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Validation of the names of nine species of fossil fungi

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ABSTRACT

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The objective of the present paper is to validate names of nine species of fossil fungi recorded from the Cenozoic sediments. These names were not validly published by their original authors because they were not registered with any recognized nomenclatural repository and therefore lacked citation of the registration identifier, which is a mandatory requirement for valid publication of the name of a fungal taxon (Article F.5.1, Turland et al. 2018). In order to validate these names, the senior author registered the names in Index Fungorum and obtained a unique Registration Identifier for each of them and these are cited with each species. These species are: *Asterina indodeightonii* Vishnu, M.A. Khan & M. Bera, *Asterina mioconsobrina* Vishnu, M.A. Khan & M. Bera, *Asterina miosphaerelloides* Vishnu, M.A. Khan & M. Bera, *Asterina neocombreticola* Vishnu, M.A. Khan & M. Bera, *Asterina neoelaeocarpi* Vishnu, M.A. Khan & M. Bera, *Asterina presaracae* Vishnu, M.A. Khan & M. Bera, *Cyathus dominicanus* Poinar, *Dicellaesporites intertrappea* Sonkusare, B. Samant & Mohab. and *Nidula baltica* Poinar.

Keywords: Fossil fungi, validation of species names, *Asterina*, *Cyathus*, *Nidula*, *Dicellaesporites*.

INTRODUCTION

Dispersed fungal sporocarps, spores, and mycelia are commonly encountered during palynological investigations. Poinar (2014) discovered two new species of Bird's nest fungi (*Nidulariales*: *Nidulariaceae*) from the Tertiary amber. One of these, collected from Dominican Republic, was assigned to the extant fungal genus *Cyathus* Haller (*Cyathus dominicanus* Poinar) and the other, collected from the Baltic amber of Kaliningrad region of northern Europe, was assigned to the extant fungal genus *Nidula* V.S. White (*Nidula baltica* Poinar).

Vishnu et al. (2017) published fossil *Asterinaceae* in the phyllosphere of the Eastern Himalayan Siwalik (Middle Miocene to Early Pleistocene), Arunachal Pradesh, India. This study includes description of six new fossil species assigned to the extant genus *Asterina* Lév., viz. *Asterina indodeightonii* Vishnu et al., *Asterina mioconsobrina* Vishnu et al., *Asterina miosphaerelloides* Vishnu et al., *Asterina neocombreticola* Vishnu et al., *Asterina neoelaeocarpi* Vishnu et al. and *Asterina presaracae* Vishnu et al.

Sonkusare et al. (2021) published a palynoassemblage from the intertrappean sediments (Maastrichtian) of Betul District, Madhya Pradesh, India. This assemblage also includes a new species of the fungal spore genus *Dicellaesporites*, viz.

Dicellaesporites intertrappea Sonkusare et al. 2021.

It has been observed that all the species, mentioned above, have characters different from those of the known species of the respective genera and deserve, therefore, to be recognized as new species. However, these species names are not validly published because they were not registered with any recognized nomenclatural repository and thus lacked a citation of the registration identifier required for valid publication of the name of a fungal taxon (Art. F.5.1, Turland et al. 2018). Therefore, these names have no status under the *Code* unless they are validly published (Art. *12.1,* Turland et al. 2018). Since all these species are new and well recognizable, they are being validated here. To achieve this, the senior author registered the names with Index Fungorum and obtained a unique Registration Identifier for each of them, and this is cited with each species name below.

VALIDATION OF SPECIES NAMES

Phylum: *Ascomycota* Caval.-Sm.

Class: *Dothideomycetes* O.E. Erikss. & Winka

Order: *Asterinales* M.E. Barr ex D. Hawksw. & O.E. Erikss.

Family: *Asterinaceae* Hansf.

Genus: *Asterina* Lév.

1. ***Asterina indodeightonii*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559810.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 152, figure 4A–C. 2017.

Holotype: Figure 4A–C. Specimen number: CUH/PPL/IB7/84/A_2, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings along the Itanagar-Banderdewa Road in Papumpare District, Arunachal Pradesh, India; upper part of the Siwalik Group (Kimin Formation); Late Pliocene to Early Pleistocene.

Etymology: The specific epithet is derived by adding the prefix 'indo' to the modern comparable specific epithet *deightonii*.

2. ***Asterina mioconsobrina*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559811.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 152, figure 4D–G. 2017.

