

Ammonite fauna of subfamily *Harpoceratinae* NEUMAYR, 1875 from Jurassic Janovky and Adnet formations in the Veľká Fatra Mts. (Central Slovakia)

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Abstract

The abundant ammonite fauna from the collection of Slovak National Museum in Martin – the Andrej Kmet Museum, from the Veľká Fatra Mts., especially of the *Harpoceratinae* subfamily is discussed. The stone core of ammonites comes from the Janovky and Adnet formations of Liassic sequence of the Križna nappe. Due to the poor preservation, only limited number of individuals was distinguished: *Fucinicerias compressum*, *Fucinicerias cornacaldense*, *Fucinicerias lavinianum*, *Fucinicerias* sp., *Harpoceras* cf. *elegans*, *Harpoceras* sp. cf. *eseri*, *Harpoceras falcifer*, *Harpoceras pseudoserpentinum*, *Harpoceras exaratum*, *Harpoceras* cf. *falcifer*, *Harpoceras* sp., *Micropolyplectus* sp., *Polyplectus discoides*, *Protogrammoceras incertum* and *Protogrammoceras normanianum*. This ammonite fauna indicates the Late Pliensbachian – Late Toarcian time span.

Key words: *Harpoceratinae*, ammonite fauna, Lower Jurassic, the Veľká Fatra Mts.

Introduction

The occurrence of the Ammonitico Rosso facies in the Veľká Fatra Mts. is associated with the Adnet Formation of Liassic age. Rich ammonite fauna from the Adnet Fm. in this mountain range was found around the 1850s (Hauer, 1855; Štúr, 1859, 1868) and sporadically also in 20th century (Andrusov, 1931; Rakús, 1964; Peržel, 1967). Current results come from Bendík (2000, 2001, 2004a, b, 2005a, b, 2008, 2010, 2011), as well as Kováč and Bendík (2002). Adnet Fm. in the Veľká Fatra Mts. is built by the micritic pink/red limestones (in the lowermost part), the light red/brick red massive nodular limestones with layers of micritic and marly limestones (middle part) and by the dark red marly limestones and marls (in the upper part), terminating with 2 cm thick condensed layer with small stromatolites. Stratigraphic range of Adnet Fm. in the Veľká Fatra Mts. is Upper Sinemurian–Upper Toarcian. The Janovky Formation is represented by the Lower Jurassic (Sinemurian–Toarcian) hemipelagic micritic spotted marly limestones – marlstones with intensive bioturbation (Šimo, 2011). Studied ammonite fauna from this formation is present only in locality Skladaná skala.

Localities, faunistic composition, stratigraphy

Collection of ammonite fauna of the subfamily *Harpoceratinae* comes from Nolčovo, Rovné, Turecká, Úplaz and Skladaná skala localities in the Veľká Fatra Mts. (Fig. 1). The ammonites occur in *ex situ* (localities

Rovné and Skladaná skala), but mainly *in situ* position. Faunistic composition of the subfamily *Harpoceratinae* encompasses the species *Protogrammoceras incertum* (MONESTIER), *Protogrammoceras normanianum* (D'ORBIGNY), *Fucinicerias compressum* (MONESTIER), *Fucinicerias cornacaldense* (TAUSCH), *Fucinicerias lavinianum* (FUCINI), *Harpoceras* cf. *elegans* (SOWERBY), *Harpoceras* sp. cf. *eseri* (OPPEL), *Harpoceras falcifer* (SOWERBY), *Harpoceras pseudoserpentinum* GABILLY, *Harpoceras exaratum* YOUNG & BIRD, *Harpoceras* cf. *falcifer* (SOWERBY), *Polyplectus discoides* (ZIETEN) and the more precisely undetermined genera *Harpoceras* sp., *Fucinicerias* sp. and *Micropolyplectus* sp..

Stratigraphical range of this subfamily in the Veľká Fatra Mts. is from the Late Pliensbachian (Margaritatus Biozone) to Late Toarcian (Variabilis Biozone) (Bendík, 2005a). Only four ammonite biozones (Margaritatus, Falcifer, Variabilis and Thourasense) are present here.

The Domerian Margaritatus biozone in the wide content could be proved by *Protogrammoceras normanianum* (D'ORBIGNY), *Protogrammoceras incertum* (MONESTIER), *Fucinicerias compressum* (MONESTIER), *Fucinicerias lavinianum* (FUCINI) and *Fucinicerias cornacaldense* (TAUSCH) (for Margaritatus/Cornacaldense Subzone, Bendík, 2005a).

The Early Toarcian Falcifer Biozone is indicated by the index species *Harpoceras falcifer* (SOWERBY), *Harpoceras exaratum* YOUNG & BIRD, *Harpoceras pseudoserpentinum* GABILLY (Pseudoserpentinum Subzone), *Harpoceras* cf. *falcifer* (SOWERBY), *Harpoceras* cf. *elegans* (SOWERBY).

The Late Toarcian ammonite biozones are represented by *Polyplectus discoides* (ZIETEN) from Variabilis Biozone and *Harpoceras* sp. cf. *eseri* (OPPEL) from Thouarsense Biozone.

All ammonites described herein are deposited in the Slovak National Museum in Martin – Andrej Kmet Museum. Majority of them were obtained by Dr. M. Rakús and Dr. M. Peržel in the 1960s.

Systematic part

Harpoceratinae NEUMAYR, 1875

Protogrammoceras SPATH, 1913

Protogrammoceras normanianum (D'ORBIGNY, 1844)

Tab. 1, Fig. a–d

1844 *Ammonites normanianus* D'ORBIGNY, pp. 291–292, Tab. 88 ex Fischer, 1975, p. 58

1964 *Protogrammoceras* cf. *normanianum* (D'ORBIGNY) – Rakús, p. 139, Tab. 22, Fig. 2, Tab. 25, Fig. 2

1975 *Protogrammoceras normanianum* (D'ORBIGNY) – Fischer, p. 58, Tab. 1, Figs. 1–3

1976 *Protogrammoceras normanianum* (D'ORBIGNY) – Schlegelmilch, p. 82, Tab. 41, Fig. 9

Material: Three, relatively well preserved fragments of stone cores. First specimen is mechanically damaged in the central umbilical and ventral parts. Surface of the stone core is affected with solution, but the ribbing is preserved. Keel is destroyed. Second specimen is better preserved with maintained coiling, ribbing, keel, but with a damaged umbilical part. Third specimen was partly damaged during preparation. Ribbing is partly damaged by corrosion, analogically to ventral part of the last whorl.

