

Orbaspina chlupaci sp. nov., a new siphonotretid brachiopod from the Silurian of the Barrandian area, Bohemia

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Abstract. New siphonotretid brachiopod *Orbaspina chlupaci* is described from the Kopanina Formation (Ludlow, Silurian) of the Barrandian. Its external ornament combines pits, separated by low ridges and nodes, with a typical siphonotretid ornament of long hollow spines. Spines are restricted to edges of concentric lamellae and posterior shell margin, and indicate a schizambonine affinity. Occurrence of Silurian and Devonian siphonotretids in the Barrandian area is re-evaluated.

Key words: Brachiopoda, Siphonotretida, Dysoristidae, Silurian, Barrandian, Czech Republic

Introduction

Silurian siphonotretids are poorly known, with few published records (Morris 1850, Mergl 2001a, b, Valentine and Brock 2003). They are smaller than their Ordovician ancestors, and are very rare among other organophosphatic brachiopods in samples of fossils. In addition, the siphonotretid shells are generally broken into small pieces. Consequently, their finds are merely incidental, represented only by a few pieces in any fossil samples. Despite their rarity, their remains in the Barrandian area have been found in the Motol, Kopanina, Praha and Daleje-Třebotov Formations, mostly in micritic limestones associated with small, deep-water fossils, such as tentaculitids, plectambonitids and small discinoids (Mergl 2001b). The new find of about a dozen specimen in a small limestone lens in the upper Kopanina Formation is the most numerous siphonotretid sample in the Barrandian area, which allows a formal description of a new species.

All figured specimens are housed in the paleontological collection in the Department of Biology, University of West Bohemia, Plzeň (PCZCU).

Remarks to siphonotretid ornamentation

A characteristic feature of siphonotretid brachiopod shells is, among others, the presence of hollow spines. They are often uniform in size, but sometimes of different sizes, with two size categories of spines commonly present in some early Ordovician genera (e.g., *Eosiphonotreta* Havlíček). The spines commonly cover the whole external surface, or are present along edges of growth lamellae. In some genera (e.g., *Acanthambonia* Cooper), the spines are remarkably long, curved, and indicate they fixation to cylindrical objects (Wright and Nölvak 1997). No records of spine-free siphonotretids have been taken. Shells of a similar morphology, with a pedicle foramen posteriorly closed by triangular pedicle tract are possessed by dysoristids. Their shells,

however, are always devoid of spines, being covered by minute shallow superficial pits.

Mergl (2001a) published data about the distribution of siphonotretids of Silurian age including a Lower Devonian report of the dysoristid. This suggested dysoristid of Pragian age was described as *Dysoristus posterus* Mergl, 2001. Although its morphology is consistent with schizambonine brachiopods, the absence of spines led the author to its attribution to family Dysoristidae Popov and Ushatinskaya, 1992, and consequently, to extended range of dysoristids from the Lower Ordovician to Lower Devonian. However, the new species *Orbaspina chlupaci* sp. nov. displays nearly the same morphology, including a shape of the dorsal larval shell and dorsal pseudointerarea. The only differences are scattered rows of hollow spines in *O. chlupaci*. Shallow and rather coarse pitting on the exterior is present in both species. Therefore, this suggested dysoristid is considered here as a siphonotretid without spinose ornament, and is rejected from the family Dysoristidae. Consequently, the suggested extension of Dysoristidae is erroneous; the family definitely ranges only to the Lower Ordovician as suggested by former authors (Holmer and Popov in Williams et al. 2000).

A retreat of a spinose ornament in post-Ordovician siphonotretids is obvious. This evolutionary trend appears already in the Upper Cambrian genus *Schizambon* Walcott. Unlike other siphonotretids, the ornament of *Schizambon* consists of low rugellae crossed by low discontinuous costellae and scattered fine spines. Gradual coarsening of costellae and rugellae during phylogeny led to slightly irregular and rather coarse pitted ornament. This is present in *Orbaspina*. Spines retained only along the edges of lamellae are a feature known in a few other siphonotretids (e.g., *Nushbiella* Popov). Close affinity of *Orbaspina* and, in particular of *O. postera* (Mergl 2001b: pl. 35, figs 9, 10) to *Schizambon* is evident from the morphology of pedicle foramen. A posterior cover of the foramen has two lobes on internal surface of the ventral valve. These lobes divided by a shallow groove are also developed in *O. postera*.

