will. & Godr.) Dippel, Handb. Laubholzk. 3: 377. 1893 ≡ *Sorbus suecica* var. *mougeotii* (Soy.-Will. & Godr.) Briq. in Bull. Trav. Soc. Bot. Genève 7: 99. 1894 ≡ *Hahnia mougeotii* (Soy.-Will. & Godr.) C.K. Schneid., Dendrol. Winterstud.: 247. 1903 ≡ *Sorbus aria* subsp. *mougeotii* (Soy.-Will. & Godr.) O. Bolòs & Vigo, Fl. Paisos Catalans 1: 413. 1984 ≡ *Ariosorbus mougeotii* (Soy.-Will. & Godr.) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012, pro hybr.

Type: France. Alsace: Barr, Bas-Rhin, 15.09.1858, *Mathieu* (NCY [lower-left specimen], lectotype designated by Aldasoro et al. (2004: 115); isolectotype LE).

= *Sorbus tomophylla* Gand., Fl. Lyon.: 90. 1875.

Described from France (”La Grande-Chartreuse, au Col”). Type not designated.

= *Sorbus quernea* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 335. 1996.

Type: Czech Republic. Bohemia centralis, Praha 7 – Troja, in nemore mixto in declivibus septentrionalibus collis Jabloňka, solo schistaceo, alt. 260 m, 10.10.1993, *M. Kovanda* (WU, holotype; isotypes PR).

Distribution. — Austria, France, Germany, Italy, Switzerland, Spain. Doubtfully present in Slovenia. Naturalised in the Czech Republic, Denmark, Norway, Sweden.

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1953; Pellicer et al. 2012; Lepší et al. 2013b). Earlier reported as triploid (Liljefors 1934) but in error (Liljefors 1953).

Notes on nomenclature. — The lectotypification of *Sorbus mougeotii* is erroneous and should be superseded (B. Cornier via M. Lepší, pers. comm. 2016).

Apomictic taxa, Balkans and Central Mediterranean

40.

Hedlundia velebitica (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus velebitica* Kárpáti in Németh, Acta Bot. Hung. 52: 395. 2010; Kárpáti in Feddes Repert. Spec. Nov. Regni Veg. 62: 190. 1960, nom. inval. (Art. 40.1).

Type: Croatia. Velebit: ”in dumetosis subalp. m. Badany [Badanj] prope Medak”, 09.08.1905, *A. de Degen* (BP 214670, holotype).

Distribution. — Croatia (Velebit).

Ploidy level. — Unknown.

41.

Hedlundia bosniaca (Hajrud., Frajman, Schönsw. & Bogunić) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus bosniaca* Hajrud., Frajman, Schönsw. & Bogunić in Bot. J. Linn. Soc. 178(4): 682. 2015.

Type: Bosnia-Herzegovina. Slopes and plateau of Mt. Krug planina, 4 km east of village Šujica (western Bosnia and Herzegovina), 1300 m, 09.10.2012, *A. Hajrudinović & F. Bogunić* (WU 080424, holotype; isotype SARA 51405).

Distribution. — Bosnia-Herzegovina (Krug Planina).

Ploidy level. — Unknown. Tetraploid, 2n=68 (Hajrudinović et al. 2015).

Apomictic taxa, Crimea

42.

Hedlundia roopiana (Bordz.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus roopiana* Bordz. in Izv. Kievsk. Bot. Sada 12–13: 131. 1931, pro hybr.

Type: Turkey. Kars: Kaghyzman [Kağızman], in decliviis montis Kecza-czi, 13.08/31.07.1910, *T.A. Roop* (LE, holotype).

= *Sorbus dualis* Zinserl. in Komarov, Fl. USSR 9: 498. 1939.

Type: Azerbaijan. Karabakh (Artsakh): ”in faucibus Miakjan (fl. Ochczczai super.)”, 30.07.1895, *A. Lomakin* (LE, holotype).

= *Sorbus dualis* var. *taurica* K. Popov in Ukr. Bot. Zhurn. 16: 73. 1959, nom. inval. (Art.

39.1); K. Popov in Izv. Krymsk. Pedag. Inst. 34: 73. 1959, nom. inval. (Art. 39.1).

Described from the Crimea (Babugan-jaila).

Distribution. — Crimea. Outside Europe the species is present in the Caucasus and Anatolia.

Ploidy level. — Tetraploid, 2n=68 (Zaikonnikova & Kipiani 1980), counted in the material from Armenia.

Borkhausenia Sennikov & Kurtto [*Aria* × *Sorbus* × *Torminalis*]

Borkhausenia Sennikov & Kurtto, **gen. nov.** ≡ *Sorbus* subgen. *Triparens* M. Lepší & T.C.G. Rich in New J. Bot. 4: 11. 2014.

Type: *Sorbus intermedia* (Ehrh.) Pers.

= ×*Tormariosorbus* Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012, pro nothogen. [*Torminalis* × *Aria* × *Sorbus*].

= *Sorbus* sect. *Intermedia* P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 442. 2014, nom. inval. (Art. 21.2, 40.1).

Description. — Trees or shrubs. Leaves lobed, pinnatifid to subpinnate, yellowish-green-tomentose underneath with 10–20 veins, the lobes or leaflets subacute to obtuse with few or very few teeth towards the base. Petals white. Styles 2–3. Fruit small to big, orange to red with sparse to absent small to medium size lenticels.

Origin. — *Aria* (Pers.) Host × *Sorbus* L. × *Torminalis* Medik.

Species number. — One apomictic species and one hybrid.

Etymology. — The new genus is dedicated to Moritz Balthasar Borkhausen (1760–1806), a famous German dendrologist who contributed to the development of the early system of Malinae.

Notes on nomenclature. — The nothogeneric name *Tormariosorbus* Mezhenskyj is not suitable for a genus of hybrid origin as treated here, and a new generic name is consequently proposed.

1.

Borkhausenia intermedia (Ehrh.) Sennikov & Kurtto, **comb. nov.** ≡ *Pyrus intermedia* Ehrh. in Hirschfeld, Gartenkalender 4: 197. 1784 ≡ *Lazarolus intermedia* (Ehrh.) Borkh. in Arch. Bot. 1: 88. 1798 ≡ *Sorbus intermedia* (Ehrh.) Pers., Syn. Pl. 2: 38. 1806 ≡ *Crataegus intermedia* (Ehrh.) Dum. Cours., Bot. Cult., ed. 2, 5: 457. 1811 ≡ *Aria intermedia* (Ehrh.) Schur, Enum. Pl. Transsilv.: 207. 1866 ≡ *Pyrus aria* subsp. *intermedia* (Ehrh.) Hook. f., Student Fl. Brit. Isl.: 126. 1870 ≡ *Hahnia intermedia* (Ehrh.) Samp. in Anais Fac. Sci. Porto 17: 47. 1931 ≡ *Tormariosorbus intermedia* (Ehrh.) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 29. 2012, pro hybr.; J.M.H. Shaw in Phytoneuron 2015-53: 2, isonym.

Type: Sweden. ”Upsaliae” [cultivated in Upsala], [1773–1776], *F. Ehrhart* [Arbores No. 94] in Herb. Smith 897.29 (LINN-HS 897.29.1, lectotype **designated here**; isolectotype MW).

= *Crataegus aria* var. *suecica* L., Sp. Pl.: 476. 1753 ≡ *Pyrus suecica* (L.) Garcke, Fl. N. Mitt.-Deutschland, ed. 9: 140. 1869 ≡ *Sorbus suecica* (L.) Krok & Almq., Sv. Fl. Skol., Fan., ed. 3: 132. 1888 ≡ *Aria suecica* (L.) Koehne, Deut. Dendrol.: 250. 1893 ≡ *Hahnia suecica* (L.) Dippel, Handb. Laubholzk. 3: 377. 1893.

Type: Denmark. ”Sorbus alpina folio sinuato vel laciniato”, ”in horto Herloviano Seelandiae” [cultivated in the Park of Herlufsholm, Zealand], Herb. Burser XXIV: 5 (UPS, lectotype designated by Aldasoro et al. (2004: 115), as ”neotype”).

= *Sorbus scandiaca* Fr., Fl. Hall.: 83. 1818, nom. illeg. superfl. ≡ *Crataegus scandica* Wahlenb., Fl. Upsal.: 165. 1820, nom. illeg. superfl. ≡ *Pyrus scandica* Peterm., Deutschl. Fl.: 174. 1846, nom. illeg. superfl. ≡ *Aria scandica* M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 127. 1847, nom. illeg. superfl. ≡ *Pyrus aria* subsp. *scandica* Syme, Engl. Bot., ed. 3B, 3: 245. 1864 ≡ *Sorbus latifolia* subsp. *scandica* (Syme) Berher, Fl. Vosges: 101. 1887 ≡ *Aria nivea* subsp. *scandica* (Syme) Bonnier & Layens, Tabl. Syn. Pl. Vasc. France: 103. 1894 ≡ *Sorbus aria* subsp. *scandica* (Syme) Rouy & E.G. Camus in Rouy, Fl. France 7: 21. 1901.

Type: same as for *Pyrus intermedia* Ehrh.

= *Pyrus semipinnata* Bechst., Forstbot., ed. 4: 325, t. 8. 1821.

Described from Europe (”Norden von Europa und Deutschland, Odenwald”). Type not designated.

= *Sorbus conwentzii* (Graebn.) C.K. Schneid., Ill. Handb. Laubholzk. 1: 688. 1906 ≡ *Pyrus conwentzii* Graebn. in Schriften Naturf. Ges. Danzig 9(1): 368. 1896.

Described from Pomerania, northern Poland ("an einem Landweg in Schönwalde [Dębina] bei Stolpmünde [municipality Ustka, Słupsk county] … ein junger, blühender Baum", 13.06.1895, *P. Graebner & H. Conwentz*). Type not traced.

Distribution. — Denmark, Estonia, Finland (Aland Islands), Germany, Latvia, Norway, Sweden; possibly native in Poland; established alien in Belgium, Czech Republic, Finland (outside Aland Islands), France, Ireland, Netherlands, Russia (Kaliningrad Region), United Kingdom.

Ploidy level. — Tetraploid, 2n=68 (Liljefors 1934, 1953; Pogan et al. 1980; Nelson-Jones et al. 2002; Pellicer et al. 2012).

Notes on nomenclature. — Aldasoro et al. (2004: 115) designated a specimen in Herb. Burser as the "neotype" of *Crataegus aria* var. *suecica* L. on the belief that, "according to Jarvis (in litt.), there is no original material of *Crataegus aria* var. *suecica* available in any of the Linnaean herbaria". Indeed Linnaeus provided no reference to Bauhin's *Pinax* directly in the protologue of *C. aria* var. *suecica*, apparently due to the space restrictions in the book. Instead, he cited his earlier *Flora Lapponica* (Linnaeus 1737) in which an extensive account of the species called *Crataegus inermis foliis ellipticis serratis transversaliter sinuatis subtus villosis* is found. The diagnostic character of *foliis … transversaliter sinuatis* refers to the identification originally written on Herb. Burser XXIV: 5 (Juel 1928); Linnaeus made use of the collection of Burser's *Hortus siccus* at UPS already from his student days (Savage 1937), and his references to Bauhin (1623) can be assumed to serve as indirect references to Burser's collection (Stearn 1957). Because of this evidence (Art. 9.3(a)), we assume that this specimen is indeed part of the original material of *C. aria* var. *suecica* and the type designation made by Aldasoro et al. is acceptable and should be corrected to lectotypification under Art. 9.9. The lectotype specimen originated from the Danish cultivation, not from Sweden or England as indicated in the protologue.

Rich et al. (2010) decided that *Crataegus aria* var. *scandica* was validly published in Linnaeus (1762b). Pehr Löfling's dissertation *Gemmae arborum*, defended in 1749, for which Linnaeus acted as *praeses* and of which he was apparently the author, was an early example of a work in which the nearly consistent use of binomial names occurred (Stearn 1957). In the original entry (Linnaeus 1749) the taxon was named "Crataegus scandica"; this epithet, together with a reference to Linnaeus (1737), apparently referred to the plant called *Crataegus Scandica, foliis oblongis, nonnihil laciniatis & serratis* (Celsius 1735), of which a specimen (Fl. Uplandica II:181) referable to *S. intermedia* is currently preserved in Celsius' plant collection *Flora Uplandica* at UPS (http://www.evolutionsmuseet.uu.se/samling/celsiusbot/katalog.html). This early binomial, "Crataegus scandica", was retained in revised pre-1753 editions of *Gemmae arborum* (Linnaeus 1751) but was changed for "Crataegus Aria *scandica*" in subsequent editions of the same book (Linnaeus 1762a, 1787). In the latter designation, "Crataegus Aria" is the name of the taxon in Linnaeus (1753), whereas the epithet *scandica* (the only nomenclatural irregularity in post-1753 editions of this work) is most likely a synonym retained from the previous editions. Other Linnaean treatments of his *Crataegus aria* consistently recognized the lobate-leaved variety of this species as *C. aria* var. *suecica*, not "scandica", which is another evidence that this epithet was not intended for a taxon. Jarvis (2007) also does not list *Crataegus aria* var. *scandica* as a validly published name.

Aldasoro et al. (2004: 115) treated *Pyrus intermedia* Ehrh. as homotypic with *Crataegus aria* var. *suecica* L. because Ehrhart placed the Linnaean name into the synonymy of his new species. However, the two names are not necessarily homotypic because their final epithets are different and Ehrhart provided an original description of the taxon. There is a specimen of the species collected and distributed by Ehrhart in his Exsiccata, *Arbores, Frutices et Suffrutices Linnaei* (Ehrhart 1788) and that specimen was undoubtedly collected before publication of the protologue, during the time when Ehrhart studied botany and

collected plants in Uppsala under the supervision of Linnaeus (Balandin 2006). In the protologue, Ehrhart (1784) referred to this specimen via the provenance (”ihr Vaterland ist Sweden”) along with the mention of a ”beautiful” tree of the species that he observed in the botanical garden of Leiden. Because of the strong link with the protologue and an agreement with the validating description, a specimen from the Exsiccata is designated as the lectotype of *P. intermedia* here. Another element of the original material is the aforementioned specimen in Celsius' Flora Uplandica at UPS, likely studied by Ehrhart and linked with the protologue via a reference to Celsius (1735).

