

***Petaloporella* (Cryptostomata, Bryozoa) from the Lower Devonian of central Bohemia**

ANDREJ ERNST

The bryozoan genus *Petaloporella* Prantl, 1935 was originally described from the Lower Devonian Braník Limestone (Zlíchovian = Lower Emsian) of Braník, the Czech Republic. It belongs to the family Hyphasmoporidae Vine, 1885. The type species *Petaloporella bohémica* Prantl, 1935 was also recorded from the Lower Devonian (Pragian) of Bohemia and Morocco. The present paper provides an emended diagnosis of the genus and a description of new *Petaloporella bohémica* material from the Koněprusy Limestone of Zlatý Kůň near Koněprusy, the Czech Republic. • Key words: Lower Devonian, Bohemia, cryptostome Bryozoa, taxonomy.

ERNST, A. 2009. *Petaloporella* (Cryptostomata, Bryozoa) from the Lower Devonian of central Bohemia. *Bulletin of Geosciences* 84(4), 767–770 (1 figure, 1 table). Czech Geological Survey, Prague. ISSN 1214-1119. Manuscript received August 11, 2009; accepted in revised form September 22, 2009; published online December 29, 2009; issued December 31, 2009.

Andrej Ernst, Institut für Geowissenschaften der Christian-Albrechts-Universität zu Kiel, Ludwig-Meyn-Str. 10, D-24118 Kiel, Germany; ae@gpi.uni-kiel.de

Bryozoans are abundant and diverse in the Lower Devonian of central Bohemia, representing an important faunal component of reefs. The study of bryozoans began in the 19th century, and up until now, 76 bryozoan species have been recorded from the Pragian to Emsian sequence of central Bohemia (see an overview in Ernst 2008 and Ernst & May 2009). A few recent publications provide taxonomic descriptions of the bryozoan fauna from the Koněprusy Limestone (Pragian, Lower Devonian) of Zlatý Kůň near Koněprusy, the Czech Republic (McKinney & Kříž 1986, Ernst 2008, Ernst & May 2009).

Prantl (1935) described several bryozoan taxa including a new genus, *Petaloporella*, from the Lower Devonian Braník Limestone (Zlíchovian = Lower Emsian) of Braník, the Czech Republic. Unfortunately, his illustrations were not of a satisfactory quality, and the type material has since been lost. The morphology of *Petaloporella* therefore remained dubious (Blake 1983). Bigey (1994) described and figured a bryozoan, which she called “?hyphasmoporida”, from the Lower Devonian (Pragian) of Morocco. This taxon shows all the morphological features characteristic of *Petaloporella*, and corresponds to the measurements of *P. bohémica* Prantl, 1935 presented here.

During the study of European bryozoan faunas, abundant material from the reefal limestone from the Koněprusy reef was examined. Several colonies of *Petaloporella bohémica* were discovered within a set of 111 thin sections. This material is described and illustrated here, an emended diagnosis for the genus *Petaloporella* is proposed and a neotype for *P. bohémica* erected.

Material and methods

The material for the present study comes from the upper Koněprusy Limestone, sampled from two quarries (“Čertovy schody”) in the vicinity of Zlatý Kůň Hill which lies 1 km south of the Bohemian village of Koněprusy (ca 30 km south-west of Prague, the Czech Republic; see Ernst & May 2009). The upper Koněprusy Limestone is middle Pragian in age and can be assigned to the *kindlei* Conodont Zone (Slavík 1998, May 2005, pp. 120–124) in the standard conodont zonation or to the *serratus* Conodont Zone in the alternative conodont zonation of Slavík (2004). The biota of the reef is dominated by crinoids and bryozoans, followed by algae, brachiopods and corals (Flajs & Hüßner 1996). The reef is composed mainly of white, well-washed boundstones and grainstones, which contain whole-bodied fossils.

Bryozoans were investigated in thin sections using a transmitted light binocular microscope. The thin sections and hand-specimens are housed in the Geological Centrum Göttingen, Germany, under collection numbers GZG.IN.0.010.558a, e, f, j, k, m, s, t, v, GZG.IN.0.010.557a–c.

