

Taxonomic comments on the “Flora of North America north of Mexico”, vol. 2, with some new nomenclatural combinations for *Pteridophyta*

Taxonomické poznámky k publikaci „Flora of North America north of Mexico“, vol. 2, s novými nomenklatorickými kombinacemi pro některé kapradorosty

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New taxonomic classification is suggested for some pteridophyte and gymnosperm species included in the “Flora of North America north of Mexico”, Volume 2. New combinations are proposed for some species of genera *Bryodesma* Soják (*Selaginella* s. lato), *Hippochaete* Milde (*Equisetum* s. lato), and *Sceptridium* Lyon (*Botrychium* s. lato). New genus *Holubiella* Škoda (*Ophioglossaceae*) is created. It is monotypic comprising *Botrychium lunarioides* Michx. that was formerly separated in *Botrychium* Sw. subg. *Sceptridium* (Lyon) Clausen sect. *Hiemobotrychium* W. H. Wagner. Objections against reintroduction of the names *Asplenium trichomanes-dentatum* L. and *A. trichomanes-ramosum* L. are expressed. An Appendix with detail comments on the nomenclature, synonymies, chromosome counts and distribution of individual taxa in the Flora is added.

Key words: *Pteridophyta*, North America, *Selaginella*, *Bryodesma*, *Equisetum*, *Hippochaete*, *Botrychium*, *Sceptridium*, *Holubiella*, *Botrychium* sect. *Hiemobotrychium*, distribution, nomenclature, taxonomy

Introduction

The elaboration of the Flora of North America north of Mexico, Volume 2, 1993 (1st printing), is a modern and critical, absorbing and accepting the very latest status of taxonomic knowledge. In comparison with older floras where the authors wasted their “taxonomic energy” describing plenty of insignificant varieties and forms, the emphasis of the contributors to the Flora was paid to the distinguishing of new species, to better understanding to their natural origin and relationships, and to the revealing the hybrids among them. According to Volume 1 (p. 264), the amount of species increased by 40%, the number of varieties and forms decreased to 10%, and there were four-times more hybrids reported and described in pteridophyte section of the Flora of North America north of Mexico in comparison with well-known Gray’s Manual treatment in 1950. Furthermore, 75 species in the Flora have undergone a name change in comparison with the most modern basic pteridological monograph in North America (Lellinger 1985).

However, in some cases, the classification of individual taxa is different in comparison with the approach of most of European taxonomists, and I would like to express a different taxonomic opinion. The following taxonomic comments are based on the European taxonomic conception of pteridophytes developed mostly by principal Czech taxono-

mists Josef Holub and Josef Dostál. Proposed new nomenclatural combinations arose from the studies of pteridophytes in Canada and U.S.A. during my stay there in 1991–1994, and from the revision of herbarium specimens there, as well as in Europe. Some of these combinations have been already prepared to publication independently by J. Holub (in manuscript), so we decided to publish them together here.

Results and discussion

1. Fir-mosses of genera *Phlegmariurus* Holub and *Huperzia* Bernh. differ so distinctly from the other groups of lycopods that they truly deserve their own family *Huperziaceae* Rothm. On the other hand, segregation of the genus *Phlegmariurus* is not clear yet. J. Holub, its author, described all the complications concerning the delimiting of the genus *Phlegmariurus* that is difficult at current level of knowledge (Holub 1985). He continues his taxonomic studies of this group so that precise delimiting of the genus *Phlegmariurus* is expected.

2. *Lycopodium annotinum* var. *alpestre* Hartm. and *Lycopodium annotinum* var. *pungens* (Bach. Pyl.) Desv. (p. 26 in the Flora) are synonyms of the species *Lycopodium dubium* Zoëga, Fl. Isl. 11. 1772. This species has already been reported from North America (Weber 1990 as a correct name, Hultén 1968 as a synonym). The differences between *L. annotinum* and *L. dubium* are at least of the same value as the differences between *L. clavatum* and *L. lagopus* that were treated separately in the Flora. So, this taxon should be therefore treated in a separate description, as well. I prefer to rank it as a northern geographical subspecies *Lycopodium annotinum* subsp. *alpestre* (Hartm.) Á. Löve et D. Löve because the differences between both subspecies are stable even at the locality in Norway where they both grow under uniform conditions. On the other hand, studies from Finland indicate that there are numerous intermediates so they cannot be regarded as separate species (Oellgaard et Tind 1993).

3. *Lycopodium lagopus* (Hartm.) Kuzen. does not seem to be more than a northern geographical subspecies of *L. clavatum* L.. The number of strobili is not a reliable characteristic for the separation of these taxa at species level. One can find individual plants with 1 to 5 strobili almost within all populations in Europe. I have collected several such diverse specimens in Canada as well. The name *L. clavatum* subsp. *monostachyon* (Hook. et Grev.) Selander, Acta Phytogeogr. Suecica 28:7. 1950 is available. The same conclusion was proposed by Soják (1981).

4. New species *Lycopodiella subappresa* J. G. Bruce, W. H. Wagner et Beitel and *L. margueritae* J. G. Bruce, W. H. Wagner et Beitel in the Flora (W. H. Wagner et Beitel in Morin 1993:36–37) seem to need further investigations. These two tetraploid taxa do not differ strikingly from their diploid relative *L. inundata* (L.) Holub in any other aspect than in their more robust habit caused probably by their tetraploidy. Position of peduncle leaves as well as sporophylls appression are not very stable characters and vary significantly within individual populations (at least in Europe). The currently known distribution of these taxa limited to an isolated small area in Michigan only does not support convincingly their specific ranking, as well.

5. The genus *Selaginella* P. Beauv. is strikingly heterogeneous and was divided in three naturally evolved groups. I rank these as genera. The members of genus *Lycopodioides*

Boehm. (syn.: *Stachygynandrum* P. Beauv. ex Mirb.) have rhizophores, and their dimorphic leaves are arranged in 2 median and 2 lateral ranks with axillary leaves at branching points. Recently described genus *Bryodesma* Soják (Preslia 64:154. 1992) consists of the spike-mosses with rhizophores, with quadrangular strobili and with monomorphic leaves with stomates in abaxial groove. Both these genera differ strikingly from the only two species of the genus *Selaginella* P. Beauv. s.str. that have no rhizophores, their strobili are cylindric, and stomates are throughout abaxial surface of their monomorphic leaves. According to Soják's proposal (1992: p. 157), I do not propose any *Lycopodioides* combinations because it would be really much more logical to abandon the conservation of the name *Selaginella* and rename two of its species than renaming all of about 650 *Lycopodioides* species.

New combinations within the genus *Bryodesma*:

Bryodesma acanthonota (Underw.) Škoda, comb. nova;

– Bas.: *Selaginella acanthonota* Underw., Torrey 2:172. 1902; 20:162. 1918; Syn.: *Selaginella arenicola* subsp. *acanthonota* (Underw.) R. M. Tryon, Ann. Missouri Bot. Gard. 42:24. 1955

Bryodesma arenicola (Underw.) Soják

subsp. *riddellii* (Van Eselt.) Škoda, comb. nova;

– Bas.: *Selaginella riddellii* Van Eselt., Contr. U.S. Natl. Herb. 20:162. 1918; Syn.: *Selaginella arenicola* subsp. *riddellii* (Van Eselt.) R. M. Tryon, Ann. Missouri Bot. Gard. 42:24. 1955

Bryodesma fendleri (Underw.) Škoda, comb. nova;

– Bas.: *Selaginella rupestris* var. *fendleri* Underw., Bull. Torrey Bot. Club 25:127. 1898; Syn.: *Selaginella fendleri* (Underw.) Hieron., Hedwigia 39:303. 1900, non Baker, J. Bot. 21:334. 1883

Bryodesma juniforme (Van Eselt.) Škoda, comb. nova;

– Bas.: *Selaginella juniformis* Van Eselt., Contr. U.S. Natl. Herb. 20:166. 1918

Bryodesma humifusum (Van Eselt.) Škoda, comb. nova;

– Bas.: *Selaginella humifusa* Van Eselt., Contr. U.S. Natl. Herb. 20:165. 1918

Bryodesma leucobryoides (Maxon) Škoda, comb. nova;

– Bas.: *Selaginella leucobryoides* Maxon, Smithsonian Misc. Collect. 72:8. 1920

Bryodesma montanense (Hieron.) Škoda, comb. nova;

– Bas.: *Selaginella montanensis* Hieron., Hedwigia 39:293. 1900; Syn.: *Selaginella rupestris* f. *montanensis* (Hieron.) Clute, Fern Bull. 16:52. 1908

Bryodesma muticum (D. C. Eaton) Soják

var. *limitaneum* (Weath.) Škoda, comb. nova;

– Bas.: *Selaginella mutica* var. *limitanea* Weath., J. Arnold Arbor. 25:414. 1944

