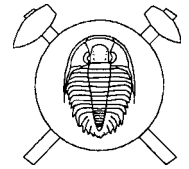


## Further new gastropods from the Early Devonian *Boucotonotus-Palaeozygopleura* Community of the Prague Basin



### Další noví gastropodi ze spodnosedevonského společenstva *Boucotonotus-Palaeozygopleura* pražské pánve (Czech summary)

(3 text-figs)

JIŘÍ FRÝDA

Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic, fryda@cgu.cz

In this short paper, further new gastropods from the Early Devonian *Boucotonotus-Palaeozygopleura* Community of the Prague Basin (Bohemia) are described. The discovery of *Kolihadiscus* in the uppermost part of the Třebotov Limestone shows that this genus extends across whole stratigraphic range of the *Boucotonotus-Palaeozygopleura* Community (i. e., from the lowermost Lochkovian to the uppermost Emsian). The Early Devonian genera *Paleuphemites* and *Prokopites* gen. nov., differing by distinct collabral ornamentation from all Carboniferous-Permian Euphemitidae, are placed in a new subfamily Paleuphemitinae. The discovery of a large non-planktotrophic protoconch in *Pragozyga* gen. nov. demonstrates that this new genus is a further member of the order Stylogastropoda. New taxa: *Kolihadiscus tureki tenuis* subsp. nov., Paleuphemitinae subfam. nov.; *Prokopites holynensis* gen. et sp. nov., and *Pragozyga costata* gen. et sp. nov.

**Key words:** Mollusca, Gastropoda, new taxa, Early Devonian, Prague Basin, Bohemia

### Introduction

This short paper brings a further contribution to the inventory of gastropods from the Early Devonian *Boucotonotus-Palaeozygopleura* Community of the Prague Basin (Bohemia). This work started in 1996 as a part of a project sponsored by the U. S. – Czechoslovak Science and Technology Joint Fund (Project Number 95057) and has focused mainly on the community analysis of the Bohemian Paleozoic gastropods. The unusually high biodiversity of the gastropod fauna belonging to the *Boucotonotus-Palaeozygopleura* Community has provided many new gastropod taxa (e. g., Horný 1955, 1963, 1964, 1992a, b; Frýda – Manda 1997; Frýda – Bandel 1997; Frýda 1998a, b, 1999). A monograph describing all gastropod species belonging to this gastropod community as well presenting an evaluation of their paleogeographic and stratigraphic distribution is under preparation. However, this work will require a long time and on-going work on Devonian gastropod faunas from other areas necessitates a comparison and discussion of some of these undescribed gastropods from the *Boucotonotus-Palaeozygopleura* Community. For this reason, some new gastropod taxa have been established in a series of short reports (Frýda – Manda 1997; Frýda – Bandel 1997; Frýda 1998a, b, 1999) before publication of the summarizing monograph. All the herein described specimens are deposited in the collection of Jiří Frýda, Czech Geological Survey, Prague.

### Systematic part

Subclass Uncertain

Family? Cyrtolitidae S. A. Miller, 1889

### Genus *Kolihadiscus* Horný, 1992

Type species: *Kolihadiscus tureki* Horný, 1992

**Remarks:** Genus *Kolihadiscus* is based on *Kolihadiscus tureki* Horný, 1992 from the Loděnice Limestone (Praha Formation, Pragian, middle Early Devonian) of the Prague Basin. Horný (1992) placed his new genus within the family Cyrtolitidae S. A. Miller, 1889 of the order Cyrtonegida Horný, 1965. According to the diagnosis given by Horný (1965), the Cyrtonegida are monoplacophora with “shell incompletely or completely coiled, non-septate, the position of apex and spire presumed to be anterior; the number of paired scars reduced in connection with long shell, the single pairs often specialized”. However, up till now, we have no information about the muscle scars in the genus *Kolihadiscus*, and its shell shape is found also among bellerophonitid gastropods. Thus, the higher systematic position of the genus *Kolihadiscus* is still questionable.

Horný (1992) based the description of his species on two specimens from the basal part of the Loděnice Limestone (Praha Formation, Pragian, middle Early Devonian) of the Prague Basin. Later, Frýda and Manda (1997) found a well-preserved shell of *Kolihadiscus tureki* (Figs 1D–G) within material from the *Monograptus uniformis*