The name *Tormariosorbus intermedia* was considered not validly published in Mezhensky et al. (2012) because by technical mistake the intended new combination appeared as ”*Sorbotoraria intermedia*” but under the nothogeneric name *Tormariosorbus* (Shaw 2015). This mistake was clarified in the abstract of the book (Mezhensky et al. 2012: 80), and the new combination should be treated as effected under Art. 60.1 (with Ex. 3).

2.

Borkhausenia* ×*liljeforsii (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus* ×*liljeforsii* T.C.G. Rich in Nordic J. Bot. 25: 339. 2007.

Type: Sweden. Västergötland: Finnerödja, Brinken, 10.06.1920, *J.A.O. Skårman* (UPS, holotype).

Distribution. — Ireland, Scandinavia, United Kingdom. Although originated locally, this hybrid can be treated as native in Scandinavia because both of its parents are native to that territory, and should be considered alien in Ireland and United Kingdom because one of its parents, *S. intermedia*, is not native to these countries (Richardson et al. 2000).

Ploidy level. — Triploid, 2n=51 (Liljefors 1953; Rich et al. 2010).

Note. — This taxon is a hybrid between *Borkhausenia intermedia* and *Sorbus aucuparia* (Rich 2008). It is not established and has not been mapped for *Atlas Florae Europaeae*, occurring sporadically when the parents can be found together. Variable, consisting of clones of independent origin (Rich 2008, Rich et al. 2010).

***Karpatiosorbus* Sennikov & Kurtto [*Aria* × *Torminalis*]**

Karpatiosorbus Sennikov & Kurtto, **gen. nov.** ≡ *Sorbus* subgen. *Tormaria* Májovský & Bernátová in Acta Horticult. Regiotect. 4: 21. 2001, pro subgen. ≡ *Sorbus* sect. *Tormaria* (Májovský & Bernátová) P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 444. 2014, comb. inval. (Art. 41.5).

Type: *Sorbus latifolia* (Lam.) Pers.

= ×*Tormaria* Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 27. 2012, cum auct. ”(Májovský & Bernátová) Mezhenskyj”, pro nothogen. [*Torminalis* × *Aria*].

Etymology. — The new generic name is dedicated to Zoltán Kárpáti (1909–1972), whose contribution to our knowledge of *Sorbus* in Central Europe was exceptionally rich, detailed and precise.

Description. — Small trees or shrubs. Leaves simple, variably whitish- to greyish- or greenish-tomentose underneath, with 7–12 pairs of lateral veins, with small to prominent, rather acute lobes, with a variable number of teeth. Petals white. Styles 2–3. Fruit rather big, yellowish-, orange-, reddish-brown, with numerous large lenticels.

Origin. — *Aria* (Pers.) Host × *Torminalis* Medik.

Species number. — One sexual hybrid and 84 apomictic species with 1 hybrid are currently recognized in Europe.

Notes on nomenclature. — Mezhensky (Mezhensky et al. 2012) intended to base a new nothogeneric name, ×*Tormaria* Mezhenskyj, on the subgeneric name published by Májovský & Bernátová (2001), which he misinterpreted as the name of a nothogenus. While doing so, he failed to refer to the presumed basionym but explicitly mentioned the intention to publish a name of a nothotaxon and stated its parentage. The resulting name was validly published as the name of a nothogenus, thus being unsuitable for a taxon treated as a genus of hybridogenous origin.

No generic name is applicable for this taxon, and a new name is supplied here.

Sexual diploid hybrids

1.

Karpatiosorbus* ×*hybrida (Borkh.) Sennikov & Kurtto, **comb. nov.** ≡ *Crataegus hybrida* Bechst. in Diana (Waltershausen) 1: 81. 1797, non L. 1761 ≡ *Azarolus hybrida* Borkh., Theor. Prakt. Handb. Forstbot. 2: 1239. 1803 ≡ *Pyrus decipiens* Bechst., Forstbot. 1: 236. 1810 ≡ *Aria decipiens* (Borkh.) M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 129. 1847 ≡ *Sorbus decipiens* (Bechst.) Petz. & G. Kirchn., Arbor. Muscav.: 301. 1864.

Described from Germany (Thuringia: Gotha, Waltershausen, Burgberg). Type: Germany. Thüringen: Burgberg bei Waltershausen, 1917, *J. Bornmüller 10* (JE, neotype designated by Düll (1961: 44), as ”holotype”). Superfluous type designation: [icon] Taf. 7 in Bechstein, Forstbot., ed. 5: 321. 1843 (neotype designated by Sell (1989: 386)).

= *Pyrus rotundifolia* Bechst., Forstbot., ed. 4: 153. 1821, nom. illeg., non (Moench) Moench 1794 ≡ *Crataegus rotundifolia* Bluff & Fingerh., Comp. Fl. German. 1: 613. 1825, nom. illeg., non Lam. 1783, nec Moench 1785, nec (Ehrh.) Borkh. 1798 ≡ *Aria rotundifolia* M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 129. 1847 ≡ *Sorbus rotundifolia* (M. Roem.) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 104. 1901, nom. illeg., non Petz. & G. Kirchn. 1864.

Described from Germany (”Thüringen, Franken”). Type not designated.

= *Sorbus tomentella* Gand., Fl. Lyon.: 90. 1875.

Type: France. Couzon, prés Lyon, 21.09.1871, Herb. Gandoger (LY, holotype).

= *Sorbus sarcocarpa* Gand., Fl. Lyon.: 90. 1875.

Described from France (”Bois aux environs de Lyon”). Type not designated.

= *Sorbus vagensis* Wilmott in Proc. Linn. Soc. London 146: 78. 1934.

Type: United Kingdom. Large tree just inside Mrs. Harris’s tea garden, Symonds Yat, W. Gloucester, v.c. 34, 18.09.1933, *A.J. Wilmott 4492* (BM, holotype).

= *Sorbus latifolia* f. *acutiloba* Irmisch in Blumen-Zeitung 29: 164. 1856 ≡ *Sorbus acutiloba* (Irmisch) Petz. & G. Kirchn., Arbor. Muscav.: 301. 1864.

Described from Germany. Type not designated.

= *Pyrus latifolia* f. *parumlobata* Irmisch in Weißenfelser Blumenzeit. 23: 148. 1859 ≡ *Sorbus parumlobata* (Irmisch) Petz. & Kirchn., Arbor. Muscav.: 302. 1864 ≡ *Sorbus latifolia* var. *parumlobata* (Irmisch) C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 695. 1906.

Type: Germany. Thüringen: Wüstung Altsiegelbach bei Arnstadt, *Th. Irmisch 70* (JE, neotype designated by Düll (1961: 45), as ”holotype”).

= *Sorbus subcordata* Bornm. ex Düll in Ber. Bayer. Bot. Ges. 34: 47. 1961.

Type: Germany. Thüringen: Alexisruh bei Arnstadt, 09.1911, *J. Bornmüller 6* (JE, holotype).

= *Sorbus heilingensis* Düll in Ber. Bayer. Bot. Ges. 34: 47. 1961.

Type: Germany. Thüringen: Schauenforst be Orlamünde, Teufelsberg, Autumn 1953, *R. Düll 608* (JE, holotype).

= *Sorbus multicrenata* Bornm. ex Düll in Ber. Bayer. Bot. Ges. 34: 49. 1961.

Type: Germany. Thüringen: am Greifenstein bei Blankenburg, 1911, *J. Bornmüller 7* (JE, holotype).

= *Sorbus acutisecta* Reuther & O. Schwarz in Wiss. Z. Pädagog. Hochschule Potsdam, Math.-Naturwiss. Reihe 7: 54. 1971, nom. inval. (Art. 40.1).

Based on two specimens designated as ”typus”: Germany. Nordwestthüringen, Mittelwerragebiet: Im Mischwald der Unteren Sommerleite über den Klippen bei Probsteizella an der Werra bei 270 m NN auf Wellenkalk, 11.05.1961 & 30.09.1961, *R. Reuther* (JE).

= *Sorbus hardeggensis* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 348. 1996.

Type: Czech Republic. Moravia austro-occid.: in locis praeruptis super sntris Ledové sluje (lingua Germanica Eisleiten) dictis haud procul ab oppidulo Vranov nad Dyjí (lingua Germanica Frain), solo gneissiaco, alt. 370 m, 16.09.1993, *M. Kovanda* (WU, holotype; isotype PR).

= *Sorbus isenacensis* Reuther in Haussknechtia 6: 19. 1997.

Type: Germany. Thüringen: Eisenach, Südabhang des Grossen Hörselberger, c. 40 m unterhalb des neuen Sendeturmes, 09.1983, *R. Reuther* (JE, holotype; isotype JE).

Distribution. — Native in France, Germany, Switzerland, Czech Republic, Hungary; established alien in United Kingdom (Great Britain).

Ploidy level. — Diploid, 2n=34 (Šefl 2007, for *S. hardeggensis*; Pellicer et al. 2012; Meyer et al. 2014, for many synonyms; Keller et al. 2015).

Notes on nomenclature. — The nomenclatural history of *Crataegus hybrida* Bechst. and homotypic names was described in detail by Sell (1989), who designated the illustration in Bechstein (1843) as the neotype of the name in the absence of any original material. This neotypification is predated by the type designation of Düll (1961) who selected a later specimen from the type locality. Sell (1989) considered an option to designate one of the illustrations in the protologue of *C. hybrida* Bechst. as a type but concluded that the illustrations represent more than one taxon and neither of them agrees with the validating description, so that they cannot be part of the original material of the name (Art. 9.3).

Buttler (2004) decided that the name *Sorbus subcordata* is illegitimate, for which we see no reason because Düll (1961) cited no earlier legitimate species name in the protologue.

Notes on taxonomy. — The synonymy in Britain follows Rich et al. (2012) and in Central Europe follows Meyer et al. (2014). *Sorbus hardeggensis* Kovanda was found diploid by Šefl (2007) and consequently has to be added to the synonymy. The name *Sorbus tomentella* was used for the diploid taxon of hybrid origin (unstabilized hybrid) between *S. aria* and *S. torminalis* (Rich et al. 2010) until Meyer et al. (2014) clarified that *S. decipiens* is the earliest name applicable to such hybrids. This change was adopted and the nomenclature in other countries (e.g. Rich et al. 2014) was adjusted accordingly. When *Sorbus* s.l. is treated as a group of genera, *Azarolus hybrida* is the earliest legitimate name at species rank, and its final epithet should be transferred to *Karpatiosorbus* according to Art. 11.4.

This iaxon is not considered established and thus has not been mapped for *Atlas Florae Europaeae*.

Apomictic taxa, British Isles

2.

Karpatiosorbus devoniensis (E.F. Warb.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus devoniensis* E.F. Warb. in Watsonia 4: 46. 1957.

Type: United Kingdom. South Devon: ca. ¼ mile from Hoo Meavy, v.c. 3, 28.09.1934, *E.F. Warburg 115* (BM, holotype).

Distribution. — Ireland, United Kingdom.

Ploidy level. — Tetraploid, 2n=68 (Sell 1989; Bailey et al. 2008; Pellicer et al. 2012).

3.

Karpatiosorbus admonitor (M. Proctor) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus admonitor* M. Proctor in Watsonia 27: 207. 2009.

Type: United Kingdom. North Devon: v.c. 4, Watersmeet, large tree above scree, 10.10.2007, *T.C.G. Rich & D.C.G. Cann* (NMW, holotype; isotypes BM, CGE).

Distribution. — United Kingdom (England: North Devon).

Ploidy level. — Tetraploid, 2n=68 (Bailey et al. 2008, as *S. devoniensis*; Pellicer et al. 2012).

4.

Karpatiosorbus bristoliensis (Wilmott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus bristoliensis* Wilmott in Proc. Linn. Soc. Lond. 146: 76. 1934.

Type: United Kingdom. Clifton Down, Bristol, v.c. 34 West Gloucestershire, 19.09.1933, *A.J. Wilmott 3980* (BM, holotype).

Distribution. — United Kingdom (England: Bristol).

Ploidy level. — Triploid, 2n=51 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012).

5.

Karpatiosorbus* ×*houstoniae (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus* ×*houstoniae* T.C.G. Rich in Watsonia 27: 370. 2009.

Type: United Kingdom. Rocks below Stokeleigh Camp, v.c. 6 North Somerset, 31.10.2004, *T.C.G. Rich, A. Robertson & L. Houston* (NMW, holotype).

Distribution. — United Kingdom (England: Bristol).

Ploidy level. — Tetraploid, 2n=68 (Pellicer et al. 2012).

Notes on taxonomy. — This taxon is a hybrid between *Karpatiosorbus bristoliensis* and *Aria edulis* (Rich et al. 2010). It is not established and has not been mapped for *Atlas Florae Europaeae*.

6.

Karpatiosorbus subcuneata (Wilmott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus subcuneata* Wilmott in Proc. Linn. Soc. Lond. 146: 76. 1934.

Type: United Kingdom. Greenaleigh Wood, Minehead, v.c. 5 South Somerset, 10.06.1914, *E.S.Marshall* 4027 (BM, holotype; isotypes BM, E).

Distribution. — United Kingdom (England: North Devon, South Somerset).