Remarks: Planispiral, convolute shell. Whorl coiling is slow and constant, height of the last whorl is increasing

faster. The whorl section is oval – moderate ellipsoidal, lateral part is flattened. Ribbing is rather fine, sigmoidal (falcated), starting on umbilical edge, ending on ventral part under the keel (in the keel depression). On ventrolateral side, the secondary sinusoidal ribbings are developed. Ventral part is moderate accurate with similar, nerveless keel. Umbilikus is wide and shallow.

Comparison: *P. normanianum* (D'ORBIGNY) has the whorl section more oval as other species of *Protogrammoceras*, but lateral sides are more flattened and acute fall on ventrolateral side to keel (Tab. 1d). Ribbing of *P. normanianum* (D'ORBIGNY) is situated in radial plane, as in other species, the upper part of sinusoidal ribbing is moved to back. Similar course of ribbing have *P. costicillatum* (FUCINI), but in the lower part there are situated singular secondary fine ribs (Fischer, 1975).

Locality: Two specimens come from Rovné locality (*ex situ*), third from Úplaz (bed n. 52/53).

Stratigraphic range: Upper Pliensbachian, Lower Domerian, Margaritatus Biozone.

Museum number: Acc. n. 25/2005 (reg. n. PZ-118), acc. n. 259/2005 (reg. n. PZ-353), acc. n. 92/2006 (reg. n. PZ-497).

Protogrammoceras incertum (MONESTIER, 1934)

Tab. 2, Fig. a

1934 *Grammoceras capillosum* MONESTIER, p. 40, Tab. 1, Figs. 17 and 18 ex Fischer, 1975, p. 61

1975 *Protogrammoceras incertum* (MONESTIER) – Fischer, p. 61, Tab. 1, Figs. 4–6

1976 *Protogrammoceras incertum* (MONESTIER) – Schlegelmilch, p. 82, Tab. 42, Fig. 2

Material: One preserved stone core, partly corroded on one lateral side. Ribbing and keel are well preserved, but are conspicuous on the last whorl.

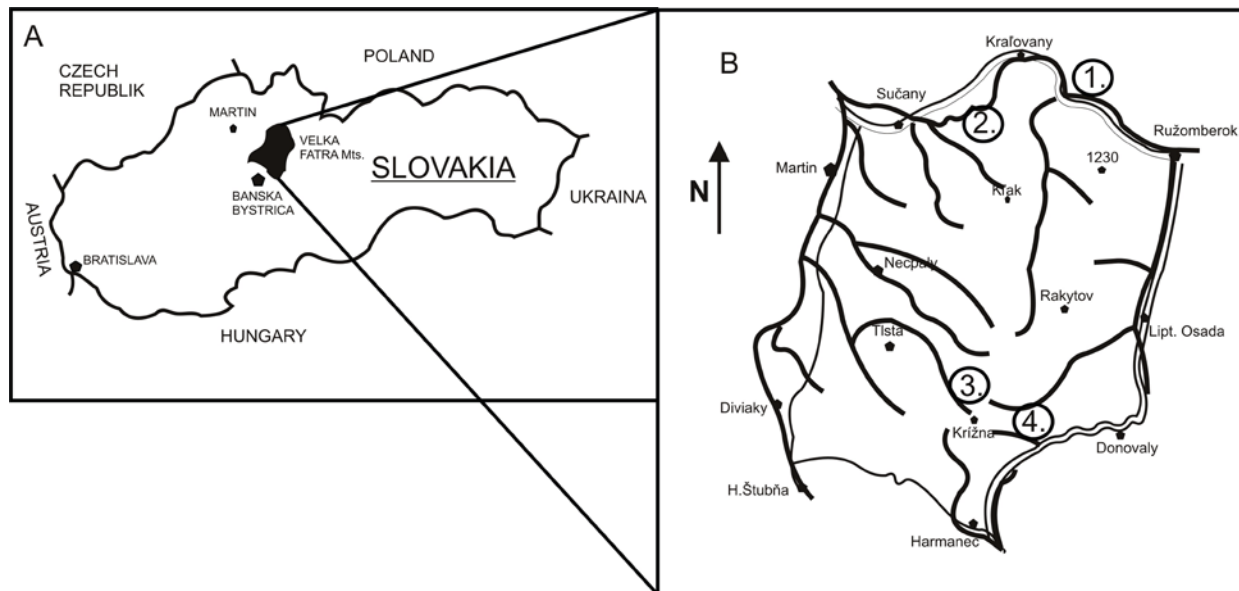


Fig. 1. Situation map of localities. 1 – Skladaná skala; 2 – Nolčovo; 3 – Rovné and Úplaz; 4 – Turecká.

Remarks: Evolute, serpenticone flattened small shell. Whorl section is oval. Last whorl increases faster, but constantly, to double height of anterior whorl. Ribbing is finer, rather dense, sinusoidal to falcate, turns convex on ventral side. Keel is fine, similar, tricarinate – bisulcate. Umbilikus is small and shallow, include 40 % from diameter of the shell.

Comparison: *P. incertum* (MONESTIER) have generally small sizes with dense fine ribbing. Lateral sides turn to keel, in contrast to other species of *Protogrammoceras*. *P. kurrianum* (OPPEL) it is similar, but these species have more dense ribbing as *P. incertum*, and proportion of width and height of whorl is bigger.

Locality: Rovné, *ex situ*.

Stratigraphic range: Upper Pliensbachian, Lower Domerian, Margaritatus Biozone.