Bryodesma scopulorum (Maxon) Škoda et Holub, comb. nova;

– Bas.: *Selaginella scopulorum* Maxon, Amer. Fern J. 11:36. 1921; Syn.: *Selaginella densa* var. *scopulorum* (Maxon) R. M. Tryon, Ann. Missouri Bot. Gard. 42:67. 1955

Bryodesma standleyi (Maxon) Škoda, comb. nova;

– Bas.: *Selaginella standleyi* Maxon, Smithsonian Misc. Collect. 72:9. 1920; Syn.: *Selaginella densa* var. *standleyi* (Maxon) R. M. Tryon, Ann. Missouri Bot. Gard. 42:71. 1955

Bryodesma utahense (Flowers) Škoda et Holub, comb. nova;

– Bas.: *Selaginella utahensis* Flowers, Amer. Fern J. 39:83. 1949

Bryodesma* × *neomexicanum (Maxon) Škoda, comb. nova;

– Bas.: *Selaginella* × *neomexicana* Maxon, Smithsonian Misc. Collect. 72:2. 1920

Selaginella eclipses W. R. Buck does not differ significantly from *S. apoda* (L.) Spring (the only difference is the shape of apices of median leaves). The subspecific level is much more corresponding to the known facts:

***Selaginella apoda* (L.) Spring**

subsp. *eclipses* (W. R. Buck) Škoda, comb. nova;

– Bas.: *Selaginella eclipses* W. R. Buck, Canad. J. Bot. 55:366. 1977

6. Quillworts assigned to *Isoëtes echinospora* Durieu in America show some different characters (stomatiferous leaves and broader velum) in comparison with European plants that do not bear stomata. Although these characters are not sharply delimited throughout the whole area, American plants deserve at least a varietal status (*I. echinospora* Durieu var. *muricata* (Durieu) Engelm. in A. Gray, Manual ed. 5:676. 1867). I prefer the rank of a geographical subspecies – *I. echinospora* subsp. *muricata* (Durieu) Å. Löve et D. Löve, Bot. Not. 114:49. 1961 – for American populations.

7. Horsetails split inevitably into two distinct groups differing so seriously that they simply cannot be ranked any other way than as separate genera. The species of the genus *Hippochaete* J. Milde differ from those of *Equisetum* L. s.str. not only by sunken stomata in single lines and pointed cone apices but also in the size of chromosomes. These are significantly longer in the genus *Hippochaete* (Bir 1960). No hybrids between *Hippochaete* and *Equisetum* s.str. species are known.

New combinations within the genus *Hippochaete*:

***Hippochaete variegata* (Schleich.) Bruhin**

subsp. *alaskana* (A. A. Eaton) Škoda, comb. nova;

– Bas.: *Equisetum variegatum* var. *alaskanum* A. A. Eaton in Merriam, Harriman Alaska Exped. 5:390. 1904; Syn.: *Equisetum variegatum* subsp. *alaskanum* (A. A. Eaton) Hultén, Acta Univ. Lund. 37(1):59. 1941; *Hippochaete hyemalis* var. *alaskana* (A. A. Eaton) Farw., Mem. New York Bot. Gard. 6:466. 1916

***Hippochaete × ferrissii* (Clute) Škoda et Holub, comb. nova;**

– Bas.: *Equisetum × ferrissii* Clute, Fern Bull. 12:22. 1904 (pro sp.); Syn.: *Equisetum hiemale intermedium* A. A. Eaton, Fern Bull. 10:120. 1902; *Hippochaete prealta* var. *intermedia* (A. A. Eaton) Farw., Mem. New York Bot. Gard. 6:468. 1916

***Hippochaete × mackayi* (Newman) Škoda et Holub, comb. nova;**

– Bas.: *Equisetum hyemale* var. *mackayi* Newman, Phytologist 1:305. 1843 (Sept. 1842); Syn.: *Equisetum mackayi* (Newman) Brichan, Phytologist 1:369. 1843 (Nov. 1842); *Equisetum hyemale* subsp. *trachyodon* A. Br., Flora 21:160. 1838, nom. nud.; *Equisetum hyemale* subsp. *trachyodon* A. Br., Flora 22:308. 1839; *Equisetum × trachyodon* (A. Br.) W. D. J. Koch Syn. Fl. Germ. Helvet., ed. 2, 2:990 ? 1845 /n.v./, ed. germ. 2:1003, 1847; *Hippochaete × trachyodon* (A. Br.) Börner, Fl. Deutsche Volk 283. 1912

Alexander C. H. Braun described validly the latter taxon as a subspecies only as was ascertained by Holub (1972:119).

8. Basically the same situation as in *Lycopodium* L. s. lato, *Selaginella* P. Beauv. s. lato, and *Equisetum* L. s. lato, is in the genus *Botrychium* Sw.. Obvious heterogeneity led W. H. Wagner Jr. and F. S. Wagner in the Flora (Morin 1993: p. 86–101) to divide the genus in three subgenera, one of them split into two sections. Again, it must be stressed that the differences exceed noticeably the subgeneric level (see, e.g. Lyon 1905, Holub 1973, etc.). Segregation of *Botrychium virginianum* L. in a separate genus *Botrypus* Michx. as *Botrypus virginianus* (L.) Holub is undoubted. Subgenus *Sceptridium* (Lyon) Clausen would be ranked as a genus *Sceptridium* Lyon as well:

Table 1. – The differences between the genera *Holubiella* Škoda and *Sceptridium* Lyon. Individual characteristics are not arranged according to their taxonomic value.

Characteristic	<i>Holubiella</i> Škoda	<i>Sceptridium</i> Lyon
roots	20–30, yellow to brown, 0.6–1 mm in diam.	10 or less, blackish, 1–4 mm in diam.
common stalks	with tracheidal idioblasts	without idioblasts
trophophores	blades commonly 2; prostrate, short stalked	blade 1; erect, long stalked
sporophore stalks and rachides	fleshy, broadly flattened, to 1.4 mm wide	not fleshy, only slightly flattened, 0.5–0.8 mm wide
leaf primordia	with scattered hairs; hairs 0.6–1 mm	densely hairy; hairs 1.5–2 mm
vegetation period	leaves appear in late autumn	leaves appear in spring

Sceptridium rugulosum (W. H. Wagner) Škoda et Holub, comb. nova;
– Bas.: *Botrychium rugulosum* W. H. Wagner, Contr. Univ. Michigan Herb. 15:315. 1982

American endemic *B. lunarioides* differs in many aspects from the other grapeferns (see the Table 1), so W. H. Wagner, Jr., (1992) distinguished it correctly as a separate taxonomic group. Tracheidal idioblasts, huge, annularly thickened tracheid-like cells present in common stalk and proximal part of rachis of *B. lunarioides*, are absolutely unique among ferns.

Thus, it would deserve to be placed in a separate genus:

Holubiella Škoda, gen. novum;
– Syn.: *Botrychium* Sw. subg. *Sceptridium* (Lyon) Clausen sect. *Hiemobotrychium* W. H. Wagner, Novon 2:267. 1992
Typus: *Holubiella lunarioides* (Michx.) Škoda, [*Botrypus lunarioides* Michx.]

Diagnosis latina: vide W. H. Wagner, Novon 2:267. 1992

The genus is monotypic, limited to southeastern U.S.A., ranging from Texas to North Carolina.

Etymology: The genus is named after Dr. Josef Holub, famous Czech plant taxonomist, for his outstanding contribution to the systematic pteridology. The ending of the new generic name recalls the genus *Lycopodiella*, one of many new pteridophyte genera described by him.

Holubiella lunarioides (Michx.) Škoda, comb. nova;
– Bas.: *Botrypus lunarioides* Michx., Fl. Bor.-Amer. 2:274. 1803; Syn.: *Botrychium lunarioides* (Michx.) Sw., Syn. Fil. 172. 1806

9. *Hymenophyllum wrightii* Bosch was treated as *Mecodium wrightii* (Bosch) Copel. in the last Canadian pteridophyte compendium (Cody et Britton 1989) according to pteridologists from Japan where this filmy fern originally grows. It seems that there are different basic chromosome numbers *x* in genera *Mecodium* C. Presl ex Copel. and *Hymenophyllum* Sm. (Löve et al. 1977). This corresponds with the reported chromosome numbers of *Hymenophyllum tunbrigense* (L.) Sm. and *Mecodium wrightii* (Bosch) Copel..

10. My own collections of *Pteridium aquilinum* var. *caudatum* (L.) Sadeb. from the southernmost Florida suggest that it is not possible to regard this striking taxon as a variety only. The same idea is outlined by Cranfill in the Flora (Morin 1993: p. 202), just the last sentence above the key, but it was not followed in the treatment on next page. Personally, in spite of known variations in its characters, I would prefer to isolate this taxon completely into the separate species as *P. caudatum* (L.) Maxon, and to promote the other varieties of *P. aquilinum* (L.) Kuhn to the subspecific level.

