

## PALYNOLOGICAL INDEX

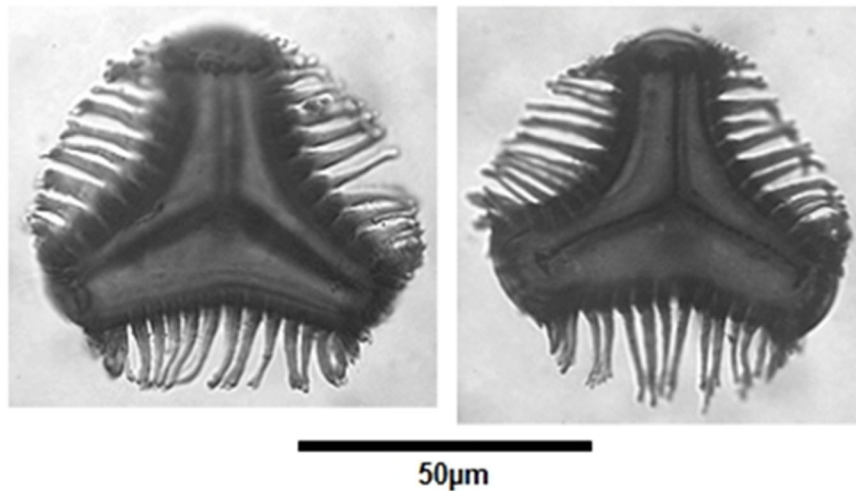
Robert L. Ravn and DGGGS Staff

### Digital Data Series 19

#### *Diatomozonotriletes saetosus* [12235]

Viséan, N. Alaska

Mississippian, N. Dakota



This report has not been reviewed for technical content or for conformity to the editorial standards of DGGGS.

2022

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS



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# **PALYNOLOGICAL INDEX**

Robert L. Ravn and DGGGS Staff

## **INTRODUCTION**

Palynology is the scientific study of microscopic fossils primarily of botanical origin and composed of waxy organic material, which are preserved in vast abundance in fine-grained sediments and sedimentary rocks. Palynomorphs, like other fossils, have distinct ranges of occurrence in geologic time. They are therefore valuable for age interpretation and stratigraphic correlation. They also provide evidence of paleoenvironments, sediment provenance, and thermal maturity (helpful for oil and gas exploration), among other things.

One of the major challenges for palynologists, recognized decades ago, is to keep track of the vast and ever-expanding published data on fossil palynomorphs and their reported occurrences. The Taxon2020 palynological index provides a comprehensive database of palynomorph systematic nomenclature and reported occurrences compiled through July 2022 encompassing all palynomorph types of all geologic ages. Information on approximately 36,000 described species is cited.

This Index is the result of an informal effort started in the mid-1980s. It started as a physical index card file, inspired by a similar effort, then confined to fossil dinoflagellate cysts, by Dr. John E. Williams (Riding and others, 2012). The Index grew rapidly into many thousands of cards, and with the advent of accessible personal computers, it became obvious that digitizing the files would be greatly desirable. An early version of this database, titled TAXON, operated on paleocybernetic MS-DOS, had an easy front-end search utility and menu, and was shared via computer disks. With the arrival of more sophisticated operating systems, the utility of this early iteration diminished. However, the data files continued to be maintained and expanded upon.

In 2022, the Alaska Division of Geological & Geophysical Surveys (DGGGS) developed a database schema to structure the existing data and created an online searchable interface to improve usability. Currently, the Index is available as both an online, searchable database ([maps.dggs.alaska.gov/ravn/index.html](https://maps.dggs.alaska.gov/ravn/index.html)) and downloadable Microsoft Excel and Word files (<https://doi.org/10.14509/30900>).

The Palynological Index was developed for personal needs and continues to serve that function. It is not to be regarded as a formal academic publication; no new taxonomic names or combinations are proposed, although some are suggested as appropriate in comments. The synonymies presented likewise are from personal preference and are not intended to be considered “official” in any sense. The structure of the information is designed such that known systematic nomenclatural combinations may be found, in association with reported stratigraphic and geographic occurrences.

## STRUCTURE: HOW IT WORKS

The downloadable Index files consist of three major categories: Species files, Genera files, and Literature References. Various pieces of information are color-coded for clarity, as described below. The online, searchable database is structured similarly but uses different colors to denote some of the information. See the help file at [maps.dggs.alaska.gov/ravn/help.html](https://maps.dggs.alaska.gov/ravn/help.html) for additional information about the online database.

