

NOMENCLATURAL NOVELTIES FOR INTERGENERIC NOTHOTAXA

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ABSTRACT

In this paper, we present nomenclatural novelties required for intergeneric nothotaxa in the course of the preparation of a continuously updated checklist project for vascular plants. At the family level, we have accepted the modern classification systems (APG IV for flowering plants, and PPG I for lycophytes and ferns). At the genus level, we have followed the generic concepts applied for particular taxonomic groups according to the POWO and available recent revision or molecular findings, so as the species concept. In total, this paper presents 93 new names, four of which are nothospecies newly validated here, in 20 families: Pteridaceae E.D.M. Kirchn. (4), Polypodiaceae J. Presl & C. Presl (1), Acanthaceae Juss. (1), Amaryllidaceae J. St.-Hil. (9), Asteraceae Bercht. & J. Presl (15), Boraginaceae Juss. (1), Brassicaceae Burnett (2), Bromeliaceae Juss. (2), Cactaceae Juss. (2), Campanulaceae Juss. (2), Crassulaceae J.St.-Hil. (3), Ericaceae Juss. (2), Gesneriaceae Rich. & Juss. (10), Hypoxidaceae R. Br. (1), Labiatae Juss. (1), Poaceae Barnhart (28), Polygonaceae Juss. (2), Rhamnaceae Juss. (3), Rosaceae Juss. (2), Rubiaceae Juss. (2). Additionally, eight names are lectotypified.

Hybrids may be regarded as results of crosses among different organisms (e.g., races, species, and varieties) and are expected to produce intermediate characteristics compared to their parentage. However, systematist's definitions of hybrids and hybridization have changed over different eras. Darwin (1872) used “hybrid” exclusively to refer to the offspring of crosses between species, and Barton & Hewitt (1985) used the term as “reproduction between members of genetically distinct populations.” Hybridization can be spontaneous or artificial, the latter chiefly for flamboyant horticultural individuals (Griesbach et al. 1993; Songpanich & Hongtrakul 2010), fruitful or resistant food crops (Xue et al. 2015; Savchenko 2017; Zheng et al. 2023), and potential medical resources (Simonnet et al. 2008).

In the present consideration, hybrids refer to results of crosses between different entities designated as genera or species. The current Shenzhen edition of *ICN* (Turland et al. 2018, hereafter *ICN*) regulates names of hybrids in Chapter H. Mosyakin & McNeill (2023) proposed to amend Art. H.11.1 with the introduction of the concept “hybridogenous genus.” In our opinion, the distinction between hybridogenous genera and nothogenera is useful, though their proposal was not accepted at the recently concluded XX International Botanical Congress in Madrid.

Checklists are important taxonomic references. They can bring together fragmentary information and review taxonomic progress. Advancing methods of molecular systematics have brought considerable changes to the classification of plants, such as the lumping, splitting, and redefinition of genera. Those changes have in turn influenced intergeneric hybrid names. Though some authors (e.g., van der Meer 2019a, 2019b, 2019c) have noticed the problem, an up-to-date nomenclator still is lacking for other intergeneric hybrid names of vascular plants — except for Orchidaceae, where the ongoing *Sander's List* (Shaw 2021, published quarterly in supplements to the *Sander's List* in *The Orchid Review* before 2023 and then in *Orchids*) accounts for all nothogeneric names and nomenclature. Orchidaceae is omitted here to avoid duplication. Our compilation here of new nomenclature for nothotaxa has been developed after tracking and checking extensive taxonomic literature as well as online databases.

Sources and methods

Based on the MediaWiki-framed website Duocet Wiki (<https://duocet.ibiodiversity.net/>) hosted in Shanghai Chenshan Botanical Garden, we have been compiling linear (numbered) synopses for all families of vascular plants (Duocet Group 2016+). The taxonomic circumscription of families mainly follows PPG I (2016) for lycophytes and fern allies, and APG IV (2016) for angiosperms with necessary amendments and updates according to our criteria of classification. For genera and species, the taxonomic circumscription is usually based on particular phylogenetic studies, many taxonomic decisions from which adopted here follow POWO (2017+), if not specially explained or cited. The published names involved here were mainly obtained from three online databases: Tropicos (Missouri Botanical Garden 1982+), IPNI (1999+) and ING (Farr & Zijlstra 1996+), with supplements from other omitted sources. During the process, more than 950 nothogeneric names and designations (not validly published names) of vascular plants (excluding Orchidaceae but including new ones to be established here) were documented and determined up to 1 October 2024.

Checklist names are arranged first according to the large groups (ferns and angiosperms), then in alphabetical order of families, genera, and species throughout the treatment. Unless more recent information is available, author attribution and original publication of plant names are in the notation of IPNI and Phytoneuron.

The ICN Shenzhen Code (Turland et al. 2018) has been followed in making necessary nomenclatural decisions. We employ Latin abbreviations to point out the nomenclatural status of nothotaxa that corresponds to certain principles, articles, or examples listed in Shenzhen Code (mainly from Chapter H) as follows: (i) A bi- or tri-generic hybrid name that contrary to Art. H.6.2 or H.6.4 is here marked as “*form. inval.*” (*forma invalida*, “invalid form”). (ii) Names of any rank of nothotaxa that are invalid if they involve a nomenclaturally unaccepted synonym as their parentage (Art. H.6.2, *Ex. 2*) are marked as “*nom. par. illeg.*” (*nomine parentis illegitimo*, “with the name of a parent illegitimate”). (iii) Because of priority (Principle III, also see Art. 9.1, *Ex. 1*), later hybrid names which bear the same hybrid formula as an earlier one (if exists) are unavailable, and marked as “*formul. hybrid. eadem*” (*formula hybrida eadem*, “with the same hybrid formula”).

NOMENCLATRURAL NOVELTIES FOR NOTHOTAXA

I. Ferns

1. PTERIDACEAE E.D.M.Kirchn., Schul-Bot.: 109. 1831.

1.1 *Jamesonia* Hook. & Grev., Icon. Filic. t. 178. 1830.

Jamesonia and *Eriosorus* are two small American fern genera, which respectively have 19 and 25 species as traditionally delimited (Tryon 1962, 1970). Although their leaf morphology differs *toto caelo* from each other, they share similarities in decumbent or creeping habits, trilete spores with coarse and often fused tubercles, and chromosome numbers. Sánchez-Baracaldo (2004) found that these two together form a monophyletic group, but neither genus itself is monophyletic and Christenhusz et al. (2011) thus proposed the merging of *Eriosorus* under the earlier name *Jamesonia*. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

1.1.1 *Jamesonia* × *kupperi* (I. Losch) Z.H. Feng & Z.J. Huang, **comb. nov.**

Basionym: *Gymnogramma* × *kupperi* I. Losch, Mitt. Bot. Staatssamml. München 1: 21. 1950.

TYPE: COSTA RICA. Cartago: Chirripo Grande, 3500 m., 27 April 1932, *W. Kupper 1223* (holotype: M [barcode] M0158811, digital image!).

Hybrid formula: *Jamesonia scammaniae* A.F. Tryon × *Jamesonia warszewiczii* (Mett.) Christenh.

1.1.2 *Jamesonia* × *lasseri* (Vareschi) Z.H. Feng & Z.J. Huang, **comb. nov.**

Basionym: *Eriosorus lasseri* Vareschi, Acta Bot. Venez. 1(2): 94. 1966.

TYPE: VENEZUELA. Estado Bolívar, en cuevas y grietas areniscosas del Cerro Auyantepui, 2300 m., 1965, *Vareschi & Foldats 4945* (holotype: VEN [barcode] VEN43087).

Hybrid formula: *Jamesonia flexuosa* (Humb. & Bonpl.) Christenh. × *Jamesonia paucifolia* (A.C. Sm.) Christenh.

1.1.3 *Jamesonia* × *longifolia* (Baker) Z.H. Feng & Z.J. Huang, **comb. nov.**

Basionym: *Gymnogramma* × *longifolia* Baker, Ann. Bot. (Oxford) 5(4): 484. 1891.

TYPE: BRAZIL. Rio de Janeiro: February 1874, *Glaziou 7017* (holotype: K [barcode] K000633139, digital image!).

Hybrid formula: *Jamesonia brasiliensis* Christ × *Jamesonia cheilanthoides* (Sw.) Christenh.

1.2 *Pityrogramma* Link, Handbuch [Link] 3: 19. 1833.

Pityrogramma is a small genus mainly centered in South America, characterized by a set of morphological combinations: concolorous rhizome scales, clustered petioles with a groove on their upper side, stalked pinnae and ceraceous indument on the lamina (Tryon 1962). Zhang et al. (2017) confirmed the position of widespread *Trismeria trifoliolata*, supporting its synonymization with *Pityrogramma*, since it forms a monophyletic group together with *P. calomelanos*, a typical representative of foregoing natural traits. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

1.2.1 *Pityrogramma* × *longipes* (Baker) Z.H. Feng & Z.J. Huang, **comb. nov.**

Basionym: *Gymnogramma longipes* Baker, J. Bot. 16: 301. 1878.

TYPE: PARAGUAY. Asunción L'Assomption, dans les fleur humides, May 1874, *Balansa 333* (holotype: K [barcode] K000633221, digital image!).

Hybrid formula: *Pityrogramma austroamericana* Domin × *Pityrogramma trifoliata* (L.) R.M. Tryon.

2. POLYPODIACEAE J.Presl & C.Presl, Delic. Prag.: 159. 1822.

2.1 *Drynaria* (Bory) J. Sm., J. Bot. (Hooker) 4: 60. 1841.

Janssen & Schneider (2005) revealed that *Drynaria* s.s. is paraphyletic when *Aglaomorpha* is recognized, suggesting merging these two into one genus. In the proposal for conserving *Drynaria* against *Aglaomorpha*, Christenhusz & Schneider (2012) weighed the pros-and-cons of the nomenclatural action and implication. After two rounds of inconclusive voting without recommendation by Nomenclature Committee of Vascular Plants, General Committee finally approve the conservation of *Drynaria* (Wilson 2016). The acceptance of *Aglaomorpha* in PPG I (2016) for a broad sense instead of *Drynaria* is an oversight of the report from GC. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

2.1.1 *Drynaria* × *robertsii* (Hoshiz.) Z.H. Feng, **comb. nov.**

Basionym: × *Aglaonaria robertsii* Hoshiz., Amer. Fern J. 81(2): 38. 1991.

TYPE: USA. California: from a plant grown by Leo Porter, Porter's Tropicals, August 1973, *Hoshizaki 73-131* (holotype: LA).

Hybrid formula: *Drynaria coronans* (Wall. ex Mett.) J. Sm. ex T. Moore × *Drynaria rigidula* (Sw.) Bedd.

II. Angiosperms

3. ACANTHACEAE Juss., Gen. Pl. [Jussieu] 102. 1789.

3.1 *Justicia* L., Sp. Pl. [Linnaeus] 1: 15. 1753.

Libonia × *penrhosiensis* Bull (1871: 5) bears the earliest available epithet for a very attractive

ornamental plant of Acanthaceae first documented in garden catalogues since 19th century. However, the generic name itself is unavailable because it is not a condensed formula when referring to a hybrid between *Libonia floribunda* and *Sericographis ghiesbreghtiana* as parentage. Luxembourgian botanist Jean Jules Linden and French horticulturalist Édouard François André later named it \times *Sericobonia ignea*, but the nothogeneric name remains invalid as it is contrary to Art. H.6.2, Ex. 2. Linden and André stated their *ignea* and Bull's *penrhosiensis* are quite different in habit (stems thin vs. robust) although they originated from the same parentage. We see little value in telling the two plants apart, so it is better treated as one.

