



Bohemian type bivalves *Praeostrea bohemica* Barrande, 1881 and *Slavinka plicata* (Barrande, 1881) from the Silurian and earliest Devonian of the Carnic Alps (Austria)

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Abstract. – The present article describes the following bivalves of the Bohemian type from the Carnic Alps of Austria: *Slavinka plicata* (Barrande, 1881) from the Silurian Cardiola Formation, Ludlow, lower Ludfordian, and *Praeostrea bohemica* Barrande, 1881 from the lowermost Devonian, Rauchkofel Limestone, Lochkovian, Cellon Section. The presence of these bivalves at the aforementioned localities further support the close palaeogeographic relations between the Carnic Alps (Austria) and Perunica (Bohemia, Prague Basin) region during the Ludfordian and early Lochkovian. • **Key words:** Bivalvia, Silurian, Devonian, Carnic Alps, Perunica, palaeogeographic relationships.

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The Silurian and earliest Devonian bivalves of the Carnic Alps have been systematically collected and studied by Jiří Kríž for thirty years (Kríž 1999b). In 1999, Kathleen Histon of the Geologische Bundesanstalt in Vienna, and Vojtěch Turek from the National Museum of Prague, collected two Bohemian species of bivalves at the Mt. Cellon Section above Plöckenpass, south-west of Kötschach – Mautzen (Walliser 1964, Kríž 1999b, text-fig. 2, p. 262). Both species are new for the Silurian and early Devonian of the Carnic Alps, and further support the close relations between the Carnic Alps and the Perunica (Prague Basin) region (Kríž 1999b).

Systematic palaeontology

Class Bivalvia Linné, 1758
Subclass Autolamellibranchiata Groben, 1894
Order Praecardioida Newell, 1965
Superfamily Cardioloidea Hoernes, 1884
Family Slavidae Kríž, 1982

Genus *Slavinka* Kríž, 1982

Type species. – *Slava acuta* Barrande, 1881.

For a complete generic synonymy and description see Kríž (1985).

Remarks. – Three Bohemian species of *Slavinka* were described from the Carnic Alps by Kríž (1999b) from the Kok Formation, upper Gorstian, lower Ludlow, from the Mt. Cocco and the Rauchkofel Boden Section localities. These three species are *S. aff. damona* Kríž, 1985, *S. elevata* (Barrande, 1881), and *S. cubula* Kríž, 1985. The *S. plicata* (Barrande, 1881) described here occurs in the Cardiola Formation, lower Ludfordian, middle Ludlow, at the Cellon Section locality.

Slavinka plicata (Barrande, 1881)

Figures 1A–D

- 1881 *Slava plicata* Barr.; Barrande, pl. 181, figs IX/1–12.
- 1985 *Slavinka plicata* (Barrande, 1881). – Kríž, p. 91–93, pl. 17, figs 1–14, text-fig. 18 (for a complete synonymy see this paper).

Lectotype. – Internal mould of a left valve figured by Barrande (1881) on pl. 181 as figs IX/1–3, and by Kríž (1985) on pl. 17 as figs 4–8, 10, 11. Deposited at the National Museum in Prague, L 14791.

Paralectotypes. – Other specimens figured by Barrande (1881) on pl. 181. Deposited at the National Museum, Prague, L 14792–L 14794.

Type horizon and type locality. – Horizon with *Cromus beaumonti*, level with *Cardiola docens* Community (Kríž 1999a), lower Ludfordian, Ludlow, Dlouhá Hora hill near Beroun, Bohemia.

Material. – Internal mould of the right valve deposited in the collections of the Geologische Bundesanstalt (GBA) in Vienna, under no. 2006/2/1.

Diagnosis. – *Slavinka* characterized by prominent stage III (for detailed description see Kríž 1985).



