

World Checklist of fossil *Morella* and allies (*Myricaceae*)

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ABSTRACT

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A revision of the fossil species of the genus *Morella* (*Myricaceae*) from all continents of Earth covering Cretaceous-Neogene has been carried out. Ninety-one new combinations are made: *Morella acuminata* (Unger) comb. nov., *Morella affinis* (Massal.) comb. nov., *Morella agdjakendica* (Kassum.) comb. nov., *Morella altenburgensis* (Kirchh.) comb. nov., *Morella amissa* (Heer) comb. nov., *Morella arenasii* (Arènes & Depape) comb. nov., *Morella ashleei* (LaMotte) comb. nov., *Morella baksanica* (Balueva & Nikitin) comb. nov., *Morella balearica* (Arènes) comb. nov., *Morella baltica* (Dorof.) comb. nov., *Morella banksioides* (Engelh.) comb. nov., *Morella berica* (Visiani & Massal.) comb. nov., *Morella beringiana* (Budants.) comb. nov., *Morella bersenevii* (Fotjan.) comb. nov., *Morella boveyana* (Heer) comb. nov., *Morella burghii* (Gregor) comb. nov., *Morella caspica* (Dorof.) comb. nov., *Morella ceriferiformis* (Kownas) comb. nov., *Morella ceriferiformoides* (Bůžek & Holý) comb. nov., *Morella cestmirii* (Holý) comb. nov., *Morella colchica* (Dorof.) comb. nov., *Morella comarifolia* (Cheleb.) comb. nov., *Morella crassa* (Dorof.) comb. nov., *Morella czokusiana* (Rajushk.) comb. nov., *Morella dubnanensis* (Knobl.) comb. nov., *Morella elongata* (Saporta) comb. nov., *Morella ettingshausenii* (Wessel) comb. nov., *Morella fraterna* (Saporta) comb. nov., *Morella germarii* (Heer) comb. nov., *Morella goeppertii* (Kohl.-Adam., Ziem.-Tworz. & Zastawn.) comb. nov., *Morella haeringiana* (Unger) comb. nov., *Morella hakeifolia* (Unger) comb. nov., *Morella hudibra* (Holý) comb. nov., *Morella hungeri* (Schneider) comb. nov., *Morella hunzikeri* (Hünick.) comb. nov., *Morella italica* (Gaudin) comb. nov., *Morella joannis* (Ettingsh.) comb. nov., *Morella johnstrupii* (Hartz) comb. nov., *Morella kasumovae* (Kolak.) comb. nov., *Morella kirchheimeri* (Friis) comb. nov., *Morella korfiensis* (Cheleb.) comb. nov., *Morella laevigata* (Heer) comb. nov., *Morella latipes* (Boulay) comb. nov., *Morella lenticularis* (Schloth.) comb. nov., *Morella lepida* (Heer) comb. nov., *Morella lignitum* (Unger) comb. nov., *Morella limburgensis* (Kräusel & Weyl.) comb. nov., *Morella lingulata* (Heer) comb. nov., *Morella longifolia* (Unger) comb. nov., *Morella lounensis* (Velen.) comb. nov., *Morella macrodonta* (Andreánszky) comb. nov., *Morella merloi* (Sismonda) comb. nov., *Morella metzelii* (Becker) comb. nov., *Morella mira* (Berry) comb. nov., *Morella modesta* (Heer) comb. nov., *Morella mohavensis* (Axelrod) comb. nov., *Morella mormonensis* (Becker) comb. nov., *Morella nordenskioeldii* (Dusén) comb. nov., *Morella obliquifolia* (Kovar-Eder) comb. nov., *Morella ovalifolia* (Borsuk) comb. nov., *Morella pacifica* (Chaney) comb. nov., *Morella pancicii* (Pilar) comb. nov., *Morella panii* (Balueva & Nikitin) comb. nov., *Morella pannonica* (Dorof.) comb. nov., *Morella platyphylla* (Saporta) comb. nov., *Morella poltavica* (Dorof.) comb. nov., *Morella praeesculenta* (Rüffle) comb. nov., *Morella premira* (Berry) comb. nov., *Morella pseudofaya* (Saporta) comb. nov., *Morella puryearensis* (Berry) comb. nov., *Morella ragazzonii* (Sordelli) comb. nov., *Morella sachalinensis* (Pojark.) comb. nov., *Morella sagoriana* (Ettingsh.) comb. nov., *Morella salicina* (Unger) comb. nov., *Morella serrulata* (Becker) comb. nov., *Morella sonomensis* (Axelrod) comb. nov., *Morella sphaeroidea* (Jakub.) comb. nov., *Morella squinabolii* (Principi) comb. nov., *Morella stoppii* (Kirchh.) comb. nov., *Morella studeri* (Heer) comb. nov., *Morella subincisa* (Saporta) comb. nov., *Morella tavidensis* (Dorof.) comb. nov., *Morella turgaica* (Kornilova) comb. nov., *Morella tusca* (Gaudin) comb. nov., *Morella ubensis* (Huzioka & Takah.) comb. nov., *Morella ucrainica* (Dorof.) comb. nov., *Morella undulata* (Heer) comb. nov., *Morella wadiiformis* (Krysht.) comb. nov., *Morella wiesaensis* (Kirchh.) comb. nov., *Morella wilcoxensis* (Berry) comb. nov., *Morella zignoi* (Principi) comb. nov. *Morella minuscula* nom. nov. is proposed instead of *Myrica minima* Negru (fossil fruits) non *Myrica minima* Saporta (fossil leaves). *Morella subsalicina* nom. nov. is proposed to replace the later homonym *Myrica subsalicina* Stanisl. ex Baikovsk. & Koval (fossil leaves) non *Myrica subsalicina* Shirley (fossil leaves). *Morella undulatoides* nom. nov. is proposed to replace the

illegitimate *Myrica undulata* Pimenova (fossil) non *Myrica undulata* Raf. (extant). *Morella cimbrica* sp. nov. is validated and renamed instead of the invalidly published *Myrica cimbrica* Mathies. (lacking holotype designation when published). New 4 extant names of *Morella* are validated: *Morella* × *burbankii* (A.Chev.) comb. nov., *Morella* × *curtissii* (A.Chev.) comb. nov., *Morella hispaniolica* nom. nov. is proposed instead of *Myrica apiculata* Urban (extant hybrid) non *Myrica apiculata* Saporta (fossil leaves) and *Morella* × *quercifera* nom. nov. is proposed to replace the later homonym *Myrica* × *incisa* A.Chev. (extant hybrid) non *Myrica incisa* (R.Ludw.) Ettingsh. (fossil leaves). Additional combinations are validated for the formerly re-classified fossil-species of *Myrica*, based on leaves: *Bohlenia dilodendrifolia* (Vassilevsk.) comb. nov., *Protohedycarya cretacea* (Heer) comb. nov., *Protohedycarya haldemiana* (Hosius & Marck) comb. nov., *Engelhardia atilica* nom. nov. is proposed instead of illegitimate *Myrica pseudolignitum* Kräusel & Weyl. (non Ettingsh.) and *Palibinia sinica* sp. nov. to replace illegitimate *Myrica angustifolia* Li (non *M. angustifolia* (Unger) Brong.). 18 new fossil-genera are proposed for the former species of fossil *Myrica*: *Amurica* gen. nov. (*A. burejensis* (Kamaeva) comb. nov.); *Amuricarpica* gen. nov. (*A. amurensis* (Krassilov) comb. nov., *Amuricarpica korjakica* nom. nov. to replace illegitimate *Carpolithes ellipticus* Golovneva (non Sternb. ex Ettingsh.); *Crataegopsis* gen. nov. (*C. hendersonii* (Cockerell) comb. nov.); *Dryandrica* gen. nov. (*D. grevilleifolia* (Ettingsh.) comb. nov.); *Miooleites* gen. nov. (*M. liguricus* (Sachse) comb. nov.); *Morellago* gen. nov. (*M. minor* (Berry) comb. nov.); *Morellastrum* gen. nov. (with 17 Cretaceous fossil-species: *M. acutum* (Hollick) comb. nov., *M. asplenoides* (Lange) comb. nov., *M. beyrichii* (Ettingsh.) comb. nov., *M. dakotense* (Lesq.) comb. nov., *M. denticulatum* (Velen. & Vinikl.) comb. nov., *M. emarginatum* (Heer) comb. nov., *M. fragiliforme* (Zenker) comb. nov., *M. hausmannii* (Dunker) comb. nov., *M. leiophyllum* (Hosius & Marck) comb. nov., *M. macrophyllum* (Hosius & Marck) comb. nov., *M. newberryanum* (Hollick) comb. nov., *M. obtusum* (Lesq.) comb. nov., *M. obtusum* (Lesq.) comb. nov., *M. schenkianum* (Heer) comb. nov., *M. schimperii* (Lesq.) comb. nov., *M. velenovskii* (Shilin) comb. nov., *M. zenkeri* (Ettingsh.) comb. nov.); *Morelloxyton* gen. nov. (*M. absarokense* (Wheeler, Scott & Bargh.) comb. nov., *M. scalariforme* (H.O.Kruse) comb. nov., *Morelloxyton gottwaldii* sp. nov. to replace invalidly published *Myricoxylon zonatum* H.Gottwald); *Myricastrum* gen. nov. (*M. arcticum* (Dorof. & Proskurin) comb. nov.); *Myricops* Doweld, gen. nov. (*Myricops brookensis* (Fontaine) comb. nov.); *Myrolea* gen. nov. (*M. hallbaueri* (Mai) comb. nov., *M. maii* (Bůžek, Holý & Z.Kvaček) comb. nov., *M. prescheri* (H.Walther) comb. nov.); *Paracercocarpus* gen. nov. (*Paracercocarpus beae-annae* sp. nov. to replace invalidly published *Cercocarpus beae-annae* H.F.Becker; *P. henricksonii* (H.E.Schorn & J.A.Wolfe) comb. nov., *P. undulatus* (Lesq.) comb. nov., *P. nanophyllus* (H.E.Schorn & J.A.Wolfe) comb. nov.); *Paracercocarpoides* gen. nov. (*Paracercocarpoides axelrodii* sp. nov.); *Pseudocercocarpus* gen. nov. (*P. orestesii* (Knowlt.) comb. nov.); *Sibiriacia* gen. nov. (*S. tomskiana* (Balueva) comb. nov., *S. tyensis* (Balueva) comb. nov.); *Sorbica* gen. nov. (*S. copeana* (Lesq.) comb. nov., *S. nupta* (Cockerell) comb. nov.); *Taldysaica* gen. nov. (*T. shilini* nom. nov. to replace *Myrica taldysaica* Shilin). Fossil pollen species of *Myrica* are re-classified into distinct fossil-genera: *Comptonipollis* gen. nov. (with 10 fossil-species: *C. aboriginus* (Gladkova) comb. nov., *C. clementius* (Gladkova) comb. nov., *C. compactus* (Gladkova) comb. nov., *C. grandis* nom. nov. instead of illegitimate *Comptonia grandis* Gladkova non *Comptonia grandis* Andreánszky, *C. imperfectus* (Gladkova) comb. nov., *C. insolitus* (Gladkova) comb. nov., *C. peregriniformis* (Gladkova) comb. nov., *C. podagrarius* (Gladkova) comb. nov., *C. saueriae* (Gladkova) comb. nov., *C. sibiricus* (Gladkova) comb. nov.) and 49 new names of *Myricipites*: *M. aroboratus* (Pflug) comb. nov., *M. belgicus* (E.Roche) comb. nov., *M. bertelsiae* (Archang.) comb. nov., *M. betuloides* (Stelmak) comb. nov., *M. carolinensisiformis* (Gladkova) comb. nov., *M. conspicuus* (Gladkova) comb. nov., *M. convexus* (Groot & Groot) comb. nov., *M. costatus* (Norton) comb. nov., *M. diversus* (Gladkova) comb. nov., *M. dubiosus* (Weyl. & Takah.) comb. nov., *M. esculentiformis* (Gladkova) comb. nov., *M. exiguus* (Sauer) comb. nov., *M. fayumensis* (Takah. & Jux) comb. nov., *M. fusus* (Chateauneuf) comb. nov., *M. galeiformis* (Gladkova) comb. nov., *M. glabrus* (Stelmak) comb. nov., *M. grandis* (Stelmak) comb. nov., *M. granulatus* (Sauer) comb. nov., *M. hartwegiiformis* (Boitz.) comb. nov., *M. intermedius* (Gladkova) comb. nov., *M. josensis* (Takah. & Jux) comb. nov., *M. lubomirovae* (Gladkova) comb. nov., *M. microturgidus* (Pflug) comb. nov., *M. mirabilis* (Gladkova) comb. nov., *M. notabilis* (Gladkova) comb. nov., *M. ongaensis* (Takah.) comb. nov., *M. opacus* (Takah.) comb. nov., *M. paradoxus* (Gladkova) comb. nov., *M. perplexus* (Pflug) comb. nov., *M. pokrovskajae* (Korallova) comb. nov., *M. pseudogranulatus* (Gladkova) comb. nov., *M. pusulatus* (Chateau.) comb. nov., *M. rarus* (Sah) comb. nov., *M. rectus* (N.O.Fred.) comb. nov., *M. roboratus* (Pflug & Thomson) comb. nov., *M. rudis* (Martynova) comb. nov., *M. rurobituitus* (Pflug) comb. nov., *M. subtilis* (Sauer) comb. nov., *M. subtriangularis* (Takah.) comb. nov., *M. tenuis* (Gladkova) comb. nov., *M. tropicus* (Stelmak) comb. nov., *M. turgidus* (Pflug) comb. nov., *M. verus* (Sauer) comb. nov., *M. yururitoensis* (Takah.) comb. nov.; new names are validated: *Myricipites indostanicus* nom. nov. instead of *Myricaceiopollenites dubius* Venkat. & Rawat, *Myricipites japonicus* nom. nov. instead of *Triatriopollenites mirabilis* Takah., *Myricipites kulkovae* nom. nov. replaced illegitimate *Myrica eocenica* Kulkova non *Myrica eocenica* Saporta and *Myricipites saueriae* nom. nov. instead of illegitimate *Myrica elegans* Sauer (non Berry), *Myricipites stelmakiae* nom. nov. instead of *Myrica minuta* Stelmak non *Myrica minuta* Knowlt. Additional combinations are proposed for fossil pollen species: *Momipites engelhardtoides* (E.Roche) comb. nov., *Momipites menatensis* (Kedves) comb. nov., *Momipites paleogenicus* (Bolotn.) comb. nov., *Momipites pseudoroboratus* (Krutzsch & Vanh.) comb. nov., *Momipites minimus* (Gladkova) comb. nov., *Vacuopollis virgatus* (Botscharnikova)

comb. nov. 37 lectotypes are designated for the first time: *Banksia dillenoides* Ettingsh., *Banksia prototypus* Ettingsh., *Banksites pseudodrymeja* Saporta, *Carpolithes lenticularis* Schloth., *Crataegus lesquereuxii* Cockerell, *Dryandroides angustifolia* Unger, *Dryandroides hakeifolia* Unger, *Dryandroides haldemiana* Hosius & von der Marck, *Dryandroides laevigata* Heer, *Dryandroides lepida* Heer, *Dryandroides undulata* Heer, *Fraxinus myricifolia* Lesq., *Lomatia swantevitii* Unger, *Myrica acuminata* Unger, *Myrica antiqua* Ettingsh., *Myrica arenestii* Arènes & Depape, *Myrica banksiifolia* Unger, *Myrica diversifolia* Lesq., *Myrica emarginata* Heer, *Myrica integrifolia* Unger, *Myrica longifolia* Unger, *Myrica ludwigii* Schimp., *Myrica minor* Berry, *Myrica ophir* Unger, *Myrica ovalifolia* Borsuk, *Myrica purearensis* Berry, *Myrica sagoriana* Ettingsh., *Myrica salicina* Unger, *Myrica sotzkiana* Ettingsh., *Myrica studeri* Heer, *Myrica wendtii* Britt., *Myricophyllum denticulatum* Velen. & Vinikl., *Panax matheronii* Saporta, *Planera longifolia* var. *myricifolia* Lesq., *Quercus aculeata* Saporta, *Quercus commutata* Unger, *Quercus ettingshausenii* Wessel. 6 neotypes are designated for the first time: *Myrica banksioides* Engelm., *Myrica gracilis* Saporta, *Myrica haeringiana* Unger, *Myrica palaeocerifera* Saporta, *Myrica speciosa* Unger, *Myrica subaethiopica* Ettingsh.

Keywords: Fossil *Morella*, *Myricaceae*, new taxonomic names, Global Checklist.

INTRODUCTION

The genus *Myrica* Linnaeus (1753: 1024) has been dismembered into three genera: *Myrica* s.s., *Comptonia* L'Héritier ex Aiton (1789: 334) and *Morella* Loureiro (1790: 548) (Wilbur 1994, Knapp 2002), it was finally corroborated by molecular phylogenetic study of *Myricaceae* (Huguet et al., 2005, Liu et al., 2015, 2017). The segregation of *Morella* from *Myrica* s.l. was previously based on morphological characters such as thick persistent leaves (vs. thin deciduous leaves), leaves with stomata not sunken (vs. sunken stomata), inflorescences on the present year's growth (vs. on the previous year's growth), presence of terminal buds (vs. their absence), distal axillary buds vegetative (vs. distal axillary buds floral) and papillose fruits (vs. papillae lacking fruits) (Wilbur 1994). Species of *Myrica* s.s. are now distributed in the temperate northern hemisphere and *Morella* species in the Old and New World tropics. *Comptonia* as a distinct monotypic genus is characterized by stipulate leaves, deeply pinnatifid leaf margins and bur-like fruit with 6–8 persistent bracteoles (Chevalier 1901, Wilbur 1994).

The overall taxonomic situation was complicated by different nomenclature treatments of the genera *Gale*, *Morella* and *Myrica* because of the dispute on type species of the genus *Myrica* (Wilbur 1994). Tropical evergreen species were classified in the genus *Myrica* when *Myrica cerifera* Linnaeus (1753: 1024) was in effect treated as a type of *Myrica* by Chevalier (1901). On the contrary, two temperate deciduous species comprised the genus *Myrica* when Britton & Brown (1913), Hitchcock & Green (1929), Elias (1971) and Wilbur (1994) treated *Myrica gale* Linnaeus (1753: 1024) as type species of *Myrica*. *Myrica* s.s. was

once erroneously thought to be named *Gale* Duhamel du Monceau (1755: 253) by Hylander (1945), who mistakenly thought that *Myrica cerifera* L. is the type species of *Myrica*, but the type of the genus is actually *Myrica gale* Linnaeus (Elias 1971: 309).

Wilbur (1994) adopted to segregate tropical evergreen species in the genus *Morella* and consequently made the required nomenclatural combinations of four tropical evergreen species which occur in North America and Canada. Verdcourt & Polhill (1997) proposed to conserve the name *Myrica* with conserved type *M. cerifera* so that ca. 47 tropical evergreen species can retain their binomial names. This proposal was rejected by the Committee for Spermatophyta (Brummitt, 1999). As a result, *Myrica* was retained for the temperate deciduous species and all the tropical evergreen species were referred to *Morella*. Subsequently, missing combinations of names in *Morella* have been made for most of the tropical species by Killick et al. (1999), Turner (2001), Wilbur (2001), Knapp (2002), Parra-Osorio (2002), Herbert (2005) and Iturralde & Hidalgo (2011). However, these necessary combinations did not affect fossil-species of *Myrica* s.l.

The creation of the International Fossil Plant Names Index (IFPNI, 2014 onwards) with the aim of listing all fossil plant species necessitates the combinations of the former fossil-species of *Myrica* into *Morella*. A few cases of homonymy between fossil and extant species are also resolved by proposing new replacement names for later homonyms of *Myrica* that are illegitimate (Art. 53.1 of the International Code of Nomenclature for Algae, Fungi and Plants—ICN, Turland et al., 2025).

New nomenclatural acts and names of fossil plants

were registered, through a pilot registration version proposed before the XIX International Botanical Congress in Shenzhen in 2017, in the International Fossil Plant Names Index (IFPNI 2014–onwards) with unique persistent registration barcodes (LSIDs, Life Science Identifiers). The registration of plant taxa (Barkworth et al. 2016a–b) was accepted at the XIX International Botanical Congress in Shenzhen 2017 (Turland et al. 2017a–b).

SYSTEMATICS

Order: *Myricales* Martius (1835: 12) (“*Myricaceae*”).

Family: *Myricaceae* Kunth (in Humboldt, Bonpland & Kunth, 1817: 16) (“*Myricaceae*”), nom. cons.

Genus: *Morella* Loureiro (1790: 537, 548)

Synonyms: 1. *Cerophora* Rafinesque (1838: 11). 2. *Fayana* Rafinesque (1838: 12). 3. *Faya* Webb & Berthelot (1847: 272). 4. *Cerothamnus* Tidestrom (1910: 40). 5. †*Myricophyllum* Saporta (1863: 255), syn. nov. 6. †*Rhopalophyllum* Ettingshausen (1888: 54), nom. inval. non †*Rhopalophyllum* Ettingshausen (1895: 28). 7. *Myrica* subgen. †*Sotzkia* Zhilin (1980: 15), syn. nov.

Type: *Morella rubra* Loureiro (1790: 548).

1. Fossil species of *Morella* (based on leaves)

Morella acuminata (Unger) Doweld **comb. nov.**

Basionym: *Myrica acuminata* Unger (1850: 396)—*Dryandroides acuminata* (Unger) Ettingshausen (1851b: 740) (“*acuminatus*”)—*Rhopalophyllum acuminatum* (Unger) Ettingshausen (1888: 54), nom. inval. Lectotype (designated here): 1851/003/0010/01 (Geologische Bundesanstalt, Wien, Austria) – figured by Unger (1850b): plate 27, figure 5. Location and age: Socka, Slovenia. Eocene. IFPNI registration record: 3D51994E-9E62-4437-9DEA-9E38AF23E824.

Synonyms: 1. *Banksia laharpii* Heer (1856: 99, plate 98, figure 15). Holotype: 2999 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer 1856: plate 98, figure 15. Location and age: Monod, Rivaz, Vaud, Switzerland. Late Oligocene (Chattian). IFPNI registration record: 18A7CAE3-1C78-44A9-B409-A675D90F4B2D. 2. *Dryandroides bituminosa* Saporta (in Heer 1861: 138)—*Myricophyllum bituminosum* Saporta (1863:

67)—*Myrica bituminosa* (Saporta) Marion (1872: 342), syn. nov. Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: E3B9BFA3-9C25-4A59-A704-D22A38338896. 3. *Myrica arguta* Saporta (1863a: 234), nom. illeg. non Kunth (in Humboldt, Bonpland & Kunth 1817: 17, plate 98) nec *Myrica arguta* (*Dryandroides arguta* Heer 1856: 103) Saporta (1867b: 413), nom. illeg.—*Myrica saportana* Schimper (1872: 551). Holotype: MNHN.F.11717 (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: F3441AA5-B18A-4292-B4F4-2E7CEF291BD0. 4. *Myrica tenuinervis* Saporta (1863b: 47). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: 85C48F2C-C737-46CF-AC46-08C3C6CE3722. 5. *Myrica linearis* Saporta (1863a: 234)—*Myrica angustata* Schimper (1872: 550), nom. illeg. & superfl. Holotype: MNHN.F.11691 (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: BAE37C2B-46BC-4ED6-BC63-3FE8BC9D4E76. 6. *Myrica subintegra* Saporta (1865: 106), nom. illeg. non Göppert (1855: 9). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Camoins-les-Bains, Bouches-du-Rhône, Provence-Alpes-Côte d'Azur, France. Oligocene. IFPNI registration record: 6C743E8B-B092-4E47-B5CF-779DAD3D7850. 7. *Myrica rectinervis* Saporta (1865: 46). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Sézanne, Marne, France. Palaeocene (Thanetian). IFPNI registration record: 6C743E8B-B092-4E47-B5CF-779DAD3D7850. 8. *Myrica ilicifolia* Saporta (1873: 28), nom. illeg. non Burman (1768: 31 [27, err.]). Holotype: MNHN.F.16219 (Muséum National d'histoire naturelle, Paris, France) – figured by Saporta 1873: plate 6, figure 5. Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: E9413817-1617-48BE-8145-F29D73495E54. 9. *Myrica sinuata* Saporta (1863a: 234). Holotype: MNHN.F.11710 (Muséum National d'histoire naturelle,

- Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: E9413817-1617-48BE-8145-F29D73495E54. **10.** *Myrica zachariensis* Saporta (1863b: 22), nom. inval. & superfl. (ICN, Art. 52.2). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: 0F7A889B-331C-4238-A4CF-29B542D88B67. Notes: When originally published, the fossil-species included in synonymy previously validly published *Myrica gracilis* as a new variety *M. zachariensis* Saporta var. *minuta*, the species name *Myrica zachariensis* Saporta is thereby nomenclaturally superfluous. **11.** *Myricophyllum zachariense* Saporta (1863b: 22) & (1863b: 66, full description)—*Myrica polymorpha* Schimper (1872: 536), nom. inval. & superfl.—*Dryandroides zachariensis* Saporta (in Heer 1861a: 138), nom. nud. Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France [& Gargas, Vaucluse, Provence-Alpes-Côte d'Azur, France]. Eocene (Ypresian). IFPNI registration record: 9FB386C9-8A12-4291-81D1-A50BCFD20887; 49568636-7459-48EC-891C-D860E5E5C32D. Notes: Since *M. polymorpha* Schimper (1872: 536) included previously validly published *Dryandroides myricina* as a new variety of later published *M. polymorpha* Saporta var. *laciniata*, the species name is thereby nomenclaturally superfluous. **12.** *Myricophyllum zachariense* var. *spinulosum* Saporta (1863b: 66) (“*spinulosum*”)—*Myrica polymorpha* var. *spinulosa* (Saporta) Schimper (1872: 537)—*Dryandroides spinulosa* Saporta (in Heer 1861a: 138), nom. nud. Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: 38E50EA1-7A09-4660-91EC-B2C05A2D3E3C. **13.** *Myricophyllum brunstattense* Lakowitz (1895: 266 [76]), syn. nov. Holotype: Not located (Museum für Naturkunde, Berlin, Germany). Location and age: Brunstatt, Alsace-Lorraine [Reichsland Elsaß-Lothringen], Prussia/Germany = Brunstatt, Mulhouse, commune Brunstatt-Didenheim, Haut-Rhin department, northeastern France. Oligocene. IFPNI registration record: CE189C89-65EC-9A56-65BF-C959A57EC703. **14.** *Dryandroides myricina* Saporta (in Heer 1861a: 138)—*Myricophyllum zachariense* var. *laciniatum* (Saporta) Saporta (1863b: 66) (“*laciniata*”), nom. inval.—*Myrica polymorpha* var. *laciniata* (Saporta) Schimper (1872: 537), nom. inval. Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: 154FAF47-33E5-448D-8460-581F455EAAC3. Notes: Since *D. myricina* Saporta (in Heer 1861a: 138) was previously validly published than *M. zachariense* Saporta (1863b: 22), the inclusion of *D. myricina* as a new variety of later published *M. zachariense* Saporta var. *laciniatum* is inadmissible. Since *M. polymorpha* Schimper (1872: 536) included previously validly published *Dryandroides myricina* as a new variety of later published *M. polymorpha* Saporta var. *laciniata*, this name is thereby also nomenclaturally superfluous. **15.** *Dryandroides anceps* Saporta (in Heer 1861a: 138)—*Myricophyllum anceps* (Saporta) Saporta (1863b: 67)—*Myrica anceps* (Saporta 1863b: 67) Schimper (1872: 538). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: 154FAF47-33E5-448D-8460-581F455EAAC3. **16.** *Myricophyllum gracile* Saporta (1863a: 255)—*Myrica gracilis* (Saporta 1863: 255) Schimper (1872: 537), nom. illeg. non Saporta (1861a: 157). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: B98D1752-34EF-4B41-B2BD-54FCA43134AA. **17.** *Myrica ludwigii* Schimper (1872: 545), nom. illeg. non Ettingshausen (1868: 27 [830])—*Myrica longifolia* Ludwig (1860: 94), nom. illeg. non Unger (1850: 396). Lectotype (designated here): MB.Pb.1984/0217 (Museum für Naturkunde, Berlin, Germany) —figured by Ludwig 1860: plate 30, figure 1. Location and age: Münzenberg, Wetteraukreis, Hessen, Germany. Early Miocene (Aquitanian). IFPNI registration record: B98D1752-34EF-4B41-B2BD-54FCA43134AA. **18.** *Myrica serratifomis* Marion (1872: 341). Holotype: Not located. Location and age: Ronzon, Le Puy-en-Velay, Haute-Loire, France. Early Oligocene (Rupelian). IFPNI registration record: B98D1752-34EF-4B41-B2BD-54FCA43134AA. **19.** *Myrica salcedana* Principi (1927: 48; 1921: 14, nom. nud.). Holotype: Not located. Location and age:

Salcedo & Schiavon (Chiavon), Vicenza, Veneto, Italy. Oligocene. IFPNI registration record: 5F998E2A-D1E8-4758-BE33-C738065A4182.