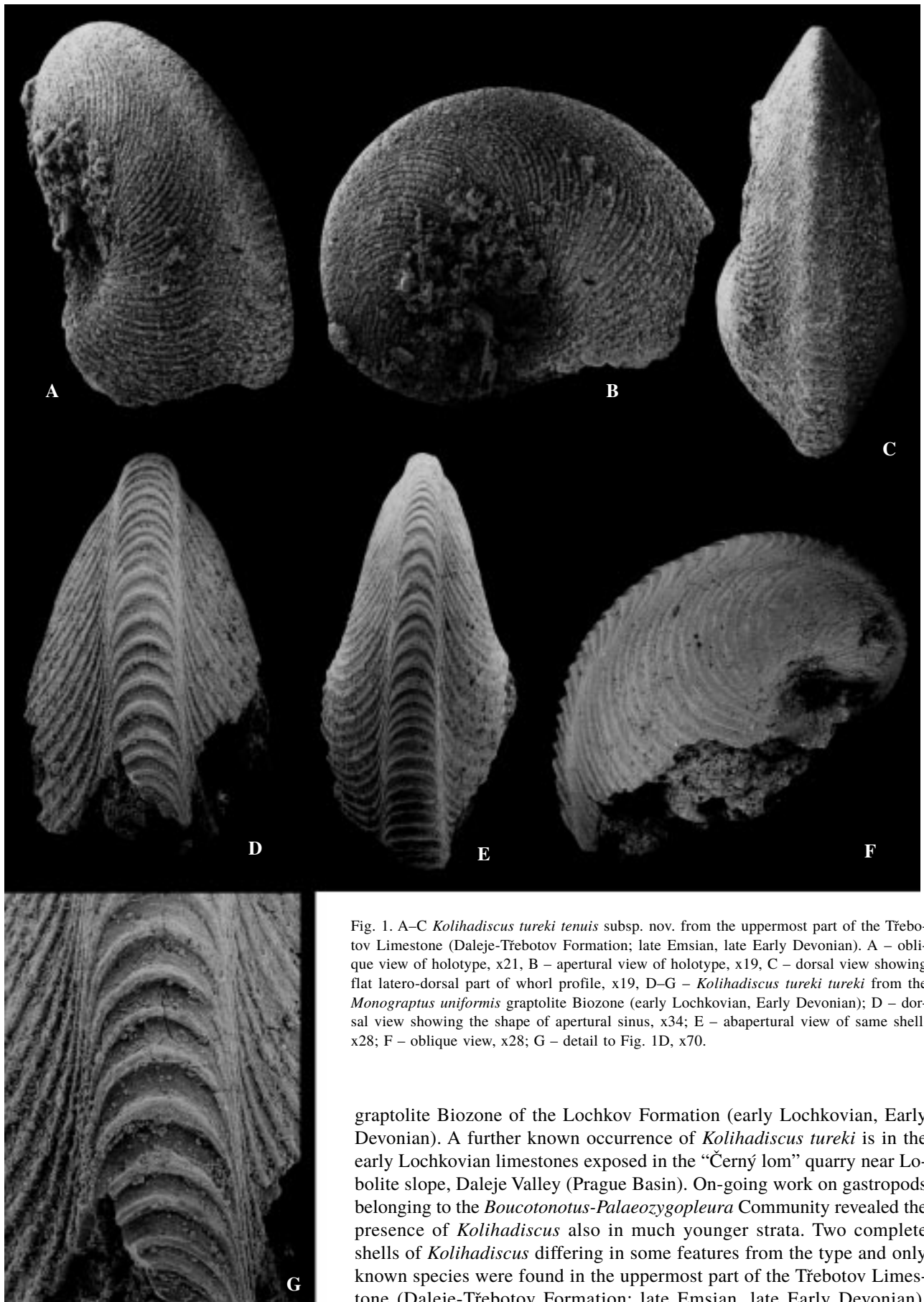


Fig. 1. A–C *Kolihadiscus tureki tenuis* subsp. nov. from the uppermost part of the Třebotov Limestone (Daleje-Třebotov Formation; late Emsian, late Early Devonian). A – oblique view of holotype, x21, B – apertural view of holotype, x19, C – dorsal view showing flat latero-dorsal part of whorl profile, x19, D–G – *Kolihadiscus tureki tureki* from the *Monograptus uniformis* graptolite Biozone (early Lochkovian, Early Devonian); D – dorsal view showing the shape of apertural sinus, x34; E – abapertural view of same shell, x28; F – oblique view, x28; G – detail to Fig. 1D, x70.

graptolite Biozone of the Lochkov Formation (early Lochkovian, Early Devonian). A further known occurrence of *Kolihadiscus tureki* is in the early Lochkovian limestones exposed in the “Černý lom” quarry near Lobolite slope, Daleje Valley (Prague Basin). On-going work on gastropods belonging to the *Boucotonotus-Palaeozygopleura* Community revealed the presence of *Kolihadiscus* also in much younger strata. Two complete shells of *Kolihadiscus* differing in some features from the type and only known species were found in the uppermost part of the Třebotov Limestone (Daleje-Třebotov Formation; late Emsian, late Early Devonian).

These shells are placed here in a new subspecies of *Kolihadiscus tureki* because of limited material as well as the poor knowledge of shell variability in *Kolihadiscus*. Only further study of additional material may provide evidence whether they represent an independent species or only a subspecies of *Kolihadiscus tureki*. The rarity of the *Kolihadiscus* does not allow one to solve these question now. The discovery of *Kolihadiscus* in the uppermost part of the Třebotov Limestone shows that the latter genus belongs to other gastropod taxa extended across whole stratigraphic range of the *Boucotonotus-Palaeozygopleura* Community, i. e. from the lowermost Lochkovian to the uppermost Emsian.

Included species:

*Kolihadiscus tureki tureki* Horný, 1992

– early Lochkovian–Pragian

*Kolihadiscus tureki tenuis* subsp. nov.

– latest Emsian

***Kolihadiscus tureki tenuis* subsp. nov.**

Text-fig. 1A–C

Holotype: Specimen ČGU JF 753, figured here in figs 1A–C.

Paratype: Specimen ČGU JF 754.

Type horizon: uppermost part of the Třebotov Limestone, Daleje-Třebotov Formation; late Emsian, late Early Devonian.

Type locality: Holyně near Prague, central Bohemia.

Etymology: *tenuis*, after its narrow shell.

**Diagnosis:** Subspecies of *Kolihadiscus tureki* with relatively narrower and slower expanding shell and wider umbilicus.