### Species Files

These files constitute the “core” of the system. They are organized alphabetically by specific epithet, which is the stable part of any binomial taxonomic name. Palynomorphs, like other biological entities, both fossil and extant, are given formal names in the system invented by the great naturalist Linnaeus. This system consists of a generic name and a specific epithet, italicized, for example, *Homo sapiens* (human beings) or *Picea alba* (white spruce). To be complete, these binomials are followed by the name of the original describer(s) and the date of formal publication. In the case of a typical palynomorph: *Broomea simplex* Cookson and Eisenack 1958. Two similar and rigorous academic codes exist to govern these procedures, the International Code of Botanical Nomenclature (ICBN) and the International Code of Zoological Nomenclature (ICZN); these differ in a few minor respects but perform the necessary duty of providing a proper structure for the naming process. Most palynological fossils (given the overall name of “palynomorphs”) are considered to be of botanical origin and are governed nomenclaturally by the ICBN. One major exception is a group of extinct and problematical fossils called chitinozoans, which are regarded as of animal origin, and therefore governed nomenclaturally by the ICZN.

The formal specific epithet is fixed by publication and unchangeable (except perhaps for minor corrections in orthography). Owing to that stability of specific epithet, the Species files are alphabetized accordingly. The generic assignment, however, can be changed in publication subsequent to the original, and such assignments often are. Therein lies one major source of nomenclatural proliferation that has made indices like that presented here highly desirable. Homonymies (identical names erected for two or more different species) have often, but not always, been corrected by creation of new replacement names in subsequent publications. In addition, it is common for later workers to propose recognizing that two or more described species may represent the same thing, with the one published first having taxonomic priority. The “junior” name equivalents are then often presented as “synonymies,” and that structure is used in the Species files, along with cross-references.

Each individual species in the Index is provided with a unique numerical code in square brackets (red). The “preferred name” (personal opinion) is given in black, with synonymies listed in green. Below any given nomenclatural citation is a list of reported occurrences (in blue) with authorship, date, and summarized stratigraphic and geographic information. Comments (in purple) are made as appropriate. All entries for individual species are linked by the unique numerical code. Names considered to be junior synonyms or homonyms are cross-referenced, as follows:

[31287] *Pseudoceratium robustum* Riding & Helby 2001g; see *australiense*.

Directs to:

[33213] *Pseudoceratium australiense* Fensome & Williams 2004; p. 554.

[33213] *Pseudoceratium robustum* Riding & Helby 2001g; p. 208-210, figs. 15A-L.

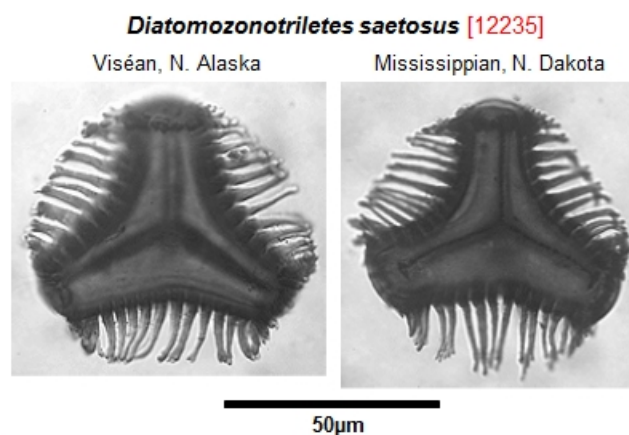
[33213] non *Pseudoceratium robustum* Michael 1964.

[33213] Riding & Helby, 2001g, Tithonian, offshore NW Australia.

[33213] <Despite the questionable nature of the holotype of *P. robustum* Michael 1964, the name was validly published and therefore preoccupied, rendering *P. robustum* Riding & Helby 2001 a junior homonym.>

Stratigraphic interpretations are cited, as much as possible, in commonly applied chronostratigraphic terminology. Information on these names is widely available on geologic column diagrams or elsewhere online. Other codes included in parentheses are (cf.) and (aff.), as noted in literature, for forms resembling but not considered identical to the cited species; (T) the genotype species for the genus; (N) the cited reference does not contain an illustration; (R) the cited reference is considered reworked from older strata; (?) the cited reference may be a questionable identification or nomenclatural assignment.

In addition, a gallery of photographic illustrations is included. An orange rectangle at the end of the species entry signifies that an illustration is present in the gallery folder (fig. 1). These are listed by species number and name.