Other siphonotretids have circular internal foramen, commonly with thickened pedicle collar. There are no reports of undoubted Middle and Upper Ordovician schizambonines, and *Schizambon* Walcott is restricted only to the Upper Cambrian and Lower Ordovician.

Systematic part

Order Siphonotretida Kuhn, 1949

Superfamily Siphonotretoidea Kutorga, 1848

Family Siphonotretidae Kutorga, 1848

Subfamily Schizamboninae Havlíček, 1982

Genus *Orbaspina* Valentine and Brock, 2003

Type species: *Orbaspina gelasinus* Valentine and Brock, 2003; Silurian, New South Wales.

Remarks: Although the genus is characterised by hollow spines along lamellae, species *Dysoristus posterus* Mergl 2001 is referred to the genus because of the same general morphology. Also the species *Schizambonine* sp. A, and *S.* sp. B described by Mergl (2001b) are referred to the genus due to similar shell morphology and paucity and arrangement of hollow spines.

Orbaspina chlupaci sp. nov.

Plate I, figs 1–5

2001a *Siphonotretid* sp. A: Mergl, p. 350, fig. 53.3 F, G

2001b *Siphonotretine* sp.: Mergl, p. 38, figs 8–10

Holotype: Dorsal valve figured in Plate 1, figs 1a–d (PCZCU 790).

Type horizon: Ludlow, Kopanina Formation, *Ananaspis fecunda* Horizon (dark micritic limestone with *Kosovopeltis svobodai* and *Scharyia micropyga*).

Type locality: Barrandian area, Králův Dvůr, Kosov Quarry.

Name: In honour of Prof. RNDr. Ivo Chlupáč, DrSc.

Material: Ten incomplete dorsal valves, several fragments.

Description: Shell is subcircular, with slightly extended dorsal beak, strongly convex in transverse and longitudinal profiles, with depressed, narrowly triangular median sector extending from the beak. The dorsal apex slightly overhangs over the posterior margin. The larval valve is circular, with larger posterior node and smaller two pairs of nodes situated anteriorly and anterolaterally. Dorsal pseudointerarea is apsacline, rather long, with broadly triangular and deeply concave median groove, weakly

separated from shorter propareas. The surface of pseudointerarea covers weak growth lines. The pseudointerarea is deeply excavated, formed by a thin plate with acute anterior edge. Ventral valve is unknown.

Dorsal valve exterior is distinct by nearly smooth larval shell followed by weakly pitted brephic shell. Uneven deep pits, arranged in oblique rows at some places, cover the adult shell. Pits are separated by low and short ridges or nodes, which do not extend into spines. Long hollow tubular spines are present along the posterior margin of the shell and on edges of a few concentric lamellae. Spines are of similar size, prostrate, along posterior margin with curved points.

Remarks: New species differs from *Orbaspina postera* (Mergl 2001) by spinose ornament.

Occurrence: Ludlow, Kopanina Formation, upper part (*Ananaspis fecunda* and *Prionopeltis archiaci* Horizons).

Localities: Barrandian area, Králův Dvůr (Kosov Quarry), Praha-Řeporyje (Mušlovka Quarry).

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Plate I

All specimens come from Ludlow, Kopanina Formation, *Ananaspis fecunda* Horizon; Bohemia, Barrandian area, Králův Dvůr, Kosov Quarry.

Photo by author.

1 – PCZCU 790, holotype, incomplete dorsal valve in dorsal (a), oblique (b), and lateral (c) views, and a detail of the beak (d); × 65 (a), × 70 (b), × 75 (c), × 120 (d). 2 – PCZCU 791, dorsal valve interior showing pseudointerarea in ventral (a), oblique (b), and posterior (c) views, × 60 (a), × 60 (b), × 70 (c). 3 – PCZCU 792, fragment of a valve with concentric rows of hollow spines (a), its oblique view (b), and a detail of spines and pitted ornament (c), × 65 (a), × 95 (b), × 350 (c). 4 – PCZCU 793, fragment of a dorsal valve with posterior spines (a), detail of larval shell (b) and detail of curved hollow spines (c), × 65 (a), × 145 (b), × 200 (c). 5 – PCZCU 794, incomplete dorsal valve, × 45.