11. The division of the broad and heterogeneous genus *Thelypteris* Schmidel s. lato just into three genera and seven subgenera accepted by A. R. Smith in the Flora (Morin 1993: p. 206–222) was a half-way effort. The differences between individual groups are significant and stable, no hybridization was reported between species from different groups. Thus, all the genera *Parathelypteris* (H. Ito) Ching, *Amauropelta* Kunze, *Oreopteris* Holub, *Christella* H. Lév. (species 7. – 14. from the subg. *Cyclosorus* (Link) Morton in the Flora by A. R. Smith (Morin 1993: p. 214–216)), *Cyclosorus* Link (*C. interrupta* (Willd.) K. Iwats. only), *Stegnogramma* Blume, *Goniopteris* C. Presl and *Meniscium* Schreb. should be accepted besides *Thelypteris* Schmidel s.str. (*T. palustris* Schott only), *Macrothelypteris* (H. Ito) Ching, and *Phegopteris* (C. Presl) Fée. Eventually, the genus *Christella* H. Lév. could be treated as a subgenus of the genus *Cyclosorus* Link because the genera *Christella* H. Lév. and *Cyclosorus* Link are much closer to each other than any other two groups within *Thelypteris* Schmidel s. lato. This group needs further taxonomic study.

12. The inclusion of traditional genera *Ceterach* Bernh., *Phyllitis* Hill, and *Camptosorus* Link in the gigantic genus *Asplenium* L. is not well-founded. Intergeneric hybrids exist throughout the plant kingdom and still it is not a reason for fusing such genera. We do not have to seek for them too far, e.g. *Polystichum lonchitis* × *Dryopteris goldiana* (× *Dryostichum singulare* W. H. Wagner). Is it possible to imagine the fusion of these two genera? Special type of rooting at frond tips and anastomosing veins (*Camptosorus*), simple tough blades, cordate at base and much larger in comparison with the other species (*Phyllitis*), and thick pinnatifid blades mostly with densely scaly laminae (*Ceterach*) are quite satisfactory characters approving segregation of these genera. It is not understandable that they were not granted even a sectional level in the Flora (Wagner, Moran et Werth in Morin 1993: p. 228–245).

Exhumation of ancient Linnaean specific names *Asplenium trichomanes-dentatum* L. and *A. trichomanes-ramosum* L. is in the contrary with several articles of the International Code of Botanical Nomenclature. First, these names should be used in abbreviated form as *A. dentatum* L. and *A. ramosum* L. according to Article 23, Example 14 in the Tokyo Code (Insertion “Trich.” in *Asplenium* should be dropped). However, the name *A. ramosum* L. should be rejected (proposed by Zimmer et Greuter 1994). I cannot agree with Lellinger’s suggestion (1981: p. 90–91). The comparison with *A. ruta-muraria*, *A. adiantum-nigrum* and *Adiantum capillus-veneris* is redundant and misleading. The non-confusing name *A. viride* Huds. has been widely and persistently used for a very long time, so it would deserve conservation. There will be a little complication with its typification (original Hudson’s collection was destroyed by fire). Nevertheless, this name should be used and any excavations in the burial ground of its precursors would seriously affect the nomenclatural stability. Thus, I fully support Zimmer’s and Greuter’s proposal for its retention.

13. A correct name for *Athyrium alpestre* (Hoppe) Clairv. is *Athyrium distentifolium* Tausch ex Opiz (and *Athyrium distentifolium* var. *americanum* (Butters) Cronquist, respectively) (see the Appendix). Clairville's name, which is based on *Aspidium alpestre* Hoppe, Bot. Taschenb. 216, 1805, nom. nudum, cannot be regarded as valid.

14. On the other hand, *Cystopteris dickieana* R. Sim is widely accepted in Europe (Hegi 1984, Derrick et al. 1987, Tutin et al. 1993), and I cannot agree with the objections against it (Haufler, Moran et Windham in Morin 1993: p. 270) because its characteristic spore sculpture seems to be stable and uniform in European populations of *C. dickieana* R. Sim.

15. *Polypodium triseriale* Sw. is so different from the other polypods that it would be better treated as *Goniophlebium triseriale* (Sw.) Pic. Serm..

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Souhrn

Práce vznikla na základě kritické recenze druhého svazku Flóry Severní Ameriky severně od Mexika. Díky možnosti studia amerických kapradorostů přímo v terénu i v amerických herbářích, autor navrhuje jiná taxonomická hodnocení pro některé taxony kapradorostů. Nové kombinace jsou navrženy pro některé druhy rodů *Bryodesma* Soják (*Selaginella* s. lato), *Hippochaete* Milde (*Equisetum* s. lato) a *Sceptridium* Lyon (*Botrychium* s. lato). Autor navrhuje také nový rod *Holubiella* Škoda (*Ophioglossaceae*), již dříve vyčleňovaný jako samostatná sekce *Botrychium* Sw. subg. *Sceptridium* (Lyon) Clausen sect. *Hiemobotrychium* W. H. Wagner. Rod je monotypický, obsahuje pouze druh *Botrychium lunarioides* Michx., který se odlišuje od ostatních vratiček celou řadou významných znaků (viz tab. I). Autor také vyjadřuje námitky proti znovuzavedení jména *A. trichomanes-ramosum* L. pro *A. viride* Huds. Za článkem následuje Appendix s kritickými poznámkami recenzní povahy, s nomenklatorickými poznámkami, s chybějícími synonymy běžně užívanými v amerických národních flórách a pteridologických monografiích, a se známými chromosomovými počty neuvedenými v textu Flóry Severní Ameriky. Autor také upozorňuje na četné nesody v rozšíření mezi textem a mapkami, a také na neokomentované rozdíly v rozšíření v porovnání s novějšími americkými národními flórami a nejznámějšími americkými pteridologickými monografiemi.

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Appendix I. – Review notes:

The nomenclature of the Flora is very good. Nevertheless, literature citations or at least a year of publication are missing after the names of families. Generic and subgeneric synonyms are not given except several exceptions (*Odontosoria*, *Thelypteris* subg. *Parathelypteris*, *T.* subg. *Lastrea*, *T.* subg. *Cyclosorus*, *Macrothelypteris*, *Phegopteris*, *Woodwardia*, *Diplazium*, *Grammitis*, *Pecluma*, *Neurodium*, *Pinus*, *Juniperus* sect. *Juniperus*, and *Torreya*). Bionyms are always served except the following three taxa: *Selaginella* subg. *Stachygynandrum*, *Phlebodium*, and *Juniperus* sect. *Sabina*.

A few names only should be replaced or corrected (see following chapter “Selected special notes”).

The literature citations are precise except a few cases (see following chapter “Selected special notes”).

If two or more authors of taxonomic names share surnames, first initials should be included every time whenever they are cited with full names. The other possibility is to follow the abbreviated names according to Brummitt et Powell (Authors of Plant Names. – Royal Bot. Garden Kew, 1992). Finally, the full names without initials could be used but then these names should be listed completely with initials somewhere in the introducing chapters; referring to Brummitt et Powell (1992) here is not relevant. So, e.g., for J. E. Smith, using the abbreviated form “Sm.” according to Brummitt et Powell (1992) is clear but not introducing “Smith” because of J. Smith, and several others. By the way, L. M. Underwood is transcribed as “L. Underwood” in the Flora in spite of “Underw.” in Brummitt et Powell (1992). N. E. Pfeiffer should be transcribed as N. Pfeiffer according to Brummitt et Powell (1992) in the contrary with the Flora, p. 69, 73, 74. The author of the name *Cystopteris dickieana* is R. Sim (p. 269), “Sim” in Brummitt et Powell (1992) is a different botanist. A list of all authors of scientific names with their first (and middle) names, surnames and years of their birth and their death published at the end of every volume (or a total list in volume 14) would be very useful anyway.

The synonyms are often incomplete and always without literature citations because the authors were restricted by editorial decision. It is questionable if such saving of publication space is acceptable (exactly not, e.g., they could be printed with smaller size of characters). Synonyms given in national pteridophyte “bibles” (Lellinger 1985, Cody et Britton 1989) or in recent regional floras would had been provided. Furthermore, the names used there as correct prior names should had been an integral part of synonymies absolutely necessarily. Intraspecific taxa, especially forms, are often of rather insignificant value, nevertheless but they could be mentioned in discussions (as in case of *Equisetum arvense* – p. 81). These taxa would not have to be cited with complete literature citations.

The keys are modern, extensive, precisely dichotomic, and easily usable. The only objection could concern the key of *Hymenophyllum* gametophytes (p. 191). It is based only on their growth substrates and geographical distribution. The gametophytes are quite similar morphologically but some differences could had been found (e.g., as in Raine et al., Amer. Fern J. 81:109–118. 1991).