Museum number: Acc. n. 258/2005 (reg. n. PZ-352).

***Fucinieras* Haas, 1913**

***Fucinieras cornacaldense* (TAUSCH, 1890)**

Tab. 2, Fig. c

1890 *Harpoceras Cornacaldense* n. f. TAUSCH, p. 36, Tab. 1, Fig. 1a–d ex Wiedenmayer, 1977, p. 102

1977 *Fucinieras cornacaldense* (TAUSCH) – Wiedenmayer, p. 102, Tab. 18, Figs. 1–9

1980 *Fucinieras cornacaldense* (TAUSCH) – Wiedenmayer, p. 83, Tab. 10, Fig. 9

1991 *Fucinieras* gr. *cornacaldense* (TAUSCH) – Blau & Meister, p. 182, Tab. 6, Figs. 12–17

1996 *Fucinieras cornacaldense* (TAUSCH) – El Hariri, Dommergues, Meister, Souhel & Chafiki, p. 564, Tab. 70, Figs. 8–14

1998 *Fucinieras* gr. *cornacaldense* (TAUSCH) – Géczy & Meister, p. 113, Tab. 13, Figs. 6, 10 and 11

2006 *Fucinieras cornacaldense* (TAUSCH) – Caracuel, Sandoval, Martín-Martín, Estévez-Rubio & Martín-Rojas, Fig. 4C

Material: Two relatively well preserved (one incomplete) stone cores with preserved ribbing, coiling and ventral side with keel. Lateral sides of specimens are damaged by solution.

Remarks: Evolute, planispiral shell. Coiling is slow, last whorl increases to double as anterior. Cross section of the whorl is elliptical – oval. Ribbing is mild, but massive, sinusoidal, on ventral side it is prorsiradiate, under umbilical edge rursiradiate. Umbilikus is relative wide and shallow. Keel is massive, similar, tricarinate – bisulcate.

Comparison: For *F. cornacaldense* there is characteristic the dense, relative fine ribbing and more evolute shell as in other species of *Fucinieras*. Whorl is in own high tolerably narrow. Other species *Fucinieras* on the research localities have smaller shells as *F. cornacaldense*, alike the keel is more strong as other *Fucinieras*. In contrast to *F. lavinianum* (FUCINI), the ribbing of *F. cornacaldense* is no more sinuinsoidal, in radial line standing in the front direction.

Locality: Úplaz, Rovné, *ex situ*.

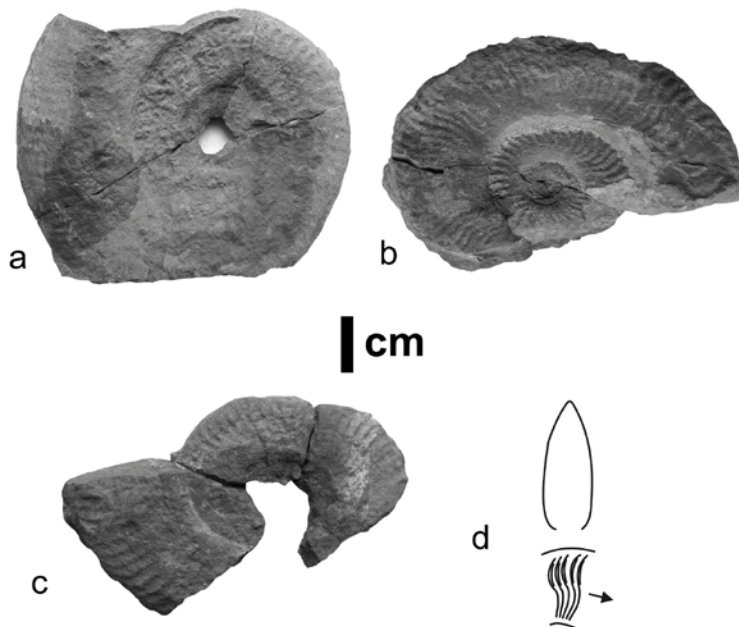
Stratigraphical range: Upper Pliensbachian, Lower Domerian, Margaritatus Biozone, Subnodusus subzone.

Museum number: Acc. n. 257/2005 (reg. n. PZ-351), acc. n. 39/2006 (reg. n. PZ-444).

***Fucinieras compressum* (Monestier, 1934)**

Tab. 2, Fig. b

1934 *Arietoceras compressum* MONESTIER, pp. 51–52, Tab. 8, Figs. 20–23 ex Fischer, 1975, p. 74



Tab. 1. *Protogrammoceras normanianum* (D'ORBIGNY), loc. Rovné, *ex situ*. From collection of SNM in Martin, Andrej Kmeť Museum: acc. n. 259/2005 (reg. n. PZ-353) – a; acc. n. 92/2006 (reg. n. PZ-497) – b; acc. n. 25/2005 (reg. n. PZ-118) – c, d. Photo by Bendík, 2012.

- 1975 *Fuciniceras compressum* (MONESTIER) – Fischer, Tab. 2, Figs. 13 and 14
 1976 *Fuciniceras compressum* (MONESTIER) – Schlegelmilch, Tab. 41, Fig. 6
 1977 *Fuciniceras compressum* (MONESTIER) – Urlichs, Tab. 2, Fig. 9

Material: One complete stone core, partly deformed (compressed) with preserved fine ribbing and nerveless keel.

Remarks: Small evolute, serpentine shell. Coiling is slow, last whorl increases relatively quickly, to overlay anterior whorl. Whorl cross-section is oval. Ribbing is fine, sinusoidal, prorsiradiate, ending under keel. Keel is similar, massive, tricarinate – bisulcate. Umbilikus is rather narrow and shallow.

Comparison: *F. compressum* has small shell and rather less number of ribs (more fine, but not as dense) in contrast to *F. cornacaldense* and *F. lavinianum* (Tab. 2b, e). Keel and keel furrow are not massive as in *F. cornacaldense*.

Locality: Rovné, *ex situ*.

Stratigraphic range: Upper Pliensbachian, Lower Domerian, biozone Margaritatus.