For the large and diverse genus *Justicia*, recent phylogenetic study (Kiel et al. 2017) implied that New World taxa could be treated as a single genus where *Libonia* and *Sericographis* will be finally included, for which the oldest name is *Dianthera*. Since this dramatic change needs further assessment, it is safe to recombine the hybrid name under *Justicia* for now. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

3.1.1 *Justicia* \times *penrhosiensis* (Bull) Z.H. Feng, **comb. nov.**

Basionym: *Libonia* \times *penrhosiensis* W.Bull, Cat. New Beautiful Rare Pl. [W. Bull] 5. 1871.

= \times *Sericobonia ignea* Linden & André, Ill. Hort. 22: 39, t. 198. 1875.

TYPE: Not designated.

Hybrid formula: *Justicia floribunda* (K. Koch) Wassh. \times *Justicia spicigera* Schltldl.

4. AMARYLLIDACEAE J.St.-Hil., Expos. Fam. Nat. 1: 134. 1805.

4.1 *Ammocharis* Herb., Appendix [Herbert]: 17. 1821.

4.1.1 *Ammocharis* \times *hardyi* (Lehmiller) Z.H. Feng, **comb. nov.**

Basionym: \times *Crimocharis hardyi* Lehmiller, Herbertia 54: 126. 2000.

TYPE: USA. Texas: Cultivated, 10 February 1997, *D.J. Lehmiller 1943* (holotype: TAMU).

Hybrid formula: *Ammocharis baumii* (Harms) Milne-Redh. & Schweick. \times *Ammocharis nerinoides* (Baker) Lehmiller.

Remarks: *Ammocharis* is a small genus consists of seven species (Snijman & Kolberg 2011) endemic to tropical and South Africa characterized by distichous and bilabellately arranged leaves arching or spreading on the ground. The inclusion of two anomalous species *Ammocharis baumii* and *Ammocharis nerinoides* was implied and confirmed by morphological analysis (Lehmiller 1993) and phylogenetic studies (Meerow et al. 2003; Kwembeya et al. 2007), respectively.

4.2 *Hippeastreae* Herb. ex Sweet, Brit. Fl. Gard., ser. 2, 1: ad t. 14. 1. 1829. (as '*Hippeastriformes*')

Remarks: Hamilton Paul Traub (1890–1983), the prominent American systematist of Amaryllidaceae, especially of *Hippeastreae*, in most of his oeuvres published in the journal *Herbertia* (forms an annal called *Plant Life* for 1949–1959 and *Amaryllis Year Book* for 1960–1983), left huge legacies of artificial hybrids from 1938 to 1983. His extensive artificial hybridization among horticultural genera adorn gardens and still botanizing horticultural ideas. After consultation of literature, especially following latest generic and specific delimitation of *Hippeastreae* as outlined by García et al. (2019), we present additional corresponding nomenclatural treatment as follows. It must be noted that 73rd report from General Committee (Applequist 2023) recommended conserving

Zephyranthes against *Sprekelia*, which finally supported formal synonymization of its type species *Sprekelia formosissima* under *Zephyranthes*.

4.2.1 × *Zecella* Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Phycella* Lindl. × *Zephyranthes* Herb.

4.2.1.1 × *Zecella lajolla* (Traub) Z.H. Feng, **comb. nov.**

Basionym: *Rhodophiala* × *lajolla* Traub, Pl. Life (Stanford) 14: 47. 1958.

TYPE: USA. California: La Jolla, cultivated by Hamilton P. Traub, 20 July 1957, *Traub 605* (holotype: TRA [barcode] MO202199, digital image!).

Hybrid formula: *Phycella chilensis* (L'Hér.) Grau ex Nic. García × *Zephyranthes bifida* (Herb.) Nic. García & Meerow.

4.2.2 *Zephyranthes* Herb., Appendix [Herbert]: 36, nom. cons.

= *Sprekelia* Heist., Besch. Neu. Geschl. 15, 19. 1755, nom. rej.

4.2.2.1 *Zephyranthes* × *cagei* (Traub) Z.H. Feng, **comb. nov.**

Basionym: × *Sprekanthus cagei* Traub, Pl. Life (Stanford) 25: 78. 1969.

TYPE: USA. California: specific locality not indicated, 15 February 1968, *John M. Cage 1* (holotype: TRA).

Hybrid formula: *Zephyranthes formosissima* (L.) Z.H. Feng × *Zephyranthes robusta* (Herb.) Baker.

Remarks: Cage (1972: 72) reported the chromosome number is $2n = 66$ (*Sprekelia formosissima* $2n = 120$ and *Zephyranthes robusta* $2n = 12$), implying it is a true bigeneric hybrid.

4.2.2.2 *Zephyranthes* × *castellanosii* (J.C. David) Z.H. Feng, **comb. nov.**

Basionym: × *Zephyranthus castellanosii* J.C. David, Hanburyana 5: 45. 2011.

TYPE: USA. California: La Jolla, cultivated by Hamilton P. Traub, 24 July 1957, *Traub 606* (holotype: TRA [barcode] MO202361, digital image!).

Hybrid formula: *Zephyranthes minuta* (Kunth) D. Dietr. × *Zephyranthes pedunculosa* (Herb.) Nic. García & S.C. Arroyo.

4.2.2.3 *Zephyranthes formosissima* (Linnaeus) Z.H. Feng, **comb. nov.**

Basionym: *Amaryllis formosissima* L., Sp. Pl. [Linnaeus] 1: 293. 1753.

≡ *Sprekelia formosissima* (L.) Herb., Appendix [Herbert]: 35. 1821.

TYPE: Provenance not given. Herb. Linn. No. 416.4 (lectotype: LINN [barcode] LINN416.4, **designated here**, digital image!). (**Fig. 1**)

4.2.2.4 *Zephyranthes* × *marylandensis* Z.H. Feng, **nom. nov.**

Basionym: *Habranthus* × *floryi* Traub, Pl. Life (Stanford) 7: 121. 1951.

TYPE: USA. Maryland: Beltsville, Greenhouse, 9 December 1950, *Traub 189* (holotype: TRA [barcode] MO045072, digital image!).

Hybrid formula: *Zephyranthes brachyandra* (Baker) Backer & Beknopte × *Zephyranthes tubispatha* (L'Hér.) Herb.

Eponymy: Epithet refers to the greenhouse in Maryland where Traub first raised the nothospecies. The replacement name is proposed here because of the existing earlier name *Zephyranthes* × *floryi* Spencer (1986: 88), see Art. 6.11 of the *ICN* (Turland et al. 2018).

4.2.2.5 *Zephyranthes* × *morrisii* (J.C. David) Z.H. Feng, **comb. nov.**

Basionym: × *Zephyranthus morrisii* J.C. David, *Hanburyana* 5: 45. 2011.

TYPE: USA. Texas: Brownsville, taken by Mrs. Clint from bulbs obtained from Mexico, 28 November 1963, *Traub 974* (holotype: TRA).

Hybrid formula: *Zephyranthes bifolia* (Aubl.) M. Roem. × *Zephyranthes immaculata* (Traub & Clint) Nic. García & Meerow.

4.2.2.6 *Zephyranthes* × *woelfleana* (Traub) Z.H. Feng, **comb. nov.**

Basionym: × *Rhodobranthus woelfleanus* Traub, *Pl. Life* (Stanford) 14: 48. 1958.

= × *Rhodobranthus molfinoi*, *Pl. Life* (Stanford) 19: 57. 1963.

TYPE: USA. California: La Jolla, cultivated by Hamilton P. Traub, 9 November 1957, *Traub 602* (holotype: TRA [barcode] MO202358, digital image!).

Hybrid formula: *Zephyranthes bifida* (Herb.) Nic. García & Meerow × *Zephyranthes pedunculosa* (Herb.) Nic. García & S.C. Arroyo.

5. ASTERACEAE Bercht. & J.Presl, *Prir. Rostlin*: 254. 1820.

With over 1700 genera and about 32000–35000 species (Duocet Group 2016+; POWO 2017+), the largest family of vascular plants, Asteraceae, contrastingly boast no more than 60 nothogeneric names and less than 40% of them are accepted ones secundum current generic delimitation. While the phylogenetic analysis and taxonomic adjustment of many tribes and large genera in Asteraceae are either achieved only in recent years (Feng et al. 2024), and, since a nothogenus is defined by its nomenclatural formula, any change to the names in the formula creates a new nothogenus (see Art. H.8.1, *Ex. 1* & *Ex. 2*). After consultation of literature, especially the reorganization of McKenzie's checklist (2001), we present additional corresponding nomenclatural treatment as follows.

5.1 × *Anrysum* Z.H. Feng, Bing Liu, & Su Liu, **nothogen. nov.**

Hybrid formula: *Anaphalioides* (Benth.) Kirp. × *Helichrysum* Mill.

5.1.1 × *Anrysum purdiei* (Petrie) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Helichrysum purdiei* Petrie., *Trans. & Proc. New Zealand Inst.* 22: 440. 1890.

TYPE: NEW ZEALAND. South Island: Dunedin, at Vauxhall and Black Jack's point, 1 December 1889, *A.C. Purdie s.n.* (lectotype: AK [barcode] AK10227, **designated here**, digital image!).

(**Fig. 2**)

Hybrid formula: *Anaphalioides bellidioides* (G. Forst.) D. Glennly × *Helichrysum lanceolatum* (Buchanan) Kirk.

5.2 × *Anthematricaria* Asch., *Ber. Deutsch. Bot. Ges.* 9: 99 bis. 1891.

Hybrid formula: *Anthemis* L. × *Matricaria* L.

5.2.1 × *Anthematricaria dominii* (Rohlena) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: × *Anthemis-matricaria dominii* Rohlena, *Čas. Nár. Mus., Odd. Přír.* 104(3–4): 9. 1930.

TYPE: Not designated.

Hybrid formula: *Anthemis cotula* L. × *Matricaria chamomilla* L.

5.3 × *Antiothamnus* Z.H. Feng, Bing Liu, & Su Liu, **nothogen. nov.**

Hybrid formula: *Anaphalioides* (Benth.) Kirp. × *Ewartiothamnus* Anderb.

5.3.1 × *Antiothamnus fowerakeri* (Cockayne) Z.H. Feng, Bing Liu & Su Liu, **comb. nov.**

Basionym: *Helichrysum fowerakeri* Cockayne, Trans. & Proc. New Zealand Inst. 48: 196. 1916.

TYPE: NEW ZEALAND. South Island: Marlborough, in soil on rock, inland Kaikoura Mountains, at about 1000 m altitude, January 1912, *L. Cockayne 4626* (holotype: CHR [barcode] CHR8660, digital image!).

Hybrid formula: *Anaphalioides bellidioides* (G. Forst.) D. Glenney × *Ewartiothamnus sinclairii* (Hook. f.) Anderb.

Remarks: See McKenzie et al. (2004) for detailed discussion.

5.4 *Centaurea* L., Sp. Pl. [Linnaeus] 2: 909. 1753.

5.4.1 *Centaurea* × *hemiptera* **nothosubsp. pseudohemiptera** (J. Wagner) Z.H. Feng, Bing Liu, & Su Liu, **comb. et stat. nov.**

Basionym: *Centaurea* × *pseudohemiptera* J. Wagner, Magyar Bot. Lapok 17: 71. 1918.

ORIGINAL MATERIAL: HUNGARY. Budapest: at the foot of the Gellért Hill, *J. Wagner s.n.* (no original material located).

Hybrid formula: *Centaurea solstitialis* L. × *Centaurea stoebe* subsp. *australis* (Pančić ex A. Kern.) Greuter.

Remarks: Wagner distinguished it from *Centaurea* × *hemiptera* by a lower, multi-stemmed habit; stems more prostrate, less branched; capitula few and smaller; scales pale or lightly mottled with brown; cilia less developed and pappus only 1(–2) mm long.

