British & Irish Botany 7(2): 143-147, 2025

Combinations in *Pyrus* (Rosaceae) required for inclusion in the second edition of *Whitebeams, Rowans and Service Trees,* BSBI Handbook No. 14.

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This pdf constitutes the Version of Record published on 14 August 2025.

Abstract
In preparation for the second edition of *Whitebeams, Rowans and Service Trees,* BSBI Handbook No. 14., eight new combinations and one new name are provided to establish a complete set of names in *Pyrus*, covering taxa of *Sorbus sensu lato*. Additionally, one new combination is proposed for a species of *Cotoneaster* that is naturalised in Kent.

Keywords: generic delimitation; monophyly; taxonomy; synonymy

Introduction

The taxonomy of our native whitebeams, rowans and services trees (*Sorbus* L. *sensu lato*; Rosaceae subtribe Malinae) and their relatives, many of which are important as crops or in horticulture (notably *Malus* Mill., *Pyrus* L., *Cydonia* Mill., *Crataegus* L., and *Cotoneaster* Medik.), has been contentious since the start of modern taxonomy. Almost immediately after the treatment by Linnaeus (1753), who placed members of Malinae in four genera (*Crataegus*, *Mespilus*, *Pyrus*, and *Sorbus*), Miller (1754) published an alternative classification, in which he separated *Malus* from *Pyrus sensu stricto*. The controversy has continued to date, and, for example, *Sorbus aria* (L.), Crantz (Common Whitebeam; basionym *Crataegus aria* L.) now has synonyms in at least 11 genera and two nothogenera (Fay & Rich, 2022).

The subtribe has a circumboreal distribution, but many DNA-based analyses have focused on questions relating to the relationships of taxa in different geographical regions (Asia, Europe, North America) or individual countries. As a result of the differences in sampling and the use of different regions of DNA, many of the phylogenetic trees are not easily comparable, and there is no clear consensus of relationships or the taxonomic system to be adopted. However, it is clear that *Sorbus sensu lato* is not monophyletic (see Fay & Rich, 2022, for summary), and several conflicting taxonomic treatments for taxa included in Rich *et al*. (2010) have been put forward in recent years, two of which need to be given serious consideration.

Sennikov & Kurtto (2017) accepted five "non-hybrid genera" (*Aria* (Pers.) Host, *Chamaemespilus* Medik., *Cormus* Spach, *Sorbus sensu stricto* and *Torminalis* Medik.) and five genera of hybrid origin (*Borkhausenia* Sennikov & Kurtto, *Hedlundia*

Sennikov & Kurtto, *Karpatiosorbus* Sennikov & Kurtto, *Majovskya* Sennikov & Kurtto and *Normeyera* Sennikov & Kurtto) for European members of *Sorbus sensu lato*. In the latter group, *Borkhausenia* was replaced the following year by *Scandosorbus* Sennikov as it was found to be an illegitimate name (Sennikov, 2018).

In this system, some of the taxa with more complex patterns of hybridization in their background were included in one of the hybridogenous genera. For example, *Sorbus pseudofennica* E.F.Warb. was included in *Hedlundia* (as *H. pseudofennica* (E.F.Warb.) Sennikov & Kurtto), even though it is derived from the cross between *Sorbus aucuparia* L. and *Sorbus arranensis* Hedl. (=*Hedlundia arranensis* (Hedl.) Sennikov & Kurtto), i.e. it is a cross between two of the ten genera *sensu* Sennikov & Kurtto. Similarly, *Sorbus* ×*liljeforsii* T.C.G.Rich, the backcross of *Sorbus intermedia* (Ehrh.) Pers. (=*Scandosorbus intermedia* (Ehrh.) Sennikov) onto *Sorbus aucuparia*) was included in *Scandosorbus* as *Scandosorbus* ×*liljeforsii* (T.C.G.Rich) Sennikov (Sennikov, 2018). In addition, it should be noted that the treatment of Sennikov & Kurtto left the non-European taxa without combinations in the new genera. Following this, Rushforth described several additional new genera to include some of the Asian taxa of Malinae (Rushforth, 2018), but at least three of these have since been shown to be non-monophyletic (Ma *et al*., 2023; for further discussion, see below).