Morella affinis (Massalongo) Doweld, **comb. nov.**

Basionym: *Myrica affinis* Massalongo (1851: 123).

Holotype: Not located (Museo Civico di Storia Naturale, Verona, Italy).

Location and age: Salcedo, Vicenza, Veneto, Italy. Oligocene.

IFPNI registration record: 9A2E0F7C-FFBA-49AC-914F-86C90C83D517.

Morella agdjakendica (Kassumova) Doweld, **comb. nov.**

Basionym: *Myrica agdjakendica* Kassumova (1966: 26).

Holotype: 34/3 (Geologiya və Geofizika İnstitutu, Bakı, Azərbaycan).

Location and age: Khandzadzor village, Nagorno-Karabakh Republic = Ağcakənd village, Goranboy district, Azerbaijan. Oligocene.

IFPNI registration record: 1D7148A2-E665-4B88-A1B6-27E3C3AB89DD.

Morella aloysiifolia (Massalongo) Doweld, **comb. nov.**

Basionym: *Myrica aloysiifolia* Massalongo (1851: 120) (“*aloesiaefolia*”).

Holotype: Not located (Museo Civico di Storia Naturale, Verona, Italy).

Location and age: Salcedo, Vicenza, Veneto, Italy. Oligocene (Chattian).

IFPNI registration record: F36F8E9D-47A4-4EDF-8DF7-B2C60C150241.

Morella amissa (Heer) Doweld, **comb. nov.**

Basionym: *Myrica amissa* Heer (1855: 36, plate 70, figure 17).

Holotype: Not located.

Location and age: Öhningen, Landkreis Konstanz, Baden-Württemberg, and Schrotzburg, Germany. Late Miocene (Tortonian).

IFPNI registration record: C5DACE84-D3CF-48B2-A823-1D0373045E42.

Synonyms: 1. *Myrica ludwigii* Ettingshausen (1868: 27 [830]) non Schimper (1872: 545), nom. illeg. Holotype: Not located. Location and age: Münzenberg, Wetteraukreis, Hessen, Germany. Early Miocene (Aquitanian). IFPNI registration record: 8B9D3CFD-A28A-4BA9-A5A2-A4263A1AFAD6. 2. *Myrica gracilis* Saporta (in Heer 1861a: 157)—*Myrica zachariensis* var. *gracilis* (Saporta) Saporta (1863b: 47)—*Myrica zachariensis* var. *minuta* Saporta (1863b: 47)—*Myrica zachariensis* Saporta (1863b: 47), nom. inval. Neotype (designated here): MNHN.F.13920 (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var [Saint Jean de Garguier, Bouches-du-Rhône], Provence-Alpes-Côte-d'Azur, France. Early Miocene (Aquitanian). IFPNI registration record: 60D0C5C5-8128-45A6-88E1-E48BC6DDDAB6.

Notes: Engelhardt (1911: 673) ascertained that fossil species *Myrica deperdita* Unger (1850a: 123; 1850b: 395), established on variable foliage from three different localities (Radoboj, Krapina-Zagorje County, Croatia & Parschlug, Sillweg, St. Gallen, Styria, Austria & Swoszowice, Kraków, Poland), was a heterogenous taxon comprising leaf remains of *Myrica* and *Quercus*. In particular, figured by Unger (1850a: 123) fossil specimen (leaf) on his plate 13, figure 2 is undoubtedly belonged to fossil species *Quercus mediterranea* Unger (1847: 114). Iljinskaja (1964: 134) designated lectotype of *M. deperdita* Unger from the fossil specimens of the Late Miocene (Tortonian) sediments of Swoszowice, Kraków, Poland (Collection of Ludwig Zeuschner, specimen # ПБ-N-15 [former 13542]), which was studied by Unger and now found in the State Natural History Museum (L'vov (L'viv), now Ukraine, then USSR). In addition, she recombined fossil taxon into the genus *Quercus*: *Q. deperdita* (Unger 1847: 114) Iljinskaja (1964: 134). Therefore, *M. deperdita* Unger was gone into synonymy of *Quercus*, and later was solidly synonymized with *Q. mediterranea* Unger (Kolakovsky 1982: 102). Fossil specimens of myricoid leaf appearance from Radoboj, Krapina-Zagorje County, Croatia and Parschlug, Sillweg, St. Gallen, Styria, Austria, identified earlier as *M. deperdita* Unger in European palaeofloras (Engelhardt 1911, etc.) should be now attributed to another fossil species of *Myrica*. The earliest available species for such a type of fossil foliage is *M. amissa* Heer (1855:

36, plate 70, figure 17), which was established from the similar Late Miocene (Tortonian) sediments of Öhningen, Landkreis Konstanz, Baden-Württemberg, and Schrotzburg, Germany. Heer (l.c.) failed to provide clear borders between *M. deperdita* Unger (not sensu lectotypification after Iljinskaja, l.c.) and his new fossil species, and therefore *M. amissa* Heer should be reinstated instead of former *M. deperdita* Unger, and transferred into *Morella* due to the resemblance with extant species *Morella cerifera* (*Myrica cerifera* Linnaeus 1753: 1024) Small (1903: 337, 1329). In addition, Ettingshausen (1872) synonymized *M. amissa* Heer and his weakly substantiated *M. ludwigii* Ettingshausen (1868: 27 [830]).

Morella arenesii* (Arènes & Depape) Doweld, **comb. nov.*

Figure 1

Basionym: *Myrica arenesii* Arènes & Depape (1956: 355) (“*Arenesi*”).

Synonym: *Leucothoe balearica* Arènes (1951: 77, plate 6, figures 1–2).

Lectotype (designated here, Figure 1): MBCN 2695, Coll de Bini, Fornalutx, Majorca, Spain (Museu

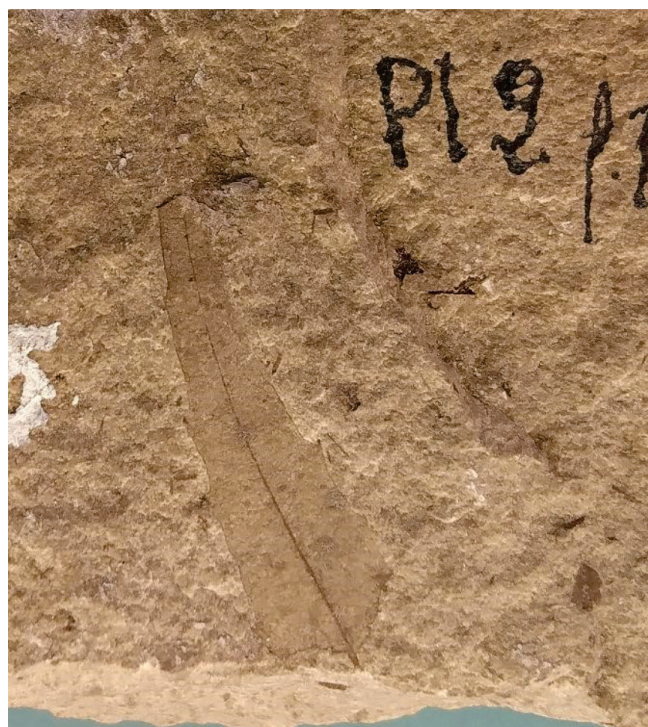


Figure 1. Lectotype of *Morella arenesii* (Arènes & Depape) Doweld. Not to scale.

Balear de Ciències Naturals, Sóller, Mallorca, Illes Balears, Spain) – figure 1.

Location and age: Majorca, Balearic Islands archipelago, Spain. Early Miocene (Burdigalian).

IFPNI registration record: 39126E3A-8891-4D9B-843C-691CFAC0F5AF.

Morella ashleei* (LaMotte) Doweld, **comb. nov.*

Basionym: *Myrica ashleei* LaMotte (1944: 205)—*Myrica idahoensis* Ashlee (1932: 82), nom. illeg. non *Myrica idahoensis* Knowlton (1898: 724).

Holotype: #303 (University of Idaho, Moscow, Idaho, USA).

Location and age: Elk River, Idaho, USA. Miocene (Latah Formation).

IFPNI registration record: 772D8B00-5202-4E9E-A013-DC5B192E23F7.

Morella balearica* (Arènes) Doweld, **comb. nov.*

Basionym: *Myrica balearica* Arènes (1951: 81, plate 6, figure 4).

Holotype: Not located.

Location and age: Majorca, Balearic Islands archipelago, Spain. Early Miocene (Burdigalian).

IFPNI registration record: 1835F3EE-47EF-45E7-97C0-4CCFC943DA03.

Morella banksioides* (Engelhardt) Doweld, **comb. nov.*

Basionym: *Myrica banksioides* Engelhardt (1887: 36, plate 1, figures 10,14).

Neotype (designated here): YPM PB 028195 (Yale Peabody Museum of Natural History, Yale University, New Haven, USA) – figured by Britton 1893: figure 5.

Location and age: [Cerro de] Potosí, Bolivia. Pliocene.

IFPNI registration record: 99511024-311E-4578-A485-11A3FDE77A60.

Synonyms: 1. *Myrica engelhardtii* Britton (1893: 258). Holotype: YPM PB 028174 (Yale Peabody Museum of Natural History, Yale University, New Haven, USA) – figured by Britton 1893: figure 19. Location and age: Potosí, Bolivia. Pliocene. IFPNI

registration record: E14434B2-B622-4AD7-A016-9393D83AA3BC. **2.** *Myrica wendtii* Britton (1893: 258). Lectotype (here designated): YPM PB 028172 (Yale Peabody Museum of Natural History, Yale University, New Haven, USA) – figured by Britton 1893: figure 2. Location and age: Potosí, Bolivia. Pliocene. IFPNI registration record: A0B5B261-5040-4EAA-BA51-B96176CAB68D.

Morella berica (Visiani & Massalongo) Doweld, **comb. nov.**

Basionym: *Myrica berica* Visiani & Massalongo (1854: 116).

Holotype: Not located (Museo Civico di Storia Naturale, Verona, Italy).

Location and age: Novale, Valdagno, Vicenza, Veneto, Italy. Miocene.

IFPNI registration record: E06171FE-C153-4F7E-A648-F605E746E6AB.

Morella beringiana (Budantsev) Doweld, **comb. nov.**

Basionym: *Myrica beringiana* Budantsev (1983: 136).

Holotype: 1201/960-9 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Rebro cape, W Kamchatka territory, Russian Federation. Eocene.

IFPNI registration record: 17F680DB-C7A3-49F8-84BE-20802CD54038.

Morella bersenevii (Fotjanova) Doweld, **comb. nov.**

Basionym: *Myrica bersenevii* Fotjanova (1988: 95).

Holotype: 3781/13 (Palaeontological Institute, Russian Academy of Sciences, Moscow, Russian Federation).

Location and age: Gar' River, eastern Sakhalin Island, Sakhalin region, Russian Federation. Early Miocene.

IFPNI registration record: 2D2E2D32-7C1A-4B88-9DC1-05CA45C5424E.

Morella cimbrica Doweld, **sp. nov.**

Replaced name: *Myrica cimbrica* Mathiesen (1975: 16, 18 [English diagnosis], text-figure 5: A–H), nom. inval. (ICN, Art. 40.1).

Holotype: MGUH 20430 (Natural History Museum of Denmark, Geological Museum, Copenhagen, Denmark) – figured by Mathiesen 1975: text-figure 5B.

Location and age: Silkeborg Vesterskov, Jutland, Denmark. Miocene.

IFPNI registration record: C324B66B-0B9D-4628-95E6-7D034B9AB060.

Morella comarifolia (Chelebaeva) Doweld, **comb. nov.**

Basionym: *Myrica comarifolia* Chelebaeva (1976: 1130).

Holotype: 87/20A (Institute of Vulcanology, Far Eastern Branch of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Russian Federation).

Location and age: Korf Bay, Bering Sea, Kamchatka territory, Russian Federation. Miocene.

IFPNI registration record: 3F6B58E3-A5F1-4E14-81EC-F5301897E304.

Morella czokusiana (Rajushkina) Doweld, **comb. nov.**

Basionym: *Myrica czokusiana* Rajushkina (1977: 175).

Holotype: 17/340 (Institute of Zoology, Almaty, Kazakhstan).

Location and age: Altyn-Shokysy (= Altyn-Chokusu), Northern Fore-Aralia, Kazakhstan. Oligocene.

IFPNI registration record: 110F78EC-9B13-4000-9515-4055AA0066E4.

Notes: Later Rajushkina (1981: 72) also published this species under different orthographic variant, *Myrica czokussuensis* Rajushkina, which is rejected.

Morella dubnanensis (Knobloch) Doweld, **comb. nov.**

Basionym: *Myrica dubnanensis* Knobloch (1969: 64).

Holotype: EK 16286 (Moravské zemské museum,

Brno, Czech Republic).

Location and age: Dubňany, Jihomoravský kraj, Czech Republic. Late Miocene (Tortonian = Pannonian F).

IFPNI registration record: 0EAD72CB-6C31-4D28-8EA5-D87774E15E21.

Morella elongata* (Saporta) Doweld, *comb. nov.

Basionym: *Myrica elongata* Saporta (1863b: 46).

Type: Not located (Muséum National d'histoire naturelle, Paris, France).

Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian).

IFPNI registration record: 3DF52BE3-05D5-4A3C-9F9E-EC49DB6DCF5A.

Morella ettingshausenii* (Wessel) Doweld, *comb. nov.

Basionym: *Quercus ettingshausenii* Wessel (in Wessel & Weber 1855: 132) (“*Ettingshausenii*”).—*Myrica ettingshausenii* (Wessel) Knobloch & Kvaček (1976: 21).

Lectotype (designated by Weyland 1948: 152): StIPB-Ro-122 (Steinmann-Institut für Geologie, Mineralogie und Paläontologie, Rheinische Friedrich-Wilhelms-Universität Bonn, Bonn, Germany) – figured by Wessel & Weber 1855: plate 22, figure 10.

Location and age: Rott near Bonn, North Rhine-Westphalia, Germany. Late Oligocene (Chattian = Rott Formation).

IFPNI registration record: E9C8170D-C042-474E-BD28-7CAB7C74486D.

Morella fraterna* (Saporta) Doweld, *comb. nov.

Basionym: *Myrica fraterna* Saporta (1867a: 57, plate 4, figure 1).

Holotype: MNHN.F.13227 (Muséum National d'histoire naturelle, Paris, France).

Location and age: Bois d'Asson, Manosque, Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Early Oligocene (Rupelian).

IFPNI registration record: A8ED9E25-644A-44F7-8718-33674E2D7F29.

Morella germarii* (Heer) Doweld, *comb. nov.

Basionym: *Myrica germarii* Heer (1861b: 411 [5], plate 8, figures 12–16).

Holotype: Not located.

Location and age: Schkopau, Sachsen-Anhalt, Germany. Eocene.

IFPNI registration record: 557FBBAC-AF5A-443B-A0A9-39783ED24D4E.

Morella hakeifolia* (Unger) Doweld, *comb. nov.

Basionym: *Dryandroides hakeifolia* Unger (1850: 428) (“*hakeaefolia*”)—*Myrica hakeifolia* (Unger) Brongniart (1861: 1235) (“*hakeaefolia*”)—*Myrica lignitum* forma *hakeifolia* (Unger) Boulay (1899: 96 [42]).

Lectotype (designated here): 1851/003/0034 (Geologische Bundesanstalt, Wien, Austria) – figured by Unger 1850b: plate 41, figure 10 (“*Dryandroides hakeaefolia*”).

Location and age: Socka, Slovenia. Eocene.

IFPNI registration record: E271E784-DEE0-4482-9A72-14BE36AB4043.

Synonym: *Dryandroides meissneri* Heer (1861b: 416[10])—*Myrica meissneri* (Heer) Schimper (1872: 549). **Type:** Not located. **Location and age:** Schkopau, Sachsen-Anhalt, Germany. Eocene. **IFPNI registration record:** 722E9D13-538D-4467-B3AB-CE84E04E5FED.

Morella hungeri* (Schneider) Doweld, *comb. nov.

Basionym: *Myrica hungeri* Schneider (1965: 1239).

Holotype: 11/476 (Technische Universität Bergakademie Freiberg, Freiberg, Germany).

Location and age: Holzweißig, Bitterfeld-Wolfen, Landkreis Anhalt-Bitterfeld, Sachsen-Anhalt, Germany. Late Oligocene.

IFPNI registration record: B612B9C4-E8A0-4E42-AFF1-1F299E6DBEDF.

Morella hunzikeri* (Hünicken) Doweld, *comb. nov.

Basionym: *Myrica hunzikeri* Hünicken (1966: 162, plate 15: figure 1).

Holotype: CPC 3190 (Paleobotanical collection

of the Museo de Paleontología, Córdoba Province, Argentina).

Location and age: Bloque Hundido locality (horizon t), Arroyo Santa Flavia region, Minas de Río Turbio, Argentina. Eocene-Oligocene (Río Turbio Formation).

IFPNI registration record: AA8BAB52-3649-A2E8-3EC8-6AD9B3DDF774.

Notes: The correction of the original correct spelling to “*Myrica hunzikerii*” (Vento & Prámparo, 2018: 7) is inadmissible.

Morella italica (Gaudin) Doweld, **comb. nov.**

Basionym: *Myrica italica* Gaudin (in Gaudin & Strozzi 1864: 11).

Type: Not located.

Location and age: Val d'Arno (Castelnuovo), Tuscany, Italy. Late Pliocene (Piacenzian).

IFPNI registration record: 15F9DE48-41E2-40F8-9CE9-E0B362B11457.

Morella joannis (Ettingshausen) Doweld, **comb. nov.**

Figure 2

Basionym: *Myrica joannis* Ettingshausen (1858: 743)—*Pelticutis joannis* (Ettingshausen) Schneider (2000: 89), **comb. inval.**

Lectotype (designated by Kovar-Eder, 1996: 153): 1995/60/441 (Naturhistorisches Museum Wien, Austria) – figured by Kovar-Eder 1996: plate 1: 2; plate 4: 1–2.

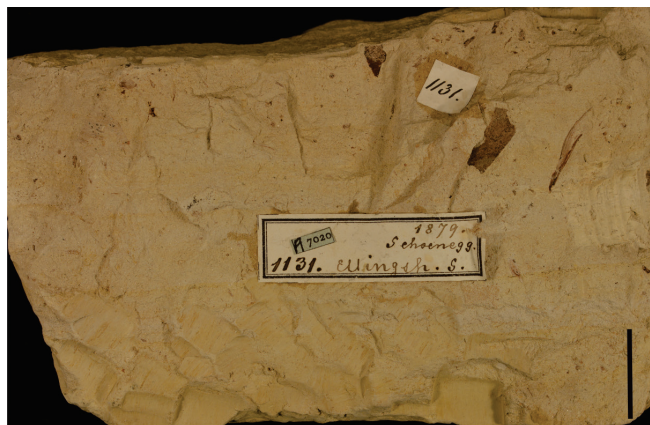


Figure 2. Neotype of *Myrica subaethiopica* Ettingshausen (synonym of *Morella joannis* (Ettingshausen) Doweld, **comb. nov.**) [1878/6/3134 (Naturhistorisches Museum, Vienna, Austria)]. Not to scale.

Location and age: Oberdorf near Köflach, Steiermark, Austria. Early Miocene (Burdigalian).

IFPNI registration record: 1DCA1623-E131-4385-9C0C-4A2F9E7BDE0E.

Synonym: *Myrica subaethiopica* Ettingshausen (1869: 26 [43]), **syn. nov.** Neotype (designated here, Figure 2): 1878/6/3134 (Naturhistorisches Museum Wien, Vienna, Austria) – figured by Ettingshausen 1890: plate 2, figures 44, 44a. Location and age: Johannistollen near Schöneck, Styria, Austria. Miocene.

Morella kasumovae (Kolakovsky) Doweld, **comb. nov.**

Basionym: *Myrica kasumoviae* Kolakovsky (in Abramov & al. 1973: 159) (“*kasumoviae*”)—*Myrica oligocenica* Kassumova (1966: 26) (“*oligocenicum*”), **nom. illeg. non Boulay** (1899: 100 [46]).

Holotype: 135/3 (Geologiya və Geofizika İnstitutu, Bakı, Azərbaycan).

Location and age: Indzhachaj, Azerbaijan. Oligocene.

IFPNI registration record: 1D7148A2-E665-4B88-A1B6-27E3C3AB89DD.

Morella korfiensis (Chelebaeva) Doweld, **comb. nov.**

Basionym: *Myrica korfiensis* Chelebaeva (1976: 1126).

Holotype: M611/16A (Institute of Vulcanology, Far Eastern Branch of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Russian Federation).

Location and age: Korf Bay, Bering Sea, Kamchatka territory, Russian Federation. Miocene.

IFPNI registration record: 481C8A28-D89C-4982-AAD3-DBC4EF374B27.

Morella laevigata (Heer) Doweld, **comb. nov.**

Basionym: *Dryandroides laevigata* Heer (1856: 101)—*Myrica laevigata* (Heer) Brongniart (1861: 1235)—*Myrica lignitum* f. *laevigata* (Heer) Boulay (1899: 96 [42]).

Lectotype (designated by Palamarev & Petkova 1987: 81): MGL 3008 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer 1856: plate 99, figure 6.

Location and age: Monod, Rivaz, Vaud, Switzerland. Late Oligocene (Chattian).

IFPNI registration record: 7F0F685A-6A27-47C0-BD49-852D407580EB.

Notes: Berger (in Septfontaine 1995: 15) inadvertently designated two fossil specimens of *D. laevigata* 3007 and 2906 as a ‘type’ (correctly to be designated as a *lectotype*), and two more specimens 3008 and 3009 as a ‘paratype’ which was inadmissible (all specimens were deposited into Musée Cantonal de Géologie de Lausanne (Switzerland) by Heer). Since I am not sure that in this case we have a deal with inadvertent mechanical choice of some known specimens as a type (lectotype) and inadmissible ‘paratype’, which contributed doubts into typification of the fossil species, I herewith designated a lectotype showing best preserved characters of the fossil species.

Synonym: *Myrica palaeocerifera* Saporta (1873: 24, plate 6, figure 1) (“*palaeo-cerifera*”), *synon. nov.* Neotype (designated here): MNHN-F-11703 (Muséum National d’histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d’Azur, France. Late Oligocene (Chattian). IFPNI registration record: B09E0698-6245-4287-ABA7-BE3F748ED986.

Morella latipes* (Boulay) Doweld, *comb. nov.

Basionym: *Quercus latipes* Boulay (1888: 126).

Type: Not located.

Location and age: Saint-Saturnin, Puy-de-Dôme, France. Eocene.

IFPNI registration record: 1208858A-BB08-4E46-862C-02AC2A64D483.

Morella lepida* (Heer) Doweld, *comb. nov.

Basionym: *Dryandroides lepida* Heer (1857: 188, plate 152, figures 19–21)—*Myrica lepida* (Heer) Schimper (1872: 556).

Lectotype (designated here): MHNN. FOS.1125A (Muséum d’histoire naturelle de Neuchâtel, Switzerland) – figured by Heer (1857): plate 153, figure 19.

Location and age: Le Locle, Kanton Neuenburg, Switzerland. Late Miocene (Tortonian).

IFPNI registration record: DDC94529-F93A-4D3A-8C9C-DB2E950FD046.

Morella lignitum* (Unger) Doweld, *comb. nov.

Figure 3

Basionym: *Quercus lignitum* Unger (1847: 113)—*Dryandroides lignitum* (Unger) Ettingshausen (1851b: 741)—*Myrica lignitum* (Unger) Saporta (1865: 102).

Lectotype (designated by Kovar-Eder, Kvaček & Ströbitzer-Hermann, 2004: 64): 76503 (Landesmuseum Joanneum, Graz, Austria).

Location and age: Parschlug, Styria, Austria. Early Miocene (Burdigalian).

IFPNI registration record: FD9F10BD-41D1-4874-B0BC-D8A0FF2237B9.

Synonyms: 1. *Myrica morlotii* Heer (1856: 97, plate 98, figure 17) (“*Morloti*”). Holotype: 3113 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer 1856: plate 98, figure 17. Location and age: Monod, Rivaz, Vaud, Switzerland. Late Oligocene (Chattian). IFPNI registration record: B026E6AD-E2A4-437D-9EB9-85131C313E85. 2. *Dryandroides gaudinii* Sismonda (1859: 542, plate 2, fig.5) (“*Gaudini*”)—*Myrica sismondiae* Meschinelli (in Meschinelli & Squinabol 1893: 252) [*Myrica gaudinii* Heer (1855: 34), *preocc.*]. Holotype: Not located. Location and age: Turin, Italy. Late Miocene (Messinian). IFPNI registration record: 6DBF8400-52F0-428D-8164-27F2AE8310D2. 3. *Prinos hyperboreus* Unger (1850: 462). Holotype: Not located.



Figure 3. Lectotype of *Quercus commutata* Unger (synonym of *Morella lignitum* (Unger) Doweld, *comb. nov.*) [76510 Graz, left leaf]. Scale Bar = 2 cm.

Location and age: Parschlug, Styria, Austria. Early Miocene (Burdigalian). IFPNI registration record: C2665CB3-A992-47B8-AFFA-95F8C4CBECD7. Notes: Unger (1863: 14, plate 3, figure 37) illustrated this fossil which is evidently related to *Morella lignitum* (Unger) Doweld; fossil specimens were not currently re-located in Austrian palaeontological collections.

4. *Quercus commutata* Unger (1852: 35) non Liebmann (1854: 177), nom. illeg. (extant). Lectotype (designated here, Figure 3): 76510 left (Landesmuseum Joanneum, Graz, Austria). Location and age: Parschlug, Styria, Austria. Early Miocene (Burdigalian). IFPNI registration record: 0FB6B7A0-84B9-4CFF-9553-4BA073FA62A3. **5. *Quercus myricifolia*** Unger (1852: 37) (“*myricaefolia*”). Holotype: Not located. Location and age: Parschlug, Styria, Austria. Early Miocene (Burdigalian). IFPNI registration record: EECBD61C-A2E0-4482-88B1-D9476E082580. **6. *Dryandroides cuneata*** Saporta (in Heer 1861a: 138)—*Myrica cuneata* (Saporta) Schimper (1872: 537). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: CC796157-E719-4CEF-987E-B627A188C47E. **7. *Dryandroides primigenia*** Saporta (1863b: 70)—*Myrica primigenia* (Saporta) Schimper (1872: 537). Holotype: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Saint-Zacharie, Var, Provence-Alpes-Côte d'Azur, France. Eocene (Ypresian). IFPNI registration record: CC796157-E719-4CEF-987E-B627A188C47E. **8. *Myrica sotzkiana*** Ettingshausen (1869: 26 [43]), synon. nov. Lectotype (designated here): 1851/003/0022 (Geologische Bundesanstalt, Wien, Austria) – figured by Unger 1850b: plate 34, figure 3 (“*Ficus degener* Unger”). Location and age: Socka, Vojnik municipality, Slovenia. Eocene. IFPNI registration record: E0FBA4BD-E9B0-4E1B-A302-F253208E31BA. **9. *Myrica solida*** Heer (1878: 28), synon. nov. Holotype: Not located. Location and age: Mgachi, Aleksandrovsk-Sakhalinsky district, Sakhalin region, Russian Federation. Miocene. IFPNI registration record: A4F6F86C-779F-4A29-88D0-0584A5393BF4. **10. *Myrica marcodurensis*** Kräusel & Weyland (1951: 41, plate 4, figures 5–6, text-figure 9). Holotype: SMB 6290/1-2 (Senckenberg Naturhistorische Sammlungen, Frankfurt/Main, Germany). Location and age: Kreuzau near Düren, Kreis Düren, Nordrhein-Westfalen, Germany.