5.5 × *Leucoraoulia* Cockayne & Allan, Trans. & Proc. Roy. Soc. New Zealand 68: 457. 1939.

Hybrid formula: *Leucogenes* Beauverd × *Raoulia* Hook. f. ex Raoul.

5.5.1 × *Leucoraoulia loganii* (Buchanan) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Haastia loganii* Buchanan, Trans. & Proc. New Zealand Inst. 14: 350. 1822.

TYPE: NEW ZEALAND. North Island: Mount Holdsworth, Tararua Range, *E.J. Beck s.n.* (holotype: K [barcode] K000910331, digital image!).

Hybrid formula: *Leucogenes leontopodium* (Hook. f.) Beauverd × *Raoulia rubra* Buchanan.

5.5.2 × *Leucoraoulia pauciflora* (Kirk) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Helichrysum pauciflorum* Kirk, Trans. & Proc. New Zealand Inst. 27: 351. 1895.

TYPE (lectotype inadvertently designated by Allan 1961: 713): **NEW ZEALAND.** South Island: Craigieburn Mountains, *L. Cockayne s.n.* (lectotype: WELT)

Hybrid formula: *Leucogenes grandiceps* (Hook. f.) Beauverd × *Raoulia bryoides* Hook. f.

5.6 × *Ligonicalia* Z.H. Feng, Bing Liu & Su Liu, **nothogen. nov.**

Hybrid formula: *Japonicalia* C. Ren & Q.E. Yang × *Ligularia* Cass.

5.6.1 × *Ligonicalia telphusiformis* (Koidz.) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Ligularia telphusiformis* Koidz., Bot. Mag. (Tokyo) 37: 57. 1923.

TYPE: JAPAN. Kyoto Prefecture (Yamashiro Province), Hieizan., October 1920, *G. Koidzumi* (holotype: KYO, digital image!).

Hybrid formula: *Japonicalia delphiniifolia* (Siebold & Zucc.) C. Ren & Q.E. Yang × *Ligularia fischeri* (Ledeb.) Turcz.

5.7 × *Lophioduus* Z.H. Feng, Bing Liu, & Su Liu, **nothogen. nov.**

Hybrid formula: *Carduus* L. × *Lophiolepis* (Cass.) Cass.

5.7.1 × *Lophioduus hohenackeri* (Arènes) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: × *Cirsiocarduus hohenackeri* Arènes, Mém. Mus. Natl. Hist. Nat. n.s., 24: 255. 1949.

ORIGINAL MATERIAL: CAUCASIA. Georgia: In the humid mountains of Bichnadael, Osmanginet, 5000 m., 1836, *F.Hohenacker s.n.* (no original material located).

Hybrid formula: *Carduus uncinatus* M. Bieb. × *Lophiolepis turkestanica* (Petr.) Bureš, Del Guacchio, Iamónico & P. Caputo.

5.8 × *Shawmisia* Z.H. Feng & Su Liu, **nothogen. nov.**

Hybrid formula: *Celmisia* Cass. × *Shawia* J.R. Forst. & G. Forst.

5.8.1 × *Shawmisia ruawahia* (Heenan) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Celmearia ruawahia* Heenan, Hort. New Zealand 4(1): 2. 1993.

TYPE: NEW ZEALAND. cultivated Rotorua, ex Mount Tarawera, 16 November 1982, *B.D. Clarkson* (holotype: CHR [barcode] CHR394214, digital image!).

Hybrid formula: *Celmisia gracilentata* Hook. f. × *Shawia arborescens* Sch. Bip.

Remarks: This nothospecies was firstly published under × *Celmearia* for an accepted name of its parentage was assigned to *Olearia* at that time. In a phylogenomic study conducted by Nicol et al. (2024), they found (‘*Olearia*’) *arborescens* definitely falls in *Shawia* Clade (including ‘*Olearia* p.p.’ and *Pachystegia*) and accordingly refers to the name *Shawia arborescens*. It is necessary to publish a new nothogenus for this hybrid in the light of Art. H.8.1, *Ex. 1 & Ex. 2*.

5.9 *Sonchus* L., Sp. Pl. [Linnaeus] 2: 793. 1753.

5.9.1 *Sonchus* × *ericii* Z.H. Feng, **nom. nov.**

Replaced name: *Sonchus* × *decipiens* (Svent.) A. Santos & Mejías, Nordic J. Bot. 31(6): 742. 2013, *nom. illeg.*, non *Sonchus decipiens* Zenari, Nuovo Giorn. Bot. Ital. n.s., 31: 15. 1924.

TYPE (lectotype designated by Mejías et al. 2013: 742): [illustration] Table XXXVI in Sventenius (1960: 88).

Hybrid formula: *Sonchus bupleuroides* (Font Quer) N. Kilian & Greuter × *Sonchus leptocephalus* Cass.

Eponymy: The epithet honors Hispano-Swedish botanist Eric Ragnor Sventenius (1910–1973), who named and described the nothospecies first.

Remarks: See Mejías et al. (2013) for further discussion on retypification.

6. BORAGINACEAE Juss., Gen. Pl. [Jussieu] 128. 1789.

6.1 *Symphytum* L., Sp. Pl. [Linnaeus] 1: 136. 1753.
= × *Procopiphytum* Pawł., Fragm. Florist. Geobot. 17(1): 50. 1971.

6.1.1 *Symphytum* × *runemarkii* (Pawł.) Z.H. Feng, **comb. nov.**

Basionym: × *Procopiphytum runemarkii* Pawł., Fragm. Florist. Geobot. 17(1): 50. 1971.

TYPE: GREECE [IKARIA ISLAND]. In the valley c. 1.5 km N of Ag. Nikolaos. S-exposed cliffs at the rill, 21 April 1958, *Runemark & Snogerup 6246 pro parte, the upper left gathering on the sheet only* (lectotype: LD [barcode] LD1225106B, **designated here**, digital image!). (**Fig. 3**)

Hybrid formula: *Symphytum circinale* Runemark × *Symphytum davisii* Wickens.

Remarks: One of its exact parentage is now accepted as a subspecies of *Symphytum davisii*. According to *ICN* (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Symphytum circinale* and *Symphytum davisii*.

7. BRASSICACEAE Burnett (1835: 854).

The cosmopolitan Brassicaceae comprise 352 genera (Duocet Group 2016+; POWO 2017+) and circa 4140 species (German et al. 2023). Unlike other families, pre- and post-fertilization barriers in Brassicaceae prevent traditional pollination cross from being a highly effective approach in obtaining intergeneric hybrids. However, with the development of embryo rescue techniques, numerous novel hybrids have been produced both interspecifically and intergenerically. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

7.1 × *Brassarda* Su Liu, & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Brassica* L. × *Mutarda* Bernh.

7.1.1 × *Brassarda juncea* (L.) Su Liu, & Z.H. Feng, **comb. nov.**

Basionym: *Sinapis juncea* L., Sp. Pl. [Linnaeus] 2: 668. 1753.

TYPE (lectotype inadvertently designated by Bailey 1922: 95): **ASIA.** Herb. Linn. No. 845.11 (lectotype: LINN [barcode] LINN845.11, digital image!).

Hybrid formula: *Brassica rapa* L. × *Mutarda nigra* (L.) Bernh.

8. BROMELIACEAE Juss., Gen. Pl. [Jussieu] 49. 1789.

8.1 *Pitcairnia* L'Hér., Sert. Angl. 7. 1789.

Pitcairnia is the largest genus in the subfamily Pitcairnioideae with attractive red flowers suggesting bird pollination. *Pitcairnia* × *daiseyana*, a name established 40 years ago, is a natural hybrid between two molecularly closely allied species *Pitcairnia heterophylla* and *Pitcairnia pungens* (Schütz et al. 2016), which received attention to its entity but unawareness of the invalidity (contrary to Art. 39.1) of the name. This nothospecies possesses traits intermediate to its parentage: a shortened scape 8–40 cm tall (nearly sessile in *P. heterophylla* and to 50 cm in *P. pungens*), a racemose inflorescence of typical *P. pungens* but with secund flowers. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

8.1.1 *Pitcairnia* × *daiseyana* H.Luther, **nothosp. nov.**

TYPE: ECUADOR. Cotopaxi: Tenufuerte, Rio Pilalo; 52–53 km. Quevedo-Latacunga, alt. 750–900 m., 12 June 1983, C.H. Dodson, D. Bemzing & D. Bermudez 13932 (holotype: SEL [barcode] SEL001397, digital image!). (**Fig. 4**)

Hybrid formula: *Pitcairnia heterophylla* (Lindl.) Beer × *Pitcairnia pungens* Kunth.

Description: Plants clustering, stemless; leaves linear, entire and deciduous or reduced, serrate and persistent; scape erect, 8–40 cm high. Inflorescence densely racemose; flowers erect to secund-spreading; corolla zygomorphic, red to pink.

Remarks: Luther (1984) failed to validate the species as it did not meet the requirement of Art. H.10.1. His English description (1984) is here *de novo* provided to validate the species (Art. 39.2).

8.2 *Puya* Molina, Sag. Stor. Nat. Chili 160, 351. 1782.

Puya, a fascinating bromeliad genus composes of 230 species ranging from Costa Rica to south tropical America, is famous for its monocarpy and *Puya raimondii* with the largest inflorescence up to 10 m among vascular plants. There are two natural intrageneric hybrids, namely *Puya* × *berteroniana* and *Puya* × *ventnorenensis* (Zizka et al. 2013). After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

8.2.1 *Puya* × *loxensis* Manzanares & Till, **nothosp. nov.**

TYPE: ECUADOR. Province of Loja: Uritushinga Project, on the páramo at the summit of Uritushinga, 3073 m, 6 March 1998, J.M. Manzanares, B. Girko, E. Cueva & P. Ochoa 6553 (holotype: QCNE [barcode] QCNE1519039; additional specimens seen: QCA [barcode] QCA24824, SEL [barcode] SEL003729, digital images!).

Hybrid formula: *Puya eryngioides* André × *Puya parviflora* L.B.Sm.

Description: Plant flowering 70–100 cm tall, polycarpic; stem branched. Leaf dense, numerous, margins serrate, pungent; leaf sheath orbicular, 3 cm long, 4.5 cm wide, margins entire, brown; blade triangular, 26 cm long, 1 cm wide, margins serrate; spine 2–4 mm long, antrorse hooked, brown; apex attenuate and pungent, glabrous, green. Branch cylindrical, dense, stipe evident 1 cm long, 4–5 cm long, 2.4 cm wide, 5–10 flowers, red, lanate, branch with sterile bracts at the apex. Inflorescence cylindrical, 26–35 cm long, 8 cm wide, branched, polystichous, with 15–20 lateral branches and a coma of sterile bracts at the apex, axis color red, lax below and dense above, exposing the axis, red, glabrous. Floral bract ovate, 20 mm long, 13 mm wide, papyraceous, apex acuminate, margins sparsely serrate, slightly carinate, nerved, slightly exceeding the sepals, imbricate, lanate at the base. Corolla actinomorphic, blue to violet; pedicels lanate, 5 mm long; sepals lanceolate, 15–18 mm long, 5 mm wide, distinctly nerved, carinate, apex acute, glabrous; petals 2.5 cm long, without ligules at the base.

Eponymy: The specific epithet refers to the city of Loja, where the type was collected.

Remarks: Manzanares and Till (in Manzanares 2005: 313) failed to validate the species as it did not meet the requirement of Art. H.10.1. Their English description is here *de novo* provided to validate the nothospecies (Art. 39.2).

8.3 *Tillandsia* L., Sp. Pl. [Linnaeus] 1: 286. 1753.

8.3.1 *Tillandsia* × *complachroma* Rauh ex Manzan., W.Till & Gouda, J. Bromeliad Soc. 74(1): 26. 2024.