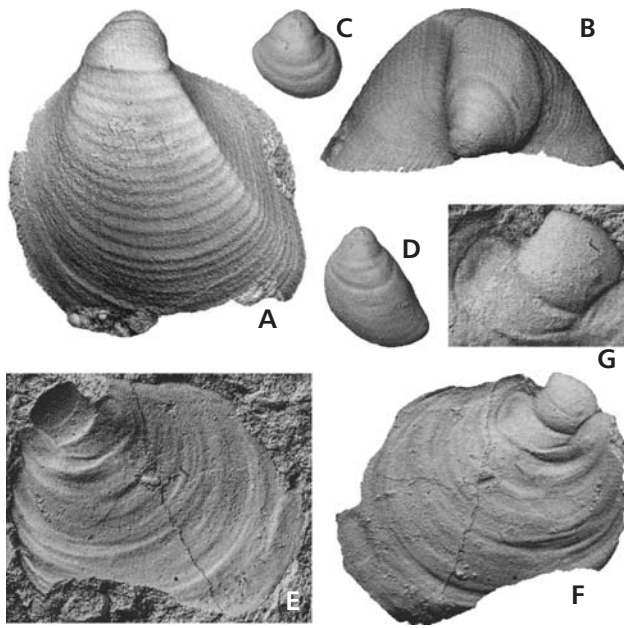


Figure 1. A–D – *Slavinka plicata* (Barrande, 1881), internal mould of the right valve, Silurian, Ludlow, Cardiola Formation, lower Ludfordian, Cellon Section, the Carnic Alps, GBA 2006/2/1; A – lateral view, x 3.3, B – dorsal view, x 3.5, C – stage II, lateral view, x 3.5, D – stage III, lateral view, x 2.8. • E–G – *Praeostrea bohemica* Barrande, 1881, composite mold of the right valve, Lower Devonian, lowermost Lochkovian, Rauchkofel Limestone, bed no. 47C, Cellon Section, the Carnic Alps, GBA 2006/2/2; E – counterpart, lateral view, x 3.9, F – latex mould, lateral view, x 3.8, G – latex mould, stages II and III, lateral view, x 10.

Dimensions (in mm). – Stage II: L = 3.1, H = 3.0, W/2 = 1.1; stage III: L = 4.4, H = 5.7, W/2 = 1.9; stage IV: L = 12.1, H = 12.7, W/2 = 6.6.

Remarks. – The size, general outline, shape, and inner surface sculpture of all ontogenetic stages are comparable with the conspecific type specimens of *S. plicata* described and figured by Kříž (1985) from the Prague Basin in Bohemia. On the specimen from the Carnic Alps, regular growth bands (21 in number) are developed in stage IV. Stage V is developed as a narrow ventral band without growth bands. The radial ribs are present in late stage II and in stage III. In stage IV the radial ribs are more strongly developed in the anterior part of the shell. Radial ribs are present as distinct crenulations on the posterior, ventral, and anterior margins of stage V.

Occurrence. – In Bohemia *S. plicata* occurs in the Kopanina Formation, Ludlow, lower Ludfordian, Horizon with *Cromus beaumonti*, level with *Cardiola docens* Community, *Saetograptus linearis* Biozone. In the Carnic Alps it occurs approximately at the same level in the Cardiola Formation, Ludlow, lower Ludfordian, level with *Cardiola docens* Community (Kříž 1999a).

Order Modiomorphoidea Newell in LaRocque & Newell, 1969
Superfamily Modiomorphoidea Miller, 1877
Family Praeostreidae Kříž, 1966

Genus *Praeostrea* Barrande, 1881

Type species. – *Praeostrea bohemica* Barrande, 1881

For a complete generic synonymy and description see Kříž (1966).

Remarks. – One Bohemian species of *Praeostrea* (*Praeostrea* cf. *moror* Kříž, 1966) was described from Sardinia by Kříž (in Kříž & Serpagli 1993) from the lower Přídolí, *Cardiolinka sardiniana* Community (Kříž in Kříž & Serpagli 1993), Domusnovas, S' Argiola locality.

