SBORNÍK NÁRODNÍHO MUZEA V PRAZE
Řada B – Přírodní vědy • sv. 69 • 2013 • čís. 1–2 • s. 65–68

ACTA MUSEI NATIONALIS PRAGAE
Series B – Historia Naturalis • vol. 69 • 2013 • no. 1–2 • pp. 65–68

SIMAKOCRINUS GEN. NOV. (CRINOIDEA, COL.) FROM THE BOHEMIAN EARLY AND MIDDLE DEVONIAN OF THE BARRANDIAN AREA (THE CZECH REPUBLIC)

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Prokop, R. J. (2013): *Simakocrinus* gen. nov. (Crinoidea, col.) from the Bohemian Early and Middle Devonian of the Barrandian Area (the Czech Republic). – Acta Mus. Nat. Pragae, Ser. B Hist. Nat., 69(1-2): 65-68. Praha. ISSN 1804-6479 • DOI 10.14446/AMNP.2013.065

Abstract. A new artificial crinoid genus of the myelodactylid type *Simakocrinus* gen. nov. (col.) and two Early Devonian species belonging to this genus, i. e: *Simakocrinus facilis* sp. nov. (col.) from Pragian and *S. diligens* sp. nov. (col.) from Late Emsian strata are described. The stratigraphical range and paleoecology of the new genus in the Bohemian Early and Middle Devonian is discused. A record of the localities in which the columnals and stem fragments of the crinoid genus *Simakocrinus* gen. n. have been found is included.

■ Crinoidea, *Simakocrinus* gen. nov. (col.), columnals and stem fragments, biostratigraphy, paleoecology, Early and Middle Devonian, Barrandian Area.

Received October 30, 2012
Issued September, 2013

Introduction

During the systematic study of echinoderm assemblages from the Bohemian Devonian, numerous isolated columnals and pluricolumnals of undescribed crinoids suggested myelodactylid morphology. These skeletal ossicles were found in the washings from weathered samples of limestones from all strata of the Barrandian Early and Middle Devonian, i.e Lochkovian, Pragian, Zlíchovian (= Early Emsian), Dalejan (= Late Emsian) and in the Choteč Limestone of Eifelian age.

Morphologically prominent columnals and stem fragments appear predominantly in the biomicrite, sparite and biosparite limestones that indicate sedimentation in a deep subtidal zone that reflects a low energy and disaerobic environment. To a lesser extent these skeletal ossicles are also found in medium to coarse bioclastic limestones which indicate sedimentation in a well aerated subtidal zone or in the bioclastic sparite limestones representing detrital back-reef flank deposits. (Chlupáč 1994).

Systematic palaeontology

Subclass: **Inadunata Wachsmuth et Springer, 1885**

Order: **Disparida Moore et Laudon, 1943**
(Group: **Varii, Moore et Jeffords, 1968**)

Family: **Myelodactylidae? S.A. Miller, 1883**

Simakocrinus gen. nov. (col.)

Type species: *Simakocrinus facilis* sp. nov., Early Devonian, Pragian, Bohemia.

Derivatio nominis: In honour of Ing. Vladislav Šimák, my late friend and for many years standing collaborator of the Paleontological Department of the National Museum in Prague.

Diagnosis. Stem homeomorphic bilateral, composed of minute but relatively hight columnals, roundedly trapezoidal to semielliptical in outline. Latera flat or slightly convex, mostly smooth; rarely with short, sporadicaly dislocated basal parts of cirri. Synarthry articulation. Articular facets plane, with a prominent fulcral ridge, created by two gently curved branches, i.e between the relatively narrow fine-grained inner ligamentary area and wide, coarse-grained outer ligamentary area. Lumen central, circular or semicircular formed by adjoining fulcral ribs accompanied by minute secondary axial canals.