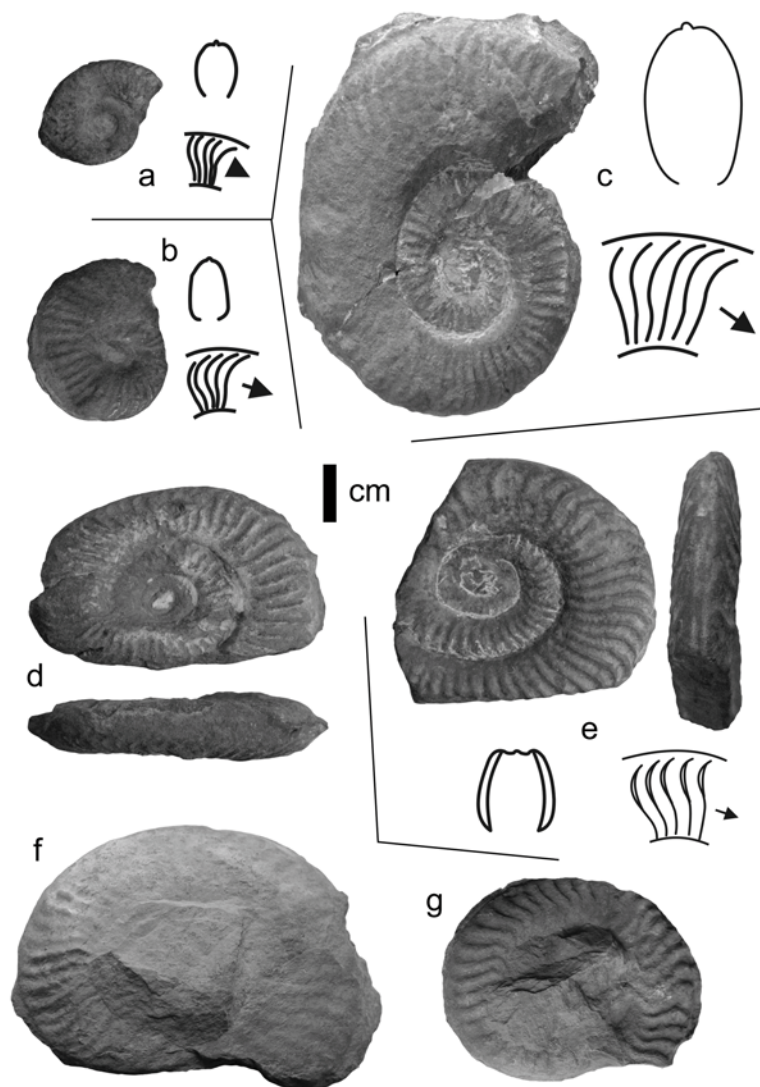
Museum number: Aacc. n. 260/2005 (reg. n. PZ-354).

***Fuciniceras lavinianum* (FUCINI, 1900)**

Tab. 2, Figs. d, e

1900 *Grammoceras portisi* FUCINI, Tab. 9, Figs. 1–3 *ex Blau & Meister, 1991, p. 182*

1980 *Fuciniceras lavinianum* (FUCINI) *coniungens* (FUCINI) – Wiedenmayer, Tab. 10, Figs. 14 and 15



Tab. 2. *Protogrammoceras incertum* (MONESTIER), loc. Rovné, *ex situ*, acc. n. 258/2005 (reg. n. PZ-352) – a; *Fuciniceras compressum* (MONESTIER), loc. Rovné, *ex situ*, acc. n. 260/2005 (reg. n. PZ-354) – b; *Fuciniceras cornacaldense* (TAUSCH), loc. Rovné, *ex situ*, acc. n. 257/2005 (reg. n. PZ-351) – c; *Fuciniceras lavinianum* (FUCINI), loc. Rovné, *ex situ*, acc. n. 256/2005 (reg. n. PZ-350) – d; *Fuciniceras lavinianum* (FUCINI), loc. Úplaz, *ex situ*, acc. n. 40/2006 (reg. n. PZ-445) – e; *Fuciniceras* sp., loc. Úplaz (layer n. 64), acc. n. 37-38/2005 (reg. n. PZ-442-443) – f, g. From collection of SNM in Martin, Andrej Kmeť Museum. Photo by Bendík, 2012.

- 1991 *Fucinicer* gr. *lavinianum* (FUCINI) – Blau & Meister, Tab. 5, Fig. 23, Tab. 6, Figs. 5–11, 14
 1993 *Fucinicer* gr. *lavinianum* (FUCINI) – Jaksch, Tab. 2, Figs. 5 and 6
 1997 *Fucinicer* *lavinianum* (FUCINI) – Dommergues, Meister & Schirolli, Tab. 2, Figs. 4 and 29
 1998 *Fucinicer* gr. *lavinianum* (FUCINI) – portisi (FUCINI) – Géczy & Meister, Tab. 8, Figs. 1–11
 2002 *Fucinicer* *lavinianum* (FUCINI) – Faraoni, Marini, Pallini & Venturi, Tab. 4, Fig. 3, Tab. 5, Figs. 1 and 2

Material: Two well preserved, partly damaged/deformed stone cores. Ribbing and keel are well preserved on last two whorls.

Remarks: Evolute, planispiral shell. Coiling is consistent, without marked changes, last whorl increases faster. Whorl cross-section is oval to quadrate, height of whorl is bigger than width. Lateral sides are partly bulging. Ribbing is strong, sinusoidal, prorsiradiate (retroverse), on ventrolateral side edge are turned to aperture of shell. Umbilikus is wide and narrow. Keel is similar and massive, tricarinate – bisulcate.

Comparison: *F. lavinianum* ribbing on ventrolateral edge more intensively turns to aperture and is not as dense as in *F. cornacaldense*. In contrast to *F. cornacaldense* the shell is less evolute and on lateral sides less bulging than in *F. lavinianum*.

Locality: Rovné and Úplaz, *ex situ*.

