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► **To cite this version:**

Marie-Béatrice Forel, Patrick De Wever, Emmanuel Robert. Paleozoic and Mesozoic Radiolaria: De Wever Type Collection. *Revue de Micropaléontologie*, 2026, 90, pp.100882. <10.1016/j.revmic.2025.100882>. <hal-05435828>

HAL Id: hal-05435828

<https://hal.science/hal-05435828v1>

Submitted on 3 Apr 2026

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Research paper

Paleozoic and Mesozoic Radiolaria: De Wever Type Collection

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ARTICLE INFO

Keywords:

Holotypes
Radiolaria
Permian-cretaceous
De Wever

Mots clés:

Holotypes
Radiolaires
Permien-Crétacé
De Wever

ABSTRACT

This manuscript reports the deposition of holotypes of fossil species of Radiolarian described by Patrick De Wever in the Micropaleontology collections of the Muséum national d'Histoire naturelle (MNHN), Paris. They belong to the Université Claude Bernard Lyon 1 and are deposited in the MNHN because of their fragility, impossibility to remove from SEM stubs where they are mixed with MNHN specimens and to maintain the integrity of the collection (sediments, processed residues, picked specimens). They correspond to 91 species described from Permian to Cretaceous deposits worldwide, in 13 scientific articles published between 1981 and 1995. In order to inform the scientific community of the institutional localisation of this important collection, an annotated alphabetic list by genera is provided, including the original citation for each species, type locality, age, collection number, and subsequent re-attributions and synonymizations. The adjustment of one collection number has been necessary because of a duplicated number.

RÉSUMÉ: Ce manuscrit rapporte le dépôt d'holotypes d'espèces fossiles de Radiolaires décrits par Patrick De Wever dans les collections de Micropaléontologie du Muséum national d'Histoire naturelle (MNHN), Paris. Ces holotypes appartiennent à l'Université Claude Bernard Lyon 1 et sont déposés au MNHN en raison de leur fragilité, de l'impossibilité de les retirer des plots MEB où ils sont mélangés aux spécimens du MNHN, et pour conserver l'intégrité de la collection (sédiments, résidus traités, spécimens prélevés). Ils correspondent à 91 espèces décrites des dépôts du Permien au Crétacé à travers le monde, dans 13 articles scientifiques publiés entre 1981 et 1995. Afin d'informer la communauté scientifique de la localisation institutionnelle de cette importante collection, une liste alphabétique annotée par genre est fournie, incluant la citation originale de chaque espèce, la localité type, l'âge, le numéro de collection, ainsi que les éventuelles réattributions et synonymisations ultérieures. L'ajustement d'un numéro de collection a été nécessaire en raison d'un numéro dupliqué.

Introduction

Trained as a geologist, Patrick De Wever specialized in the study of Radiolaria (siliceous microplankton) and his work explored the interactions between the biosphere and the geosphere. After nearly 20 years as a researcher at the CNRS from 1977 to 1995, he joined the Muséum national d'Histoire naturelle, Paris (MNHN) as a professor in 1995, where he took charge of the Geology Laboratory (1996–2001). From 2002 to 2004, he was president of the Geological Society of France and later notably responsible for the national inventory of geological heritage (2007–2018) and the International Commission on Geoheritage of the International Union of Geological Sciences. He has received various distinctions, including the bronze medal of the CNRS (1984), Grand Prize of the French Academy of Sciences (2013), the Grand Literary Prize of the French Academy (2016), the National Order of Merit (2018) and

the Benjamin Franklin Award (2021). He is currently Professor Emeritus at the MNHN and is dedicated to science outreach and preservation of geological heritage, both nationally and internationally. During his scientific career, he brought together the community of Radiolaria specialists to form the InterRad group, which continues to meet every 3 years.