Description of habitat and morphology of every species and intraspecific taxons is brief but clear and sufficient. On the other hand, it is really disappointing that not all the taxa are depicted on separate illustrations with details of taxonomic value.

Chromosome counts are not given every time when they were available. If the source plant material was not from North America, it should had been stated (as in case of *Actinostachys pennula* (Sw.) Hook. – $2n = 168$ (Trinidad) – p. 113). Original literature reference of chromosome counts would had been much better in the Flora than in the database only.

Geographical ranges and distribution maps of all the species and intraspecific taxa are very useful and convenient. However, a few disproportions between the text and maps were found. In some cases, the given range of distribution is shortened or widened in comparison with the pteridophyte monographs (Lellinger 1985, Cody et Britton 1989) or with recent regional floras. In such cases, these changes should be commented in discussions whether the reasons had been reclassification of herbarium specimens, or whether no vouchers had been seen from this area or whether it had been more likely an author's error. This was done excellently in the Flora in case of *Selaginella kraussiana* (Kunze) A. Br. – Range: Calif., Va. (Lellinger 1985) commented on p. 61; *Notholaena standleyi* Maxon – Range: Nev. (Lellinger 1985) commented on p. 149; *Pellaea ovata* (Desv.) Weath. – Range: N.Mex. (Lellinger 1985) commented on p. 178; *P. atropurpurea* (L.) Link – Range: B.C., Sask. commented on p. 185 or *Pilularia americana* A. Br. – Range: Alaska commented on p. 335. Extraamerican distribution could be appended where it is incomplete or missing.

The hybridization in some important genera is very clearly demonstrated by reticulograms. This is a very effective approach for explaining the complicated relationships, e.g., within the genus *Dryopteris* Adans. or *Asplenium* L.. Unfortunately, the hybrids are not treated equally throughout the text. In the genus *Diphasiastrum* Holub, the well studied fertile hybrids regarded as species for a long time are mentioned in separate brief paragraphs at the end of the description of the last species only. Fertile hybrid *Lycopodiella margueritae* $\times$ *L. subappressa* is just marginally mentioned. On the contrary, sterile hybrid *Selaginella* $\times$ *neomexicana* Maxon has its own complete description, as well as four frequent *Equisetum* L. s.l. sterile hybrids while the other *Equisetum* L. s.l. hybrids are just mentioned in the reticulogram and in the foreword (*E. x arcticum* (Rothm.) Hyl. and *E. x font-queri* Rothm. occur in North America – Cody et Britton 1989, and Flora p. 78). *Osmunda x ruggii* R. M. Tryon, a sterile hybrid, has its own complete description. In the genus *Asplenium* L., apogamous hybrid *A. x heteroresiliens* W. H. Wagner, and two sterile hybrids *A. x biscoyneum* (D. C. Eaton) A. A. Eaton and *A. x curtissii* Underw. are completely described only. *A. x curtissii* is not apogamous as it is depicted in the reticulogram in contradiction with the text (p. 229 and 242). *Dryopteris* hybrids are perfectly depicted in the reticulogram but most of their binomial names are not served. These hybrids are just mentioned in discussions. Hybrids within other genera are worked out in the same way. A few rare hybrids are not mentioned at all.

In spite of some incorrectnesses that are mostly infrequent, sometimes marginal, Flora of North America north of Mexico is indisputably exemplary. It must be stressed that the elaboration of the Flora is much better than similar continental Flora Europaea (Tutin et al. 1993). This European compendium lacks illustrations, literature citations of the names of families with their authors' names, literature citations of generic names and of all basionyms and synonyms. It does not serve generic synonyms at all, synonyms of species are very scarce, world ranges and distribution maps are not provided. In this sense, three supraregional floras excel above all-European "Flora von Mitteleuropa" [Illustrated Flora of Central Europe] by Hegi and his followers (1984, 1981) and American Vascular Plants of the Pacific Northwest by Hitchcock et al. (1969) and Intermountain Flora by Cronquist et al. (1972). These floras serve admirable illustrations of all described species and cover excellently most of the aspects missing in Flora Europaea (except literature citations of the names of families and genera, generic synonyms and distribution maps in case of Cronquist et al. (1972) and Hitchcock et al. (1969), and except literature citations of family names with their authors' names in case of the first part of the Flora of Central Europe (Hegi 1984). Even more, complete sets of synonyms are served with their literature citations in all these floras. In some aspects, Flora of North America north of Mexico does not reach the quality of these floras as well.

In spite of it, the Flora is an excellent synthesis accumulating and critically sorting large amount of botanical information. It will become undoubtedly the most valuable reference compendium of North-American Flora to all American, European as well as all the other botanists.

Selected special notes:

Following data should be added, corrected or at least commented in discussions in the Flora of North America north of Mexico, Volume 2, 1st printing. The 2nd printing is not available to all the readers, and no errata was sent to the mail-buyers of the 1st printing.

Species are given in the same rank, nomenclature and order as in the Flora. Generic names, if incomplete, are completed.

References are given as numbers listed at the end of the Appendix. Literature citations are not repeated after the corrected names and after basionyms whenever they are correct in the Flora because of limited space.

Synonyms reported are those used in national pteridophyte monographs (Lellinger 1985, = 1, Cody et Britton 1989, = 2) or the names used as correct prior names in recent American regional floras. These synonyms should have been reported in the Flora even if the number of synonyms was restricted by the editor.

Whenever the given range of distribution is shortened or widened in comparison with the pteridophyte monographs (Lellinger 1985, = 1, Cody et Britton 1989, = 2) or with recent regional floras, it is reported. Even if it is not correct, it should be commented in discussions in the Flora whether the reasons for that had been reclassification of herbarium specimens, or whether no vouchers had been seen from this area or whether it had been more likely an author's error. Extraamerican distribution could be appended where it is incomplete or missing.

**Psilotum*

P. nudum Range: Europe (Spain) (28, 30)

**Phlegmariurus*

P. dichotoma 2n = ca. 264 (3, 31)

**Huperzia*

H. lucidula Syn.: *H. selago* subsp. *lucidula* (Michx.) Á. Löve et D. Löve (31 as a correct prior name, 2, 11 as a synonym)

H. miyoshiana Syn.: *L. selago* subsp. *chinense* (C. Chr.) Á. Löve et D. Löve (22 as a correct prior name)

H. porophila Range: Md. (1) (*H. lucidula* only is reported from Md. in the Flora)

H. selago Syn.: *Lycopodium selago* subsp. *appressum* (Desv.) Hultén (22 as a correct prior name, 30 as a synonym); *L. selago* var. *appressum* Desv. (11 as a correct prior name, 1, 2, 4, 10, 18, 22, 24, 25 as a synonym); *L. selago* var. *patens* (P. Beauv.) Desv. (11 as a correct prior name, 10, 18, 19, 24, 25 as a synonym)

**Lycopodium*

L. annotinum Range: W.Va. (4, 18) (but it is on the distribution map); Eurasia (18, 28, 29, 30, 34)

[*L. dubium* Zoëga (20 as a correct prior name, 22 as a synonym) Syn.: *L. annotinum* subsp. *pungens* (Bach. Pyl.) Hultén (22 as a correct prior name, 30); *L. annotinum* subsp. *alpestre* (Hartm.) Á. Löve et D. Löve (28, 31 as a correct prior name, 22, 30 as a synonym)]

L. lagopus Syn.: *L. clavatum* subsp. *monostachyon* (Hook. et Grev.) Selander (22, 28 as a correct prior name, 29, 30 as a synonym)

L. clavatum Range: Wash. (2, 18) (but it is on the distribution map); Iowa (1, 19 – a voucher in ISTC cited)

L. dendroideum Range: Ind., Ohio, Tenn. (1) (to *L. hickeyi* ?); Ill. (1) (no species of this complex is reported from Ill. in the Flora, and refused by 19, 21)

L. obscurum Range: Ga. (4) (but it is on the distribution map); Ill. (1) (but it is on the distribution map); Minn. (1) (to *L. hickeyi* ?)

