

New replacement generic names of fossil plants

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ABSTRACT

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27 new fossil generic replacement names were validated. The new fossil wood generic names are validated to replace later homonyms: *Austrotsugoxylon* **nom. nov.** is proposed to replace later homonym, *Tsugoxylon* Vozenin-Serra & Sal.-Cheb. (non *Tsugoxylon* H. Gottwald); *Dracaenoxylon* **nom. nov.** instead of *Neyvelia* P.R. Reddy non *Neyvelia* Thiergart & U. Frantz; *Euailanthoxylon* **nom. nov.** to replace *Ailanthoxylon* Ramanujam non *Ailanthoxylon* U. Prakash; *Eusyzygioxylon* **nom. nov.** instead of *Syzygioxylon* K. Kramer non *Syzygioxylon* Ingle; *Grewiaceoxylon* **gen. nov.** to replace later homonyms or invalidly published *Grewioxylon* U. Prakash & Ramesh Dayal, **nom. illeg.**, *Grewioxylon* Shallom, **nom. inval.** and *Grewinium* R. Srivast. & Guleria, **nom. inval.**; *Gymnostomatoxylon* **gen. nov.** to replace some fossil-species of *Casuaroxylon* Goeppert & Stache, **nom. dub.**; *Saururopsidoxylon* **nom. nov.** instead of *Saururopsis* Stopes & Fujii non *Saururopsis* Turczaninow; *Spirocallitrixylon* **nom. nov.** instead of *Protocallitrixylon* Vozenin-Serra & Sal.-Cheb. non *Protocallitrixylon* S. Yamazaki & Tsunada; *Trivedioxylon* **nom. nov.** to replace *Baphioxylon* Trivedi & Kir. Srivast. non *Baphioxylon* R.N. Lakh. & U. Prakash. The new fossil generic names based on leaf remains are proposed to replace later homonyms: *Ceratophylloides* **nom. nov.** instead of *Ceratophytum* A. Boyd non *Ceratophytum* H. Pittier; *Hyperbaenopsis* **nom. nov.** instead of *Calkinsia* J.A. Wolfe non *Calkinsia* Nieuwland nec *Calkinsia* J. Lackey; *Knighiophylloides* **nom. nov.** to replace *Knighiophyllum* E.W. Berry non *Knighiophyllum* Ettingshausen; *Typholium* **nom. nov.** instead of *Typhoides* H.W. Meyer & Manchester non *Typhoides* Moench; *Wolfea* **nom. nov.** to replace *Pugetia* J.A. Wolfe non *Pugetia* (Gandoger) Gandoger nec *Pugetia* Kylin. The new fossil generic name *Pungentophyllum* **gen. nov.**, based on fossil leaves, is validated to replace previously invalidly published fossil-generic name, *Pungiphyllyum* Frankenh. & V. Wilde, **nom. inval.** The new fossil generic name *Sassafropsis* **gen. nov.**, based on leaf remains, is proposed to replace the invalidly published and misapplied fossil-generic name *Sassafrophyllum* Velenovský, **nom. inval.** The new fossil generic names based on fruit or seed remains are proposed to replace later homonyms: *Bulbocarpella* **nom. nov.** instead of *Ascospaera* Manchester non *Ascospaera* L.S. Olive & Spiltoir; *Cyperago* **nom. nov.** instead of *Polycarpella* E. Reid & M. Chandler non *Polycarpella* Theissen & H. Sydow; *Globospermum* **nom. nov.** instead of *Sphaerosperma* Manchester non *Sphaerosperma* Preuss; *Stachylacca* **nom. nov.** instead of *Stachycarpus* Meunier non *Stachycarpus* (Endlicher) van Tieghem; *Ulocaryon* **nom. nov.** instead of *Ulospermum* Manchester non *Ulospermum* Link nec *Ulospermum* Pomel; *Wheleastrum* **nom. nov.** instead of *Wheleera* Manchester non *Wheleera* Schreber. The previously invalidly published fossil generic name *Epacridicarpum* M. Chandler, **nom. inval.**, based on fruit remains, is re-classified in 3 distinct fossil-genera, viz. *Epacridops* **gen. nov.**, *Friisiastrum* **nom. nov.** is replaced invalidly published *Friisia* Proskurin & Vikulin non *Friisia* M.M. Mendes & J. Kvaček, and validated here *Epacridicarpum* M. Chandler ex Doweld, **gen. nov.** The new fossil sporomorph generic name *Chlonovica* **nom. nov.** is validated to replace initially invalidly published fossil-generic name *Vesicula* Chlonova (coinciding with technical term) and to replace later proposed unfortunate replacement later homonym, *Jania* Chlonova ex Jansonius & Hills non *Jania* Lamouroux nec *Jania* J.A. Schultes & J.H. Schultes. The new fossil generic name *Molinamyces* **nom. nov.**, based on fungal mycelial remains, is proposed to replace previously invalidly published *Molinaea* Doub. & D. Pons non *Molinaea* Comm. ex Jussieu. 32 new combinations are validated.

Keywords: Botanical nomenclature, homonymy, *Magnoliophyta*, *Pinophyta*, *Chlonovica*, *Molinamyces*

INTRODUCTION

New additional cases of homonymy between fossil and extant species of plants, algae and fungi were recorded during the further editing of the International Fossil Plant Names Index (IFPNI 2014 onwards) (Doweld 2015, 2016, 2022). This paper is an illustrative supplement of the analysis review of the IFPNI (Doweld 2022) and shows needed nomenclatural corrections and alterations in palaeobotanical nomenclature and systematics.

New names of the fossil plants were registered in the International Fossil Plant Names Index (IFPNI 2014–onwards) with unique persistent registration barcodes (LSIDs, Life Science Identifiers) through a pilot registration version started before the XIX International Botanical Congress in Shenzhen in 2017 (Doweld 2015, 2016). The registration of plant taxa, including fossils (Barkworth et al. 2016a, b), was accepted at the XIX International Botanical Congress in Shenzhen 2017 (Turland et al. 2017, 2018).

REPLACEMENT NAMES, NEW GENERA, NEW SPECIES, AND NEW COMBINATIONS

Genus: *Austrotsugoxylon* Doweld, **nom. nov.**

≡ *Tsugoxylon* Vozenin-Serra & Sal.-Cheb., *Palaeontographica*, Abt. B, *Paläophytol.* 225: 8. 1994, **nom. illeg. non** *Tsugoxylon* H. Gottwald, *Palaeontographica*, Abt. B, *Paläophytol.* 179: 142. 1981.

IFPNI registration LSID: 8B6814FC-0565-B3A9-1A17-2C71626BF4EF

Type: *Austrotsugoxylon primaevum* (Vozenin-Serra & Sal.-Cheb.) Doweld, **comb. nov.**

≡ *Tsugoxylon primaevum* Vozenin-Serra & Sal.-Cheb., *Palaeontographica*, Abt. B, *Paläophytol.* 225: 8. 1994.

Holotype: Ducos Island, New Caledonia, overseas France [2068 (collection Avias 9276), Sorbonne Université, Faculté des Sciences et Ingénierie, Paris, France] – figured: plate 5–6, l.c.

IFPNI registration LSID: FA433318-F266-38F1-8019-C7EE13CDA508

Geologic age: Triassic.

Genus: *Bulbocarpella* Doweld, **nom. nov.**

≡ *Ascospaera* Manchester, *Palaeontogr. Amer.* 58: 97. 1994, **nom. illeg. non** *Ascospaera* L.S. Olive & Spiltoir [in Spiltoir & L.S. Olive], *Mycologia* 47: 242. 1955 (Fungi).

IFPNI registration LSID: 1429B16C-BFD0-4444-11A2-33CC9F46FBCE

Etymology: The generic name is derived from bulb-shaped fruits.

Type: *Bulbocarpella reticulata* (Manchester) Doweld, **comb. nov.**

≡ *Ascospaera eocenis* Manchester, *Palaeontogr. Amer.* 58: 97. 1994.

Holotype: Nut Beds, Oregon, USA (UF 6318, Florida Museum of Natural History, Gainesville, USA) – figured: plate 46, figure 7, l.c.

IFPNI registration LSID: DF60886F-0A66-E62E-DCB1-B0B76665D59B

Geologic age: Eocene (Clarno Formation).

Genus: *Ceratophylloides* Doweld, **nom. nov.**

≡ *Ceratophytum* A. Boyd, *Palaeontographica*, Abt. B, *Paläophytol.* 247: 16. 1998, **nom. illeg. non** *Ceratophytum* H. Pittier, *J. Wash. Acad. Sci.* 18: 62. 1928 [*Magnoliophyta: Bignoniaceae*].

IFPNI registration LSID: 726AB912-C0AE-969C-4335-DECBC6D619A8

Type: *Ceratophylloides schornii* (A. Boyd) Doweld, **comb. nov.**

≡ *Ceratophytum schornii* A. Boyd, *Palaeontographica*, Abt. B, *Paläophytol.* 247: 17. 1998.

Holotype: Between Ikorfat and Ravn Kløft, West Greenland (MGUH # 23890, Natural History Museum of Denmark, Geological Museum, Copenhagen, Denmark) – figured: plate 1, figure 4, l.c. 1998.

IFPNI registration LSID: 5FBC7ECC-32DE-A090-BBCF-985C64EA461E

Geologic age: Cretaceous (Albian = Kome Formation).