The De Wever collection was deposited in the MNHN micropaleontology collections in 2025. It is composed of holotypes on SEM stubs, micropaleontological slides containing isolated radiolarians and picked radiolarian assemblages, thin sections, bulk sediments as well as diverse archives. Here we provide the list of holotypes of 91 species described from 1981 to 1995 from Permian to Cretaceous deposits of Turkey, Japan, Italy, Sultanate of Oman and Canada. These holotypes are the property of the Université Claude Bernard Lyon 1 (UCBL), originally listed in the published literature using

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the acronym FSL (Faculté des Sciences de Lyon) and today noted UCBL-FSL (<https://scientific-collections.gbif.org/collection/6985c6f3-55a0-43fd-a108-276eb770bb4c>). They are however mounted of SEM stubs where they are mixed with specimens belonging to other institutions, mainly MNHN, and from which they cannot be removed because of their fragility. The decision has been made to store the holotypes in the MNHN collection as deposits: UCBL thus remains owner of the specimens that retain their UCBL-FSL numbers but are curated by MNHN team to maintain the integrity of the De Wever collection and its full scientific significance. Of note, collection number UCBL-FSL167065 was mistakenly used twice in the literature, for *Haplentactinia? ichikawai* De Wever and Caridroit, 1984 and *Andromeda depressa* De Wever and Miconnet, 1985. A replacement number is here provided for *Andromeda depressa* De Wever and Miconnet, 1985. The following list does not include type specimens from De Wever et al. (1979; mentioned as deposited in the MNHN but not located so far), De Wever (1981a; mentioned as deposited in the UCLB, not part of the present deposit) and Widz and De Wever (1993; deposited in the Institute of Geological Sciences of the Polish Academy of Sciences, Krakow). In the following, species are listed in alphabetical order of original generic attribution.

The De Wever's collection of Radiolaria will soon be available online the MNHN online database (<https://science.mnhn.fr>). This important collection is from now on available for the scientific community and all requests on the collections, from information to visits, should be posted on the dedicated MNHN platform: <https://muse.mnhn.fr/fr>.

The De Wever radiolarian holotypes deposited at the MNHN

Below we present per published paper the list of species hosted in the De Wever radiolarian type collection and described as new to science. It consists of an annotated alphabetic list by original generic attribution, with the original citation and illustration of holotype for each species, type locality, age, collection number, and subsequent re-attributions and synonymizations, where necessary.

De Wever P. 1981b *Hagiastriidae, Patulibracchiidae et Spongodiscidae (Radiolaires polycystines) du Lias de Turquie. Revue de Micropaléontologie* 24(1): 27–50.

***Archaeotriastrum dentatum* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167006.

Original description and illustrations of the holotype: p. 30, pl. 1, fig. 11.

***Archaeotriastrum hirsutum* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167007.

Original description and illustrations of the holotype: p. 30, pl. 1, fig. 13.

Remarks: this species is type-species of *Archaeotriastrum* De Wever, 1981, today recognized as junior synonym of *Paronaella* Pessagno, 1971 (see O'Dogherty et al., 2009).

***Crucella mijo* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167012.

Original description and illustrations of the holotype: p. 35, pl. 4, fig. 1, 2.

***Crucella spongase* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167013.

Original description and illustrations of the holotype: p. 36, pl. 5, fig. 3.

***Hagiastrum macrum* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167005.

Original description and illustrations of the holotype: p. 29, pl. 1, fig. 7.

***Orbiculiforma radiata* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167014.

Original description and illustrations of the holotype: p. 44, pl. 7, fig. 1, 2.

***Paronaella corpulenta* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167009.

Original description and illustrations of the holotype: p. 33, pl. 2, fig. 7, 8.

***Paronaella gemmata* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167010.

Original description and illustrations of the holotype: p. 33, pl. 4, fig. 3.

***Paronaella tripla* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167011.

Original description and illustrations of the holotype: p. 34, pl. 3, fig. 5, 6.

***Pseudocrucella? ornata* De Wever, 1981b**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167008.

Original description and illustrations of the holotype: p. 32, pl. 2, fig. 1, 2.

De Wever P. 1981c. *Parasaturnalidae, Pantanellidae et Sponguriidae (Radiolaires polycystines) du Lias de Turquie. Revue de Micropaléontologie* 24(3): 138–156.

***Protopsium gesponsa* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167019.

Original description and illustrations of the holotype: p. 145, pl. 5, fig. 11.

***Protopsium libidonosum* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167020.

Original description and illustrations of the holotype: p. 145, pl. 5, fig. 20.

***Protopsium posinos* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167021.

Original description and illustrations of the holotype: p. 146, pl. 5, fig. 23, 24.

***Pseudoheliodiscus? concordis* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167015.

Original description and illustrations of the holotype: p. 141, pl. 2, fig. 1.

Remarks: this species is type-species of *Stauracanthocircus* Kozur and Mostler, 1983 (see also O'Dogherty et al., 2009).

