

**IDOCERATINAE (*IDOCERAS* AND *NEBRODITES* GENERA) FROM “*ACANTHICUM*  
BEDS” OF THE HĂGHIMAȘ MTS.  
(THE EASTERN CARPATHIANS, ROMANIA)**

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**Abstract.** This paper deals with the taxonomic study of the Idoceratinae species (for *Idoceras* and *Nebrodités* genera) found in the Kimmeridgian deposits from Ghilcoș and Ciofronca (the Hăghimaș Mts). The number of species identified here reached 11 taxa. Also, there have been revised all the species described by the previous authors: Herbich, Neumayr, and Preda. Species *Nebrodités hetaerus* described by HERBICH is confirmed here for the first time.

**Keywords:** Idoceratinae, taxonomy, Hăghimaș.

**Rezumat. Idoceratinae (genurile *Idoceras* și *Nebrodités*) din „Stratele cu *Acanthicum*” din Munții Hăghimaș (Carpații Orientali, România).** În lucrare este prezentat studiul taxonomic al speciilor din familia Idoceratinae (genurile *Idoceras* și *Nebrodités*) găsite în depozitele kimmeridgiene din Ghilcoș și Ciofronca (Munții Hăghimaș). Numărul speciilor cunoscute aici a ajuns la 11. De asemenea, în această lucrare sunt revizuite toate speciile descrise de autorii anteriori: Herbich, Neumayr și Preda. Specia *N. hetaerus* descrisă de HERBICH este confirmată aici pentru prima dată.

**Cuvinte cheie:** Idoceratinae, taxonomie, Hăghimaș.

### INTRODUCTION

The outcrops (F1, F2, F17 in GRIGORE et al., 2009) from which the studied fauna were collected are situated in the Hăghimaș Mts. Some of them (F1, F2) are included in the Cheile Bicazului – Hăghimaș National Park. From this region only 4 species from *Nebrodités* genus were known until now and more important, two holotypes have been described here, i.e., *N. hospes* (NEUMAYR) and *N. hetaerus* (HERBICH). One of them, *Nebrodités hetaerus* (HERBICH) is confirmed here as a valid species.

### Systematics

Abbreviations for the measurements, collections and outcrops:

Dmax = maximal diameter	GIR = Geological Institute of Romania
Dph = phragmocone diameter	GIA = Geological Institute of Austria (Bundesanstalt)
D = measured diameter	UBB = "Babeș Bolyai" University from Cluj Napoca
U = diameter of umbilicus	LGB = Geology Laboratory of Bucharest University
H = height	LPB = Paleontology Lab. of Bucharest University
W = width	MNSPN = Museum of Natural Sciences - Piatra Neamț
N <sub>i</sub> = number of inner ribs (primary)	F1 = Outcrop from western Ghilcoș walls
(for one whorl or a half of this)	F2 = Outcrop from north-western Ghilcoș slope
N <sub>e</sub> = number of external ribs (secondary)	F17 = Outcrop from "Ciofronca"
(for the same whorl as N <sub>i</sub> or a half of this)	all in Grigore et al, 2009
	A, D... K= studied sections (Grigore, 2002, 2010)

Suprafamily Perisphinctaceae STEINMANN 1890

Family Perisphinctidae STEINMANN 1890

Subfamily Idoceratinae SPATH 1924

Genus *Idoceras* BURCKHARDT 1906

*Idoceras sautieri* (FONTANNES 1876)

Pl. 1, Figs. 13, 14

1876 *Ammonites sautieri*–FONTANNES; p. 112; pl. 16, Fig. 1

1959 *Idoceras sautieri* FONTANNES–ZIEGLER; p. 26; pl. 1, Fig. 5

1978 *Idoceras sautieri* (FONTANNES)–OLORIZ; p. 146; pl. 11, Fig. 4

1993 *Idoceras sautieri* (FONTANNES)–SARTI; p. 115

Material: LRd28A10, *Idoceras* cf. *sautieri* LRd61A4 Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	N <sub>i</sub>
Holotype	85	-	85	45	21	18	0.53	0.25	0.21	0.85	51
LRd28A10	49	-	49	25	13.5	11	0.51	0.27	0.22	0.81	53

Remarks: LRd28A10 specimen is half of a medium size conch, which preserves the specific ornamentation. Unlike holotype it has a whorl section more narrow and a lower number of simply ribs. The second specimen was only

assigned to this species because it represents a small segment of a conch ornamented with more simply ribs.

Occurrence: Kimmeridgian–Divisum/*Acanthicum* interval in F2 outcrop from Ghilcoş (A profile); Kimmeridgian–Divisum Zone in Italy, Divisum/*Acanthicum* interval in Bulgaria, France and Strombecki /Divisum interval in Spain.