Genus: *Chlonovica* Doweld, **nom. nov.**

≡ *Jania* Chlonova ex Jansonius & Hills, Genera File Foss. Spor. Pollen, Suppl. 6: 3987. 1982, nom. illeg.

≡ *Jania* Chlonova, Paleontol. Zhurn. 1981(2): 132. 1981, nom. illeg. & inval. non *Jania* Lamouroux, Nouv. Bull. Sci. Soc. Philom. Paris 3: 186. 1812 (*Chlorophyta—Corallinaceae*) nec *Jania* J.A. Schultes & J.H. Schultes in J.J. Roemer & J.A. Schultes, Syst. Veg. 7(2): xcvi, 1528. 1830 (*Magnoliophyta—Liliaceae*).

≡ *Vesicula* Chlonova, Trudy Inst. Geol. Geofiz. Sibirsk. Otdel. Akad. Nauk SSSR 312: 65. 1977 [‘1976’], nom. inval.

IFPNI registration LSID: 95A370AF-7A42-8A5F-391F-3CB13B2EC1DD

Etymology: The genus is named in honour of A.F. Chlonova.

Remarks: The fossil-genus *Vesicula* Chlonova (1977) was first proposed for the fossil palynomorphs *incertae sedis* from the Cretaceous (Albian to Cenomanian) sediments of Western Siberia. However, this generic name coincides with a botanical term, which is prohibited in botanical nomenclature; in this connection, Chlonova (1981) changed the name to *Jania* Chlonova. However, this name was not available in botanical nomenclature, since it was proposed as a replacement name with no cited basionym (replaced name) and it is a later homonym of two previously validly published generic names in green algae, *Jania* Lamouroux (1812) and *Jania* J.A. Schultes & J.H. Schultes (in Roemer & J.A. Schultes 1830) (*Magnoliophyta—Liliaceae*). Jansonius and Hills (1982) in validating of *Jania* Chlonova ex Jansonius & Hills also overlooked that the generic name is a later homonym. A new replacement name is validated as *Chlonovica*.

Type: *Chlonovica reticulata* (Chlonova) Doweld, **comb. nov.**

≡ *Vesicula reticulata* Chlonova, Trudy Inst. Geol. Geofiz. Sibirsk. Otdel. Akad. Nauk SSSR 312: 65. 1977 [‘1976’].

Holotype: Kubaevo village, Kemerovo region, Russian Federation (prep. 2489-IV, coordinates 8.5 °N 95, Trofimuk Institute of Petroleum-Gas Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russian Federation) – figured: plate 21, figures 5–6 in Chlonova 1976, l.c.

IFPNI registration LSID: 5566AE7C-A4C0-A07F-BC31-C36D142513E4

Geologic age: Cretaceous (Albian to Cenomanian).

Genus: *Cyperago* Doweld, **nom. nov.**

≡ *Polycarpella* E. Reid & M. Chandler, London Clay Fl. 486. 1933, nom. illeg. non *Polycarpella* Theissen & H. Sydow, Ann. Mycol. 16: 28, 34. 1918 (Fungi).

IFPNI registration LSID: 2DE763D4-96D4-F99C-C607-8F2663FE7CD4

Etymology: The generic name is derived from superficial likeness to extant *Cyperaceae*.

Type: *Cyperago caespitosa* (E. Reid & M. Chandler) Doweld, **comb. nov.**

≡ *Polycarpella caespitosa* E. Reid & M. Chandler, London Clay Fl. 486. 1933.

Holotype: The Isle of Sheppey, northern coast of Kent, England, U.K. (V.23097, Natural History Museum, London, U.K.) – figured: plate 28: 13–21, l.c.

IFPNI registration LSID: 1A9792C0-3D2B-1A03-F205-6EFCC3190E59

Geologic age: Eocene (Ypresian).

Genus: *Dracaenoxylon* Doweld, **nom. nov.**

≡ *Neyvelia* P.R. Reddy, Indian J. Earth Sci. 22: 175. 1995, nom. illeg. non *Neyvelia* Thiergart & U. Frantz, Palaeobotanist 11: 43. 1963 (Fossil Sporae Dispersae).

IFPNI registration LSID: 0DD91286-7192-F236-47EF-E373A475D2AC

Etymology: The generic name is derived from likeness to extant genus *Dracaena* D. Vandelli.

Type: *Dracaenoxylon awasthii* (P.R. Reddy)
Doweld, **comb. nov.**

≡ *Neyvelia awasthii* P.R. Reddy, Indian J. Earth
Sci. 22: 175. 1995.

Holotype: First mine area, Neyveli lignite, Neyveli,
South Arcot District, Tamil Nadu, India (unnumbered,
Palaeobotany-Palynology Laboratory, P.G. College of
Science Saifabad, Hyderabad, India) – figured: figure
1A, l.c. 1995.

IFPNI registration LSID: 3A0EC0FA-8B65-
1DC9-2DEA-EA8706EB3BFB

Geologic age: Miocene.

Genus: *Epacridicarpum* M. Chandler ex Doweld,
nom. nov.

≡ *Epacridicarpum* M. Chandler, Bull. Brit. Mus.
(Nat. Hist.), Geol. 4: 214, 234. 1960, nom. inval.

Type: *Epacridicarpum mudense* M. Chandler
ex Doweld, sp. nov.

Description: Fruits capsular, syncarpous, 5–
locular, dorsiseptical, oblate spheroidal, 5–angled, the
sides sometimes becoming concave and separated by
conspicuous angles; subapical axile placentae; style
elongate, with a conspicuous lobed stigma. Seeds
solitary in the locules, pendulous.

IFPNI registration LSID: 1EB7F4FB-6643-
FA88-5A7E-61AC268935E3

Remarks: The fossil-genus *Epacridicarpum* M.
Chandler was proposed for two fossil-species
Epacridicarpum mudense M. Chandler and
Epacridicarpum headonense M. Chandler, both on
the basis of fossil capsular fruits from the Eocene
sediments of England, but with no necessitated separate
generic description and type species. The provided
“diagnosis” “a form-genus for fruits referable to
Epacridaceae of which the nearer relationship is not
known” is an evident descriptive statement that does
not satisfy the requirement of Art. 38.1(a) (ICN) for a
“description or diagnosis”, since no characters were
provided to differentiate the new genus from other taxa.
As a result, the fossil-generic name and two fossil-
species were all invalidly published. Chandler (1963)

added a new fossil-species, *Epacridicarpum
colwellense* M. Chandler (in Bull. Brit. Mus. (Nat.
Hist.), Geol. 6(3): 354. 1963), but again with validation
of the previously invalidly fossil-genus, and therefore,
this fossil-species remained not validly published. It is
noteworthy that although the fossil-generic name was
used in palaeobotany and more than 10 additional fossil-
species were described in total (Friis 1985; Knobloch
& Mai 1986; Proskurin & Vikulin 1990; Mai & Walther
1992; Vikulin 2010), no one questioned the initial
invalidity of the fossil-generic name. Since the fossil-
genus is an artificial assemblage of superficially related
fossil forms, based on fruit remains, I concur with
the reasons to segregate the fossil-species
Epacridicarpum chandlerae Friis in a separate genus,
then named *Friisia* Proskurin & Vikulin (1990), but
now renamed *Friisiastrum* Doweld (see below) due
to the preoccupation of the generic name by another
fossil-generic name *Friisia* M.M. Mendes & J. Kvaček
(2019) (Fossil *Podocarpaceae*). In addition, I concur
also with an idea that Late Cretaceous fossil fruits are
only superficially and very distantly related to Tertiary
fossil-species, initially constituting fossil-genus
Epacridicarpum, and in this connection, the invalidly
published distinct fossil-subgenus *Epacridicarpum*
subgen. *Cretacea* Proskurin & Vikulin (1990) along
with its all Late Cretaceous fossil-species, are excluded
in a separate fossil-genus *Epacridops* Doweld, gen.
nov. (see below). In sum, a newly re-circumscribed
Epacridicarpum M. Chandler ex Doweld gen. nov. is
restricted only to fossil capsular septicidal fruits with a
distinct style bearing a conspicuous lobed stigma,
occurring as 7 distinct fossil-species from Eocene to
Miocene sediments in Europe, based on fruit remains.

Fossil-species.

Epacridicarpum balticum P.I. Dorof. & Vikulin ex
Doweld, **sp. nov.**

≡ *Epacridicarpum balticum* P.I. Dorof. & Vikulin
[in Vikulin], Bot. Zhurn. (Moscow & Leningrad) 95(1):
65. 2010 [description in English], nom. inval.

Holotype: Otradnoe, Sambian peninsula,
Kaliningrad region, Russian Federation (43/K471,

Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation) – figured: plate 2, figure 3–4, l.c. 2010.

IFPNI registration LSID: A20F741D-7ECF-4DAD-3E1E-B5F211CD3C65

Geologic age: Early Oligocene (Rupelian).

Epacridicarpum clavatum P.I. Dorof. & Vikulin ex Doweld, **sp. nov.**

≡ *Epacridicarpum clavatum* P.I. Dorof. & Vikulin [in Vikulin], Bot. Zhurn. (Moscow & Leningrad) 95(1): 67. 2010 [description in English], nom. inval.