**Relationships:** *Kolihadiscus tureki tenuis* subsp. nov. differs by its relatively narrower and slower expanding shell from the type subspecies. All known shells of *Kolihadiscus tureki* from the Praha Formation (Pragian; see Horný 1992, pl. 4, figs 12–14) as well as those from the Lochkov Formation (see Frýda – Manda 1997, pl. 3, figs 3–7; herein Fig. 1D–G) have a considerably rounded shell dorsum on both sides of the dorsal crest. In contrast to these, the shells of *Kolihadiscus tureki tenuis* subsp. nov. from the uppermost part of the Třebotov Limestone (Daleje-Třebotov Formation; late Emsian) have an almost flat latero-dorsal part of the whorl profile which curves suddenly into the wide umbilicus at its most abaxial point. In dorsal view, the lateral sides of shell contain a much narrower angle in *Kolihadiscus tureki tenuis* subsp. nov. than those in *Kolihadiscus tureki tureki* because of the much slower whorl expansion rate in the first subspecies. The slower whorl expansion also causes wider umbilici in *Kolihadiscus tureki tenuis* subsp. nov.

**Material:** Only two complete shells are known.

Subclass Amphigastropoda

Superfamily Bellerophontoidea M'Coy, 1851

Family Euphemitidae Knight, 1956

Subfamily Paleuphemitinae subfam. nov.

**Diagnosis:** Members of the Euphemitidae with shells ornamented by distinct collabral ribs; outer apertural lip bearing very narrow sinus generating a pseudoselenizone.

**Remarks:** Horný (1962, 1963) placed his new genus *Paleuphemites* in the family Euphemitidae and showed that it represents the oldest known genus of this family. He also pointed out that the regular ribs ornamenting its shells resemble members of the subfamily Bellerophonitinae. Later, Horný (1992b) again stated that the wide open umbilicus and limited deposition of parietal inductura in *Paleuphemites* are unusual characters among the Euphemitidae. I agree with Horný (1963) that the shape of the outer apertural lip bearing a very narrow sinus generating a pseudoselenizone is a character strongly resembling Carboniferous–Permian Euphemitidae. On the other hand, *Paleuphemites* and *Prokopites* gen. nov. show some features of the Bellerophonitinae from which they probably originated as suggested by Horný (1963). Both of these Devonian genera, *Paleuphemites* and *Prokopites* gen. nov., differ by their distinct collabral ornamentation from all Carboniferous–Permian Euphemitidae, and are here placed in a new subfamily Paleuphemitinae in order to emphasize this difference. This subfamily is tentatively placed in Euphemitidae because of the close similarity of the apertural margin. However, at present it is impossible to determine whether they represent an ancestral group of the Carboniferous–Permian Euphemitidae or a quite independent offshoot of the Bellerophonitidae.

**Genera included:**

*Paleuphemites* Horný, 1962

*Prokopites* gen. nov.

***Prokopites* gen. nov.**

Type species: *Bellerophon (Bellerophon) chlupaci* Horný, 1963

Etymology: *Prokopites*, according to Prokop Valley near which both known species are derived.

**Diagnosis:** Genus of Paleuphemitinae with a narrow shell and flatly arched dorsum; lateral sides of whorl strongly arched into wide open umbilicus.

**Relationships:** The new genus *Prokopites* differs from the closely related genus *Paleuphemites* Horný, 1962 in its wide umbilicus and flatly arched dorsum. The type species of *Paleuphemites*, *Paleuphemites petrboki* Horný, 1962, has an umbilical area partly or completely filled with secondary shell deposits and its umbilicus is very narrow (Horný 1963, fig. 14b). In contrast to that, the shells of both known species of *Prokopites* gen. nov. have wide open umbilici (Horný 1963, pl. 38, fig. 3; herein fig. 2D). The shells of *Prokopites* are much narrower than those of *Paleuphemites*; the width/length ratio of the type species of *Prokopites* is about 0.8, but more than 1.0 in *Paleuphemites*. The much more involute whorls in *Paleuphemites* are broadly rounded forming so a subglobular shell (Horný 1963, pl. 43). On the other



Fig. 2. A–D. *Prokopites holynensis* sp. nov. from the uppermost part of the Třebotov Limestone (Daleje-Třebotov Formation, late Emsian, late Early Devonian). A – abapertural view showing flatly arched dorsum, x20; B – dorsal view of the same shell, x23; C – same view in different lighting showing the collabral ornamentation and narrow sinus forming the pseudoselenizone, x21; D – oblique view showing wide open umbilicus, x21.

hand, the shell in *Prokopites* is elongate with a flatly arched dorsum and lateral sides of whorls strongly arched into wide open umbilici (Horný 1963, pl. 38, figs 1–5; herein fig. 2). In addition, *Prokopites* has a relatively wider pseudoselenizone than *Paleuphemites*.

**Remarks:** The type species of *Prokopites*, *Prokopites chlupaci* (Horný, 1963), was originally established as a species of *Bellerophon* (*Bellerophon*). Nevertheless, Horný (1963, p. 129) noted that “this species distinguishes itself from the other species of the subgenus (i. e., *Bellerophon* (*Bellerophon*)) by very wide selenizone, short sinus and considerably long shell with strongly open umbilicus“. On the other hand, he did not note any

relationship to his new genus *Paleuphemites*. Later, Horný (1992) transferred *Bellerophon* (*Bellerophon*) *chlupaci* Horný, 1963 to his genus *Paleuphemites* on the basis of the discovery of additional shells. He found several shells showing parietal inductura with dense revolving striae (see fig. in Horný 1992). The presence of these striae has been considered by him as main reason for the transfer of this species from *Bellerophon* to *Paleuphemites*. On the other hand, Horný (1992) pointed out that the widely phaneroomphalous, narrow shells of *Bellerophon* (*Bellerophon*) *chlupaci* Horný, 1963 differ by this character from the type species of *Paleuphemites*. I agree with Horný (1992) that this species is much closer to *Paleu-*