Holotype: Figure 4D–G. Specimen number: CUH/PPL/IB7/40A/A_5, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings along the Itanagar-Banderdewa Road in Papumpare District, Arunachal Pradesh, India; upper part of the Siwalik Group (Kimin Formation); Late Pliocene to Early Pleistocene.

Etymology: The specific epithet is derived by adding the prefix 'mio' to the modern comparable specific epithet *consobrina*.

3. ***Asterina miosphaerelloides*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559812.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 155, figure 5A–F. 2017.

Holotype: Figure 5A–F. Specimen number: CUH/PPL/IB7/34/A_6, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings along the Itanagar-Banderdewa Road in Papumpare District, Arunachal Pradesh, India; upper part of the Siwalik Group (Kimin Formation), Late Pliocene to Early Pleistocene.

Etymology: The specific epithet is derived by adding the prefix 'mio' to the modern comparable specific epithet *sphaerelloides*.

4. ***Asterina neocombreticola*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier : 559813.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 158, figures 6–7. 2017.

Holotype: Figures 6–7. Specimen number: CUH/PPL/SA/7/A_4, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings to the south of Pinjoli area in West Kameng District, Arunachal Pradesh, India; lower part of the Siwalik succession of sediments (Dafla Formation), Middle to Late Miocene.

Etymology: The fossil form is reported from the compression leaf remain of *Combretum* Loefl. (*Combretaceae*) from the Neogene and hence receives the epithet '*neocombreticola*'.

5. ***Asterina neoelaeocarpi*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559814.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 161, figure 8A–F. 2017.

Holotype: Figure 8A–F.Specimen number: CUH/PPL/P/3A/A_7, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings to the east of Pinjoli area, West Kameng District, Arunachal Pradesh, India; lower part of the Siwalik Group (Dafla Formation), Middle to Late Miocene.

Etymology: The specific epithet is derived by adding the prefix 'neo' to the modern comparable specific epithet *elaeocarpi*.

6. ***Asterina presaracae*** Vishnu, M.A. Khan & M. Bera ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559815.

Validating description and illustration: In: Botanical Journal of the Linnean Society 185: 161, figure 9A–F. 2017.

Holotype: Figure 9A–F. Specimen number: CUH/PPL/B/59/A_8, Herbarium and Museum of the Department of Botany, University of Calcutta, Kolkata (CUH).

Type Locality, Horizon and Age: Road cuttings to the Bhalukpong area in West Kameng District, Arunachal Pradesh, India; Middle part of the Siwalik Group (Subansiri Formation); Pliocene.

Etymology: The specific epithet is derived by adding the prefix 'pre' to the modern comparable specific epithet *saracae*.

Phylum: *Basidiomycota* R.T. Moore

Class: *Agaricomycetes* Doweld

Order: *Agaricales* Underw.

Family: *Nidulariaceae* Dumort.

Genus: *Cyathus* Haller

7. ***Cyathus dominicanus*** Poinar ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559263.

Validating description and illustration: In: Fungal Biology 118(3): 326, figures 3–5. 2014.

Holotype: Poinar amber collection at Oregon State University, U.S.A. (Accession AF-9-20A)

Type Locality, Horizon and Age: Dominican Republic; Cenozoic Dominican amber.

Etymology: The specific epithet is based on the country of origin (Dominican Republic).

Genus: *Nidula* V.S. White

8. *Nidula baltica* Poinar ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559264.

Validating description and illustration: In: Fungal Biology 118(3): 326, figures 1–2. 2014.

Holotype: Poinar amber collection at Oregon State University, U.S.A. (Accession AF-9-20B)

Type Locality, Horizon and Age: Kaliningrad region of northern Europe. Cenozoic Baltic amber.

Etymology: The specific epithet is based on the area of origin (Baltic region).

Suprageneric taxon: Didymosporae.

Genus: *Dicellaesporites* Elsik

9. *Dicellaesporites intertrappea* Sonkusare, B. Samant & Mohab. ex R.K. Saxena & P.M. Kirk, **sp. nov.**

Index Fungorum Registration Identifier: 559265.

Validating description and illustration: In: Journal of the Palaeontological Society of India 66(1): 39, Plate III, figure 1. 2021.

Holotype: Plate III, figure 1, Slide No. PGNU/KN/IT/12, Museum of Department of Geology, R.T.M. Nagpur University, Nagpur, India.

Type Locality, Horizon and Age: Kanhobagholi, Betul District, Madhya Pradesh, India; Intertrappean chert; Maastrichtian.

Etymology: The specific epithet refers to the intertrappean sediments.

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