TYPE: ECUADOR. Province of Napo, road Papallacta-Baeza, 2800 m, 22 July 1975, *W. Rauh 37925* (lectotype: HEID [barcode] HEID604361, **designated here**, digital image!; isolectotypes: HEID [barcodes] HEID600886, HEID604650, HEID604823, digital images!). (**Fig. 5**)

Remarks: Rauh (1977) gave hybrid formula in Latin, but failed to validate the species as he did not provide Latin description (Art. H.10.1). Manzanares et al. (2024) validated the name, however, the type *W.Rauh 37925* has four sheets housed at HEID. According to *ICN* (Turland et al. 2018: Art. 7.11 [Note 2, Ex. 12], 8.1, 9.4), they are syntypes. In both “protologues” of Rauh (1977: 21) and Manzanares et al. (2024: 26), they did not elucidate which one serves as holotype even though the latter have added notes on two sheets. Moreover, Rauh mentioned his 37925 was collected in August 1975, while specimen label indicates that the collection date is 22 July 1975.

9. CACTACEAE Juss., Gen. Pl. [Jussieu] 310. 1789.

Members of Cactaceae are of high horticultural value and generally have few barriers to hybridization (Machado 2008, and literature cited therein). Reports and naming on intergeneric hybrids began increasing rapidly in late 20th century such as by Rowley (1980, 1982, 1994, 2004), Mottram (1990, 2014), and more recently by van der Meer (2018, 2019b, 2019c, 2020, 2021a, 2021b, 2021c, 2022a, 2022b, 2023) due to large-scale horticultural practice and radical taxonomic changes. After consultation of literature, especially following the most up-to-date generic redelimitation of Korotkova et al. (2021) for the whole family and Romeiro-Brito et al. (2023) for Cereeae, we present additional corresponding nomenclatural treatment as follows.

9.1 × *Borzicana* M.H.J. van der Meer, Cact. Phantast. 2019(3)-3: 26. 2019.

9.1.1 × *Borzicana soniae* (Halda, Malina & Panarotto) Z.H. Feng, **comb. nov.**

Basionym: × *Borkersia soniae* Halda, Malina & Panar., Acta Mus. Richnov., Sect. Nat. 10(2): 150. 2003.

≡ × *Cleistocana soniae* (Halda, Malina & Panarotto) M.H.J. van der Meer, Cact. Phantast. 2019(3)-3: 27. 2019.

TYPE: ex horticultural hybrid, 25 June 2003, *P. Panarotto s.n.* (holotype: PR [barcode] PR11903).

Hybrid formula: *Borzicactus icosagonus* Britton & Rose × *Matucana madisoniorum* (Hutchison) G.D. Rowley.

Remarks: One of its exact parentage is now accepted as a subspecies of *Borzicactus icosagonus*. According to *ICN* (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Borzicactus icosagonus* and *Matucana madisoniorum*.

9.2 × *Cleistochamaecereus* P.V. Heath, Calyx 1(3): 103. 1992.

Hybrid formula: *Chamaecereus* Britton & Rose, Cactaceae (Britton & Rose) 3: 48. 1922. × *Cleistocactus* ., Ill. Hort. 8(Misc.): 35. 1861.

9.2.1 × *Cleistochamaecereus cintiae* (Halda, Malina & Panarotto) Z.H. Feng, **comb. nov.**

Basionym: × *Chamaezicactus cintiae* Halda, Malina & Panar., Acta Mus. Richnov., Sect. Nat. 10(2): 151. 2003.

≡ × *Borzivia cintiae* (Halda, Malina & Panarotto) M.H.J. van der Meer, Cact. Phantast. 2019(3)-3: 27.

2019.

TYPE: ex horticultural hybrid, 25 June 2003, *P. Panarotto s.n.* (holotype: PR [barcode] PR11904).

Hybrid formula: *Chamaecereus silvestrii* (Speg.) Britton & Rose × *Cleistocactus samaipatanus* (Cárdenas) D.R. Hunt.

10. CAMPANULACEAE Juss., Gen. Pl. [Jussieu] 163. 1789.

Campanula × *hausmannii* Rchb. (1877: 31) was proposed for a hybrid between *Campanula barbata* and *Phyteuma hemisphaericum* collected by Franz von Hausmann in 1874. The name × *Fockeanthus* Wehrhahn (1931: 985) is unavailable for this taxon because it is not a condensed formula. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

10.1 × *Phyteupanula* Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Campanula* L. × *Phyteuma* L.

Invalid designation: × *Fockeanthus* H.R. Wehrh., Gartenstaud. 2: 985. 1931, *form. inval.*

10.1.1 × *Phyteupanula hausmannii* (Rchb. f.) Z.H. Feng, **comb. nov.**

Basionym: *Campanula* × *hausmannii* Rchb. f., Flora 60: 31. 1877.

Invalid designation: × *Fockeanthus hausmannii* (Rchb. f.) Wehrhahn, Gartenstaud. 2: 985. 1931, *nom. inval.*

ORIGINAL MATERIAL: Provenience not given, May 1874, *von Hausmann, Franz s.n.* (no original material located).

Hybrid formula: *Campanula barbata* L. × *Phyteuma hemisphaericum* L.

11. CRASSULACEAE J. St.-Hil., Expos. Fam. Nat. 2: 123. 1805.

Phylogenetic analysis has resolved *Greenovia* as monophyletic, but derived within a well-supported *Aeonium* clade (Mort et al. 2001) and it is no longer upheld as a distinct genus by most authors (e.g., Cristini 2022). Thiede & Eggli (2007) summed up that hybridization patterns in European Sedeeae are colonized by four morphological traits: testa ornamentation (costate vs. reticulate-papillate), shape of the micropylar region (coronate vs. apiculate), sepal insertion (free vs. connate at base), and glandular hairs (presence or absence). There are no genuine intergeneric hybrids in Aeonieae (*Aichryson*, *Monanthes* and *Aeonium*), but intrageneric ones are possible. After consultation of literature, especially following these recent literature, we present additional corresponding nomenclatural treatment as follows.

11.1 *Aeonium* Webb & Berthel., Hist. Nat. Iles Canaries (Phytogr.). 3(2:1): 184. 1840.

11.1.1 *Aeonium* × *garafiense* (O. Arango) Z.H. Feng, **comb. nov.**

Basionym: × *Greenonium garafiense* O. Arango, Vieraea 47: 94. 2021.

TYPE: SPAIN. Canary Islands: La Palma, entre Las Tricias y Sto Domingo de Garafia, 463 m, 28 April 2019, *O. Arango s.n.* (holotype: TFC [barcode] TFC53395).

Hybrid formula: *Aeonium aureum* (C. Sm. ex Hornem.) T. Mes × *Aeonium canariense* (L.) Webb & Berthel.

Remarks: The designation ‘*Aeonium* × *garafiense*’ was mentioned by Cristini (2022) in his monograph but remained a nude name therein. One of its exact parentage is now accepted as a

subspecies of *Aeonium canariense*. According to ICN (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Aeonium aureum* and *Aeonium canariense*.

11.1.2 *Aeonium* × *haeckelii* (O. Arango) Z.H. Feng, **comb. nov.**

Basionym: × *Greenonium haeckelii* O. Arango, Collect. Bot. (Barcelona) 42(e008): 10. 2023.

TYPE: SPAIN. Canary Islands: La Gomera, Hermigua, Barranco de Monteforte, near Embalse de Mulagua, 260 m, 8 May 2014, *O. Arango s.n.* (holotype: TFC [barcode] TFC53309).

Hybrid formula: *Aeonium aureum* (C. Sm. ex Hornem.) T. Mes × *Aeonium castello-paivae* Bolle.

11.1.3 *Aeonium* × *rochae* (O. Arango) Z.H. Feng, **comb. nov.**

Basionym: × *Greenonium rochae* O. Arango, Bot. Macaronés. 31: 24. 2021.

TYPE: CANARY ISLANDS: Tenerife, cercanías de Teno Alto, sendero PR-TF 51, Altos de Baracán, 850 m, 18 August 2019, *O. Arango s.n.* (holotype: TFC [barcode] TFC53344; isotype: LPA [barcode] LPA38602).

Hybrid formula: *Aeonium dodrantale* (Willd.) T. Mes × *Aeonium urbicum* (C. Sm. ex Hornem.) Webb & Berthel.

Remarks: Exact parentage of this nothospecies is now accepted as a subspecies of *Aeonium dodrantale* and *Aeonium urbicum*, respectively. According to ICN (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Aeonium dodrantale* and *Aeonium urbicum*.

12. ERICACEAE Juss., Gen. Pl. [Jussieu] 159. 1789.

Kalmia was long considered a natural group with ten pouches on their corolla in which anthers are holding and another two monotypic genera *Leiophyllum* and *Loiseleuria*, otherwise alike, can be distinguished from it by lacking saccate structure and cleft petals. However, phylogenetic studies implied a broad sense of *Kalmia* with the inclusion of these two genera to maintain the genuine monophyly of *Kalmia* (Kron & King 1996; Kron et al. 2002). After consultation of literature, especially following these recent literature, we present additional corresponding nomenclatural treatment as follows.

12.1 × *Phyllokalmia* Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Kalmia* L. × *Phyllodoce* Salisb.

= × *Phyllodoleuria* Halda, Acta Mus. Richnov., Sect. Nat. 9(1): 70. 2002.

12.1.1 × *Phyllokalmia kamtschadalarum* (Halda) Z.H. Feng, **comb. nov.**

Basionym: × *Phyllodoleuria kamtschadalarum* Halda, Acta Mus. Richnov., Sect. Nat. 9(1): 70. 2002.

TYPE: EAST ASIA. south Kamchatka: on Mount Mutnovka, growing in volcanic soil on a mountain slope in a bed of moss, 1350 m, 13 August 2002, *J.J. Halda & J. Halda s.n.* (holotype: PR [barcode] PR11709).

Hybrid formula: *Kalmia procumbens* (L.) Gift, Kron & P.F. Stevens ex Galasso, Banfi & F. Conti × *Phyllodoce caerulea* (L.) Bab.

13. GESNERIACEAE Rich. & Juss., Essai Propr. Méd. Pl. ed. 2: 192. 1816.

Comprising over 150 genera and circa 3500 species distributed in tropical, with extension to temperate zone (Duocet Group 2016+; POWO 2017+), most members of Gesneriaceae are garden darlings because of their dazzling flowers. Following the redelimitation of Gloxinieae done by Roalson et al. (2005), Roalson & Boggan (2006) renewed a checklist of nothogenera in the tribe, but there are names published by Moore (1954) awaiting suitable position. Besides, the monotypic genus *Jancaea* should be merged into *Ramonda* according to phylogenetic results shown by Petrova et al. (2015), several nothogenera need new names accordingly. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

13.1 × *Achimenantha* Moore (1973: 35).

Hybrid formula: *Achimenes* P. Browne × *Smithiantha* Kuntze.

13.1.1 × *Achimenantha roezlii* (Planch.) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: *Mandirola* × *Naegelia Roezlii* Planch., Fl. Serres Jard. Eur. 10: 49. 1854–55.

Invalid designation: × *Eucodonopsis roezlii* (Planch.) Moore (1954: 397), *nom. inval.*

TYPE: [illustration] “*MANDIROLA NÆGELIA (HYB.) ROEZLII* Planch” in Planchon (1854–55b: folio not given, fig. 987–988) (**lectotype designated here**).

Hybrid formula: *Achimenes mexicana* (Seem.) Fritsch × *Smithiantha zebrina* (Pax.) Kuntze.

13.2 × *Coranda* Z.J. Huang & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Corallodiscus* Batalin × *Ramonda* Rich.

13.2.1 × *Coranda bluemelii* (Halda) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: × *Jancaessandra bluemelii* Halda, Preslia 61(2): 127. 1989.