*phemites* than to *Bellerophon*. However, the placement of *Bellerophon* (*B.*) *chlupaci* in a new genus seems to be a better solution which is supported by its different shell morphology as well as by the discovery of a new species with a similar shell morphology. The discovery of inductural deposits in *Bellerophon* (*B.*) *chlupaci*, which are formed by dense revolving striae, is not considered here to be important. Parietal inductura generating longitudinal (spiral) ribs which form a reticulate ornamentation with intersecting collabral ribs was recently also found in a new genus *Blodgettinotus* belonging to the subfamily Plectonotinae (Frýda 1999, this volume). These deposits are much more similar to those in *Paleuphemites petroboki* than to those in *Bellerophon* (*B.*) *chlupaci*. However, it is evident that the both genera, *Paleuphemites* and *Blodgettinotus*, are not closely related (Frýda 1999, this volume). Thus, the morphology of the secondary shell deposits has limited significance for the suprageneric classification of bellerophonoid molluscs.

#### Species included:

*Prokopites chlupaci* (Horný, 1963) – Pragian  
*Prokopites holynensis* sp. nov. – latest Emsian

#### *Prokopites holynensis* sp. nov.

Text-fig 2A–D

**Holotype:** Specimen ČGU JF 755, figured here as fig. 2A–D.

**Type horizon:** The uppermost part of the Třebotov Limestone, Daleje-Třebotov Formation; late Emsian, late Early Devonian.

**Type locality:** Holyně near Prague, central Bohemia.

**Etymology:** *holynensis* – after its occurrence near the village of Holyně.

**Diagnosis:** Species of *Prokopites* with the anterior margin of the aperture extending from the pseudoselenizone at an obtuse angle to the sides.

**Description:** Small, isostrophically coiled shell with flatly arched dorsum; lateral sides of whorls strongly arched onto wide, open umbilici; width of umbilicus about half of shell length; shell longer than wide; anterior margin of aperture bearing a short, narrow U-shaped sinus at its center which generates a pseudoselenizone (fig. 2B–D); width of pseudoselenizone about one tenth of dorsum width; anterior margin of aperture extending from pseudoselenizone at an obtuse angle to the sides; shell ornamentation consisting of regularly spaced, collabral ribs; distance between ribs about one half of pseudoselenizone width.

**Relationships:** *Prokopites holynensis* sp. nov. may be easily distinguished from the type species of *Prokopites*, *Prokopites chlupaci* (Horný, 1963), by the shape of its outer lip. The anterior margin of aperture extends from the pseudoselenizone at an obtuse angle of about 140 degree to the sides in *Prokopites holynensis*. On the other hand, the anterior margin of aperture is almost straight in *Prokopites chlupaci* (see Horný 1963, pl. 38, figs 1, 2, 4, 5).

**Remarks:** The shape of the outer lip in *Prokopites holynensis* sp. nov. resembles that of *Paleuphemites* sp. il-

lustrated by Blodgett et al. (1988) from the Emsian (late Early Devonian) of the Canadian Arctic Islands. The shell of the latter species is about twice as large as the shells of all other known species of *Paleuphemites* and *Prokopites*. In addition, it shows some shell features unknown in these genera like weak, but distinct spiral ornamentation. Nevertheless, I agree with Blodgett et al. (1988) that its placement in the genus *Paleuphemites* represents the best solution for this species among all known bellerophonoid genera.

#### Subclass Archaeogastropoda

Order Stylogastropoda Frýda & Bandel, 1997

Superfamily Loxonematoidea Koken, 1889

**Remarks:** Wenz (1938) placed the superfamily Loxonematoidea Koken, 1889 in the order Archaeogastropoda. In his concept, the families Loxonematidae, Coelostylidae, Spirostylidae, and Streptacididae were included in this superfamily. Knight et al. (1960) transferred the superfamily Loxonematoidea Koken, 1889 from the Archaeogastropoda to the Caenogastropoda Cox, 1959. They also considerably changed its family content. This superfamily, according to these authors, includes the families Loxonematidae Koken, 1889, Palaeozygopleuridae Horný, 1955, Pseudozygopleuridae Knight, 1930, and Zygopleuridae Wenz, 1938. Knight et al. (1960) also noted that “the Loxonematacea seem to have been closely related to the Murchisoniacea and probably were derived from them” despite the fact that they placed these superfamilies into different orders. This opinion on the position of the superfamily Loxonematoidea was also followed by Taylor – Sohl (1962), who again placed the families, Coelostylinidae Cossmann, 1909 and Spirostylidae Cossmann, 1909, into this superfamily. Licharew (1970) established within the superfamily Loxonematoidea a new family Cyclozygidae based on the Carboniferous genus *Cyclozyga* Knight, 1930. This author also suggested the placement of the Palaeozygopleuridae Horný, 1955, into the family Pseudozygopleuridae Knight, 1930 as a junior synonym. Later Golikov – Starobogatov (1975) placed the Loxonematoidea together with the superfamilies Aclidoidea Thiele, 1925, Pyramidelloidea Orbigny, 1840, and Nerineoidea Zittel, 1873 into the suborder Entomotaeniata Cossmann, 1896 of the order Heterostropha Fischer, 1884. They noted the same families within the superfamily Loxonematoidea as had been made by Taylor & Sohl (1962), thus without the family Cyclozygidae Licharew, 1970. Houbriek (1979) who revised the species of the deep water genus *Abyssochrysos* Tomlin, 1927 suggested that the family Abyssochrysidae Tomlin, 1927 belongs to the superfamily Loxonematoidea. The genus *Abyssochrysos* includes only two living species, *Abyssochrysos melanoides* Tomlin, 1927 and *Abyssochrysos melvili* (Schepman, 1909). Houbriek (1979) placed the family Abyssochrysidae in the Loxonematoidea because of similarities in their shell shape and ornamentation. Pon-