Ploidy level. — Triploid, 2n=51 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012). A previous report of the tetraploid level, 2n=68 (Nelson-Jones et al. 2002) has been rejected (Pellicer et al. 2012).

7.

Karpatiosorbus parviloba (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus parviloba* T.C.G. Rich in Watsonia 27: 306. 2009.

Type: Ship Rock, Coldwell Rocks, Symonds Yat, v.c. 34 West Gloucestershire SO571156, 04.10.1999, *T.C.G. Rich & L. Houston* (NMW, holotype).

Distribution. — United Kingdom (England: Gloucestershire).

Ploidy level. — Tetraploid, 2n=68 (Pellicer et al. 2012).

Apomictic taxa, Western Europe

8.

Karpatiosorbus latifolia (Lam.) Sennikov & Kurtto, **comb. nov.** ≡ *Crataegus latifolia* Lam., Fl. Franç. 3: 486. 1779 ≡ *Sorbus latifolia* (Lam.) Pers., Syn. Pl. 2: 38. 1806 ≡ *Pyrus intermedia* var. *latifolia* (Lam.) DC., Prodr. 2: 636. 1825 ≡ *Pyrus latifolia* (Lam.) R. Thomps., Cat. Fr. Gard. Horticult. Soc. London: 183. 1826; Peterm., Deutschl. Fl.: 174. 1846 ≡ *Pyrus arguta* Tausch in Flora 17(2): 490. 1834, nom. illeg. superfl. ≡ *Aria latifolia* (Lam.) M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 128. 1847 ≡ *Pyrus aria* subsp. *latifolia* (Lam.) Hook. f., Student. Fl. Brit. Isl., ed. 2: 132. 1878 ≡ *Torminaria latifolia* (Lam.) Dippel, Handb. Laubholzk. 3: 388. 1893 ≡ *Sorbus aria* subsp. *latifolia* (Lam.) Rouy & E.G. Camus in Rouy, Fl. France 7: 22. 1901 ≡ *Tormaria latifolia* (Lam.) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012, pro hybr.

Type: France. Prés dans la forêt de Fontainebleau, Herb. Lamarck (P, lectotype designated by Sell (1989: 396)).

= *Crataegus dentata* Thuill., Fl. Env. Paris, ed. 2: 245. 1799.

Described from France (”Fontainebleau”). Type not designated.

= *Aria arguta* M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 129. 1847.

Described from cultivation (Czech Republic), presumably of French origin. Type not designated.

Distribution. — France; naturalized in Czech Republic, Ireland, Norway, Sweden, United Kingdom. Exact distribution area has not been studied.

Ploidy level. — Tetraploid, 2n=68 (Nelson-Jones et al. 2002; Bailey et al. 2008; Pellicer et al. 2012). Only tetraploid counts are accepted as correct for the species in its strict sense (Rich et al. 2010). Diploid counts reported for this species (Poucques 1951; Bailey et al. 2008) apparently belong to primary hybrids between *S. aria* and *S. torminalis*, frequently confused with *S. latifolia*.

Notes on taxonomy. — This taxon provides the earliest name for the complex of apomictic taxa originated from crosses between *S. aria* s.l. (= *Aria edulis*) and *S. torminalis* (= *Torminaria glaberrima*). In many countries this name is applied in collective sense (e.g. Zieliński & Vladimirov 2013). Besides mountains of Western and Central Europe, the Balkans and the Crimea, the distribution of *K. latifolia* s.l. covers also a small area in North-Western Africa.

Notes on nomenclature. — As discovered by Mabberley (1984), the name *Pyrus latifolia* was validly published with a reference to ”*Sorbus latifolia*, Pers.” in a garden catalogue authored by Robert Thompson (1798–1869), Superintendent of the Fruit Department, Chiswick Gardens, at the Horticultural Society of London (Johnson & Hogg 1869).

Tausch (1834) included *Pyrus intermedia* var. *latifolia* (Lam.) DC. in the synonymy of his new *P. arguta*, thus making his name superfluous and illegitimate. While transferring this name to *Aria*, Roemer (1847) excluded the type-bringing synonym and published a name of new taxon, although apparently conspecific with *Crataegus latifolia* Lam.

9.

Karpatiosorbus remensis (Cornier) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus remensis* Cornier in Bull. Mens. Soc. Linn. Lyon 78: 36. 2009 ≡ *Sorbus latifolia* var. *remensis* (Cornier) Jauzein in Jauzein & Nawrot, Fl. Île-de-France 2: 32. 2013.

Type: France. Marne, à l'extrémité nord-ouest de la commune de Merfy, à l'ouest de la cote 192, 13.05.2006, *B. Cornier 2006/003* (Herb. B. Cornier [2006/003a], holotype; isotype Herb. B. Cornier [2006/003b]).

Distribution. — France (Marne), possibly Luxembourg.

Ploidy level. — Unknown. The species was reported as diploid (Cornier 2009), although it was mentioned that the species' morphology is stable presumably because of apomixis. Later Cornier commented (pers. comm., 2016) that this report is unreliable and most likely erroneous.

10.

Karpatiosorbus croceocarpa (P.D. Sell) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus croceocarpa* P.D. Sell in Watsonia 17: 392. 1989.

Type: United Kingdom. The Mound, Lleiniog, Anglesey, v.c. 52, 01.10.1980, *R. Hattey L2* (CGE, holotype).

Distribution. — Cultivated in United Kingdom and Ireland; naturalized in Great Britain; native area not known but presumably Western European.

Ploidy level. — Tetraploid, 2n=68 (Nelson-Jones et al. 2002; Bailey et al. 2008). Aneuploidy is known, 2n=59 (Bailey et al. 2008).

11.

Karpatiosorbus sellii (T.C.G. Rich) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus sellii* T.C.G. Rich in New J. Bot. 4: 7. 2014.

Type: United Kingdom. Cambridge Botanic Garden s.n., origin unknown, 18.09.2001, *T.C.G. Rich* (NMW V.2001.25.309, holotype).

– *Sorbus decipiens* auct.: Rich et al., Whitebeams, Rowans Service Trees Britain Ireland: 200. 2010.

Distribution. — Cultivated and naturalised in United Kingdom (Great Britain); native area not known but presumably Western European.

Ploidy level. — Triploid, 2n=51 (Bailey et al. 2008, as *S. decipiens*; Rich et al. 2014).

Apomictic taxa, Central Europe

12.

Karpatiosorbus alnifrons (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus alnifrons* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 356. 1996.

Type: Czech Republic. Moravia austro-occid.: in nemore mixto in declivibus septentrionali-occidentalibus sub arcem Templštejn, solo granulitico, alt. 380 m, 27.09.1989, *M. Kovanda* (WU, holotype; isotype PR).

Distribution. — Czech Republic (South Moravia).

Ploidy level. — Tetraploid, 2n=68 (Kovanda 1996b).

13.

Karpatiosorbus gemella (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus gemella* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 329. 1996.

Type: Czech Republic. Bohemia occid.-centr.: in pineto munimenti prae-historici situ occid. a pago Konětopy (distr. Louny), solo calcifero-schistaceo, alt. 450 m, 13.10.1992, *M. Kovanda* (WU, holotype; isotype PR).

Distribution. — Czech Republic (Central Bohemia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2009; Vít et al. 2012). The tetraploid count, 2n=68 (Kovanda 1996a) is erroneous (M. Lepší, pers. comm. 2012).

14.

Karpatiosorbus omissa (Velebil) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus omissa* Velebil in Preslia 84: 377. 2012.

Type: Czech Republic. Bohemia centralis, distr. Praha-západ, pagus Úholičky-Podmoráň: ca. 300 m a stationem viae ferreae austro-orientem versus, disperse in querceto in declivi boreo-orientali collis Stříbrník ad ripam sinistram fluminis Vltava, 250 m, 09.05.2011, *J. Velebil* (PR [110508/e], holotype; isotypes PR [110855/a, 110855/b], PRC [110508/a, 110508/b], PRA [110508/g], CB [110508/f], ROZ [110508/c, 110508/d]).

Distribution. — Czech Republic (Central Bohemia).

Ploidy level. — Triploid, 2n=51 (Velebil 2012).

15.

Karpatiosorbus milensis (M. Lepší, Boublík, P. Lepší & Vít) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus milensis* M. Lepší, Boublík, P. Lepší & Vít in Preslia 80: 235. 2008.

Type: Czech Republic. Bohemia septentrionalis, distr. Louny, pagus Milá (5548d): ca. 0.6 km situ sept.-orient. a pago, in rupibus praeruptis in declivibus meridionalibus collis Milá; solo basaltico; 450 m s. m., 50°26’02.88” N, 13°45’30.30” E; numerus arboris 13; leg. 16. 5. 2002, *M. Lepší* (CB [33262], holotype; isotypes CB [33261, 33263, 33264, 33275–33279], PRC [33262/a], PR [33279/a]).

Distribution. — Czech Republic (Central Bohemia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2008).

16.

Karpatiosorbus rhodanthera (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus rhodanthera* Kovanda in Verh. Zool.-Bot. Ges. Österreich 133: 321. 1996.

Type: Czech Republic. Bohemia occid.: in fruticetis in locis praeruptis ad cacumen collis Chlumská hora prope oppidulum Manětín (distr. Plzeň – sever), solo basaltico, alt. 651 m, 25.05.1992, *M. Kovanda* (WU, holotype; isotypes PR).

Distribution. — Czech Republic (Karlovy Vary Region).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2009; Vít et al. 2012). The tetraploid count, 2n=68 (Kovanda 1996a) is erroneous (M. Lepší, pers. comm. 2012).

17.

Karpatiosorbus bohemica (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus bohemica* Kovanda in Acta Univ. Carol., Biol. 1961: 77. 1961.

Type: Czech Republic. Bohemia, montes České Středohoří: in fruticetis sub cacumine collis Lovoš prope urbem Lovosice, alt. 572 m s.m., 17.07.1958, *M. Kovanda* (PR, holotype).

Distribution. — Czech Republic (North Bohemia).

Ploidy level. — Triploid, 2n=51 (Jankun & Kovanda 1987; Jankun 1993; Lepší et al. 2009).

18.

Karpatiosorbus albensis (M. Lepší, K. Boublík, P. Lepší & P. Vít) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus albensis* M. Lepší, K. Boublík, P. Lepší & P. Vít in Preslia 81: 76. 2009.

Type: Czech Republic. Bohemia septentrionalis, distr. Litoměřice, pagus Knobloška (5450d): declivia occidentalia dumetosa ca 0.7 km situ sept.-sept.-occidentali a pago, solo calcifero-schistaceo; 290 m s. m., 50°32’57.9’’N, 14°05’17.5’’E; disperse; arbor ca. 6 m alta cum aliquot truncis; arbor no. 210; 22.06.2007, *M. Lepší & K. Boublík* (CB [65263], holotype; isotypes PR [65263/a], PRC [65263/b], PRA [65263/c], LIT [65263/d;], LI [65263/f]).

Distribution. — Czech Republic (North Bohemia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2009).

19.

Karpatiosorbus portae-bohemicae (M. Lepší, P. Lepší, P. Vít & K. Boublík) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus portae-bohemicae* M. Lepší, P. Lepší, P. Vít & K. Boublík in Preslia 81: 72. 2009.

Type: Czech Republic. Bohemia septentrionalis, distr. Litoměřice, pagus Litochovice nad Labem (5450a): ca 0.65 km situ austro-orientali a pago, in declivibus orient.-sept.-orientali angustiae Porta bohemica dictae, ad ripam sinistram fluminis Labe, in querceto, solo gneissiaceo; 220 m s. m., 50°33’07.8’’N, 14°02’10.6’’E; disperse; arbor no. 22; 11.05.2007, *M. Lepší* (CB [65306], holotype; isotypes CB [65298, 65299, 65304, 65305, 65307, 65308], PR [65306/a], PRC [65299/a], PRA [65304/a], LIT [65305/a], LI [65298/a]).

Distribution. — Czech Republic (North Bohemia).

Ploidy level. — Triploid, 2n=51 (Lepší et al. 2009).

20.

Karpatiosorbus eximia (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eximia* Kovanda in Preslia 56: 170. 1984.

Type: Czech Republic. Berghänge bei Srbsko, 1918, *Beck* (PRC, holotype); Bohemia centralis, distr. Beroun, pagus Srbsko, ca. 300 m situ sept.-orientali a pago Koda, in rupibus in declivibus meridionalibus cotae 393 m, solo calcareo, 360 m s.m., 02.08.2007, *M. Lepší* (CB [65278], epitype designated by Vít et al. (2012: 76)).

Distribution. — Czech Republic (Central Bohemia).

Ploidy level. — Triploid, 2n=51 (Vít et al. 2012). Earlier this species was reported as diploid and tetraploid (Kovanda 1984; Jankun & Kovanda 1988; Jankun 1993); these reports have been proven to be erroneous (Vít et al. 2012).

21.

Karpatiosorbus barrandienica (Vít, M. Lepší & P. Lepší) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus barrandienica* Vít, M. Lepší & P. Lepší in Preslia 84: 82. 2012.

Type: Czech Republic. Bohemia centralis, distr. Beroun, pagus Srbsko: in summo collis Doutnáč, in querceto, solo calcareo, 430 m, 02.08.2007, *M. Lepší* (CB [65274], holotype; isotype PRC [65274/a]).

Distribution. — Czech Republic (Central Bohemia).

Ploidy level. — Triploid, 2n=51 (Vít et al. 2012).

22.

Karpatiosorbus franconica (Bornm.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus franconica* Bornm. in Beih. Bot. Centralbl. 36: 186. 1918; Düll in Ber. Bayer. Bot. Ges. 34: 49. 1961, "isonym"; N. Mey. et al. in Ber. Bayer. Bot. Ges. Sonderband: 135. 2005, isonym.

Described from Germany (Fränkische Schweiz). Type not designated.