Oligocene. IFPNI registration record: 08FBE6CB-A3D6-4389-8B2C-63F6D9247662.

Morella limburgensis (Kräusel & Weyland) Doweld, **comb. nov.**

Basionym: *Myrica limburgensis* Kräusel & Weyland (1951: 39).

Holotype: SMB 6281a/1-2 (Senckenberg Naturhistorische Sammlungen, Frankfurt/Main, Germany).

Location and age: Heerlen, Limburg, The Netherlands. Miocene (?Oligocene).

IFPNI registration record: D002FC6F-535F-4A64-BBAE-D0A04199D5F9.

Morella lingulata (Heer) Doweld, **comb. nov.**

Basionym: *Myrica lingulata* Heer (1874b: 21).

Holotype: S112538 (Naturhistoriska Riksmuseet, Stockholm, Sweden).

Location and age: Puilasok, Disko, Greenland. Palaeocene (Selandian = Naujat Member [Atanikerluk Formation]).

IFPNI registration record: 19EEE904-019A-41D9-8D6F-6BB5E16FDED3.

Morella longifolia (Unger) Doweld, **comb. nov.**

Figures 4, 5, 6, 7a, b

Basionym: *Myrica longifolia* Unger (1850: 396)—*Myrica longifolia* Unger (1845: 214), nom. nud.—*Banksia longifolia* (Unger) Ettingshausen (1851b: 730), nom. illeg. non Donn ex Dietrich (1802: 150).

Lectotype (designated here, Figure 4): 77415 (Landesmuseum Joanneum, Graz, Austria) – figured by Unger 1850b: plate 28, figure 1.

Location and age: Zagorje ob Savi, Central Sava Statistical Region, Slovenia. Oligocene (Rupelian).

IFPNI registration record: 2D2E2D32-7C1A-4B88-9DC1-05CA45C5424E.

Synonyms: **1. *Myrica ophir*** Unger (1850a: 396)—*Banksia ophir* (Unger) Ettingshausen (1851a: 494), comb. inval. Lectotype (designated here): 1851/003/0012 (Geologische Bundesanstalt, Wien, Austria) – figured by Unger 1850b: plate 27, figure 12. Location and age: Socka, Vojnik municipality, Slovenia.



Figure 4. Lectotype of *Myrica longifolia* Unger (basionym of *Morella longifolia* (Unger) Doweld, comb. nov.) [77415 Graz]. Scale Bar = 2 cm.



Figure 5. Lectotype of *Myrica banksiifolia* Unger (synonym of *Morella longifolia* (Unger) Doweld, comb. nov.) [64355 Graz]. Scale Bar = 2 cm.



Figure 6. Holotype of *Salicites stenophyllos* Ettingshausen (synonym of *Morella longifolia* (Unger) Doweld, comb. nov.) [1853/001/0042 (Geologische Bundesanstalt, Vienna, Austria)]. Scale Bar = 2 cm.

Eocene. IFPNI registration record: 152A6188-357A-4B20-989B-904F533188CC. **2.** *Dryandroides stricta* Heer (1859: 313)—*Myrica stricta* (Heer) Schimper (1872: 540). Holotype: Not located. Location and age: Menat, Puy-de-Dôme, Auvergne, France. Miocene. IFPNI registration record: FB48D314-73C6-42DA-883B-90181C89C2AB. **3.** *Myrica banksiifolia* Unger (1850: 395) (“*banksiaefolia*”), nom. illeg. non *Myrica banksiifolia* Wendland (1806: 70) (“*banksiaefolia*”)—*Myrica banksiifolia* Unger (1845: 214) (“*banksiaefolia*”), nom. nud.—*Dryandroides banksiifolia* Heer (1856: 102) (“*banksiaefolia*”). Lectotype (designated here): 64355 (Landesmuseum Joanneum, Graz, Austria) – figured by Unger 1850b: plate 28, figure 2. Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian). IFPNI registration record: C571B203-854F-46AB-973C-FCF33E839665. **4.** *Myrica speciosa* Unger (1850: 396)—*Banksia ungeri* Ettingshausen (1851b: 732) [*Banksia speciosa* Brown (1810: 210), preoccupied]. Neotype (designated here): 1853/001/0070/06 (Geologische Bundesanstalt, Vienna, Austria) – figured by Ettingshausen 1853: plate 17, figure 7. Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian). IFPNI registration record: 6F737ACA-1349-4F6C-8686-68A86A546C99. **5.** *Dryandroides angustifolia* Unger (1850: 428)—*Myrica angustifolia* (Unger) Brongniart (1861: 1235) non Li (1978: 541, 545), nom. inval. (ICN, Art. 40.1) & illeg. **6.** Lectotype (designated here): 1851/003/0033 (Geologische Bundesanstalt, Vienna, Austria) – figured by Unger (1850): plate 41, figure 6. Location and age: Socka, Vojnik municipality, Slovenia. Eocene. IFPNI registration record: F21BA215-0CF8-4892-892F-5A5965E105C6. **7.** *Lomatia swantevitii* Unger (1850b: 40 [170], plate 42, figure 2) (“*Swanteviti*”)—*Myrica swantevitii* (Unger) Awakov (1979: 48) (“*swanteviti*”). Lectotype (designated here, Figure 5): 1851/003/0035 (Geologische Bundesanstalt, Vienna, Austria) – figured by Unger (1850): plate 42, figure 2. Location and age: Socka, Vojnik municipality, Slovenia. Eocene. IFPNI registration record: 3BE036FF-AD1F-4B86-BD81-D3D4CB7EE81D6. Notes: Awakov (1979: 48) designated another specimen figured by Unger (1850: plate 42, figure 1), which was not preserved in the collections of Geologische Bundesanstalt, Vienna, Austria. Since the specimen is lost, a new lectotype is designated herewith. **8.** *Banksia dillenioides* Ettingshausen (1851b: 733)—*Myrica dilleniifolia* Schimper (1872: 396) (“*dilleniaefolia*”), nom. illeg. et

superfl. Lectotype (designated here): 1853/001/0071 (Geologische Bundesanstalt, Vienna, Austria) – figured by Ettingshausen 1853: plate 18, figure 7. Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian). IFPNI registration record: 6F737ACA-1349-4F6C-8686-68A86A546C99. Notes: Ettingshausen (1851b: 733, 1853: 55) mentioned that another specimen, though unfigured, was collected also from the older Late Eocene sediments of Promina Mt. (Croatia) along with only preserved specimen from another, younger,



Figure 7a, b. Holotype of *Banksia solonis* Unger (synonym of *Morella longifolia* (Unger) Doweld, comb. nov.) [1862/9/9 Pb 04657 (Geologische Bundesanstalt, Vienna, Austria)]. **a.** Upper part of the leaf, **b.** Lower part of the leaf. Not to scale.

Oligocene (Rupelian) sediments of Bad Häring (Tyrol, Austria), which was designated herewith as a lectotype. **9.** *Dryandroides linearis* Heer (1856: 103, plate 98, figure 14)—*Myrica linearis* (Heer) Schimper (1872: 396), nom. illeg. non Saporta (1863a: 234) nec De Candolle (1864: 154), nom. illeg. Holotype: 3125 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer (l.c.). Location and age: Monod, Rivaz, Vaud, Switzerland. Late Oligocene (Chattian). IFPNI registration record: F0F36CBC-2C84-4B4B-A390-B2207F3EFBEF. **10.** *Salicites stenophyllos* Ettingshausen (1853: 43). Holotype: 1853/001/0042, Figure 6 (Geologische Bundesanstalt, Vienna, Austria) – figured by Ettingshausen 1853: plate 10, figure 10. Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian). IFPNI registration record: 23292018-3EC4-4980-9AE6-BFDA4F93D7F8. **11.** *Dryandroides serotina* Heer (1857: 187)—*Myrica serotina* (Heer) Schimper (1872: 545). Lectotype (designated by Hantke 1954: 48): B 28 1573 [OE3 = Plate 241b] (Eidgenössische Technische Hochschule (ETH), Zürich, Switzerland) – figured by Heer 1857: plate 153, figure 11. Location and age: Öhningen, Landkreis Konstanz, Baden-Württemberg, Germany. Late Miocene (Tortonian). IFPNI registration record: F2FE55E4-7E6E-49D3-A1FB-AC5301F2525F. **12.** *Banksia solonis* Unger (1861: 65) & (1862: 165)—*Myrica solonis* (Unger) Saporta (1867b: 412). Holotype: 1862/9/9 Pb 04657, Figure 7a, b (Naturhistorisches Museum, Vienna, Austria) – figured by Unger 1861: figure 22 (middle) & Unger 1862: figure 21 (middle). Location and age: Kymi (= Kumi), Evia (= Euboea) Island, Greece. Early Miocene (Aquitian). IFPNI registration record: E257F5D9-FF2E-4D93-871E-49F7F242280B. **13.** *Myrica andegavensis* Crié (1885: 403). Holotype: Not located. Location and age: Cheffes, Maine-et-Loire, France. Eocene. IFPNI registration record: B502CEEB-92F4-429C-B09C-24C5D3A0ED9D.

***Morella lounensis* (Velenovský) Doweld, comb. nov.**

Basionym: *Dryandroides lounensis* Velenovský (1881: 33, plate 9: figures 17–22)—*Myrica lounensis* (Velenovský) Němejc (1975: 358), comb. inval. (ICN, Art. 41.5).

Lectotype (designated by Kotlaba 1959: 199): G 1858 (Národní Muzeum, Praha, Czech Republic) – figured by Velenovský 1881: plate 9, figure 17.

Location and age: Vršovice u Loun, okres Louny, Ústecký kraj, Czech Republic. Early Miocene (Middle Most Formation).

IFPNI registration record: 1547AAC8-EF82-4F26-BB11-0893EFED639E.

***Morella macrodonta* (Andreánszky) Doweld, comb. nov.**

Basionym: *Myrica macrodonta* Andreánszky (1962: 225).

Holotype: 6551 (Hungarian Natural History Museum, Budapest, Hungary).

Location and age: Wind brickyard, Eger, Hungary. Oligocene.

IFPNI registration record: B18CBBA0-04DC-4DC7-9B3E-3599DBCB2595.

***Morella merloi* (Sismonda) Doweld, comb. nov.**

Basionym: *Myrica merloi* Sismonda (1859: 538).

Holotype: Not located.

Location and age: Guarene, Province of Cuneo, Piedmont, Italy. Late Miocene (Messinian).

IFPNI registration record: 3765B29D-4ED3-4197-B252-060C58E5736A.

***Morella metzelii* (Becker) Doweld, comb. nov.**

Basionym: *Myrica metzelii* Becker (1961: 56) (“metzeli”).

Holotype: 33579 (University of Michigan Museum of Paleontology, Ann Arbor, USA).

Location and age: Ruby Basin, SW Montana, USA. Oligocene.

IFPNI registration record: BABDF74A-6CB2-4223-8339-4796B1D57FE9.

***Morella mira* (Berry) Doweld, comb. nov.**

Basionym: *Myrica mira* Berry (1925a: 196).

Holotype: USNM PAL 219073 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).

Location and age: Mirhoja, Mirador Mesa, Chubut, Patagonia, Argentina. Early Miocene (Burdigalian).

IFPNI registration record: 34B59E34-96CB-425A-9DB9-7B6C752DA351.

Morella modesta (Heer) Doweld, **comb. nov.**

Basionym: *Quercus modesta* Heer (1855: 48).

Holotype: 7274 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer 1855: plate 75, figure 22.

Location and age: Etavez, 5 km north Lausanne, Switzerland. Early Miocene (Burdigalian).

IFPNI registration record: 7C8DD934-27FB-4E57-AA3F-05776CC85202.

Synonym: *Banksia helvetica* Heer 1856: 98, plate 97, figures 44–48; plate 98: 16, *synon. nov.*—*Myrica helvetica* Heer (1853: 138), *nom. nud.* Type: Not located. Location and age: St. Gallen, Switzerland. Late Oligocene (Chattian). IFPNI registration record: 656452F5-55E0-4230-810B-BFF9154602E6.

Notes: Hantke (1964: 36) noticed great resemblance between *Q. modesta* Heer and *Banksia helvetica* Heer, debunking any putative relationships of *Q. modesta* with recent or extinct forms of oaks.

Morella mohavensis (Axelrod) Doweld, **comb. nov.**

Basionym: *Myrica mohavensis* Axelrod (1939: 94).

Holotype: 1422 (University of California Museum of Paleontology, Berkeley, USA).

Location and age: Tehachapi, Kern Co., California, USA. Middle Miocene (Kinnick Formation).

IFPNI registration record: B220E26F-A527-4827-8237-9799A7D5E9FC.

Morella mormonensis (Becker) Doweld, **comb. nov.**

Basionym: *Myrica mormonensis* Becker (1960: 102).

Holotype: 36424 (University of Michigan Museum of Paleontology, Ann Arbor, USA).

Location and age: Ruby Basin, SW Montana, USA. Oligocene.

IFPNI registration record: 505A42BE-3DA2-4E40-8120-F62DAB449885.

Morella nordenskioeldii (Dusén) Doweld, **comb. nov.**

Basionym: *Myrica nordenskioeldii* Dusén (1908: 10, plate 2, figure 5) (“*Nordenskjöldii*”).

Holotype: Not located (Naturhistoriska riksmuseet, Stockholm, Sweden).

Location and age: Seymour Island, Weddell Sea, E Antarctic Peninsula, Antarctica. Palaeocene.

IFPNI registration record: 505A42BE-3DA2-4E40-8120-F62DAB449885.

Morella obliquifolia (Kovar-Eder) Doweld, **comb. nov.**

Basionym: *Myrica obliquifolia* Kovar-Eder (2016: 349, plate 4, figure 17).

Holotype: SMNS P 1952/85 (Staatliches Museum für Naturkunde, Stuttgart, Germany).

Location and age: Rauenberg, Baden-Württemberg, Germany. Early Oligocene (Rupelian = Bodenheimer Formation).

IFPNI registration record: 75F171DB-3BCE-4AEB-A596-A3C82C643102.

Morella ovalifolia (Borsuk) Doweld, **comb. nov.**

Basionym: *Myrica ovalifolia* Borsuk (1956: 24).

Lectotype (designated here): 30/6874 (24) (Central Scientific-Research Geological Exploration Museum after S. N. Chernyshev (CNIGRMuseum), S.-Petersburg, Russian Federation).

Location and age: Brodjazheskaja pad', Sakhalin island, Sakhalin region, Russian Federation. Oligocene.

IFPNI registration record: 505A42BE-3DA2-4E40-8120-F62DAB449885.

Notes: Borsuk (1956) originally inadmissibly designated two ‘holotypes’ for this fossil species, specimen # 24 [30/6874] (Borsuk 1956: 24, in the text) and specimen # 25 [31/6874, figured as plate 3: figure 3] (Borsuk 1956: 94, in legends to plate 3). A lectotype is designated from the fossil specimen mentioned in the text.

Morella pacifica (Chaney) Doweld, **comb. nov.**

Basionym: *Myrica pacifica* Chaney (1920: 163).

Holotype: 22394 (Walker Museum, Chicago, Illinois, USA).

Location and age: Multnomah County, Oregon, USA. Miocene (Langhian = Eagle Creek Formation).

IFPNI registration record: 3E9B43F7-D796-4977-B5C9-D26DDCC897CA.

Morella pancicii (Pilar) Doweld, **comb. nov.**

Basionym: *Myrica pancicii* Pilar (1883: 33).

Holotype: 1564 [Pilar 69] (Hrvatski prirodoslovni muzej, Zagreb, Croatia).

Location and age: Nedelja, Croatia. Miocene.

IFPNI registration record: 98E10F55-509E-4B58-9E66-44E3F881301D.

Morella platyphylla (Saporta) Doweld, **comb. nov.**

Basionym: *Myrica platyphylla* Saporta (1868: 341, plate 6, figure 7).

Holotype: MNHN.F.11852 (Muséum National d'histoire naturelle, Paris, France).

Location and age: Sézanne, Marne, France. Late Palaeocene (Thanetian).

IFPNI registration record: 1621AEAF-820D-4FE5-BDE6-AA09489A4A84.

Morella praeesculenta (Rüffle) Doweld, **comb. nov.**

Basionym: *Myrica praeesculenta* Rüffle (1963: 172, 175).

Holotype: RM 312089 (Staatliches Museum für Naturkunde, Stuttgart, Germany).

Location and age: Randecker Maar, Lenningen, Baden-Württemberg, Germany. Late Miocene (Sarmatian).

IFPNI registration record: CADE5EE7-F926-458A-B2DE-27793337876F.

Morella premira (Berry) Doweld, **comb. nov.**

Basionym: *Myrica premira* Berry (1937: 38).

Type: Not located (Johns Hopkins University, Baltimore, USA).

Location and age: Cerro Funes, between Chubut and Santa Cruz, Patagonia, Argentina. Palaeocene.

IFPNI registration record: EE9F743B-64D8-4100-A65B-2ACBA50C9C8E.

Morella pseudofaya (Saporta) Doweld, **comb. nov.**

Basionym: *Myrica pseudofaya* Saporta (1867a: 56, plate 3, figure 11) (“*pseudo-faya*”).

Holotype: MNHN.F.13221 (Muséum National d'histoire naturelle, Paris, France).

Location and age: Bois d'Asson, Manosque, Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Early Oligocene (Rupelian).

IFPNI registration record: 94336721-05BF-4490-BF67-15F8A5119803.

Morella puryearensis (Berry) Doweld, **comb. nov.**

Basionym: *Myrica puryearensis* Berry (1916: 62).

Lectotype (designated here): USNM P 39746 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA) – figured by Berry 1930: plate 48, figure 37.

Location and age: Puryear, Henry County, Tennessee, USA. Eocene.

IFPNI registration record: 95321EF2-444B-404C-9712-E619E765BCF2.

Morella ragazzonii (Sordelli) Doweld, **comb. nov.**

Basionym: *Myrica ragazzonii* Sordelli (1882: 93).

Holotype: Not located.

Location and age: Badia di Brescia, Lombardia, Italy. Late Oligocene (Chattian).

IFPNI registration record: 1C3A793B-F134-43AD-AE7B-5406655CBE0D.

Morella sachalinensis (Pojarkova) Doweld, **comb. nov.**

Basionym: *Myrica sachalinensis* Pojarkova (1935: 43).

Holotype: Not located.

Location and age: Evaj River, Sakhalin Island, Sakhalin region, Russian Federation. Eocene.

IFPNI registration record: 03E2BA73-C408-435D-A2C4-5C58EB36DFDF.

***Morella sagoriana* (Ettingshausen) Doweld, comb. nov.**

Figure 8

Basionym: *Myrica sagoriana* Ettingshausen (1872: 16).

Lectotype (designated here, Figure 8): 1878/0006/5079 (Naturhistorisches Museum, Vienna, Austria) – figured by Ettingshausen 1872: plate 3, figure 35.

Location and age: Zavine, north of Kisovec, Zagorje ob Savi, Central Sava Statistical Region, Slovenia. Eocene.

IFPNI registration record: AAB2A10B-5F49-4B47-8B93-2C5A0F3C0262.

***Morella salicina* (Unger) Doweld, comb. nov.**

Figure 9

Basionym: *Myrica salicina* Unger (1850: 396).

Lectotype (designated here, Figure 9): 76744 (Landesmuseum Joanneum, Graz, Austria) – figured by Unger 1852: plate 16, figure 7.

Location and age: Radoboj, Krapina-Zagorje County, Croatia. Miocene.

IFPNI registration record: D63B820D-E5C0-49DB-BD61-A6292D0A5716.

Synonyms: 1. *Myrica integrifolia* Unger (1850: 396), nom. illeg. non Roxburgh (1832: 765). Lectotype (designated here): 76632 (Landesmuseum Joanneum, Graz, Austria) – figured by Unger 1852: plate 16, figure 6. Location and age: Radoboj, Krapina-Zagorje County, Croatia. Miocene. IFPNI registration record: 878F9C1D-5674-459B-B06C-C3FA96194305. 2. *Myrica sylvani* Unger (1866: 67). Holotype: Not located. Location and age: Radoboj, Krapina-Zagorje County, Croatia. Miocene. IFPNI registration record: CBC3749D-C920-4B31-8292-911BC3CD03D2. 3. *Myrica antiqua* Ettingshausen (1853: 39). Lectotype (designated here): 1853/001/0034/1 (Geologische Bundesanstalt, Wien, Austria) – figured by Ettingshausen 1853: plate 10, figure 1. Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian). IFPNI registration record: CBC3749D-C920-4B31-8292-911BC3CD03D2.



Figure 8. Lectotype of *Myrica sagoriana* Ettingshausen (basonym of *Morella sagoriana* (Ettingshausen) Doweld, comb. nov. [1878/0006/5079 (Naturhistorisches Museum, Vienna, Austria)]). Scale Bar = 2 cm.



Figure 9. Lectotype of *Myrica integrifolia* Unger (synonym of *Morella salicina* (Unger) Doweld, comb. nov. [76632 Graz]. Scale Bar = 2 cm.

***Morella haeringiana* (Unger) Doweld, comb. nov.**

Basionym: *Myrica haeringiana* Unger (1850: 395)—*Myrica haeringiana* Unger (1845: 214), nom. nud.—*Banksia haeringiana* (Unger) Ettingshausen (1851b: 731)—*Dryandroides haeringiana* (Unger) Heer (1861b: 425 [19]).

Neotype (designated here): 1853/001/0069/01

Geologische Bundesanstalt, Wien, Austria) – figured by Ettingshausen 1853: plate 16, figure 1.

Location and age: Bad Häring, Tyrol, Austria. Oligocene (Rupelian).

IFPNI registration record: 64A07EA0-FEFA-42A1-9FB4-AA01C42E4E0E.

***Morella serrulata* (Becker) Doweld, comb. nov.**

Basionym: *Myrica serrulata* Becker (1961: 57).

Holotype: UM 38229 (University of Michigan Museum of Paleontology, Ann Arbor, USA).

Location and age: Ruby Basin, SW Montana, USA. Oligocene.

IFPNI registration record: E48DC67E-4601-41D6-96E6-AD707B89A7D2.

***Morella sonomensis* (Axelrod) Doweld, comb. nov.**

Basionym: *Myrica sonomensis* Axelrod (1944: 194).

Holotype: UCMP 2651 (University of California Museum of Paleontology, Berkeley, USA).

Location and age: Neer's Hill, Sonoma, California, USA. Late Pliocene (Gelasian).

IFPNI registration record: 360AFA12-B51F-4F5E-835F-015B0FE4F474.

***Morella squinabolii* (Principi) Doweld, comb. nov.**

Basionym: *Myrica squinabolii* Principi (1916: 57) (“*Squinaboli*”).

Holotype: Not located (University of Genova, Department for the Study of the Territory and its Resources (DIPTERIS), Genova, Italy).

Location and age: Santa Giustina, Liguria, Italia. Oligocene (Rupelian).

IFPNI registration record: C40237C4-F152-4982-93DA-CD643543B172.

***Morella studeri* (Heer) Doweld, comb. nov.**

Basionym: *Myrica studeri* Heer (1855: 36, plate 70, figures 21–24).

Lectotype (designated here): 2879 (Musée Cantonal de Géologie de Lausanne, Switzerland) – figured by Heer 1855: plate 70, figure 21.

Location and age: Monod, Rivaz, Vaud, Switzerland. Late Oligocene (Chattian).

IFPNI registration record: DF7476CD-0F09-4BC7-BB6C-D9406CE274B0.

Notes: Berger (in Septfontaine 1995: 18) inadvertently designated this fossil specimen [2879] of *M. studeri* as a 'type' (correctly should be designated as a *lectotype*), since it was only preserved fossil specimen of this fossil-species which was survived/ deposited into Musée Cantonal de Géologie de Lausanne (Switzerland). It should be mentioned that the fossil-species was originally established on different specimens from different localities (Mönzlen near St. Gallen, Findlingen of St. Gallen, Hohen Rhonen and Monod, Rivaz, Vaud), which are keeping now in different Museums (Naturmuseum St. Gallen, Musée Cantonal de Géologie de Lausanne). Since I am not sure that we have a deal with inadvertent mechanical choice of only known specimen as a type (*lectotype*), I herewith designated *lectotype* of the fossil species on the same specimen as Berger did use previously.

Morella subincisa* (Saporta) Doweld, **comb. nov.*

Basionym: *Myrica subincisa* Saporta (1868: 342, plate 4, figure 4).

Holotype: MNHN.F.11854 (Muséum National d'histoire naturelle, Paris, France).

Location and age: Sézanne, Marne, France. Late Palaeocene (Thanetian).

IFPNI registration record: 6BD79F88-4395-4C2C-969F-8B7ECE559A71.

Morella subsalicina* Doweld, **nom. nov.*

Replaced name: *Myrica subsalicina* Stanislawski ex Baikovskaja & Koval (1968: 1254), *nom. illeg. non Shirley* (1898: 10).

Holotype: Baikovskaja *s.n.* (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation) – figured by Baikovskaja & Koval 1968: plate 1: figure 5.

Location and age: Obojan', Kursk region, Russian Federation. Eocene.

IFPNI registration record: 9CDFF54A-F554-42BA-BC8D-7E09B0D69883.

Morella turgaica* (Kornilova) Doweld, **comb. nov.*

Basionym: *Myrica turgaica* Kornilova (1950: 97).

Holotype: 636 (Institute of Zoology, Almaty, Kazakhstan).

Location and age: Zhaman-Kaindy river, Enbeshi village, Amangel'dy district, Kostanaj region, Kazakhstan. Oligocene.

IFPNI registration record: 1710EEF2-4146-42FA-A2BF-0839B04C4035.

Morella tusca* (Gaudin) Doweld, **comb. nov.*

Basionym: *Dryandroides tusca* Gaudin (in Gaudin & Strozzi 1858: 37)—*Myrica tusca* (Gaudin) Schimper (1872: 552)—*Lomatia tusca* (Gaudin) Schimper (1872: 796).

Type: Not located.

Location and age: San Vivaldo, Iano, Tuscany, Italy. Late Pliocene (Piacenzian).

IFPNI registration record: 52249372-42DF-42C7-8508-8030D0187292.

Morella ubensis* (Huzioka & Takahashi) Doweld, **comb. nov.*

Basionym: *Myrica ubensis* Huzioka & Takahashi (1970: 50).

Holotype: AKMG-3467A (Akita University, Mining College, Institute of Applied Geology, Akita, Japan).

Location and age: Kami-Umeda, Ube City, Yamaguchi Prefecture, Japan. Eocene (Okinoyama Formation).

IFPNI registration record: 52249372-42DF-42C7-8508-8030D0187292.

Morella undulata* (Heer) Doweld, **comb. nov.*

Basionym: *Dryandroides undulata* Heer (1857: 188, plate 153, figures 22–23)—*Myrica undulata* (Heer) Schimper (1872: 556), *nom. illeg. non Rafinesque* (1838: 10).

Lectotype (designated here): MHNN-FOS.1123 (Muséum d'histoire naturelle de Neuchâtel, Switzerland) – figured by Heer 1857: plate 153, figure 22.

Location and age: Le Locle, Kanton Neuenburg, Switzerland. Late Miocene (Tortonian).

IFPNI registration record: E68735B2-E480-A35F-E70B-06C776C324CA.

Morella undulatooides Doweld, **nom. nov.**

Replaced name: *Myrica undulata* Pimenova (1954: 32), nom. illeg. non Rafinesque (1838: 10) nec (Heer) Schimper (1872: 556), nom. illeg.

Holotype: Pimenova 27/1057 (National Museum of Natural History, National Academy of Sciences of Ukraine, Kyiv, Ukraine) – figured by Pimenova 1954: plate 3: figure 8.

