

# Late Ordovician Conodonts from the Fosses Formation, Condruz Area, Belgium

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## Abstract

Taxonomic study of a conodont faunule obtained from the Bois des Presles Member of the Fosses Formation, permitted identification of *Amorphognathus* sp. cf. *A. ordovicicus* BRANSON & MEHL, *Amorphognathus?* sp., *Panderodus gracilis* (BRANSON & MEHL), *Birksfeldia?* sp., and *Plectodina?* sp. This conodont association, attributed to the *Amorphognathus ordovicicus* Biozone (Ashgill), is tentatively referred to the British Province of the North Atlantic conodont Realm.

**Key-words:** *Amorphognathus ordovicicus* Biozone, conodonts, Ashgill, North Atlantic Realm, Belgium.

## Resumen

El estudio taxonómico de una faunula de conodontos proveniente del Miembro Bois des Presles de la Formación Fosses ha permitido la identificación de *Amorphognathus* sp. cf. *A. ordovicicus* BRANSON & MEHL, *Amorphognathus?* sp., *Panderodus gracilis* (BRANSON & MEHL), *Birksfeldia?* sp. y *Plectodina?* sp. Esta asociación de conodontos se atribuye a la Biozona de *Amorphognathus ordovicicus* (Ashgill) y se adscribe tentativamente a la Provincia Británica del Dominio Nord-Atlántico de conodontos.

**Palabras Clave:** Biozona de *Amorphognathus ordovicicus*, conodontos, Ashgill, Dominio Nord-Atlántico, Bélgica.

## Résumé

L'étude systématique d'une faunule à conodontes, provenant du Membre du Bois des Presles (Formation de Fosses) a permis l'identification des taxa suivants: *Amorphognathus* sp. cf. *A. ordovicicus* BRANSON & MEHL, *Amorphognathus?* sp., *Panderodus gracilis* (BRANSON & MEHL), *Birksfeldia?* sp. et *Plectodina?* sp. Cette faunule à conodontes, appartenant à la Biozone à *Amorphognathus ordovicicus* (Ashgill), est provisoirement attribuée à la Province Britannique du Domaine à conodontes de l' Atlantique Nord.

**Mots-clés:** Biozone à *Amorphognathus ordovicicus*, conodontes, Ashgill, Domaine de l'Atlantique Nord, Belgique.

## Introduction

In a preliminary sedimentological and palaeontological study of the carbonate beds from the Fosses Formation (Condruz Area, Belgium) TOURNEUR *et al.* (1993, p. 675) mention the very rare presence of conodonts and figure a specimen of *Panderodus* sp. In the present paper a more significant conodont fauna from the same area is described. It was obtained from the Bois de Presles Member of the Fosses Formation in 1977 and 1983. Two discontinuously exposed sections were measured and sampled (Fig. 1).

In section 1 at Coerliamont two 5 kg samples were taken and only sample 1 at the base of the formation produced four conodont elements.

In section 2, south-east of Presles and temporarily exposed along the access road to a new residential area, three 2 to 4 kg samples were taken from which sample 2 produced thirteen conodont elements.

The reader is referred to VERNIERS *et al.* (2002, pp. 24-27) for the Ordovician lithostratigraphy used herein.

## Conodont collection and biostratigraphic and palaeobiogeographic remarks

Only few and not well preserved conodont elements were recovered. All the specimens exhibit a homogeneous Colour Alteration Index (CAI) of 4.5, indicating a thermal interval of 190-320°C (EPSTEIN *et al.*, 1977). Most of the elements are poorly preserved and fragmentary but deformations have not been observed. Due to this preservation state most of the specimens have been identified in open nomenclature. The conodont association is dominated by simple cones of *Panderodus gracilis*. The conodont collection is housed in the Department of Paleontology of the Royal Museum of Natural Sciences of Belgium.

Although most of the conodonts from the Bois des Presles Member of the Fosses Formation have been identified in open nomenclature, the conodont association is most likely indicative of the *Amorphognathus ordovicicus* Biozone by the occurrence of *Amorphognathus* sp. cf. *A. ordovicicus* and *Birksfeldia?* sp.