***Pseudoheliodiscus pamphyliensis* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167016.

Original description and illustrations of the holotype: p. 142, pl. 2, fig. 5, 6.

***Pseudoheliodiscus poissoni* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167017.

Original description and illustrations of the holotype: p. 142, pl. 3, fig. 1, 2.

***Pseudoheliodiscus radiosus* De Wever, 1981c**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167018.

Original description and illustrations of the holotype: p. 143, pl. 4, fig. 2–4.

De Wever P. 1982. Nassellaria (Radiolaires polycystines) du Lias de Turquie. *Revue de Micropaléontologie* 24(4): 189–232.***Ares armatus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167043.

Original description and illustrations of the holotype: p. 203, pl. 10, fig. 4.

Remarks: this species is type-species of *Ares* De Wever, 1982.

***Bipedis calvabovis* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167026.

Original description and illustrations of the holotype: p. 193, pl. 2, fig. 7.

Remarks: this species is type-species of *Bipedis* De Wever, 1982.

***Citriduma radiotuba* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167042.

Original description and illustrations of the holotype: p. 202, pl. 9, fig. 1–3, 7, 8.

Remarks: this species is type-species of *Citriduma* De Wever, 1982.

***Cuniculiformis aristotelis* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167036.

Original description and illustrations of the holotype: p. 199, pl. 6, fig. 10.

***Cuniculiformis plinius* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167037.

Original description and illustrations of the holotype: p. 199, pl. 6, fig. 20.

Remarks: this species is type-species of *Cuniculiformis* De Wever, 1982.

***Dumitricaella? cucurbitina* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167035.

Original description and illustrations of the holotype: p. 198, pl. 6, fig. 9.

***Dumitricaella pauliani* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167034.

Original description and illustrations of the holotype: p. 198, pl. 6, fig. 7.

Remarks: this species is type-species of *Dumitricaella* De Wever, 1982.

***Ectonocorys? furcillata* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167032.

Original description and illustrations of the holotype: p. 196, pl. 5, fig. 12.

***Ectonocorys? saltantis* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167033.

Original description and illustrations of the holotype: p. 197, pl. 6, fig. 2.

***Gigi fustis* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167028.

Original description and illustrations of the holotype: p. 195, pl. 4, fig. 1.

Remarks: this species is type-species of *Gigi* De Wever, 1982.

***Jacus? anatifformis* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167046.

Original description and illustrations of the holotype: p. 205, pl. 11, fig. 10.

Remarks: this species is now assigned to *Anaticapitula* Dumitrica and Zügel, 2003 (see synonymy in Goričan et al. 2006).

***Jacus clatratus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167048.

Original description and illustrations of the holotype: p. 205, pl. 12, fig. 7, 8.

Remarks: this genus is recognized as junior synonym of *Napora* Pessagno, 1977 (see O'Dogherty et al., 2009).

***Jacus coronatus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167047.

Original description and illustrations of the holotype: p. 208, pl. 12, fig. 1–3.

Remarks: this species is type-species of *Jacus* De Wever, 1982, today recognized as junior synonym of *Napora* Pessagno, 1977 (see O'Dogherty et al., 2009).

***Jacus isa* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167049.

Original description and illustrations of the holotype: p. 212, pl. 13, fig. 1, 2.

Remarks: this genus is recognized as junior synonym of *Napora* Pessagno, 1977 (see O'Dogherty et al., 2009).

***Katroma bicornus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167027.

Original description and illustrations of the holotype: p. 193, pl. 3, fig. 2, 3.

***Ovum cetinum* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167044.

Original description and illustrations of the holotype: p. 204, pl. 11, fig. 1.

Remarks: this species is type-species of *Ovum* De Wever, 1982. This genus name was preoccupied and replaced by *Ovumella* De Wever and O'Dogherty, 2006 (De Wever and O'Dogherty 2006).

***Ovum pertusum* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167045.

Original description and illustrations of the holotype: p. 204, pl. 11, fig. 7, 8.

Remarks: this name of this genus was preoccupied and replaced by *Ovumella* De Wever and O'Dogherty, 2006 (De Wever and O'Dogherty 2006).

***Poulpus hirsutus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167022.

Original description and illustrations of the holotype: p. 191, pl. 1, fig. 2.

***Poulpus oculatus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167023.

Original description and illustrations of the holotype: p. 191, pl. 1, fig. 9.