Location and age: Amvrosiivka village, Donetsk region, Ukraine. Late Miocene (Tortonian).

IFPNI registration record: 91C96149-DA7E-4A24-853E-CF573E312931.

Morella wadiiformis (Kryshtofovich) Doweld, **comb. nov.**

Basionym: *Myrica wadiiformis* Kryshtofovich (1958: 95).

Holotype: 11/7120 (Central Scientific-Research Geological Exploration Museum after S. N. Chernyshev (CNIGRMuseum), S.-Petersburg, Russian Federation).

Location and age: Penzhinskaja bay, between mouths of Shestakovka river and Lovaty creek, Kamchatka territory, Russian Federation. Eocene.

IFPNI registration record: 6B4985CF-272B-4763-A056-6AC0DF425758.

Morella wilcoxensis (Berry) Doweld, **comb. nov.**

Basionym: *Myrica wilcoxensis* Berry (1916: 188).

Holotype: USNM P 35546 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).

Location and age: Grenada, Grenada County, Missouri, USA. Eocene.

IFPNI registration record: 72A18600-A539-4BB7-85F5-1E6018641185.

Morella zignoi (Principi) Doweld, **comb. nov.**

Basionym: *Myrica zignoi* Principi (1927: 49; 1921: 14, nom. nud.).

Holotype: Not located.

Location and age: Schiavon (Chiavon), Vicenza, Veneto, Italy. Oligocene.

IFPNI registration record: CEB46279-AF12-42EB-A560-874FA0E6EDF5.

2. Fossil species of *Morella* (based on fruits)

Morella altenburgensis (Kirchheimer) Doweld, **comb. nov.**

Basionym: *Myrica altenburgensis* Kirchheimer (1938a: 628).

Holotype: 1055i (Naturkundemuseum Mauritium, Altenburg, Germany).

Location and age: Altenburg, Thuringia, Germany. Oligocene.

IFPNI registration record: 842494FF-A255-4476-AEA7-AC41B0548674.

Morella baksanica (Balueva & Nikitin) Doweld, **comb. nov.**

Basionym: *Myrica baksanica* Balueva & Nikitin (in Nikitin 2007: 70, plate 5, figure 55).

Holotype: 50-7/1, Бкс.57-3a-204 (Novosibirskgeologija, Novosibirsk, Russian Federation).

Location and age: Pikhtovka village, Novosibirsk region, Russian Federation. Eocene.

IFPNI registration record: 6BB7A28F-14F0-44D9-8547-4170C42D577B.

Morella baltica (Dorofeev) Doweld, **comb. nov.**

Basionym: *Myrica baltica* Dorofeev (1994: 27, plate 63, figure 4; text-figure 23: 6).

Holotype: 8/4-K471 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Otradnoe, Kaliningrad region, Russian Federation. Oligocene.

IFPNI registration record: 8B04450C-1D57-4FC6-BD8C-691686149BC5.

Morella boveyana (Heer) Doweld, **comb. nov.**

Basionym: *Carpolithes boveyanus* Heer (1862:

152)—*Myrica boveyana* (Heer) Chandler (1957: 90).

Neotype (designated by Chandler 1957: 91): V.33868 (Natural History Museum, London, U.K.) – figured by Chandler 1957: plate 12, figure 48.

Location and age: Bovey Tracey, Devon, England, U.K. Oligocene.

IFPNI registration record: 2955FD6F-CA40-4C39-8093-2D8A193BC8BF.

Morella burghii (Gregor) Doweld, **comb. nov.**

Basionym: *Myrica burghii* Gregor (1983: 33, plate 1: 1-7, text-figure 1).

Holotype: P 1246 (Staatliches Museum für Naturkunde, Stuttgart, Germany).

Location and age: Garsdorf, N Bergheim, W Köln, Germany. Miocene.

IFPNI registration record: 42D657AD-54B0-4D22-A6BE-EE6F6583D68C.

Morella caspica (Dorofeev) Doweld, **comb. nov.**

Basionym: *Myrica caspica* Dorofeev (1994: 25, plate 62, figure 7; text-figure 21: 2).

Holotype: 3/2-K547 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Karauelkel'dy [= Karaul-Kel'dy], borehole 70F, Aktobe region, western Kazakhstan. Oligocene.

IFPNI registration record: 9952932E-CDF4-4322-846C-0BF1E06F911E.

Morella ceriferiformis (Kownas) Doweld, **comb. nov.**

Synonym: *Myrica ceriferiformis* Kownas (1955: 459), synon. nov.

Holotype: Kownas in 1947/1948 (unnumbered) (Uniwersytet Mikołaja Kopernika, Torun, Poland, n.v.).

Location and age: Dobrzyń nad Wisłą, Kuyavian-Pomeranian Voivodeship, Poland. Miocene (Serravallian).

IFPNI registration record: A7DE5907-387F-4188-AEDA-375FACE35BBD.

Morella ceriferiformoides (Bůžek & Holý) Doweld, **comb. nov.**

Basionym: *Myrica ceriferiformoides* Bůžek & Holý (1964: 118).

Holotype: Bůžek in 1964 (unnumbered) (Czech Geological Survey, Prague, Czech Republic).

Location and age: Hošnice, Chomutov okres, Ústecký kraj, Czech Republic. Miocene (Serravallian).

IFPNI registration record: 5A82D92D-B072-42EF-8201-A8BA5795C039.

Morella cestmirii (Holý) Doweld, **comb. nov.**

Basionym: *Myrica cestmirii* Holý (1977: 113) (“*cestmiri*”).

Holotype: G-4281 (Národní Museum, Praha, Czech Republic).

Location and age: Kristina near Hrádek nad Nisou, okres Liberec, Liberecký kraj, Czech Republic. Early Miocene (Burdigalian = Ottnangian).

IFPNI registration record: 20143952-D32D-4F35-8B07-63F6D5877BFC.

Morella colchica (Dorofeev) Doweld, **comb. nov.**

Basionym: *Myrica colchica* Dorofeev (1994: 29, plate 65, figure 9, text-figure 82: 1).

Holotype: 1/2-K534 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Kodor (Kodori or Kwydry) river, Abkhazia. Late Miocene (Messinian = Pontian).

IFPNI registration record: F0BEB135-DA2F-421B-BEF2-99C9378CCAE8.

Morella crassa (Dorofeev) Doweld, **comb. nov.**

Basionym: *Myrica crassa* Dorofeev (1994: 26, plate 63, figure 20; text-figure 22: 6).

Holotype: 7/6-K471 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Otradnoe, Kaliningrad region, Russian Federation. Oligocene.

IFPNI registration record: 586F3948-4D41-47EB-B3F9-AB0B0D67411B.

Morella hudibra (Holý) Doweld, **comb. nov.**

Basionym: *Myrica hudibra* Holý (1978: 4).

Holotype: G-4350 (Národní museum, Praha, Czech Republic).

Location and age: Kristina near Hrádek nad Nisou, okres Liberec, Liberecký kraj, Czech Republic. Early Miocene (Burdigalian = Ottnangian).

IFPNI registration record: 56D329B4-9E28-48E3-B665-6AF0AB5335B0.

Morella johnstrupii (Hartz) Doweld, **comb. nov.**

Basionym: *Carpolithes johnstrupii* Hartz (1909: 58)—*Myrica johnstrupii* (Hartz) Friis (1985: 32), nom. illeg. non *Myrica johnstrupii* (Heer 1883: 24) Berry (1925b: 43).

Lectotype (designated by Friis 1985: 33): Hartz coll. s.n. (Natural History Museum of Denmark, Copenhagen) – figured by Friis (1985): plate 6: figure 4.

Location and age: Sønderkov near Silkeborg, Jutland, Denmark. Miocene.

IFPNI registration record: A92A86D3-9E4E-46E2-8D9B-6F5780D119AF.

Morella kirchheimeri (Friis) Doweld, **comb. nov.**

Basionym: *Myrica kirchheimeri* Friis (1985: 34).

Lectotype (designated by Friis 1985: 33): 2012.13 (Natural History Museum of Denmark, Copenhagen) – figured by Friis 1985: plate 6: figure 14.

Location and age: C. Nielsen A/S lignite quarry, Fæstervold, Denmark. Middle Miocene (Odderup Formation).

IFPNI registration record: 28F5F7F8-A138-43D4-A13F-9BFC2EED916A.

Morella lenticularis (Schlotheim) Doweld, **comb. nov.**

Basionym: *Carpolithes lenticularis* Schlotheim (1822: 99, plate 21, figures 12a–12b).

Lectotype (designated here): MB.Pb.2012/0379 [F.49] [Schlotheim coll., Museum für Naturkunde, Berlin, Germany].

Location and age: Orsberg, Erpel, Landkreis

Neuwied, Rheinland-Pfalz, Germany. Late Oligocene (Chattian).

IFPNI registration record: 7CB0E125-A6CB-4CB9-80E0-7BA36292FB49.

Synonym: *Myrica suppanii* Kirchheimer (1938b: 326, plate 3, figures 13–18), synonym. nov. Holotype: Not located. Location and age: Niederpleis, Siegburg, Nordrhein-Westfalens, Germany. Late Oligocene (Chattian). IFPNI registration record: 477E8E7A-5145-4C87-AB25-E777EC3C4146.

Morella minuscula Doweld, **nom. nov.**

Replaced name: *Myrica minima* Negru (1979: 62, plate 11, figure 6), nom. illeg. non Saporta (1863b: 45)—*Myrica minima* Negru (in Dorofeev 1994: 29, plate 64, figure 20), nom. illeg. non Saporta (1863b: 45), nom. superfl. [isonym] & illeg.—*Myrica minima* Negru (in Dorofeev & Negru 1970: 506), nom. inval. (ICN, Art. 40.1).

Holotype: 86/1-4IIK (Grădina Botanică (Institut), Academiei de Științe a Moldovei, Chișinău, Moldova).

Location and age: Tabaky village, Bolgrad district, Odesa region, Ukraine. Late Miocene (Messinian = Pontian).

IFPNI registration record: C2C58DF5-8487-408A-9F43-E2F27139AEC8.

Morella panii (Balueva & Nikitin) Doweld, **comb. nov.**

Basionym: *Myrica panii* Balueva & Nikitin (in Nikitin 2007: 70, plate 5, figure 63).

Holotype: 50-2/1, Tyr.60-1694-24.4 (Novosibirskgeologija, Novosibirsk, Russian Federation).

Location and age: Tomsk, Tomsk region, Russian Federation. Eocene (Bartonian).

IFPNI registration record: 4F2EA7E1-FEAF-4CBD-85DA-B193F10C0A12.

Morella pannonica (Dorofeev) Doweld, **comb. nov.**

Basionym: *Myrica pannonica* Dorofeev (1994: 28, plate 65, figure 1, text-figure 27: 4).

Holotype: 3/1-K447 (Komarov Botanical Institute,

Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Mala Byjgan', Beregove district, Zakarpat'ska region, Ukraine. Late Miocene (Tortonian = Pannonian).

IFPNI registration record: CF5F1BE1-BD15-49B3-B315-8D01B7B07A8F.

Morella poltavica* (Dorofeev) Doweld, **comb. nov.*

Basionym: *Myrica poltavica* Dorofeev (1994: 23, plate 61, figure 10)—*Myrica poltavica* Dorofeev (in Dorofeev & Negru 1970: 503), nom. inval. (ICN, Art. 40.1).

Holotype: 2/4-K436 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Between Sencha and Zhdney villages, Poltava region, Ukraine. Miocene.

IFPNI registration record: 5909CDA0-1A77-49F1-ADFF-CAC808A01335.

Morella sphaeroidea* (Jakubovskaja) Doweld, **comb. nov.*

Basionym: *Myrica sphaeroidea* Jakubovskaja (1987: 917).

Holotype: Coll. 310-Я (Scientific-Exploration Centre for Geology, Minsk, Belarus).

Location and age: Bereza, Brest region, Belarus. Oligocene.

IFPNI registration record: 83AC97CD-99D7-4484-A7D3-4D7015449796.

Morella stoppii* (Kirchheimer) Doweld, **comb. nov.*

Basionym: *Myrica stoppii* Kirchheimer (1942: 430, figure 8).

Holotype: Kirchheimer *s.n.* (Senckenberg Naturhistorische Sammlungen, Dresden, Germany, n.v.).

Location and age: Wiesa near Kamenz, Saxony, Germany. Early Miocene (Burdigalian).

IFPNI registration record: 97D1DAA1-1F64-42A6-A7DA-300238192EA7.

Morella tavidensis* (Dorofeev) Doweld, **comb. nov.*

Basionym: *Myrica tavidensis* Dorofeev (1994: 23, plate 60, figures 5–6; text-figures 18: 1–2).

Holotype: 20/3-K511 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Belojarka village, right bank of Tavda river, Sverdlovsk region, Russian Federation. Oligocene.

IFPNI registration record: 5F64AD86-9FFD-4FE4-970D-CB3195FF1574.

Morella ucrainica* (Dorofeev) Doweld, **comb. nov.*

Basionym: *Myrica ucrainica* Dorofeev (1994: 27, plate 60, figure 13, text-figure 25: 1)—*Myrica ucrainica* Dorofeev (in Dorofeev & Negru 1970: 505), nom. inval. (ICN, Art. 40.1).

Holotype: 4/10-K434 (Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation).

Location and age: Demydove village, Odesa region, Ukraine. Late Miocene (Tortonian).

IFPNI registration record: B22AAD3D-2B40-49A5-B73B-5372E149A643.

Morella wiesaensis* (Kirchheimer) Doweld, **comb. nov.*

Basionym: *Myrica wiesaensis* Kirchheimer (1938b: 328).

Holotype: Not located.

Location and age: Wiesa near Kamenz, Kamenz, Saxony, Germany. Oligocene.

IFPNI registration record: B066CCD9-1FC7-49BE-AADA-F07FCAB795A0.

3. Fossil species of *Morella* (based on male inflorescences)

Morella goeppertii* (Kohlman-Adamska, Ziemińska-Tworzydło & Zastawniak) Doweld, **comb. nov.*

Basionym: *Myrica goeppertii* Kohlman-Adamska, Ziemińska-Tworzydło & Zastawniak (2004: 268, plate 4, figure 1).

Holotype: MZ VII/53/445a (Museum of the Earth, Polish Academy of Sciences, Warsaw, Poland).

Location and age: Sośnica, Wrocław County, Early Silesian Voivodeship, Poland. Late Miocene (Tortonian).

IFPNI registration record: FC05B8F6-CD6B-49B1-A59D-2F6C2C38D560.

4. Extant species of *Morella*: additional names

Morella × *burbankii* (A. Chevalier) Doweld, **comb. nov.**

Basionym: *Myrica* × *burbankii* A. Chevalier (1901: 221) (“*burbanki*”) [*Morella californica* (Cham.) Wilbur (1994: 102) × *Morella caroliniensis* (Mill.) Small (1903: 337)].

Morella × *curtissii* (A. Chevalier) Doweld, **comb. nov.**

Basionym: *Myrica* × *curtissii* A. Chevalier (1901: 269) (“*curtissi*”) [*Morella inodora* (W.Bartram) Small (1903: 337) × *Morella cerifera* (Linnaeus) Small (1903: 337)].

Morella hispaniolica Doweld, **nom. nov.**

Replaced name: *Myrica apiculata* Urban & Ekman (in Urban 1928: 13), **nom. illeg.** non *Myrica apiculata* Saporta (1868: 342, plate 4, figure 5).

Holotype: Haiti. Matheux, near Mirebalais, Horrible Mt., Carrefour-Boudon, 7 Feb 1926, Ekman *H* 5520 (S, S-R-3688).

Location: Hispaniola.

Eponymy: Hispaniola, a name of the endemic area of species distribution.

Notes: Since fossil *Myrica apiculata* Saporta (1868) has a precedence over extant species *Myrica apiculata* Urban & Ekman (in Urban 1928), which is in current use as endemic species of Hispaniola (Acevedo-Rodríguez & Strong 2012: 575), a replacement name is proposed for extant species of *Morella* (not *Myrica* s.l.).

Morella × *quercifera* Doweld, **nom. nov.**

Replaced name: *Myrica* × *incisa* A. Chevalier (1901: 234) non *Myrica incisa* (R. Ludwig) Ettingshausen (1968: 830) [*Morella serrata* (Lam.) Killick (1998: 993) × *Morella quercifolia* (Linnaeus) Killick (1998: 994)].

5. Excluded and Revised Taxa

A few fossil-species of *Myrica* s.l., based on fruits and leaves, were conditionally attributed to the extant genus; all of them are re-classified below by exclusion from *Myrica* and placement in different extant and fossil-genera. Majority of these species are based on leaves. Species based on other parts are mentioned under “Status”.

Genus *Amurica* Doweld, **gen. nov.**

IFPNI registration record: CAE0A61C-E5E6-4DCE-A2A9-A4F37B0C44F6.

Diagnosis: Leaves linear-lanceolate, base narrow wedge-shaped, apex attenuate, small, 5 cm long and 1.1 cm wide; central vein staright, thin, secondary veinlets numerous, diverging from the main vein at 50–60°, arcuate, terminating into teeth of leaf margin; teeth with acicular apex.

Notes: Unusual leaf shape and venation for *Myrica* s.l.; the relationships with *Myricaceae* is doubtful, the fossils represent perhaps endemic Eastern Eurasian fossil-genus (excluded from *Myricaceae*).

Type species: *Amurica burejensis* (Kamaeva) Doweld, **comb. nov.**

Amurica burejensis (Kamaeva) Doweld, **comb. nov.**

Basionym: *Myrica burejensis* Kamaeva (1982: 76).

Holotype: 28–18a/25M (Far Eastern Geological Service, Vladivostok, Russian Federation).

Location and age: Rajchikhinskoe brown coal mine, Amur region, Russian Federation. Early Palaeocene (Danian = Kivdinian suite).

Eponymy: From *Amur*, name of river of Eastern Eurasia (known also as Heilong Jiang in Chinese) and suffix *-ica* (plural suffix), plural form of *-icus* (singular suffix), of or pertaining to, connected with (from locus classicus).

IFPNI registration record: 1DC490E3-341B-41E5-81CA-31ACCDF1D38E.

Genus *Amuricarpica* Doweld, **gen. nov.**

IFPNI registration record: C9E612E9-CDF0-4470-A7BA-8ADB6F3C1686.

Diagnosis: Fruits widely ovoid, with rounded base and apex, slightly depressed, 10–15 mm long and 8–12 mm wide; walls thick, up to 1–1.5 mm; locule ovoidal, with rounded base and acicular to obtuse apex. Channel protruding endocarp base 0.5 mm wide.

Type species: *Amuricarpica amurensis* (Krassilov) Doweld, **comb. nov.**

Location and age: Amur region and Kamchatka territory, Russian Federation (Far East). Late Cretaceous (Maastrichtian)—Early Palaeocene (Danian).

Status: Fruits (endocarps).

Eponymy: From *Amur*, name of river of Eastern Eurasia (known also as Heilong Jiang in Chinese) and *-carpus* (*-carpus*, fem.), *karpos* (Greek: *Καρπός*; literally "fruit").

Amuricarpica amurensis (Krassilov) Doweld, **comb. nov.**

Basionym: *Myrica amurensis* Krassilov (1976: 69).

Holotype: 570/260 (Biological-Soil Institute, Far Eastern branch of the Russian Academy of Sciences, Vladivostok, Russian Federation).

Location and age: Arkhara village, Arkharinskaja sopka, Amur region, Russian Federation. Early Palaeocene (Danian).

Status: Fruits.

IFPNI registration record: 5A3C06C9-0CBF-4D62-9516-900F97FC50A8.

Amuricarpica korjakica Doweld, **nom. nov.**

Replaced name: *Carpolithes ellipticus* Golovneva (1994: 118, plate 13: 11–12), **nom. illeg. non Sternberg** ex Ettingshausen (1854: 70)—*Carpolithes ellipticus* Sternberg (1825: xl), **nom. nud.** ("*Carpolites*").

Holotype: 1051/967 (Komarov Botanical Institute, Russian Academy of Sciences, S.-Petersburg, Russian Federation).

Location and age: Pravaja Gornaja river, Korjak upland, Kamchatka Territory, Russian Federation. Late Cretaceous (Maastrichtian = Early Rarytkinian subsuite).

Status: Fruits.

Eponymy: From Korjak upland, *locus classicus*.

IFPNI registration record: 83C1011C-9C29-4980-84AC-310556ACEC88.

Genus *Bohlenia* Wolfe & Wehr (1987: 19).

Bohlenia dilodendrifolia (Vassilevskaja) Doweld, **comb. nov.**

Basionym: *Myrica dilodendrifolia* Vassilevskaja (1957: 137).

Holotype: Vassilevskaja Collection #22 (Komarov Botanical Institute, Russian Academy of Sciences, S.-Petersburg, Russian Federation).

Location and age: Akar-Tchesme, Badkhyz, Turkmenistan. Eocene.

IFPNI registration record: 20FABBA7-A3F7-4331-A25D-A79638A07632.

Genus *Crataegopsis* Doweld, **gen. nov.**

IFPNI registration record: 61899FA7-5346-D3C9-D3AB-341E1EF1FA19.

Diagnosis: Leaves ovate to oblong, with a cuneate base; apex blunt; petiole slender; margin entire, but in lower half, dentate at tip and with a few scattered, glandular teeth below; venation of a slender midrib with 7 pairs of subopposite, thin secondaries originating at 30°, slightly convex proximad, directly craspedodrome or branching and looped immediately within margin; tertiary venation finely reticulate; areolation obsolete.

Notes: Cockerell (1906) mentioned the resemblance of *Myrica hendersonii*, based on a twig bearing six leaves from Florissant Eocene sediments, to extant *Salix*, but actually referred the specimen to *Myrica* because of the sparsely dentate margin in the upper portion of the leaves. Although the margin may be similar to the extant *Morella cerifera* it appears to be a very unreliable comparison since the modern species differs in both petiole and shape. MacGinitie (1953) stated that leaf morphology of fossils is similar to the leaves of two extant Mexican species, *Crataegus mexicana* De Candolle and *C. pubescens* Steudel, but this superficial resemblance is rejected by its leaf

venation. The fossil-species is segregated in the fossil-genus of its own, *Crataegopsis* Doweld, gen. nov. and tentatively referred to *Rosaceae*.

Type species: *Crataegopsis hendersonii* (Cockerell) Doweld, comb. nov.

Crataegopsis hendersonii (Cockerell) Doweld, comb. nov.

Basionym: *Myrica hendersonii* Cockerell (1906: 308) $\equiv$ *Morella hendersonii* (Cockerell) Cockerell $\equiv$ *Crataegus hendersonii* (Cockerell) MacGinitie (1953: 118).

Holotype: UCMP 3616 & UCMP 3814 [part/counterpart] (Museum of Paleontology, University of California, Berkeley, USA).

Epitype (designated here): USNM P 40567 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).

Location and age: Florissant, Colorado, USA. Eocene (Green River Formation).

Eponymy: From extant *Crataegus* L., and suffix *-opsis*, resembling in appearance.

IFPNI registration record: B23253EC-D237-A649-CD27-4A53F43116B7.

Genus *Dryandrica* Doweld, gen. nov.

IFPNI registration record: 87AF7DE4-7431-C5B1-B553-47517E960FBE.

Diagnosis: Leaves long-petiolate leaf; petiole ~18 mm long; excluding teeth, lamina linear, including teeth, shape oblong; base angle very narrow acute, base shape nearly straight, i.e. narrow cuneate to decurrent; apex incomplete, apex angle narrow acute, apex shape straight; margin coarsely and asymmetrically serrate, one side entire near base then with 5 spine-like teeth, other side with 7 teeth, starting near base; teeth differently sized, tooth height up to nearly 5 mm, distal flank convex to straight, proximal flank concave to nearly straight, teeth curved outwards, sinus acute to narrow rounded, apex acute; midvein strong, minimally sinuate, approaching one or the other margin of lamina, i.e. not always running in middle of lamina; secondaries already very faint, craspedodromous, secondaries terminating in tooth apices and (?) camptodromous in between, arising at moderate angle; secondaries running into teeth straight to curved towards apex.

Type species: *Dryandrica grevilleifolia* (Ettingshausen) Doweld, comb. nov.

Eponymy: From *Dryandroides*, a fossil genus, and a suffix *-icus*, denoting "belonging to" or "pertaining to".

Dryandrica grevilleifolia (Ettingshausen) Doweld, comb. nov.

Basionym: *Dryandroides grevilleifolia* Ettingshausen (1888: 57, plate 4: figures 15, 15a) ("*grevilleaefolia*").

Holotype: RGM.THDB.6757 (Naturalis Biodiversity Center, Leiden, The Netherlands).

Location and age: Münzenberg, Leoben, Styria, Austria. Late Miocene (Langhian).

IFPNI registration record: 50C12C6F-79B6-94FC-694B-085B8052D851.

Notes: When originally published, the fossil-species *Dryandroides grevilleifolia* Ettingshausen was originally treated as a proteacean fossil taxon which was unlikely because that family lives in the southern hemisphere. The supposed synonymy with *Engelhardia orsbergensis* (Wessel & C.O. Weber) Jähnichen, Mai & H. Walther (1978) is also excluded because of the craspedodromous secondary venation, large size of the teeth and the sinuous course of the midvein approaching the left or right margin and thus dividing the lamina into uneven parts. In this connection, this endemic Miocene element of the European palaeofloras should be placed in the fossil-genus of its own, *Dryandrica* Doweld, gen. nov.

Genus *Engelhardia* Leschenault ex Blume (1826: 528).

Engelhardia atilica Doweld, nom. nov.

Replaced name: *Myrica pseudolignitum* Kräusel & Weyland (1951: 42), nom. illeg. non Ettingshausen (1893: 10) ("*pseudo-lignitum*").

Holotype: SMB 6292/1, 2 (Senckenberg Naturhistorische Sammlungen, Frankfurt/Main, Germany).

Location and age: Tagebau Regis near Altenburg, Thuringia, Germany. Late Miocene (Pannonian).

IFPNI registration record: CA7D258D-843D-473C-93CE-C810A4C8434B.

Notes: In the opinion of Knobloch and Kvaček (1976) fossil leaves reported as *Myrica pseudolignitum* Kräusel & Weyland from Stare Gliwice by Szafer (1961) belong to *Buxus pliocenica* Saporta, although their cuticular features point to the affinity with extant *Engelhardia*.

Genus *Morellago* Doweld, **gen. nov.**

IFPNI registration record: 95B28668-CF84-453D-A974-CFA41DE7BFDD.

Diagnosis: Leaves long-petiolate, 0.8x2 cm, small, elliptical, apex acute, base cordate, with a few large crenate-serrate teeth; venation craspedodrome.

Type species: *Morellago minor* (Berry) Doweld, **comb. nov.**

Morellago minor (Berry) Doweld, **comb. nov.**

Basionym: *Myrica minor* Berry (1925b: 43).

Lectotype (designated here): USNM P 37071 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA) – figured by Berry 1925: plate 6, figure 2.

Location and age: Perry place, Henry County, Tennessee, USA. Late Cretaceous (Maastrichtian = Ripley Formation).

IFPNI registration record: AA26CE9D-A353-4954-B058-B8685180525F.

Eponymy: From *Morella* Loureiro and suffix – *ago*, having the character of, resembling.

Notes: A quite unusual leaf shape for *Myrica* s.l.; however, it does convergently resemble the modern African species *Myrica cordifolia* Linnaeus (1753: 1025).

Genus *Morellastrum* Doweld, **gen. nov.**

Diagnosis: Leaves linear to linear-oblong, obtuse and entire, rarely crenate; base tapered to cuneate or acute, emarginate to acute at apex; venation camptodrome, with polygonal areolation.

Notes: The venation appears similar to modern *Myrica*, but the leaf shape is different. Although crenulate margin and linear leaf shape are not found in modern *Myrica*, fossil *M. dakotensis* Lesq. is nevertheless considered as *Morellastrum* due to resemblance in venation.

Type species: *Morellastrum obtusum* (Lesquereux) Doweld, **comb. nov.**

IFPNI registration record: 62188D60-9C09-406F-8537-152335E89A69.

Location and age: North America, Europe, Central Asia. Cretaceous (Maastrichtian–Cenomanian).