Late Ordovician conodont provincialism was discussed

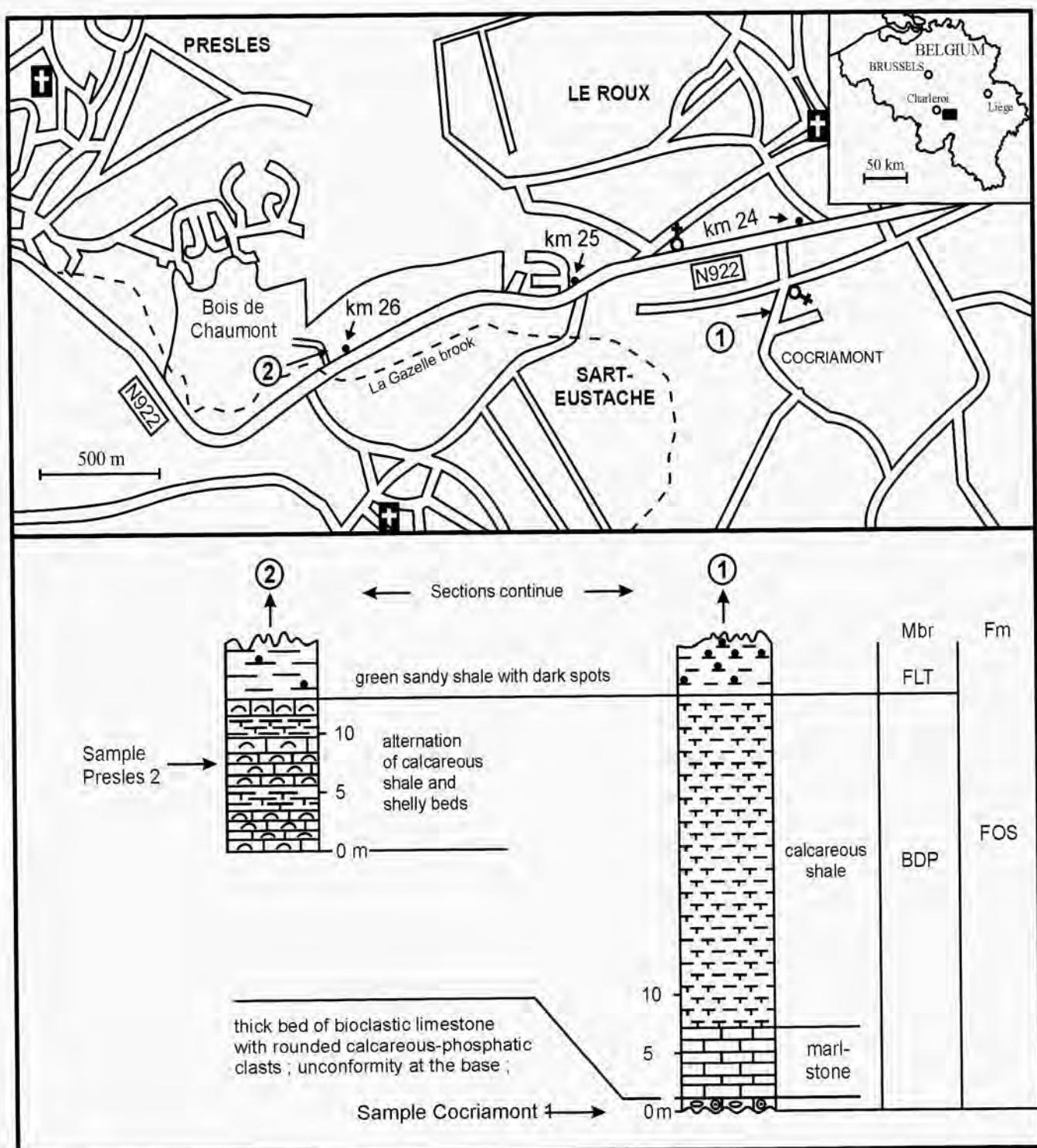


Fig. 1 — Upper part: location of the studied outcrops; the black rectangle on the inset map shows location of the Presles – Cocriamont area.  
Lower part: Schematic columnar sections of localities 1 (Cocriamont) and 2 (Presles); FOS = Fosses Formation; BDP = Bois des Presles Member; FLT = Faulx-les-Tombes Member.