TYPE: CZECH REPUBLIC. Cultivated plant at Sedloňov Garden, 15 June 1986, *J. Halda s.n.* (PR [barcode] PR377611).

Hybrid formula: *Corallodiscus lanuginosus* (Wall. ex R. Br.) B.L. Burt × *Ramonda heldreichii* (Boiss.) C.B. Clarke.

13.3 × *Glokoheria* Wiehler, Selbyana 1(4): 407. 1976.

Hybrid formula: *Gloxinia* L’Hér. × *Kohleria* Regel.

13.3.1 × *Glokoheria rosea* (Wiehler) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: × *Koellikohleria rosea* Wiehler, Baileya 16: 30. 1968.

TYPE: USA. New York: Ithaca, cultivated in a conservatory at Cornell University (under number G-1218), 24 September 1968, *H. Wiehler 6814* (holotype: BH).

Hybrid formula: *Gloxinia erinoides* (DC.) Roalson & Boggan × *Kohleria spicata* (Kunth) Oerst.

13.4 × *Ramberlea* Halda, Preslia 61(2): 127. 1989.

Hybrid formula: *Haberlea* Friv. × *Ramonda* Rich.

= × *Jancaeberlea* Halda, Preslia 61(2): 125. 1989.

13.4.1 × *Ramberlea panayotii* (Halda) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: × *Jankaerberlea panayotii* Halda, Preslia 61(2): 125. 1989.

TYPE: CZECH REPUBLIC. Cultivated plant at Sedloňov Garden, 15 June 1986, *J. Halda s.n.* (holotype: PR [barcode] PR377609).

Hybrid formula: *Haberlea rhodopensis* Friv. × *Ramonda heldreichii* (Boiss.) C.B. Clarke.

13.5 × ***Ramondron*** Z.J. Huang & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Conandron* Siebold & Zucc. × *Ramonda* Rich.

= × *Jancaendron* Halda, *Preslia* 61(2): 125. 1989.

13.5.1 × ***Ramondron stevensiae*** (Halda) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: × *Jancaendron stevensiae* Halda, *Preslia* 61(2): 125. 1989.

TYPE: CZECH REPUBLIC. Cultivated plant at Sedloňov Garden, 15 June 1986, *J. Halda s.n.* (holotype: PR [barcode] PR377610).

Hybrid formula: *Conandron ramondioides* Siebold & Zucc. × *Ramonda heldreichii* (Boiss.) C.B. Clarke.

13.6 ***Sinningia*** Nees, *Ann. Sci. Nat. (Paris)* 6: 297. 1825.

13.6.1 ***Sinningia* × *donkelaeriana*** (Lem.) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: *Gesneria* × *donkelaeriana* ('*Donkelaariana*') Lem., *Jard. Fleur.* 4(1): 382. 1854.

≡ *Gloxinera* × *donkelaeriana* (Lem.) H.E. Moore, *Gentes Herbarum* 8: 397. 1954.

TYPE: [illustration] "*Gesneria Donckelaariana* [sic.] Hort." in Lemaire (1854: t. 382) (**lectotype designated here**).

Hybrid formula: *Sinningia gigantifolia* Chautems × *Sinningia speciosa* (G. Lodd. ex Ker Gawl.) Hiern.

13.7 × ***Smidirola*** Z.J. Huang & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Mandirola* Decne. × *Smithiantha* Kuntze.

13.7.1 × ***Smidirola picturata*** (Planchon) Z.J. Huang & Z.H. Feng, **comb. nov.**

Basionym: *Mandirola* × *Naegelia Picturata* Planch., *Fl. Serres Jard. Eur.* 10: 55. 1854–55.

Invalid designation: × *Eucodonopsis picturata* (Planch.) H.E. Moore, *Gentes Herbarum* 8: 397. 1954, *nom. inval.*

TYPE: [illustration] "*Mandirola Naegelia* (Hybr.) *Picturata* Planch" in Planchon (1854–55a: folio not given, fig. 989) (**lectotype designated here**).

Hybrid formula: *Mandirola hirsuta* (DC.) A.O. Araujo & Chautems × *Smithiantha zebrina* (Pax.) Kuntze.

14. HYPOXIDACEAE R. Br., *Voy. Terra Austral.* 2: 576. 1814..

Rhodohypoxis differs from *Hypoxis* mainly by the floral colour (red, pink or white vs. yellow) and subtle perianth structure (a lower constriction of claws vs. free). However, they show no substantial differences in pollen ornamentation and share with the same indumentum of tufted or two-branched trichomes. The close relationship of *Hypoxis baurii* and *Hypoxis parvula* was also confirmed by phylogenetic study (Kocyan et al. 2011), which advised unifying these two genera. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

14.1 ***Hypoxis*** L., *Syst. Nat.*, ed. 10. 986, 1366. 1759.

= × *Rhodoxis* B. Mathew, Quart. Bull. Alpine Gard. Soc. Gr. Brit. 66(4): 441. 1998.

14.1.1 *Hypoxis* × *hybrida* (B. Mathew) Z.H. Feng, **comb. nov.**

Basionym: × *Rhodoxis hybrida* B. Mathew, Quart. Bull. Alpine Gard. Soc. Gr. Brit. 66(4): 441. 1998.

TYPE: SOUTH AFRICA. KwaZulu-Natal: Mt. Currie District, farm ‘Hebron’, NE of Kokstad, 1976, Hilliard & Burt 7376 (holotype: E [barcode] E00386982, digital image!).

Hybrid formula: *Hypoxis baurii* Baker × *Hypoxis parvula* Baker.

15. LABIATAE Juss., Gen. Pl. [Jussieu] 110. 1789.

15.1 *Clinopodium* L., Sp. Pl. [Linnaeus] 2: 587. 1753.

15.1.1 *Clinopodium* × *hostii* **nothosubsp. narentanum** (K. Malý ex Dörf.) Z.H. Feng & Su Liu, **comb. et stat. nov.**

Basionym: *Satureja* × *narentana* K. Malý ex Dörf., Exsicc. (Herb. Norm.) 1909: 302. 1909.

TYPE: HERZEGOVINA. On the stony slopes of the river “Narenta” and in the neighboring gorges, singularly; soil calc., 130–500 m., August 1908, K. Maly s.n. (holotype: MPU [barcode] MPU015977, digital image!; isotypes: G [barcodes] G00424751, G00424752, digital images!).

Hybrid formula: *Clinopodium album* (Waldst. & Kit.) Bräuchler & Govaerts × *Clinopodium nepeta* subsp. *spruneri* (Boiss.) Bartolucci & F. Conti.

16. POACEAE Barnhart, Bull. Torrey Bot. Club 22(1): 7. 1895.

With over 800 genera and more than 11000 species (Duocet Group 2016+; POWO 2017+), Poaceae are of the most important agricultural and economical value among all the plant families, diverse clades of which underwent rapid radiation both in tropical and temperate habitats since Neogene, often by the mechanism of allopolyploidization (Gallaher et al. 2022).

The tribe Triticeae, containing several major cereal crops such as wheats, barleys, oats, ryes and numerous forage grasses, are one famous example of allopolyploid phylogeny and reticulate evolution, meanwhile, a troublesome group for classification (Bernhardt et al. 2017). It has long been known that several diploid taxa can be seen as the base of the “polyploid pillar complex” (PPC) in Triticeae, e.g. *Triticum Monococcum* Group (providing genome **A**) and *T. tauschii* (genome **D**), *Hordeum* spp. excluding *H. vulgare* (genome **H**), and *Pseudoroegneria* (genome **St**) (Wang et al. 1994). Other polyploid taxa can usually be explained as allopolyploids from those basic genomes, e.g. *Elymus* (genome **StH**, **StStH**, etc.), and thus can originate many times (Mason-Gamer 2013). There seems to be only two rational treatment for such a PPC: one is to lump all involved genera into one, which will evidently ruin the current nomenclature; the other is moderately splitting taxa containing different genomes, treating the polyploid genera as “hybridogenous” ones.

In the latter scheme, van den Meer (2019a) and Sennikov (in Sennikov & Tojibaev 2021) has solved some nomenclatural problems of triticeous hybrids. After consultation of literature, we present additional nomenclatural treatment, as well as several non-triticeous names, as follows.

16.1 × *Agrothinopyrum* Su Liu, & Bing Liu, **nothogen. nov.**

Hybrid formula: *Agropyron* Gaertn. × *Thinopyrum* Á. Löve.

16.1.1 × *Agrothinopyrum androssovii* (Roshev.) Su Liu & Bing Liu, **comb. nov.**

Basionym: *Agropyron* × *androssovii* Roshev., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 11: 30. 1949.

≡ × *Agroelymus androssovii* (Roshev.) Olshanskyi, Ukrayins'k. Bot. Zhurn. 80(2): 129. 2023.

TYPE: TURKMENISTAN. Turcomania: “*Kopet-Dagh orientalis, ad declivia montis Chuncha Secunda, supra pagum Robergovskii*”, 5 August 1934, *N. Androssov s.n.* (lectotype: LE [barcode] LE01299591, **designated here**, digital image!; isolectotypes: LE [barcodes] LE01299592, LE01299593, LE01299594, digital images!).

Hybrid formula: *Agropyron cristatum* (L.) Gaertn. × *Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey.

Remarks: One of its exact parentage is now accepted as a subspecies of *Thinopyrum intermedium*. According to ICN (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Agropyron cristatum* and *Thinopyrum intermedium*.

16.2 × *Campeiordeum* Z.H. Feng & Su Liu, **nothogen. nov.**

Hybrid formula: *Campeiostrachys* Drobow × *Hordeum* L.

16.2.1 × *Campeiordeum bowes-lyonii* (Melderis) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymordeum bowes-lyonii* Melderis, Grasses Burma, Ceyl., Ind. & Pakist.: 699. 1960.

TYPE: PAKISTAN. Chitral: Turkho, sandy soil by the water channel, 29 June 1958, *S.A. Bowes Lyon 1034* (holotype: BM [barcode] BM000959869, digital image!).

Hybrid formula: *Campeiostrachys nutans* (Griseb.) B.R. Baum, J.L. Yang & C. Yen × *Hordeum brevisubulatum* (Trin.) Link.

16.3 × *Dasyticum* Su Liu, & Bing Liu, **nothogen. nov.**

Hybrid formula: *Dasypyrum* (Coss. & Durieu) T. Durand × *Triticum* L.

Invalid designations: × *Haynaldoticum* Cif. & Giacom., Nomencl. Fl. Ital. Pt. 1, 50. 1950, *nom. par. illeg.*

× *Tritihaynaldia* J. Fu & S.Y. Chen, Acta Bot. Boreal.-Occid. Sin. 10(1): 67. 1990, *nom. par. illeg.*

Remarks: Hybrids between *Dasypyrum* and *Triticum* were long given their names under the nothogenus × *Haynaldoticum* Cif. & Giacom., i.e. *Haynaldia* × *Triticum*. Being unaware of the earlier work, Fu & Chen (1990) published × *Tritihaynaldia* for hybrids of the same genera. Both names are not available in terms of Art. H.6.2 (Ex. 2) because *Haynaldia* Schur is a later homonym of the fungi genus *Haynaldia* Schulzer. Nomenclatural clarification hence here provided.

16.3.1 × *Dasyticum sardoum* Z.H. Feng & Su Liu, **nothosp. nov.**

TYPE: ITALY. Sardinia: Agro di Cagliari, 1965, *P. Meletti & A. Onnis s.n.* (holotype: PI [barcode] PI041265, digital image!; isotypes: PI [barcodes] PI041266, PI041267, PI041268, digital images!). (**Fig. 6**)

Hybrid formula: *Dasypyrum villosum* (L.) P. Candargy × *Triticum turgidum* L.