***Raoultius calcar* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167050.

Original description and illustrations of the holotype: p. 218, pl. 13, fig. 5.

Remarks: this species is type-species of *Raoultius* De Wever, 1982.

***Riedelius microceras* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167041.

Original description and illustrations of the holotype: p. 201, pl. 8, fig. 1, 2.

Remarks: the name of this genus was preoccupied and replaced by *Riedeliusella* De Wever and O'Dogherty, 2008 (De Wever and O'Dogherty 2008).

***Riedelius orthoceras* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167038.

Original description and illustrations of the holotype: p. 200, pl. 7, fig. 12.

Remarks: the name of this genus was preoccupied and replaced by *Riedeliusella* De Wever and O'Dogherty, 2008 (De Wever and O'Dogherty 2008).

***Riedelius patulus* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167039.

Original description and illustrations of the holotype: p. 200, pl. 7, fig. 4, 5.

Remarks: the name of this genus was preoccupied and replaced by *Riedeliusella* De Wever and O'Dogherty, 2008 (De Wever and O'Dogherty 2008).

***Riedelius williami* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167040.

Original description and illustrations of the holotype: p. 201, pl. 7, fig. 9.

Remarks: this species is type-species of *Riedelius* De Wever, 1982. The name of this genus was preoccupied and replaced by *Riedeliusella* De Wever and O'Dogherty, 2008 (De Wever and O'Dogherty 2008).

***Saitoum curvipedatum* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167024.

Original description and illustrations of the holotype: p. 192, pl. 2, fig. 2.

***Saitoum keki* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167025.

Original description and illustrations of the holotype: p. 192, pl. 2, fig. 4.

***Thetis oblonga* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167029.

Original description and illustrations of the holotype: p. 195, pl. 4, fig. 10.

Remarks: this species is type-species of *Thetis* De Wever, 1982, which name was preoccupied and replaced by *Thetisolala* De Wever and O'Dogherty, 2007 (De Wever and O'Dogherty 2007).

***Thetis stolata* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167030.

Original description and illustrations of the holotype: p. 195, pl. 5, fig. 1.

Remarks: the name of this genus was preoccupied and replaced by *Thetisolala* De Wever and O'Dogherty, 2007 (De Wever and O'Dogherty 2007).

***Thetis undulata* De Wever, 1982**

Type locality: Gümüslü, Antalya, Turkey.

Type level: Sögütlü dere Formation, Pliensbachian, Early Jurassic.

Holotype: UCBL-FSL167031.

Original description and illustrations of the holotype: p. 196, pl. 5, fig. 9.

Remarks: the name of this genus was preoccupied and replaced by *Thetisolala* De Wever and O'Dogherty, 2007 (De Wever and O'Dogherty 2007).

De Wever P. and Caridroit M. 1984. Description de quelques nouveaux Latentifistulidea (radiolaires polycystines) paléozoïques du Japon. *Revue de Micropaléontologie* 27: 98–106.

***Deflandrella manica* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167051.

Original description and illustrations of the holotype: p. 99, pl. 1, fig. 2.

Remarks: this species is type-species of *Deflandrella* De Wever and Caridroit, 1984, which name was preoccupied and replaced by *Caletella* Caridroit et al., 1999 (see details in Noble et al. 2017).

***Foremanhelena triangula* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167057.

Original description and illustrations of the holotype: p. 106, pl. 2, fig. 18.

Remarks: this species is type-species of *Foremanhelena* De Wever and Caridroit, 1984.

***Ishigaum obesum* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167053.

Original description and illustrations of the holotype: p. 100, pl. 1, fig. 9.

***Ishigaum trisfustis* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167052.

Original description and illustrations of the holotype: p. 99, pl. 1, fig. 11.

Remarks: this species is type-species of *Ishigaum* De Wever and Caridroit, 1984.

***Nazarovella gracilis* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167055.

Original description and illustrations of the holotype: p. 101, pl. 1, fig. 17.

Remarks: this species is type-species of *Nazarovella* De Wever and Caridroit, 1984, which name was preoccupied and replaced by *Raciditor* Sugiyama, 2000 by Sugiyama (2000). Noble et al. (2017) consider it as junior synonym of *Quadricaulis* Caridroit and De Wever, 1986.

***Ormistonella robusta* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167054.

Original description and illustrations of the holotype: p. 100, pl. 2, fig. 9.