Holotype: Otradnoe, Sambian peninsula, Kaliningrad region, Russian Federation (64/K471, Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation) – figured: plate 2, figure 7–8, l.c. 2010.

IFPNI registration LSID: FC3B970F-6D0D-2C80-F07A-9C0950287715

Geologic age: Early Oligocene (Rupelian).

Epacridicarpum headonense M. Chandler ex Doweld, **sp. nov.**

≡ *Epacridicarpum headonense* M. Chandler, Bull. Brit. Mus. (Nat. Hist.), Geol. 4: 234. 1960 [description], nom. inval.

Holotype: Highcliff Sands, Cliff End near Mudeford, Hampshire, England, U.K. (V.36485, Natural History Museum, London, U.K.) – figured: plate 21, figure 3 (in Chandler 1964, marked as ‘V.36486’ in error).

IFPNI registration LSID: CB7DB9F6-36FA-6394-92FE-FB82A3710483

Synonym: *Epacridicarpum colwellense* M. Chandler, Bull. Brit. Mus. (Nat. Hist.), Geol. 6(3): 354. 1963, nom. inval.

Geologic age: Eocene.

Type: *Epacridicarpum mudense* M. Chandler ex Doweld, **sp. nov.**

≡ *Epacridicarpum mudense* M. Chandler, Bull. Brit. Mus. (Nat. Hist.), Geol. 4: 214. 1960 [description], nom. inval.

Holotype: Highcliff Sands, Cliff End near Mudeford, Hampshire, England, U.K. (V.36486, Natural History Museum, London, U.K.) – figured: plate 21, figure 7 (in Chandler 1964).

IFPNI registration LSID: 809C57DA-4454-1E4D-8843-1570D77F7C57

Geologic age: Eocene.

Epacridicarpum pusillum (Menzel) Doweld, **comb. nov.**

≡ *Ruta pusilla* Menzel, Jahrb. Königl. Preuss. Geol. Landesanst. 34, Teil 1(1): 38. 1913.

≡ *Epacridicarpum pusillum* (Menzel) Mai [in Knobloch & Mai], Rozpr. Ústøed. Ústavu Geol. 47: 94. 1986, nom. inval.

≡ *Epacridicarpum pusillum* (Menzel) Mai [in Mai & H. Walther], Abh. Staatl. Mus. Miner. Geol. Dresden 38: 87. 1992 [‘1991’], nom. inval.

Holotype: Maria Theresia mine, near Herzogenrath, Aachen, North Rhine-Westphalia, Germany (MB.Pb.2004/1131, Museum für Naturkunde, Berlin, Germany) – figured: plate 4, figure 14, 1913, l.c.

IFPNI registration LSID: BACD3473-3D1B-202E-CC76-7FEE6C148BAB

Geologic age: Miocene.

Epacridicarpum rossicum Proskurin & Vikulin ex Doweld, **sp. nov.**

≡ *Epacridicarpum rossicum* Proskurin & Vikulin, Bot. Zhurn. (Moscow & Leningrad) 75(2): 217. 1990, nom. inval.

Description: Fruitsglobose, large, septicidal, capsular, 1.9–2.5 mm wide and 2.7–3.1 mm high, with a stellate 5-lobed stigma.

Holotype: Pasekovo village, Voronezh region, Russian Federation (800/1, Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation) – figured: plate 21, figure 3 (in Chandler 1964, marked as ‘V.36486’ in error).

IFPNI registration LSID: 1D0DE9E4-398B-BB83-1FA0-4A0F7899C27A

Geologic age: Early Oligocene (Rupelian).

Epacridicarpum rugosum P.I. Dorof. & Vikulin ex Doweld, **sp. nov.**

≡ *Epacridicarpum rugosum* P.I. Dorof. & Vikulin [in Vikulin], Bot. Zhurn. (Moscow & Leningrad) 95(1): 66. 2010 [description in English], nom. inval.

Holotype: Otradnoe, Sambian peninsula, Kaliningrad region, Russian Federation (54/K471, Komarov Botanical Institute, Russian Academy of Sciences, St.-Petersburg, Russian Federation) – figured: plate 2, figure 5–6, l.c. 2010.

IFPNI registration LSID: F691FA9A-E3A3-3702-0463-49A4C8B3DA27

Geologic age: Early Oligocene (Rupelian).

Genus: *Epacridops* Doweld, **gen. nov.**

≡ *Epacridicarpum* subgen. *Cretacea* Proskurin & Vikulin, Bot. Zhurn. (Moscow & Leningrad) 75(2): 216. 1990, nom. inval.

Type: *Epacridops cretacea* Doweld, **sp. nov.**

Description: Fruits small, capsular, septicidal, ellipsoidal, 5–locular, carpels incompletely fused, with a short style bearing capitate to 5–lobed stigma, subtended by a 5–lobed, hypogynous calyx. Pericarp with a thin endocarp.

IFPNI registration LSID: A01A663D-2A7E-947C-B5CF-2EA10304E425

Etymology: Greek *epi* = upon and *acris* = a summit, forming the extant generic name *Epacris* Cav., and Greek *-Sps*, appearance.

Remarks: The fossil-genus *Epacridops* gen. nov. is proposed for the formerly segregated Late Cretaceous fossil-species of *Epacridicarpum*, viz. *E. cretaceum* (W.W. Jung) Erv. Knobl. & Mai, *E. rugulatum* Erv. Knobl. & Mai and *E. cannelatum* Erv. Knobl. & Mai. In contrast to type species and associated Tertiary fossils-species, these fossil-species are distinct in smaller globose capsules having incompletely fused carpels, and bearing short stylus with a capitate or 5–rayed stigma; its pericarp with a thin endocarp, sometimes fused with a membranous testa. On the basis of the differences in the structure of

capsular fruits these Late Cretaceous remains are segregated in a distinct fossil-genus *Epacridops* gen. nov. Since the authors, however, invalidly published their fossil-species names, being associated with invalidly published fossil-generic name *Epacridicarpum* Chandler (1960) [see the validation of this name above], combinations and new names are validated here.

Fossil-species:

Type: *Epacridops cretacea* (W.W. Jung) Doweld, **sp. nov.**

≡ *Stewartia cretacea* W.W. Jung [in W.W. Jung et al.] Mitt. Bayer. Staatssamml. Paläontol. 18: 139. 1978.

≡ *Epacridicarpum cretaceum* (W.W. Jung) Erv. Knobl. & Mai, Rozpr. Ústøed. Ústavu Geol. 47: 94. 1986, nom. inval.

Holotype: Atmosgraben near Niederndorf N Kufstein, Austria (Inv.-Nr. 1978 VI 3, Bayerische Staatssammlung für Paläontologie und Geologie, Munich, Germany) – figured: plate 8, figure 1–2, l.c. 1978.

IFPNI registration LSID: C82A7EC2-9117-9B22-6E47-4355AF41AE78

Geologic age: Late Cretaceous (Maastrichtian) (Gosau Formation).

Epacridops knoblochii Doweld, **sp. nov.**

≡ *Epacridicarpum rugulatum* Erv. Knobl. & Mai, Rozpr. Ústøed. Ústavu Geol. 47: 95. 1986, nom. inval.

Description: Fruits 0.8–1.4 mm in diameter, capsular, septicidal, subglobose, 5–lobed, rugulate on the outside, with a clear surrounding line of a calyx receptacle in the lower third, in the lines of the septa somewhat apically retracted, with 5 lobes. Calyx lobes 5, large, exceeding the capsule, somewhat auriculate at the base. Pedicel thickened; without (?) bracteoles. Stylus subsessile, 5–lobed. Epicarp leathery, thin-skinned, endocarp thin, strongly rugulate.

Holotype: Eisleben, Saxony-Anhalt, Germany (8503, Museum für Naturkunde, Berlin, Germany) – figured: plate 50, figures 1–2, l.c. 1986.

IFPNI registration LSID: 80D0D57A-6679-1372-C438-7820EC545186

Geologic age: Late Cretaceous (Maastrichtian).

Etymology: The specific epithet is in honour of Ervín Knobloch (1934–2004), Czech palaeobotanist.

Epacridops maii Doweld, **sp. nov.**

≡ *Epacridicarpum cannelatum* Erv. Knobl. & Mai, Rozpr. Ústøed. Ústavu Geol.47: 94. 1986, nom. inval.

Description: Fruits 1.2–2.5 mm in diameter, septical, elliptical to ovate, 5-lobed, longitudinally furrowed and wrinkled on the outside, with a clear circumferential line of a calyx receptacle in the lower third, apically somewhat retracted in the lines of the septa, edge of the valves protruding. Calyx lobes unknown. Stylus thick, pentagonal, but not broadened. Epicarp thick, firm; endocarp thin, fused with a membranous testa, cells longitudinally striated.

Holotype: Walbeck, Saxony-Anhalt, Germany (9225, Senckenberg Naturhistorische Sammlungen Dresden, Abteilung Museum für Mineralogie und Geologie, Dresden, Germany) – figured: plate 21, figures 1–2, l.c. 1986.

IFPNI registration LSID: B0569BC8-4EC1-6866-277A-5E3FBA26810F

Geologic age: Late Cretaceous (Maastrichtian).

Etymology: The specific epithet is in honour of D. Mai (1934–2013), German palaeobotanist.