**Diphasiastrum*

D. alpinum Range: Mich. (1, 2, 4); Asia – Caucasus, Middle Asia, Far East, etc. (18, 29, 34)

D. complanatum Range: Minn., Pa. (4) (but Minn. is covered on the distribution map)

D. digitatum Range: Ga. (1, 4, 18, 21) (but it is on the distribution map); Man., La. (4)

D. sitchense Syn.: *Lycopodium sabinifolium* var. *sitchense* (Rupr.) Fernald (22 as a correct prior name, 2, 9, 10, 14, 24 as a synonym) Range: N.W.T., Calif., Minn., Nev., Utah, Wis., Wyo. (18)

D. tristachyum Range: Alta. (14)

Diphasiastrum hybrids are fertile, so they deserve special chapters as in case of *Equisetum* sterile hybrids

**Palhinhaea* Franco et Vasc. in Vasc. et Franco, Bol. Soc. Brot., ser. 2, 41:24. 1967

P. cernua Correct name: *P. cernua* (L.) Franco et Vasc. in Vasc. et Franco, Bol. Soc. Brot., ser. 2, 41:25. 1967 2n = 312 (31); 2n = ca.330 (Jamaica), 208, 220, 271 (India) (3, 31) Range: Mexico, S. America (8); Azores (28, 30); Lebanon, Syria, Africa (30), it is practically pantropical (18, 28, 30)

**Lycopodiella*

L. inundata Range: Oreg. (2, 21), Calif. (1, 4, 6, 9, 10, 11) (no species of this genus is reported from Oreg. or Calif. in the Flora)

L. appressa formerly transcribed as *Lycopodium adpressum* (7, 8, 32 as a correct prior name)

L. alopecuroides Range: Tenn. (1) (to *L. appressa* ?)

L. prostrata Syn.: *L. alopecuroides* var. *pinnatum* (Chapm.) Lloyd et Underw. (7 as a correct prior name)
Range: Ky. (1, 18)

Hybrids *L. alopecuroides* × *L. appressa*, *L. alopecuroides* × *L. inundata*, *L. alopecuroides* × *L. prostrata*,
L. appressa × *L. inundata* and *L. appressa* × *L. prostrata* are reported in (32)

**Selaginella*

S. selaginoides Range: it has never been reported from P.E.I. (2, 11, 23)

S. rupestris Correct name of synonym: *Lycopodium rupestre* L. Range: Mont. (16, 18); Nfld. (1, refused by
2, 11, 25)

S. sibirica Range: N. Korea (11)

S. wallacei Syn.: *S. montanensis* Hieron. (2, 9, 10, 11)

S. densa 2n = 18 (31) (presented as a subsp. of *S. delicatula* in Index, p. 472)

**Selaginella* subg. *Stachygynandrum* Bas.: *Stachygynandrum* P.Beauv. ex Mirb. in Lam. et Mirb., Hist.
Natur. Veg. 3:477. 1802

S. douglasii Range: Calif., B.C. (6, refused by 10, 11)

S. kraussiana Range: trop. et S. Africa, Azores, naturalized in Europe (28, 29, 30)

S. eatonii Syn.: *S. armata* Baker (8 as a correct prior name)

S. apoda 2n = 18 (31)

**Isoetes*

I. echinospora Syn.: *I. muricata* var. *braunii* (Durieu) Reed (22 as a correct prior name, 2, 10, 11, 12 as
a synonym); *I. setacea* Lam. (10, 29 as a correct prior name, 9, 12, 28, 30, 34 as a synonym); *I. setacea*
subsp. *muricata* (Durieu) Holub (20 as a correct prior name, 11 as a synonym); *I. echinospora* var.
robusta Engelm. (2, 11, 26); *I. echinospora* subsp. *muricata* var. *savilei* Boivin (2, 11) Range: Wyo.
(1, 18); St. Pierre and Miquelon (2, 25); it has never been reported from P.E.I. (2, 11, 23)

I. maritima Syn.: *I. muricata* subsp. *maritima* (Underw.) Hultén (22 as a correct prior name) Range: Alta. (2)
I. lacustris Range: Utah, Uinta Mts. (12, 13); N.J. (1, 4); Colo. (4, 20); St. Pierre and Miquelon (25)

I. engelmannii Range: Miss. (1, 4, 18)

I. tuckermanii Range: Md. (2, 4); P.E.I. (4)

I. melanopoda Range: Ala. (4)

I. virginica Range: N.C. (1)

I. howellii Range: Utah, Dry lake (1, 9, 10, 12, 13)

I. nuttallii Range: Idaho, N Baja Calif. (11)

I. × truncata Syn.: *I. echinospora* var. *asiatica* Makino (11 as a correct prior name) (misapplied, native in
Japan)

**Equisetum*

E. fluviatile Range: the occurrence in Oreg. is doubtful (9, 10)

E. palustre Range: Pa. (4, 9, 10, 18, 21) (but it is on the distribution map); Nebr. (9, 10, 11, 18, 21); Ohio (11,
18, 21); Ill. (1, 21); Conn., N.Y. (1, 36); N.J. (11);

E. telmateia subsp. *braunii* Range: Mich. (1, 2, 4, 6, 11, 36 – probably as an alien only but it should be stated
in discussion)

E. arvense Range: S.C. (21, 36)

E. × littorale 2n = 216 (29, 34, 37) Range: St. Pierre and Miquelon (1); Europe (28, 29, 30, 34, 37); Siberia
(29, 34, 37)

E. sylvaticum Syn.: *E. sylvaticum* var. *pauciramosum* Milde (11, 23 as a correct prior name) Range: Mont.
(1, 2, 9, 10, 11, 18, 36) (but it is on the distribution map); Ky. (4, 9, 10); Wyo. (1, 18)

E. pratense 2n = 216 (2, 28, 29, 31, 34, 37) Range: S.D. (1, 18); Colo. (20)

E. ramosissimum 2n = 216 (28, 29, 31, 34) Syn.: *Hippochaete ramosissima* (Desf.) Börner (28, 29, 30, 31,
34, 35)

E. laevigatum Syn.: *Hippochaete laevigata* (A. Br.) Farw. (20, 31 as a correct prior name, 35, 2, 10, 12 as
a synonym); Range: N.Y., Va. (4) (to *E. × ferrissii* ?); La., Mass., N.C. (21)

E. hyemale Syn.: *Hippochaete hyemalis* (L.) Bruhin (10, 12, 25, 28, 29, 30, 31, 34, 35)

E. hyemale subsp. *affinis* Syn.: *H. hyemalis* subsp. *affinis* (Engelm.) Holub (20, 31, 34 as a correct prior
name, 2 as a synonym)

E. × ferrissii Range: W. Va. (1) (but it is on the distribution map)

E. variegatum Correct name: *E. variegatum* Schleich., Ann. Bot. (Usteri) 21:124. 1797 Syn.: *Hippochaete*
variegata (Schleich.) Bruhin (20, 31, 34 as a correct prior name, 10, 12, 28, 29, 30, 35 as a synonym)
Range: Pa. (1, 4, 9, 10, 12, 13, 18, 21); N.J. (1)

- E. × mackayi* Syn.: *E. hyemale* var. *jesupii* (A. A. Eaton) Vict. (2, 35) 2n = 432 (31), 2n = 216 (29, 37)
Range: N.S. (11); Ill., Ind., Wash. (1)
- E. × nelsonii* Range: Utah (12)
- E. scirpoides* Syn.: *Hippochaete scirpoides* (Michx.) Farw. (2, 10, 25, 29, 30, 31, 35) Range: Conn. (1, 4, 35); Wyo. (1)