Stratigraphic range: Upper Pliensbachian, Lower Domerian, Margaritatus Biozone.

Museum number: Acc. n. 256/2005 (reg. n. PZ-350), acc. n. 40/2006 (reg. n. PZ-445).

***Fucinicer* sp.**

Tab. 2, Figs. f, g

Material: Four incomplete, mechanically damaged stone cores affected by solution. Accurate determination is impossible.

Remarks: Evolute, serpenticonic stone core. Coiling is consistent, last whorl grows faster. Whorl cross-section is oval, partly elliptical. Ribbing is strong, sinusoidal, prorsiradiate, typical for genus *Fucinicer*. Umbilikus is wide and narrow, like to *F. lavinianum*. Keel is damaged, on viewable part it is tricarinate – bisulcate.

Locality: Úplaz (bed n. 64), Rovné, 3 pieces (*ex situ*).

Stratigraphic range: Upper Pliensbachian, Lower Domerian, Margaritatus Biozone.

Museum number: Acc. n. 27/2005 (reg. n. PZ-120), acc. n. 255/2005 (reg. n. PZ-349), acc. n. 37-38/2005 (reg. n. PZ-442-443).

***Harpoceras* WAAGEN, 1869
Harpoceras falcifer (SOWERBY)**

Tab. 3, Figs. a–h

- 1822 *Ammonites falcifer* – SOWERBY, Tab. 254, Fig. 2
 1961 *Harpoceras falcifer* (SOWERBY) – Dean, Donovan, Howart, Pl. 72, Fig. 3

- 1964 *Harpoceras falcifer* (SOWERBY) – Rakús, p. 137, Tab. 23, Fig. 1
 1968 *Harpoceras falciferum* (SOWERBY) – Sapunov, Pl. 1, Fig. 2a–c
 1976 *Harpoceras falcifer* (SOWERBY) – Schlegelmilch, Tab. 45, Fig. 4
 1977 *Harpoceras falcifer* (SOWERBY) – Nicosia & Pallini, Pl. 1, Fig. 7
 1997 *Harpoceras falciferum* (SOWERBY) – Metodiev, pp. 14–15, Tab. 1, Fig. 8
 2001 *Harpoceras* (*Harpoceras*) *falciferum* (SOWERBY) – Rulleau & Elmi, Pl. 6, Fig. 1
 2002 *Harpoceras falciferum* (SOWERBY) – Bécaud, Pl. 5, Figs. 1–3
 2002 *Harpoceras falciferum* (SOWERBY) – Neige & Rouget, pp. 769–770, Fig. 3
 2008 *Harpoceras falciferum* (SOWERBY) – Metodiev, Fig. 3d–h
 2009 *Harpoceras* ex gr. *falciferum* (SOWERBY) – Myczynsky, Jach, Fig. 5D–F

Material: Eleven specimens. Six more or less complete stone cores from the grey marly spotted limestones (Allgäu Fm.), strongly deformed (flattened) with preserved coiling, ribbing, umbilikus and keel. Other five, hosted by ammonitico rosso limestones (Adnet Fm.), are preserved only in incomplete fragments or impression of ribbing (last whorl).

Remarks: Planispiral, partly involuted shell. The last whorl is increasing faster, it is two/two and a half times higher as the previous whorl. Whorl cross-section is lanceolated (in these specimens not preserved due to deformation), with partly convex lateral sides and coarser on ventrolateral side. Ribbing is very fine, falcoid. Lateral side reaches the edge of the ventral side (keel). Keel edge is simple and bold. Umbilikus is relatively narrow and deeper with stronger umbilical edge.

Comparison: Found exemplars are typical representatives for *Harpoceras falcifer* (SOWERBY).

Locality: Rovné and Skladaná skala (*ex situ*).

Stratigraphic range: Lower Toarcian, Falcifer Biozone (species zone).

Museum number: Acc. n. 47-51/2006 (reg. n. PZ-452-456), acc. n. 61-65/2011 (reg. n. PZ-742-744), acc. n. 70/2011 (reg. n. PZ-751).

***Harpoceras pseudoserpentinum* GABILLY, 1976**

Tab. 4, Figs. d, e

- 1976 *Harpoceras* (*Harpoceras*) *pseudoserpentinum* GABILLY – Pl. 6, Figs. 1 and 2, Pl. 7, Figs. 1–5, Pl. 8, Fig. 1, Pl. 9, Figs. 1 and 2
 2002 *Harpoceras pseudoserpentinum* GABILLY – Bécaud, Pl. 3, Figs. 2 and 3

Material: Two well preserved stone cores (positive and negative) manifesting strong deformation (flattening). Preserved is coiling with ribbing and keel.

Remarks: Planispiral, partly involuted shell. The last whorl

is increasing quickly, reaching the height of the previous whorl two/two and half times. Whorl cross-section is lanceolate (in these specimens not preserved due to deformation). Ribbing is very fine, sinusoidal, falcoid. Lateral side proceeds to the sharp edge of the ventral side (keel). Keel edge is simple and bold. Umbilikus is relatively narrow and shallow.

Comparison: In preserved individuals the whorl cross-section does not allow comparison between species. Ribbing of *H. pseudoserpentinum* is finer (more ribs per whorl) and falcoid as in *H. alternatum* (SIMPSON) and/or *H. exaratum* (YOUNG & BIRD).

Locality: Skladaná skala (*ex situ*).

Stratigraphic range: Lower Toarcian, Falcifer Biozone.