by SWEET & BERGSTRÖM (1984) and updated in terms of multielement taxonomy by BERGSTRÖM (1990). According to these authors, three different provinces, Baltic, British and Mediterranean, can be recognized for the North Atlantic Realm. The characteristic conodont taxa of the Mediterranean Province have not been recorded in our collection, while the genera *Birksfeldia* and *Plectodina* that are common in the Baltic and British provinces occur in the Belgian association. Although the small size of the studied conodont collection enable a conclusive assignment to one of these two provinces, the presence of several elements of *Plectodina?* sp., that is common in Great Britain but rare in Baltoscandia, suggests major affinities with the British Province.

#### Taxonomic remarks

Genus *Amorphognathus* BRANSON & MEHL, 1933

Type species: *Amorphognathus ordovicicus* BRANSON & MEHL, 1933

*Amorphognathus* sp. cf. *A. ordovicicus*  
BRANSON & MEHL, 1933  
Pl. 1, Figs. 1-3

#### REMARKS

Fragmentary pectiniform (Pa and Pb) elements of the *Amorphognathus* apparatus are here compared with those of *A. ordovicicus*. The distinction of *A. ordovicicus* from the older *A. superbus* (RHODES) is mainly based on the M (holodontiform) element. In the same way, other Late Ordovician species of *Amorphognathus*, such as, *A. lindstroemi* (SERPAGLI) and *A. ventilatus* FERRETTI & BARNES have been distinguished upon the base of the M element, that is not represented in our collection.

For the position of the elements within the apparatus we follow the notation proposed by ARMSTRONG *et al.* (1996).

The index species *Amorphognathus ordovicicus* has been recorded widely in Europe and North America.

*Amorphognathus?* sp.  
Pl. 1, Fig. 8

#### REMARKS

One incomplete Pb? element with prominent basal ribs is assigned to this genus in open nomenclature.

Genus *Panderodus* ETHINGTON, 1959

Type species: *Paltodus unicostatus* BRANSON & MEHL, 1933

*Panderodus gracilis* (BRANSON & MEHL, 1933)  
Pl. 1, Figs. 7, 9

#### REMARKS

Several almost complete specimens are present in our

collection. The elements are slender, sub-symmetrical, with an antero-lateral costa on each side. According to the reconstruction and the notation proposed by SANSOM *et al.* (1995) for the genus *Panderodus*, they are identified as sub-symmetrical graciliform elements.

*Panderodus gracilis* is known from the Ashgill of Europe, North America and Asia. Its total stratigraphic range is from the Middle Ordovician into the Silurian.

Genus *Birksfeldia* ORCHARD, 1980

Type species: *Birksfeldia circumPLICATA* ORCHARD, 1980

*Birksfeldia?* sp.  
Pl. 1, Fig. 6

#### REMARKS

One incomplete Sc? element is tentatively attributed to this genus. According to ORCHARD (1980, p. 19) the Sc element of *Birksfeldia* has an anticusp and sharp anterior and posterior edges which are developed as broad keels. Also the presence of a short denticulate posterior process and a broad carina on the inner face of the cusp was pointed out by this author. In our specimen the anticusp is shorter than that illustrated by ORCHARD (1980, pl. 6, fig. 21), and the posterior process is only partially preserved.

ORCHARD (1980) erected this genus upon the base of a Late Ordovician (Cautleyan-Rawtheyan) conodont collection from England and Wales. It has been also reported from the attenuated Dent Group (mid-to late Rawtheyan) in Cumbria (UK) by ARMSTRONG *et al.* (1996). In the Holy Cross Mountains (Poland) DZIK (1999) identified the genus *Birksfeldia* within the interval of the *Amorphognathus ordovicicus* Biozone. FERRETTI (1998) illustrated one Pb element of *Birksfeldia?* sp. from the Prague Basin, (Bohemia). Scarce and not well preserved specimens that could correspond to this genus have been found in the Iberian Peninsula (SARMIENTO, unpublished).

Genus *Plectodina* STAUFFER, 1935

Type species: *Prioniodus aculeatus* STAUFFER, 1935

*Plectodina?* sp.  
Pl. 1, Figs. 4-5

#### REMARKS

Fragmentary ramiform elements with compressed denticles and apparently well developed cusp are attributed to this genus in open nomenclature.