Remarks: this species is type-species of *Ormistonella* De Wever and Caridroit, 1984.

***Pseudotormentus kamigoriensis* De Wever and Caridroit, 1984**

Type locality: Kamigori belt, SW Japan.

Type level: Upper Permian.

Holotype: UCBL-FSL167056.

Original description and illustrations of the holotype: p. 101, pl. 2, fig. 3.

Remarks: this species is type-species of *Pseudotormentus* De Wever and Caridroit, 1984.

Caridroit M. and De Wever P. 1984. Description de quelques nouvelles espèces de Follicucullidae et d'Entactinidae (Radiolaires polycystines) du Permien du Japon. *Geobios* 17(5): 639–644.

***Follicucullus bipartitus* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167059.

Original description and illustrations of the holotype: p. 640, pl. 1, fig. 1.

***Follicucullus? charveti* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167060.

Original description and illustrations of the holotype: p. 641, pl. 1, fig. 17.

Remarks: Caridroit and De Wever (1986) removed the generic doubt and emended the diagnosis of this species (p. 66).

***Follicucullus falx* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167061.

Original description and illustrations of the holotype: p. 641, pl. 1, fig. 4.

***Follicucullus hamatus* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167062.

Original description and illustrations of the holotype: p. 642, pl. 1, fig. 9.

***Follicucullus hamatus uncinatus* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167063.

Original description and illustrations of the holotype: p. 642, pl. 1, fig. 13.

***Follicucullus orthogonus* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167064.

Original description and illustrations of the holotype: p. 642, pl. 1, fig. 28.

***Haplentactinia? ichikawai* Caridroit and De Wever, 1984**

Type locality: Kamigori region, 8 km north of Mikasuki, Hyogo prefecture, SW Japan.

Type level: Tatsuno Formation, Upper Permian.

Holotype: UCBL-FSL167065.

Original description and illustrations of the holotype: p. 643, pl. 1, fig. 33.

De Wever P. and Miconnet P. 1985. **Datations directes des radiolarites du bassin du Lagonegro (Lucanie, Italie méridionale) Implications et conséquences.** *Revista Española de Micropaleontología* 17(3): 373–402.

***Andromeda depressa* De Wever and Miconnet, 1985**

Type locality: section in the radiolarites located 750 m north of San Fele, in the canyon of the Bradano torrent, Lagonegro basin, Lucany, southern Italy.

Type level: San Fele Unit, upper Callovian-middle Kimmeridgian.

Holotype: UCBL-FSL167065a.

Original description and illustrations of the holotype: p. 384, pl. 2, fig. 1, 2.

Remarks: the holotype was registered under collection number 167065 in De Wever and Miconnet (1985), already used for the holotype of *Haplentactinia? ichikawai* De Wever and Caridroit, 1984. The genus name *Andromeda* Baumgartner in Baumgartner et al., 1980 was preoccupied and replaced by *Palinandromeda* Pessagno et al., 1993 (Pessagno et al. 1993).

Caridroit M. and De Wever P. 1986. **Some Late Permian radiolarians from pelitic rocks of the Tatsuno Formation (Hyogo Prefecture), Southwest Japan.** *Marine Micropaleontology* 11: 55–90.

***Entactinosphaera aubouini* Caridroit and De Wever, 1986**

Type locality: Maizuru Group, 8 km north of Mikazuki, Hyogo Prefecture, SW Japan.

Type level: Tatsuno Formation, Wuchiapingian, Upper Permian.

Holotype: UCBL-FSL167067.

Original description and illustrations of the holotype: p. 75, pl. 3, fig. 14.

***Follicucullus furca* Caridroit and De Wever, 1986**

Type locality: Maizuru Group, 8 km north of Mikazuki, Hyogo Prefecture, SW Japan.

Type level: Tatsuno Formation, Wuchiapingian, Upper Permian.

Holotype: UCBL-FSL167066.

Original description and illustrations of the holotype: p. 64, pl. 1, fig. 18, 19.

***Latentifistula similicutis* Caridroit and De Wever, 1986**

Type locality: Maizuru Group, 8 km north of Mikazuki, Hyogo Prefecture, SW Japan.

Type level: Tatsuno Formation, Wuchiapingian, Upper Permian.

Holotype: UCBL-FSL167068.

Original description and illustrations of the holotype: p. 78, pl. 4, fig. 4.