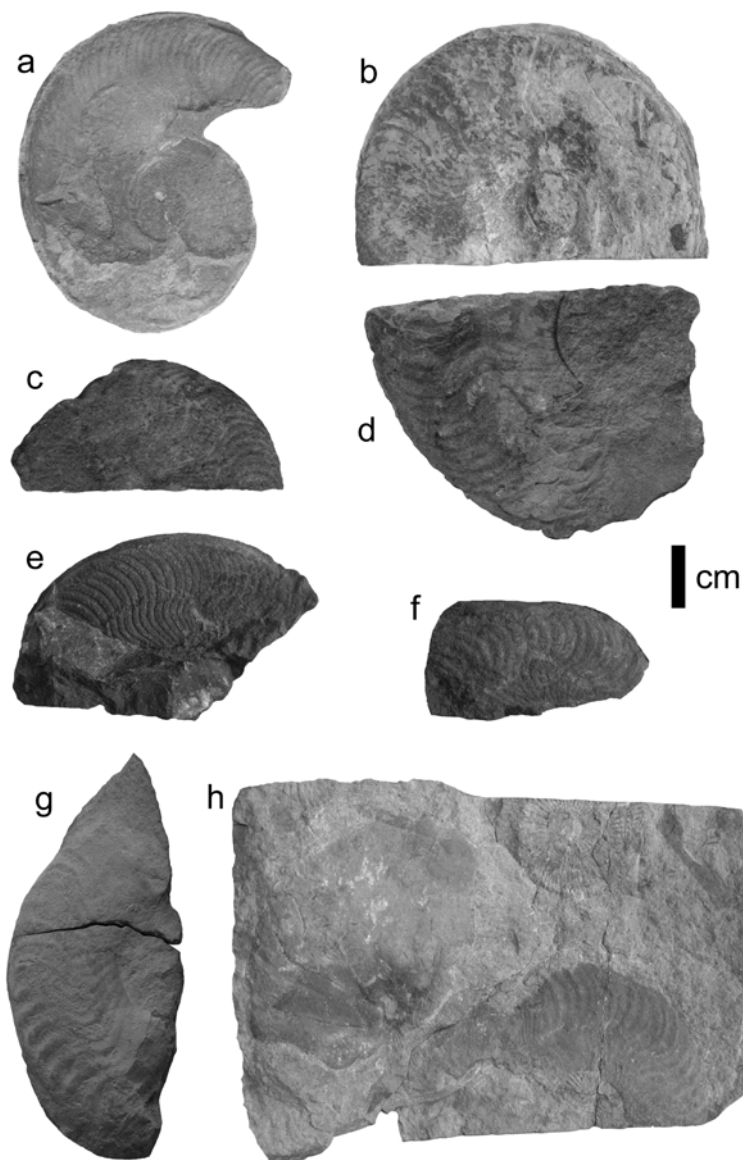
Museum number: Acc. n. 67-69/2011 (reg. n. PZ-748-750).

***Harpoceras cf. exaratum* (YOUNG & BIRD, 1828)**

Tab. 4, Fig. g

Material: One very well preserved stone core (positive and negative). Preserved is coiling, ribbing and keel.

Remarks: Planispiral, involute shell. The last whorl is increasing fast reaching two and a half times the height of the previous whorl. Whorl cross-section is lanceolate, thicker on the ventrolateral side of the whorl (in this specimen not preserved due to the deformation). Ribbing is sinusoidal, partly falcoid. Lateral side proceeds to



Tab. 3. *Harpoceras falcifer* (SOWERBY), loc. Skladaná skala, *ex situ* (a – d, h), loc. Úplaz, *ex situ* (e – g). From collection of SNM in Martin, Andrej Kmeť Museum: acc. n. 61/2011 (reg. n. PZ-742) – a; acc. n. 62/2011 (reg. n. PZ-743) – b; acc. n. 65/2011 (reg. n. PZ-746) – c; acc. n. 64/2011 (reg. n. PZ-745) – d; acc. n. 47-49/2006 (reg. n. PZ-452-454) – f, g; *Harpoceras falcifer* (SOWERBY), *Dactylioceras* sp., *Cenoceras* sp., acc. n. 70/2011 (reg. n. PZ-751) – h. Photo by Bendík, 2012.

a sharp edge of the ventral side (keel). Keel edge is simple and bold. Umbilikus is relatively narrow and shallow.

Locality: Skladaná skala, *ex situ*.

Stratigraphic range: Lower Toarcian, Falcifer biozone.

Museum number: Acc. n. 72-73/2011 (reg. n. PZ-753-754).

***Harpoceras cf. falcifer* (SOWERBY, 1820)**

Material: One fragment of ribbing shape, being damaged, but typical for *H. falcifer* (SOWERBY).

Remarks: Planispiral, medium involuted shell. Coiling is faster, but constant, lateral sides are flattened. Whorl cross section is elliptical. Ribbing is fine, falcoidal,

prorsiradial, terminate under the keel. Keel is similar, massive. Umbilikus is massive and narrow.

Locality: Úplaz, bed n. 77.

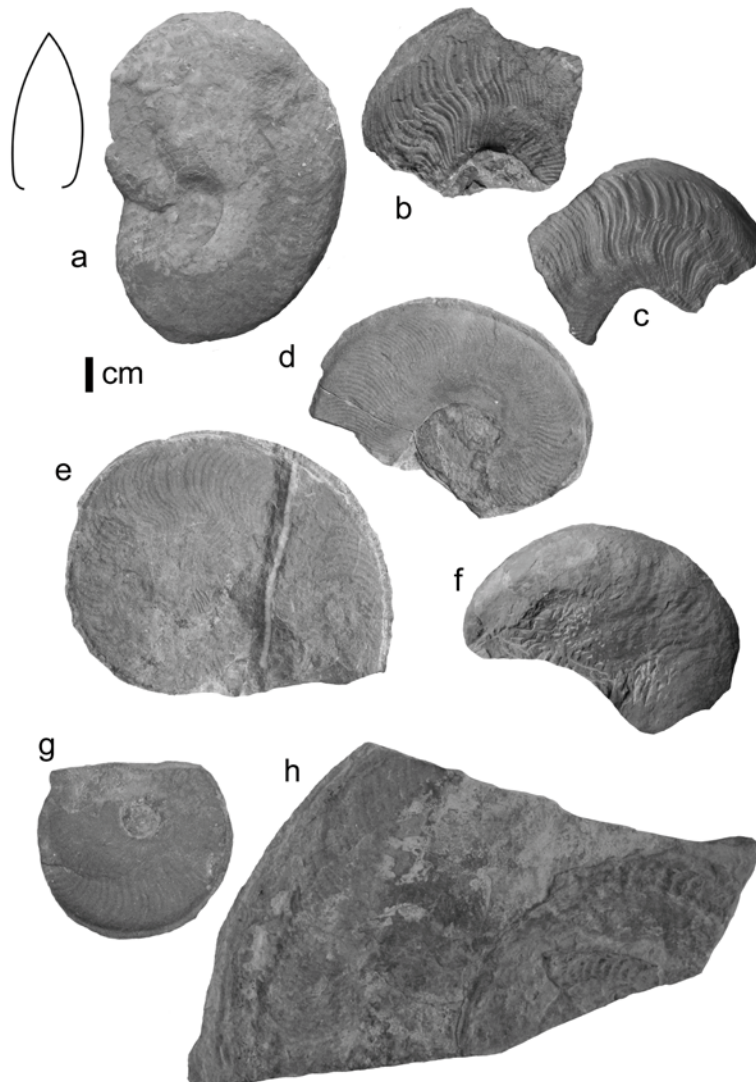
Stratigraphic range: Lower Toarcian, Falcifer Biozone.