Genus: *Euailanthoxylon* Doweld, **nom. nov.**

≡ *Ailanthoxylon* Ramanujam, Palaeontographica, Abt. B, Paläophytol. 106: 115, 117. 1960, nom. illeg. non *Ailanthoxylon* U. Prakash, Palaeobotanist 7: 19. 1959.

IFPNI registration LSID: 34102740-235A-E3AA-D7B2-747E1AE2320E

Etymology: The generic name indicates superficial likeness to the woods of extant *Ailanthus* Desf.

Remarks: The fossil-genus *Ailanthoxylon* Ramanujam (1960) was initially proposed for the fossil woods from the Mio-Pliocene (Cuddalore Series)

sediments of India, but it was a later homonym of the fossil-genus, *Ailanthoxylon* U. Prakash (1959), created for the fossil woods from the older Deccan Intertrappean beds with only putative affinities to extant genus *Ailanthus* Desf. Since the fossil-generic name *Ailanthoxylon* was intended to emphasize the affinity of the wood fossils to extant genus, and taking into account the difference between Maastrichtian wood type and extant forms (Prakash 1959), a new replacement name for the fossil woods of *Ailanthoxylon* Ramanujam is validated as *Euailanthoxylon*.

Type: *Euailanthoxylon scantiporosum* (Ramanujam) Doweld, **comb. nov.**

≡ *Ailanthoxylon scantiporosum* Ramanujam, Palaeontographica, Abt. B, Paläophytol. 106: 115, 117. 1960.

Holotype: Mortandra, Tamil Nadu, India (S.A. 20), Andhra University, Department of Botany, Visakhapatnam, India) – figured: plate 20, figures 27–32.

IFPNI registration LSID: 87567C91-9437-220C-A6C1-34046B0A1B8C

Geologic age: Mio-Pliocene (Cuddalore Series).
Genus: *Eusyzygioxylon* Doweld, **nom. nov.**

≡ *Syzygioxylon* K. Kramer, Palaeontographica, Abt. B, Paläophytol. 144: 151. 1974, nom. illeg. non *Syzygioxylon* Ingle, Botanique 4(1): 71, 74. 1973.

IFPNI registration LSID: 1B8E158B-327C-1E0A-44A3-C8583184720E

Etymology: The generic name is derived from superficial likeness to the woods of extant *Syzygium* P. Browne ex J. Gaertner.

Remarks: The fossil-genus *Syzygioxylon* Trivedi & C.L. Verma 1971 was initially proposed for the fossil woods from the Deccan Intertrappean sediments of India, but it was not validly published to the lack of illustrations and type designation for the fossil-species, *Syzygioxylon indicum* Trivedi & C.L. Verma. However, later the fossil-generic name *Syzygioxylon* Ingle (1973) was *de novo* published for the analogous

woods from the Deccan Intertrappean sediments of different location of India. Author was inclined to relate his wood remains to the extant myrtaceous genus *Syzygium* P. Browne ex J. Gaertn., although the comparison between the fossil wood type and extant wood type was weak. In revising fossil woods of younger Mio-Pliocene sediments of Southeast Maritime Asia, Kramer (1974) found the more reliable fossil wood type assignable to extant *Syzygium* P. Browne ex J. Gaertn., and created a new fossil-genus *Syzygioxylon* K. Kramer (1974). Since the last fossil generic designation is a later homonym, a new replacement name for the fossil wood generic name *Syzygioxylon* K. Kramer is validated as *Eusyzygioxylon*.

Type: *Eusyzygioxylon bataviae* (K. Kramer)
Doweld, **comb. nov.**

≡ *Syzygioxylon bataviae* K. Kramer,
Palaeontographica, Abt. B, Paläophytol. 144: 151.
1974.

Holotype: Tjilegon, W Java Island, Indonesia (SM.B 12 479 & 12 479/1–12 479/6 (Collection Musper Nr.: Jav. Kaart. 12c/52c), Senckenberg Naturhistorische Sammlungen Frankfurt, Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany) – figured: plate 30, figure 137, 138, plate 31, figure 139, 140, 142–144; text-figures 18a–c.

IFPNI registration LSID: 28C4669D-E8A6-9629-3F7A-1FF19598FA99

Geologic age: Mio-Pliocene.

Genus: *Friisiastrum* Doweld, **nom. nov.**

≡ *Friisia* Proskurin & Vikulin, Bot. Zhurn. (Moscow & Leningrad) 75(2): 219. 1990, nom. inval. non *Friisia* M.M. Mendes & J. Kvaček, Cret. Res. 108 (104352): 2. 2019 (Fossil *Podocarpaceae*).

Description: Fruits capsular, subglobose, 5–locular with a short style and 5–lobed stigma, dorsiseptical, subtended by a 5–lobed, hypogynous calyx. Placentation subbasal, axile. Pericarp composed of 3 distinct layers: a thin epicarp of small cuboidal cells

with polygonal facets, a mesocarp of small isodiametric parenchyma cells and an endocarp of elongated sclereids, diverging from placenta.

IFPNI registration LSID: 54E8B79C-9930-64A0-657E-283C4C1E40BD

Etymology: The generic name is in honour of E.M. Friis, Swedish palaeobotanist.

Remarks: The fossil-genus *Friisia* Proskurin & Vikulin was proposed to segregate formerly described fossil-species *Epacridicarpum chandlerae* Friis on the basis of fossil capsular fruits from the Miocene sediments of Jutland (Denmark). The authors, however, invalidly published the fossil-generic name *Friisia* since the basionym of its type fossil-species *Epacridicarpum chandlerae* was previously invalidly published being associated with invalidly published fossil-generic name *Epacridicarpum* Chandler (1960) [see the validation of this name above]. A new fossil-generic name *Friisiastrum* gen. nov. is validated with a modification of the initial spelling since the name *Friisia* was preoccupied by a recently validated fossil-generic name *Friisia* M.M. Mendes & J. Kvaček (2019) (Fossil *Podocarpaceae*).

Type: *Friisiastrum chandlerae* Doweld, **gen. & sp. nov.**

≡ *Epacridicarpum chandlerae* Friis, Biol. Skr. 24(3): 48. 1985, nom. inval.

≡ *Friisia chandlerae* (Friis) Proskurin & Vikulin, Bot. Zhurn. (Moscow & Leningrad) 75(2): 219. 1990, nom. inval.

Holotype: C. Nielsen A/S lignite quarry, Fæstervold, Denmark (SEM-325, Natural History Museum of Denmark, Geological Museum, Copenhagen, Denmark) – figured: plate 13, figure 1, Friis, l.c.

IFPNI registration LSID: D3040181-A849-FAE0-2E03-CAD0E8ABA770

Geologic age: Miocene (Odderup Formation).

Genus: *Globospermum* Doweld, **nom. nov.**

≡ *Sphaerosperma* Manchester, Palaeontogr. Amer. 58: 110. 1994, nom. illeg. non *Sphaerosperma* Preuss, Linnaea 25: 732. 1853 ('1852') (Fungi).

IFPNI registration LSID: EEB556FA-ED7F-BD16-7D52-BCB20B95DDAA

Etymology: The generic name is from Greek stems, *Globos* = rounded and *sperma* = a seed.

Type: *Globospermum riesiorum* (Manchester) Doweld, **comb. nov.**

≡ *Sphaerosperma riesiorum* Manchester, *Palaeontogr. Amer.* 58: 110. 1994 (“*riesii*”).

Holotype: Nut Beds, Oregon, USA (UF 9746, Florida Museum of Natural History, Gainesville, USA) – figured: plate 58, figure 16–17, l.c.

IFPNI registration LSID: 8612F325-0DF7-9D1D-FD30-0BA5675FD0D0

Geologic age: Eocene (Clarno Formation).

Genus: *Grewiaceoxylon* Doweld, **gen. nov.**

≡ *Grewioxylon* U. Prakash & Ramesh Dayal, *Palaeobotanist* 13(1): 20. 1965, nom. illeg.

= *Grewioxylon* Shallom, *J. Indian Bot. Soc.* 42(2): 174. 20 Jan 1964 (‘1963’), nom. inval.

= *Grewinium* R. Srivast. & Guleria, *Palaeobotanist* 49(3): 531. 2000, nom. inval.

IFPNI registration LSID: 0AC5AAD9-1284-44D5-7E51-CB44352BB18D

Type: *Grewiaceoxylon mahurzariense* (U. Prakash & Ramesh Dayal) Doweld, **comb. nov.**

Description: Wood diffuse-porous. Growth rings indistinct or delimited by narrow line of terminal parenchyma. Vessels small to medium sized; solitary and inradial multiples of 2–4 (or more); vessel members short with oblique or tailed ends; perforations simple; intervessel pits small, bordered and alternate. Parenchyma paratracheal present, terminal and diffuse present or lacking; strands irregularly storied. Rays fine to broad; heterocellular; narrow rays have storied tendency; broad rays consist of *Pterospermum*-type of tile cells interspersed among procumbent cells. Radial gum canal like structures lacking or in median portion of broad rays. Fibres nonseptate, irregularly storied (modified after Srivastava & Guleria 2000).

Etymology: The generic name is by attribution of

the fossil woods to the family *Grewiaceae* Doweld & Reveal.