Eponymy: From *Morella* Loureiro and suffix – *astrum*, expressing incomplete resemblance.

Morellastrum acutum (Hollick) Doweld, **comb. nov.**

Basionym: *Myrica acuta* Hollick (in Newberry 1896: 65).

Holotype: YPM PB 011246 (Yale Peabody Museum of Natural History, Yale University, New Haven, USA).

Location and age: [locality unknown], USA. [precise age unknown] ?Cretaceous (Cenomanian = Raritan Formation).

IFPNI registration record: 818846B9-7E4D-4B2E-8D4A-54E683B102FB.

Morellastrum asplenoides (Lange) Doweld, **comb. nov.**

Basionym: *Myricophyllum asplenoides* Lange (1890: 667).

Holotype: Not located.

Location and age: Aachen, North Rhine-Westphalia, Germany. Late Cretaceous (Santonian).

IFPNI registration record: B3353028-DA19-491D-8EF8-34608B5F2286.

Morellastrum beyrichii (Ettingshausen) Doweld, **comb. nov.**

Basionym: *Quercus beyrichii* Ettingshausen (1867: 248, plate 2, figure 2).

Holotype: Not located.

Location and age: Niederschöna, Halsbrücke, Landkreis Mittelsachsen, Saxony, Germany. Late Cretaceous (Cenomanian).

IFPNI registration record: 30F41133-B3F8-43E5-B323-4EF540901010.

***Morellastrum dakotense* (Lesquereux) Doweld,
comb. nov.**

Basionym: *Myrica dakotensis* Lesquereux (1885: 64)—*Myrica cretacea* Lesquereux (1876: 339), nom. illeg. non Heer (1871: 10).

Lectotype (designated here): USNM P 607 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA) – figured by Lesquereux 1876: plate 3, figure 4.

Location and age: Fort Harker, Kansas, USA. Late Cretaceous (Cenomanian = Dakota Formation).

IFPNI registration record: A7E90E1A-FDB2-43AC-ADAA-94E7F1CD0847.

Notes: The typification of the fossil-species by Peale (1907: 225) is considered ineffective since Peale (l.c.) provided a type for illegitimate fossil-species *Myrica cretacea* Lesquereux (non Heer), which has no standing in the nomenclature being a later illegitimate homonym, but no exact type for its valid substitute *Myrica dakotensis* Lesquereux, for which Peale have cited two specimens ('types'): USNM P 607 and USNM P 608. In this connection, a new valid and effective lectotypification is proposed here.

***Morellastrum denticulatum* (Velenovský & Viniklár)
Doweld, comb. nov.**

Basionym: *Myricophyllum denticulatum* Velenovský & Viniklár (1931: 17, 78, plate 30, figures 8–11).

Lectotype (designated here): F 1944 (Národní Muzeum, Praha, Czech Republic) – figured by Velenovský & Viniklár 1931: plate 30, figure 11.

Location and age: Vyšehořovice (Vyšerovice), Středočeský kraj, Czech Republic. Late Cretaceous (Cenomanian).

IFPNI registration record: C11CB368-713C-4FD2-A0FF-C3A1CCF0CFA4.

***Morellastrum emarginatum* (Heer) Doweld, comb.
nov.**

Basionym: *Myrica emarginata* Heer (1882: 66).

Lectotype (designated here): MGUH 5918 (Type and Illustrated Paleontology Collection, Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark) – illustrated by Heer (1882: Plate 41, Figure 2).

Location and age: Isunngua [= Isunguak], Qeqqata municipality, Greenland. Late Cretaceous (Cenomanian = Dakota Formation).

IFPNI registration record: 418ED74C-472C-4860-B30D-D3785D14B62A.

***Morellastrum fragiliforme* (Zenker) Doweld, comb.
nov.**

Figure 10

Basionym: *Salix fragiliformis* Zenker (1833: 22, plate 3, figure H)—*Salicites fragiliformis* (Zenker) Göppert (in Bronn 1849: 1108)—*Quercites fragiliformis* (Zenker) Stiehler (1857: 69)—*Myrica fragiliformis* (Zenker) Engelhardt (1891: 93).

Holotype: Not located.

Location and age: Blankenburg, Harz, Saxony-Anhalt, Germany. Late Cretaceous (Campanian).

IFPNI registration record: 3254C7C9-3F5F-4ED9-82E4-1CB78602BC54.

Synonyms: 1. *Banksia prototypus* Ettingshausen (1851b: 732). Lectotype (designated here, Figure 10): 1836/0007/0076 (Naturhistorisches Museum, Vienna, Austria) – figured by Ettingshausen 1851b: plate 2, figure 2. Location and age: Niederschöna, near Freiberg, Landkreis Mittelsachsen, Saxony, Germany. Late Cretaceous (Cenomanian). IFPNI registration record: EE1C4DAC-7BDA-4DB1-BB51-0FA631029094.



Figure 10. Lectotype of *Banksia prototypus* Ettingshausen (synonym of *Morellastrum fragiliforme* (Zenker) Doweld, comb. nov.) [1836/0007/0076 (Naturhistorisches Museum, Vienna, Austria)]. Not to scale.

2. *Dryandroides latifolius* Ettingshausen (1867: 257). Holotype: Not located. Location and age: Niederschöna, Halsbrücke, Landkreis Mittelsachsen, Sachsen, Germany. Late Cretaceous (Cenomanian). IFPNI registration record: 519AF9FA-4CBB-4341-8903-DE4A9CF493AC.

Morellastrum hausmannii* (Dunker) Doweld, **comb. nov.*

Basionym: *Castanea hausmannii* Dunker (1856: 181, plate 34, figure 1) (“*Hausmanni*”).

Holotype: Not located.

Location and age: Blankenburg, Landkreis Harz, Sachsen-Anhalt, Germany. Late Cretaceous (Santonian).

IFPNI registration record: ADC6759F-10C0-4BF4-B885-E2D35BF173B7.

Morellastrum macrophyllum* (Hosius & von der Marck) Doweld, **comb. nov.*

Basionym: *Dryandroides macrophylla* Hosius & von der Marck (1880: 169).

Holotype: Not located.

Location and age: Haldem, Stemwede, Kreis Minden-Lübbecke, North Rhine-Westphalia, Germany. Late Cretaceous (Campanian).

IFPNI registration record: F3823FE0-1D39-44E6-8DEC-0D72254F3021.

Morellastrum newberryanum* (Hollick) Doweld, **comb. nov.*

Basionym: *Myrica newberryana* Hollick (in Newberry 1896: 63).

Holotype: YPM PB 011271 (Yale Peabody Museum of Natural History, Yale University, New Haven, USA).

Location and age: South Amboy, Middlesex County, New Jersey, USA. Late Cretaceous (Cenomanian = Raritan Formation).

IFPNI registration record: D698BAD5-6F8C-41E2-9B6F-6C9E5CDDD197.

Morellastrum obtusum* (Lesquereux) Doweld, **comb. nov.*

Basionym: *Myrica obtusa* Lesquereux (1874: 63).

Holotype: USNM P 606 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).

Location and age: Kansas, USA. Late Cretaceous (Cenomanian = Dakota Formation).

IFPNI registration record: EA01B5F8-FD91-4AC4-84AD-C589EA8F06D2.

Morellastrum leiophyllum* (Hosius & von der Marck) Doweld, **comb. nov.*

Basionym: *Myrica leiophylla* Hosius & von der Marck (1880: 155)—*Banksia leiophylla* (Hosius & von der Marck) Ettingshausen (1895: 30).

Holotype: P 6–17 (Georg-August-Universität Göttingen, Geowissenschaftliches Museum, Göttingen, Germany).

Location and age: Haldem, Stemwede, Kreis Minden-Lübbecke, North Rhine-Westphalia, Germany. Late Cretaceous (Campanian).

IFPNI registration record: 8ACB186B-1996-4629-ACF7-629AA9C54BDC.

Morellastrum schenkianum* (Heer) Doweld, **comb. nov.*

Basionym: *Myrica schenkiana* Heer (1871: 11, plate 3, figure 1).

Holotype: Not located (Naturhistoriska riksmuseet, Stockholm, Sweden).

Location and age: Quedlinburg, Saxony-Anhalt, Germany. Late Cretaceous (Santonian).

IFPNI registration record: DE03B35D-E666-40E6-A57E-BD1DEB959909.

Morellastrum schimperi* (Lesquereux) Doweld, **comb. nov.*

Basionym: *Myrica schimperi* Lesquereux (1892: 66).

Holotype: USNM P 50021 (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).

Location and age: Brookville, Kansas, USA. Late Cretaceous (Cenomanian = Dakota Formation).

IFPNI registration record: 0EEBA174-B25F-44BD-A3A5-E894CC429EF6.

Morellastrum velenovskyi* (Shilin) Doweld, **comb. nov.*

Basionym: *Myrica velenovskyi* Shilin (in Shilin & Romanova 1978: 58)—*Myrica serrata* Velenovský (1883: 34 [9]), nom. illeg. non Lamarck (1788: 592)—*Myricophyllum serratum* Velenovský (1889: 50).

Lectotype (designated by Shilin & Romanova 1978: 58): NM-F 4599 (Národní Muzeum, Praha, Czech Republic) – figured by Velenovský 1883: plate 2, figure 2.

Location and age: Mělník, Středočeský kraj, Czech Republic. Late Cretaceous (Cenomanian).

IFPNI registration record: 1547AAC8-EF82-4F26-BB11-0893EFED639E.

Morellastrum zenkeri* (Ettingshausen) Doweld, **comb. nov.*

Basionym: *Dryandroides zenkeri* Ettingshausen (1867: 257)—*Myrica zenkeri* (Ettingshausen) Heer (1874a: 108)—*Myricophyllum zenkeri* (Ettingshausen) Velenovský (1889: 37).

Holotype: Not located.

Location and age: Niederschöna, Halsbrücke, Landkreis Mittelsachsen, Sachsen, Germany & Dreistätten, Niederösterreich, Austria. Late Cretaceous (Cenomanian).

IFPNI registration record: 06D2E884-6CE6-4283-8912-E81B1230999F.

Genus *Myricastrum* Doweld, **gen. nov.**

IFPNI registration record: 4089D96E-935B-454E-93B0-DEA0D5890C35.

Diagnosis: Fruit (endocarps) 0.9–1.5X0.6–1.0 mm, ovoid, elliptical, biconvex and flattened, splitting along suture into two halves; the apex narrowed, attenuate into short or long column base; the base rounded or weakly sinuate, stalkless; sides depressed, the end acicular or obtuse. Wingless. Fruit endocarp outer surface slightly scabrous to finely rugose; hollow large, apically attenuate into narrow micropylar exit,

inner surface glabrous; walls not heavily thickened. Epidermal cells rectangular (in cross-section), short or columnar, with not heavily thickened cell walls.

Type species: *Myricastrum arcticum* (Dorofeev & Proskurin) Doweld, **comb. nov.**

Myricastrum arcticum* (Dorofeev & Proskurin) Doweld, **comb. nov.*

Basionym: *Myrica arctica* Dorofeev & Proskurin (in Dorofeev 1994: 15, plate 65, figure 24).

Holotype: 1/1-K103 (Komarov Botanical Institute, Russian Academy of Sciences, S.-Petersburg, Russian Federation).

Location and age: Mal'j Van'kin cape, Bol'shoj Ljakhovskij Island, New Siberian Archipelago, Russian Federation. Late Cretaceous.

Status: Fruits.

IFPNI registration record: 7F97A6CF-285E-4960-9FC6-25A36EB1B21F.

Eponymy: From *Myrica* L., using Latin suffix *-astrum* (suffix of nouns, expressing incomplete resemblance).

Notes: Fruit endocarps of this fossil species differ considerably from the fruit endocarps of *Myrica* s.l.: wingless, greatly attenuate apex, sinuate base with no stalk, peculiar outer surface. The splitting into two halves may not be considered as a linking feature between *Myrica* s.l. and *Myricastrum* gen. nov. As a result, the Cretaceous fossil species of Palaeoarctica is excluded in the genus of its own. Relationships with *Myricaceae* are doubtful.

Genus *Myricops* Doweld, **gen. nov.**

IFPNI registration record: A2BF1F02-C57B-C61D-39E2-228D24905C32.

Diagnosis: Leaves small, elliptical, acute, narrowed to the base, pinnate, margins beginning a little above the base, serrated with small acute teeth directed apically; petiole quite short; midrib stout at base, rapidly attenuated above; primary veinlets slender, leaving the midrib obliquely curving upwards and following the margins for some distance, connected with one another by veinlets that go off nearly at right angles.

Type species: *Myricops brookensis* (Fontaine) Doweld, **comb. nov.**

***Myricops brookensis* (Fontaine) Doweld, comb. nov.**

Basionym: *Myrica brookensis* Fontaine (1889: 310, Plate CL, Figure 11; Plate CLVI, Figure 10).

Neotype (designated here): USNM P 31740 (National Museum of Natural History, Smithsonian Institution, Washington, USA) – illustrated by Ward (1905: Pl. CVIII, figure 8).

Location and age: Brooke, Stafford County, Virginia, USA. Early Cretaceous (Albian) [Patapsco Formation].

IFPNI registration record: 993EF97B-9043-54CA-EDBC-40276752F2D5.

Eponymy: From *Myrica* L., using Latin suffix – *opsis* (suffix of nouns, expressing a resemblance).

Notes: Knowlton (1920) synonymized three species, *Celastrorhynchium obtusidens* Fontaine (1889: 305), *Celastrorhynchium acutidens* Fontaine (1889: 305) and *Myrica brookensis* Fontaine into the one species, *Celastrorhynchium acutidens*, but it seems was a hasty step since the leaves of three fossil-species were different in venation pattern and teeth morphology. In addition, *C. obtusidens* has very closely spaced teeth with an obtusely rounded shape in the upper half of the length of the leaf margin. *C. acutidens* was described as a small leaf with small teeth, and in the opinion of Fontaine (1889), *C. obtusidens* may be a variety of *C. acutidens*. *C. obtusidens* has teeth directed perpendicular to the margin and is larger than *C. acutidens*, which has teeth directed apically like *Myrica brookensis* having a similar leaves with small teeth directed apically. I consider *M. brookensis* apart from previously leaf types of *Celastrorhynchium obtusidens* Fontaine and *Celastrorhynchium acutidens* Fontaine. The relationships with *Myricaceae* are doubtful; the same remote relationships might be suggested with the foliage type with characteristic semicraspedodromous venation and rounded teeth located along the entire length of the leaf margin of *Todziaphyllum saportanum* (Velenovský) Čepičk. & J.Kvaček (Čepičková & Kvaček, 2022). As a result, the Cretaceous fossil species from Patapsco Formation is excluded in the genus of its own, *Myricops* gen. nov.

Genus *Myrolea* Doweld, gen. nov.

IFPNI registration record: B7E64150-908E-2550-0049-EC30A2009C91.

Diagnosis: Leaves fragmentary, short petiolate, lamina elongate, base truncate to cuneate, strongly asymmetrical, apex not preserved, margin sinuate-toothed with very large, pointed teeth, simple dentate, teeth coarse, sharp, abmedially patent, sinus either sharp or rounded. Venation craspedodromous to semicraspedodromous, midrib strong, straight, secondaries at a wide angle somewhat sinuous, sometimes forked, looping well within the margin or partly entering the teeth, intersecondaries occasional, tertiaries reticulate. Adaxial cuticle smooth, reflecting polyedric isometric to elongate cells ca. 16–40 µm across, solitary simple trichome bases rounded, rare; abaxial cuticle finely striate, cells polygonal, 16–36 µm across, with straight to wavy anticlines. Stomata irregularly distributed, ovate to narrow ovate, mostly anomocytic, pore small, ovate, inner sides of guard cells heavily cutinized, lateral sides of guard cells covered by fine cutin striations. Trichomes peltate, with multicellular disk-shaped heads.

Notes: Sachse (2001) revised anomalous *Myrica*-like leaf cuticular remains from the Early Oligocene of Germany and Czechia, related them to the *Oleaceae*, and included in namely artificial leaf fossil morphogenus *Oleinites* Cookson (1947), which was established on fragmentary leaf remains with cuticles from Miocene/Eocene of Victoria, Australia. Agreeing that these European fossil leaf remains have nothing in common to do with *Myricaceae*, from which they ought to be excluded, I could not agree with their placement in artificial Australian fossil-genus *Oleinites*, counterparted with the extant oleacean genus *Notelaea* Ventenat. The European leaf remains were related by Sachse (2001) to several extant genera, e.g. *Chionanthus*, *Fraxinus* or *Olea* with no exact relationships; in this connection, a new fossil-genus is needed for European fossil remains. However, the fossil-species *Oleinites liguricus*, based on leaf remains with cuticles from the Late Miocene sediments of Italy in contrast to the older Early Oligocene sediments of *Myrica hallbaueri* and *Dicotylophyllum maii*, deviates decidedly in gross morphology and cuticle ultrastructure from Oligocene fossils. Sachse (l.c.) reported that trichomes with strongly cutinized heads with entire margins composed of up to 24–32 cells were only found in *Chionanthus* and *Fraxinus*; therefore, a distinct fossil genus *Miooleites* gen. nov. (see below) is suggested for Italian fossil foliage.

Type species: *Myrolea hallbaueri* (Mai) Doweld, comb. nov.

Eponymy: From *Myrica* and *Olea*, two extant generic names (not hybrid formula).

Myrolea hallbaueri (Mai) Doweld, **comb. nov.**

Basionym: *Myrica hallbaueri* Mai (1963: 46, plate 2, figure 4)—*Oleinites hallbaueri* (Mai) M. Sachse (2001: 219).

Holotype: MMG PB Sf 3294 (Senckenberg Naturhistorische Sammlungen Dresden, Abteilung Museum für Mineralogie und Geologie, Dresden, Germany).

Location and age: Seifhennersdorf, Saxony, Germany. Early Oligocene (Rupelian).

IFPNI registration record: 73FB6F14-103C-FCF5-8BBA-70EE8A68CB97.

Myrolea maii (Bůžek, Holý & Z. Kvaček) Doweld, **comb. nov.**

Basionym: *Dicotylophyllum maii* Bůžek, Holý & Z. Kvaček (1976: 111, plate 13, figure 2)—*Oleinites maii* (Bůžek, Holý & Z. Kvaček) M. Sachse, (2001: 221).

Holotype: MR-447 (Czech Geological Survey, Prague, Czech Republic).

Location and age: Markvartice, Děčín okres, Ústecký kraj, Czech Republic. Early Oligocene (Rupelian, Ústí Formation).

IFPNI registration record: 7146CB54-9194-6DDF-12F8-65CC4EAF6E4F.

Myrolea prescheri (H. Walther) Doweld, **comb. nov.**

Basionym: *Ailanthus prescheri* H. Walther, Palaeontographica, Abt. B, Paläophytol. 249: 125, 142, plate 15, figure 1. 1999.

Holotype: MMG KS 110: 1b (Senckenberg Naturhistorische Sammlungen Dresden, Abteilung Museum für Mineralogie und Geologie, Dresden, Germany).

Location and age: Kleinsaubernitz borehole 1/70, near Bautzen, eastern Saxony, Germany. Late Oligocene (Chattian).

IFPNI registration record: D7D33886-D180-CCB1-D371-A7649416E17A.

Notes: Walther (1999) described a peculiar fossil leaf type, originally placed in *Ailanthus*, but it is differed by the lack of glands on the teeth, and the venation to the teeth running to the sinus of the tooth and along the apical margin of the tooth rather than medially to the tooth apex as in *Ailanthus*; such a venation is more similar to that of oleacean extant *Fraxinus*. Former *Myrica hallbaueri* is in gross morphology not easily distinguishable from “*Ailanthus prescheri*”.

Genus *Miooleites* Doweld, **gen. nov.**

IFPNI registration record: ED5DE37E-E63D-49AE-5F30-410AEB299BE6.

Diagnosis: Leaves simple, lanceolate, entire-margined, elliptic, apex acute, base cuneate. Venation brochidodromous. Primary veins straight; secondary veins near the base alternately, towards the tip suboppositely arranged, often irregularly spaced, arising at an angle of 40-50° straight to slightly curved but strongly curved in their final third; intersecondary veins simple to complex; tertiary and quaternary veins orthogonal reticulate. Areoles well developed, quadrangular to polygonal, veinlets in areoles frequently branched. Abaxial cuticle: cells small with thin, often indistinct, generally straight, sometimes undulating anticlinal walls. Stomata anomocytic, tetracytic or paracytic, rounded, randomly orientated, but never situated above major veins; weakly cutinized guard cells bordered by elevated cell margins with a generally strongly cutinized tooth-like ornamentation and T-pieces. Trichomes sunken in a pit, peltate, probably glandular with a unicellular stalk; unicellular base with thickened margin, surrounded by about seven radially, strongly thickened, sometimes branching rays, which represent the anticlinal walls of the neighbouring cells; head with smooth or infrequently lobed margin consisting of c. 12-18 (rarely about 32) cells.

Type species: *Miooleites liguricus* (Sachse) Doweld, comb. nov.

Eponymy: From Miocene, a geological epoch, and extant genus *Olea*, with a suffix *-ites*, denoting the fossil state.

Miooleites liguricus (Sachse) Doweld, **comb. nov.**

Basionym: *Oleinites liguricus* Sachse (2001: 217, plate 1: figures 1-2; plate 2: figures 1, 5-6).

Holotype: 2000B0001/1 (Naturhistorisches Museum Wien, Geologisch-Paläontologische Abteilung, Vienna, Austria).

Location and age: Rio Mazzapiedi, Italy. Late Miocene (Messinian).

Status: Leaves (with cuticles).

IFPNI registration record: D5CFB90D-47D0-5AB2-BC4A-D8FD319E3DD1.

Genus *Palibinia* Korovin (1932: 517).

Palibinia sinica Doweld, **sp. nov.**

Replaced name: *Myrica angustifolia* Li (1965: 541, 545), nom. inval. (ICN, Art. 40.1) & illeg. non *Myrica angustifolia* (Unger) Brongniart (1861: 1235)—*Palibinia angustifolia* Li (1979: 235), nom. inval. (ICN, Art. 40.1) [as ‘comb. nov.’].

Description: Leaves 2.2–4.2 cm long, 0.3–0.5 (–0.7) cm wide, ratio 7 : 8 (length : width), linear, uniform, gradually sharpening at the base and the apex, sometimes curved, especially at the tips, elongate sharp at the tips, narrow wedge-shape at the bases. Petioles thick, about 0.25 cm. Leaf margin with tooth, tooth arc, the lower tooth margin twice of the upper one in length. The middle vein strong, weaker at the base and tip, curved at the tip; lateral veins weaker than the midvein, arc, (almost) opposite and 50° the midvein, equal to the numbers of leaf tooth, extending to the parallel teeth; interveins 2–3, between adjacent lateral veins, with the longest one near to the upper lateral vein and extending to the tooth, the other 1–2 interveins short, unclear; interveins at 90° to the lateral veins modified after Li (1979).

Holotype: PB 6589 (Nanjing Institute of Geology and Palaeontology, Nanjing, China) – figured by Li 1979: plate 1, figure 8.

Location and age: Xiawanpu, Xiangxiang, Hunan Province, China. Eocene.

Eponymy: From China, *locus classicus*.

IFPNI registration record: 26A653E1-411E-2CC3-16B3-527979313669.

Notes: Initially Li (1965) described a new fossil-species *Myrica angustifolia* Li, but the taxon was not validly published due to the lack of type designation. In addition, the Chinese fossil-species is a later homonym

of *Myrica angustifolia* (Unger) Brongniart (1861: 1235). Later Li (1979) transferred the fossil-species to fossil-genus *Palibinia* Korovin, but the fossil-species, originally treated as a new combination, was based on the invalid name, and due to the lack of the required type designation, *Palibinia angustifolia* Li (1979) as a new replacement name (ICN, Art. 58.1) was not validly published. The fossil-species is validated here under a new name *Palibinia sinica* Doweld, **sp. nov.**, based on the characteristic fossil specimen from the Eocene sediments of Xiawanpu, Hunan Province, China (not from Chashan'ao village, Hunan Province, originally used previously by Li 1965 for *Myrica angustifolia* Li, nom. inval.).

Genus *Paracercocarpus* Doweld, **gen. nov.**

Diagnosis: Leaves very narrowly elliptic or oblanceolate to narrowly oblanceolate, sometimes falcate, simple; stipulate; base symmetric, acute to cuneate, apex acute to narrowly obtuse; teeth simple, typically confined to apical half of lamina, apical side very short relative to basal side and some teeth very appressed. Venation pinnate; midrib stout; (6-)12-15 (-30) pairs of secondary veins, originating at angles of 10°-20° to 50°-70°, typically straight, the basal one to three pairs brochidodromous, the more apical pairs entering teeth medially, flanked by two weak converging veins, craspedodromous; tertiary veins closely spaced; fourth-order veins forming with tertiary veins small, well-developed, quadrangular areoles; veinlets unbranched.

Notes: MacGinitie (1953) identified fossil formerly myricoid leaves as *Cercocarpus*, but the association of a distinctive pentacarpellary fruits (*Paracercocarpoides* Doweld, **gen. nov.**, see below) with this type of fossil foliage (apart monocarpellate extant *Cercocarpus*) debunked the possibility to treat these leaves as *Myrica* or *Cercocarpus*, and segregates them into a separate fossil leaf morphotaxon, *Paracercocarpus* Doweld, **gen. nov.** and tentatively referred to *Rosaceae*.

Type species: *Paracercocarpus henricksonii* (H.E. Schorn & J.A. Wolfe) Doweld, **comb. nov.**

Eponymy: From extant *Cercocarpus* Kunth, and prefix *para-*, resembling in appearance.

IFPNI registration record: ECB6C07E-6037-FF5F-24AE-901E937BBC72.

***Paracercocarpus beae-annae* Doweld, sp. nov.**

Replaced name: *Cercocarpus beae-annae* H.F. Becker 1961: 72, plate 22: figures 2-6 (“*bea-annae*”), nom. inval. (sine typo).

Holotype: UM 38259 (Museum of Palaeontology, University of Michigan, Ann Arbor, USA) – illustrated by Becker (1961: plate 22, figure 2).

Isotypes: UM 33611 [plate 22: figure 3]; UM 38260 [plate 22: figure 4] (Museum of Palaeontology, University of Michigan, Ann Arbor, USA) – both illustrated by Becker (1961: l.c.)

Location and age: Ruby Basin, SW Montana, USA. Early Oligocene (Rupelian).

IFPNI registration record: A0935A9A-369E-8FDE-8CB8-BF078A28D10C.

Notes: Becker (1961) invalidly established the new fossil-species *Cercocarpus beae-annae* H.F. Becker on the leaves and calyx from the Early Oligocene (Rupelian) sediments of Montana, USA, mentioned two “holotypes” (leaf and calyx). Now the fossil-species is validated (excluding calyx remains) and transferred in a new fossil-genus *Paracercocarpus* with a retained species epithet.

***Paracercocarpus henricksonii* (H.E. Schorn & J.A. Wolfe) Doweld, comb. nov.**

Basionym: *Cercocarpus henricksonii* H.E. Schorn & J.A. Wolfe (in J.A. Wolfe & H.E. Schorn 1991: 28, plate 10: figure 3).

Holotype: UCMG 34073 (Museum of Natural History, University of Colorado, Boulder, USA); Counterpart: USNM 422592; National Museum of Natural History, Smithsonian Institution, Washington, USA).

Location and age: North bank of Rio Grande near Sevenmile Bridge, Creede, Mineral County, Colorado, USA. Late Oligocene (Chattian).

IFPNI registration record: 1EAE5A13-8C28-7F8D-DAD1-DD60A1D332C3.

***Paracercocarpus undulatus* (Lesquereux) Doweld, comb. nov.**

Basionym: *Ilex undulata* Lesquereux (1874: 416) ≡ *Myrica bolanderi* Lesquereux 1878: 133) ≡ *Morella bolanderi* (Lesquereux) Cockerell (1906: 173).

Neotype (designated here): UCMP 3853 (Museum of Paleontology, University of California, Berkeley, USA) – illustrated by McGinitie (1953: plate 49, figure 4).

Location and age: Florissant, Colorado, USA (neotype); Middle Park, Colorado, USA (*locus classicus*, holotype lost). Late Eocene (Green River Formation).