Museum number: Acc. n. 29/2005 (reg. n. PZ-122).

***Harpoceras cf. elegans* (SOWERBY, 1815)**

Tab. 4, Figs. a–c

Material: One well preserved stone core and one fragment (impression) of shell. Stone core is partly damaged by erosion, ribbing is preserved on last whorl. Impressions have well preserved ribbing and keel. Sutures are the most damaged, incomplete.



Tab. 4. *Harpoceras cf. elegans* (SOWERBY), loc. Rovné, *ex situ*, acc. n. 278/2005 (reg. n. PZ-312) – a; *Harpoceras cf. elegans* (SOWERBY), original impression and model of whorl (c), loc. Rovné, *ex situ*, acc. n. 293a,b/2005 (reg. n. PZ-387a, b) – b, c); *Harpoceras pseudoserpentinum* GABILLY, loc. Skladaná skala, *ex situ*, acc. n. 69/2011 (reg. n. PZ-750) – d; *Harpoceras pseudoserpentinum* GABILLY, loc. Skladaná skala, *ex situ*, acc. n. 67/2011 (reg. n. PZ-748) – e; *Harpoceras* sp. cf. *eseri* (OPPEL), loc. Nolčovo (layer n. 25), acc. n. 109/2005 (reg. n. PZ-202) – f; *Harpoceras cf. exaratum* (YOUNG & BIRD), loc. Skladaná skala, *ex situ*, acc. n. 72/2011 (reg. n. PZ-753) – g; *Harpoceras* sp., loc. Skladaná skala, *ex situ*, acc. n. 66/2011 (reg. n. PZ-747) – h. From collection of SNM in Martin, Andrej Kmet Museum. Photo by Bendík, 2012.

Remarks: Platycone, involute planispiral shell. Last whorl increases the most fast (grows to triple as anterior), irregularly, and laps to anterior whorl. Whorl cross-section is oval, partly with lanceolar ventral side. Ribbing is moderately strong, sinusoidal – falcate, starting at umbilical edge, ending under keel. Upper side of the ribs is convex curved, lower part is moderate equal, partly concave. Umbilikus is narrow and shallow.

Comparison: In contrast with *H. falcifer* (SOWERBY), the *H. elegans* (SOWERBY) has the fine dense ribbing, whorl cross-section is more oval (mainly lateral sides) with marked lanceolar ventral side (*H. falcifer* has stronger keel). *H. elegans* (SOWERBY) has more involute coiling and umbilikus is narrower.

Locality: Rovné, *ex situ*.

Stratigraphic range: Lower Toarcian, Falcifer Biozone.

Museum number: Acc. n. 278/2005 (reg. n. PZ-312), acc. n. 293a-d/2005 (reg. n. PZ-387a-d).

***Harpoceras* sp. cf. *eseri* (OPPEL, 1856)**

Tab. 4, Fig. f

Material: One impression of strong ribbing, stone core is not preserved.

Remarks: Platycone, planispiral shell. Last whorl increases

fast and regularly. Whorl cross-section is elliptical, ventrolateral part passes into the lanceolar form. Ribbing is moderately strong, sinusoidal. Keel is small, obscure.

Locality: Nolčovo, bed n. 25.

Stratigraphic range: Upper Toarcian, Thouarsense biozone.

Museum number: Acc. n. 109/2005 (reg. n. PZ-202).

***Harpoceras* sp.**

Tab. 4, Fig. h

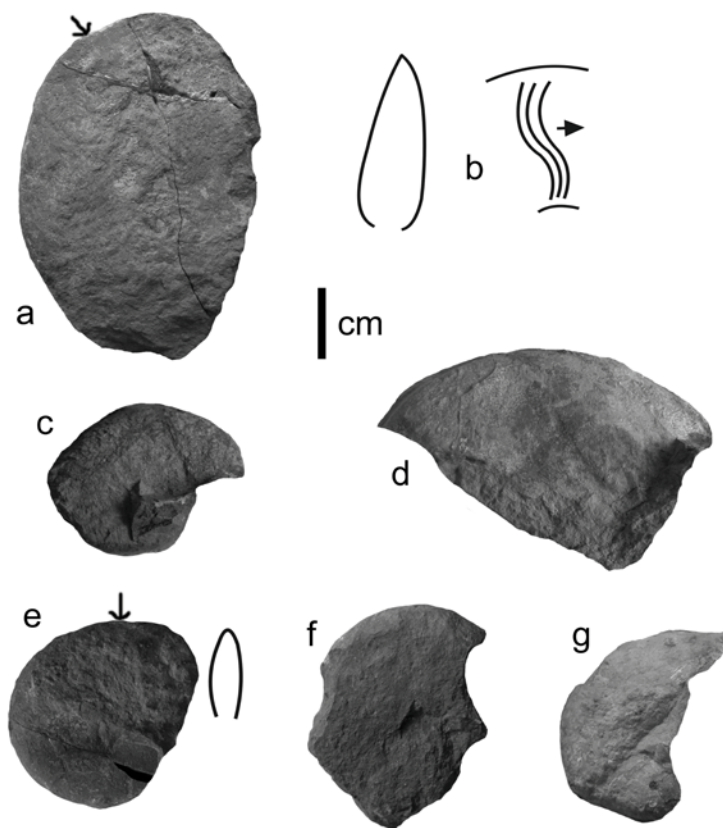
Material: Two partly preserved specimens. One incomplete stone core with negative impression and other one incomplete, considerable damaged impression of ribbing, the stone core is not preserved.