Distribution. — Germany (Bayern).

Ploidy level. — Triploid, 2n=51 (Feulner et al. 2013).

Notes on nomenclature. — Bornmüller (1918) accepted this hybridogenous taxon and validly published the name with a laconic yet sufficient diagnosis (Somlyay & Sennikov 2014). Düll (1961) believed that conditions for valid publications of the name had not been fulfilled and provided a new description in Latin but designated two gatherings as the type. Finally, an isonym was published by Meyer at al. (2005). The indication of a single specimen as the "holotype" in Meyer et al. (2005) does not constitute the neotypification of *Sorbus franconica* under Art. 7.10.

23.

Karpatiosorbus hoppeana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus hoppeana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 150. 2005.

Type: Germany. Waldrand am Öden Grainberg südlich Kallmünz, 01.07.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

24.

Karpatiosorbus adeana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus adeana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 139. 2005.

Type: Germany. Hangkante des Bärentals westlich Neudorf, 19.05.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Triploid, 2n=51 (Feulner et al. 2013).

25.

Karpatiosorbus cordigastensis (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cordigastensis* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 143. 2005.

Type: Germany. Kordigast nördlich Giechköttendorf, Waldsaum am Herrenholz am Südostrand der Hochfläche, 19.05.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, STU, Hb. Meyer).

Distribution. — Germany (Bayern).

Ploidy level. — Triploid, 2n=51 (Feulner et al. 2013).

26.

Karpatiosorbus schnizleiniana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus schnizleiniana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 146. 2005.

Type: Germany. Hartenfels bei Neukirchen, Waldsaum am Südosthang, 01.07.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

27.

Karpatiosorbus haesitans (Meierott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus haesitans* Meierott in Ber. Bayer. Bot. Ges. Sonderband: 180. 2005.

Type: Germany. Fischersberg ENE Thüngersheim, 04.09. 2003, *N. Meyer, L. Meierott & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

28.

Karpatiosorbus cochleariformis (Meierott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus cochleariformis* Meierott in Ber. Bayer. Bot. Ges. Sonderband: 176. 2005.

Type: Germany. Geißrain 2 km WNW Untererthal, 18.05. 2001, *N. Meyer, L. Meierott & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

29.

Karpatiosorbus herbipolitana (Meierott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus herbipolitana* Meierott in Ber. Bayer. Bot. Ges. Sonderband: 183. 2005.

Type: Germany. Westecke des Hemmerich W Greußenheim, 08.05.2003, *N. Meyer, L. Meierott & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

30.

Karpatiosorbus mergenthaleriana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus mergenthaleriana* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 154. 2005.

Type: Germany. Südrand der Diptam-Wiese im Bereich des gleichnamigen NSG bei Etterzhausen, 01.07.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

31.

Karpatiosorbus perlonga (Meierott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus perlonga* Meierott in Ber. Bayer. Bot. Ges. Sonderband: 187. 2005.

Type: Germany. Nordsaum Feldberg Oberleinach, 18.05. 2001, *N. Meyer, L. Meierott & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

32.

Karpatiosorbus puellarum (Meierott) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus puellarum* Meierott in Ber. Bayer. Bot. Ges. Sonderband: 190. 2005.

Type: Germany. SW-Hang Leite zwischen Uettingen und Roßbrunn, 18.05.2001, *N. Meyer, L. Meierott & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

33.

Karpatiosorbus ratisbonensis (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus ratisbonensis* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 158. 2005.

Type: Germany. Waldlichtung im Westteil des Pfarrbergs nördlich der B 8 bei Nittendorf, 01.07.2001, *N. Meyer & O. Angerer* (M, holotype; isotypes JE, REG, Hb. Meyer).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

34.

Karpatiosorbus schuwerkiorum (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus schuwerkiorum* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 162. 2005.

Type: Germany. Pfaffenberg südwestlich Mettendorf bei Gredling, Waldrand am Südwesthang zum Heimbachtal, 18.06.2001, *H. Schuwerk & O. Angerer* (M, holotype; isotypes JE, REG, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

35.

Karpatiosorbus eystettensis (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eystettensis* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 165. 2005.

Type: Germany. Frauenberg oberhalb Eichstätt, Abhang unterhalb der Kapelle, 18.06.2001, *H. Schuwerk & O. Angerer* (M, holotype; isotypes JE, REG, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

36.

Karpatiosorbus meierottii (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus meierottii* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 169. 2005.

Type: Germany. Waldrand am Mühlberg bei Wellheim, 18.06.2001, *H. Schuwerk & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

37.

Karpatiosorbus fischeri (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus fischeri* N. Mey. in Ber. Bayer. Bot. Ges. Sonderband: 172. 2005.

Type: Germany. Waldrand bei Großsorheim bei Punkt 529,4, 18.06.2001, *H. Schuwerk & O. Angerer* (M, holotype; isotypes JE, STU).

Distribution. — Germany (Bayern).

Ploidy level. — Unknown.

38.

Karpatiosorbus badensis (Düll) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus badensis* Düll in Ber. Bayer. Bot. Ges. Sonderband: 131. 2005; Düll in Ber. Bayer. Bot. Ges. 34: 51. 1961, nom. inval. (Art. 40.1).

Type: Germany. Baden: Tauberbischofsheim, 2 km SSE Gamburg an der SW-Ecke des Apfelberges, 07.05.1961, *R. Düll* (M, holotype).

Distribution. — Germany (Baden-Württemberg, Bayern).

Ploidy level. — Triploid, 2n=51 (Hammel et al. 2015).

Notes on nomenclature. — Düll (1961) designated two different gatherings, one in fruit and another in flower, as the holotype of *Sorbus badensis*. This is contrary to Art. 40.1. Meyer et al. (2005) cited a single specimen as the type and provided a full and direct reference to the validating description, thus fulfilling the conditions for valid publication of the name.

39.

Karpatiosorbus meyeri (S. Hammel & Haynold) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus meyeri* S. Hammel & Haynold in Kochia 8: 2. 2014.

Type: Germany. Baden-Württemberg: Nördliche Gäulandschaften: 6323/1, 3537300/5502750, Waldrand im Gewann Läger südlich von Külsheim, 380 m ü. NN, 12.5.2013, S. Hammel & B. Haynold (STU, holotype; isotype Herb. Hammel).

Distribution. — Germany (Baden-Württemberg).

Ploidy level. — Triploid, 2n=51 (Hammel et al. 2015).

40.

Karpatiosorbus seyboldiana (S. Hammel & Haynold) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus seyboldiana* S. Hammel & Haynold in Jahresh. Ges. Naturk. Württemberg 171: 52. 2015.

Type: Germany. Baden-Württemberg, Nördliche Gäulandschaften: MTB 6324/1, R-H 3549280/5504460, ehemalige Schafweide im Gewann Leitenberg südöstlich von Werbach-Werbachhausen, 235 m ü NN, 19.06.2014, *S. Hammel & B. Haynold* (STU, holotype; isotypes WB, Herb. Hammel).

Distribution. — Germany (Baden-Württemberg).

Ploidy level. — Triploid, 2n=51 (Hammel et al. 2015).

41.

Karpatiosorbus slovenica (Kovanda) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus slovenica* Kovanda in Acta Univ. Carol., Biol. 1961: 73. 1961.

Type: Slovakia. Montes Čachtické kopce, in declivibus fruticosis supra viam ferram in valle fluminis Hrabutnica inter vicos Višňové et Čachtice, distr. Nové Mesto nad Váhom, solo dolomitico, alt. ca. 200 m s.m., 28.05.1958, *M. Kovanda* (PRC, holotype).

Distribution. — Austria, Slovakia.

Ploidy level. — A diploid chromosome number reported for the species, 2n=34 (Marhold et al. 2007) is considered unreliable.

42.

Karpatiosorbus amici-petri (Mikoláš) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus amici-petri* Mikoláš in Thaiszia 13: 128. 2004.

Type: Slovakia. Kysak, ca. 1.3 km situ austro-orientali in silvo-steppa, 22.09.2002, *V. Mikoláš* (KO 28231, holotype).

Distribution. — Slovakia (Košice Region).

Ploidy level. — Tetraploid, 2n=68 (Mikoláš 2004).

43.

Karpatiosorbus holubyana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus holubyana* Kárpáti in Bot. Közlem. 52: 137. 1966; Németh in Acta Bot. Hung. 52: 386. 2010, isonym.

Type: Slovakia. In monte Skalka prope Plávecký Peter, solo dolom., 21.08.1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705121, presumed holotype).

Distribution. — Slovakia (Trnava Region).

Ploidy level. — A diploid chromosome number reported for the species, 2n=34 (Marhold et al. 2007) is considered unreliable.

Notes on nomenclature. — When Kárpáti (1966) published his *Sorbus holubyana*, he indicated a single gathering (by citing the locality and the collectors) and stated that the specimen (or specimens) of that gathering are kept in his personal collection, without having termed that specimen as the type. The name appears to have been validly published under Art. 40.3. Németh (2010) decided that the name *S. holubyana* should be validly published again, although there is no evidence that the protologue of *S. holubyana* does not comply with the requirements of Art. 40.

44.

Karpatiosorbus joannis (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus joannis* Kárpáti in Bot. Közlem. 52: 140. 1966; Németh in Acta Bot. Hung. 52: 386. 2010, isonym.

Type: Slovakia. Strážovská hornatina: Kňažný stôl. In monte Drieňovec prope Timoradza, solo dolom., 22.08. 1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705125, presumed holotype; isotypes BP 705122, BP 705123).

Distribution. — Slovakia (Trenčín Region.

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned a single gathering in the protologue of *Sorbus joannis* (kept in his personal collection), which should be taken as the holotype and the name should be treated as validly published under Art. 40.3. Németh (2010) found more duplicates of the same gathering at BP, where the collection of Kárpáti is preserved now, and decided to validly publish the name again contrary to Art. 40.

45.

Karpatiosorbus klasterskyana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus klasterskyana* Kárpáti in Bertová, Fl. Slovenska IV/3: 437. 1992; Németh in Acta Bot. Hung. 52: 387. 2010, isonym; Kárpáti in Bot. Közlem. 52: 136. 1966, nom. inval. (Art. 40.1).

Type: Slovakia. In monte Skalka prope Plávecký Peter, solo dolom., 21.08.1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705140, presumed holotype).

Distribution. — Slovakia (Trnava Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned two gatherings, of which a single specimen was found in BP and designated as the holotype by Németh (2010). This would have been the place of valid publication of the name but it was Májovský (1992) who was the first to indicate that a specimen collected in Skalka and indicated in Kárpáti (1966) is the type of the name (”typ zo Skalky pri Plaveckom Petri (Žertová, Futák, Kárpáti 1965)”) and provided a full and direct reference to the validating description. This indication is effective under Art. 40, although the collection year was not correctly cited by Májovský (see Ex. 2 under Art. 9.1). The collection in which the type is conserved was specified (Art. 40.7) already in Kárpáti (1966).

46.

Karpatiosorbus zertovae (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus zertovae* Kárpáti in Bot. Közlem. 52: 137. 1966, ”žertovae”; Németh in Acta Bot. Hung. 52: 396. 2010, isonym.

Type: Slovakia. In monte Skalka prope Plávecký Peter, solo dolom., 21.08.1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705128, presumed holotype; isotypes BP 705124, BP 705126).

Distribution. — Slovakia (Trnava Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned a single collection under *Sorbus zertovae*, which is acceptable as indication of the type under Art. 40.3, so that the name was validly published. Németh (2010) published an isonym and cited the label data of the holotype.

47.

Karpatiosorbus dolomiticola (Mikoláš) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus dolomiticola* Mikoláš in Thaiszia 6: 2. 1997.

Type: Slovakia. Trebejov, ca. 1 km situ orientali in silvosteppa, 06.10.1993, *V. Mikoláš* (KO 11377, holotype).

Distribution. — Slovakia (Košice Region).

Ploidy level. — Triploid, 2n=51 (Mikoláš 1997).

48.

Karpatiosorbus dominii (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus dominii* Kárpáti in Bot. Közlem. 52: 140. 1966; Németh in Acta Bot. Hung. 52: 383. 2010, isonym.

Type: Slovakia. Považský Inovec: inter montem Ihelnik et ruinam Tematin, solo dolom., 23.08.1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705120, presumed holotype).

Distribution. — Slovakia (Trenčín Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned a single collection kept in a single place (his own herbarium) under *Sorbus dominii*, and that mention fulfills the conditions for valid publication of the name (Art. 40.3). A single specimen was discovered at BP by Németh (2010) who published an isonym and cited the label data of the holotype.

49.

Karpatiosorbus futakiana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus futakiana* Kárpáti in Bertová, Fl. Slovenska IV/3: 441. 1992; Németh in Acta Bot. Hung. 52: 384. 2010, isonym; Kárpáti in Bot. Közlem. 52: 137. 1966, "*futákiana*", nom. inval. (Art. 40.1).

Type: Slovakia. Považský Inovec, inter montem Ihelnik et ruinam Tematin, solo dolom., 23.08.1961, *A. Žertová, J. Futák & Z. Kárpáti* (BP 705127, lectotype **designated here**; isolectotypes BP 705129, BP 705130).

Distribution. — Slovakia (Trenčín Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned three gatherings in this publication, thus leaving the name not validly published (Kovanda 1996c). Németh (2010) intended to fulfill the conditions for valid publication and designated a holotype at BP. However, Májovský (1992) indicated the gathering collected between Ihelník Mt. and the ruins of Tematín as the type of the name ("typ pochádza zo svahov medzi Ihelníkom a hradom Tematín (Žertová, Futák, Kárpáti 1965)") and provided a full and direct reference to the validating description. The incorrect collection year in this citation does not make it ineffective (see Ex. 2 under Art. 9.1), and the name was validly published in 1992 under Art. 40. The collection in which the type is conserved was specified (Art. 40.7) in Kárpáti (1966). Németh (2010) cited three specimens of the type gathering at BP, of which one he designated as the "holotype". Since the holotype has already been designated in Májovský (1992) and the sentence "designated here" or its equivalent was lacking in the designation of Németh, the second-step (restrictive) typification was not effected and is formally made here.