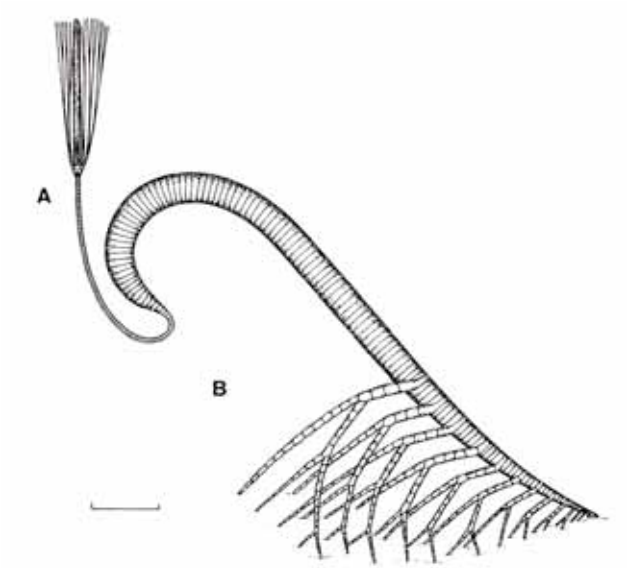
Comparison. The columnals of the genus *Simakocrinus* gen. nov., (col.) resemble skeletal ossicles of some Silurian and Devonian myelodactylid crinoid genera especially *Myelodactylus* Hall, 1852 and *Crinobrachiatus* Moore, 1962. They differ from these genera in the prominent deep fulcral ridge, roundedly trapezoidal to semielliptical shape in transverse section, plane articular facet without distinct crenellae in the inner ligamentary area and most importantly, in the circular or semicircular lumen accompanied by minute secondary axial canals.

Paleoecology. Most skeletal remains of *Simakocrinus* gen. nov. (col.) were found in the washings from biosparitic and viz. biomicritic limestones which represent the arenaceous or clay marly sediments indicating that these minute crinoids lived on a soft sea bottom.

The crinoid living and anchoring strategy for soft bottom dwelling has been discussed by many authors,

especially Springer 1926, Breimer 1978, Eckert and Brett 1985, Seilacher and McClintock 2005 and Donovan 2006.

The flexible stem and cirri are dislocated only lateraly and dorsally on columnals in the middle and proximal parts of stem, I assume that living simakocrinoids resembled a related myelodactylid species *Crinobrachiatus brachiatus* (Hall) from the Silurian of North America (see text-fig. 1).



Text-fig. 1. Restoration of *Crinobrachiatus brachiatus* (HALL), a crinoid probably related to *Simakocrinus*, in semi-recumbent orientation. Cirri are depicted on one side of column only. Scale bar is 1 cm. (After Eckert and Brett, 1985).

R e m a r k s . Similar species to the genus *Simakocrinus* gen. nov. are known also from washings from weathered limestones from the other Pragian facies in the Barrandian Area, i.e. Koněprusy Limestone and Dvorce-Prokop Limestone. They were found also in the Kotýz Limestone (Lochkovian) and from the Middle Devonian Choteč Limestone of Eifelian age (see record of localities on p. xx.).

Simakocrinus facilis sp. nov. (col.)

Pl. 1, figs 1-4

H o l o t y p e : Isolated columnal NMP L 41041 figured on Pl. 1, figs 3-4.

T y p e h o r i z o n : Loděnice Limestone, Pragian, Praha Formation, Early Devonian.

T y p e l o c a l i t y : Praha – Klukovice, abandoned "Červený lom" Quarry.

M a t e r i a l : In addition to the holotype, more than 250 isolated columnals and pluricolumnals from washings.

D e s c r i p t i o n : Columnals bilateral, roundedly trapezoidal to semielliptical in shape. Latera flat or slightly convex, protruding in lateral and dorsal surface by short, relatively massiv cirri basis. Articular facet flat, fulcral ridge deep and narrow, created by two distinctly curved branches between a narrower, fine grained inner ligamentary area and wide coarse grained outer ligamentary area. Lumen semicircular accompanied by 7 – 8 semicircularly arranged minute axial canals.

O c c u r r e n c e : Abundant in the washings from weathered parts of the well-bedded platy biosparitic Slivenec Limestone and biomicritic Loděnice Limestone.

Simakocrinus diligens sp. nov. (col.)

Pl. 1, figs 5-7

H o l o t y p e : Isolated columnal NMP L 41044 figured on Pl. 1, figs 6-7.

T y p e h o r i z o n : Třebotov Limestone, Dalejan (= Late Emsian), Daleje-Třebotov Formation, Early Devonian.

T y p e l o c a l i t y : Praha – Holyně, abandoned "Prastav" Quarries.

M a t e r i a l : In addition to the holotype, cca 150 isolated columnals and pluricolumnals from washings.

D e s c r i p t i o n : Columnals of *Simakocrinus diligens* sp. nov. differ from *S. facilis* sp. nov. by the semielliptical shape in outline, broader inner ligamentary area, circular lumen and only two minute secondary axial canals accompaning the lumen.

O c c u r r e n c e : Abundant in the washings from weathred parts of well bedded platy biomicritic Třebotov Limestone.