Remarks: The fossil-genus *Grewioxylon* J. Schust. was initially described on the basis of problematic fossil woods from the Miocene sediments of East Indies, its type species, *G. swedenborgii* J. Schust. was soon re-interpreted as a representative of the fossil-wood genus *Dipterocarpoxyton*, *D. swedenborgii* (J. Schust.) (J. Schust.) Kräusel (in *Verh. Geol.-Mijnb. Genootsch. Ned. Kolon., Ser. Geol.* 5(4): 267. Feb 1922) or later *Shoreoxylon*, *Sh. swedenborgii* (J. Schust.) H.-J. Schweitz (in *Palaeontographica, Abt. B, Paläophytol.* 105: 9. 1958, **comb. inval.**). Therefore, *Grewioxylon* J. Schust. was subsumed in the synonymy. Shallom revived *Grewioxylon* Shallom (1964) as a new fossil-genus based on the fossil woods reminiscent modern *Grewia* from the Deccan Intertrappean beds, however, she failed to designate a type for the type fossil-species, *G. intertrappeum* Shallom, and hence, both fossil-genus and its sole fossil-species were invalidly published. This nomenclatural mistake was overlooked by subsequent researchers. Prakash and Dayal (1965) maintained Schuster’s generic name because of its priority, but excluded Schuster’s type species, and furthermore, they inadmissibly designated a new ‘generotypus’, *G. mahurzariense* U. Prakash & Ramesh Dayal (1963), thus created a later homonym. Srivastava and Guleria (2000) tried to resolve the homonymy in proposing of a new fossil generic name *Grewinium* R. Srivast. & Guleria as a replacement name for invalidly published *Grewioxylon* Shallom (1964), this action resulted in the creation of the invalidly published fossil generic name, since the type species, ‘*G. intertrappeum*’ was not validated by designation of its holotype (only recombined). Since under *Grewioxylon* name (also *Grewinium*) several unrelated fossil woods, superficially related to extant genus *Grewia*, were published from the Deccan Intertrappean sediments, European Miocene and Indo-Chinese Neogene. In revising the fossil-genus, I propose to delimit the newly validated fossil-genus *Grewiaceoxylon* gen. nov. (Type: *Grewioxylon mahurzariense* U. Prakash & Ramesh

Dayal) by the *Grewia*-like fossil woods from the Deccan Intertrappean sediments only, excluding other fossil woods named *Grewioxylon* as problematic types, awaited their re-classification in different fossil wood genera. The fossil-species *G. intertrappeum* Shallom, for which no type specimens were found, is considered as a synonym of *Grewioxylon mahurzariense* U. Prakash & Ramesh Dayal due to the weak differences in wood structure: the lack of terminal parenchyma and occurrence of diffuse parenchyma in addition to the vasicentric type, otherwise *G. intertrappeum* appears to be almost similar to that of *G. mahurzariense* described and published earlier.

Fossil-species:

Grewiaceoxylon canalisum (Bande & R. Srivast.)
Doweld, **comb. nov.**

≡ *Grewioxylon canalisum* Bande & R. Srivast.,
Geophytology 24(2): 131. 1995.

Holotype: Nawargaon, Wardha District, Maharashtra, India (B.S.I.P. Museum No. 36795, Birbal Sahni Institute of Palaeosciences, Lucknow, India) – figured: plate 1, figures 1–7, l.c.

IFPNI registration LSID: 62604443-A872-46F9-554F-89BF21C70702

Geologic age: Late Cretaceous (Maastrichtian).

Grewiaceoxylon indicum (U. Prakash & Ramesh Dayal) Doweld, **comb. nov.**

≡ *Grewioxylon indicum* U. Prakash & Ramesh Dayal, *Palaeobotanist* 13(1): 21. 1965.

Holotype: Mahurzari near Nagpur, Madhya Pradesh, India (B.S.I.P. Museum No. 32789, Birbal Sahni Institute of Palaeosciences, Lucknow, India) – figured: Plates 1–2, figures 6–13; Text-figure 2, l.c.

IFPNI registration LSID: C199B132-5221-232D-1A84-AC81B907EF68

Geologic age: Late Cretaceous (Maastrichtian).

Type: ***Grewiaceoxylon mahurzariense*** (U. Prakash & Ramesh Dayal) Doweld, **comb. nov.**

≡ *Grewioxylon mahurzariense* U. Prakash & Ramesh Dayal, *Curr. Sci. (Bangalore)* 32(7): 315. 1963.

= *Grewioxylon intertrappeum* Shallom, *J. Indian Bot. Soc.* 42(2): 174. 1964, nom. inval. (sine typo).

Holotype: Mahurzari near Nagpur, Madhya Pradesh, India (B.S.I.P. Museum No. 32777, Birbal Sahni Institute of Palaeosciences, Lucknow, India) – figured: figures 1–2.

IFPNI registration LSID: 585726B7-6FCD-0756-F80A-B94D2B89F983

Geologic age: Late Cretaceous (Maastrichtian).

Genus: ***Gymnostomoxylon*** Doweld, **gen. nov.**

= *Casuaroxylon* Goeppert & Stache [in Stache], *Casuarin.* 42. 1855 [typo excl.], auctt.

Description: Growth rings indistinct, wood diffuse porous; vessels exclusively solitary, arrayed in a loose diagonal pattern; perforation plates simple, vessel element length medium; intervessel pitting alternate; rays 1–3-seriate and 10+ seriate, aggregate rays present, rays composed of procumbent cells; fibres thin- to thick-walled, pitted on radial and tangential sides; axial parenchyma in bands 1–3 wide.

IFPNI registration LSID: 8C596A04-9B38-FAC3-29F8-F8B905249ABC

Type: *Gymnostomoxylon ildephonsi* (Vanner) Doweld, **comb. nov.**

Etymology: The generic name is derived from the extant *Gymnostoma* L.A.S. Johnson and Greek stem *-xylon*, a wood.

Remarks: The fossil-genus *Casuaroxylon* Goeppert & Stache was described on the basis of fossil woods from the unknown sediments and unknown territory (presumably Europe); authors likened the fossils to the extant genus *Casuarina*, but the xylotomical diagnosis of fossil woods do not match the *Casuarina*-type of wood (Vanner 2019). Unfortunately, this fossil-generic name was used as a repository for the fossil woods, which were doubtfully related to the *Casuarina*-type of wood: *Casuaroxylon japonicum* Shimakura (1937) from the Cretaceous of Hokkaido, Japan [nothing in common to do with *Casuarina*, represents a distinct type of Cretaceous woods]; *Casuaroxylon prambachense* E. Hofmann (1944)

from the Oligocene of Austria [differed in the presence of presence of vessels arranged in short tangential rows lying between parenchyma bands, this characters calls to the placement of the fossil woods outside *Casuarinaceae*]; *Casuaroxylon latrobei* (R.T. Patton) Müller-Stoll & Mädler-Angeliewa (1984) from the Rupelian of Australia [wood type resembles the wood of extant *Lithocarpus* Blume, cf. Kramer 1974; Patton 1958]. The fossil woods from Indonesia, *Casuaroxylon palaeosumatranum* K. Kramer (1974), were likened to the extant species of *Gymnostoma sumatranum* (Jungb. ex de Vriese) L.A.S. Johnson, but Vanner (2019) explicitly noticed the differences of fossil woods from the known wood of extant species, namely *G. sumatranum* does not have large (10+ seriate) rays, nor does it have vessels of two distinct size classes visible in fossils; in this connection, I recombined this fossil-species in *Gymnostomatoxylon* with a query. Since the fossil woods, which could be related/likened to the extant genus *Casuarina*, were not discovered in known fossil record, I reject the idea to validate the fossil-generic name ‘*Casuarinoxylon*’ for the fossil-species relative to extant *Gymnostoma*; in contrast, I prefer to create a new fossil-generic name *Gymnostomatoxylon* for these fossils, emphasizing their relationships with extant genus *Gymnostoma*, not *Casuarina* s. str.

Fossil-species:

Type: *Gymnostomatoxylon ildephonsi* (Vanner) Doweld, **comb. nov.**

≡ *Casuaroxylon ildephonsi* Vanner, I.A.W.A. J. 40(3): 631. 2019 (“*Casuarinoxylon*”).

Holotype: Landslip Hill, Southland, New Zealand (OU35157a, Geology Museum, University of Otago, Dunedin, New Zealand) – figured: plate 1–3, l.c. 2019.

IFPNI registration LSID: 6A4AF5A1-1FAB-7118-83F5-9FB1BFA5AB05

?*Gymnostomatoxylon palaeosumatranum* (K. Kramer) Doweld, **comb. nov.**

≡ *Casuaroxylon palaeosumatranum* K. Kramer, Palaeontographica, Abt. B, Paläophytol. 144(3–6): 94. 1974.

Holotype: Morasa River, Obilatu Island, North Maluku Province, Indonesia (Utrecht Nr. 18 (also in Kol. Museum Haarlem: 3821, 3822, 10155), Utrecht University, Laboratory of Palaeobotany and Palynology, Utrecht, The Netherlands) – figured: plate 22: 52, 54; 33: 55, 56, 58 60; text-figure 7, l.c. 1974.