*Botrychium

- B. virginianum* Syn.: *Botrypus virginianus* (L.) Holub (20, 31 as a correct prior name, 25, 29, 30 as a synonym);
B. virginianum subsp. *europaeum* (Angstr.) Jáv. (22 as a correct prior name, 29 as a synonym);
B. virginianum var. *europaeum* Angstr. (2 as a correct prior name, 1, 11, 22, 25, 29, 30 as a synonym);
B. virginianum var. *laurentianum* Butters (2, 25)
- B. lunarioides* Range: Okla. (1)
- B. dissectum* Syn.: *B. dissectum* var. *obliquum* (Muhl.) Clute (16 as a correct prior name, 2, 4, 19 as a synonym); *B. dissectum* f. *obliquum* (Muhl.) Fernald (11, 19 as a correct prior name, 2 as a synonym);
B. obliquum f. *elongatum* (Gilbert et Haberer) Weath. (11 as a correct prior name) Range: Minn. (1, 2, 4, 18, 19 – six vouchers in MIN and two vouchers in UWL quoted, 21)
- B. multifidum* Correct name: *B. multifidum* (S. G. Gmelin) Trevis., Atti Soc. Sci. Nat. Ital. 17:241. 1874 Syn.: *B. multifidum* Rupr., Beitr. Pfl. Russ. Reichs 11:40. 1859, a provisional name, not validly published according to the Code; *B. multifidum* subsp. *coulteri* (Underw.) Clausen (20 as a correct prior name, 10 as a synonym); *B. multifidum* subsp. *silaifolium* (C. Presl) Clausen (6, 24 as a correct prior name, 10, 21 as a synonym); *B. multifidum* var. *intermedium* (D. C. Eaton) Farw. (2, 11, 14 as a correct prior name, 10, 21, 24 as a synonym); *B. ternatum* (Thunb.) Sw. (19 as a correct prior name, 28 as a synonym) Range: Ill. (1, 4, 18, 19, 21) (but it is on the distribution map); N.C. (4, 9, 10); Ind. (1, 18); Nebr., N. Mex., Ohio (1)
- B. robustum* should have been treated as the other *Botrychium* species because it was collected in Alaska (22) as is stated inescapably on p. 93 in the Flora Bas.: *B. rutaceum* var. *robustum* Rupr. (11, 22) Syn.: *B. multifidum* subsp. *robustum* (Rupr.) Clausen (22 as a correct prior name)
- B. oneidense* Syn.: *B. dissectum* f. *oneidense* (Gilbert) Clute (11 as a correct prior name, 2 as a synonym) Range: Tenn. (1)
- B. rugulosum* Range: N.H., Conn. (4); Asia (2)
- B. lanceolatum* subsp. *lanceolatum* Range: Maine (2)
- B. lanceolatum* subsp. *angustisegmentum* Range: N.C. (1); R.I. (17)
- B. lunaria* Syn.: *B. lunaria* var. *onondagense* (Underw.) House (9, 10, 12 as a correct prior name, 11, 13 as a synonym) Range: Africa (30, 34)
- B. matricarifolium* Correct name: *B. matricarifolium* (Retz.) A. Br. ex Koch, Syn. Fl. Germ. Helv., ed. 2, 3: 972. 1845 Bas.: *Osmunda lunaria* (var.) *matricariaefolia* Retz., Fl. Scand. Prodr., 203. 1779 Range: Alta. (1, 4, 14); S.D. (4, 18); Colo (4, 18); Idaho (9, 10); N.D. (1)
- B. minganense* Syn.: *B. lunaria* subsp. *minganense* (Vict.) Calder et R. L. Taylor (24 as a prior name, 10, 12, 22 as a synonym) Range: Yukon (11) (but it is on the distribution map)
- B. pinnatum* Syn.: *B. boreale* var. *obtusifolium* (Rupr.) M. Broun (11 as a correct prior name, 2, 9, 10, 12, 22 as a synonym)
- B. boreale* (subsp. *boreale*) 2n = 180 (31) Range: N. Mex. (1) (but it is on the distribution map); Alaska (2)
- B. simplex* Correct name: *B. simplex* E. Hitchc. in Silliman, Amer. Journ. Sci. Arts 6:103., tab. 8. 1823 Range: N. Mex. (1, 6, 9, 10, 11, 12, 13, 18); S.D. (1); E. Asia – Japan (2, 4, 18, 29, 30)
- B. dissectum* × *B. multifidum* reported in (32)

*Ophioglossum

- O. nudicaule* Syn.: *O. nudicaule* var. *tenerum* (Prantl) Clausen (7, 16 as a correct prior name) 2n = 240 (31)
- O. petiolatum* 2n = 960, 1020 (31) Range: trop. Africa (7)
- O. pusillum* Syn.: *O. vulgatum* var. *alaskanum* (E. Britton) C. Chr. (22 as a correct prior name, 2, 11 as a synonym)
- O. vulgatum* Range: Ariz. (7, 18) (but it is on the distribution map); Del. (1); Africa (30, 34)

*Osmunda

- O. cinnamomea* Range: N. Mex. (2, 4, 7, 11, 18, 21); Kans., Nebr. (1, 18)
- O. claytoniana* Range: Ala. (1, 18)
- O. regalis* var. *spectabilis* Range: Kans., Nebr. (1, 18); Mexico (18); Sask. (1, 4, 7, 26, refused by 2); Man. is in the text but it is not covered on the distribution map (refused by 2)

***Dicranopteris**

D. flexuosa 2n = 136 (31), 2n = 156 (3)

***Schizaea**

S. pusilla Syn.: *Microschizaea pusilla* (Pursh) Reed (25 as a prior name) Range: Ont. (1, 2, 4, 11)

***Lygodium**

L. palmatum 2n = 60 (4, 31) Range: Mich. (4, 18); Ont. (1)

L. microphyllum 2n = 120 (31)

L. japonicum 2n = 58, 116 (31)

***Anemia**

A. adianthifolia × *A. mexicana* reported in (32)

***Adiantum**

A. jordanii K. Müller

A. hispidulum 2n = 170–180 (31)

A. pedatum Range: Ariz., Calif., Idaho, Nev. (1) (to *A. aleuticum* ?); S.D.(1)

A. aleuticum Range: Mich., Wis. (1) (to *A. pedatum* ?)

***Pteris**

P. tripartita 2n = 116 (31) Range: Africa (18)

P. vittata Range: Europe (28, 29, 30); Africa, Australia (30)

P. multifida Range: Calif. (1); Europe – Azores (28, 29, 30)

***Pityrogramma**

P. calomelanos 2n = 240 (3, 31) Range: Europe – Azores (30)

P. trifoliata 2n = 120 (31)

***Cryptogramma**

C. stelleri Range: Sask. (11, 18); N. Mex. (1)

C. acrostichoides Range: Minn. (2, 4, 18); Nebr. (10, 12, 13); Que. (1, 4)

***Astrolepis**

A. sinuata Range: Okla. (1, 7)

***Notholaena**

N. ashenborniana Range: N. Mex. (1)

N. californica subsp. *californica* Syn.: *Aleuritopteris californica* subsp. *nigrescens* (Ewan) Munz (6 as a correct name)

***Cheilanthes**

C. tomentosa Range: Ky. (1, 4)

C. fendleri Range: Okla. (1, 18); Calif. (12)

C. aemula Range: N. Mex. (7)

C. lanosa Range: Wash. (9, 10)

***Aspidotis**

A. densa Syn.: *Cryptogramma densa* (Brack.) Diels (10 as a correct prior name, 2, 4, 9, 11, 12, 13 as a synonym); *Cheilanthes densa* (Brack.) St. John (2) Range: Ont. (4) (2 with some doubts)

***Pellaea**

P. ternifolia Range: Utah (13)

P. glabella Range: N.J. (17)

***Hymenophyllum**

H. tunbrigense Range: N.C. (18)

***Trichomanes**

T. petersii Range: Ill. (1, refused by 21)

T. membranaceum Range: Fla. (18)

***Dennstaedtia**

D. punctilobula Syn.: *Dicksonia punctilobula* (Michx.) A. Gray (2, 4, 11, 16, 21, 23, 25); *Dicksonia pilosiuscula* Willd. (2, 21, 23, 25) Range: Minn. (4)

***Pteridium**

- P. aquilinum* var. *caudatum* 2n = 104 (31)
P. aquilinum var. *pubescens* Syn.: *P. aquilinum* subsp. *lanuginosum* (Bong.) Hultén (22 as a correct prior name, 24 as a synonym); *P. aquilinum* var. *lanuginosum* (Bong.) Fernald (2, 6, 11, 22, 23) 2n = 104 (2)
P. aquilinum var. *latiusculum* Syn.: *P. aquilinum* var. *champlainense* Boivin (2, 11) Range: Colo., Wyo. (1) (probably to *P. aquilinum* var. *pubescens* ?); Kans. (1)
P. aquilinum var. *pseudocaudatum* Range: Mich. (1)

***Thelypteris**

- T. nevadensis* Syn.: *Lastrea oregana* (C. Chr.) Copel. (6 as a correct prior name, 10, 33 as a synonym); *T. oregana* (C. Chr.) St. John (2, 9, 10)
T. noveboracensis Range: Wis. (4); Minn. (11)
T. simulata Range: P.E.I. (11, 23); W.Va. (4)
T. augescens Syn.: *Lastrea augescens* (Link) Houlston (6 as a correct prior name, 27 as a synonym)
T. dentata Range: Tex. (7); S.C. (1); Europe – Azores, Spain, Crete, Sicily (30)
T. interrupta Syn.: *T. totta* var. *hirsuta* (Mett.) Morton (27 as a correct prior name)

***Phegopteris**

- P. connectilis* Range: Ind. (11, 18) (but it is on the distribution map)

***Stenochlaena**

- S. tenuifolia* (Desv.) Moore deserves special chapter because its occasional introduction in southernmost Fla. (8, 18)

***Blechnum**

- B. spicant* Syn.: *Lomaria spicant* (L.) Desv. (2, 6, 10, 11, 22, 28, 29, 30); *B. spicant* subsp. *nipponicum* (Kunze) Á. Löve et D. Löve (2, 22, 29, 31); *B. doodioides* Hook. (2) Range: Eurasia (6, 11, 28, 29, 30, 34); N. Africa (11, 29, 30, 34)
B. occidentale Range: naturalized in Azores, Europe (28, 29, 30)

***Woodwardia**

- W. areolata* Syn.: *W. angustifolia* Sm. (2, 7) Range: Mich. (1, 4, 7, 11, 18); Minn. (11, 18)
W. virginica Range: Ill. (1, 4, 7, 11, 18, 21) (but it is on the distribution map); Mo. (18, 21)
W. fimbriata Syn.: *W. radicans* var. *americana* Hook. (2, 6, 9, 10, 11, 12)