Description: Culms fistulose or solid, up to 140 cm tall; nodes sometimes pilose. Leaf blades linear, acuminate, up to 35 cm long, 15–18 mm wide, glabrous. Spike 8–13 cm long, quadrangular,

loose; axis tough; margins shortly ciliate. Spikelets with 3–5 florets, 15 mm long, 10 mm wide. Glumes pallid, apically pilose, carinate, strongly toothed. Lemma awned. Awn 6–10 cm long, pallid. $2n = 42$.

Remarks: The binomial ‘*Triticum × turgidovillosum*’ was firstly used by Tschermak (1930), referring to the hybrid entity between *Triticum turgidum* and *T. villosum*. However, “*turgidovillosum*” must be considered as a hybrid formula but not an epithet because there is only the termination of one epithet changed, as per Art. H.10.2 (*Ex. 3*). $×$ *Haynaldoticum sardoum* is the first designation bearing a true epithet, used by Meletti & Onnis (1975), in spite of the fact that it is invalid due to the nothogeneric name is contrary to Art. H.6.2 (*Ex. 2*). Fu & Chen (1990) published the binomial ‘ $×$ *Tritihaynaldia hexaploidea*’ in Chinese for the homologous hybrid, it is also invalid in light of the same rationale and Art. 39.1. Moreover, the specimens they cited in the protologue are now impossible to locate, preventing us from making further treatment. Accordingly, we adopt *sardoum* as the ultimate epithet to validate this nothospecies (Art. 46.4). One of its exact parentage is now accepted as a subspecies of *Triticum turgidum*. According to ICN (Turland et al. 2018: Art. H.5.2, *Ex. 1*), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Dasypyrum villosum* and *Triticum turgidum*.

16.4 $×$ *Dupontopoa* Prob., Bot. Zhurn. (Moscow & Leningrad) 69(5): 689. 1984.

Hybrid formula: *Arctopoa* (Griseb.) Prob. $×$ *Dupontia* R. Br.

$≡ ×$ *Duarctopoa* Soreng & L.J. Gillespie, Botany (Ottawa) 86(8): 965. 2008, *formul. hybrid. eadem*.

16.4.1 $×$ *Dupontopoa labradorica* (Steudel) Z.H. Feng, **comb. nov.**

Basionym: *Poa labradorica* Steud., Syn. Pl. Glumac. 1(3): 252. 1854.

$≡ ×$ *Dupoa labradorica* (Steud.) J. Cay. & Darbysh., Nordic J. Bot. 13(6): 616. 1993.

$≡ ×$ *Duarctopoa labradorica* (Steud.) Soreng & L.J. Gillespie, Botany (Ottawa) 86(8): 965. 2008.

$= ×$ *Dupontopoa dezhnevii* Prob., Bot. Zhurn. (Moscow & Leningrad) 69(5): 689. 1984.

TYPE: CANADA. Labrador [probably Hopedale, 1846–1848], *Missionarius* [C.G.] *Albrecht s.n.* (holotype: P [barcode] P00624307, digital image!).

Hybrid formula: *Arctopoa eminens* (C. Presl) Prob. $×$ *Dupontia fisheri* R. Br.

16.5 $×$ *Elylymus* B.R. Baum, Canad. J. Bot. 57: 947. 1979.

Hybrid formula: *Elymus* L. $×$ *Leymus* Hochst.

16.5.1 $×$ *Elylymus adamsii* (J. Rousseau) Z.H. Feng, **comb. nov.**

Basionym: $×$ *Agroelymus adamsii* J. Rousseau, Naturaliste Canad. 69(4–5): 99. 1942.

$= ×$ *Elylymus pacificus* (Prob.) Chepinoga, Botanica Pacifica 12(2): 125. 2023.

TYPE: CANADA. Quebec: Anticosti Island, Port-Menier, *Rousseau 51473* (holotype: MTJB).

Hybrid formula: *Elymus repens* (L.) Gould $×$ *Leymus mollis* (Trin.) Pilg.

Remarks: Rousseau (1942: 99) annotated $×$ *Agroelymus adamsii* as “nom. nov.”, his citation of *Elymus arenarius* var. *villosus* E. Mey. (Meyer 1830: 20, as “*Elymus arenarius* $β$ *villosus*”) as a synonym validates the name.

16.6 *Elymus* L., Sp. Pl. [Linnaeus] 1: 83. 1753.

16.6.1 *Elymus × piettei* (Cugnac) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Agroelymus piettei* Cugnac, Bull. Soc. Bot. France 86: 28. 1939.

TYPE: Not designated.

Hybrid formula: *Elymus canadensis* L. × *Elymus caninus* (L.) L.

16.7 *Festuca* L., Sp. Pl. [Linnaeus] 1: 73. 1753.

16.7.1 *Festuca* × *hubbardii* (Stace & R. Cotton) Z.H. Feng, **comb. nov.**

Basionym: × *Festulpia hubbardii* Stace & R. Cotton, Watsonia 10(2): 136. 1974.

TYPE: CHANNEL ISLES. Guernsey: Vazon, on consolidated sand with *Festuca rubra* and *Vulpia membranacea*, 17 June 1953, C.E. Hubbard 13609 (holotype: K [barcode] K000913375, digital image!; isotype: K [barcode] K000913376, digital image!).

Hybrid formula: *Festuca membranacea* (L.) Druce × *Festuca rubra* L.

16.7.2 *Festuca* × *melderisii* (Stace & R. Cotton) Z.H. Feng, **comb. nov.**

Basionym: × *Festulpia melderisii* Stace & R. Cotton, Watsonia 10(2): 137. 1974.

TYPE: ENGLAND. W. Sussex: Littlehampton, on mobile sand-dunes by the golf-course, with *Festuca rubra*, *Festuca junceifolia* and *Vulpia membranacea*, 17 July 1972, A.Melderis & C.A. Stace s.n. (holotype: BM [barcode] BM000057161).

Hybrid formula: *Festuca juncifolia* St.-Amans × *Festuca membranacea* (L.) Druce.

16.8 × *Leydeum* Barkworth, Phytologia 83(4): 308. 1998.

16.8.1 × *Leydeum berkeleyanum* (Bowden) Su Liu & Bing Liu, **comb. nov.**

Basionym: × *Elymordeum berkeleyanum* Bowden, Canad. J. Bot. 36: 109. 1958.

TYPE: USA. California: Berkeley. Artificial hybrid No. 621-3 produced by Dr. G.L. Stebbins, Jr., 14 June 1947, G.L. Stebbins, Jr. s.n. (holotype: UC [barcode] UC756622, digital image!). (**Fig. 7**)

Hybrid formula: *Hordeum brachyantherum* Nevski × *Leymus condensatus* (J.Presl) Á.Löve.

16.8.2 × *Leydeum triploideum* (Bowden) Su Liu & Bing Liu, **comb. nov.**

Basionym: × *Elymordeum triploideum* Bowden, Canad. J. Bot. 36: 107. 1958.

≡ × *Elyhordeum triploideum* (Bowden) Bowden, Canad. J. Bot. 45: 719. 1967.

ORIGINAL MATERIAL: USSR. Moscow: Nemchinovka, artificial hybrid grown at the Institute for Grain Husbandry, and specimens presumably preserved in their herbarium (no original material located).

Hybrid formula: *Hordeum vulgare* L. × *Leymus racemosus* (Lam.) Tzvelev.

Remarks: One of its exact parentage is now accepted as a subspecies of *Hordeum vulgare*. According to ICN (Turland et al. 2018: Art. H.5.2, Ex. 1), the combination itself is at a rank inappropriate to a hybrid formula with taxa at unequal ranks. It is, however, the correct name applicable to all hybrids between *Hordeum vulgare* and *Leymus racemosus*.

16.9 *Lolium* L., Sp. Pl. [Linnaeus] 1: 83. 1753.

16.9.1 *Lolium* × *colinii* (Cugnac & A. Camus) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Festulolium colinii* Cugnac & A. Camus, Bull. Soc. Bot. France 91: 16. 1944.

TYPE: Not designated.

Hybrid formula: *Lolium pratense* (Huds.) Darbysh. × *Lolium temulentum* L.

Remarks: Banfi et al. (2017) “did not regard the illustration within the protologue as a safe element for this purpose”.

16.10 × *Psammopyrordeum* Su Liu, **nothogen. nov.**

Hybrid formula: *Hordeum* L. × *Psammopyrum* Á. Löve.

Remarks: The accepted nothospecific name for the following hybrid is somewhat changeable because *Triticum athericum* Link was either assigned to the genus *Psammopyrum* (Lucía et al. 2020) or *Elymus* (Wilcox et al. 2021). Yen & Yang (2022) classified *Triticum athericum* under *Psammopyrum* as *Psammopyrum athericum*, which was followed here, hence the establishment of a new nothogenus.

16.10.1 × *Psammopyrordeum rouxii* (Grenier & Duval-Jouve) Su Liu & Bing Liu, **comb. nov.**

Basionym: *Agropyron rouxii* Grenier & Duval-Jouve, Fl. Massil. Adv. Suppl. 23. 1859.

TYPE: FRANCE. “Prairies salées de Berre près de Marseille, Bouches du Rhône”, 11 June 1858, Blaise & Roux 67 (holotype: MPU [barcode] MPU449820, digital image!).

Hybrid formula: *Hordeum secalinum* Schreb. × *Psammopyrum athericum* (Link) Á. Löve.

16.11 × *Pseudelymus* Barkworth & D.R. Dewey, Great Basin Naturalist 43(4): 570. 1983.

Hybrid formula: *Elymus* L. × *Pseudoroegneria* (Nevski) Á. Löve.

16.11.1 × *Pseudelymus austroaltaicus* (Kotukhov) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymotrigia austroaltaica* Kotukhov, Bot. Zhurn. (Moscow & Leningrad) 75(12): 1753. 1990.

TYPE: Altaj australis, jugum altaj australis, depressio Bobrovskiensis in viciniis pag. Sorvenok, prata substepposa graminosa, 29 August 1984, Yu. Kotukhov s.n. (holotype: LE [barcode] LE01065550, digital image!; isotypes: LE [barcodes] LE00054131, LE00054133, digital images!).

Hybrid formula: *Elymus gmelinii* (Trin.) Tzvelev × *Pseudoroegneria gmelinii* (Trin.) Sennikov.

16.11.2 × *Pseudelymus kalbicus* (Kotukhov) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymotrigia kalbica* Kotukhov, Bot. Zhurn. (Moscow & Leningrad) 75(12): 1754. 1990.

TYPE: [KAZAKHSTAN] Altai, Kalba Highland, East Alba Mountains, environs: Kazakhstan village of Targyn, middle montane region, 40 m s.l.m., western rocky steppe slope, 26 June 1977, Yu. Kotukhov s.n. (holotype: LE [barcode] LE01065546, digital image!; selected isotypes: LE [barcodes] LE00054145, LE00054146, digital images!).

Hybrid formula: *Elymus mutabilis* (Drobow) Tzvelev × *Pseudoroegneria geniculata* (Trin.) Á. Löve.

16.11.3 × *Pseudelymus kurczumicus* (Kotukhov) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymotrigia kurczumica* Kotukhov, Bot. Zhurn. (Moscow & Leningrad) 75(12): 1756. 1990.

TYPE: Altai australis, jugum Kurczumicum (brachia orientalia), vallis fl. Tautekeli, 1800 m, tumuli herbosi morenici, prata substepposa graminosa, 3 August 1985, Yu. Kotukhov s.n. (holotype: LE [barcode] LE01065548, digital image!; isotypes: LE [barcodes] LE00054140, LE00054141, LE01299550, LE01299551, LE01299552, LE01299553, digital images!).

Hybrid formula: *Elymus fedtschenkoi* Tzvelev × *Pseudoroegneria gmelinii* (Trin.) Sennikov.