**Figure 1.** Example of photographic illustration included in the database.

At present, only a small number of photographic illustrations are available, but more will be added, and contributions of copyright-free photographs are most welcome. Any such contributions will be gratefully acknowledged. All contributions should be clearly identified, and microscopic measurements should be included, as the intent is to provide a uniform magnification for photographs.

## Genera Files

These list the generic names, alphabetically, along with authorship and known species combinations:

### **LPSIDINIUM** Dolby 2014; p. 173.

*Lopsidinium paxense* Dolby 2014

*Lopsidinium subrisum* Dolby 2014 (T)

### **LORANTHACITES** Mtchedlishvili, in Samoilovich et al., 1961; p. 193.

*Loranthacites bellus* Gao 1982

*Loranthacites catterallii* Srivastava 1969

*Loranthacites digitatus* Silva-Caminha, Jaramillo & Absy 2010

*Loranthacites macrosolenoides* Mtchedlishvili, in Samoilovich et al., 1961 (T)

*Loranthacites nataliae* Salard-Chebodaeff 1978

*Loranthacites pilatus* Mtchedlishvili, in Samoilovich & Mtchedlishvili, 1961

*Loranthacites rhombiformis* Wang 1989

*Loranthacites rodaensis* Lenk, in Kunert & Lenk, 1964

*Loranthacites scabratus* Song, Li & Zhong 1986

### **LORANTHIPITES** Rao & Ramanujam 1982; p. 72.

*Loranthipites elegans* Rao & Ramanujam 1982 (T)

### **LORISPORITES** Leschik 1956a; p. 63.

*Lorisporites spectabilis* Leschik 1956a (T)

### **LOTHARINGIA** Below 1990; p. 20-21.

*Lotharingia maubeugeii* Below 1990 (T)

Cross-references, synonymies, and comments are displayed similarly to those in the Species files. At present, many of the generic references need authorship/pagination citations; these are being added and most should be greatly expanded by the next update.

## Literature References

Literature references are alphabetized by surname of the senior author.

- Schiøler, P., & Wilson, G. J. 1995: *Glaphyrosphaera*, a new synonym of *Wilsonisphaera* (Dinophyceae, Gonyaulacales). *Taxon*, 44, 511–512.
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- Schopf, J. M. 1936b. Spores characteristic of Illinois Coal No. 6. *Illinois State Academy of Science Transactions* (1935), 28: 173-176.
- Schopf, J. M. 1938. Spores from the Herrin (No. 6) Coal bed of Illinois. *Illinois Geological Survey Report of Investigations*, 50: 1-73.

Several other index/database resources exist for fossil palynomorphs of various kinds and are highly useful. These include the various editions of the Lentin and Williams indices for dinoflagellate cysts, the most recent edition of which is that of Williams and others (2017); with a few exceptions, the systematic practices in that volume are followed here. Of similar format is the acritarch index of Fensome and others (1990). For generic-level information on spores, pollen, and other *incertae sedis* forms, the voluminous card file of Jansonius and Hills (maintained into the mid-1990s) remains invaluable. Still available and useful is the Palynodata Database, maintained into the early 2000s and accessible via the Geological Survey of Canada.

At this time, the Index concentrates on formally published literature in which photographic illustrations are provided. Useful information also exists in the form of theses and dissertations, which are not considered formal publications, although many are now available for free online. Some information from a few of these has been included in the Index, and data from others of those freely available works will be entered in the future as the Index is updated. New taxonomic names or combinations proposed in these unpublished works, however, are invalid by rules of the ICBN; the creation of names in such works should be discouraged.

The Index is a work in progress and is intended to remain so. It is not to be considered “official,” nor can it ever be considered complete. It is intended as a guide to basic information, and users are urged to consult original publications whenever possible for greater detail. I have been very fortunate over many years to have had access to a wide range of literature, but many citations remain incomplete where the original published material has not been available. Much older literature has become essentially unavailable in recent years, which represents a significant problem for further research in the field; by no means are all important journals containing relevant information available online. Accordingly, correction of any such omissions would be most desirable, and contributions of relevant literature (especially for older material) would be greatly appreciated. As the current intent is to update the Index periodically, such contributions will be publicly acknowledged. Likewise, comments and suggestions are also welcome.

## ACKNOWLEDGEMENTS

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- Fensome, R.A., Williams, G.L., Barss, M.S., Freeman, J.M., and Hill, J.M., 1990, Acritarchs and fossil prasinophytes: an index to genera, species and infraspecific taxa: American Association of Stratigraphic Palynologists Contributions Series, no. 25, 771 p.
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