50.

Karpatiosorbus kmetiana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus kmetiana* Kárpáti in Bertová, Fl. Slovenska IV/3: 440. 1992; Németh in Acta Bot. Hung. 52: 387. 2010, isonym; Kárpáti in Bot. Közlem. 52: 137. 1966, "*kmet'iana*", nom. inval. (Art. 40.1).

Type: Slovakia. Carpati minores, in *Querceto pubescenti* montis + 326 prope Plávecky Sv. Peter, solo calc., 11.06.1960, *J. Futák & Z. Kárpáti* (BP 705138, lectotype **designated here**; isolectotypes BP 705137, BP 705139).

Distribution. — Slovakia (Trnava Region and Trenčín Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned two gatherings in his publication; for this reason the name was not validly published (Art. 40.1). Májovský (1992) indicated the gathering collected at Plavecký Peter as the type of the name ("typ pochádza od Plaveckého Petra z kóty 326 (Futák, Kárpáti 1965)") and provided a full and direct reference to the validating description. Although the collection year was indicated incorrectly by Májovský, this error does not make his type indication ineffective (see Ex. 2 under Art. 9.1), and the name was validly published in 1992. The collection in which the type is conserved was specified (Art. 40.7) earlier in Kárpáti (1966). Németh (2010) cited three specimens of the type gathering at BP, of which one he designated as the "holotype". Since Májovský (1992) referred

to the whole gathering as the type and did not specify which of its parts is the holotype, second-step lectotypification was possible but it was not effected by Németh (2010) because he used the term "holotype" and made no statement like "designated here" (Art. 7.10). This lectotypification is formally proposed here.

51.

Karpatiosorbus magocsyana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus magocsyana* Kárpáti in Németh, Acta Bot. Hung. 52: 388. 2010; Kárpáti in Bot. Közlem. 52: 140. 1966, "*mágocsyana*", nom. inval. (Art. 40.1).

Type: Slovakia. Zemplén Mts., Homonna, Podskalka, 08.1877, *S. Mágocsy-Dietz* (BP s.n., holotype; isotype BP 592600).

Distribution. — Slovakia (Prešov Region).

Ploidy level. — Unknown.

Notes on nomenclature. — Kárpáti (1966) mentioned two gatherings in his publication, one of 19th century's collector S. Mágocsy-Dietz, after whom the species was named, and another of 20th century collector J. Michalko. The name was consequently not validly published (Art. 40.1). Májovský (1992) stated that the type of the species name comes from the locality specified by Kárpáti ("typ pochádza z hrebeňa Sokola nad Humenným") but listed three gatherings as the type: two indicated by Kárpáti and the third collected by Ľ. Dostál et al. in 1985 and kept at SLO. Májovský's statement is also not acceptable as indication of the type because more than one gathering is involved (Art. 40.1). Németh (2010) cited a single specimen as the holotype and provided a full and direct reference to the validating description, thus fulfilling the conditions for valid publication of the name. Oddly enough, the holotype specimen is far the worst possible type choice in this case, as it contains one poor fragment of a sterile short shoot and a number of loose leaves of uncertain origin. The isotype cited by Németh is in a better state of preservation but contains two long sterile shoots only, thus also being unsuitable for the proper identification of the species. More material at SLO and also to be collected in the wild should be consulted for a proper circumscription of the taxon.

52.

Karpatiosorbus adamii (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus adamii* Kárpáti in Hung. Acta Biol. 1: 112. 1949, "*adami*".

Type: Hungary. Fejér: in rupestribus montis Nagy Somlóhegy, Vértes hegység supra vallis Fáni völgy prope pag. Vérteskozma, alt. ca. 400 m. s. m., 05.10.1947, *L. Vajda* (BP 524340, lectotype designated by Németh (2010: 379)).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

Notes on nomenclature. — The species is named in honour of Ádám Boros. The name Adam cannot be taken as classical (Rec. 60C.2) because its Latin Genitive recorded in medieval translations of the Bible, Adae, has never been used as such in the botanical tradition.

53.

Karpatiosorbus borosiana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus borosiana* Kárpáti in Agrártud. Egyet. Kert-Szölögazdaságtud. Karának Közlem. 12: 144. 1948.

Type: Hungary. Fehér: in silvaticis vallis Fánien völgy prope pagum Vérteskozma, alt. ca. 300 m s.m., 06.06.1943, *Z. Kárpáti* (BP 595329, lectotype designated by Németh (2010: 382)).

Distribution. — Hungary (Fejér County).

Ploidy level. — Unknown.

54.

Karpatiosorbus decipientiformis (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus decipientiformis* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1(14): 36. 1950.

Type: Hungary. Zala: in declivibus dumetosis montis Bodorhálás supra vallem Kígyós-völgy prope pagum Balatongyörök, alt. ca. 320 m. s. m., 18.09.1949, *Z. Kárpáti* (BP 700905, lectotype designated by Németh (2010: 382); isolectotype BP 432380).

Distribution. — Hungary (Zala County).

Ploidy level. — Unknown.

55.

Karpatiosorbus degenii (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus degenii* Jáv. in Magyar Bot. Lapok 25: 85. 1927.

Type: Hungary. Komárom: In rupibus apricis calcareis ad Felső-Galla, 03.08.1896, *L. Simonkai* (BP 81203, lectotype designated by Kováts (1998: 118); isolectotype BP 592422).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

56.

Karpatiosorbus gayeriana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus gayeriana* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1(14): 35. 1950.

Type: Hungary. Zala: in quercetis montis Garga-hegy supra pagum Balatongyörök, alt. ca. 220 m. s. m., 18.09.1949, *Z. Kárpáti* (BP 592612, lectotype designated by Németh (2010: 384); isolectotype BP 432787).

Distribution. — Hungary (western parts).

Ploidy level. — Unknown.

57.

Karpatiosorbus pseudolatifolia (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudolatifolia* Boros in Mitt. Kgl. Ungar. Gartenb.-Lehranst. 3: 51. 1937.

Type: Hungary. Fejér. In rupestribus dolom. dumet. ad ”Macska-gödör” vallis Fáni-völgy pr. Vérteskozma, alt. ca. 250–300 m s.m., *Á. Boros* (BP 432336, lectotype designated by Németh (2010: 390); isolectotypes BP 81399, BP 432165, BP 432166, BP 432335).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

58.

Karpatiosorbus tobani (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus tobani* C. Németh in Fl. Pannonica 5: 177. 2007.

Type: Hungary. Bakony, Comit. Veszprém, in rupestribus dolomit. silvat. montis Tobán-hegy prope Hajmáskér, ca. 380 m s.m., in declivibus septentrionalis frequentissima, 15.09.2007, *C. Németh* (BP 690648, holotype).

Distribution. — Hungary (Veszprém County).

Ploidy level. — Unknown.

59.

Karpatiosorbus andreanszkyana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus andreanszkyana* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1: 34. 1950.

Type: Hungary. Keszthely Mts., Balatongyörök, ”in declivibus dumetosis montis Bodorhálás”, 18.09.1949, *Z. Kárpáti* (BP 432182, lectotype designated by Németh (2010: 389)).

= *Sorbus latissima* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1: 36. 1950.

Type: Hungary. Keszthely Mts., Balatongyörök, ”in rupestribus dolomit. Bodorhálás”, 15.05.1950, *Á. Boros* (BP 432412, lectotype designated by Németh (2010: 387)).

Distribution. — Hungary (Keszthely Mts.).

Ploidy level. — Unknown.

Notes on taxonomy. — In the expert opinion of Lajos Somlyay (pers. comm. 2014), *Sorbus andreanszkyana* and *S. latissima* represent two forms of the same species, being different in the size of lobes only. Both morphotypes co-occur in the same area.

60.

Karpatiosorbus concavifolia (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus concavifolia* C. Németh in Stud. Bot. Hung. 47: 299. 2016.

Type: Hungary. Zala County, Keszthely Mts, Vállus, Láztető, mészkedve lő tölgyesben [= in calciphilous oak forest], 46.83760° N, 17.31028° E, 379 m, 16.07.2011, *Cs. Németh 3700* (BP 751073, holotype; isotype BP 751074).

Distribution. — Hungary (Keszthely Mts.).

Ploidy level. — Triploid, 2n=51 (Németh et al. 2016).

61.

Karpatiosorbus rhombiformis (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus rhombiformis* C. Németh in Stud. Bot. Hung. 47: 305. 2016.

Type: Hungary. Zala County, Keszthely Mts, Vállus, Láztető, above cave Vadlány-lik, 46.84434° N, 17.30539° E, 268 m, 17.07.2010, *Cs. Németh 3325* (BP 751075, holotype; isotype BP 751076).

Distribution. — Hungary (Keszthely Mts.).

Ploidy level. — Triploid, 2n=51 (Németh et al. 2016).

62.

Karpatiosorbus vallusensis (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus vallusensis* C. Németh in Stud. Bot. Hung. 47: 310. 2016.

Type: Hungary. Zala County, Keszthely Mts, Vállus, Láztető, 46.83729° N, 17.31243° E, 379 m, 16.07.2011, *Cs. Németh 3709* (BP 751077, holotype).

Distribution. — Hungary (Keszthely Mts.).

Ploidy level. — Triploid, 2n=51 (Németh et al. 2016).

63.

Karpatiosorbus bakonyensis (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus franconica* f. *bakonyensis* Jáv. in Magyar Bot. Lapok 25: 87. 1927 ≡ *Sorbus bakonyensis* (Jáv.) Jáv. in Kertészeti Lapok 32: 284. 1928.

Type: Hungary. Veszprém: in dumetosis montis Kápolnadomb prope pagum Márkó, alt. ca. 350 m s.m., 08.10. 1920, *Á. Boros* (BP 299993, lectotype designated by Kováts (1998: 121)).

= *Sorbus majeri* Barabits in Tilia 13: 14. 2007, nom. illeg. superfl.

Type: Hungary. in dumetosis montis Kápolnadomb prope pagum Márkó, alt. ca. 350 m s.m., 08.10.1920, *Á. Boros* (BP 689794, holotype).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

Notes on nomenclature. — The nomenclature of *Sorbus bakonyensis* and *S. majeri* was clarified by Somlyay & Sennikov (2014).

64.

Karpatiosorbus udvardyana (Somlyay & Sennikov) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus udvardyana* Somlyay & Sennikov in Phytotaxa 164: 268. 2014.

Type: Hungary. Balaton Uplands, Káptalantóti: Tóti-hegy, 46°50’09.45” N, 17°31’15.81” E, 16.09.2011, *L. Somlyay & N. Bauer* (BP 711382, holotype; isotype BP 711383).

– *Sorbus bakonyensis* auct.: Németh in Acta Bot. Hung. 52: 380. 2010.

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

65.

Karpatiosorbus pelsoensis (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pelsoensis* C. Németh in Studia Bot. Hung. 46: 50. 2015.

Type: Hungary. Balaton Uplands, Felsőörs, Malom-völgy, 47.02010° N, 17.93321° E, 265 m, 03.06.2012, *Cs. Németh HCsN 4342-1/2* (BP 739621, holotype; isotype BP 739622).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Triploid, 2n=51 (Németh 2015a).

Notes on taxonomy. — The circumscription of this species should include not only the type locality in Malom-völgy but also an isolated locality in Mina-völgy, which had been included in *S. bakonyensis* (Németh 2010) or *S. udvardyana* (Somlyay & Sennikov 2014). The main difference between *S. pelsoensis* and *S. udvardyana* is the shape of leaves (more ovate with a prominent basal lobe in *S. pelsoensis*, more rhombic with a minor basal lobe in *S. udvardyana*).

66.

Karpatiosorbus bodajkensis (Barabits) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus bodajkensis* Barabits in Tilia 13: 19. 2007.

Type: Hungary. Eastern Bakony Uplands, Bodajk, Gaja-völgy, alt. 236 m s.m., 30.07.1993, *E. Barabits* (BP 689792, holotype).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

67.

Karpatiosorbus polgariana (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus polgariana* C. Németh in Acta Bot. Hung. 54: 132. 2012.

Type: Hungary. Bakony Mts, Comit. Fejér, in rupestribus dolomiticis vallis Burok-völgy supra Várpalota (Királyszállás) prope pagum Isztimér, ca 380 m s. m.; N 47.26621°, E 18.12039°, 28.6.2008, *C. Németh HCsN2550* (BP 712741, holotype; isotype BP 712742).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

68.

Karpatiosorbus veszpremensis (Barabits) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus veszpremensis* Barabits in Tilia 13: 17. 2007.

Type: Hungary. Southern Bakony Uplands, Márkó, Malom-hegy, alt. 400 m s.m., 09.06.1990, *E. Barabits* (BP 689788, holotype).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

69.

Karpatiosorbus balatonica (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus balatonica* Kárpáti in Hung. Acta Biol. 1: 121. 1949.

Type: Hungary. Zala: in declivibus dumetosis dolomiticis prope pag. Vanyarc supra opp. Keszthely, alt. ca: 150 m., 27.06.1927, *S. Jávorka* [Flora Hungarica Exsiccata 8: 751] (BP 702614, lectotype designated by Németh (2010: 381)).

Distribution. — Hungary (western parts).

Ploidy level. — Unknown.

70.

Karpatiosorbus barthae (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus barthae* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1(14): 37. 1950.