16.11.4 × *Pseudelymus leninogoricus* (Kotukhov) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymotrigia leninogorica* Kotukhov, Bot. Zhurn. (Moscow & Leningrad) 75(12): 1756. 1990.

TYPE: Altai occidentalis, jugum Ivanovskiense, depressionis Leninogoricae margo boreali-orientalis, 1000 m s. m., ager derelictus, in ruderalo, 20 August 1974, *Yu. Kotukhov s.n.* (holotype: LE [barcode] LE01065547; isotypes: LE [barcodes] LE00054142, LE00054143, LE00054144, digital images!).

Hybrid formula: *Elymus sibiricus* L. × *Pseudoroegneria geniculata* (Trin.) Á. Löve.

16.11.5 × *Pseudelymus nuraniae* (Kotukhov) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Elymotrigia nuraniae* Kotukhov, Turczaninowia 7(4): 9. 2004.

TYPE: Altai occidentalis, jugum Lineiski, prope castellum Tschernoubinski in reservato Occidentali Altajensi, regio montata media, 1500 alt., abietum colluctarum, fruticetum humilis, 15 July 2002, *Yu. Kotukhov s.n.* (holotype: ABG).

Hybrid formula: *Elymus dentatus* (Hook. f.) Tzvelev × *Pseudoroegneria gmelinii* (Trin.) Sennikov.

16.12 × *Sibirokoeleria* Su Liu, & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Koeleria* Pers. × *Sibirotrisetum* Barberá, Soreng, Romasch., Quintanar & P.M. Peterson.

Invalid designation: × *Sibirotrisetokoeleria* Chepinoga (in Chepinoga et al. 2023: 127), *form. inval.*

16.12.1 × *Sibirokoeleria gorodkowi* (Roshev.) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: *Koeleria gorodkowi* Roshev., Izv. Bot. Sada Akad. Nauk S.S.S.R. 30: 296. 1932.

Invalid designation: × *Sibirotrisetokoeleria gorodkowi* (Roshev.) Chepinoga, Bot. Pacifica 12(2): 127. 2023.

TYPE: RUSSIA. Siberia: Gydan tundra (between the lower reaches of the Yenisei River and the Ob Bay). Bass. Gyda-yam Bay, Lake Egena, near the lake Tongaeva, scattered slope of a sandy hill, *s.d.* 1927, *B.N. Gorodkov s.n.* (holotype: LE [barcode] LE01011127, digital image!).

Hybrid formula: *Koeleria asiatica* Domin × *Sibirotrisetum litorale* (Rupr. ex Roshev.) Chepinoga.

16.13 × *Thinoleymus* Su Liu & Bing Liu, **nothogen. nov.**

Hybrid formula: *Leymus* Hochst. × *Thinopyrum* Á. Löve.

16.13.1 × *Thinoleymus strictus* (Rchb.) Su Liu & Bing Liu, **comb. nov.**

Basionym: *Agropyron strictum* Rchb., Handb. Gewächsk., ed. 2. 3: 1812. 1830.

TYPE: GERMANY. Mecklenburg-Vorpommern: In littore arenoso saepe a mare inundato prope Warnemünde, *s.d.*, *G.G. Detharding s.n.* (holotype: W [barcode] W18890216859, digital image!).

Hybrid formula: *Leymus arenarius* Hochst. × *Thinopyrum junceum* (L.) Á. Löve.

16.14 *Thinopyrum* Á. Löve, Taxon 29: 351. 1980.

16.14.1 *Thinopyrum* × *obtusiusculum* (Lange) Z.H. Feng, **comb. nov.**

Basionym: *Agropyron obtusiusculum* Lange, Haandb. Danske Fl. ed. 2, 48. 1856.

TYPE: Not designated.

Hybrid formula: *Thinopyrum acutum* (DC.) Banfi × *Thinopyrum junceiforme* (Á. Löve & D. Löve) Á. Löve.

16.15 × *Triticosecale* Wittm. ex A. Camus, Bull. Mus. Natl. Hist. Nat. 33: 539. 1927.

Hybrid formula: *Secale* L. × *Triticum* L.

16.15.1 × *Triticosecale krolowii* (H.R. Jiang & H.S. Kung) Z.H. Feng & Su Liu, **comb. nov.**

Basionym: × *Triticale krolowii* H.R. Jiang & H.S. Kung, J. Sichuan Agric. Univ. 9(3): 334. 1991.

TYPE: CHINA. Sichuan: Ya'an, Laboratory of Crop Cultivation, Department of Agronomy, Sichuan Agriculture University, 14 May 1988, *H.R. Jiang 8801* (holotype: SAUF).

Hybrid formula: *Triticum tauschii* (Coss.) Schmalh. × *Secale sylvestre* Host.

16.16 × *Tritipyrum* Curwen-McAdams, Arterburn, K. Murphy, X.W. Cai & S.S. Jones, Genet. Resources Crop Evol. 64(7): 1654. 2016.

Hybrid formula: *Thinopyrum* Á. Löve × *Triticum* L.

16.16.1 × *Tritipyrum cziczinii* (Tzvelev) Su Liu & Bing Liu, **comb. nov.**

Basionym: × *Trititrigia cziczinii* Tzvelev, Novosti Sist. Vyssh. Rast. 10: 59. 1973.

TYPE: RUSSIA. Saratov: “*hybrida Triticum vulgare lutescens 62* × *Agropyron intermedium*”, *s.d.* July 1932, *s.coll.* (holotype: LE [barcode] LE01025683, digital image!).

Hybrid formula: *Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey × *Triticum aestivum* L.

17. POLYGONACEAE Juss., Gen. Pl. [Jussieu] 82. 1789.

Weill (in Weill & Bournérias 1946) reported a natural intergeneric hybrid between *Polygonum hydropiper* and *Rumex obtusifolius* from France. It differs from the former by terminal leaves with a long petiole (vs. sessile or subsessile), longer inflorescence (up to 20 cm vs. not longer than 10 cm) and differentiates from the latter in pauciflorous inflorescence (3–6 vs. up to 30). He coined the name × *Polygonorumex guinetii* for such a hybrid. However, all the text he provided in the protologue is French, and this only validated the nothogenus (see Art. H.9.1, *Ex.* 1) but not the nothospecies (see Art. 32.4, *Ex.* 3, also see Art. H.10.1). Moreover, one of the parentage, *Polygonum hydropiper*, is now assigned to *Percicaria* according to phylogenetic studies (Kim & Donoghue 2008; Cao et al. 2022), this leaves × *Polygonorumex* without species but the name itself still available. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

17.1 × *Persirumex* Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Percicaria* (L.) Mill. × *Rumex* L.

17.1.1 × *Persirumex guinetii* Z.H. Feng, **nothosp. nov.**

TYPE: FRANCE. Deux-Sèvres: 73 Savoie, 4 July 1936, *J. Weill s.n.* (holotype: P [barcode] P02428133, digital image!; isotypes: P [barcodes] P02428131, P02428132, digital images!). (**Fig. 8**)

Hybrid formula: *Percicaria hydropiper* (L.) Delarbre × *Rumex obtusifolius* L.

Description: Biennial herb with thick roots, emitting sorrel odour. Stem more or less stiff, grooved, somewhat branched, glandular. Leaves acuminate, long petioled, petioles 2–3 cm.

Inflorescence a slender pauciflorous spike up to 20 cm with whorled flowers, soon pendulous in anthesis. Flowers 3–6 in false whorls, with a fairly thick pedicel 4–7 mm long. Perianth 6, free, external ones bracteiform and 3 internal ones subovate, not very accrescent, barely reticulated, denticulate and eglandular. Stamens 6, filaments equal to or slightly exceed the anthers. Stigma fimbriate. Ovary vaguely trigonous with 3 apical feathery styles apical and reflexed. Fruit not seen.

18. RHAMNACEAE Juss., Gen. Pl. [Jussieu] 376. 1789.

Hauenschild et al. (2016) and Hauenschild (2016) split *Rhamnus* s.l. to four genera (*Rhamnus* s.s., *Frangula*, *Atadinus* including *Oreohertzogia* and *Endotropis* merging *Apetlorhamnus*, and the superfluous *Ventia*) and provided numerous nomenclatural novelties. However, these authors did not pay much attention to hybrids in *Rhamnus* s.l. when they made new combinations. It was Tison (in Tison et al. 2021) who first transferred *Rhamnus* × *lemaniana* to *Atadinus* as *Atadinus* × *lemaniana*. After consultation of literature, we present additional corresponding nomenclatural treatment as follows.

18.1 × *Rhatadinus* Su Liu, & Bing Liu, **nothogen. nov.**

Hybrid formula: *Atadinus* Raf. × *Rhamnus* L.

= × *Rhamzogia* W. Vent, Feddes Repert. Spec. Nov. Regni Veg. 65: 108. 1962.

18.1.1 × *Rhatadinus hybrida* (L'Héritier) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Rhamnus* × *hybrida* L'Hér., Sert. Angl. 6. 1789.

≡ × *Rhamzogia hybrida* (L'Hér.) W. Vent, Feddes Repert. Spec. Nov. Regni Veg. 65: 108. 1962.

TYPE: Not designated.

Hybrid formula: *Atadinus alpinus* (L.) Raf. × *Rhamnus alaternus* L.

18.1.2 × *Rhatadinus mercieri* (Briq.) Z.H. Feng, Bing Liu, & Su Liu, **comb. nov.**

Basionym: *Rhamnus* × *mercieri* Briq., Annuaire Conserv. Jard. Bot. Genève 3: 85. 1899.

≡ × *Rhamzogia mercieri* (Briq.) W. Vent, Feddes Repert. Spec. Nov. Regni Veg. 65: 108. 1962.

TYPE: Not designated.

Hybrid formula: *Atadinus alpinus* (L.) Raf. × *Rhamnus cathartica* L.

19. ROSACEAE Juss., Gen. Pl. [Jussieu] 334. 1789.

In the family Rosaceae, the tribes Amygdaleae and Maleae are two economically important groups, the former containing stone fruits such as peaches, apricots, almonds, and cherries, the latter pome fruits such as apples, pears, and hawthorns, and both containing many ornamental shrubs and trees. They also show similar phylogenetic and evolutionary patterns by reticulate evolution resulting in vast incongruence between plastid and nuclear trees.

However, different nomenclatural traditions have determined different methods of taxonomical treatment for the two tribe. It has been generally accepted that all genera in Amygdaleae merge into one, e.g. *Prunus* s.l., leaving all classification problems including nothotaxa below the genus rank. However, the similar lumping treatment by Christenhusz et al. (2018) of synonymization of many generic names with *Pyrus* has generally been debated and repudiated by academic communities (e.g. Specht et al. 2018).

When keeping the traditional concept of small genera, recent phylogenetic studies have considerably

changed their circumscription and relationship (e.g. Liu et al. 2019, 2022; Wang et al. 2024). Most nothotaxa names, especially the “hybridogenous” ones, have been updated by Mezhenkyj (2012) and Sennikov & Kurtto (2017).

It must be noted that, according to Wang et al. (2024) and their previous research, *Malus* is dyphyletic, the North American crab apples clade being not close to the type clade. It is then necessary to mandate a new nothogenus for the horticultural hybrids between the two clades, but it is still too premature to do so. After consultation of literature, we present additional nomenclatural treatment as follows.

19.1 × *Arsorbus* Su Liu & Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Aria* (Pers.) Host × *Sorbus* L.

19.1.1 × *Arsorbus thuringiaca* (Nyman) Z.H. Feng & Su Liu, **comb. & stat. nov.**

Basionym: *Sorbus hybrida* var. *thuringiaca* Nyman, Consp. Fl. Eur. 2: 241. 1879.