Systematic palaeontology

Phylum Bryozoa Ehrenberg, 1831
Class Stenolaemata Borg, 1926
Order Cryptostomata Vine, 1884
Suborder Rhabdomesina Astrova & Morozova, 1956
Family Hyphasmoporidae Vine, 1885

Genus *Petaloporella* Prantl, 1935

1935 *Petaloporella* Prantl, pp. 4, 5.
1966 *Streblotrypa* Vine. – Owen, p. 143 (pars).

- 1970 *Leptotrypella* Vinassa. – Astrova, pp. 199, 200, pl. 7, figs 1a–c.
 1983 *Petaloporella* Prantl. – Blake, p. 591.
 1992 *Petaloporella* Prantl. – Gorjunova, p. 125.
 1994 ?hyphasmoporiid cryptostome; Bigey, pp. 15, 16.
 1996 *Streblotrypa* (*Streblotrypa*) Vine. – Wyse Jackson, p. 136.
 2005 *Streblotrypa* (*Streblotrypa*) Vine. – Ernst, p. 56.

Type species. – *Petaloporella bohémica* Prantl, 1935. “Braník” Limestone, Zlíchovian (Lower Emsian), Lower Devonian; Braník, the Czech Republic.

Emended diagnosis. – Branched colonies; autozoecia tubular, growing from the median axis, having subtriangular shape in transversal section in endozones, becoming circular to oval in exozones; hemisepta absent; metazooecia abundant, separating autozoecia in 1–3 rows; acanthostyles small, rare to abundant, sometimes absent.

Comparison. – *Petaloporella* is similar to *Hyphasmopora* Etheridge, 1875, but differs from it in the absence of hemisepta and presence of styles. *Petaloporella* is also similar to *Streblotrypa* (*Streblotrypa*) Vine, 1885, from which it differs in budding of autozoecia from the median axis instead of forming an axial bundle, as well as in the absence of hemisepta.

Occurrence. – Three species are assigned to *Petaloporella*: *P. bohémica* Prantl, 1935 from the Pragian and Lower Emsian (Lower Devonian) of the Czech Republic and from the Pragian of Morocco, *P. pectinata* (Owen, 1966) from the Lower Carboniferous of England, Ireland and Germany, and *P. remota* Gorjunova, 1992 from the Upper Carboniferous of northeastern Russia.

Petaloporella bohémica Prantl, 1935

Figure 1A–H, Table 1

- 1935 *Petaloporella bohémica* Prantl, pp. 5, 6, pl. 1, figs 4–6, text-figs 1–3.
 1970 *Leptotrypella multifora* Astrova, pp. 199–200, pl. 7, figs 1a–c.
 1994 ?hyphasmoporiid cryptostome; Bigey, pp. 15, 16, pl. 1, figs 1–8, figs 1–5, 9–14.

Type material. – Type specimens of Prantl (1935) are missing from the National Museum in Prague (Blake 1983, p. 591, and own revision). As a result, specimen number GZG.IN.0.010.558a from the Koněprusy Limestone, Pragian (Lower Devonian); Zlatý Kůň, the Czech Republic is herein designated as the neotype of *Petaloporella bohémica* Prantl, 1935. The holotype of *Leptotrypella multifora*

Table 1. Measurement statistics for *Petaloporella bohémica* Prantl, 1935 (twelve colonies), upper Koněprusy Limestone, middle Pragian (Lower Devonian) of Zlatý Kůň, the Czech Republic. Measurements are in mm. Abbreviations: N – number of measurements, X – mean, SD – sample standard deviation, CV – coefficient of variation, MIN – minimal value, MAX – maximal value.

	N	X	SD	CV	MIN	MAX
branch width	8	1.36	0.269	19.75	1.05	1.72
aperture width	30	0.11	0.014	12.93	0.08	0.14
aperture spacing from centre to centre	20	0.23	0.042	18.29	0.17	0.29
metazooecia width	25	0.03	0.006	20.51	0.02	0.045
acanthostyle diameter	10	0.03	0.010	36.10	0.015	0.05

ra Astrova, 1970 is deposited in the Paleontological Institute Moscow (PIN 2960/5).

Studied material. – GZG.IN.0.010.558a, e, f, j, k, m, s, t, v, GZG.IN.0.010.557a–c [Koneprusy Limestone, Pragian (Lower Devonian); Zlatý Kůň, the Czech Republic].