Type: Hungary. Fehér: Mt. Bakony, in dumetis ad viam inter Várpalota et Királyszállás, alt. ca. 350 m. s. m., 02.10.1949, *Z. Kárpáti* (BP 705153, lectotype designated by Németh (2010: 382); isolectotypes BP 705148, BP 705149, BP 705150, BP 705151).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

71.

Karpatiosorbus eugenii-kelleri (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus eugenii-kelleri* Kárpáti in Hung. Acta Biol. 1: 113. 1949.

Type: Hungary. Fehér: in montibus Vérteshegység, in ostio vallium Meszesvölgy et Kőkapuvölgy prope vico Csákberény, 19.09.1948, *J. Papp* (BP 432195, lectotype designated by Németh (2010: 384); isolectotype BP 371060).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

72.

Karpatiosorbus gerecseensis (Boros & Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus gerecseensis* Boros & Kárpáti in Hung. Acta Biol. 1: 107. 1949.

Type: Hungary. Fejér: in rupestribus dolomit. montis "Liponya" prope Szár, alt. ca. 300 m s.m., 18.05.1944, *Á. Boros* (BP 432265, lectotype designated by Németh (2010: 385)).

Distribution. — Hungary (Fejér County).

Ploidy level. — Unknown.

73.

Karpatiosorbus barabitsii (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus barabitsii* C. Németh in Acta Bot. Hung. 54: 138. 2012.

Type: Hungary. Bakony Mts, Comit. Veszprém, in rupestribus dolomiticis, in declivibus septentrionalibus montis Malom-hegy ad Márkó prope Bánd, ca 352 m s. m.; N 47.10932°, E 17.82605°, 31.05.2008, *C. Németh HCsN2477/4–1/4* (BP 712740, holotype; isotypes BP 712739, Hb. Németh).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

74.

Karpatiosorbus karpatii (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus karpatii* Boros in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Közlem. 13: 153. 1949.

Type: Hungary. Fejér: in rupestribus dolomit. supra vallem Szappanos-völgy prope pag. Csákberény, alt. ca. 400 m s.m., 22.08.1948, *Á. Boros* (BP 432099, lectotype designated by Németh (2010: 387); isolectotypes BP 432334, BP 432098).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

75.

Karpatiosorbus pseudobakonyensis (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudobakonyensis* Kárpáti in Hung. Acta Biol. 1: 117. 1949.

Type: Hungary. Fehér, in silvaticis vallis Fánien-völgy prope pagum Vérteskozma, alt. ca. 300 m. s. m., 06.06. 1943, *Z. Kárpáti* (BP 704347, lectotype designated by Németh (2010: 389); isolectotypes BP 704348, BP 704349).

Distribution. — Hungary (Fejér County).

Ploidy level. — Unknown.

Notes on nomenclature. — The original material of Kárpáti (1949) included a number of taxa collected from several localities. Németh (2010) restricted the application of the name and the circumscription of the taxon.

76.

Karpatiosorbus pseudosemiincisa (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudosemiincisa* Boros in Mitt. Kgl. Ungar. Gartenb.-Lehranst. 3: 53. 1937.

Type: Hungary. Fejér, in dumetosis supra vallem Szappanos-völgy prope Csákberény, alt. ca. 400 m s.m., 21.05.1934, *Á. Boros* (BP 432650, lectotype designated by Németh (2010: 391); isolectotypes BP 432651, BP 702557).

= *Sorbus pyricarpa* C. Németh in Studia Bot. Hung. 46: 162. 2015, **syn. nov.**

Type: Hungary. Fejér, in dumetosis sept. montis Gránási-hegy prope Csákberény, 300 m a.s.l., 21.05.1950, *Á. Boros* (BP 432273, holotype; isotype BP 487977).

Distribution. — Hungary (Vértes Mts.).

Ploidy level. — Triploid, 2n=51 (Németh 2015b, as *S. pyricarpa*).

Notes on nomenclature. — The original material of Boros (1937) was heterogeneous. The lectotype was selected by Németh (2010) as to exclude the taxa separated subsequently by Kárpáti.

Notes on taxonomy. — *Sorbus pseudosemiincisa* and *S. pyricarpa* were described from the same area of the Vértes Mts. in Hungary. When Németh (2015b) further revised the circumscription of *S. pseudosemiincisa*, once established by Kárpáti (1960) and mapped by Németh (2006), he retained no other elements assigned to the species but its type collection. Besides, he claimed that no living plants of the species remained in its type locality. The alleged differences between *S. pseudosemiincisa* and *S. pyricarpa* are attenuate leaf lobes and globose fruits in the former species vs. acute leaf lobes and pyriform fruits in the latter one. However, the differences in the leaf lobes are very slender and minor variants of acute lobes may occur in other species of *S. aria* s.l. × *S. torminalis*, whereas the fruit characters of *S. pseudosemiincisa* s. str. are known from the immature lectotype collection only. For these reasons we consider the two names as belonging to the same taxon.

77.

Karpatiosorbus acutiserrata (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus acutiserrata* C. Németh in Kitaibelia 14: 90. 2009, "*acutiserratus*".

Type: Hungary. Vértes, Comit. Fejér, in rupestribus dolomit. silvat. vallis Német-völgy prope Gánt (Kőhányás), ca. 364 m s. m. in declivibus septentrionalibus frequentissima, 47.44936° N, 18.39471° E, 14.06.2008, *C. Németh* (BP 694171, holotype).

Distribution. — Hungary.

Ploidy level. — Unknown.

78.

Karpatiosorbus semiincisa (Borbás) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus aria* f. *semiincisa* Borbás, Term. Tud. Közl. 11(113): 34. 1879 ≡ *Sorbus aria* var. *semiincisa* (Borbás) Borbás, Földmivelési Érdekeink 10(48): 520. 1882 ≡ *Sorbus semiincisa* (Borbás) Borbás, Oesterr. Bot. Zeitschr. 37: 403. 1887 ≡ *Aria semiincisa* (Borbás) Beck, Fl. Nieder-Österreich 2(1): 714. 1892.

Type: Hungary. "In montibus Budae", 01.10.1876, *V. Borbás* (BP 657518, lectotype **designated here** by L. Somlyay & Sennikov). Previously designated type superseded under Art. 9.19(a): Hungary. Budapest, Zugliget, 21.05.1887, *V. Borbás* (BP 592363, BP 657519, neotype designated by Aldasoro et al. (2004: 127)).

Distribution. — Hungary (Buda Mts.).

Ploidy level. — Unknown. A previous record of the diploid count (Baksay 1956) is not acceptable because the stable morphology indicates that apomictic reproduction should occur in this species.

Notes on nomenclature. — The nomenclature is corrected after Somlyay (pers. comm. 2014). Citations of protologues in Aldasoro et al. (2004) and Kurtto (2009) are based on misinterpretations of the original literature.

Notes on taxonomy. — This species was reported from Germany (Arnstadt, Bayern) in Aldasoro et al. (2004). This record may not belong to *S. semiincisa*, which is restricted to the Buda Mts. (Kárpáti 1960), but may appear among the unresolved taxa of the *S. latifolia* group mentioned by Meyer et al. (2014).

79.

Karpatiosorbus pseudovertesensis (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus pseudovertesensis* Boros in Mitt. Kgl. Ungar. Gartenb.-Lehranst. 3: 53. 1937.

Type: Hungary. Fejér: in dumetis supra vallem Szappanos-völgy prope Csákberény, alt. ca. 400 s.m., 21.05.1934, *Á. Boros* (BP 301841, lectotype designated by Németh (2010: 392); isolectotypes BP 81426, BP 390415, BP 432573, BP 432574, BP 503901, BP 701252).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

80.

Karpatiosorbus dracofolia (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus dracofolia* C. Németh in Kitaibelia 14: 93. 2009, "*dracofolius*".

Type: Hungary. Vértes, Comit. Fejér, in rupestribus dolomit. silvat. vallis Antal-árok prope Gánt (Kápolnapuszta), ca. 330 m s. m. in declivibus septentrionalibus frequentissima, 47.39502° N, 18.34798° E, 25.05.2008, *C. Németh* (BP 694170, holotype).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

81.

Karpatiosorbus vertesensis (Boros) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus vertesensis* Boros in Mitt. Kgl. Ungar. Gartenb.-Lehranst. 3: 52. 1937.

Type: Hungary. Fejér, in rupestribus dolom. dumet. "Meszes-völgy" prope Csákberény, alt. ca. 300–380 m s.m., 29.04.1934, *Á. Boros (*BP 432763, lectotype designated by Németh (2010: 396); isolectotype BP 705109).

Distribution. — Hungary (northwestern parts).

Ploidy level. — Unknown.

82.

Karpatiosorbus vallerubusensis (C. Németh) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus vallerubusensis* C. Németh in Kitaibelia 14: 93. 2009.

Type: Hungary. Comit. Fejér, Vértes, in rupestribus dolomit. silvat. vallis Szedres (Juhdöglő)-völgy prope Csákberény, alt. ca. 364 m.s.m. in declivibus septentrionalibus frequentissima, 47.37940° N, 18.32743° E, 09.09.2007, *C. Németh* (BP 694172, holotype).

Distribution. — Hungary (Vértes Mts.).

Ploidy level. — Unknown.

83.

Karpatiosorbus redliana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus redliana* Kárpáti in Hung. Acta Biol. 1: 118. 1949.

Type: Hungary. Bakony Mts., "in valle Burok", 31.05. 1928, *R. Rédl* (BP 592333, lectotype designated by Németh (2010: 393)).

Distribution. — Hungary (Bakony Mts.).

Ploidy level. — Unknown.

84.

Karpatiosorbus simonkaiana (Kárpáti) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus simonkaiana* Kárpáti in Agrártud. Egyet. Kert- Szölögazdaságtud. Karának Évk. 1(14): 38. 1950.

Type: Hungary. Comit. Fehér. Mt. Vértes, in rupestribus dolomiticis ad "Rédl-emlék" supra Kápolnapuszta prope pagum Gánt; alt. ca. 360 m. s. m., 19.09.1950, *Z. Kárpáti* (BP 705145, lectotype designated by Németh (2010: 394); isolectotypes BP 432383, BP 705146, BP 705147).

Distribution. — Hungary (Vértes Mts.).

Ploidy level. — Unknown.

85.

Karpatiosorbus paxiana (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus paxiana* Jáv. in Magyar Bot. Lapok 25: 89. 1927.

Type: Romania. In monte Elisabeth höhe ad Thermae Herkulis, 05.09.1899, Á. Degen (BP 702566, lectotype designated by Németh (2010: 388); isolectotypes BP 702567, BP 81286 p.p., BP 4261). Previously designated type superseded under Art. 9.19(a): Romania. Baie Herculane p. Domogled, 20.08.1957, *I.D. Tatazanu* (BP 238160, neotype designated by Kováts (1998: 121)).

Distribution. — Romania (Southern Carpathians).

Ploidy level. — Unknown.

Notes on nomenclature. — Kováts (1998) designated a neotype of *Sorbus paxiana* which was superseded by Németh (2010) because of the presence of original material. The specimen designated by Németh was used for the original description and the illustration of the species which was published earlier in Jávorka (1915).

Apomictic taxa, Crimea

86.

Karpatiosorbus tauricola (Zaik. ex Sennikov) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus tauricola* Zaik. ex Sennikov in Willdenowia 43: 39. 2013; Zaik. in Novosti Sist. Vyssh. Rast. 22: 137. 1985, nom. inval. (Art. 40.1).

Type: Crimea. Ai-Petri Mt, NE of weather station, 960 m, gravelly slope, 22.06.1956, *K. Popov* (LE, holotype; isotypes KW, SIMF).

– *Sorbus pseudolatifolia* K. Popov in Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 19: 188. 1959, nom. inval. (Art. 40.1), non Boros (1937).

– *Sorbus armeniaca* auct.: Aldasoro & al. in Syst. Bot. Monogr. 69: 113–114. 2004.

Distribution. — Crimea.

Ploidy level. — Tetraploid, 2n=68 (Zaikonnikova & Kipiani 1980).

Majovskya Sennikov & Kurtto [*Aria* × *Chamaemespilus*]

Majovskya Sennikov & Kurtto, **gen. nov.** ≡ *Sorbus* subgen. *Chamaespilaria* Májovský & Bernátová in Acta Horticult. Regiotect. 4: 21. 2001, pro subgen.

Type: *Sorbus sudetica* (Tausch) Bluff, Nees & Schauer.

= ×*Chamaearia* Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 27. 2012, pro nothogen. [*Chamaemespilus* × *Aria*].

Etymology. — The new generic name is dedicated to Jozef Májovský (1920–2012), who contributed to the development of the taxonomy of hybridogenous *Sorbus* taxa in Slovakia.

Description. — Small shrubs. Leaves simple, entire, whitish-tomentose underneath, with 4–8 pairs of lateral veins, without any apparent lobation, minutely serrate to double serrate. Petals pinkish. Styles 2–3. Fruit medium-sized, reddish, with sparse small lenticels.

Origin. — *Aria* (Pers.) Host × *Chamaemespilus* Medik.

Species number. — Four facultatively apomictic species and one diploid hybrid are currently recognized in Europe.

Notes on nomenclature. — The name *Sorbus* subgen. *Chamaespilaria* Májovský & Bernátová was published as the name of a taxon. It cannot be validly published as the name of a nothotaxon as being contrary to Art. H.6.1.

The nothogeneric name published by Mezhensky, ×*Chamaearia* Mezhenskyj, cannot be used for this taxon when treated as a genus of hybrid origin. For this reason a new name is proposed here.

1.