With a diametrically different approach, Christenhusz *et al.* (2018), in light of the problems with the phylogenetic placement of hybridogenous taxa and the polyphyly of *Sorbus sensu lato*, chose to recognise *Pyrus sensu lato* including *Sorbus*, *Malus* etc. This reflected the phylogenetic trees of Zhang *et al.* (2017), combining their clades B and C, and it removed the need for the use of "hybridogenous genera" and (most) nothogeneric names, bringing the use of generic names in Malinae into line with treatments of other groups including *Prunus* L. (including *Amygdalus* L., *Armeniaca* Scop., *Cerasus* Mill., *Padus* Mill., etc.: e.g., POWO, 2025), *Dracaena* Vand. ex L. (including *Pleomele* Salisb., *Sansevieria* Thunb.: e.g., POWO, 2025), genera of Orchidinae (Bateman *et al*., 1997; Stace, 2019), and *Scilla* L. (including *Chionodoxa* Boiss.: e.g., David, 2018).

A third, intermediate suggestion (Sun *et al*., 2018) in which the authors advocated the recognition of two genera for the "six *Sorbus*-related genera" should be mentioned. This focused on the Asian taxa of *Sorbus sensu lato*, and it is not further considered here as their analyses did not support the monophyly of *Sorbus sensu* Sun *et al.* (= *Sorbus* + *Cormus* + *Micromeles* Descne.) excluding *Pyrus*.

For readers with wider geographical interests, it should be noted that the controversy relating to genera of Malinae and to *Sorbus sensu lato* is not solely a European issue. For example, Rushforth (2018) described five genera (summarised in Rushforth, 2019) for Asian taxa of entire-leaved *Sorbus*, but these have since been shown to be embedded in *Micromeles*, with the three genera *sensu* Rushforth with more than one species sampled (*Alniaria* Rushforth, *Griffitharia* Rushforth and *Thomsonaria* Rushforth) all being polyphyletic (Ma *et al*., 2023).

Neither the treatment of Sennikov & Kurtto (2017) nor that of Christenhusz *et al*. (2018) has received widespread acceptance to date (see, e.g., Rushforth, 2019; Fay & Rich, 2022). To reflect this, the decision to use *Sorbus* in the second edition of the BSBI Handbook with the same circumscription as used in the first edition and elsewhere (e.g. Stace, 2019) has been taken, while recognising the polyphyly of *Sorbus* in this sense.

For those who wish to use *Pyrus sensu lato*, names in *Pyrus* will be included in the synonymy in the new edition of the BSBI Handbook. Many of these names are already available, but we here make the small number of combinations in *Pyrus* for those taxa covered in the BSBI Handbook for which they are not available (including those published by Houston & Rich, 2025). One new name is required due to the epithet already being in use in *Pyrus*.

In addition, to allow *Pyrus sensu lato* to be used for the flora of Britain and Ireland, one new combination is required for a species not included in *Sorbus sensu* Rich *et al*. (2010). This is for a species of *Cotoneaster* naturalised in West Kent (VC16), although it may since have died out at this site (see, e.g., Stace, 2010, 2019).

Taxonomic treatment

New combinations and a new name: taxa to be covered in the second edition of the BSBI Handbook:

Pyrus domestica (L.) Ehrh. var. *pomifera* (Hayne) M.F.Fay **comb. nov.** Basionym: *Sorbus domestica* α *pomifera* Hayne, Dendrol. Fl.:76 (1822). No type indicated.

Pyrus domestica (L.) Ehrh. var. *pyrifera* (Hayne) M.F.Fay **comb. nov.** Basionym: *Sorbus domestica* β *pyrifera* Hayne, Dendrol. Fl.:76 (1822). No type indicated.

Pyrus fayana (L.Houston & T.C.G.Rich) Christenh. **comb. nov.** Basionym: *Sorbus fayana* L.Houston & T.C.G.Rich *Brit. Irish Bot.* 7:30-31 (2025). TYPE: UK, England, limestone rocks, top of first slab above lower car park, Burrington Combe, Somerset (VC6), ST4767058749, 24 July 2003, T.C.G. Rich & M. Chester (holotype: **NMW** accession number V.2003.1.65).

Pyrus lanigera M.F.Fay & Christenh. **nom. nov.** Replaced synonym: *Sorbus incana* Hedl., *Kongl. Svenska Vetensk.-Akad. Handl*. 35(1):105 (1901), Etymology: Latin, *lanigera*, meaning woolly, in reference to the felty hairs on the leaves mentioned in the original description. TYPE: (designated by Houston & Rich, 2025) Plants cultivated in the Botanical Garden of Copenhagen. *Sorbus incana* Hedl., P1968-5911, 9 May 1990 (Neotype **C** barcode no. C10025549). [Not *Pyrus incana* (W.W.Sm.) M.F.Fay & Christenh. (= *Cotoneaster incanus* (W.W.Sm.) G.Klotz; basionym: *Cotoneaster hebephyllus* Diels var. *incanus* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 10:22 (1917)].