The distinction of *Plectodina* STAUFFER from the most closely related genus *Aphelognathus* BRANSON *et al.*, 1951 is based on some features that cannot be observed in our material. Based on the aspect of the basal cavity of the Sa element we considerer that these specimens could be part of the apparatus of *Plectodina*.

## References

- ARMSTRONG, H., JOHNSON, E.W. & SCOTT, R.W., 1996. Conodont biostratigraphy of the attenuated Dent Group (Upper Ordovician) at Hartley Broughton in Furness, Cumbria, UK. *Proceedings of the Yorkshire Geological Society*, **51**: 9-21.
- BERGSTRÖM, S.M., 1990. Relations between conodont provincialism and the changing palaeogeography during the Early Palaeozoic. *Geological Society of America Memoir*, **12**: 105-121.
- BRANSON, E.B. & MEHL, M.G., 1933. Conodont studies. *University of Missouri Studies*, **8**, Parts 1-4: 1-343.
- BRANSON, E.B., MEHL, M.G., & BRANSON, C.C., 1951. Richmond conodonts of Kentucky and Indiana. *Journal of Paleontology*, **25**: 1-17.
- DZIK, J., 1999. Evolution of the Late Ordovician high-latitude conodonts and dating of Gondwana glaciations. *Bulletino della Società Paleontologica Italiana*, **37**: 237-253.
- EPSTEIN, A.G., EPSTEIN, J.B. & HARRIS, L.D., 1977. Conodont color alteration – An index to organic metamorphism. *United States Geological Survey Professional Paper*, **995**: 1-20.
- ETHINGTON, R.L., 1959. Conodonts of the Ordovician Galena Formation. *Journal of Paleontology*, **33**: 257-292.
- FERRETTI, A., 1998. Late Ordovician conodonts from the Prague Basin, Bohemia. In: SZANIAWSKI, H. (ed.), Proceedings of the Sixth European Conodont Symposium (ECOS VI). *Palaeontologia Polonica*, **58**: 123-139.
- ORCHARD, M. J., 1980. Upper Ordovician conodonts from England and Wales. *Geologica et Palaeontologica*, **14**: 9-44.
- SANSOM, I.J., ARMSTRONG, H.A. & SMITH, M.P., 1995. The apparatus architecture of *Panderodus* and its implications for coniform conodont classification. *Palaeontology*, **37**: 781-800.
- STAUFFER, C.R., 1935. Conodonts of the Glenwood Beds. *Geological Society of America, Bulletin*, **46**: 125-168.
- SWEET, W.C. & BERGSTRÖM, S.M., 1984. Conodont provinces and biosfacies of the Late Ordovician. *Geological Society of America, Special Papers*, **196**: 69-87.
- VERNJERS, J., HERBOSCH, A., VANGESTAINE, M., GEUKENS, F., DELCAMBRE, B., PINGOT, J.-L., BELANGER, I., HENNEBERT, M., DEBACKER, T., SINTUBIN, M. & DEVOS, W., 2002. Cambrian – Ordovician – Silurian lithostratigraphic units (Belgium). *Geologica Belgica*, **4** (1-2): 5-38.

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## Explanation of Plate 1

Specimens Figs. 1-3 are from sample Presles 2, specimens Figs. 4 to 9 from sample Cocriamont 1.

Figs. 1-3 — *Amorphognathus* sp. cf. *A. ordovicicus* BRANSON & MEHL; 1- Pa element, upper view, x 69; 2- Pa element, upper view, x 84; 3- Pb element, lateral view, x 137; IRScNB specimens N° b4179, b4180, b4181.

Figs. 4-5 — *Plectodina*? sp.; 4- Sa element, posterior view, x 227; 5- S? element, posterior view, x 227; IRScNB specimens N° b4182, b4183.

Fig. 6 — *Birkfeldia*? sp.; Sc? element, inner lateral view, x 167; IRScNB specimen N° b4184.

Figs. 7, 9 — *Panderodus gracilis* (BRANSON & MEHL); 7a- graciliform element, lateral view, x 190; 7b- detail of the microstructure near the basal margin of the element, x 455; 9- graciliform element, lateral view, x 190; IRScNB specimens N° b4185, b4187.