Majovskya sudetica (Tausch) Sennikov & Kurtto, **comb. nov.** ≡ *Pyrus sudetica* Tausch in Flora 17: 76. [7 Feb] 1834 ≡ *Sorbus sudetica* (Tausch) Bluff, Nees & Schauer, Comp. Fl. German., ed. 2, 1(2): 178. 1837 ≡ *Sorbus aria* var. *sudetica* (Tausch) Heynh., Nom. Bot. Hort. 2: 685. 1841 ≡ *Chamaemespilus sudetica* (Tausch) M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 131. 1847 ≡ *Sorbus chamaemespilus* var. *sudetica* (Tausch) Wenzig in Linnaea 38(1): 65. 1874 ≡ *Sorbus chamaemespilus* subsp. *sudetica* (Tausch) Nyman, Consp. Fl. Eur. [2]: 242. 1879 ≡ *Aria sudetica* (Tausch) Beck, Fl. Nieder-Österreich 2(1): 711. 1892 ≡ *Chamaearia sudetica* (Tausch) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 28. 2012, pro hybr.

Type: Czech Republic. ”Riesengebirge” [Krkonoše], *Tausch* [Herbarium Florae Bohemicae n. 507b, as ”*Pyrus Aria* ß. *rosea*”] (PR, lectotype designated by Aldasoro & al. (2004: 119); isolectotypes LE, W).

Distribution. — Czech Republic, Poland.

Ploidy level. — Tetraploid, 2n=68 (Kovanda 1983; Jankun & Kovanda 1986; Jankun 1993). The same count reported from Spain by Aldasoro et al. (1998) belongs to *Majovskya ambigua*.

2.

Majovskya ×ambigua (Decne.) Sennikov & Kurtto, **comb. nov.** ≡ *Aria ambigua* Decne. in Nouv. Arch. Mus. Hist. Nat. 10: 165. 1874 ≡ *Sorbus chamaemespilus* subsp. *ambigua* (Decne.) Nyman, Consp. Fl. Eur. [2]: 242. 1879; Hedl. in Kongl. Svenska Vetensk. Akad. Handl. 35(1): 60. 1901 ≡ *Hahnia hostii* var. *ambigua* (Decne.) Dippel, Handb.

Laubholzk. 3: 379. 1893 ≡ *Sorbus ambigua* (Decne.) Beck in Dörfler, Herb. Norm. 37: 221. 1898.

Type: Switzerland. ”Rocailles de la Dole du côté de la Faucille (Vaud)”, 24.06.1856, *Michalet* [Plantes du Jura n. 77] (P, lectotype designated by Aldasoro & al. (2004: 121); isolectotypes BR, MPU).

Distribution. — Austria, Czech Republic, France, Germany, Poland, Spain, Slovakia, Switzerland.

Ploidy level. — Diploid, 2n=34 (inferred from variable morphology: Meyer et al. 2005).

Note. — This hybrid between *Chamaemespilus alpina* and *Aria edulis* is very similar to the first parent, being different mostly in a small amount of pubescence on the lower side of its leaves. It is not considered a constant taxon and thus has not been mapped for *Atlas Florae Europaeae*.

3.

Majovskya algoviensis (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus algoviensis* N. Mey. in Ber. Bayer. Bot. Ges. 86: 228. 2016; N. Mey. in Ber. Bayer. Bot. Ges. 69–70: 165. 2000, nom. inval. (Art. 40.1).

Type: Germany. Bayern: Grat vom Söllerkopf zum Söllereck, 05.09.1997, *N. Meyer, H. Schuwerk & O. Angerer* s.n. (M 0213790, holotype).

Distribution. — Austria (Voralberg) and Germany (Bayern). Newly reported from Austria by W. Gutermann (unpubl.).

Ploidy level. — Unknown.

4.

Majovskya haljamovae (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus haljamovae* Bernátová & Májovský in Biologia (Bratislava) 58: 784. 2003.

Type: Slovakia. Nízke Tatry, l.d. Salatín in mughetis cacuminis ca. 1630 m s.m., solo calcareo, 18.06.1993, *D. Bernátová & J. Topercer* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Nízke Tatry).

Ploidy level. — Unknown.

5.

Majovskya zuzanae (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus zuzanae* Májovský & Bernátová in Biologia (Bratislava) 58: 784. 2003.

Type: Slovakia. Veľká Fatra, l.d. Skalná Alpa, ad margines Pinetum mughi, solo calcareo, ca. 1450 m s.m., 08.06.1993, *J. Májovský & D. Bernátová* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Veľká Fatra).

Ploidy level. — Unknown.

Normeyera **Sennikov & Kurtto [*Aria* × *Chamaemespilus* × *Sorbus*]**

Normeyera Sennikov & Kurtto, **gen. nov.** ≡ *Sorbus* subgen. *Chamsoraria* Májovský & Bernátová in Acta Horticult. Regiotect. 4: 21. 2001, pro subgen.

Type: *Sorbus hostii* (J. Jacq. ex Host) Heynh.

= ×*Chamariosorbus* Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 29. 2012, pro nothogen. [*Chamaemespilus* × *Aria* × *Sorbus*].

Etymology. — The new generic name honours Norbert Meyer (b. 1954), who contributed greatly to the taxonomy of apomictic species of *Sorbus* in Central Europe.

Description. — Small or large shrubs. Leaves simple, entire or lobate with very small obtuse lobes, glabrous to whitish- or greyish-tomentose underneath, with 4–8 pairs of lateral veins, double serrate. Petals pinkish. Styles 2(3). Fruit medium-sized, reddish, with sparse small lenticels.

Origin. — *Aria* (Pers.) Host × *Chamaemespilus* Medik. × *Sorbus* L.

Species number. — Seven facultatively apomictic species and two diploid hybrids are currently recognized in Europe.

Notes on nomenclature. — The name *Sorbus* subgen. *Chamsoraria* Májovský & Bernátová was validly published as the name of a subgenus and is not suitable for a nothosubgenus. The name ×*Chamariosorbus* Mezhenskyj was validly published for a nothogenus and is not applicable to a genus of hybrid origin as accepted here. For this reason a new generic name is required and is proposed here.

1.

Normeyera* ×*hostii (J. Jacq. ex Host) Sennikov & Kurtto, **comb. nov.** ≡ *Aria* ×*hostii* J. Jacq. ex Host, Fl. Austriaca 2: 8. 1831 ≡ *Sorbus hostii* (J. Jacq. ex Host) Heynh., Nom. Bot. Hort. 2: 685. 1841 ≡ *Pyrus hostii* (J. Jacq. ex Host) Endl., Cat. Hort. Vindob. 2: 440. 1842 ≡ *Aronia hostii* (J. Jacq. ex Host) Carrière in Rev. Hort. (Paris) 45: 470. 1873 ≡ *Sorbus aria* subsp. *oblongifolia* Nyman, Consp. Fl. Eur. [2]: 242. 1879 ≡ *Hahnia hostii* (J. Jacq. ex Host) Dippel, Handb. Laubholzk. 3: 378. 1893 ≡ *Aria chamaemespilus* subsp. *hostii* (J. Jacq. ex Host) Bonnier & Layens, Tabl. Syn. Pl. Vasc. France: 103. 1894 ≡ *Chamariosorbus hostii* (J. Jacq. ex Host) Mezhenskyj in Mezhensky et al., Netrad. Plodov. Kult.: 29. 2012, pro hybr.

Described from Austria ("in Austriae, Styriae subalpinis, alpium convallibus locis saxosis, rupestribus"). Type not designated.

Distribution. — Austria, Czech Republic, France, Germany, Poland, Slovakia, Switzerland.

Ploidy level. — Diploid, 2n=34 (Meyer et al. 2005).

Note. — Presumed hybrid between *Chamaemespilus alpina* and *Hedlundia austriaca*, sexual diploid (Meyer et al. 2005). It is not considered a constant taxon and thus has not been mapped for *Atlas Florae Europaeae*. Its distribution area has not been verified.

2.

Normeyera* ×*schinzii (Düll) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus* ×*schinzii* Düll in Ber. Bayer. Bot. Ges. 34: 61. 1961.

Type: Switzerland. Vaud: Chalets de la Dôle, 24.06.1926, *Palezieux* (BRNU 270266, holotype).

Distribution. — Austria, Czech Republic, France, Germany, Poland, Slovakia, Switzerland.

Ploidy level. — Diploid, 2n=34 (Meyer et al. 2005).

Note. — Presumed hybrid between *Chamaemespilus alpina* and *Hedlundia mougeotii*, sexual diploid (Meyer et al. 2005). It is not considered a constant taxon and thus has not been mapped for *Atlas Florae Europaeae*. Its distribution area has not been verified.

3.

Normeyera margittaiana (Jáv.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus hostii* subsp. *margittaiana* Jáv. in Sched. Fl. Hung. Exs. 8: 27. 1927 ≡ *Sorbus margittaiana* (Jáv.) Kárpáti in Repert. Spec. Nov. Regni Veg. 62: 304. 1960.

Type: Slovakia. "Montes Kriván-Tátra ad confines comitatuum Trencsén et Túróc, inter mughos montis Suchy, supra opp. Ruttka [Vrútky], alt. ca. 1450 m, 21.06.1915, *A. Margittai* [Flora Hungarica Exsiccata no. 750] (BP 81345, lectotype designated by Kováts (1998: 121)).

Distribution. — Slovakia (Krivánska Fatra).

Ploidy level. — Tetraploid, 2n=68 (Májovský et al. 1998; Marhold et al. 2007).

4.

Normeyera atrimontis (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus atrimontis* Bernátová & Májovský in Biologia (Bratislava) 58: 786. 2003.

Type: Slovakia. Veľká Fatra, l.d. Čierny kameň, in mughetis sub cacumine ca. 1400 m s.m., solo calcareo, 16.06. 1993, *J. Obuch* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Veľká Fatra).

Ploidy level. — Unknown.

5.

Normeyera caeruleomontana (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus caeruleomontana* Bernátová & Májovský in Biologia (Bratislava) 58: 786. 2003.

Type: Slovakia. Nízke Tatry, montis Sina, l.d. Na jame (1438 m), in fruticetis *P. mughi*, 18.06.1997, *D. Bernátová* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Nizke Tatry).

Ploidy level. — Unknown.

6.

Normeyera diversicolor (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus diversicolor* Bernátová & Májovský in Biologia (Bratislava) 58: 788. 2003.

Type: Slovakia. Veľká Fatra, l.d. Strapatá skala (1195 m), in fruticetis *Pinetum mughi*, locis saxosis dolomiticis,

07.06.1999, *D. Bernátová* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Veľká Fatra).

Ploidy level. — Unknown.

7.

Normeyera montisalpae (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus montisalpae* Bernátová & Májovský in Biologia (Bratislava) 58: 788. 2003.

Type: Slovakia. Veľká Fatra, l.d. Skalná Alpa, in mughetis ca. 1450 m s.m., solo calcareo, 08.06.1993, *D. Bernátová* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Veľká Fatra).

Ploidy level. — Unknown.

8.

Normeyera salatini (Bernátová & Májovský) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus salatini* Bernátová & Májovský in Biologia (Bratislava) 58: 790. 2003.

Type: Slovakia. Nízke Tatry, solum ad cacumen montis Salatín (1630 m), solo calcareo in mughetis, expositione SW, S et ESE, rarissimeque per saxosa aperta usque ad ca 1350 m s.m. descendens, 18.06.1993, *D. Bernátová & J. Topercer* (Botanical Garden at Blatnica, Comenius University, holotype).

Distribution. — Slovakia (Nízke Tatry).

Ploidy level. — Unknown.

9.

Normeyera doerriana (N. Mey.) Sennikov & Kurtto, **comb. nov.** ≡ *Sorbus doerriana* N. Mey. in Ber. Bayer. Bot. Ges. 86: 228. 2016; N. Mey. in Ber. Bayer. Bot. Ges. 69–70: 169. 2000, nom. inval. (Art. 40.1).

Type: Germany. Bayern: Grat vom Söllerkopf zum Söllereck, 18.06.1997, *N. Meyer, H. Schuwerk & O. Angerer* s.n. (M 0213772, holotype; Hb. Meyer, isotypi).

Distribution. — Austria (Voralberg), Germany (Bayern).

Ploidy level. — Unknown.

Unresolved names

Aria crantzii Beck, Fl. Nieder-Österreich 2(1): 712. 1892. [*Chamaemespilus* × *Aria*]

Described from Austria ("zwischen Krummholz auf dem Schneeberge, der Raxalpe"). Type not designated.

Chamaemespilus aria M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 132. 1847. [*Chamaemespilus* × *Aria*]

Described from Switzerland ("in Helvetiae australis (Valesiae) montibus Dolaz, Enzeindaz"). Type not designated.

Crataegus pseudaria Spach, Hist. Nat. Vég. 2: 108. [12 Jul] 1834 ≡ *Chamaemespilus pseudaria* (Spach) M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 132. 1847 ≡ *Sorbus hostii* var. *pseudaria* (Spach) Briq. in Rev. Gén. Bot. 5: 416. 1893 ≡ *Sorbus pseudaria* (Spach) Hedl. in Kongl. Svenska Vetensk. Acad. Handl. 35(1): 110. 1901. [*Chamaemespilus* × *Aria*]

Described from France ("collines calcaires du département de la Côte-d'Or"). Type not designated.

Pyrus semilobata Bechst., Forstbot., ed. 4: 154. 1821 ≡ *Crataegus semilobata* (Bechst.) Bluff & Fingerh., Comp. Fl. German. 1: 614. 1825 ≡ *Aria semilobata* (Bechst.) M. Roem., Fam. Nat. Syn. Monogr. Rosiflorae 3: 129. 1847. [*Aria* × *Torminalis*]

Described from Germany ("Franken" = Franconia). Type not designated.

Sorbus alnoides Gand., Dec. Pl. Nov. 1: 23. 1875. [*Aria*]

Described from cultivation ("in Europa media; in horto Lugdunensi Galliae colitur"). Type not designated.