der and Waren (1988) considered the superfamily Loxonematoidea to belong together with other superfamilies of Paleozoic gastropods such as the Subulitoidea Lindstrom, 1884 and Murchisonoidea Koken, 1896 in the order Neotaenioglossa Haller, 1882 of the Caenogastropoda. According to these authors the superfamily Loxonematoidea includes the following families: Loxonematidae Koken, 1889, Palaeozygopleuridae Horný, 1955, Pseudozygopleuridae Knight, 1930, Zygopleuridae Wenz, 1938, Coelostylinidae Cossmann, 1909, Spirostylinidae Cossmann, 1909, Cyclozygidae Licharew, 1970, Velainellidae Vasseur, 1880, and questionably also the Alyssochrysidae Tomlin, 1927. Later, Bandel (1991) also discussed the higher taxonomic position of loxonematid gastropods and suggested that the Loxonematoidea represents a polyphyletic group. He placed the families Pseudozygopleuridae Knight, 1930, and Zygopleuridae Wenz, 1938, together with his new family Protorculidae into the newly established superfamily Zygopleuroidea of the order Ctenoglossa within the subclass Caenogastropoda Cox, 1959. In contrast, he tentatively placed the Loxonematidae together with his new family Polygyrinidae into the Mesogastropoda (=Caenogastropoda). Members of the Zygopleuroidea Bandel, 1991 (Pseudozygopleuridae Knight, 1930, Zygopleuridae Wenz, 1938, and Protorculidae Bandel, 1991) have larval shells or simplified shells that reflect lecithotrophic development. Frýda and Bandel (1997) found a large archaeogastropod-type protoconch in some Early Devonian members of the families Loxonematidae (*Katoptychia* and *Stylonema*) and Palaeozygopleuridae (*Palaeozygopleura*). For this reason, they placed these very slender, high-spired gastropods in the new order Stylogastropoda of the subclass Archaeogastropoda. Nützel (1997) discussed in detail the classification and evolutionary history of the order Ptenoglossa and he found that the superfamily Zygopleuroidea represents a parataxon. According to him, all known members of the Mesozoic Zygopleuridae have had planktotrophic larval development. On the other hand, members of the Carboniferous Pseudozygopleuridae are characterized by the presence of either planktotrophic or non-planktotrophic development. The large protoconchs of the Devonian Palaeozygopleuridae have been interpreted by Nützel (1997) to be clearly non-planktotrophic but the higher taxonomic position of this family was considered to be unclear. Nützel (1997) also suggested that the non-planktotrophic nature of the Palaeozygopleuridae may have resulted from their life in a deeper-water environment. On the other hand, Nützel noted the similarity of members of the Loxonematidae and species of the Heterostropha (Nützel 1997, p. 207).

In summary, I agree with Nützel (1997) that our knowledge of the protoconch morphologies in the pre-Carboniferous “loxonematoideans” is still very limited and the question of their higher taxonomic position(s) is also still open. On the other hand, the absence of a planktotrophic larval shell in all Devonian loxonematoideans with a well-preserved early shell (i. e., the Loxonemati-

dae and Palaeozygopleuridae) cannot be easily explained by their life in deeper-water environments as suggested by Nützel (1997). These gastropods are found in differing limestone facies deposited in variable depths including relatively shallow environments. An effort to find Devonian “loxonematoidean” gastropods with planktotrophic larval development (if they exist) has spurred my more intensive study of these gastropods in order to solve the question of whether they are Caenogastropoda with unusually large, non-planktotrophic larval shells or Archaeogastropoda with an unusual teleoconch shape. However, this study has not yet resulted in the discovery of any such “loxonematoideans”. On the other hand, another Devonian loxonematoidean genus with a large non-planktotrophic protoconch was found. The large protoconch of the herein described type species of *Pragozyga* gen. nov. is formed only by the first half of the whorl and has a diameter of slightly more than 0.35 mm. Thus, this new genus fits well in the concept of the Stylogastropoda. Nevertheless, my study of this problem continues and morphometric studies of all available Devonian “loxonematoideans” with preserved protoconchs from different geographic regions as well as differing marine environments is being prepared (Frýda and Blodgett, in prep.). Only such a detailed study may help to solve the question of their higher taxonomic position.

#### *Pragozyga* gen. nov.

Type species: *Pragozyga costata* sp. nov.; Praha Formation; Pragian, Early Devonian; Malá Chuchle; Prague Basin.

Etymology: The name *Pragozyga* was created by combining the geographic name Praga (= Prague) and word zyga.

Diagnosis: Small loxonematoidean gastropod shells with low and wide whorls; whorl profile strongly concave; sutures deep; shell ornamentation consisting of widely spaced collabral threads; threads orthocone to slightly opisthocyrt; aperture circular and shell base narrowly phaneromphalous; large protoconch formed only by first half of the whorl.