IFPNI registration record: B33331B6-9123-E95D-29AF-68BC4EAAF17B.

Synonyms: 1. *Fraxinus myricifolia* Lesquereux 1885: 170, plate 33: figures 13-14) (“*myricaefolia*”) – synonymized by MacGinitie (1953: 115). Lectotype (designated here): USNM P s.n. (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Lesquereux (1885: plate 33, figure 14. Location and age: Florissant, Colorado, USA. Late Eocene (Green River Formation). IFPNI registration record: 67CA6DD6-D5C8-4A53-8B57-E875C6243A6D. 2. *Planera longifolia* var. *myricifolia* Lesquereux, 1885: 161, plate 29: figures 14-27) (“*myricaefolia*”) ≡ *Planera myricifolia* (Lesquereux) Cockerell (1908: 87) ≡ *Cercocarpus myricifolius* (Lesquereux) MacGinitie (1953: 115) (“*myricaefolius*”) – synonymized by MacGinitie (1953: 115). Lectotype (designated here): USNM P 1725 (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Lesquereux (1885: plate 29, figure 15. Location and age: Florissant, Colorado, USA. Late Eocene (Green River Formation). IFPNI registration record: 33DC8320-AF05-46AA-9A50-930E04BA7815. 3. *Ilex florissantensis* Cockerell & Knowlton [in Knowlton] (1920: 326) ≡ *Ilex microphylla* Lesquereux (1885: 186), nom. illeg. non *Ilex microphylla* Spreng. ex DC., Prodr. 2: 12. 1825 ≡ *Cercocarpus myricifolius* (Lesquereux) MacGinitie (1953: 115) (“*myricaefolius*”) – synonymized by MacGinitie (1953: 115). Holotype: USNM P 50329 (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Knowlton (1916: plate 21, figure 6. Location and age: Florissant, Colorado, USA. Late Eocene (Green River Formation). IFPNI registration record: 33DC8320-AF05-46AA-9A50-930E04BA7815. 4. *Celastrus lacoei* Lesquereux (1885: 184) – synonymized by MacGinitie (1953: 116). Holotype: USNM P 50252 [= Lacoe Collection # 49] (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Knowlton

(1916): plate 24, figure 6. Location and age: Florissant, Colorado, USA. Late Eocene (Green River Formation). IFPNI registration record: 8A8D0ECC-DE37-4909-97A1-902D31845CB5.

Notes: The fossil-species *Myrica bolanderi* Lesquereux (1878: 133) included previously validly published, but nearly forgotten fossil-species *Ilex undulata* Lesquereux (1874: 416). Lamotte (1952) incorrectly stated that *Ilex undulata* Lesquereux is a later homonym of “*Ilex undulata* Heer (1859)”, which has not been really published by Heer. McGinitie (1953) noticed that the formal priority of his adopted fossil-species *Cercocarpus myricifolius* (Lesq.) MacGinitie was incorrect since he thought that the first species epithet in *Myrica* ought to be adopted, *Myrica bolanderi* Lesq. He didn’t find the original holotype of *Myrica bolanderi* Lesq., and decided to adopt the name based on the fossil myricoid foliage, *Planera longifolia* var. *myricifolia* Lesq. I corrected the nomenclature of this type of fossil foliage by adopting the earliest validly published fossil-species, *Ilex undulata* Lesq.

Paracercocarpus nanophyllus (H.E. Schorn & J.A. Wolfe) Doweld, **comb. nov.**

Basionym: *Cercocarpus nanophyllus* H.E. Schorn & J.A. Wolfe (in J.A. Wolfe & H.E. Schorn 1991: 29, plate 10: figure 12).

Holotype: UCMG 34078 (Museum of Natural History, University of Colorado, Boulder, USA).

Location and age: North bank of Rio Grande near Sevenmile Bridge, Creede, Mineral County, Colorado, USA. Late Oligocene (Chattian).

IFPNI registration record: 27C91C22-FB0F-980E-0DB1-52BAB0A74D12.

Notes: Knowlton (1918: 325) described a distinct type of fossil leaf from the Palaeocene sediments (Raton Formation) of Raton Valley, New Mexico, USA, *Cercocarpus orestesii* Knowlt., which was most closely related to fossil foliage of *Cercocarpus*, but differed in longer wedge-shaped base, more numerous, sharper angled, and deeper impressed secondary veinlets and the veins ending at the sinus and not inside the teeth. This venation feature exclude the fossil leaf type from the relationships of rosaceous *Cercocarpi*, and since it is represented a distinct leaf type from older Palaeocene sediments, it is placed in a distinct

fossil-genus *Pseudocercocarpus* Doweld, *gen. nov.*: **Diagnosis:** Leaves small, obovate in outline, long and regularly wedge shaped at base, rather obtuse at apex; margin entire for one-third of the basal portion, thence slightly- toothed; midrib moderately slender, straight; secondary veinlets numerous, about ten pairs, close, parallel, straight, at an angle of about 50° craspedodrome, deeply impressed. IFPNI registration record: ECB6C07E-6037-FF5F-24AE-901E937BBC72. Eponymy: From extant *Cercocarpus* Kunth, and prefix *pseudo*–, not resembling in appearance. **TYPE SPECIES:** *Pseudocercocarpus orestesii* (Knowlton) Doweld, **comb. nov.** **Basionym:** *Cercocarpus orestesii* Knowlton (1918: 325, Plate XCV, figure 2). **Holotype:** USNM P 34655 (National Museum of Natural History, Smithsonian Institution, Washington, USA). **Geography:** leaf ledge just above Smith house, south of Raton Valley, New Mexico, USA. **Stratigraphy:** Palaeocene (Raton Formation). **Status:** Leaves. IFPNI registration record: BF1CCE53-F0D5-9ADE-AF99-685B1700489C.

Genus ***Paracercocarpoides*** Doweld, **gen. nov.**

Diagnosis: Fruits 3-pentacarpellary, enclosed in a striated hypanthium tube, with 3-(5?) curved, long styles; two presumably indehiscent structures, also with curved, long styles, cross the hypanthium tube, achenes almost exactly the same length as the hypanthium tube.

Notes: Axelrod (1987) referred a distinctive unusual pentacarpellary fruit, as a paratype, to fossil leaf species *Fallugia lipmanii* Axelrod; fruit and leaves were not found in organic connection, and therefore, their inclusion in a single fossil morphotaxon is untenable. Later Wolfe & Schor (1991) questioned the placement of fruits in *Fallugia* and considered most likely the association with a distinct type of fossil foliage, referred by Wolfe & Schor (1991) to the extant genus *Cercocarpus*, but not to their re-classified *Eleopoldia lipmanii* (Axelrod) H.E. Schorn & J.A. Wolfe (Bull. U.S. Geol. Surv. 1923: 24. 1991) [former *Fallugia lipmanii* Axelrod, Univ. Calif. Publ. Geol. Sci. 130: 129. 1987]. Since the extant species of *Cercocarpus* have only one achene per flower, this character questioned the relationship of the fossil foliage of *Cercocarpus henricksonii* and *C. myricifolius* with fossil fruits to *Cercocarpus*. If the leaves and fruits represent the same fossil taxon, distinct fossil-genera ***Paracercocarpus***

Doweld (leaves) and *Paracercocarpoides* Doweld (monotypic *Paracercocarpoides axelrodii* Doweld, sp. nov.) (fruits) should be used for these fossil remains.

Type species: *Paracercocarpoides axelrodii* Doweld, sp. nov.

Eponymy: From extant *Cercocarpus* Kunth, prefix *para-* and suffix *-oides*, resembling in appearance.

IFPNI registration record: 69E8C3FC-ECE4-6935-C90D-39C253CCC2A2.

Paracercocarpoides axelrodii Doweld, sp. nov.

Holotype: UCMP 7781A, B (Museum of Palaeontology, University of Michigan, Ann Arbor, USA) – illustrated by Axelrod (1987: plate 29, figure 10).

Location and age: North bank of Rio Grande near Sevenmile Bridge, Creede, Mineral County, Colorado, USA. Late Oligocene (Chattian).

Status: Fruits.

IFPNI registration record: 9F188B9C-CC4C-B9E7-CD13-C96D96F5129B.

Eponymy: In honour of Daniel Isaac Axelrod (1910–1998).

Genus *Protohedycarya* Rüffle (1965: 84).

In addition to completed re-classification (Rüffle 1965, 1988) of some Late Cretaceous fossil species of *Myrica* into a distinct fossil-genus *Protohedycarya* Rüffle, *Myrica cretacea* Heer (1871) and closely allied *Dryandroides haldemiana* Hosius & von der Marck (1880) are also transferred into *Protohedycarya* on the basis of similar leaf morphology.

Protohedycarya cretacea (Heer) Doweld, comb. nov.

Basionym: *Myrica cretacea* Heer (1871: 10, plate 3, figures 2 a–c) non *Myrica cretacea* Lesquereux (1876: 339).

Holotype: Not located (Naturhistoriska riksmuseet, Stockholm, Sweden).

Location and age: Quedlinburg, Saxony-Anhalt, Germany. Late Cretaceous (Santonian).

IFPNI registration record: DE03B35D-E666-40E6-A57E-BD1DEB959909.

Protohedycarya haldemiana (Hosius & von der Marck) Doweld, comb. nov.

Basionym: *Dryandroides haldemiana* Hosius & von der Marck (1880: 168)—*Myricophyllum haldemianum* (Hosius & von der Marck) Lange (1890: 666)—*Banksia haldemiana* (Hosius & von der Marck) Ettingshausen (1896: 163) – figured by Hosius & von der Marck 1880: plate 31, figure 97.

Lectotype (designated here): Cm66 (Geologisch-Paläontologische Museum der Westfälischen Wilhelms-Universität, Münster, Germany).

Location and age: Haldem, Stemwede, Kreis Minden-Lübbecke, North Rhine-Westphalia, Germany. Late Cretaceous (Campanian).

IFPNI registration record: 8ACB186B-1996-4629-ACF7-629AA9C54BDC.

Genus *Sibiriaca* Doweld, gen. nov.

Eponymy: From *Siberia* (*Sibiria*), *locus classicus*.

IFPNI registration record: 57A9F18E-20B3-4DAD-A6FD-F259790354CE.

Diagnosis: Fruits (endocarps) 1.65–3.15 x 0.95–2.15 mm, ovoid and ellipsoidal, elongate irregular, biconvex; the apex narrowed, attenuate or obtuse, with a short column or none; the base wedge-shaped, rounded, obliquely notched or weakly sinuate, short-stalked; sides depressed. Wingless. Fruit endocarp outer surface rugose; hollow large; inner surface glabrous, with a distinctive sculpturing of large 4–6-angular cells in longitudinal series; walls thickened.

Notes: Fruit endocarps of this fossil-genus differ essentially from the fruit endocarps of *Myrica* s.l.: wingless, unusual general form, thickened walls, and peculiar inner surface. The splitting into two halves may not be considered as a linking feature between *Myrica* s.l. and *Sibiriaca* gen. nov. As a result, two endemic Siberian Eocene/Oligocene fossil-species are excluded into a separate genus.

Type species: *Sibiriaca tomskiana* (Balueva) Doweld, comb. nov.

Sibiriaca tomskiana (Balueva) Doweld, comb. nov.

Basionym: *Myrica tomskiana* Balueva (in Dorofeev 1994: 16, plate 66, figure 24).

Holotype: 18/1 (Novosibirsk State University, Novosibirsk, Russian Federation).

Location and age: Tomsk, Tomsk region, Russian Federation. Early Oligocene (Cheganian suite).

Status: Fruits.

IFPNI registration record: B8E8B30C-4432-4DD8-A3DD-65197B023AB0.

Sibiriaca tymensis (Balueva) Doweld, **comb. nov.**

Basionym: *Myrica tymensis* Balueva (in Dorofeev 1994: 16, plate 66, figure 2).

Holotype: FTP 1-72-4 (Novosibirsk State University, Novosibirsk, Russian Federation).

Location and age: Valley between Belyj Yar and Dunaevsky Yar, right bank of Tym river, right tributary of Ob' river, Tomsk region, Russian Federation. Eocene.

Status: Fruits.

IFPNI registration record: F9F73FF7-0A63-4F1D-B659-A20A2C3FF980.

Genus *Sorbica* Doweld, **gen. nov.**

IFPNI registration record: 52BACA61-5237-3AF3-9031-3EFE9BE0DBE0.

Diagnosis: Leaves ovate to wide ovate-lanceolate; base cuneate to wide cuneate; apex acuminate; petiole long, slender; margin strongly doubly serrate to deeply incised, sinuses often reaching nearly to midrib basally, lobing always less well developed apically. Midrib slender; 4-7 to 12 or more pairs of opposite to alternate secondaries, originating at 40° to 50°, pursuing a straight course to points of marginal lobes; intersecondary veinlets commonly present, branching and forming marginal veins around base of sinus; tertiary venation reticulate.

Eponymy: From extant *Sorbus* L., and suffix – *icus*, resembling in appearance.

Notes: MacGinitie (1953: 117) mentioned the resemblance of the fossil leaves of *Myrica copeana* Lesq., from Florissant Eocene sediments, to leaves that intermediate between the leaves of certain extant species of *Sorbus* and *Crataegus*. Cockerell (1910) found that leaf morphology of these fossils is similar to the leaves of extant species of *Sorbus*, *Pyrus pinnatifida* Ehrh. (*Sorbus hybrida* L.) and *Sorbus* × *neuillyensis* Dippel, and transferred previously published myricod fossils of Lesquereux to *Sorbus*, *Sorbus diversifolia* (Lesq.) Cockerell. He also advanced a hypothesis that fossil-species *Sorbus diversifolia* (Lesq.) Cockerell

is “a hybrid” with parents, fossil-species *Sorbus megaphylla* Cockerell (1908: 95) and *Sorbus nupta* Cockerell (1910: 78). Leaving aside speculations on the hybrid nature of *S. diversifolia*, rejected also by MacGinitie (1953), since *Sorbus megaphylla* was treated as a synonym of *Rhus obscura* (Lesquereux) MacGinitie, the resemblance to *Sorbus/Crataegus* was overestimated and even misleading due to the superficial similarity in venation, which precludes the relationship. The fossil-species *Myrica copeana* Lesq. and *Sorbus nupta* Cockerell is both segregated in the fossil-genus of its own, *Sorbica* Doweld, gen. nov. and tentatively referred to *Rosaceae*.

Type species: *Sorbica copeana* (Lesquereux) Doweld, **comb. nov.**

Sorbica copeana (Lesquereux) Doweld, **comb. nov.**

Basionym: *Myrica copeana* Lesquereux (1874: 411) (“*copiana*”) ≡ *Crataegus copeana* (Lesquereux) MacGinitie (1953: 117) ≡ *Sorbus copeana* (Lesquereux) Cockerell (1910: 78).

Holotype: USNM P 147 (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Lesquereux, 1885: plate 17, figure 5.

Location and age: Florissant, Colorado, USA. Eocene (Green River Formation).

IFPNI registration record: 618C1045-78F9-473C-2DC0-42EB8168E89A.

Synonyms: 1. *Myrica diversifolia* Lesquereux (1885: 148, 241) ≡ *Sorbus diversifolia* (Lesquereux) Cockerell (1910: 76) ≡ *Pyrus diversifolia* (Lesquereux) R.S. LaMotte (1952: 285), nom. illeg. non *Pyrus diversifolia* Bongard (1832: 133). Lectotype (designated here): USNM P 1624 (National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured by Lesquereux, 1885: plate 25: figure 6. Location and age: Florissant, Colorado, USA. Eocene (Green River Formation). IFPNI registration record: 60D0C5C5-8128-45A6-88E1-E48BC6DDDB6. 2. *Crataegus lesquereuxii* Cockerell (1906: 311) ≡ *Crataegus acerifolia* Lesquereux (1885: 198), nom. illeg. non *Crataegus acerifolia* Lodd. ex Moench (1785: 31). Lectotype (designated here): Princeton Museum 660 (Princeton Museum, USA). Location and age: Florissant, Colorado, USA. Eocene (Green River Formation). IFPNI registration record: FBCAB7DD-

F2DC-4951-B1DE-2A299DF6CF72. **3.** *Betula florissanti* Lesquereux (1885: 157, plate 27, figure 11). Holotype: Princeton Museum [not specified] (Princeton Museum, USA). Location and age: Florissant, Colorado, USA. Eocene (Green River Formation). IFPNI registration record: 5E2ABD97-19EA-4747-8B0F-66A5DA4C444D. **4.** *Carpinus attenuata* Lesquereux (1885: 152, plate 27, figure 10). Holotype: Princeton Museum # 258 (Princeton Museum, USA). Location and age: Florissant, Colorado, USA. Eocene (Green River Formation). IFPNI registration record: 09AFB184-6934-4212-82B1-02FDDA8A6A02. **5.** *Onoclea reducta* Cockerell (1908: 76, plate 6, figure 4). Holotype: USNMP40763 (National Museum of Natural History, Smithsonian Institution, Washington, USA). Location and age: Florissant, Colorado, USA. Eocene (Green River Formation). IFPNI registration record: 5BAACB3A-9309-4436-B9B7-3EE7AE9349A7.

***Sorbica nupta* (Cockerell) Doweld, comb. nov.**

Basionym: *Sorbus nupta* Cockerell (1910: 78, text-figure 2) $\equiv$ *Crataegus nupta* (Lesquereux) MacGinitie (1953: 118).

Holotype: 18545 (Museum of Natural History, University of Colorado, Boulder, USA).

Location and age: Florissant, Colorado, USA. Eocene (Green River Formation).

IFPNI registration record: 2823F1A2-4A63-0D9B-4D33-FAFB1A7496AC.

Notes: MacGinitie (1953) mentioned that it is possible that these fossil leaves are merely variants of the highly characteristic *Sorbica copeana* (Lesq.) Doweld, *comb. nov.*, it is retained as a distinct fossil-species since they “show a consistent set of characters among themselves” MacGinitie (1953: 119).

Genus *Taldysaica* Doweld, gen. nov.

IFPNI registration record: 6E26D2E8-712A-4161-AB1B-09AA53F75BE7.

Diagnosis: Leaves simple. Coriaceous, elongate, widened in the lower part near the leaf base; leaf base wedge-shaped, slightly decurrent to a short, but massive petiole, apex attenuate, rim finely serrate, teeth terminated with small glandulae. Median vein massive, abruptly thinned from the middle of the leaf; secondary veins very fine, depressed (after Shilin 1971, modified).

Type species: *Taldysaica shilinii* Doweld, nom. nov.

***Taldysaica shilinii* Doweld, nom. nov.**

Replacement name: *Myrica taldysaica* Shilin (1971: 101).

Holotype: 108/284 (Institute of Zoology, Almaty, Kazakhstan) – figured by Shilin 1971: plate 1, figure 4.

Location and age: Taldysaj, Chu-Sarysuj depression, Kazakhstan. Late Cretaceous (Senonian).

IFPNI registration record: 0185279F-4E0C-4A9D-9E6A-C6EB35549F07.

Eponymy: In honour of P. V. Shilin, Russian palaeobotanist and explorer of fossil floras of Central Asia.

Notes: Shilin (1971) noticed that endemic fossil-species *Myrica taldysaica* Shilin from Central Asia has no analogues among known species of the genus *Myrica*, but nevertheless, he refrained to establish a new fossil-genus for the receipt of the anomalous fossil foliage. Since the leaf morphology of the species does correspond to neither *Myrica*, nor *Morella*, the Asian endemic species is excluded into the genus of its own.

Genus *Vauquelinia* Correa ex Bonpland (1807: 140)

***Vauquelinia aculeata* (Saporta) Denk, Bouchal, H.T. Güner, Coiro, Butzm., Pigg & Tiffney, New Phytol. 238(6): 2677. 2023.**

Synonyms: **1.** *Quercus aculeata* Saporta (in Heer, 1861a: 145)—*Banksites aculeatus* (Saporta) Saporta (1863a: 257)—*Myrica aculeata* (Saporta) Saporta (in Schimper 1872: 548). Lectotype (designated here): MNHN.F.14771 (Muséum National d'histoire naturelle, Paris, France) – figured by Saporta 1863a: plate 9, figure 3. Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Early Miocene (Aquitania). IFPNI registration record: C80691D7-A16C-466E-A738-A444BD488BB7. Notes: Denk & al. (2023) incorrectly based their new combination on *Banksites aculeatus* (Saporta) Saporta (1863a: 257), a later recombined plant synonymic name; I corrected here the basionym and provided a new lectotypification for its exact basionym, *Quercus aculeata* Saporta (in Heer, 1861a: 145). **2.** *Panax matheronii* Saporta (1863a: 267)—*Myrica matheronii* (Saporta) Saporta (1873: 30). Lectotype (designated here): MNHN.F.11694 (Muséum National d'histoire naturelle, Paris, France)

– figured by Saporta 1873: plate 6, figure 4. Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: BB239CB3-64AC-4BFE-B630-B1C4CA0FD877. **3.** *Panax demersum* Saporta (1863a: 268). Type: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: BCBEAB94-796D-4D52-9A4C-5D18427EB2A0. **4.** Synonym: *Ilex quercina* Saporta (1863a: 275). Type: Not located (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Late Oligocene (Chattian). IFPNI registration record: 7B480991-7771-44DE-B9C9-BB37B8DC1192. **5.** *Banksites pseudodrymeja* Saporta (1863a: 258, plate 9: 2) (“*pseudo-drymeja*”)—*Knightites pseudodrymeja* Saporta (in Heer, 1861a: 145), nom. inval.—*Myrica pseudodrymeja* (Saporta) Saporta (in Schimper 1872: 548) (“*pseudo-drymeja*”). Lectotype (designated here): MNHN.F.14770 (Muséum National d'histoire naturelle, Paris, France). Location and age: Aix-en-Provence, Provence-Alpes-Côte d'Azur, France. Early Miocene (Aquitanian). IFPNI registration record: BB239CB3-64AC-4BFE-B630-B1C4CA0FD877.

6. Fossil leaf cuticles

Genus *Pelticutis* Schneider (1969: 15)

Synonym: *Pilisolicutis* Roselt & Schneider, Paläontol. Abh., Abt. B, Paläobot. 3: 68. Feb 1969. (1969: 15).

Type: *P. amplirima* Schneider (1969: 15).

Pelticutis crenata (Jählichen) Schneider (2000: 94).

Basionym: *Myrica crenata* Jählichen (1969: 78).

Holotype: MB.Pb.2004/0665 (Museum für Naturkunde, Berlin, Germany).

Location and age: Niederlausitz, Sachsen, Germany. Middle Miocene.

IFPNI registration record: 18C551BB-951F-4021-958C-F07B3A08A015.

Pelticutis integerrima (Kräusel & Weyland) Schneider (2000: 100).

Basionym: *Myrica integerrima* Kräusel & Weyland (1954: 129).

Holotype: SMB 6575/1 (Senckenberg Naturhistorische Sammlungen, Frankfurt/Main, Germany).

Location and age: Heerlen, Limburg, The Netherlands. Miocene (?Oligocene).

IFPNI registration record: E6BE3A45-6D5D-49BF-B1B1-5F4853F23B2.

Synonyms: **1.** *Myrica pseudointegerrima* Weyland & Kilpper (1963: 95), nom. inval. & syn. nov. Type (“holotype”): SM.B. 9940/1, 2 (Senckenberg Naturhistorische Sammlungen, Frankfurt/Main, Germany). Location and age: Neurath, Düren & Fortuna mines, Rheinland-Pfalz, Germany. Miocene. IFPNI registration record: 8C88DD25-61B4-40A3-B28D-85E4BAE380D8. Notes: Weyland & Kilpper (1963: 95) inadmissibly based their new fossil species on several fossil specimens from three different localities (Neurath, Düren & Fortuna mines, Rheinland-Pfalz, Germany), therefore their designation of the holotype consisting of several specimens from different geographical places is invalid. Since Schneider (2000) pointed out that there are no discrete borders between *M. integerrima* and *M. pseudointegerrima*, the last species is placed into synonymy of *M. integerrima* with no validation. **2.** *Myrica holzweissingensis* Schneider (1965: 1240), syn. nov. Holotype: 11/467 (Technische Universität Bergakademie Freiberg, Freiberg, Germany). Location and age: Holzweißig, Bitterfeld-Wolfen, Landkreis Anhalt-Bitterfeld, Sachsen-Anhalt, Germany. Late Oligocene. IFPNI registration record: BF04795F-1BC2-4F33-AD59-ABC712997A48. Notes: Jählichen (1969: 81) noticed that *Myrica holzweissingensis* Schneider, based on leaf cuticles, has a great similarity with previously described leaf cuticles of *M. integerrima* Kräusel & Weyland (1954: 129). Since no sufficient distinction in leaf cuticular ultrastructure was found between both extinct forms, *M. holzweissingensis* is placed in synonymy of *M. integerrima* on account of priority.

Pelticutis undulatissima (Knobloch & Kvaček)
Schneider (2000: 91).

Basionym: *Myrica undulatissima* Knobloch & Kvaček (1976: 22).

Holotype: Knobloch & Kvaček s.n. (Bayerische Staatssammlung für Paläontologie und Geologie, Munich, Germany).

Location and age: Murnerweiher, Bavaria, Germany. Early Miocene (Burdigalian).

IFPNI registration record: B065CE69-5394-4AFB-AD61-34CD6C843D16.

7. Fossil spores dispersae (pollen)

The fossil pollen record of the myricoid type of pollen is extensive, started with similar, but problematic (possibly convergent) forms in the Cretaceous (Gladkova 1965). The *Myricaceae* is a stenopalynous (homogeneous) family, having the distinctive feature of their pollen – the so-called *Myrica*-type of aperture, lacking nexine in the pores and the thickened sexine forming an annulus (Romanowicz 1960; Planderová 1974; Moncada 1985; Sundberg 1985). Pollen of the extant *Myrica* and *Morella* overlap fine sculpturing (under LM and SEM) and cannot be usually set apart. However, the pollen of *Canacomyrica* and *Comptonia* are distinctive (Sundberg 1985); the fossil pollen of *Canacomyrica* are placed to the fossil genus *Haloragacidites* Couper (1953: 41). A distinct morphogenus for the fossil pollen of *Comptonia* was not still formed; it is created here on the base of the fossil-species *Comptonia peregriniformis* Gladkova (1965: 183):

Genus ***Comptonipollis*** Doweld, **gen. nov.**

IFPNI registration record: 2E4C287E-76F7-470D-9AC5-33037D40631F.

Diagnosis: Pollen triporate, angulaperturate, amb convex-triangular, equatorial diameter 30–34 µm. Pores slightly aspidate, without labrum, equatorial, occasionally one pore slightly shifted beyond the equator. Ectopores oval, slightly equatorially elongated, 2.5–3 µm in diam., endospores 4–7 µm in diam. Atrium broad, very flat, ca 2.0 µm deep, with pseudogranula. Exine two-layered, ca 1.5 µm thick, compact, separated only in the area of endopores. Ectexine ca 1.0 µm thick, near the ectopores thickened, endexine thinner than

ectexine. Surface of exine (under LM) finely granulate, surface of tectum (under SEM) covered by irregular tubercles, 1.5–2.0 µm in diam., with uneven surface covered by microconi with slightly rounded or rare sharp tips, circular bases ca 0.8 µm in diam., and ca 0.6 µm high.

Type species: *Comptonipollis peregriniformis* (Gladkova) Doweld, **comb. nov.**

Comptonipollis peregriniformis (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia peregriniformis* Gladkova (1965: 183)—*Myricipites peregriniformis* (Gladkova) Grabowska & Ważyńska (in Stuchlik & al. 2009: 26).

Holotype: Prep. 7495–9 (71,1 x 9,5) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*).

Location and age: Bol'shaja Khukhu river, Khanty-Mansi autonomous district, Russian Federation. Early Oligocene (Rupelian = Novomikhailovian suite).

Eponymy: From extant *Comptonia* L'Héritier and suffix *-pollis*, pollen.

IFPNI registration record: 60015E3E-B52D-4553-B9D9-0B8DAE14C654.