Description. – Ramose branched colonies. Branches 1.05–1.72 mm in diameter, with 0.30–0.38 mm wide exozones. Autozoecia tubular, growing from the median axis and bending gently in the exozones, the subtriangular shape in transverse section of the endozones becomes rounded in the exozones. Autozoecial apertures circular to oval, arranged in irregular rows on the colony surface. Hemisepta absent; rare planar diaphragms present. Abundant metazooecia separating autozoecia in 1–3 rows, arranged in a random order, rounded, restricted to the exozones. Autozoecial walls granular, 0.010–0.015 mm thick in endozones; laminated, 0.025–0.035 mm thick in exozones. Acanthostyles are small and rare, originating at the base of the exozones, and having distinct hyaline cores and laminated sheaths.

Comparison. – *Leptotrypella multifora* Astrova, 1970 does not belong to the trepostome genus *Leptotrypella* Vinassa de Regny, 1921, which is characterised by having few exilozooecia but many acanthostyles. This bryozoan taxon is synonymised herein with *P. bohémica*. *Streblotrypa* (*Streblotrypa*) *pectinata* Owen, 1966 from the Lower Carboniferous (Viséan) of England, Ireland and Germany, is generally similar, but differs in having more abundant acanthostyles (Owen 1966, Wyse Jackson 1996, Ernst 2005).

Occurrences. – Pragian (Lower Devonian); Khemis-n’ Ga, Morocco (Bigey 1994). Upper Koněprusy Limestone, middle Pragian (Lower Devonian); Zlatý Kůň, the Czech Republic (Astrova 1970, and present paper). Braník Limestone, lower Emsian (Lower Devonian); Braník, the Czech Republic (Prantl 1935).