Fig. 8 — *Amorphognathus*? sp.; Pb? element, antero-lateral view, x 227; IRScNB specimen N° b4186.

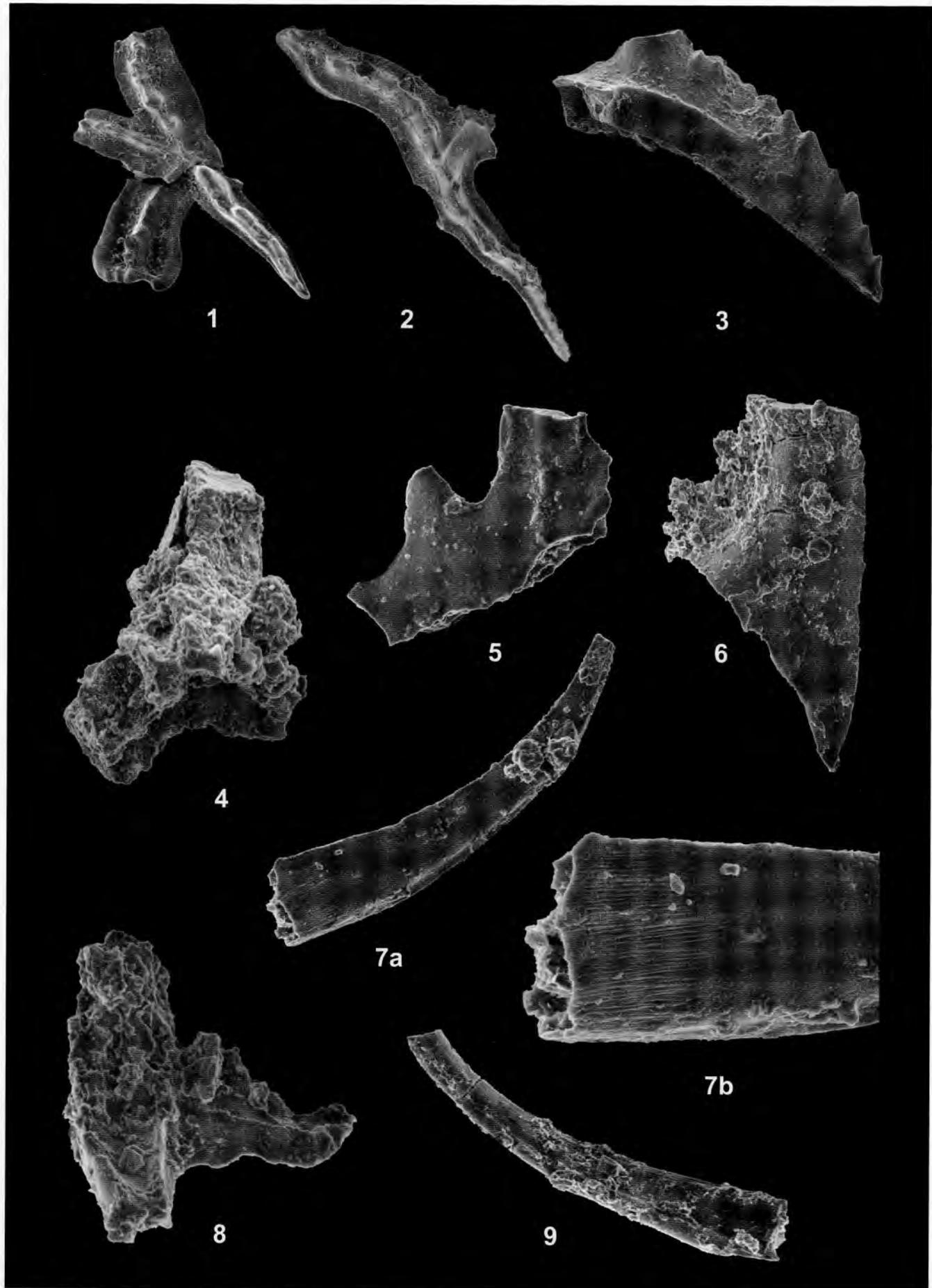


PLATE 1