***Praeostrea bohemica* Barrande, 1881**

Figures 1E–G

1881 *Praeostrea bohemica* Barr.; Barrande, p. 147, pl. 111, figs 2–4.

1966 *Praeostrea bohemica* Barrande, 1881. – Kříž, p. 30, 31, pl. 1, figs 1–8 (for a complete synonymy see this paper).

Lectotype. – Right valve figured by Barrande (1881) on pl. 111 as fig. 2 and by Kříž (1966) on pl. 1 as fig. 1. Deposited at the National Museum in Prague, L 6788.

Paralectotypes. – Other specimens figured by Barrande (1881) on pl. 111, deposited at the National Museum, Prague, L 6790–L 6791.

Type horizon and type locality. – Ludfordian, Ludlow, Dlouhá Hora hill near Beroun, Bohemia.

Material. – Counterpart of the composite mould of the right valve deposited in the collections of the Geologische Bundesanstalt (GBA) in Vienna, under no. 2006/2/2.

Diagnosis. – *Praeostrea* characterized by the subcircular outline of adult shells and by growth sculptures only (for detailed description see Kříž 1966).

Dimensions (in mm). – Stage II: L = 2.2, H = 2.2, W/2 = 0.7; stage III: L = 3.9, H = 2.5, W/2 = 0.8; stage IV: L = 10.0, H = 8.9, W/2 = ca 1.5.

Remarks. – The size, general outline, shape, and inner surface sculpture of all ontogenetic stages (II–IV) are comparable with the conspecific type specimens of *P. bohemica*

described and figured by Kříž (1966) from the Prague Basin, Bohemia.

Occurrence. – In Bohemia, *P. bohémica* occurs from the late Wenlock, *Testograptus testis* Biozone up to the early Lochkovian, *Monograptus uniformis* Biozone. In the Carnic Alps, *P. bohémica* occurs at the Cellon Section (Walliser 1964) in bed no. 47C, Rauchkofel Limestone, *Eisenackitina bohémica* Biozone (Priewalder 1994), lowermost Lochkovian, Devonian (Kříž 1999a), approximately at the same level as in Bohemia.

Palaeogeographic conclusions

The genus *Slavinka* is represented by 11 species in the Bohemian Prague Basin, the majority of which occur in the Gorstian and lower Ludfordian stages. In addition to Perunica and the Carnic Alps, the genus *Slavinka* is also known from Sardinia, Italy (Kříž & Serpagli 1993) and from the Montagne Noire, France (Kříž 1996). Four Bohemian species of the genus occur in the Carnic Alps (including *S. plicata*), while in the Montagne Noire only *S. acuta* (Barrande, 1881) occurs, and in Sardinia only *S. amarygma* Kříž, 1985.

According to Kříž (1999b, p. 314, text-fig. 7), 15 species of Cardiolidae occur in the Ludfordian of the Prague Basin, and nine in the Carnic Alps. Four species are common in the Montagne Noire and in Sardinia. Both of the latter regions are characterized by only three species that co-occur in the Carnic Alps. This supports the closer palaeogeographic relation of the Carnic Alps to Bohemia, Perunica, than to the Montagne Noire and Sardinia (Kříž 1999b). *S. plicata* is another species common to the Carnic Alps and Perunica. In addition, three other Bohemian *Slavinka* species described from the Carnic Alps further support a very close palaeogeographic relation between both regions during the Ludfordian, Ludlow.

The genus *Praeostrea* (3 species) occurs in the Prague Basin from the Homeric, *Testograptus testis* Biozone up to the lower Lochkovian, Lower Devonian. Besides Perunica, the genus *Praeostrea* is also known from Lindener Mark (Kegel 1953) and Frankenwald (Heller 1925) in Germany, and from Sardinia (Kříž & Serpagli 1993). In the Carnic Alps *Praeostrea bohémica* Barrande, 1881 occurs in the lowermost Lochkovian of the Lower Devonian, and thus further demonstrates the close palaeogeographic relations of the Carnic Alps with Perunica during the early Lochkovian.

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