Relationships: In its general shell shape, *Pragozyga* gen. nov. is closest to the genus *Aulacostrepsis* Perner, 1907, among all known loxonematoidean genera. *Pragozyga* differs from the latter genus by its much more convex whorls, deeper sutures, smaller shell size and by its ornamentation. The genus *Aulacostrepsis* is based on the *Aulacostrepsis simplex* Perner, 1907 from the Koněprusy Limestone of the Praha Formation (Pragian, middle Early Devonian) and the shells of this species typically measure more than 5 cm. In contrast, the shells of *Pragozyga costata* sp. nov. are about ten times smaller. The shell of the latter species is ornamented by widely spaced, orthocone to slightly opisthocyrt collabral threads. On the other hand, the shell of *Aulacostrepsis simplex* is smooth and bears only widely spaced growth lines. Also, the only other known species of *Aulacostrepsis*, *Aulacostrepsis carinthiaca* Jhaveri, 1969, from the Emsian of Austria has a large, smooth

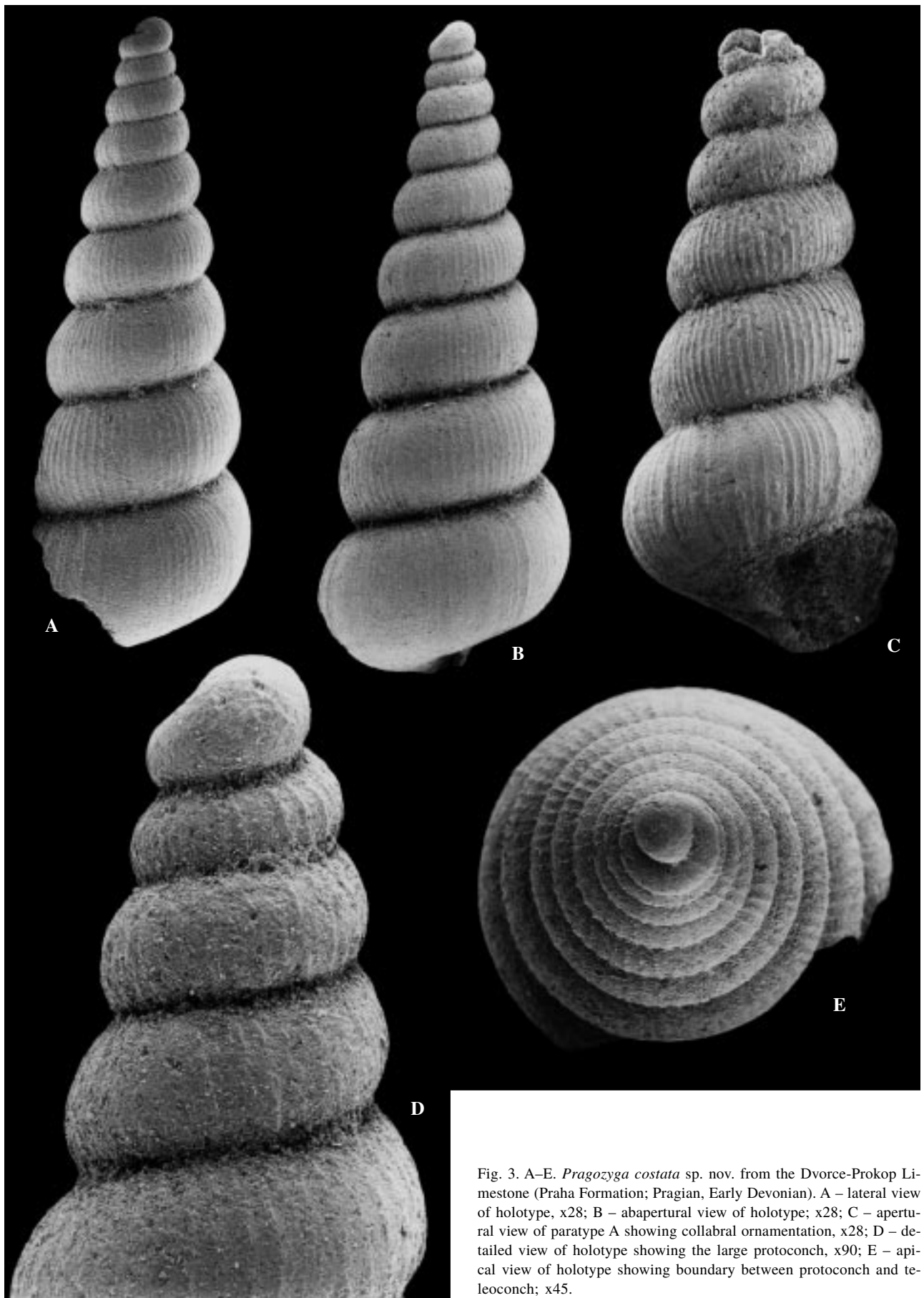


Fig. 3. A–E. *Pragozyga costata* sp. nov. from the Dvorce-Prokop Limestone (Praha Formation; Pragian, Early Devonian). A – lateral view of holotype, x28; B – abapertural view of holotype; x28; C – apertural view of paratype A showing collabral ornamentation, x28; D – detailed view of holotype showing the large protoconch, x90; E – apical view of holotype showing boundary between protoconch and teleoconch; x45.

shell. However, the shell of the latter species is sinistrally coiled in contrast to the type species and so its placement in genus *Aulacostrepsis* is not without problems. Nevertheless, the similarities in the general shell shape of both genera, *Aulacostrepsis* and *Pragozyga*, suggests that they represent closely related taxa. Unfortunately, the protoconch in both known species of *Aulacostrepsis* is unknown and without these data this relationship remains open. The shells of *Pragozyga costata* sp. nov. also resemble the species of *Palaeozygopleura* (the type genus of the family Palaeozygopleuridae) in their collabral ornamentation. The former genus may be easily distinguished from the latter by its low, strongly convex whorls. The whorls in *Pragozyga* meet in deep sutures where the whorl surfaces contain an angle less than 90 degrees. In contrast, the species of *Palaeozygopleura* have moderately convex whorls which are adpressed. This results in their shallow sutures where their whorl surfaces meet at an obtuse angle (e. g., Frýda and Bandel 1997, pls. 7–9). In addition, the shell base of *Palaeozygopleura* is anomphalous (see Frýda and Bandel 1997, pl. 7, fig. 6; pl. 8, fig. 4) in contrast to that of *Pragozyga*. The collabral ornamentation of *Pragozyga costata* is formed by widely spaced collabral threads in contrast to that in *Palaeozygopleura*.