IFPNI registration LSID: 430CD8B1-8E9E-4D34-98BE-5F36DD75BFD9

Genus: *Hyperbaenopsis* Doweld, **nom. nov.**

≡ *Calkinsia* J.A. Wolfe, Prof. Pap. U.S. Geol. Surv. 571: 20. 1968, nom. illeg. non *Calkinsia* Nieuwland, Amer. Midl. Naturalist 4: 383. 1916 (Fungi) nec *Calkinsia* J. Lackey, Trans. Amer. Microscop. Soc. 79: 105. 1960 (Algae: *Euglenophyta*).

IFPNI registration LSID: E28A2BC3-0738-568C-19A1-66F52D20FA1F

Type: *Hyperbaenopsis franklinensis* (J.A. Wolfe) Doweld, **comb. nov.**

Etymology: The generic name is indicates likeness to the extant genus *Hyperbaena* Miers ex Bentham, nom. cons.

Remarks: The fossil-genus *Calkinsia* J.A. Wolfe was described on the basis of fossil leaves from the Eocene sediments of Washington (USA), author later likened the fossils to the extant genus *Hypserpa* Miers (Wolfe 1977). A new fossil-generic name *Hyperbaenopsis* nom. nov. is validated due to the existence of senior homonyms, *Calkinsia* Nieuwland (1916) (Fungi) and *Calkinsia* J. Lackey (1960) (Algae: *Euglenophyta*).

Fossil-species:

Hyperbaenopsis dilleri (Knowlton) Doweld, **comb. nov.**

≡ *Cinnamomum dilleri* Knowlton, Ann. Rept. U. S. Geol. Surv. 18(3): 47, tab. 4, figure 1. 1900.

Lectotype (designated here) — National Museum of Natural History, Smithsonian Institution, Washington, USA (USNM USNM P 7581, National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured: plate 4, figure 1, l.c. 1900.

IFPNI registration LSID: 80C17E87-CF4F-A7D9-4628-637F77ACC698

Type: *Hyperbaenopsis franklinensis* (J.A. Wolfe)
Doweld, **comb. nov.**

≡ *Calkinsia franklinensis* J.A. Wolfe, Prof. Pap. U.S. Geol. Surv. 571: 20, tab. 4, figures 4, 8. 1968.

Holotype: National Museum of Natural History, Smithsonian Institution, Washington, USA (USNM 42149, National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured: plate 4, figure 8, l.c. 1968.

IFPNI registration LSID: 2655D35E-41E8-D419-72A7-7F7AC70C7EA9

Hyperbaenopsis plafkeri (J.A. Wolfe) Doweld,
comb. nov.

≡ *Calkinsia plafkeri* J.A. Wolfe, Prof. Pap. U. S. Geol. Surv. 997: 62, tab. 6, figure 8; plate 23, figures 3, 4, 6, 7b. 1977.

Holotype: National Museum of Natural History, Smithsonian Institution, Washington, USA (USNM 43296, National Museum of Natural History, Smithsonian Institution, Washington, USA).

IFPNI registration LSID: 2655D35E-41E8-D419-72A7-7F7AC70C7EA9

Genus: *Knightiophylloides* Doweld, **nom. nov.**

≡ *Knightiophyllum* E.W. Berry, U.S. Geol. Surv. Prof. Pap. 91: 208. 1916, nom. illeg. non *Knightiophyllum* Ettingshausen, Foss. Fl. Neuseelands: 43 [185]. 25 Aug 1887 [preprint] & Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 53: 185. 20 Oct 1887 (*Magnoliophyta* — ?*Proteaceae*).

IFPNI registration LSID: 546DF057-106B-6E17-8290-7087ABFCDA0C

Etymology: The generic name indicates likeness to the fossil-genus *Knightiophyllum* Ettingsh.

Remarks: The fossil-genus *Knightiophyllum* E.W. Berry was described on the basis of several fossil leaves from the Eocene sediments of Puryear, Tennessee (USA), author suggested its putative

relationships with extant proteaceous genus *Knightia* R. Br. Dilcher & Mehrotra (1969) re-studied authentic and additional materials from the locality, and came to conclusion that previously suggested relationships with extant genus *Knightia* R. Br. is unsupported in terms of stomatography and leaf micromorphology, since the leaf ultrastructure does not reminiscent any extant genera of *Proteaceae*. The affinity of these enigmatic fossils was not established; perhaps, these fossils represent a distinct palaeoendemic taxon. A new fossil-generic name *Knightiophylloides* nom. nov. is validated in order to emphasize the distant similarity to fossil forms due to the existence of senior homonym, *Knightiophyllum* Ettingshausen, described for a different type of fossil proteaceous foliage from the Eocene sediments of New Zealand.

Type: *Knightiophylloides wilcoxianum* (E.W. Berry) Doweld, **comb. nov.**

≡ *Knightiophyllum wilcoxianum* E.W. Berry, U. S. Geol. Surv. Prof. Pap. 91: 208. 1916.

Lectotype (designated here): Puryear, Henry County, Tennessee, USA (USNM P 35599, National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured: plate 35, figure 1, l.c. 1916.

IFPNI registration LSID: 785363D1-4C24-1912-B603-427BAB1BF077

Geologic age: Eocene (Lagrange Formation).

Genus: *Mitragynoxyloides* Doweld, **gen. nov.**

≡ *Mitragynaxylon* Koeniguer & Lemoigne [in Gevin, Koeniguer & Lemoigne], Bull. Soc. Géol. France, Series 7 [1971], 13: 388. 1973, nom. inval.

IFPNI registration LSID: 3D2C9552-4CDB-4651-E2B4-CBB688BAD380

Description: Wood heteroxylic with generally grouped, small to medium, numerous to very numerous vessels; rays irregularly arranged, heterogeneous, moderately numerous to very numerous, very short to very high, very fine to moderately broad, uni- and multiseriate; apotracheal parenchyma; non-septate, mostly narrow, libriform fibers.

Etymology: The generic name is by remote likeness with extant genus *Mitragyna* P.W. Korthals (*Rubiaceae*).

Remarks: The fossil-genus *Mitragynaxylon* Koeniguer & Lemoigne was described on the basis of several fossil woods from the Oligocene sediments of Algeria (North Africa), authors suggested their putative relationships with extant rubiaceous genus *Mitragyna* P.W. Korthals. However, the fossil-generic name was invalidly published since no type was designated for the type-species. Gros (1990) re-studied authentic materials, and came to conclusion that previously suggested relationships with extant genus *Mitragyna* is weak, since the wood structure reminiscent numerous other extant genera of *Rubiaceae*. Since it might be a possible option that a true '*Mitragynoxylon*' might be discovered among fossils woods, that could be definitely related with extant genus *Mitragyna*, the new fossil-generic name *Mitragynoxyloides* gen. nov. is validated with a light modification of the initial spelling in order to emphasize the distant similarity to extant forms.

Type: *Mitragynoxyloides gevinii* Doweld, **sp. nov.**

≡ *Mitragynaxylon gevinii* Koeniguer & Lemoigne [in Gevin, Koeniguer & Lemoigne], Bull. Soc. Géol. France, Sér. 7 [1971], 13: 388. 1973, nom. inval. (sine typo).

Holotype: Dalaat el Admia, Tindouf, Algeria (Collection P. Gevin # 12), Sorbonne Université, Faculté des Sciences et Ingénierie, Paris, France) – figured: text-figures 1 in Koeniguer & Lemoigne, l.c.

IFPNI registration LSID: 2BD04184-1B1C-E8DF-737E-8E7BC70A64D4

Geologic age: Oligocene.

Genus: *Molinamyces* Doweld, **nom. nov.**

≡ *Molinaea* Doub. & D. Pons, Compt. Rend. Congr. Natl. Soc. Savantes, Sec. Sci., 95 [1970], 3: 149. 1975 ("*Molinea*"), nom. illeg. & inval. non *Molinaea* Comm. ex Jussieu, Gen. Plate: 248. 1789 (*Magnoliophyta*—*Sapindaceae*).

IFPNI registration LSID: 02239BC0-7486-7CFD-EF39-99D0B6F22BAD

MycoBank: 843725

Description: Epiphyllous colonies. Hyphae anastomosing, non-radiate. Hyphopodia capitate, bicellular. Suction devices simple, round. Mucronate hyphopodia and mycelial setae lacking. Ascospores dicellate (monoseptate), brown.

Etymology: The generic name is in honour of E. Molina Echavarría (Instituto Colombiano de Energía eléctrica. Colombia).

Remarks: The fungal fossil-genus *Molinaea* Doub. & D. Pons (with incorrect, alternatively used spelling *Molinea* since the generic name was derived from *Molina*) was described on the basis of mycelial remains with ascospores (perithecium described, but not illustrated) from the Late Cretaceous (Maastrichtian) sediments of Colombia in South America (then Gondwana). However, the fossil-generic name was not validly published since the authors did not provide a type for the type species (several syntypes were unfortunately designated); moreover, it is a later homonym of the extant genus of flowering plants, *Molinaea* Comm. ex Jussieu (1789) (*Magnoliophyta*: *Sapindaceae*). In this connection, a new replacement name for the fossil fungal generic name was instituted with a validation of its sole fossil-species.

Type: *Molinamyces asterinoides* Doweld, **gen. & sp. nov.**

≡ *Molinaea asterinoides* Doub. & D. Pons, Compt. Rend. Congr. Natl. Soc. Savantes, Sec. Sci., 95 [1970], 3: 149. 1975 ("*Molinea*"), nom. illeg. & inval. (sine typo).