Comptonipollis aboriginus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia aborigena* Gladkova (1965: 175, plate 6, figure 1)—*Labraferoidaepollenites aboriginus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 427-2 (82 x 4) (All-Russian Scientific research institute of geology and mineral resources of Ocean, VNIIOkeangeologiya, St.-Petersburg, Russian Federation).

Location and age: Novyj Port, Khanty-Mansi autonomous district, Russian Federation. Paleocene.

IFPNI registration record: 6CA07FD2-322D-E930-DBB1-A7361915C57F.

Comptonipollis imperfectus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia imperfecta* Gladkova (1965: 178, plate 8, figure 3)—*Triatriopollenites imperfectus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 427-2 (82,5 x 1,0) (All-Russian Scientific research institute of geology and mineral resources of Ocean, VNIIOkeangeologiya, St.-Petersburg, Russian Federation).

Location and age: Novyj Port, Khanty-Mansi autonomous district, Russian Federation. Paleocene.

IFPNI registration record: FFE5B3C5-4667-9EE6-891E-5117900AF53D.

Comptonipollis compactus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia compacta* Gladkova (1965: 182, plate 11, figure 1)—*Triatriopollenites compactus* (Gladkova) N.O. Frederiksen (1988: 50)—*Alabroidaepollenites compactus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 10464-2 (88,5 x 11,0) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Tazov peninsula, Yamal-Nenets autonomous district, Krasnojarsk Territory, Russian Federation. Paleocene.

IFPNI registration record: FFE5B3C5-4667-9EE6-891E-5117900AF53D.

Comptonipollis insolitus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia insolita* Gladkova (1965: 181, plate 10, figure 6)—*Alabroidaepollenites insolitus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 5044-2 (66 x 3) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Shipla River, Kemerovo region, Russian Federation. Eocene.

IFPNI registration record: 2849DAE2-D5EB-F416-3684-781A06C2D8D9.

Comptonipollis podagrarius (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia podagraria* Gladkova (1965: 179, plate 9, figures 1-3)—*Triatriopollenites podagrarius* (Gladkova) Kedves (1974: 47), nom. inval. (sine basionymo).

Holotype: Preparation 7669 (77,0 x 3,5) (All-

Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Tab'jakha River, Khanty-Mansi autonomous district, Russian Federation. Paleocene.

IFPNI registration record: 91BE153C-0B50-A09D-706C-45FDA05192B2.

Comptonipollis sauerae (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia sauerae* Gladkova (1965: 180, plate 10, figure 1)—*Triatriopollenites sauerae* (Gladkova) Kedves (1974: 48), nom. inval. (sine basionymo).

Holotype: Preparation 100-1 (96,5 x 16,2) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Zolotoj Kitat River, Kemerovo region, Russian Federation. Eocene.

IFPNI registration record: 7AD010B5-C3CD-9E89-F498-B6FB428540B2.

In early years of palaeopalynology (1930–50ths) numerous fossil pollen genera and species were established, which have myricoid appearance (although names of some genera pointed to quite different families and genera of angiosperms): *Myricipites* Wodehouse (1933: 505), *Myricaceae-pollenites* Potonié, Thomson & Thiergart (1950: 51), *Engelhardtoidites* Potonié, Thomson & Thiergart (1950: 51), *Triatriopollenites* Pflug (in Thomson & Pflug 1953: 76), *Myricaceoipollenites* Potonié (1960: 142), *Betulaceoipollenites* Potonié (1960: 114), *Engelhardtoidites* Potonié (1960: 118), and *Myricites* Zaklinskaja (1963: plate 41). Later Kedves added two more genera, viz. *Labraferoidaepollenites* Kedves (in Kedves & Russell 1982: 108) and *Alabroidaepollenites* Kedves (in Kedves & Russell 1982: 108), which were segregated from *Triatriopollenites* (former sections of *Triatriopollenites* were raised to generic rank). Kedves (1992) and Grabowska & Ważyńska (in Stuchlik & al. 2009) summarized existing classifications of myricoid fossil pollen, but with no critical and exhaustive nomenclatural analysis, and came to different conclusions. Kedves (1992) accepted *Triatriopollenites* Pflug with two segregated genera, *Labraferoidaepollenites* Kedves and *Alabroidaepollenites* Kedves, status of the previously

established *Myricipites* Wodehouse was not resolved. In contrary, Grabowska & Ważyńska (l.c. 2009) recognized two genera of fossil myricoid pollen, *Myricipites* Wodehouse and *Triatriopollenites* Pflug, because they strangely were not able to combine both genera into a single genus (i.e. to subsume junior synonym *Triatriopollenites* Pflug 1953 into synonymy of *Myricipites* Wodehouse 1933): “*Triatriopollenites rurensis* has pollen grains very similar to those of recent species of *Myrica* L. and which should be incorporated to the earlier created valid genus *Myricipites* Wodehouse 1933, but which is a type species for the genus *Triatriopollenites* Pflug and can not be transferred to another genus (ICBN)”. The same idea was advanced also earlier (Stuchlik & al. 2007). The problem is far-fetched. Their conclusions are incorrect since there are no provisions in the International Code of Nomenclature for Algae, Fungi and Plants (ICN, Turland & al. 2025) that could preclude the possibility of synonymization of junior generic name with older synonyms.

Nichols (2010) re-studied the holotype of *Myricipites dubius* Wodehouse (1933: 506), the type of *Myricipites* Wodehouse, and came to conclusion that the single corrupted by preservation pollen grain representing the holotype of the fossil species is triporate, spheroidal, psilate to scabrate, with pores aspidate, not annulate or vestibulate, ectexine protruding at pores but not thickened, endexine is lacking in pore area. This re-study definitely allows relating *Myricipites* with its formerly treated ambiguous type due to ill preservation to the myricoid pollen type. In sum, the oldest validly published generic name for the fossil pollen of the *Myrica*-group is *Myricipites* Wodehouse 1933, which is amplified here by inclusion of previously established, superfluous fossil-genera *Betulaceoipollenites* Potonié, *Labraferoidaepollenites* Kedves, and *Triatriopollenites* Pflug.

Genus *Myricipites* Wodehouse (1933: 505) emend.
Doweld.

IFPNI registration record: EDF7C1AF-9780-407A-952E-2763310D95C4.

Synonyms: 1. *Carpinus-pollenites* Potonié, Thomson & Thiergart (1950: 52), nom. nud. non Thiergart (1938: 315), nom. nud. **Type:** *Carpinus-pollenites bituitus* (Potonié) Potonié, Thomson & Thiergart (1950: 52), comb. inval. (ICN, Art. 35).

2. *Triatriopollenites* Pflug (in Thomson & Pflug 1953: 79), nom. superfl. & illegit. (ICN, Art. 52.1). **Type:** *Triatriopollenites rurensis* Pflug & Thomson (in Thomson & Pflug 1953: 79). 3. *Betulaceoipollenites* Potonié (1960: 114), syn. nov. **Type:** *Betulaceoipollenites bituitus* (Potonié) Potonié (1960: 114). 4. *Labraferoidaepollenites* Kedves (in Kedves & Russell 1978: 108), nom. superfl. & illeg. (ICN, Art. 52.1), syn. nov. **Type:** *Labraferoidaepollenites pseudorurensis* (Pflug) Kedves (in Kedves & Russell 1982: 108). 5. *Myricites* Zaklinskaya (1963: ad plate 41), nom. nud. & inval. **Type:** Not designated. **Type:** *M. dubius* Wodehouse (1933: 506, figure 33). Location and age: Parachute Creek, Garfield Co., Colorado, USA. Middle Eocene (Green River Formation).

Myricipites aroboratus (Pflug) Doweld, **comb. nov.**

Basionym: *Triatriopollenites aroboratus* Pflug (in Thomson & Pflug 1953: 80)—*Alabraferoidaepollenites aroboratus* (Pflug) Kedves (in Kedves & Russell 1982: 110).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Antweiler & Wehmingen bei Saristedt, Hannover, Germany. Palaeocene.

IFPNI registration record: BFF3073C-CB10-4F47-96B1-D9BE65995341.

Myricipites belgicus (E. Roche) Doweld, **comb. nov.**

Basionym: *Triatriopollenites belgicus* E. Roche (1973: 58).

Holotype: Slide Dessin n° 12 (not located) – figured by Roche 1973: plate 4, figures 13–14.

Location and age: Kallo, Beveren, Belgium. Palaeocene (Thanetian = Landenian).

IFPNI registration record: 835003A4-00FA-48F4-878B-77F0F8B1B65E.

Myricipites bertelsiae (Archangelsky) Doweld, **comb. nov.**

Basionym: *Triatriopollenites bertelsiae* Archangelsky (1973: 387) (“*bertelsii*”).

Holotype: p.m. 1015, 28.9/ 96.2 (División Paleobotánica, Museo de La Plata, Argentina) – figured by Archangelsky 1973: plate 10, figures 2–5.

Location and age: Chubut, Argentina. Palaeocene (Bororó Formation).

IFPNI registration record: 835003A4-00FA-48F4-878B-77F0F8B1B65E.

Myricipites bituitus (Potonié) Nagy (1969: 477)—*Pollenites bituitus* Potonié (1934: 57)—*Pollenites bituitus* Potonié (1931: 332), nom. inval. (ICN, Art. 35)—*Carpinus-pollenites bituitus* (Potonié) Potonié, Thomson & Thiergart (1950: 52), nom. inval. (ICN, Art. 35)—*Triatriopollenites bituitus* (Potonié) Pflug & Thomson (in Thomson & Pflug 1953: 79)—*Betulaceoipollenites bituitus* (Potonié) Potonié (1960: 114)—*Labraferoidaepollenites bituitus* (Potonié) Kedves (in Kedves & Russell 1978: 109).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Eschweiler & Frielendorf, Kassel, Germany. Oligocene/Miocene (Burdigalian).

IFPNI registration record: 6D9721EF-DB49-442C-B921-55D0D8B02779.

Myricipites carolinensisiformis (Gladkova) Doweld, **comb. nov.**

Basionym: *Myrica carolinensisiformis* Gladkova (1956: 216).

Holotype: Not located (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Nebit-dag, Monzhukly, Kum-dag, Western Turkmenia. Pliocene.

IFPNI registration record: 5DDA9954-D7C7-4C91-BA03-14EF06DE9027.

Myricipites conspicuus (Gladkova) Doweld, **comb. nov.**

Basionym: *Myrica conspicua* Gladkova (1965: 168) (“*conspiqua*”)—*Triatriopollenites conspicuus* (Gladkova) Kedves (1974: 46), nom. inval. (ICN, Art. 41.5)—*Labraferoidaepollenites conspicuus* (Gladkova) Kedves (1992: 34).

Holotype: Preparation 8645–4 (56,1–8,9) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Malyj Atlym village, Khanty-Mansi autonomous district, Russian Federation. Late Oligocene (Chattian).

IFPNI registration record: 3904D67E-7BDF-4A7E-951B-76CE8D499C8C.

Myricipites convexus (Groot & Groot) Doweld, **comb. nov.**

Basionym: *Triatriopollenites convexus* Groot & Groot (1962: 166)—*Casuarinidites convexus* (Groot & Groot) Frederiksen & Christopher (1978: 140).

Holotype: Slide 50312–B, grain 5, 114.5x3.9 (University of Maryland, n.v.).

Location and age: Landover, Maryland, USA. Palaeocene (Brightseat Formation).

IFPNI registration record: 835003A4-00FA-48F4-878B-77F0F8B1B65E.

Synonym: *Trivestibulopollenites fissuratus* Frederiksen (1978: 691, figure 1a). **Holotype:** Slide DC-13 (4), coordinates 36.9 X 98.2. **Location and age:** Clubhouse Crossroads core at 160.0 m, Dorchester County, South Carolina, USA [32°53.25' N., 80°21.41' W.]. Palaeocene (Black Mingo Formation, lower Sabinian). IFPNI registration record: 3299CC54-4C03-80D4-A4D8-453844544932.

Notes: Frederiksen (1988: 50) synonymized *Triatriopollenites convexus* Groot & Groot (1962) and *Trivestibulopollenites fissuratus* Frederiksen (1978) into a single pollen fossil morphotaxon. In addition, he also noticed that these American fossil-species may be conspecific with European *Triatriopollenites rurensis* Pflug & Thomson (in Thomson & Pflug 1953).

Myricipites costatus (Norton) Doweld, **comb. nov.**

Basionym: *Triatriopollenites costatus* Norton in Norton & Hall (1969: 40).

Holotype: Slide KHC-I-II, 41.7 x 113.2 (ref. 67.1 x 49.8 (Dept. Botany, Univ. Minnesota, USA, n.v.))

Location and age: Montana, USA. Paleocene (Hell Creek Formation).

IFPNI registration record: 1C461726-05D7-4A89-88D1-056A4EA4A0ZZ.

***Myricipites diversus* (Gladkova) Doweld, comb. nov.**

Basionym: *Myrica diversa* Gladkova (1965: 166)—*Triatriopollenites diversus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 10464-1 (55,5 X 3,5) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Tazov peninsula, Yamal-Nenets autonomous district, Krasnojarsk territory, Russian Federation. Early Oligocene (Rupelian = Atlymian suite).

IFPNI registration record: 1C461726-05D7-4A89-88D1-056A4EA4A083.

***Myricipites dubiosus* (Weyland & Takahashi)
Doweld, comb. nov.**

Basionym: *Triatriopollenites dubiosus* Weyland & Takahashi (1961: 100).

Holotype: Preparation A-1 (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany, n.v.).

Location and age: Heerlen, Limburg, The Netherlands. Early Miocene (?).

IFPNI registration record: 1C461726-05D7-4A89-88D1-056A4EA4A0ZZ.

***Myricipites esculentiformis* (Gladkova) Doweld,
comb. nov.**

Basionym: *Myrica esculentiformis* Gladkova (1956: 216).

Synonym: *Myrica esculentiformis* var. *insignis* Gladkova (1956: 216), syn. nov.

Holotype: Not located (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Nebit-dag, Monzhukly, Kum-dag, western Turkmenia. Pliocene.

IFPNI registration record: 945A82F5-4FD9-4D89-AF9F-F55EB9F9163B.

***Myricipites exiguus* (Sauer) Doweld, comb. nov.**

Basionym: *Myrica exigua* Sauer (1960: 411).

Holotype: Preparation 1494/941 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Yantarnyj village, Kaliningrad region, Russian Federation. Early Oligocene (Rupelian).

IFPNI registration record: 224CF5EE-A683-4F19-8D58-398DDFA900D7.

***Myricipites fayumensis* (Takahashi & Jux) Doweld, comb. nov.**

Basionym: *Triatriopollenites fayumensis* Takahashi & Jux (1989b: 395).

Holotype: Preparation Fayum 1-19 (GN 5319) (Department of Geology, Nagasaki University, Nagasaki, Japan) – figured by Takahashi & Jux 1989b: plate 9, figure 10.

Location and age: Fayum Oasis, Egypt. Oligocene/Miocene.

IFPNI registration record: C6B39AC7-491D-4763-ABFB-F4877457AF55.

***Myricipites fusus* (Chateauneuf) Doweld, comb. nov.**

Basionym: *Triatriopollenites fusus* Chateauneuf (1980: 104).

Holotype: Slide 8639, coordinates 35.9/120.9 (Université Pierre et Marie Curie, Paris VI, France, n.v.) – figured by Chateauneuf 1980: plate 8, figure 18–19.

Location and age: Chelles, near Paris, France. Late Eocene (Priabonian = Ludian).

IFPNI registration record: C6B39AC7-491D-4763-ABFB-F4877457AF55.

***Myricipites galeiformis* (Gladkova) Doweld, comb. nov.**

Basionym: *Myrica galeiformis* Gladkova (1965: 165) (“*galiformis*”)—*Triatriopollenites galeiformis* (Gladkova) Frederiksen (1988: 50) (“*galiformis*”); *Triatriopollenites galeiformis* (Gladkova) Kedves (1992: 36) (“*galiformis*”), nom. superfl. [isonym].

Holotype: Preparation 8127-5 (83,5 x 13,0) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Pomut River, Khanty-Mansi autonomous district, Russian Federation.

IFPNI registration record: 4B6105EE-F15C-41DE-A875-51A2CEA6BC31.

Myricipites granulatus (Sauer) Doweld, **comb. nov.**

Basionym: *Myrica granulata* Sauer (1960: 410).

Holotype: Preparation 1492/832 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Yantarnyj village, Kaliningrad region, Russian Federation. Middle Eocene.

IFPNI registration record: 62BAB7B7-3D61-46B3-B5E2-B30C90F66D7C.

Myricipites hartwegiiformis (Boitzova) Doweld, **comb. nov.**

Basionym: *Myrica hartwegiiformis* Boitzova (1966: 216) (“*hartwegiiformis*”).

Holotype: Preparation 732 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Astcheajryk ravine, Ustjurt plateau, Kazakhstan. Early Oligocene (Rupelian).

IFPNI registration record: D89EE7AD-17FD-412F-9F9F-05DE55B409DB.

Myricipites indostanicus Doweld, **nom. nov.**

Replaced name: *Myricaceoiipollenites dubius* Venkatachala & Rawat (1972: 320)—*Triatriopollenites dubius* (Venkatachala & Rawat) Frederiksen (1994: 116) [non *Myricipites dubius* Wodehouse 1933: 506, preoccupied].

Holotype: Not located – figured by Venkatachala & Rawat 1972: plate 4, figures 35–36.

Location and age: Cauvery basin, India. Palaeocene.

Eponymy: From Indostan, *locus classicus*.

IFPNI registration record: 1C461726-05D7-4A89-88D1-056A4EA4A083.

Myricipites japonicus Doweld, **nom. nov.**

Replaced name: *Triatriopollenites mirabilis* Takahashi (1961: 299, plate 19, figure 10) [non *Myricipites mirabilis* (Gladkova) Doweld, **comb. nov.**, preoccupied].

Holotype: GK-V 1254 (Department of Geology, Nagasaki University, Nagasaki, Japan).

Location and age: Second Middle-seam,

Sumitomo-Kishima pit, Karatsu coalfield, Saga Prefecture, Japan. Oligocene (Yoshinotani Formation).

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA6YY.

Myricipites josensis (Takahashi & Jux) Doweld, **comb. nov.**

Basionym: *Triatriopollenites josensis* Takahashi & Jux (1989a: 258).

Holotype: Prep. Jos 1-15 (GN 5335) (Department of Geology, Nagasaki University, Nagasaki, Japan) – figured by Takahashi & Jux 1989a: plate 15, figure 28.

Location and age: Sabon Gida tin mine, Jos Plateau, Nigeria. Oligocene/Miocene.

IFPNI registration record: C6B39AC7-491D-4763-ABFB-F4877457AF55.

Myricipites kulkovae Doweld, **nom. nov.**

Replaced name: *Myrica eocenica* Kulkova (1973: 411), **nom. illeg.** non *Myrica eocenica* Saporta (in Heer, 1861: 138).

Holotype: Preparation D-C 35 (2), index 19 x 78,3 (Trofimuk Institute of Petroleum-Gas Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russian Federation) – figured by Kulkova, 1973, plate 1, figure 4.

Location and age: Berelekh River, Dzheloon-Sise upland, Yakutia (Sakha) Republic, Russian Federation. Eocene.

Eponymy: In honour of Inessa Arsen'jeva Kulkova (Kul'kova) (1931–2016), eminent Russian (Soviet) palaeopalynologist.

IFPNI registration record: 17DB1F74-EB4B-C297-114B-5764933AE48A.

Myricipites lubomirovae (Gladkova) Doweld, **comb. nov.**

Basionym: *Myrica lubomirovae* Gladkova (1965: 165)—*Triatriopollenites lubomirovae* (Gladkova) Kedves (1974: 46), **nom. inval.** (ICN, Art. 41.5)—*Triatriopollenites lubomirovae* (Gladkova) Snopková (1980: 31).

Synonym: *Myrica propria* Frederiksen (1973: 73)—*Triatriopollenites proprius* Frederiksen (1973: 73), **nom. inval.**—*Triatriopollenites proprius*

(Frederiksen 1973) Frederiksen (1980: 40).

Holotype: Prep. 10464-2 (61,5 x 2,6) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Tazov peninsula, Yamal-Nenets autonomous district, Krasnojarsk Territory, Russian Federation. Early Oligocene (Rupelian = Atlymian suite).

IFPNI registration record: C6B39AC7-491D-4763-ABFB-F4877457AF55.

Notes: Frederiksen (1988: 50) synonymized his American fossil pollen species *Myrica propria* N.O.Fred. with formerly described *M. lubomirovae* Gladkova from Western Siberia (Russian Federation).

Myricipites megabituitus (Pflug) Grabowska & Ważyńska (in Stuchlik & al. 2009: 24)—*Triatriopollenites megabituitus* Pflug (in Thomson & Pflug 1953: 80).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Helmstedt, Niedersachsen, Germany. Eocene.

IFPNI registration record: A9D1172B-F934-4AF4-97D6-29CBDFB20551.

Myricipites microturgidus (Pflug) Doweld, **comb. nov.**

Basionym: *Triatriopollenites excelsus* subspecies *microturgidus* Pflug [in Thomson & Pflug 1953: 77, plate 7: figures 59, 61]—*Myricipites excelsus* subspecies *microturgidus* (Pflug) Planderová (1973: 267), nom. inval.

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Messel, Darmstadt, Germany. Late Eocene (Lutetian).

IFPNI registration record: 3C86CDD7-FB92-4771-C7E9-7B14FB5A881D.

Myricipites mirabilis (Gladkova) Doweld, **comb. nov.**

Basionym: *Myrica mirabilis* Gladkova (1956: 216) non Sauer (1960: 412), nom. illeg.

Holotype: Not located (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Monzhukly, Kum-dag, Western Turkmenia. Pliocene.

IFPNI registration record: AEC24839-B6D8-4AE6-A2BC-FBF0360E6689.

Myricipites myricoides (Kremp) Nagy (1969: 477)—*Pollenites myricoides* Kremp (1949: 64)—*Triatriopollenites myricoides* (Kremp) Pflug & Thomson (in Thomson & Pflug 1953: 80)—*Alabraferoidaepollenites myricoides* (Kremp) Kedves (in Kedves & Russell 1982: 110).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Konin, Warta River, Konin County, Greater Poland Voivodeship, Poland. Miocene.

IFPNI registration record: A318AAAF-6C13-44A6-891B-3E611CD56C0F.

Myricipites ongaensis (Takahashi) Doweld, **comb. nov.**

Basionym: *Triatriopollenites ongaensis* Takahashi (1961: 300, plate 19, figure 16).

Holotype: GK-V 1141 (Department of Geology, Nagasaki University, Nagasaki, Japan).

Location and age: Mie-Lower seam, Nittan-Takamatsu-coalmine, Chikuhō coalfield, Fukuoka Prefecture, Japan. Oligocene (Onga Formation).

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA6YY.

Myricipites opacus (Takahashi) Doweld, **comb. nov.**

Basionym: *Triatriopollenites opacus* Takahashi (in Takahashi & Kim 1979: 50, plate 17, figure 5).

Holotype: GN 3584 (sample Y-7) (Department of Geology, Nagasaki University, Nagasaki, Japan).

Location and age: Yeoungill Bay District, South Korea. Miocene.

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA6ZZ.

Myricipites paradoxus* (Gladkova) Doweld, **comb. nov.*

Basionym: *Myrica paradoxa* Gladkova (1965: 163)—*Triatriopollenites paradoxus* (Gladkova) Frederiksen (1988: 50)—*Labraferoidaepollenites paradoxus* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 9262-1 (74,5 x 9,0) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Verkhnjaja Khadyta river, Yamal-Nenets autonomous district, Krasnojarsk Territory, Russian Federation. Eocene.

IFPNI registration record: 46B8E771-7E0B-4979-9944-8E0D5F30BE9C.

Myricipites perplexus* (Pflug) Doweld, **comb. nov.*

Basionym: *Triatriopollenites perplexus* Pflug (1953: 114) (“*Triatrio-pollenites*”).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Wehmingen near Saristedt, Hannover, Germany. Palaeocene.

IFPNI registration record: C85EE3C2-1031-431E-85D3-CF3E033B6FF3.

Myricipites pokrovskajae* (Korallova) Doweld, **comb. nov.*

Basionym: *Myrica pokrovskajae* Korallova (in Korallova & Panova 1971: 19).

Holotype: Preparation 3746 (Dnipro State University, Dnipro, Ukraine, *n.v.*).

Location and age: Kakhovka district, Kherson region, Ukraine. Late Oligocene (Chattian = Askanian suite).

IFPNI registration record: 4E0E1AD3-264E-44C4-B755-7806AC9A9C69.

Myricipites pseudogranulatus* (Gladkova) Doweld, **comb. nov.*

Basionym: *Myrica pseudogranulata* Gladkova (1965: 164, plate 2, figure 4)—*Triatriopollenites pseudogranulatus* (Gladkova) Kedves (1974: 46), *nom. inval.* (ICN, Art. 41.5)—*Triatriopollenites pseudogranulatus* (Gladkova) Snopková (1980: 31).

Holotype: Preparation 8914-5 (71 x 14) (All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation [lost]).

Location and age: Verkhnjaja Khadyta River, Dal'nee, Yamal-Nenets autonomous district, Krasnojarsk Territory, Russian Federation. Early Oligocene (Rupelian).

IFPNI registration record: CB74956B-8515-411E-AF7B-F7C5D57F2C31.

***Myricipites pseudorurensis* (Pflug) Grabowska & Ważyńska (in Stuchlik & al. 2009: 27)—*Triatriopollenites pseudorurensis* Pflug & Thomson (in Thomson & Pflug 1953: 78)—*Labraferoidaepollenites pseudorurensis* (Pflug) Kedves (in Kedves & Russell 1978: 108).**

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Wehmingen near Saristedt, Hannover, Germany. Palaeocene.

IFPNI registration record: 6C07480C-D96F-4977-BBE3-E9BA7DA554E6.

Myricipites pusulatus* (Chateauneuf) Doweld, **comb. nov.*

Basionym: *Triatriopollenites pusulatus* Chateauneuf (1980: 104).

Holotype: Slide 3659, coordinates 59.5/101.5 (Université Pierre et Marie Curie, Paris VI, France, *n.v.*) – figured by Chateauneuf 1980: plate 8, figure 20–21.

Location and age: La Hassaye, near Paris, France. Late Eocene (Bartonian = Marinesian).

IFPNI registration record: C6B39AC7-491D-4763-ABFB-F4877457AF55.

Myricipites rarus* (Sah) Doweld, **comb. nov.*

Basionym: *Myricaceoipollenites rarus* Sah (1967: 115, plate 10, figure 24).

Holotype: Slide 14-6 (Birbal Sahni Institute of Palaeosciences, Lucknow, India).

Location and age: Rusizi valley, Kundava, Burundi. Neogene (Pleistocene).

IFPNI registration record: 448BB8C6-4715-4AFB-BF35-D3A6DEBF91F8.

Myricipites rectus (Frederiksen) Doweld, **comb. nov.**

Basionym: *Triatriopollenites rectus* Frederiksen (1994: 116).

Holotype: Slide R4071C(2), coordinates 39.5 x 97.5 (USGS, Reston, USA) – figured by Frederiksen 1994: plate 2, figure 1.

Location and age: Borehole UAL-2, Pakistan. Palaeocene (Sohnari Formation).

IFPNI registration record: 1C461726-05D7-4A89-88D1-056A4EA4A083.

Myricipites roboratus (Pflug & Thomson) Doweld, **comb. nov.**

Basionym: *Triatriopollenites roboratus* Pflug & Thomson (in Thomson & Pflug 1953: 78)—*Alabraferoidaepollenites roboratus* (Pflug & Thomson) Kedves (in Kedves & Russell 1982: 110).

Synonym: *Myrica mirabilis* Sauer (1960: 412), nom. illeg. non Gladkova (1956: 216).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Antweiler & Wehmingen bei Saristedt, Hannover, Germany. Paleocene.

IFPNI registration record: 6D9721EF-DB49-442C-B921-55D0D8B02779.

Myricipites rubriformis Grabowska & Ważyńska (in Stuchlik & al. 2009: 27) (“*rubraeformis*”).

Holotype: PIG/Ręsz. 94/96 No 17/1 (Państwowy Instytut Geologiczny, Warszawa, Poland).