Sorbus austriaca subsp. *croatica* Kárpáti in Feddes Repert. Spec. Nov. Regni Veg. 62: 177. 1960, nom. inval. (Art. 40.1) ≡ *Sorbus croatica* [Kárpáti] P.D. Sell in Sell & Murrell, Fl. Gr. Brit. Ireland 2: 522. 2014, nom. inval. (Art. 40.1) [*Aria* × *Sorbus*]

Described from Croatia (many localities cited).

Sorbus austriaca subsp. *mayeri* Kárpáti in Biol. Vestn. 16: 19. 1968 ≡ *Sorbus mayeri* (Kárpáti) Mikoláš in Carinthia II 190/110: 384. 2000. [*Aria* × *Sorbus*]

Type: Slovenia. ”Istra, in monte Slavnik supra pagos Herpelje et Kozina, al. ca. 1000 m s. m.”, 17.09.1966, *Kárpáti et al.* (not located).

Notes on nomenclature. — Although no type of this name was designated in the protologue, Kárpáti (1968) cited a single locality, and also mentioned collection day and participants in the excursion. These data may be treated as mention of a single gathering, which is acceptable as indication of the type (Art. 40.3).

Sorbus carniolica Kárpáti in Biol. Vestn. 16: 21. 1968. [*Aria* × *Sorbus*]

Type: Slovenia. ”Tractus montium Gorjanci supra Novo mesto, alt. ca. 500 m s.m.”, 22.09.1966, *Kárpáti et al.* (not located).

Notes on nomenclature. — This name was validly published under Art. 40.3.

Sorbus chamaemespilus var. *arioides* Godet, Flore de Jura, 1: 229. 1852 ≡ *Sorbus arioides* (Godet) Michalet, Hist. Nat. Jura, Bot.: 156. 1864 ≡ *Aria scandica* var. *arioides* (Godet) Gren., Revue Fl. Monts Jura: 82. 1875 ≡ *Sorbus scandica* subsp. *arioides* (Godet) Nyman, Consp. Fl. Eur. [2]: 242. 1879. [*Chamaemespilus* × *Aria*]

Type: Switzerland. ”Rocailles de la Dole du côté de la Faucille (Vaud)”, 24.06.1856, *Michalet* [Plantes du Jura n. 76] (P, neotype designated by Aldasoro & al. (2004: 109), as ”lectotype”; isoneotype NCY).

Notes on nomenclature. — Godet (1852) described *Sorbus chamaemespilus* var. *arioides* as presumably intermediate between *S. chamaemespilus* and *S. aria*. Aldasoro et al. (2004) designated a ”lectotype” of *S. arioides* (not seen) which is not part of the original material of the name. This neotype specimen reportedly belongs to *S. aria*, and the typification should be superseded once the original material of the name is found.

Sorbus cyclophylla Gand., Fl. Lyon.: 89. 1875. [*Aria*]

Described from France (”bois à Couzon (Rhône)”). Type not designated.

Sorbus domugledica Kárpáti in Németh in Acta Bot. Hung. 52: 383. 2010; Kárpáti in Feddes Repert. 62: 189. 1960, nom. inval. (Art. 40.1). [*Aria*]

Type: Romania. Domugled bei Herkulesbad, Buchenwald, Kalk, 450 m, 19.08.1901, *F. Pax* (BP 702580, holotype).

Sorbus erubescens A. Kern. in Magnier, Scrin. Fl. Select. 8: 148, no. 1170 bis. 1889. [*Chamaemespilus* × *Aria*]

Type: Austria. Tirolia sept., in ditione Oenipontana in montium catena a jugo maxime eminente: Solstein-Kette nominata, *Kerner* (P, lectotype designated by Aldasoro & al. (2004: 121)).

Sorbus fallacina Royer in Bull. Soc. Bot. France 30: 233. 1883 [*Aria* × *Torminalis*]

Described from France (”Côte-d’Or”). Type not designated.

Sorbus herculis Kárpáti in Németh in Acta Bot. Hung. 52: 386. 2010; Kárpáti in Feddes Repert. 62: 189. 1960, nom. inval. (Art. 40.1). [*Aria*]

Type: Romania. In silvis vallis Zselereu ad Thermae Herculis, 18.06.1913, *W. Seymann* (BP 702574, holotype).

Sorbus istriaca Kárpáti in Biol. Vestn. 16: 19. 1968. [*Aria* × *Sorbus*]

Locus classicus: Slovenia. ”Istra, in monte Slavnik supra pagos Herpelje et Kozina, alt. ca. 1000 m s.m.”, 17.09.1966, *Kárpáti et al.* (not located).

Notes on nomenclature. — This name was validly published under Art. 40.3.

Sorbus kitaibeliana Baksay & Kárpáti in Feddes Repert. 62: 299. 1960. [*Aria* × *Torminalis*]

Type: Hungary. Budapest: Máriaremete, Remetehegy, *Baksay* (BP, holotype, not traced).

Notes on taxonomy. — Kárpáti (1960) believed that this name is applicable to a hybrid between *S. danubialis* and *S. torminalis*; its type specimen (the only specimen cited and apparently the only original material on which the hybrid name was based) was collected in Budapest City. Kovanda (1996b) discovered a similar tree in the Czech Republic (Moravia) and determined its chromosome number as tetraploid, 2n=68. It is unlikely that the two specimens, from isolated localities in Hungary and Czech Republic, belong to the same taxon. The identity of the type specimen has not been assessed.

Sorbus latifolia var. *secalliana* Pau in Bol. Soc. Aragonesa Ci. Nat. 15: 160. 1916. [*Aria* × *Torminalis*]
Described from Spain (”Paular: VIII.1912 (*Beltrán y Vicioso*)”). Type not traced.

Sorbus obtusata (Spach) Petz. & G. Kirchn., Arbor. Muscav.: 300. 1864 ≡ *Crataegus obtusata* Spach, Hist. Nat. Vég. 2: 104. 1834 ≡ *Aria obtusata* (Spach) M. Roem., Fam. Nat. Syn. Monogr. 3: 125. 1847. [*Aria*]
Described from cultivation (France). Type not designated.

Sorbus platyodon Gand., Dec. Pl. Nov. 1: 23. 1875. [*Aria* × *Sorbus*]
Described from cultivation (”in Europa centrali; in horto Lugdunensi Galliae colitur”). Type not designated.

Sorbus pseudoscandica Zabel in Mitt. Deutsch. Dendrol. Ges. 16: 82. 1907. [*Aria* × *Sorbus*]
Described from Germany (”Waltershausen in Thüringen”). Type not designated.

Notes on nomenclature. — This speces name was validly published with a brief diagnosis: ”ihre Früchte sind etwas kleiner und ihre Fruchtkelchlappen länger als die der Sorb. scandica” (Zabel 1907).

Sorbus rotundifolia Petz. & G. Kirchn., Arbor. Muscav.: 301. 1864. [*Aria*]
Described from cultivation (Germany & Poland, Muskau Park). Type not designated.

Sorbus ronnigeri Jáv. in Bot. Közlem. 14: 102. 1915. [*Aria* × *Sorbus*]
Described from Austria (Reisalp). Type: in BP (Kárpáti 1960: 216).

Sorbus slavnicensis Kárpáti in Biol. Vestn. 16: 19. 1968. [*Aria* × *Sorbus*]
Locus classicus: Slovenia. ”Istra, in monte Slavnik supra pagos Herpelje et Kozina, alt. ca. 1000 m s.m.”, 17.09.1966, *Kárpáti et al.* (not located).

Notes on nomenclature. — This name was validly published under Art. 40.3.

Sorbus umbellata Maratti, Fl. Rom. 1: 358. 1822, ”*umbellatus*”. [*Aria*]
Described from Italy (”prope montem Monachum juxta montem Fiscollum, in loco, qui vulgo audit Li Trocchi”). Type not designated.

Sorbus umbellata var. *orbiculata* Gabrielian, Ryabiny Zapadnoi Azii i Gimalaev: 175. 1978. [*Aria*]
Type: Armenia. Zangezur, m. Allu ex adverso pag. Schabadin, in decliviis boreali-occidentalis, 26.08.1952, *E. Gabrielian* (ERE 59270, holotype; isotypes ERE 59269, ERE 66330, ERE 66331, E 61765, LE).

Excluded names

Pyrus hybrida Moench, Verz. Ausländ. Bäume: 90. 1785, non *Crataegus hybrida* L. 1761 ≡ *Sorbus spuria* Pers., Syn. Pl. 2: 38. 1807 ≡ *Pyrus spuria* (Pers.) DC., Prodr. 2: 637. 1825 ≡ ***Sorbaronia*** × ***hybrida*** (Moench) C.K. Schneid.
Described from cultivation (Germany, Kassel, Wilhelmshöhe). Type not designated.

Mespilus sorbifolia Poir. in Lamarck, Encycl. Méth. Bot. Suppl. 4: 73. 1816 ≡ *Pyrus sorbifolia* (Poir.) Bosc ex P. Watson, Dendrol. Brit. 1: ad Tab. 53. 1823–1825 ≡ *Sorbus heterophylla* Reichenb., Fl. Germ. Excurs. 2(2): 628. 1832, nom. illeg. superfl. ≡ *Sorbus sorbifolia* (Poir.) Hedl. in Kongl. Svenska Vetensk.-Akad. Handl., nov. ser. 35(1): 114. 1901 ≡ ***Sorbaronia*** × ***sorbifolia*** (Poir.) C.K. Schneid.
Described from cultivation (France). Type not designated.

Sorbus fallax C.K. Schneid., Ill. Handb. Laubholzk. 1(5): 688. 1906 ≡ ***Sorbaronia*** × ***fallax*** (C.K. Schneid.) C.K. Schneid.
Described from cultivation (Germany). Type not designated.

Statistical analysis

In the present revision, 201 taxa of *Sorbus* s.l. are accepted at the level of species (Table 1). Diploid species are 5, each representing a separate genus and being a primary source of further diversity. Sexual diploid hybrids are 4; these are variable hybrids which were formed recurrently many times, have unstable morphology and do not represent isolated entities. Apomictic species are 186, mostly deemed stabilised but some appar-

Table 1. Statistical analysis of the described taxonomic diversity of *Sorbus* s.l. in Europe.

genus	diploid species	diploid hybrids	apomictic species	apomictic hybrids	total
Sorbus	1				1
Aria	1		51	1	53
Chamaemespilus	1				1
Cormus	1				1
Torminalis	1				1
Hedlundia (*S* × *A*)		1	39	2	42
Borkhausenia (*S* × *A* × *T*)			1	1	2
Karpatiosorbus (*A* × *T*)		1	84	1	86
Majovskya (*A* × *C*)		1	4		5
Normeyera (*S* × *A* × *C*)		2	7		9
all genera	5	5	186	5	201

Table 2. Geographical distribution of native taxa of *Sorbus* s.l. according to main regions of Europe.

genus	British Isles	N Europe	SW Europe	C Europe	Balkans and C Mediterranean	Crimea	total
Sorbus	1	1	1	1	1	1	1
Aria	28	2	1	19	7	2	53
Chamaemespilus			1	1	1		1
Cormus			1	1	1	1	1
Torminalis			1	1	1	1	1
Hedlundia (*S* × *A*)	12	9	2	19	4	1	42
Borkhausenia (*S* × *A* × *T*)		2					2
Karpatiosorbus (*A* × *T*)	6		3	75	1	1	86
Majovskya (*A* × *C*)			1	5			5
Normeyera (*S* × *A* × *C*)			2	9			9
all genera	47	14	13	131	16	7	201

ently facultative. Five taxa are considered non-established interspecific hybrids, either not forming populations because of a very small number of individuals or consisting of a diverse variety of hybrids which are however at least partly apomictic.

Only sexual and established apomictic species are mapped for *Atlas Florae Europaeae*, with further exclusion of casual aliens according to the regular policy of this work (Kurtto et al. 2013), thus leaving the total of 190 taxa.

The geographical distribution of the described taxonomic diversity of *Sorbus* s.l. in Europe (Table 2) was roughly analysed according to main regions as follows: British Isles, North Europe (Scandinavia, Finland and the Baltic area), Southwest Europe (France and Spain), Central Europe (Alps, Carpathians), Balkans and the central part of the Mediterranean (including Italy), and the Crimea.

The greatest taxonomic diversity of *Sorbus* s.l. has been registered in the mountains of Central Europe, which are rather well studied for apomictic taxa of *Aria*, *Karpatiosorbus* and *Hedlundia*. However, some countries of this region (Slovakia, Romania) were very little studied for this group, and many new taxa may be found in these countries. The second species-rich region is the British Isles which may be considered nearly comprehensively studied. The third region is the Balkans whose diversity is indeed highly un-

derestimated because of nearly complete absence of taxonomic inventories in the region. The taxonomic diversity of the group in Fennoscandia and the Crimea is limited but rather well known except for the unstudied species of *Hedlundia*. Southwest Europe is another "white spot" on the *Sorbus* map because the taxonomy of apomictic taxa was neglected there since the times of Gandoger.

When the mountains of Central Europe and the British Isles can be clearly treated as hotspots of the *Sorbus* diversity, we expect that similar areas of high taxonomic diversity can be found in the Balkans as well, and to a lesser extent also in the French Alps and the Pyrenees. Many new species of *Sorbus* s.l. are still waiting for being discovered in these areas.

Conclusions

Although there has been much effort to describe the diversity of *Sorbus* s.l. in various parts of Europe, and subsequently many broadly circumscribed or ill-defined taxa have been re-studied and the knowledge of them has been updated, several taxa of *Aria*, *Hedlundia*, *Majovskya* and *Normeyera* are still accepted in their collective circumscription. Many other species names remain not applied taxonomically. The "white areas" of Europe where the taxonomy of *Sorbus* s.l. has been little or not studied are very extensive and cover the Balkans and most of the Mediterranean, whereas significant gaps in our knowledge remain also in the Alps and the Carpathians.

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