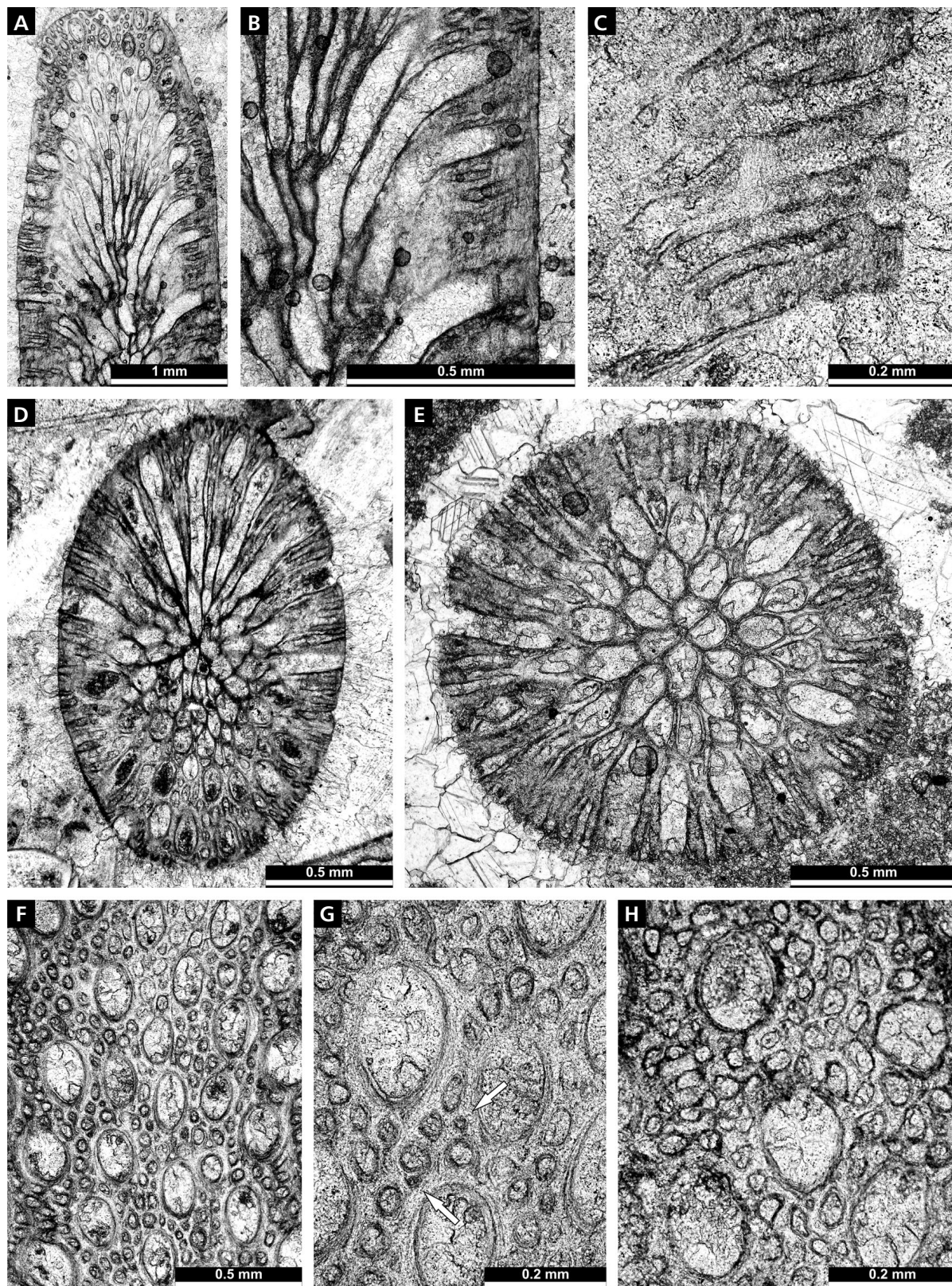


Figure 1. *Petaloporella bohémica* Prantl, 1935. All specimens from the upper Koněprusy Limestone, middle Pragian (Lower Devonian) of Zlatý Kůň, the Czech Republic. • A, B – branch, longitudinal section, neotype GZG.IN.0.010.558a. • C – branch, longitudinal section of the exozone showing metazooecia, GZG.IN.0.010.558e. • D – branch, oblique section, GZG.IN.0.010.558k. • E – branch, transverse section, GZG.IN.0.010.557b. • F, G – branch, tangential section showing autozooecial apertures, metazooecia and acanthostyles (arrows), GZG.IN.0.010.558j. • H – branch, tangential section, GZG.IN.0.010.557a.

Discussion

Bryozoa are abundant and diverse in the Devonian world-wide (Cuffey & McKinney 1979). However, their use for stratigraphy and palaeobiogeographic studies is limited due to insufficient investigation of regional faunas. Indeed, bryozoans can be reliable indicators of environmental conditions and useful for palaeobiographic analysis. The finding of *Petaloporella bohémica* and another rhabdomesine cryptostome species, *Paracuneatopora striata* Ernst, 2008, in the Lower Devonian of Morocco (Bigey 1994) suggests a close relationship between these two areas. However, Pragian and Emsian bryozoan communities of Spain rarely contain Bohemian species (unpublished data). This suggests a low faunal exchange between Bohemian and Iberian communities in the Lower Devonian.

Acknowledgements

I am thankful to Mike Reich, Geological Centrum Göttingen, for providing the material for study, and Kamil Zágorský, National Museum, Prague, for help with collection of Bohemian bryozoans. Patrick Wyse Jackson, Trinity College, Dublin, and Hans Arne Nakrem, Natural History Museum, Oslo, are also thanked for their helpful reviews and comments on the manuscript. The present study was accomplished within the project ER 278/4-1 u. 2, supported by the Deutsche Forschungsgemeinschaft (DFG). This paper is a contribution to IGCP 499 “Devonian land-sea interaction: evolution of ecosystems and climate”. A short field trip and work on the collections of National Museum in Prague were supported by the grant DE06P04OMG009.