≡ *Hedlundia* × *thuringiaca* (Nyman) Sennikov & Kurtto, Memoranda Soc. Fauna Fl. Fenn. 93: 34. 2017.

TYPE (lectotype designated by Velebil & Businský 2016: 353): **GERMANY**. Thuringia: “Pirus *Aria* × *aucuparia* Irm. Var. *thuringiaca* Ilse = *P. aucuparia* × *Aria* Ilse. Walperholz bei Arnstadt., 1868, lg Wiessner” with stamp “H. Ilse / Flora von Thüringen” (lectotype: LUX [barcode] LUX No.7156A, digital image!; isolectotype: JE [barcode] JE00021080, digital image!).

Hybrid formula: *Aria edulis* (Willd.) M. Roem. × *Sorbus aucuparia* L.

20. RUBIACEAE Juss., Gen. Pl. [Jussieu] 196. 1789.

Del Guacchio & Caputo (2020) elevated sections *Cynanchicae*, *Thlipthisa* and *Hexaphylla* of *Asperula* to generic rank as a consequence of numerous molecular phylogenetic studies providing abundant evidence on the polyphyletic nature of the genus. However, a comprehensive molecular sampling at species level of the genus *Galium* is yet to be conducted. After consultation of literature, especially following their study, we present additional corresponding nomenclatural treatment as follows.

20.1 × *Galiphthisa* Z.H. Feng, **nothogen. nov.**

Hybrid formula: *Galium* L. × *Thlipthisa* (Griseb.) Caputo & Del Guacchio.

20.1.1 × *Galiphthisa ferdinandi-coburgii* (J. Wagner) Z.H. Feng, **comb. nov.**

Basionym: *Galium* × *ferdinandi-coburgii* J. Wagner, Repert. Spec. Nov. Regni Veg. 38: 284. 1935.

TYPE: Not designated.

Hybrid formula: *Galium degenii* Bald. ex Degen × *Thlipthisa purpurea* (L.) Caputo & Del Guacchio.

Remarks: We did not regard the line illustration within the protologue as a safe element for the purpose of typification.

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Figure 1. *Amaryllis formosissima*, basionym of *Zephyranthes formosissima*. Lectotype sheet (LINN416.4) housed at LINN © Linnean Society of London, with permission to reproduce provided by Andrea Deneau and Mark Spencer.



Figure 2. *Helichrysum purdiei*, basionym of \times *Anrysum purdiei*. Lectotype sheet (AK10227) housed at AK © Auckland War Memorial Museum, licensed under CC-BY 4.0, with permission to reproduce provided by Dan Blanchon.



Figure 3. *x Procopiphytum runemarkii*, basionym of *Symphytum x runemarkii*. Lectotype sheet (the upper left gathering on the sheet only, LD1225106B) housed at LD © Lund University, with permission to reproduce provided by Arne Thell and Patrik Frödén.



Figure 4. *Pitcairnia* × *daisyana*. Holotype sheet (SEL001397) housed at SEL © Marie Selby Botanical Gardens, licensed under CC-BY 4.0, with permission to reproduce provided by Bruce Holst.



Figure 5. *Tillandsia x complachroma*. A. Lectotype sheet (HEID604361) and B–D. isolectotype sheets (HEID600886, HEID604650, HEID604823) housed at HEID © University of Heidelberg, with permission to reproduce provided by Peter Sack.

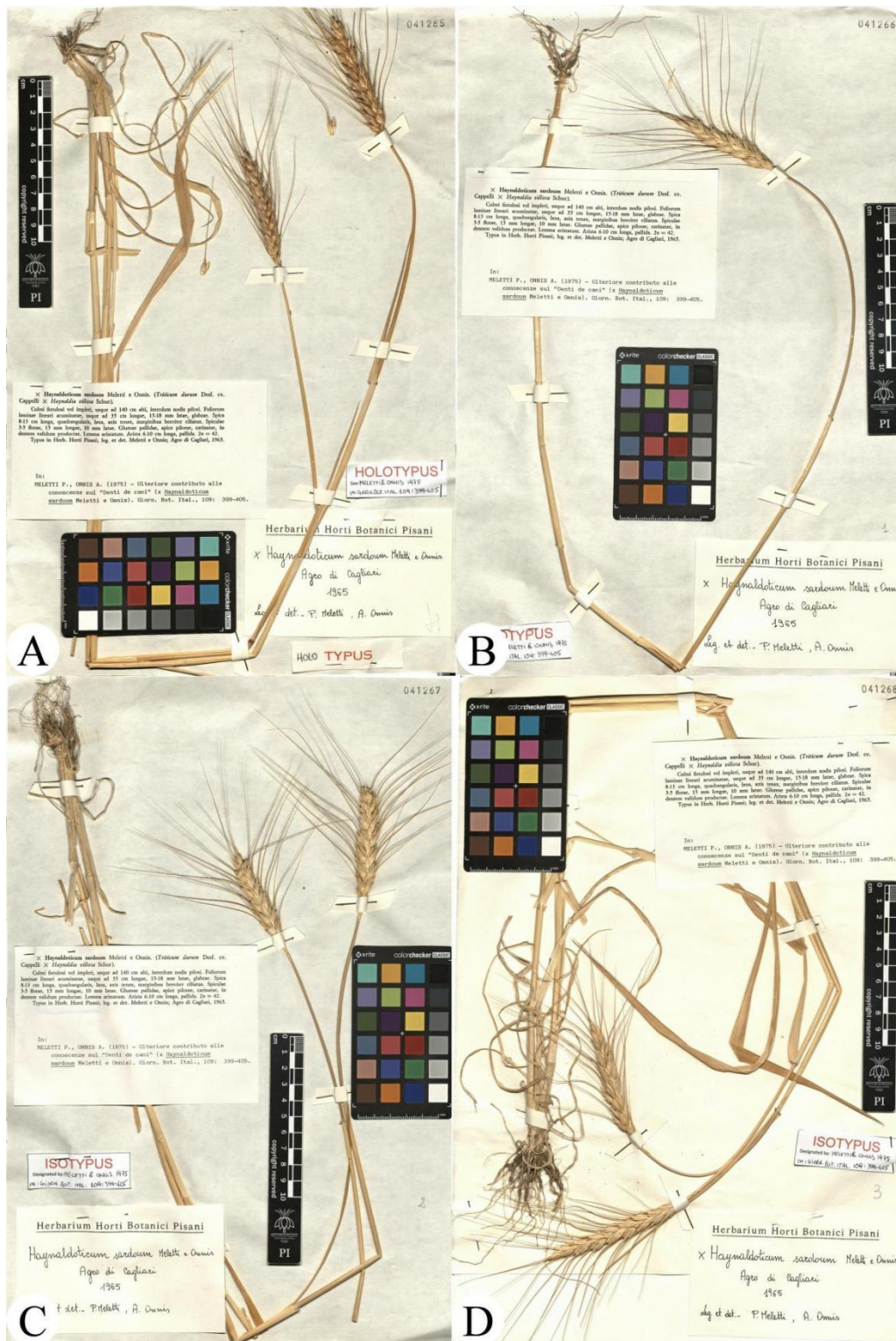


Figure 6. *× Dasyticum sardoum*, originally labelled with invalid designation *× Haynaldoticum sardoum*. **A.** Holotype sheet (PI041265) and **B–D.** isotype sheets (PI041266, PI041267, PI041268) housed at PI © Università di Pisa, with permission to reproduce provided by Francesco Roma-Marzio.

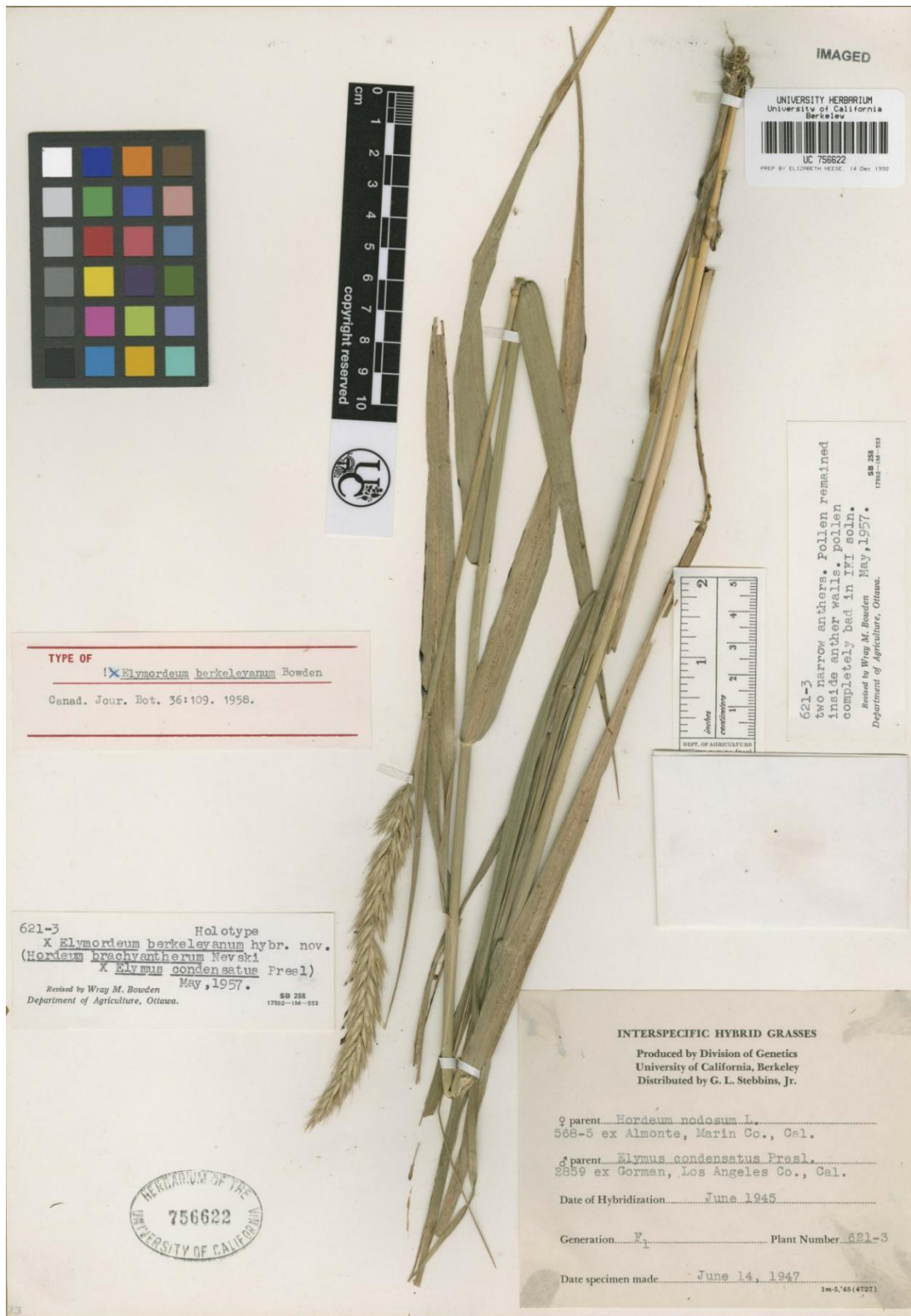


Figure 7. × *Elymordeum berkeleyanum*, basionym of × *Leydeum berkeleyanum*. Holotype sheet (UC756622) housed at UC © The University & Jepson Herbaria, University of California, Berkeley, with permission to reproduce provided by Ana Penny.



Figure 8. × *Persirumex guinetii*, originally labelled with invalid designation × *Polygonorumex guinetii*. **A.** Holotype sheet (P02428133) and **B.** selected isotype sheet (P02428131) housed at P © Muséum national d’Histoire naturelle–Paris Herbarium, with permission to reproduce provided by Germinal Rouhan.