***Nazarovella scalae* Caridroit and De Wever, 1986**

Type locality: Maizuru Group, 8 km north of Mikazuki, Hyogo Prefecture, SW Japan.

Type level: Tatsuno Formation, Wuchiapingian, Upper Permian.

Holotype: UCBL-FSL167070.

Original description and illustrations of the holotype: p. 83, pl. 5, fig. 3.

Remarks: the genus name *Nazarovella* De Wever and Caridroit, 1984 was preoccupied and replaced by *Raciditor* by Sugiyama (2000). Noble et al. (2017) consider it as junior synonym of *Quadricaulis* Caridroit and De Wever, 1986.

***Quadricaulis femoris* Caridroit and De Wever, 1986**

Type locality: Maizuru Group, 8 km north of Mikazuki, Hyogo Prefecture, SW Japan.

Type level: Tatsuno Formation, Wuchiapingian, Upper Permian.

Holotype: UCBL-FSL167069.

Original description and illustrations of the holotype: p. 79, pl. 4, fig. 16.

Remarks: this species is type-species of *Quadricaulis* Caridroit and De Wever, 1986.

De Wever P., Bourdillon-De Grissac C. and Beurrier M. 1988. **Radiolaires sénoniens de la nappe de Samail (Oman).** *Revue de Micropaléontologie* 31(3): 166–179.

***Annikaella omanensis* De Wever et al., 1988**

Type locality: Daris, Haylayn ophiolitic Massif, Sultanate of Oman.

Type level: Late Cretaceous (Santonian).

Holotype: UCBL-FSL167071.

Original description and illustrations of the holotype: p. 168, pl. 2, fig. 1.

Remarks: this species is type-species of *Annikaella* De Wever in De Wever et al., 1988.

***Schadelfusslerus? valgus* De Wever et al., 1988**

Type locality: Daris, Haylayn ophiolitic Massif, Sultanate of Oman.

Type level: Late Cretaceous (Santonian).

Holotype: UCBL-FSL167072.

Original description and illustrations: p. 170, pl. 2, fig. 1.

Remarks: *Schadelfusslerus* Empson-Morin, 1981 is today recognized as junior synonym of *Millocercion* Foreman, 1968 (see O'Dogherty et al., 2009).

Cordey F., De Wever P., Dumitrica P., Danelian T., Kito N. and Vrielynck B. 1988. **Description of some Middle Triassic radiolarians from the Camp Grove Formation, southern British Columbia.** *Revue de Micropaléontologie* 31(1): 30–37.

***Sarla ariana* Cordey et al., 1988**

Type locality: southwest side of Harrison Lake, southern British Columbia, Canada.

Type level: sample MV890, Camp Cove Formation, Coast Plutonic Complex, ?Ladinian, Middle Triassic.

Holotype: UCBL-FSL167074.

Original description and illustrations of the holotype: p. 32, pl. 1, fig. 9.

***Sarla integrata* Cordey et al., 1988**

Type locality: southwest side of Harrison Lake, southern British Columbia, Canada.

Type level: sample MV890, Camp Cove Formation, Coast Plutonic Complex, ?Ladinian, Middle Triassic.

Holotype: UCBL-FSL167075.

Original description and illustrations of the holotype: p. 33, pl. 2, fig. 2.

***Sarla soustra* Cordey et al., 1988**

Type locality: southwest side of Harrison Lake, southern British Columbia, Canada.

Type level: sample MV890, Camp Cove Formation, Coast Plutonic Complex, ?Ladinian, Middle Triassic.

Holotype: UCBL-FSL167076.

Original description and illustrations of the holotype: p. 33, pl. 2, fig. 8.

***Spongoserrula delhi* Cordey et al., 1988**

Type locality: southwest side of Harrison Lake, southern British Columbia, Canada.

Type level: sample MV890, Camp Cove Formation, Coast Plutonic Complex, ?Ladinian, Middle Triassic.

Holotype: UCBL-FSL167073.

Original description and illustrations of the holotype: p. 31, pl. 1, fig. 4.

Kito N., De Wever P., Danelian T. and Cordey F., 1990. Middle to Late Jurassic radiolarians from Sicily (Italy). *Marine Micropaleontology* 15(3–4): 329–349.

***Bernoullius furcospinus* Kito et al., 1990**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167077.

Original description and illustrations of the holotype: p. 344, pl. 2, fig. 2, 6, 8.