Acknowledgements

The author is grateful to Ronald L. Parsley (Tulane University, New Orleans, USA) and Vojtěch Turek (National Museum, Prague) for their advice and critical reading of the manuscript and to Jan Sklenář (National Museum, Prague) for technical help. This work was financially supported by the Ministry of Culture of the Czech Republic (DKRVO 2013/05, National Museum, 00023272).

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Explanation of the Plate

PLATE 1

***Simakocrinus facilis* sp. nov. (col.),**

Early Devonian, Pragian, Loděnice Limestone. Praha-Klukovice, abandoned "Červený lom" Quarry.

1. NMP L 41039 articulum of an isolated columnal from ?distal part of stem.×40.
2. NMP L 41040 articulum of an isolated columnal from ?middle part of stem.×40.
3. NMP L 41041 holotype, articulum of an isolated columnal from ?proximal part of stem.×40.
4. NMP L 41041, holotype, detail of the central part of articulum with lumen accompanied by 7–8. minute arcuately arranged secondary axial canals.×200.

***Simakocrinus diligens* sp. nov. (col.),**

Early Devonian, Dalejan (= Late Emsian), Třebotov Limestone. Praha-Holyně, "Prastav" Quarries, small quarry near the volley-ball court.

5. NMP L 41043 articulum of an isolated columnal from proximal part of stem.×60.
6. NMP L 41044 holotype, articulum of an isolated columnal from distal part of stem.×60.
7. NMP L 41044 holotype, detail of the central part of articulum of an isolated columnal with lumen accompanied by two secondary axial canals.×300.

All specimens are deposited in the collections of the Palaeontological Department of the National Museum (abbrev. NMP, catalogue L). SEM photos by P. Šlehofer.

Appendix

Localities where the crinoid genus *Simacocrinus* gen. n. (col.) was recorded in the Bohemian Devonian

Early Devonian.

Lochkovian:

Kotýz Limestone. Thick bedded, light grey sparitic, medium to coarse bioclastic limestones."Záloženský lom" Quarry near Loděnice. Rare.

Pragian:

Koněprusy Limestone. Massive white to light-grey sparitic bioclastic limestones.

1. Velkolom "Čertovy schody" Quarry near Koněprusy. Rare.
2. "Na Plešivci" Quarry near Suchomasty. Rare.

Slivenec Limestone. Thick-bedded rosy to reddish sparitic crinoid limestones. Abundant.

1. Praha-Smíchov, "Na Konvářce" Quarry.
2. Praha-Klukovice, "Červený lom" Quarry, western part.
3. Praha-Zlíchov, quarry by Zlíchov church.
4. Praha-Řeporyje, "U kantiny" Quarry.
5. Praha-Řeporyje,"U Ohrady" Quarry.
6. Srbsko near Beroun, quarry in the Kačák brook valley near its discharge into the Berounka River.

Loděnice Limestone. Well-bedded platy variegated (rosy-yellow-grey) biosparitic and biomicritic limestones. Common at the same localities as Slivenec Limestone.

Dvorce-Prokop Limestone. Well-bedded grey micritic limestones. All localities in the Barrandian area. Common.

1. Praha-Klukovice, "Červený lom" Quarry, eastern part.
2. Praha-Hlubočepy, "St. Prokop" Quaries.
3. Praha-Braník, "Branická skála" Quarry.
4. Praha-Řeporyje, "U kantiny" Quarry.

Zlíchovian (Early Emsian):

Zlíchov Limestone.

"Kaplička Coral Horizon" at the base of the Zlíchov Limestone. Massive to thick-bedded bioclastic limestones.

1. "U kapličky" Quarry, Praha-Zlíchov. Abundant.
2. "Hvížďalka" Quarry near Lochkov. Rare.

"Normal facies" of the Zlíchov Limestone. Well-bedded grey to dark-grey biodetritic to biomicritic limestones with cherts.

1. Praha-Klukovice, eastern part of the "Červený lom" Quarry.

Dalejan (Late Emsian):

Třebotov Limestone. Well bedded light-grey micritic to biomicritic limestones. Common.

1. Praha-Holyně, "Prastav" Quarries.
2. Praha-Hlubočepy, "U jezírka" Quarry.
3. Section at the roadcut of the motorway at Praha-Barrandov.

Middle Devonian.

Eifelian.

Choteč Limestone. Well bedded grey and dark-grey fine grained bioclastic to micritic limestones. Rare.

1. Praha-Holyně, "Prastav" Quarries.
2. Section at the road-cut of the high-way at Praha-Barrandov.

PLATE 1