**Remarks:** The family level position of *Pragozyga* gen. nov. within the superfamily Loxonematoidea is unclear. Knight et al. (1960) proposed to divide the Loxonematoidea into four families: Loxonematidae Koken, 1889; Palaeozygopleuridae Horný, 1955; Pseudozygopleuridae Knight, 1930; and Zygopleuridae Wenz, 1938. However, Frýda and Bandel (1997) showed that all undoubted members of the families Loxonematidae and Palaeozygopleuridae have a similar large protoconch consisting of less than one whorl which was interpreted as an archaeogastropod-type protoconch. On the other hand, the species of the Pseudozygopleuridae and Zygopleuridae are undoubted members of the subclass Caenogastropoda (e. g., Knight 1930, Bandel 1993, Nützel 1997). The protoconch morphology of *Pragozyga costata* sp. nov. fits well with that of the Loxonematidae and Palaeozygopleuridae. Frýda (1993) discussed the teleoconch characters which have been used to distinguish the families Loxonematidae and Palaeozygopleuridae and suggested that these characters can not be used for a reliable distinction of these two families. The fact that these families also have the same type of the protoconch, as shown by Frýda and Bandel (1997), evokes the necessity to emend the diagnoses of the both families. This opinion was recently also pointed out by Nützel (1997). The new Devonian genus *Pragozyga* is herein placed close to the genus *Aulacostrepsis* Perner, 1907 which is considered to be the most related generic taxon. However, this placement is complicated by the absence of data about the protoconch in the type species *Aulacostrepsis simplex* Perner, 1907. Both genera belong to the superfamily Loxonematoidea, but their placement within any family of Loxonematoidea is difficult to determine before emendation of its family-level classification.

**Species:** The Devonian genus *Pragozyga* n. gen. is established here as a monotypic genus.

***Pragozyga costata* sp. nov.**

Text-fig. 3A–E

**Holotype:** Specimen ČGU JF 756, figured here in fig. 3A, B, D, E. **Paratypes:** Specimens ČGU JF 757–769; paratype A figured here in fig. 3C.

**Type horizon:** Dvorce-Prokop Limestone, Praha Formation; Pragian, Early Devonian.

**Type locality:** Malá Chuchle, Praha - Hlubočepy.

**Etymology:** *costata*, after its shell ornamentation.

**Diagnosis:** Because of tentative monotypy, see that of genus.

**Description:** A small gastropod with a high-spired, dextrally coiled shell consisting of at least 10 whorls; shell sides straight; pleural angle about 22°; whorls low and wide; lateral sides of the whorl strongly concave; whorl surfaces meet in deep sutures at angle less than 90 degrees; lateral part of the outer whorl sides curves uniformly onto the basal part without any edge; shell base smooth, rounded and narrowly phanerocephalous; shell ornamentation consisting of widely spaced collabral threads; threads orthocone to slightly opisthocyrt; aperture circular; large protoconch formed only by first half of the whorl; protoconch smooth and its diameter is slightly more than 0.35 mm high; all whorls succeeding the protoconch are ornamented by collabral threads (Fig. 3D, E).

**Remarks:** *Pragozyga costata* sp. nov. is relatively rare species of the Pragian (middle Early Devonian) gastropod community and it is hitherto known only from its type locality Malá Chuchle, Praha-Hlubočepy as are *Ladamarekia miranda* Horný, 1992, *Chuchlina minuta* Frýda and Manda, 1997, *Paraliospira* (*Neoparaliospira*) *pragensis* Frýda, 1998, *Barroisocaulus* sp., and *Chuchleconus mandai* Frýda, 1998.

**Acknowledgments.** This publication is based on work sponsored by the U. S. – Czechoslovak Science and Technology Joint Fund in cooperation with the Czech Geological Survey and U. S. Geological Survey under Project Number 95057. I also wish to acknowledge Robert B. Blodgett (Corvallis, Oregon) for improving the use of English language herein and for his helpful, critical reviews of this paper.

Submitted October 1, 1999

**References**

- Bandel K. (1991): Über triassische "Loxonematoidea" und ihre Beziehungen zu rezenten und palaeozoischen Schnecken. – *Palaeontologische Zeitschrift*, 65, 3–4:239–268.
- (1993): Caenogastropoda during Mesozoic times. – *Scripta Geologica*, Spec. Issue 2: 7–56, Leiden.
- Blodgett, R. B. – Rohr, D. M. – Boucot, A. J. (1988): Lower Devonian gastropod biogeography of the Western Hemisphere, 281–294 (also 291a, b added as addendum later due to printer's error). In: *McMillan, N. J. – Embry, A. F. – Glass, D. J.* (eds.), *Devonian of the World*. Canadian Society of Petroleum Geologists Memoir 14, volume 3.