Location and age: Ręszów 94/96 borehole, Gmina Ścinawa, Lubin County, Early Silesian Voivodeship, Poland. Early Miocene (Gorzów Formation).

IFPNI registration record: 90A68D33-B205-4927-818F-D884F9DB8A2E.

Myricipites rudis (Martynova) Doweld, **comb. nov.**

Basionym: *Myrica rudis* Martynova (in Agranovskaja & al. 1960: 364).

Holotype: Сев. 2114 (Uralian Geological Territory Fund, Ekaterinburg, Russian Federation).

Location and age: Polunochnaja station, Sverdlovsk region, Urals, Russian Federation. Late Paleocene (Ivdelian suite).

IFPNI registration record: 6D9721EF-DB49-442C-B921-55D0D8B02779.

Myricipites rurensis (Pflug & P.W. Thomson) Nagy (1969: 477); (Pflug & Thomson) Zheng (in Song & al. 1999: 687), nom. superfl. [isonym]—*Triatriopollenites rurensis* Pflug & P.W. Thomson (in Thomson & Pflug 1953: 79)—*Labraferoidaepollenites rurensis* (Pflug & P.W. Thomson) Kedves (in Kedves & Russell 1982: 108).

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Eschweiler & Frielendorf, Kassel, Germany. Oligocene/Miocene (Burdigalian).

IFPNI registration record: 6D9721EF-DB49-442C-B921-55D0D8B02779.

Myricipites rurobotuitus (Pflug) Doweld, **comb. nov.**

Basionym: *Triatriopollenites rurobotuitus* Pflug [in Thomson & Pflug 1953: 79, plate 7: figures 111-113].

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Borken & Burghasungen, Kassel, Germany. Oligocene/Eocene.

IFPNI registration record: 17B23CB9-AE42-9222-74D1-70507202E9C5.

Myricipites saueri Doweld, **nom. nov.**

Replaced name: *Myrica elegans* Sauer (1960: 411), nom. illeg. non Berry (1907: 191).

Holotype: Preparation 1495/836 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Yantarnyj village, Kaliningrad region, Russian Federation. Middle Eocene.

Eponymy: In honour of Veronika Vasilievna Sauer (Zauer, Зауер Вероника Васильевна) (1912–1992), eminent Russian (Soviet) palaeopalynologist.

IFPNI registration record: 1218A1BE-5EB0-4D39-96FF-7D22AA62A7E9.

Myricipites subtilis (Sauer) Doweld, **comb. nov.**

Basionym: *Myrica subtilis* Sauer (1960: 411).

Holotype: Preparation 1493/927 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Yantarnyj village, Kaliningrad region, Russian Federation. Early Oligocene (Rupelian).

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA605.

Myricipites subtriangularis (Takahashi) Doweld, **comb. nov.**

Basionym: *Triatriopollenites subtriangularis* Takahashi (in Takahashi & Kim 1979: 50, plate 17, figure 2).

Holotype: GN 3269 (sample Y 10-1) (Department of Geology, Nagasaki University, Nagasaki, Japan).

Location and age: Yeoungill Bay District, South Korea. Miocene.

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA6ZZ.

Myricipites turgidus (Pflug) Doweld, **comb. nov.**

Basionym: *Triatriopollenites excelsus* subspecies *turgidus* Pflug [in Thomson & Pflug 1953: 77, plate 7: figures 36-46]—*Myricipites excelsus* subspecies *turgidus* (Pflug) Planderová (1973: 267), nom. inval.

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Burghasungen, Kassel, Germany. Oligocene/Eocene.

IFPNI registration record: 4B63D290-6F26-5BCB-368F-44C26D221595.

Myricipites verus (Sauer) Doweld, **comb. nov.**

Basionym: *Myrica vera* Sauer (1960: 413).

Holotype: Preparation 1497/941 [lost] (Karpinsky Russian Geological Research Institute (VSEGEI), St.-Petersburg, Russian Federation).

Location and age: Yantarnyj village, Kaliningrad region, Russian Federation. Early Oligocene (Rupelian).

IFPNI registration record: ED498BA6-A3A2-42D9-8F70-76D4FE66D709.

Myricipites yururitoensis (Takahashi) Doweld, **comb. nov.**

Basionym: *Triatriopollenites yururitoensis* Takahashi (1991: 31, plate 2, figure 10a–b).

Holotype: GN 5938 (sample YUR-04) (Department of Geology, Nagasaki University, Nagasaki, Japan).

Location and age: Yururi Island, Nemuro City, Hokkaido, Japan. Palaeocene (Kiritappu Formation).

IFPNI registration record: B58C2FCB-A710-449B-A270-B0AF82FDA6YY.

8. Incertae sedis Sporae dispersae (pollen, species Cretaceorum)

The ancient pollen type has a resemblance to the pollen type of *Myrica*; it is formally recombined here pending further revision of north Eurasian Cretaceous fossil pollen types.

Genus *Comptonipollis* Doweld, **gen. nov.**

Comptonipollis clementius (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia clementia* Gladkova (1965: 174, plate 5, figure 3)—*Triatriopollenites clementius* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 6189-A (61,5-3,6) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Brusov Jar, Sym river, Krasnojarsk Territory, Russian Federation. Late Cretaceous (Maastrichtian).

IFPNI registration record: 6E2B65D1-013B-A682-1E9F-2FAF20070C2A.

Comptonipollis grandis Doweld, **nom. nov.**

Basionym: *Comptonia grandis* Gladkova (1965: 174, plate 5, figure 1), nom. illeg. non *Comptonia grandis* Andreánszky (1963: 232)—*Triatriopollenites grandis* Kedves (1974: 48), nom. inval. (sine basionymo).

Holotype: Preparation 431-3 (56,5 x 10,5) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Novyj Port, Khanty-Mansi autonomous district, Russian Federation. Late Cretaceous (Maastrichtian).

IFPNI registration record: 785106D7-7106-EBB4-867D-E21F85A9565B.

Comptonipollis sibiricus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia sibirica* Gladkova (1965: 177, plate 7, figure 1)—*Triatriopollenites sibiricus* (Gladkova) Kedves (1974: 48), nom. inval. (sine basionymo).

Holotype: Preparation 965-c (65 x 5) (All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation).

Location and age: Opoka-Khaja, Yakutia (Sakha) Republic, Russian Federation. Late Cretaceous (Danian).

IFPNI registration record: 05814F76-754A-F83E-1BC0-17EEB4AAC5C4.

Genus *Momipites* Wodehouse (1933: 511).

Momipites minimus (Gladkova) Doweld, **comb. nov.**

Basionym: *Comptonia minima* Gladkova, Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst. N. S. 239: 172, plate 4, figure 2. 1965—*Triatriopollenites minimus* (Gladkova) Kedves (1974: 45), nom. inval. (sine basionymo)—*Triatriopollenites minimus* (Gladkova) Snopková (1980: 35).

Holotype: Preparation 8532-a (56,5 x 14,5) [All-Russian petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*].

Location and age: Vakh River, Khanty-Mansi Autonomous District, Russian Federation. Late Cretaceous (Maastrichtian).

IFPNI registration record: C5695F26-EF64-1CDA-6FFC-32BBAE5B1772.

Notes: The ancient pollen type has a resemblance to the pollen type of *Engelhardia*, not *Comptonia*; it is formally recombined here pending further revision of north Eurasian Cretaceous fossil pollen types.

Genus *Myricipites* Wodehouse (1933: 505) emend. Doweld.

Myricipites betuloides (Stelmak) Doweld, **comb. nov.**

Basionym: *Myrica betuloides* Stelmak [in Romanovskaja & Stelmak], Trudy Vsesoyuzn. Nauchno-Issl. Geol. Inst. Nov. Ser. 30: 219. 1960.

Holotype: Preparation s.n. [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*] – illustrated by Romanovskaja & Stelmak, 1960: plate 10, figure 8.

Location and age: Sarbaj village, Kostanaj region, Kazakhstan. Late Cretaceous (Turonian; Ajatian suite).

IFPNI registration record: 2CA1BAB9-7685-CD35-D765-90B05BE46E42.

Myricipites glabrus (Stelmak) Doweld, **comb. nov.**

Basionym: *Myrica glabra* Stelmak [in Romanovskaja & Stelmak], Trudy Vsesoyuzn. Nauchno-Issl. Geol. Inst. Nov. Ser. 30: 219. 1960.

Holotype: Preparation s.n. [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*] – illustrated by Romanovskaja & Stelmak, 1960: plate 4, figure 10.

Location and age: Panfilovka village, Kostanaj region, Kazakhstan. Late Cretaceous (Cenomanian; Shetirgizian suite).

IFPNI registration record: 37F6EEBC-FBF6-2336-2410-6A290D6BD601.

Myricipites grandis (Stelmak) Doweld, **comb. nov.**

Basionym: *Myrica grandis* Stelmak [in Romanovskaja & Stelmak], Trudy Vsesoyuzn. Nauchno-Issl. Geol. Inst. Nov. Ser. 30: 220. 1960 [non *Myrica grandis* Andreánszky (1963: 238), nom. inval.].

Holotype: Preparation s.n. [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*] – illustrated by Romanovskaja & Stelmak, 1960: plate 16, figure 9.

Location and age: Sarbaj village, Kostanaj region, Kazakhstan. Late Cretaceous (Maastrichtian; Zhuravlevian suite).

IFPNI registration record: 90B09C86-E93B-CC48-0C17-4EE0310DA0AA.

Notes: This fossil pollen type has a resemblance to the pollen type of *Myricipites rurobituitus* (Pflug) Doweld, comb. nov. (see above) from Oligocene/Eocene sediments of Borken & Burghasungen, Kassel, Germany; it is formally recombined here pending further revision of north Eurasian Cretaceous fossil pollen types to avoid convergence cases.

***Myricipites intermedius* (Gladkova) Doweld, comb. nov.**

Basionym: *Myrica intermedia* Gladkova, Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst. N. S. 239: 162, plate 1, figure 5. 1965—*Triatriopollenites intermedius* (Gladkova) Kedves (1974: 47), nom. inval. (sine basionymo)—*Triatriopollenites intermedius* (Gladkova) Snopková (1980: 30).

Holotype: Preparation 6189-C (80,5 x 12,5) [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*].

Location and age: Brusov Jar, Sym River, Krasnojarsk Territory, Russian Federation. Late Cretaceous (Maastrichtian).

IFPNI registration record: 23DFC8EB-24AB-DE0A-0A2F-6115EBB88694.

***Myricipites notabilis* (Gladkova) Doweld, comb. nov.**

Basionym: *Myrica notabilis* Gladkova, Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst. N. S. 239: 161, plate 1, figure 3. 1965.

Holotype: Preparation 8853-C (57,5 x 10,0) [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*].

Location and age: Eloguj River, left tributary of Yenisej River, Krasnojarsk Territory, Russian Federation. Cretaceous (Senonian).

IFPNI registration record: 410BFE27-44B5-FD9D-4DA4-318A16EA096E.

***Myricipites stelmakiae* Doweld, nom. nov.**

Replaced name: *Myrica minuta* Stelmak [in Romanovskaja & Stelmak], Trudy Vsesoyuzn. Nauchno-Issl. Geol. Inst. Nov. Ser. 30: 219. 1960, nom. illeg. non *Myrica minuta* Knowlton (1923: 157)].

Holotype: Preparation s.n. [All-Russia petroleum research exploration institute (VNIGRI), St.-

Petersburg, Russian Federation, *n.v.*)] – illustrated by Romanovskaja & Stelmak, 1960: plate 10, figure 7.

Location and age: Sarbaj village, Kostanaj region, Kazakhstan. Late Cretaceous (Eginsaj suite).

Eponymy: In honour of Nina Kazimirovna Stelmak (Stel'mak) (1910–1976), eminent Russian (Soviet) palaeopalynologist.

IFPNI registration record: 05140711-A946-8A34-3C2D-93EEECC732BD.

***Myricipites tenuis* (Gladkova) Doweld, comb. nov.**

Basionym: *Myrica tenuis* Gladkova, Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst. N. S. 239: 159, plate 1, figure 1. 1965—*Labraferoidaepollenites tenuis* (Gladkova) Kedves (1992: 36).

Holotype: Preparation 6196-4 (61,1 x 10) [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*].

Location and age: Kolokol'nikov Jar, below mouth of Nerunda river, Sym River, Krasnojarsk Territory, Russian Federation. Late Cretaceous (Coniacian; Early Symian subsuite).

IFPNI registration record: CC806560-90FB-5104-9E23-4AE4AAED90EC.

***Myricipites tropicus* (Stelmak) Doweld, comb. nov.**

Basionym: *Myrica tropica* Stelmak [in Romanovskaja & Stelmak], Trudy Vsesoyuzn. Nauchno-Issl. Geol. Inst. Nov. Ser. 30: 219. 1960.

Holotype: Preparation s.n. [All-Russia petroleum research exploration institute (VNIGRI), St.-Petersburg, Russian Federation, *n.v.*)] – illustrated by Romanovskaja & Stelmak, 1960: plate 14, figure 9.

Location and age: Kushmurun district, Kostanaj region, Kazakhstan. Late Cretaceous (Eginsaj suite).

IFPNI registration record: 095B255D-E6D4-B731-A52E-75A7980D0FE3.

9. Excluded myricoid sporae dispersae (pollen).

Genus *Momipites* Wodehouse (1933: 511).

Synonyms: 1. *Engelhardtoidites* Potonié, Thomson & Thiergart ex Potonié (1960: 118)—*Engelhardtoidites* Potonié, Thomson & Thiergart

(1950: 51), nom. nud. **2.** *Alabraferoidaepollenites* Kedves (1978: 109), syn. nov.

Type: *M. coryloides* Wodehouse (1933: 511, figure 43).

Location and age: Parachute Creek, Garfield Co., Colorado, USA. Eocene (Green River Formation).

IFPNI registration record: AF8356D3-0DFC-4D81-80E5-4DF711C977CB.

Momipites coryphaeus (R. Potonié) N.O. Frederiksen & R.A. Christopher (1978: 129).

Basionym: *Coryli-pollenites coryphaeus* R. Potonié (1934: 53)—*Myricipites coryphaeus* (R. Potonié) R. Potonié (1960: 119)—*Triatriopollenites coryphaeus* (R. Potonié) P.W. Thomson & Pflug (1953: 80)—*Triporato-pollenites coryphaeus* (R. Potonié) Mürrig. & Pflug (1952: 59), nom. inval.

Lectotype (designated by Jansonius, Hills & Hartkopf-Fröder, 1998: 5060): R. Potonié Collection s.n. (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany, n.v.) – illustrated by Potonié (1931: plate 2, figure 15).

Location and age: Geiseltal, Germany. Eocene.

IFPNI registration record: 11382CC5-6BA0-421C-A3A6-81F64347F724.

Notes: The fossil pollen type was originally compared by Potonié (1934) to the pollen type of extant *Corylus*; later Potonié (1960) revised and transferred it to the fossil-genus *Myricipites*. However, the revision of the ultrastructure of exine by Frederiksen & Christopher (1978) debunked the myricoid affinity of the fossil pollen type.

Momipites engelhardtoides (E. Roche) Doweld, **comb. nov.**

Basionym: *Triatriopollenites engelhardtoides* E. Roche [in E. Roche & M. Schuler] Profess. Pap. Serv. Géol. Belg. 11: 13, plate 4, figure 18. 1976—*Triatriopollenites engelhardtoides* E. Roche (1973: 57), nom. inval. (sine holotypo).

Holotype: Geiseltal, Germany.

Location and age: Belgium [not specified]. Thanetian.

IFPNI registration record: BC5D9F5C-3E09-43E1-F0B9-7DD6BF55209E.

Notes: The fossil pollen type was originally compared to the pollen type of extant *Engelhardia*; it is formally recombined here.

Momipites marylandicus (Groot & Groot) Nichols (1973: 107).

Basionym: *Triatriopollenites marylandicus* Groot & Groot (1962: 165).

Holotype: Slide 50311-A, grain 16, 117.5x21.9 (University of Maryland, n.v.)

Location and age: Landover, Maryland, USA. Palaeocene (Brightseat Formation).

IFPNI registration record: 6B7092D3-4F5F-4919-A654-C762B47601A8.

Momipites menatensis (Kedves) Doweld, **comb. nov.**

Basionym: *Labraferoidaepollenites menatensis* Kedves (in Kedves & D.E. Russell, 1982: 109, plate 10, figures 10-11).

Holotype: Menat-43; 13.6/115.5 (University of Szeged, n.v.)

Location and age: Menat, Puy-de-Dôme, Auvergne-Rhône-Alpes, France. Eocene (Thanetian).

IFPNI registration record: A70D32FE-1F5F-54CA-5330-920D747339B9.

Momipites microcoryphaeus (P.W. Thomson & Pflug) Nichols (1973: 107)—*Pollenites microcoryphaeus* R. Potonié (1931: 332), nom. inval. (ICN, Art. 35)—*Engelhardtoidites microcoryphaeus* R. Potonié, Thomson & Thiergart (1950: 51), nom. nud. & inval. (ICN, Art. 35) [“(Potonié) Potonié, Thomson & Thiergart”]—*Triatriopollenites coryphaeus* subspecies *microcoryphaeus* P.W. Thomson & Pflug (1953: 81)—*Engelhardtoidites microcoryphaeus* (P.W. Thomson & Pflug) Potonié (1960: 118) [“(Potonié) Potonié”]—*Myricipites microcoryphaeus* (P.W. Thomson & Pflug) Słodkowska (in Ziemińska-Tworzydło & al. 1994: 16) [“(Potonié) Słodkowska”].

Holotype: Not located (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany).

Location and age: Helmstedt, Lower Saxony, and Borken, near Kassel, Germany. Palaeocene, Oligocene/Miocene (Burdigalian).

IFPNI registration record: A89FBA5B-B06B-4EDC-930E-3ED90CEBC33D.

***Momipites paleogenicus* (Bolotnikova) Doweld,
comb. nov.**

Basionym: *Engelhardia paleogenica* Bolotnikova, Trudy Biol.-Pochv. Inst. Dal'nevost. Nauchn. Tsentra Akad. Nauk S.S.S.R. 27(130): 104. 1976—*Alabroidaepollenites paleogenicus* (Bolotnikova) Kedves (1992: 35).

Holotype: 201-50/6 [Institute of Biology and Soil Science, Russian Academy of Sciences, Vladivostok, Russian Federation].

Location and age: Northern Fore-Tumangania, western shore of the Sea of Japan, Primorye Territory, Russian Federation. Paleocene.

IFPNI registration record: E3F39E60-CD51-4B9C-827D-30828BC3A0C6.

Notes: The fossil pollen type was originally referred to a distinct fossil-species of *Engelhardia*; it is formally recombined here.

***Momipites pseudoroboratus* (Krutzsch & Vanhoorne)
Doweld, comb. nov.**

Basionym: *Triatriopollenites pseudoroboratus* Krutzsch & Vanhoorne (1977: 42, plate 18, figures 1–2)

Synonym: *Casuarinidites sparsus* Frederiksen & Christopher (1978: 142, plate 3, figures 25–27)—*Triatriopollenites sparsus* (Frederiksen & Christopher) Frederiksen (1988: 50), syn. nov. Holotype: Slide 1/1 (17.2 x 116.5) [not located]. Location and age: Épinois, Henegouwen, Belgium. Early Eocene (Ypresian). IFPNI registration record: 30B5A0A9-7DB1-A743-4552-B05A8D3B4745. Notes: Frederiksen (1988: 51) noticed that his American fossil pollen species *Casuarinidites sparsus* N.O. Fred. & Christopher is nearly identical and even intergrading pollen type with formerly described *Triatriopollenites pseudoroboratus* Krutzsch & Vanhoorne from Europe (Belgium); they are synonymized here.

Genus *Tripoporopollenites* Pflug & P.W. Thomson (in Thomson & Pflug 1953: 82).

Synonym: *Myricaceoipollenites* Potonié (1960: 142)—*Myricaceapollenites* Potonié, Thomson & Thiergart (1950: 51) (“*Myricaceae*?-*Pollenites*”), nom. nud.

Type: *T. coryloides* Pflug (in Thomson & Pflug 1953: 84).

Location and age: Wallensen im Hils, Germany. Pliocene.

IFPNI registration record: 6EF1ADCC-DEEC-4082-AEE9-54261C482E4D.

Notes: The problematical fossil type, based on round to triangular, granulose, triporate pollen with finely infrareticulate sexine, was quite differently treated in the past, which resulted in the creation of distinct fossil pollen genera referred either to the myricoid pollen type *Myricaceoipollenites* R. Potonié or *Myricaceapollenites* R. Potonié, P.W. Thomson & Thiergart or betuloid pollen type, *Carpinus-pollenites granifer* forma *megagranifer* (R. Potonié) Thiergart. It is now solidly established upon ultrastructural studies of exine and pores that it is a betuloid fossil pollen type.

***Tripoporopollenites megagranifer* (R. Potonié)
P.W. Thomson & Pflug (1953: 82)—*Pollenites granifer* forma *megagranifer* Potonié (1934: 20)—*Myricaceoipollenites megagranifer* (R. Potonié)
R. Potonié (1960: 119)—*Carpinus-pollenites granifer* forma *megagranifer* (R. Potonié) Thiergart (1938: 315), nom. inval.—*Myricaceae-pollenites megagranifer* (R. Potonié) R. Potonié, P.W. Thomson & Thiergart (1950: 51), nom. inval.**

Holotype: R. Potonié Collection s.n. (Geologischer Dienst Nordrhein-Westfalen, Krefeld, Germany, n.v.).

Location and age: Geiseltal, Germany. Eocene.

IFPNI registration record: D38749FC-5822-4D0C-A590-62FE9ABE5E76.

10. Additional revisions, sporae dispersae (pollen)

***Vacuopollis virgatus* (Botscharnikova) Doweld,
comb. nov.**

Basionym: *Myrica virgata* Botscharnikova [in Agranovskaja, Botscharnikova & Martynova], Trudy Vsesoyuzn. Nauchno-Issled. Geol. Inst., Nov. Ser. 30: 122, plate 4, figure 8. 1960.

Holotype: Preparation Cp. 1543 [Uralian Geological Territory Fund, Ekaterinburg, Russian Federation, n.v.).]

Location and age: Urefty lake, Chelyabinsk region, Russian Federation. Late Cretaceous (Santonian; Slavgorodian suite).

IFPNI registration record: 97B0B926-67A2-09BF-37AD-3E4D888F81FF.

Notes: This Cretaceous fossil pollen type was originally determined as a pollen of fossil *Myrica*; but it has nothing to do with myricoid type of pollen and was treated as a synonym of *Vacuopollis semiconcavus* Pflug (Palaeontographica, Abt. B, Paläophytol. 95: 104. 1953) by Ponomarenko (in Petrosjanz 1979: 73). Since the Uralian Cretaceous fossil pollen is distinguished from the European Cretaceous pollen by its ultrastructure of pores and sculpture, it is formally recombined here as a distinct fossil-species of *Vacuopollis*.

11. Fossil wood taxa

Müller-Stoll & Mädler (1962: 323) created a special fossil morphogenus *Myricoxylon* based on the woods of the Miocene age from Hungary (type: *M. hungaricum* Müller-Stoll & Mädler); in addition, they also attributed to the established genus ill-studied fossil species *M. scalariformis* Kraus (1954). Wheeler & al. (1978) described a new fossil species *M. absarokensis* Wheeler, Scott & Barghoorn from the Eocene sediments of North America (Yellowstone National Park); they hesitated to include this fossil species into a specialized fossil wood genus *Myricoxylon*, noticing the essential differences in wood anatomy between two fossil taxa. Type of the fossil genus fossil *Myricoxylon* has a wood that lacks growth rings and has predominantly simple perforation plates and a higher ray density; this combination of characters might point to the possible relationship of the Hungarian fossil wood with other angiosperm families, namely *Cornaceae* and *Hamamelidaceae*, which were discussed by Müller-Stoll & Mädler (l.c.). *M. absarokensis* most closely resemble wood of extant *Morella cerifera* and *M. rubra*, since both have inflated crystalliferous axial parenchyma and predominantly scalariform perforation plates (Wheeler & al. 1978). Since the wood structure of *M. absarokensis* precludes its inclusion into the fossil wood genus *Myricoxylon*, this fossil-species is segregated into a genus of its own, *Morelloxylo* gen. nov., noticing the similarity of its wood with some species of *Morella*.

Genus *Morelloxylo* Doweld, gen. nov.

IFPNI registration record: 4AC146D2-05C1-4FA6-9C01-6A41C3CDC1DA.

Diagnosis: Wood with distinct growth rings; vessel elements diffuse porous; predominantly solitary, some

pairs; tangential diameter 30–85 µm; radial diameter 47–118 µm; 65–110 per square mm.; length 505–735 µm; perforation plates all scalariform with 7 to 16 bars; intervacular pitting predominantly opposite, some transitional, vessel-ray pits similar to intervacular pitting. Parenchyma apotracheal diffuse, often inflated and crystalliferous. Rays multiseriate, 4 cells wide; 4 to 25 cells, 80–600 µm high; with uniseriate margins of 1 to 9 rows of square and upright cells; uniseriate 2 to 8 cells, 92–350 µm high, apparently composed of only square and upright cells; 8–12 per mm. Fibers with bordered pits on both radial and tangential walls.

Type species: *Morelloxylo absarokense* (Wheeler, Scott & Barghoorn) Doweld, comb. nov.

Morelloxylo absarokense (Wheeler, Scott & Barghoorn) Doweld, **comb. nov.**

Basionym: *Myrica absarokensis* Wheeler, Scott & Barghoorn (1978: 10).

Holotype: Fossil Wood Collection D-2054B-11 (U.S. Geological Survey, USA).

Location and age: Specimen Ridge, Yellowstone National Park, Wyoming, USA. Eocene.

Eponymy: From extant *Morella* Loureiro and suffix *-xylon*, a wood.

IFPNI registration record: 2B2E314A-6A52-4A9E-B266-BDF30956C84D.

Morelloxylo gottwaldii Doweld, **sp. nov.**

Replaced name: *Myricoxylon zonatum* H. Gottwald (1997: 35), nom. inval. (descr. Germ.)

Description: Wood with the type of intervessel pits opposite, diffuse-in-aggregate type axial parenchyma presents; porosity of wood semi-ring to diffuse. Pores solitary and distinctly zoned according to diameter and density in earlywood and latewood; perforations predominantly simple, scalariform perforation plates up to 18 bars; pits opposite to alternating, 4 µ to 5 µ in diameter. Rays distinctly heterogeneous, 1 and 3-4(5) cells wide and up to 700 µ high; intersection fields with multilayered, rounded pits, around 5 µ in diameter. Parenchyma apotracheal in scattered, single-rowed tangential groups, crystals possible. Supporting tissue predominantly composed of fibers, varying from 10 µ to 20 µ in diameter; fiber tracheids scattered, 20 µ to 30 µ in diameter, bordered pits around 5 µ in diameter (modified after Gottwald, 1997).

Holotype: 94-208/744 (Naturmuseum Augsburg, Augsburg, Germany) [illustrated by Gottwald, 1997: plate VII, Figure 58-63].

Location and age: Ortenburg, Bavaria, Germany. Miocene.

Eponymy: In honour of Helmut Paul Josef Gottwald (1918–2008), German palaeobotanist and xylologist.

IFPNI registration record: 74FDAF44-287A-7103-BE9D-7B3F3FB5198D.

***Morelloxylon scalariforme* (H.O. Kruse) Doweld, comb. nov.**

Basionym: *Myrica scalariformis* H.O. Kruse (1954: 243)—*Myricoxylon scalariforme* (H.O. Kruse) Müll.-Stoll & Mädler (1962: 329)—*Morella scalariformis* (H.O. Kruse) E.A. Wheeler & Manchester [in E.A. Wheeler, Baas, Manchester] (2021: 76).

Holotype: B-3302 (University of Cincinnati, Cincinnati, USA).

Location and age: Hays' Ranch, about 16 miles east of Farson, Eden Valley, Wyoming, USA. Late Eocene (Priabonian: Green River Formation).

IFPNI registration record: 269DE5A0-4C03-B376-2993-ACCB22008E48.

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