References

- ASTROVA, G.G. 1970. Early Devonian trepostomatous bryozoans from Czechoslovakia. *Paleontologicheskii Zhurnal* 4(2), 197–201. [in Russian]
- ASTROVA, G.G. & MOROZOVA, I.P. 1956. Systematics of the order Cryptostomata. *Doklady Akademii Nauk SSSR* 110, 661–664. [in Russian]
- BIGEY, F.P. 1994. Bryozoans as components of a Devonian fauna in the Safi area (Morocco), 15–21. In HAYWARD, P.J., RYLAND, J.S. & TAYLOR, P.D. (eds) *Biology and Palaeobiology of Bryozoans*. Olsen & Olsen, Fredensborg.
- BLAKE, D.B. 1983. The Order Cryptostomata. Systematic descriptions for the Suborder Rhabdomesina, 551–592. In ROBISON, R.A. (ed.) *Treatise on invertebrate paleontology, Part G (1). Bryozoa (revised)*. Geological Society of America & University of Kansas Press, Boulder & Lawrence.
- BORG, F. 1926. Studies on recent cyclostomatous Bryozoa. *Zoologiska Bidrag fran Uppsala* 10, 181–507.
- CUFFEY, R.J. & MCKINNEY, F.K. 1979. Devonian Bryozoa. *Special Papers in Palaeontology* 23, 307–311.
- EHRENBERG, C.G. 1831. *Animalia invertebrata exclusis insectis. Symbolae Physicae, seu Icones et descriptiones Corporum Naturalium novorum aut minus cognitorum. Pars Zoologica*. 831 pp. Mittler, Berlin.
- ERNST, A. 2005. Lower Carboniferous Bryozoa from some localities in Sauerland, Germany, 49–62. In MOYANO, G.I., CANCINO, J.M. & WYSE JACKSON, P.N. (eds) *Bryozoan Studies 2004 – Proceedings of the 13th International Bryozoology Association Conference, Concepcion, Chile, January 2004*. Balkema Publishing House, Leiden, London, New York.
- ERNST, A. 2008. Trepostome and cryptostome bryozoans from the Koněprusy Limestone (Lower Devonian, Pragian) of Zlatý Kůň (Czech Republic). *Rivista Italiana di Paleontologia e Stratigrafia* 114(3), 329–348.
- ERNST, A. & MAY, A. 2009. Bryozoan fauna from the Koněprusy Limestone (Pragian, Lower Devonian) of Zlatý Kůň near Koněprusy (Czech Republic). *Journal of Paleontology* 83(5), 767–782. DOI 10.1666/09-019.1
- ETHERIDGE, R. 1875. Note on a new provisional genus of Carboniferous Polyzoa. *Annals and Magazine of Natural History* (4)15, 43–45.
- FLAJS, G. & HÜSSNER, H. 1996. Lower Devonian coral/stromatoporeid reefs in the Koněprusy area (Czech Republic) – A preliminary report, 355–357. *Göttinger Arbeiten zur Geologie und Paläontologie, Sb2*.
- GORJUNOVA, R.V. 1992. Morphology and systematics of the Palaeozoic Bryozoa. *Trudy Paleontologicheskogo Instituta, R. A. N.* 251, 1–168. [in Russian]
- MAY, A. 2005. Die Stromatoporen des Devons und Silurs von Zentral-Böhmen (Tschechische Republik) und ihre Kommensalen. *Zitteliana* B25, 117–250.
- MCKINNEY, F.K. & KRÍŽ, J. 1986. Lower Devonian Fenestrata (Bryozoa) of the Prague Basin, Barrandian Area, Bohemia, Czechoslovakia. *Fieldiana, Geology new series* 15, 1–90.
- OWEN, D.E. 1966. New Carboniferous Polyzoa from Derbyshire. *Geological Journal* 5(1), 135–148.
- PRANTL, F. 1935. New cyclostomatous Bryozoa from Braník-Limestone g._a (Bohemia). *Bulletin international de l'Academie des Sciences de Boheme* 36, 1–10.
- SLAVÍK, L. 1998. Early Devonian conodont succession from the section of the Čertovy schody Quarry (Koneprusy, Barrandian, Czech Republic). *Věstník Českého geologického ústavu* 73, 157–172.
- SLAVÍK, L. 2004. A new conodont zonation of the Pragian Stage (Lower Devonian) in the stratotype area (Barrandian, central Bohemia). *Newsletters on Stratigraphy* 40(1/2), 39–71. DOI 10.1127/0078-0421/2004/0040-0039
- VINE, G.R. 1884. Fourth report of the Committee appointed for the purpose of reporting on fossil Polyzoa. *Reports of the 53rd meeting of the British Association for Advances in Science*, 161–209.
- VINE, G.R. 1885. Notes on the Polyzoa and Foraminifera of the Cambridge Greensand. *Proceedings of the Yorkshire Geological Society* 9, 10–29.
- VINASSA DE REGNY, P. 1921. Sulla classificazione die trepostomidi. *Societa Italiana di Scienze Naturali Atti* 59, 212–231.
- WYSE JACKSON, P.N. 1996. Bryozoa from the Lower Carboniferous (Viséan) of County Fermanagh, Ireland. *Bulletin of the Natural History Museum, London (Geology)* 52(2), 119–171.