***Asplenium**

- A. scolopendrium* Syn.: *Scolopendrium vulgare* Sm. (2, 11, 29, 30) Range: N.B. (4); N. Africa, Japan (29)
A. septentrionale Range: Baja Calif. (10, 12, 13, 18, 29)
A. auritum 2n = 144 (3, 31) Range: Africa (18)
A. platyneuron Syn.: *A. ebeneum* Aiton (2, 8, 11, 16, 21)
A. resiliens Range: Colo. (1, 13, 20)
A. trichomanes Range: La. (1) (but it is on the distribution map); Utah (1, 12, 13, 18); Alta. (11, 18, 21); Man. (18, 21); Idaho, Miss. (1, 18); N.D. (11, 18); R.I. (17)
A. vespertinum Range: Ariz. (18)
A. ruta-muraria Range: Ill. (4, 21); N. Africa (29)
A. septentrionale hybridizes in Europe with *A. ruta-muraria* to form *A. × murbeckii* Dörf. (29, 30, 32, 34)
A. adulterinum could be of hybrid origin but it is not likely to be a direct hybrid between *A. trichomanes* and *A. viride* in spite of synthesis experiments (such hybrids found in nature are different and were described under different names (see below): *A. adulterinum* hybridizes in Europe with *A. viride* to form *A. × poscharskyanum* (Hoffm.) Preissm., with *A. ruta-muraria* to form *A. × lobmingense* Melzer, Lovis et Reichst., and with *A. adiantum-nigrum* to form *A. × bechereri* D. E. Meyer, as well as with both subspecies of *A. trichomanes* (29, 30, 32)
A. trichomanes subsp. *trichomanes* and *A. trichomanes* subsp. *quadrivalens* are not treated differently in the reticulogram; in Europe, they hybridize with each other to form *A. trichomanes* nsubsp. *lusaticum* (D. E. Meyer) Lawalrée (30), and distinct hybrids *A. × trichomaniforme* Woyn. (*A. adulterinum* × *A. trichomanes* subsp. *trichomanes*), *A. × praetermissum* Lovis, Melzer et Reichst. (*A. adulterinum* × *A. trichomanes* subsp. *quadrivalens*), *A. × protoadulterinum* Lovis et Reichst. (*A. trichomanes* subsp. *trichomanes* × *A. viride*), *A. × bavaricum* D. E. Meyer (*A. trichomanes* subsp. *quadrivalens* × *A. viride*), and *A. × heufleri* Reichardt (*A. septentrionale* × *A. trichomanes* subsp. *quadrivalens*) are recognized (29, 30, 32)
A. adiantum-nigrum hybridizes in Europe with *A. septentrionale* to form *A. × contrei* Calle, Lovis et Reichst., and with *A. ruta-muraria* to form a very rare hybrid *A. × lingelsheimii* Seymann (29, 30, 32)

A. scolopendrium var. *scolopendrium* hybridizes in Europe with *A. trichomanes* subsp. *quadrivalens* to form *Asplenium* × *confluens* (Moore ex Á. Löve) Lawalrée (= *Asplenophyllitis confluens* (Moore ex Á. Löve) Alston) (29, 30, 32)

*Matteucia

M. struthiopteris Syn.: *Onoclea struthiopteris* (L.) Roth (2, 11, 21, 22, 23, 29, 30)

M. struthiopteris var. *pennsylvanica* Syn.: *M. struthiopteris* subsp. *pennsylvanica* (Willd.) Á. Löve et D. Löve (31 as a correct prior name); *Onoclea struthiopteris* var. *pennsylvanica* (Willd.) Boivin (2) 2n = 78 (31)

*Onoclea

O. sensibilis Range: introduced in Europe – G.B., Germ., Belgium, Netherlands (28, 29, 30)

*Diplazium

D. pycnocarpon Syn.: *Athyrium angustifolium* (Michx.) Milde (2, 11)

D. lonchophyllum 2n = 82 (31)

D. esculentum Range: introduced in Azores, Europe (28, 29, 30)

*Deparia

D. acrostichoides Syn.: *Lunathyrium acrostichoides* (Sw.) Ching (2); *Diplazium thelypteroides* (Michx.) C. Presl (2, 4, 11) Range: La. (1, 4, 11, 18, 21)

*Athyrium

A. alpestre Correct name: *A. distentifolium* Tausch ex Opiz, Kratos 2/1:14. 1820 Syn.: *A. alpestre* (Hoppe) Rylands ex Moore, 1860, not Clairv., 1811, based on *Aspidium alpestre* Hoppe, 1805, nom. nudum; *Polypodium alpestre* (Hoppe) Hoppe, Flora (Regensb.) 4:48. 1821 (10, 12, 29, 30)

A. alpestre var. *americanum* Correct name: *A. distentifolium* var. *americanum* (Butters) Cronquist, Univ. Wash. Publ. Biol. 17(1):63. 1969 Bas.: *A. alpestre* var. *americanum* Butters Range: Utah (12, 13) (but it is on the distribution map)

A. filix-femina var. *cyclosorum* Range: Colo. (20); Nfld. (11)

A. filix-femina var. *californicum* Range: Mexico (6)

A. filix-femina var. *angustum* Range: Colo. (20); Ky. (4); St. Pierre and Miquelon (25)

*Gymnocarpium

G. disjunctum Range: Ill. (21) (no *Gymnocarpium* species is reported from Ill. in the Flora)

G. dryopteris Correct liter. cit.: *G. dryopteris* (L.) Newman, Phytologist 4 (App. 24):371 1851 Syn.: *Carpogymnia dryopteris* (L.) Á. Löve et D. Löve (2) Range: Ill. (1, 19 – three vouchers in UWL quoted); Utah (1) (no *Gymnocarpium* species is reported from Ill. or Utah in the Flora); Va. (1, 2, 9, 10, 11, 21) (to *G. appalachianum* ?)

G. jessoense subsp. *parvulum* Range: Sweden, Norway, Northeuropean Russia (28)

G. robertianum Correct liter. cit.: *G. robertianum* (G. F. Hoffm.) Newman, Phytologist 4 (App. 24):371 1851 Syn.: *Carpogymnia robertiana* (Hoffm.) Á. Löve et D. Löve (2); *G. dryopteris* var. *pumilum* (DC.) Boivin (2) Range: Ill. (18, 19 – a voucher in SIU quoted) (no *Gymnocarpium* species is reported from Ill. in the Flora); N. Africa (29, 30)

*Cystopteris

C. montana Correct name: *C. montana* (Lam.) Desv., Mem. Soc. Linn. Paris 6:264. 1827 (Bernh. in Neues J. Bot. (Schrader) 1(2):26. 1806 quoted *Aspidium montanum* only, although it is connected with the description of new genus *Cystopteris* – on the contrary, *C. fragilis* is quoted on p. 27, and *C. bulbifera* on p. 10 there)

C. bulbifera Range: S.D. (1, 2, 18); Nebr., Okla. (1, 18); R.I. (17)

C. tennesseensis Range: Tex. (1)

C. tenuis Range: Ga. (1, 4); Colo. (20); Nfld. (1, 25); Alaska, Ala., Calif., Ga., N.Mex. (1)

C. fragilis Correct name and liter. cit.: *C. fragilis* (L.) Bernh., Neues J. Bot. (Schrader) 1 (2):27, tab. 2, fig. 9. 1806 [1805] Correct name of synonym: *C. dickieana* R. Sim Range: Tex. (7, it is in the text but it is not covered on the distribution map); N.C. (4); Mo. (1, refused by 5); Va. (1, 2); Ky., N.J., Okla., W.Va. (1)