***Bernoullius rectispinus* Kito et al., 1990**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167078.

Original description and illustrations of the holotype: p. 347, pl. 2, fig. 5, 7, 9, 10.

Kito N. and De Wever P., 1992. New species of Hagiastriidae (Radiolaria) from the Middle Jurassic of Sicily (Italy). *Revue de Micropaléontologie* 35(2): 127–141.

***Angulobracchia sicula* Kito and De Wever, 1992**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167081.

Original description and illustrations of the holotype: p. 136, pl. 3, fig. 1.

***Cavabracchia dueei* Kito and De Wever, 1992**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167080.

Original description and illustrations of the holotype: p. 135, pl. 2, fig. 1.

Remarks: this species is type-species of *Cavabracchia* Kito and De Wever, 1992, today considered as junior synonym of *Angulobracchia* Baumgartner, 1980 (see O'Dogherty et al. 2009).

***Tritrabs simplex* Kito and De Wever, 1992**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167079.

Original description and illustrations of the holotype: p. 131, pl. 1, fig. 3.

Kito N. and De Wever P., 1994. New species of Middle Jurassic Actinommidae (Radiolaria) from Sicily (Italy). *Revue de Micropaléontologie* 37(2): 123–134.

***Acaeniotyloopsis splendens* Kito and De Wever, 1994**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167091.

Original description and illustrations of the holotype: p. 132, pl. 2, fig. 2.

***Acaeniotyloopsis triacanthus* Kito and De Wever, 1994**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167090.

Original description and illustrations of the holotype: p. 132, pl. 1, fig. 9–11.

Remarks: this species is type-species of *Acaeniotyloopsis* Kito and De Wever, 1994.

***Actinomma siciliensis* Kito and De Wever, 1994**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167089.

Original description and illustrations of the holotype: p. 128, pl. 2, fig. 10.

***Archaeocenosphaera limbata* Kito and De Wever, 1994**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167087.

Original description and illustrations of the holotype: p. 125, pl. 1, fig. 2.

***Carposphaera? jurassica* Kito and De Wever, 1994**

Type locality: Contrada La Ferta section, Campofiorito-Cammarata Zone, eastern slope of Mt. Cammarata, western Sicily.

Type level: Middle Jurassic.

Holotype: UCBL-FSL167088.

Original description and illustrations of the holotype: p. 126, pl. 2, fig. 7.

Kellici I. and De Wever P., 1995. Radiolaires triasiques du Massif de la Marmolada, Italie du Nord. *Revue de Micropaléontologie* 38(2): 139–167.

***Gomberellus? biduplispinus* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167094.

Original description and illustrations of the holotype: p. 145, pl. 2, fig. 8.

***Gomberellus trispinosus vishnevskayae* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167093.

Original description and illustrations of the holotype: p. 146, pl. 2, fig. 6.

***Karnospongella goricanae* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167092.

Original description and illustrations of the holotype: p. 148, pl. 2, fig. 2.

***Nofrema? dumitricai* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167095.

Original description and illustrations of the holotype: p. 149, pl. 3, fig. 4.

***Pararchaeospongoprimum? vrielyncki* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167096.

Original description and illustrations of the holotype: p. 152, pl. 3, fig. 12.

***Pentaspogodiscus ladinicus croisi* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167097.

Original description and illustrations of the holotype: p. 154, pl. 4, fig. 4.

***Sepsagon? dercourti* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167098.

Original description and illustrations of the holotype: p. 157, pl. 5, fig. 7.

***Sepsagon gaetanii* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167099.

Original description and illustrations of the holotype: p. 158, pl. 5, fig. 9.

***Stauracontium? marmoladaensis* Kellici and De Wever, 1995**

Type locality: Fociade, Monte de Saline, southeastern of Marmolada Massif, northeastern Italy.

Type level: top of the “Livinallongo” pelagic series, Ladinian, Middle Triassic.

Holotype: UCBL-FSL167100.

Original description and illustrations of the holotype: p. 162, pl. 6, fig. 3.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

Acknowledgments

We are thankful to Dr. Taniel Danelian (University of Lille, France) and Dr. Špela Goričan (Ivan Rakovec Institute of Palaeontology, Slovenia) for their very detailed analysis of an earlier version of this manuscript, that greatly improved it.

Dr. Marie-Béatrice Forel was not involved in the peer-review or editorial decision-making process for this article.

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