Holotype: Mine Corrales, Boyacá Bassin, Colombia (Collection Boureau (Paris), n° 6441, Sorbonne Université, Faculté des Sciences et Ingénierie, Paris, France) – figured: plate 2, figure 1.

IFPNI registration LSID: 7F62CAEE-1297-20B8-40E0-08C6647E0A9A

MycoBank: 843727.

Geologic age: Late Cretaceous (Maastrichtian) [Formation Guaduas].

Genus: *Pungentophyllum* Doweld, **gen. nov.**

≡ *Pungiphyllum* Frankenh. & V. Wilde, Abh. Staatl. Mus. Miner. Geol. Dresden 41: 99. 1995, nom. inval.

Description: Leaves variable, with margin irregularly toothed to deeply lobed, number of lobes variable; apex of distinct lobes pointed, acuminate to attenuate; petiolate. Venation irregular, mixed, midvein continuing into a leaf tip, strong, with distinct secondary veinlets running into lobes, subordinate veins arching marginally; margin enhanced by strengthening, revolution, or a marginal vein. Stomata restricted to abaxial face of the leaves, stomata raised, paracytic.

IFPNI registration LSID: 87AC349A-C763-9439-B777-8867F07FA74A

Etymology: The generic name is derived from Latin word stem, *pungċns* (genitive *pungentis*), pricking and Greek word stem *phyllum*, a leaf; species epithet — in honour of Harald Walther (1929–2013), German palaeobotanist.

Remarks: The fossil-genus *Pungiphyllum* Frankenh. & V. Wilde was proposed for the distinctive leaf remains of Europe from Eocene and Oligocene/Miocene sediments. However, the fossil-generic name was not validly published, since authors based their new fossil-genus on the invalidly published type fossil-species ‘*Pungiphyllum waltheri*’ Frankenh. & V. Wilde, for which they failed to designate the repository of the type specimens (obligatory requirement of the Code for the valid publication of a new species since 1991, ICN, Art. 40.7). The fossil-genus is validated with a corrected spelling, reflecting the established custom of the use of classical Latin stems in plant names, namely use of the word stem *pungċns* in genitive *pungentis* (not barbarous *Pungi-*): *Pungentophyllum* gen. nov.; the species epithet is also modified to *haraldwaltheri*, honouring Harald Walther.

Type: *Pungentophyllum haraldwaltheri* Doweld, **gen. & sp. nov.**

≡ *Pungiphyllum waltheri* Frankenh. & V. Wilde, Abh. Staatl. Mus. Miner. Geol. Dresden 41: 99. 1995, nom. inval.

Holotype: Eckfelder Maar near Manderscheid, Eifel, Rheinland-Pfalz, Germany (PB 199517 LS, Naturhistorisches Museum Mainz/Landessammlung für Naturkunde Rheinland-Pfalz, Mainz, Germany) – figured: text-figure 2b, plate 1, figure 2 in Frankenh. & V. Wilde, l.c.

IFPNI registration LSID: 9428EAF1-0FE9-8C76-32E5-905B33E10492

Geologic age: Eocene (Lutetian = Late Geiseltalian).

Additional fossil-species (formerly invalidly recombined in *Pungiphyllum* nom. inval.):

Pungentophyllum cruciatum (A. Braun) Doweld, **comb. nov.**

≡ *Quercus cruciata* A. Braun in A.E. Bruckm., Jahresh. Vereins Vaterl. Naturk. Württemberg 6(2): 228. 1850.

≡ *Pungiphyllum cruciatum* (A. Braun) Frankenh. & V. Wilde, Abh. Staatl. Mus. Miner. Geol. Dresden 41: 101. 1996, nom. inval.

IFPNI registration LSID: 9C89F032-870E-3AE9-B532-D40ECB83DAD8

Pungentophyllum heeri (J. Sieber) Doweld, **comb. nov.**

≡ *Ilex heeri* J. Sieber, Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-Naturwiss. Cl., Abt. 1, 82(1): 87. 1880.

≡ *Pungiphyllum heeri* (J. Sieber) Z. Kvaček & Teodoridis, Sborn. Nár. Muz. Praze, Øada B, Pøír. Vidy 67: 105. 2011, nom. inval.

IFPNI registration LSID: CB13E1C4-21D1-2A07-EFFD-9F699928EA5F

Genus: *Sassafropsis* Doweld, **nom. nov.**

≡ *Sassafrophyllum* Velenovský, Abh. Königl. Böhm. Ges. Wiss. 7, 3(3): 50, 53, 58. 1889, *excl. typo*.

Description: Leaves trilobate, entire, leaf bases wide to rounded wedge-shaped, lobes well differentiated, narrowly wedge-shaped with narrow apices, the middle lobe biggest, the lateral lobes oriented

at nearly right angle to the middle lobe. Sinuses wide, open. Venation palmate-pinnate, midvein with lateral basal veins, oppositely diverging at 45–55° from the midvein in the basal part of the lobe; secondary veins diverging at 55–60° ill-defined, very thin, initially straight, then arched upwards and running to the leaf margin; secondary veins of the lateral basal diverging at obtuse angle, slightly arched upwards; the leaf margin is bordered by a marginal veinlet.

IFPNI registration LSID: E8102587-742D-0A87-6632-B270157D2DD6

Etymology: The generic name is derived from extant genus *Sassafras*, and *-opsis*, similar; *beleutica* from Beleuta River.

Remarks: The fossil-genus *Sassafrrophyllum* Velenovský was initially proposed for the North American fossil-species *Sassafras acutilobum* Lesq. (Rept. U.S. Geol. Surv. Territ. 6: 79. 1874), based on leaf remains from the Cretaceous sediments. However, the fossil-generic name was not validly published, since Velenovský did not supply necessitated separate generic description for a fossil-genus, and therefore, both fossil-generic and fossil-species names were not validly published. Later the fossil-genus was not accepted in palaeobotanical systematics, and the fossil-genus remained not validated. The fossil-species from Central Asia, *Sassafrrophyllum beleutinum* Shilin (1977), was tentatively attributed to the fossil-genus *Sassafrrophyllum*, but since the fossil-genus was not previously validly published, the new fossil-species from Central Asia was not validly published as well. The endemic forms from Central Asia might not be related to the fossil forms in North America, and the resemblance remained merely superficial, a new monotypic fossil-genus is created for the distinctive fossil leaf forms from Central Asia.

Type: *Sassafropsis beleutica* Doweld, **gen. & sp. nov.**

≡ *Sassafrrophyllum beleutinum* Shilin, Mater. Istorii Fauny Fl. Kazakhstana 7: 129. 1977 (“*beleutinus*”), nom. inval.

Holotype: Bozingen saj, right bank of Beleuta River near its mouth, Zhezkazgan (Dzhezkazgan) region, Kazakhstan (81/314, Institute of Zoology, Almaty, Kazakhstan)– figured: plate 2, figure 1.

IFPNI registration LSID: E14A81DD-212B-A3AE-E9FE-89B909008B08

Geologic age: Cretaceous (Turonian).

Genus: *Saururopsidoxylon* Doweld, **nom. nov.**

≡ *Saururopsis* Stopes & Fujii, Phil. Trans. R. Soc. London 201B: 62. 1910, nom. illeg. non *Saururopsis* Turczaninow, Bull. Soc. Imp. Nat. Moscou 21(1): 589. 1848 (*Magnoliophyta: Saururaceae*).

IFPNI registration LSID: 31403811-EFAE-5344-44F6-2EAB0D834773

Type: *Saururopsidoxylon nipponense* (Stopes & Fujii) Doweld, **comb. nov.**

≡ *Saururopsis nipponensis* Stopes & Fujii, Phil. Trans. R. Soc. London 201B: 62. 1910 (“*nipponensis*”).

Holotype: Hokkaido, Japan (Stopes Coll. Slides 1 B 1-1 B 10 & 1 B II-1 B 13, Natural History Museum, London, U.K.)– figured: Text-figure 19; Photos. 42–47, Plate 7, l.c. 1910.

IFPNI registration LSID: AF9D1B53-80B8-DFFD-EADE-49F5E5310403

Geologic age: Late Cretaceous.

Genus: *Spirocallitrixylon* Doweld, **nom. nov.**

≡ *Protocallitrixylon* Vozenin-Serra & Sal.-Cheb., Palaeontographica, Abt. B, Paläophytol. 225: 6. 1994, nom. illeg. non *Protocallitrixylon* S. Yamazaki & Tsunada, Mem. School Sci. Engin. Waseda Univ. 46: 75. 30 Mar 1982.

IFPNI registration LSID: A4990A4B-3FFD-A4E1-0354-9D46E57CFDE3

Type: *Spirocallitrixylon kanakense* (Vozenin-Serra & Sal.-Cheb.) Doweld, **comb. nov.**

≡ *Protocallitrixylon kanakense* Vozenin-Serra & Sal.-Cheb., Palaeontographica, Abt. B, Paläophytol. 225: 6. 1994.

Holotype: St. Vincent Bay, New Caledonia, overseas France [2138 (collection Avias 9997),

Sorbonne Université, Faculté des Sciences et Ingénierie, Paris, France) – figured: plate 3–4, l.c.

IFPNI registration LSID: AF9D1B53-80B8-DFFD-EADE-49F5E5310403

Geologic age: Triassic (Carnian/ Norian).