- Frýda, J. (1993): Oldest representative of the family Palaeozygopleuridae (Gastropoda) with notes on its higher taxonomy. – *Journal of Paleontology*, 67, 5, 822–827
- (1998a): Some new and better recognized Devonian gastropods from the Prague Basin (Bohemia). – *Věstník ÚÚG*, 73, 1, 41–49, Praha.
- (1998b): Some new and better recognized Devonian gastropods from the Prague Basin (Bohemia): part II. – *Věstník ÚÚG*, 73, 4, 355–363, Praha.
- (1999): Three new gastropod genera from the Early Devonian of Bohemia. – *Bulletin of the Czech Geological Survey*, 74, 1, 31–38.
- Frýda, J. – Mandel, K. (1997): New Early Devonian gastropods from the *Plectonotus* (*Boucotonotus*) – *Palaeozygopleura* Community in the Prague Basin (Bohemia). – *Mitteilungen aus dem Geologisch-Palaeontologischen Institut der Universität Hamburg*, 80:1–58.
- Frýda, J. – Mandel, K. (1997): A gastropod faunule from the *Monograptus uniformis* graptolite Biozone (Early Lochkovian, Early Devonian) in Bohemia. – *Mitteilungen aus dem Geologisch-Palaeontologischen Institut der Universität Hamburg*, 80:59–122.
- Golikov, A. N. – Starobogatov, Y. I. (1975): Systematics of prosobranch gastropods. – *Malacologia*, 15, 1:185–232.
- Horný, R. (1955): Palaeozygopleuridae nov. fam. (Gastropoda) ze stredočeského devonu. – *Sborník ÚÚG*:17–159.
- (1962): New genera of Bohemian Lower Paleozoic Bellerophontina. – *Věstník ÚÚG*, 37:473–476.
- (1963): Lower Paleozoic Bellerophontina (Gastropoda) of Bohemia. – *Sborník ÚÚG*, řada P, 2:57–164.
- (1964): New Lower Paleozoic gastropod genera of Bohemia (Mollusca). – *Časopis Národního Muzea, Řada přírodovědná*, 133 (4):211–216.
- (1965): O systematické příslušnosti měkkýše *Cyrtolites* Conrad, 1838 (Mollusca). – *Časopis Národního Muzea, Řada přírodovědná*, 134:8–10.
- (1992a): New Lower Devonian Gastropoda and *Tergomya* (Mollusca) of Bohemia. – *Časopis Národního Muzea, Řada přírodovědná*, 1–4:99–110.
- (1992b): Nové poznatky o rodu *Paleuphemites* (Gastropoda, Bellerophontina) – *Časopis Národního Muzea, Řada přírodovědná*, 160:99–100.
- Houbriek, R. S. (1979): Classification and systematic relationships of the Abyssochrysidae, a relict family of bathyal snails (Prosobranchia: Gastropoda). – *Smithsonian contributions to zoology*, 290:1–21.
- Jhaveri, R. B. (1969): Unterdevonische Gastropoden aus den Karnischen Alpen. – *Palaeontographica*, Abteilung A, 133:146–175.
- Knight, J. B. (1930): The gastropods of the St. Louis, Mo., Pennsylvanian outlier. The Pseudozygopleurinae. – *Journal of Paleontology*, 4:1–88.
- (1956): New families of Gastropoda. – *Washington Academy of Sciences Journal*, 46:41–42.
- Knight, J. B. – Batten, R. L. – Yochelson, E. L. (1960): Systematic descriptions, p. I169–I310. In: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology, Part I, Mollusca* 1. Geological Society of America and Kansas University Press, Lawrence.
- Koken, E. (1889): Über die Entwicklung der Gastropoden vom Cambrium bis zur Trias. – *Neues Jahrbuch für Mineralogie, Geologie und Palaeontologie*, 6:305–484.
- Likharev, B. K. (1970): K sistematike pozdnepaleozojskikh Loxonematacea (Gastropoda). – *Paleontologicheskij Zhurnal*, 3:48–55.
- Nützel, A. (1997): Über die Stammesgeschichte der Ptenoglossa (Gastropoda). – *Berliner geowissenschaftliche Abhandlungen*, E, 26:229 pp.
- Perner, J. (1903–1911): In: J. Barrande, *Systeme silurien du centre de la Boheme*. IV, Gasteropodes. Prague.
- Ponder, W. F. – Waren, A. (1988): Classification of the Caenogastropoda and Heterostropha – a list of the family-group names and higher taxa. 288–326. In: W. F. Ponder: *Prosobranch Phylogeny*, *Malacological Review Supplement*.
- Taylor, D. W. – Sohl, N. F. (1962): An outline of gastropod classification. – *Malacologia*, 1, 1:7–32.
- Wenz, W. (1939–1943): *Gastropoda*, *Handbuch der Palaeozoologie*, 1–6, 1–1639. O. H. Schindewolf.

### Další noví gastropodi ze spodnodevonského společenstva *Boucotonotus-Palaeozygopleura* pražské pánve

V této krátké zprávě jsou popsáni další gastropodi patřící ke spodnodevonskému společenství *Boucotonotus-Palaeozygopleura* pražské pánve. Nález schráněk rodu *Kolihadiscus* v nejvyšší části třebotovských vápenců dokládá, že tento rod je rozšířen v celém stratigrafickém rozsahu společenstva *Boucotonotus-Palaeozygopleura* (od nejspodnějšího lochkovu do nejvyššího emsu). Spodnodevonské rody *Paleuphemites* and *Prokopites* gen. nov. lišící se zřetelnou collabrální ozdobou od všech karbonských a permských zástupců čeledi Euphemitidae jsou umístěny do nové podčeledi Paleuphemitinae. Objev velké, neplanktotrofní protokonchy u nového rodu *Pragozyga* dokazuje, že tento rod je dalším zástupcem taxonu Stylogastropoda. Nové taxony: *Kolihadiscus tureki tenuis* subsp. nov., Paleuphemitinae subfam. nov.; *Prokopites holynensis* gen. et sp. nov., and *Pragozyga costata* gen. et sp. nov.