*Woodsia

W. glabella Range: Mass. (4)

W. scopulina Range: N. Mex. (1, 2, 4, 10, 11, 12, 13, 18); Man. (2, 18); Mich., Wis. (11)

W. oregana Range: Vt. (1, 4, 10, 12, 13, 18)

*Dryopteris

D. fragrans Syn.: *Aspidium fragrans* (L.) Sw. (2, 11, 22, 23, 30); *Thelypteris fragrans* (L.) Nieuwl. (2, 11, 17, 25)

- D. marginalis* Syn.: *Thelypteris marginalis* (L.) Nieuwl. (2, 11, 16, 25) Range: Minn. (4, 18, 19 – a voucher in MIN quoted, 21)
- D. arguta* Syn.: *D. rigida* var. *arguta* (Kaulf.) Underw. (2, 6, 10)
- D. filix-mas* Correct liter. cit.: *D. filix-mas* (L.) Schott, Gen. Filic. 1: tab. 9. 1834 Syn.: *Aspidium filix-mas* (L.) Sw. (2, 6, 10, 11, 12, 29, 30, 34); *Thelypteris filix-mas* (L.) Nieuwl. (2, 10, 11, 12) Range: Mexico (4, 7, 11, 18); N. Africa (11, 29, 30)
- D. ludoviciana* Range: Tex. (1)
- D. goldiana* Syn.: *Thelypteris goldiana* (Hook. ex Goldie) Nieuwl. (2, 11) Range: N.S. (11)
- D. clintoniana* Syn.: *Thelypteris cristata* var. *clintoniana* (D. C. Eaton) Weath. (2) Range: Wis. (4, 18); R.I. (17)
- D. cristata* Syn.: *Thelypteris cristata* (L.) Nieuwl. (2, 10, 11, 17, 25) Range: Idaho (1, 2, 4, 7, 10, 18, 21); Ark. (7, 10, 18); La. (7, 18); Tex. (7); Kans. (1); St. Pierre and Miquelon (25); Siberia (29, 30, 34)
- D. intermedia* Syn.: *Aspidium spinulosum* var. *intermedium* (Muhl. ex Willd.) D. C. Eaton (2, 21) Range: Ark. (4, 18); Azores, Europe (30)
- D. carthusiana* Syn.: *Aspidium spinulosum* (O. F. Müll.) Sw. (2, 10, 11, 14, 16, 21, 23, 29, 30, 34); *Thelypteris spinulosa* (O. F. Müll.) Nieuwl. (2, 10, 11, 25) Range: S.D. (1); St. Pierre and Miquelon (25 – incl. *D. intermedia*, *D. expansa*, and *D. campyloptera*)
- D. expansa* (*D. dilatata* auct. amer. pro parte, frequently misapplied) Range: Colo. (1, 20); Asia (6, 29, 30, 34)
- D. campyloptera* Range: Pa. (1, 4, 17, 18)
- D. rossii* C. Chr. (1 as a correct prior name) is not synonymized with any *Dryopteris* species in the Flora
- D. spinulosa* var. *fructuosa* (Gilbert) Trudell (23 as a correct prior name, 11, 25) /Syn.: *D. austriaca* var. *fructuosa* (Gilbert) Morton (11 as a correct prior name, 25)/ is not synonymized with any *Dryopteris* species in the Flora
- D. campyloptera* × *D. expansa* (2) is missing in reticulogram p. 281
- D. campyloptera* × *D. intermedia* (1, 2, 18) is missing in reticulogram p. 281
- D. carthusiana* × *D. clintoniana* = *D. × benedictii* (Farw.) Wherry (1, 2, 18, 32)
- D. carthusiana* × *D. cristata* = *D. × uliginosa* (A. Br. ex Döll) Druce (1, 2, 11, 18, 19, 29, 30, 32, 34)
- D. carthusiana* × *D. expansa* = *D. × sarvelae* Fraser-Jenk. et Jermy (29) known in Europe, it is missing in reticulogram p. 281
- D. carthusiana* × *D. filix-mas* = *D. × brathaica* Fraser-Jenk. et Reichst. (1, 29, 30), known in Europe, it is missing in reticulogram p. 281
- D. carthusiana* × *D. goldiana* = *D. × poyseri* Wherry (1, 32)
- D. carthusiana* × *D. marginalis* = *D. × pittsfordensis* Sloss. (1, 2, 18, 19, 32)
- D. celsa* × *D. carthusiana* (1, 32) is missing in reticulogram p. 281
- D. celsa* × *D. intermedia* = *D. × separabilis* (W. Palmer) Small (1, 18, 32)
- D. celsa* × *D. ludoviciana* = *D. × australis* (Wherry) Small (1, 18, 32)
- D. celsa* × *D. marginalis* = *D. × leedsii* Wherry (1, 16, 18, 32)
- D. clintoniana* × *D. intermedia* = *D. × dowellii* (Farw.) Wherry (1, 2, 18, 32)
- D. clintoniana* × *D. marginalis* = *D. × burgessii* Boivin (1, 18)
- D. cristata* × *D. intermedia* = *D. × boottii* (Tuck.) Underw. (1, 2, 11, 17, 18, 19, 23, 25, 29, 32)
- D. cristata* × *D. marginalis* = *D. × slossonae* Wherry (1, 2, 18, 32)
- D. filix-mas* × *D. goldiana* (2) is missing in reticulogram p. 281
- D. goldiana* × *D. marginalis* = *D. × neo-wherryi* W. H. Wagner (1, 2, 18, 32)

*Arachniodes

- A. simplicior* 2n = 164 (31)

*Maxonia

- M. apiifolia* 2n = 82 (31)

*Polystichum

- P. acrostichoides* Syn.: *P. acrostichoides* f. *incisum* (A. Gray) Gilbert (2, 11, 16, 21)
- P. braunii* Range: Minn. (1, 18) (but it is on the distribution map)
- P. imbricans* 2n = 82 (2)
- P. lonchitis* Syn.: *Aspidium lonchitis* (L.) Sw. (2, 10, 11, 12, 22, 29, 30); *Dryopteris lonchitis* (L.) Kuntze (2, 10, 12, 22, 29, 30) Range: N.Mex. (13, 18); Eurasia (6, 11, 18, 28, 29, 30, 34); Morocco, N. Africa (30)
- P. microclamys* 2n = 164 (31)
- P. munitum* Range: Alaska (1, 2, 6, 9, 10, 11, 18, 22)

***Ctenitis**

C. submarginalis 2n = 82 (8, 31)

***Tectaria**

T. fimbriata × *T. heracleifolia* (32)

***Nephrolepis**

N. exaltata 2n = 82 (3, 32)

***Polypodium**

P. glycyrrhiza Range: Ariz. (1)

P. hesperium Range: Black Hills, S.D. (1, 2, 6, 10, 12, 13); Alaska (6, 10, 18, 22)

P. amorphum Range: Ariz. (1); Colo. (20)

P. scolopendria Burm. f. (18) / Syn.: *Microsorium scolopendrium* (Burm.) Copel./ was introduced in southern Florida

P. amorphum × *P. glycyrrhiza* (32)

***Pleopeltis**

P. polylepis × *P. polypodioides* = *P. × bartlettii* Weath. (32)

***Campyloneurum**

C. angustifolium 2n = 148 (31)

C. latum 2n = 74 (31)

***Marsilea**

M. quadrifolia 2n = 40 (2, 29, 31) Range: Tenn. (21); Kans. (1)

M. vestita Syn.: *M. vestita* var. *mucronata* (A. Br.) Baker (16 as a correct prior name) Range: Mo. (1, refused in 5); Tenn. (1)

***Pilularia**

P. americana 2n = 20 (3, 31) Range: Chile (9, 10, 12)

***Azolla**

A. caroliniana 2n = 48 (2, 4, 29, 31, 34) Range: Wis. (11), Minn. (26) (but both are covered on the distribution map)

A. mexicana Range: Tex. (1, 7) (but it is on the distribution map); Ind. (21)

A. filiculoides Range: Alaska (9, 10, 11, 16, 18); Ga., N.Y. (1)

***Abies**

A. bifolia Range: Alta. (14, 15)

A. concolor Range: Wyo. (10, 12)

A. lowiana Range: Oreg. (12)

***Pseudotsuga**

P. menziesii var. *glauca* 2n = 24 (34)

***Larix**

L. occidentalis Range: Alta. (11, 14)

***Picea**

P. rubens Range: Nfld. (25)

P. engelmannii Range: Yukon (10, 12)

P. sitchensis Range: Yukon (11, 22)

***Pinus**

P. nigra (p.374) Correct name: *P. nigra* J. F. Arnold (Reise n. Mariazell 8. 1785)

(**P. subg. Strobis* Lemmon)

P. strobiformis Range: Colo. (20)

P. ponderosa 2n = 24 (10, 34) Range: Alta. (14, 15, refused by 11)

P. ponderosa var. *scopulorum* Syn.: *P. ponderosa* subsp. *scopulorum* (Engelm.) Weber (20 as a prior name)

***Juniperus**

J. communis Range: St. Pierre and Miquelon (25)

J. communis var. *montana* Correct name of synonym: *J. communis* subsp. *alpina* (Neilr.) Čelak., Prodr. Fl. Böhmen 1:17. 1867 (Bas.: *J. communis* var. *alpina* Neilr., Fl. Nieder. Österr. 1/1:227. 1859) Range: Alta. (14); Colo. (20)

- ***Juniperus** sect. **Sabina** Correct name: *J.* sect. ***Sabina*** (Mill.) Spach, Ann. Sci. Nat., Bot., ser. 2, 16:291. 1841 Bas.: *Sabina* Mill., Gard. Dict. Abr., ed. 4, 1754
- J. flaccida* missing in Index (p. 467)
- J. deppeana* missing in Index (p. 467)
- J. ashei* Range: N. Mex. (7)
- J. monosperma* Syn.: *Sabina monosperma* (Engelm.) Rydb. (20 as a correct name, 12 as a synonym) Range: Utah (7, 12, 13); Mexico (7, 12)
- ***Taxus**
- T. canadensis* Range: P.E.I. (11, 23)

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