Genus: *Stachylacca* Doweld, **nom. nov.**

≡ *Stachycarpus* Meunier, Le Naturaliste, Ser. 2, 20: 17. 1898, nom. illeg. non *Stachycarpus* (Endlicher) van Tieghem, Bull. Soc. Bot. France 38: 163, 173. 1891 (*Pinophyta: Podocarpaceae*).

IFPNI registration LSID: 36021834-85A1-2852-9E2C-CC4958B21890

Remarks: The fossil-genus *Stachycarpus* Meunier was described on the basis of fossil infructescence from the Eocene (Thanetian) sediments of France, its relationships with extant *Phytolaccaceae* family was suggested, but it is still inconclusive in terms of morphology of fossil infructescences. The general similarity with previously described fossil myrtaceous infructescence from the Eocene of formerly Volynia Governorate, Russian Empire (now Zhytomyr region, Ukraine), named *Leptospermites spicatus* Schmalhausen (1883), was noticed. As a result, *Stachycarpus eocenicus* was placed in the synonymy of *Leptospermites spicatus* (Pimenova 1937: 31), since the species epithet published in 1883 has a priority. Unfortunately, the fossil-generic name *Stachycarpus* Meunier (1898) is a later homonym of extant podocarpaceous *Stachycarpus* (Endlicher) van Tieghem (1891), and therefore, a new substitute generic name is proposed: *Stachylacca* nom. nov.

Fossil-species:

Type: *Stachylacca eocenica* (Meunier) Doweld, **comb. nov.**

≡ *Stachycarpus eocenicus* Meunier, Le Naturaliste, Ser. 2, 20: 17. 1898 (“*eocenica*”).

≡ *Leptospermites eocenicus* (Meunier) Laskarev, Trudy Geol. Komiteta 77: 625. 1914 (“*eocenica*”).

Holotype: Beuvry village, near Béthune, Pas-de-Calais, région Hauts-de-France, France (not located,

Muséum National d’histoire naturelle, Paris, France) – figured: unnumb. figure p. 17, l.c. 1898.

IFPNI registration LSID: 9DAD61AB-29E3-F7B0-A005-492F9D99EBFA

Geologic age: Eocene (Thanetian).

Stachylacca spicata (Schmalhausen) Doweld, **comb. nov.**

≡ *Leptospermites spicatus* Schmalhausen, Palaeontol. Abh. 1(4): 319 [37]. 1883.

Holotype: Polis’ke village, Korosten’ district, Zhytomyr region, Ukraine [Mohyl’ne village, Volynian Governorate, Russian Empire] (no access, National Museum of Natural History, Geological Museum, Kyiv, Ukraine) – figured: plate 9 [36], figure 29b; plate 10 [37], figures 7 b–c; plate 11 [38], figures 8–15, l.c. 1883.

IFPNI registration LSID: 7ED5D973-C0F1-01F7-7E3A-C920660D19D8

Geologic age: Eocene.

Genus: *Trivedioxylon* Doweld, **nom. nov.**

≡ *Baphioxylon* Trivedi & Kir. Srivast., J. Indian Bot. Soc. 65: 439. 1986, nom. illeg. non *Baphioxylon* R.N. Lakh. & U. Prakash, Ann. Koninkl. Mus. Mid.-Afr., Geol. Wetensch. 64: 17. 1970.

IFPNI registration LSID: 947EF09D-12BE-BD82-6423-AE6D2468D94A

Etymology: The generic name is in honour of B.S. Trivedi.

Remarks: The fossil-genus *Baphioxylon* Trivedi & Kir. Srivast. was described on the basis of fossil woods from the Deccan Intertrappean sediments of India, its relationships with extant fabaceous genus *Baphia* G. Loddiges is however superficial. However, the fossil-generic name is a later illegitimate homonym of fossil fabaceous wood genus *Baphioxylon* R.N. Lakh. & U. Prakash (1970), the wood structure of which shows solid relationships with extant *Baphia*. Thus, a new replacement name for the fossil wood generic name *Baphioxylon* Trivedi & Kir. Srivast. is necessary and validated in honour of B.S. Trivedi as *Trivedioxylon*.

Type: *Trivedioxylon palaeonitidoides* (Trivedi & Kir. Srivast.) Doweld, **comb. nov.**

≡ *Baphioxylon palaeonitidoides* Trivedi & Kir. Srivast., J. Indian Bot. Soc. 65: 439. 1986.

Holotype: Ghughua, near Shahpura, Mandla district, Madhya Pradesh, India (B.S. Trivedi coll. M.D. 57), Lucknow University, Botany Department, Lucknow, India) – figured: figures 1–8.

IFPNI registration LSID: E14A81DD-212B-A3AE-E9FE-89B909008B08

Geologic age: Late Cretaceous (Maastrichtian).

Genus: *Typholium* Doweld, **nom. nov.**

≡ *Typhoides* H.W. Meyer & Manchester, Univ. Calif. Publ. Geol. Sci. 141: 159. 1997, nom. illeg. non *Typhoides* Moench, Meth.: 201. 1794 (*Magnoliophyta*—*Poaceae*).

IFPNI registration LSID: D32F3DFC-412B-DE74-D172-9D0BE2787815

Etymology: The generic name is derived from the assemblage of Greek stems *Typh-* and *folium*.

Type: *Typholium buzekii* (H.W. Meyer & Manchester) Doweld, **comb. nov.**

≡ *Typhoides buzekii* H.W. Meyer & Manchester, Univ. Calif. Publ. Geol. Sci. 141: 159. 1997.

Holotype: Iron Mountain, north central Oregon, USA (UF 10724, Florida Museum of Natural History, Gainesville, USA) – figured: plate 73: 2, 3.

IFPNI registration LSID: 0F6A6D6E-6C5C-1D8F-555E-B645F1615894

Geologic age: Early Oligocene (Rupelian) [John Day Formation].

Genus: *Ulocaryon* Doweld, **nom. nov.**

≡ *Ulospermum* Manchester, Palaeontogr. Amer. 58: 115. 1994, nom. illeg. non *Ulospermum* Link, Enum. Horti Berol. 1: 267. 1821 (*Magnoliophyta*—*Apiaceae*) nec *Ulospermum* Pomel, Amtl. Ber. Versamml. Deutsch. Naturf. Ärzte 1847, 25: 346. 1849 (Fossil *Cycadopsida*).

IFPNI registration LSID: 145923E0-265B-1B48-145A-7FABD7C9B8AB

Etymology: The generic name is derived from the combination of Greek stems, *Ulo-* (*Oule*), scar, scarring, and *caryon*, nut.

Type: *Ulocaryon hardingiae* (Manchester) Doweld, **comb. nov.**

≡ *Ulospermum hardingiae* Manchester, Palaeontogr. Amer. 58: 115. 1994 (“*hardingae*”).

Holotype: Nut Beds, Oregon, USA (USNM 355363, National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured: plate 65, figure 4–6, l.c.

IFPNI registration LSID: 4A24F9AD-BCC2-02DE-9FD9-35BC9CEFFDC3

Geologic age: Eocene (Clarno Formation).

Genus: *Wheelerastrum* Doweld, **nom. nov.**

≡ *Wheeleria* Manchester, Palaeontogr. Amer. 58: 116. 1994, nom. illeg. non *Wheeleria* Schreber, Gen. 2: 725. 1791 (*Magnoliopsida*).

IFPNI registration LSID: 4CA7512F-0D3E-88E3-7BB2-43DBDFA08A00

Etymology: The generic name is in honour of Elisabeth Anne Wheeler.

Type: *Wheelerastrum lignicrustum* (Manchester) Doweld, **comb. nov.**

≡ *Wheeleria lignicrusta* Manchester, Palaeontogr. Amer. 58: 116. 1994.

Holotype: Nut Beds, Oregon, USA (UF 9271, Florida Museum of Natural History, Gainesville, USA) – figured: plate 65, figure 9–16, l.c.

IFPNI registration LSID: 98EE1772-0151-523A-7D6B-376A441E5CCD

Geologic age: Eocene (Clarno Formation).

Genus: *Wolfea* Doweld, **nom. nov.**

≡ *Pugetia* J.A. Wolfe, Prof. Pap. U.S. Geol. Surv. 571: 16. 1968, nom. illeg. non *Pugetia* (Gandoger) Gandoger, Fl. Eur. 8: 189. 1886 (*Rosaceae*) nec *Pugetia* Kylin, Acta Univ. Lund, Ser. 2, Avd. 2, 21(9): 30. 1925 (Algae: *Rhodymeniophyta*).

IFPNI registration LSID: DD55311D-2366-34C4-E7BD-13C97FD856

Etymology: The generic name is in honour of J.A. Wolfe (1936–2005), American palaeobotanist.

Type: *Wolfea longifolia* (J.A. Wolfe) Doweld,
comb. nov.

≡ *Pugetia longifolia* J.A. Wolfe, Prof. Pap. U.S. Geol. Surv. 571: 16. 1968.

Holotype: King County, Washington, USA (USNMP42122, National Museum of Natural History, Smithsonian Institution, Washington, USA) – figured: plate 2, figure 6, l.c. 1968.

IFPNI registration LSID: C05A7A4D-2531-EF6A-1B31-09CEE7487B5B

Geologic age: Eocene.

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