Pyrus latifolia (Lam.) R.Thomps. var. *semitorminalis* (Borbás) M.F.Fay **comb. nov.** Basionym: *Sorbus latifolia* Lam. var. *semitorminalis* Borbás, Oesterr. Bot. Z. 28:393 (1878). No type indicated.

Pyrus ×*pseudoporrigentiformis* (T.C.G.Rich & L.Houston) M.F.Fay **comb. nov.** Basionym: *Sorbus* ×*pseudoporrigentiformis* T.C.G.Rich & L.Houston, *Brit. Irish Bot.* 7:32-34 (2025). TYPE: UK, England, Symonds Yat viewpoint by café [West Gloucester (VC34)], SO5630315912, 12 July 2011, M. Fay, J. Pellicer Moscardó, S. Clermont & T. Rich, flow cytometry collecting number FC131, triploid (holotype: **NMW** accession number V.2011.1.782).

Pyrus wyensis (D.Green) M.F.Fay **comb. nov.** Basionym: *Aria wyensis* D.Green (2024) *Brit. Irish Bot.* 6:1. TYPE: UK, Wales, Wynd Cliff Quarry, St Arvens, Monmouthshire (VC35), ST5307797377, 75 m altitude, 20 July 2022, D.E. Green. (holotype **NMW** accession number V.2023.004.1; isotype **herb. D.E. Green**). In the original paper (Green, 2024a), the grid reference was cited incorrectly; see Green (2024b) for the corrected grid reference.

Lectotypification of a name included under Sorbus aria *in Rich* et al. *(2010)*
Rich *et al*. (2010), discussed several infraspecific taxa under *Sorbus aria*. Following discussions with Martin Lepší and Tim Rich, one of these (*S. aria* forma *cyclophylla* (Beck) Jáv. has more recently been shown to be a polyploid (M. Lepší, *pers. comm.*), and therefore it should be excluded from *S. aria* (a diploid). The plants that have been ascribed to this taxon in the UK (see discussion in Rich *et al*., 2010) therefore do not appear to belong to the continental taxon.

This taxon, under its original name, is formally lectotypified here:
Aria nivea Host forma *cyclophylla* Beck, Ann. K.K. Naturhist. Hofmus. 11:47 (1896). TYPE (designated here by M. Lepší): Bosnia and Herzegovina, 'Oberes Vogošcatal bei Jarekovice', 5 July 1888, C.G. Pringle, Plantae bosniae et hercegovinae Series II s.n. (Lectotype **PRC** accession number PRC455206).

Combination in Pyrus *for a taxon occurring in Britain: not covered in the BSBI Handbook*
Following the publication of Christenhusz *et al.* (2018), it was discovered that the name *Cotoneaster froebelii* M.Vilm. ex H.J.Sax was a nomen nudum and therefore not validly published, meaning that *Pyrus froebelii* (M.Vilm. ex H.J.Sax) M.F.Fay & Christenh. was also not valid. Fryer (2020) published the name validly as *Cotoneaster froebelii* J.Fryer (stating that 'M. Vilm. ex' could be inserted before 'J.Fryer', if the original listing of *C. froebelii* by Vilmorin is traced in the future). For completeness with regard to *Pyrus s.l*. for the British flora, the new combination in *Pyrus* is validated here.

Pyrus froebelii (J.Fryer) M.F.Fay **comb. nov.** Basionym: *Cotoneaster froebelii* J.Fryer, Brit. Irish Bot. 2:259 (2020). TYPE: China, N.E. Yunnan, between Yiliang and Xiaocuba, 05/101995, Cox & Hutchinson 7104 (holotype **E**).

Acknowledgements
The authors wish to thank Tim Rich and Libby Houston for all the interesting conversations about whitebeams and their relatives over many years. MFF particularly thanks them both for naming a species in his honour. We also thank Martin Lepší for discussions relating to the name *Aria nivea* forma *cyclophylla*.

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ISSN: 2632-4970

https://doi.org/10.33928/bib.2025.07.143