Remarks: One specimen has preserved part of coiling, typical ribbing and keel of the genus *Harpoceras*. In second specimen, the incomplete stone core does not allow determination. Ribbing is strong, falcated, one impression has expressive, similar keel.

Locality: Úplaz, bed n. 77, Skladaná skala, *ex situ*.

Stratigraphic range: Lower Toarcian, Falcifer Biozone (found together with *s. cf. falcifer*).

Museum number: Acc. n. 30/2005 (reg. n. PZ-123), acc. n. 66/2011 (reg. n. PZ-747).



Tab. 5. *Polyplectus discoides* (ZIETEN), loc. Turecká, layer n. 34, acc. n. 91/2005 (reg. n. PZ-184) – a, b; *Polyplectus discoides* (ZIETEN), loc. Úplaz, *ex situ*, acc. n. 64/2007 (reg. n. PZ-663) – c; *Polyplectus discoides* (ZIETEN), loc. Turecká, layer n. 34, acc. n. 91/2005 (reg. n. PZ-184) – d; *Micropolyplectus* sp., loc. Rovné, *ex situ*, acc. n. 276/2005 (reg. n. PZ-370) – e; *Micropolyplectus* sp., loc. Rovné, *ex situ*, acc. n. 277/2005 (reg. n. PZ-371) – f; *Micropolyplectus* sp., loc. Turecká, layer n. 34, acc. n. 90/2005 (reg. n. PZ-183) – g. From collection of SNM in Martin, Andrej Kmeť Museum. Photo by Bendík, 2012.

***Polyplectus* BUCKMAN, 1890**
***Polyplectus discoides* (ZIETEN, 1830)**
Tab. 5, Figs. a–d

- 1830 *Ammonites discoides* ZIETEN, p. 21, Tab. 16, Fig. 1 ex Guex, 1975, p. 115
1968 *Polyplectus discoides* (ZIETEN) – Guex, p. 7, Tab. 2, Fig. 15
1975 *Polyplectus discoides* (ZIETEN) – Guex, p. 115, Tab. 7, Fig. 8
1976 *Polyplectus discoides* (ZIETEN) – Schlegelmilch, p. 90, Tab. 47, Fig. 8
1994 *Polyplectus discoides* (ZIETEN) – Jakobs, Smith & Tipper, Tab. 3, Figs. 20 and 21
1997 *Polyplectus discoides* (ZIETEN) – Jakobs, p. 52, Tab. 4, Figs. 14 and 15
1997 *Polyplectus discoides* (ZIETEN) – Metodiev, p. 15, Tab. 1, Fig. 7
2008 *Polyplectus discoides* (ZIETEN) – Metodiev, Tab. 5, Fig. r, s

Material: Three incomplete fragments of the rock core. Preserved there are only one side with ribbing, and ventral part with keel.

Remarks: Oxycone, involute shell. The last whorl is increasing fast on two/two and a half times of the height of previous whorl. The whorl cross-section is lanceolated, thicker on the inner side of the whorl. Ribbing is fine, sinusoidal, strongly forward on ventrolateral side. On the ventral side it is towards the mouth ribs. Lateral side acquired the sharp edge of the ventral side (keel). Keel edge is simple and bold. Umbilikus is relatively narrow and deep.

Comparison: A detailed description of the occurrence was provided Guex (1968). Individuals from Turecká are consistent with those in the work of Guex (1975), being characteristic with a typical sinusoidal ribbing and strong involute shell.

Locality: Turecká, bed n. 34, Úplaz, *ex situ*.

Stratigraphic range: Upper Toarcian, bed with *H. variabilis* (D'ORBIGNY), Variabilis biozone.

Museum number: Acc. n. 91-92/2005 (reg. n. PZ-184-185), acc. n. 64/2007 (reg. n. PZ-663).

***Micropolyplectus* sp.**
Tab. 5, Figs. e–g

Material: Three complete, moderately mechanically damaged rock cores. This genus is typical with winding turns on the core dimensions. Detailed species identification was not possible due to the failures in ribbing. Poorly (incompletely) preserved suture.

Remarks: Oxycone, strongly involute shell of smaller size. The coiling is fast, the last thread overlaps the previous one. Ribbing on the cores is not observable. Lateral sides are smooth and straight or slightly arched. The dorsal part has rounded edge (keel), in one case, a slightly sharper peak was observed. Umbilikus is very narrow and relatively shallow.

Locality: Turecká, bed n. 34, Rovné, *ex situ*.

Stratigraphic range: Upper Toarcian, bed with *H. variabilis* (D'ORBIGNY), Variabilis biozone (only in locality Turecká).

Museum number: Acc. n. 90/2005 (reg. n. PZ-183), acc. n. 276-277/2005 (reg. n. PZ-370-371).

Conclusion

The long-term research of Adnet and Allgäu formations in the Veľká Fatra Mts. has identified 63 ammonite species of Lower Jurassic age. This paper summarizes the results of the research of the *Harpoceratinae* subfamily. The individual specimens were found mainly in the *ex situ* position, which do not allowed to learn the relations in examined profiles (localities), as well as their mutual correlation and correlation of individual species within the layers. Research has identified 11 species, and other three undeterminable genera (designated as sp.). Found species represented four ammonite biozones (Margaritatus, Falcifer, Variabilis and Thouarsense), which are typical for the northwestern Europe (boreal/subboreal realm) (Bendík, 2005a).

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