Genus *Nebrodites* BURCKHARDT 1912

*Nebrodites agrigentinus agrigentinus* (GEMMELLARO 1872)

Pl. 1, Figs. 8, 10, 11

1872 *Simoceras Agrigentinum*–GEMMELLARO; p. 46; pl. 6, Fig. 7, 8

1875 *Ammonites Randenensis* MOESCH-FAVRE; p. 35; pl. 4, Fig. 3

1877 *Ammonites (Simoceras) Agrigentinus* GEMMELLARO-FAVRE; pl. 5, Fig. 6 non Fig. 7

1959 *Nebrodites (Nebroditis) agrigentinus* (GEMMELLARO)-ZIEGLER; p. 33; pl. 1, Fig. 12

1978 *Nebroditis (Nebroditis) agrigentinus* (GEMMELLARO)-OLORIZ; p. 150; pl. 14, Fig. 2

1979 *Nebroditis (Nebroditis) agrigentinus* (GEMMELLARO)-SAPUNOV; p. 113; pl. 29, Fig. 5; pl. 30, Fig. 1

1986 *Nebroditis agrigentinus* (GEMMELLARO)-SARTI; p. 509; pl. 6, Fig. 5

1993 *Nebroditis agrigentinus agrigentinus* (GEMMELLARO) morphotyp *agrigentinus*-SARTI; p. 95

1994 *Nebroditis agrigentinus agrigentinus* (GEMMELLARO)-SARTI; p. 328; pl. 3, Fig. 2; text Fig. 1

Material: LRd29D2, LRd16Ap, LRd45R1, LRd27A3, LRdK6 Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	88	-	88	48	21	25	0.54	0.24	0.28	1.20	66	80
LRd29D2	56	54	56	33	14	15	0.59	0.25	0.27	1.10	62	85
LRd16Ap	64	63	61	36	13	16	0.59	0.21	0.26	1.23	67	89
LRd45R1	21	21	20	11	5	6	0.55	0.25	0.30	1.20	41	60
LRd27A3	32	32	31	18	8	8	0.58	0.26	0.26	1	50	85
LRdK6	30	-	29	17	7	8	0.59	0.24	0.28	1.14	-	-

We took into account Sarti's (1994) revision of *agrigentinus* group from *Nebroditis*.

Remarks: all specimens are phragmocones of small to medium size and LRd16Ap is the best preserved of them. Compared with the holotype there are some differences in the width of the umbilicus and ribbing evolution (see the ribbing curves in Fig. 1). Constrictions of LRd16Ap specimen are less oblique and the whorl section of LRd27A3 specimen is more isometric. The number of bifurcates is variable but never exceeds 50%.

Occurrence: Kimmeridgian–Divisum/*Acanthicum* interval in F1 and F2 outcrops from Ghilcoş (K, R, A, and D profiles); Kimmeridgian–Strombecki/*Acanthicum* interval in Germany, Spain, Divisum/*Acanthicum* interval in Italy, Switzerland, France and Divisum Zone in Bulgaria.

*Nebroditis agrigentinus contortus* (NEUMAYR 1871)

Pl. 1, Figs. 3, 4

1871 *Simoceras contortum*–NEUMAYR; p. 369; pl. 21, Figs. 1 a, b

1877 *Ammonites (Simoceras) contortus* NEUMAYR-FAVRE; p. 52; pl. 5, Figs. 5 a, b

Non 1973 *Simoceras contortum* NEUMAYR-PREDA; pl. 15, Fig. 1 (= *Nebroditis doublieri doublieri*)

1976 *Simoceras contortum* NEUMAYR-PELIN; pl. 5, Fig. 5

1993 *Nebroditis agrigentinus contortus* (NEUMAYR) morphotyp *contortus*-SARTI; p. 95

1994 *Nebroditis agrigentinus contortus* (NEUMAYR)-SARTI; p. 331; pl. 3, Fig. 1, text Fig. 3

Material: LRd36T5.0, LRd37T3.5, LRd11Adp Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	75	-	75	47	15	17	0.62	0.20	0.23	1.13	83	88
Favre specimen	50	-	50	30	10.5	11.5	0.60	0.21	0.23	1.10	70	-
LRd36T5.0	77	70	77	46	17	18	0.60	0.22	0.23	1.06	82	100
LRd37T3.5	49	45	44	26	10	11	0.59	0.22	0.25	1.10	69	75
LRd11Adp	36	36	35	21	8	9	0.60	0.23	0.25	1.12	63	100

Remarks: the LRd36T5.0 specimen is more complete than Neumayr's specimen and more similar to Favre's specimen in cross-section and ribbing style (Fig. 3) as in *contortus* morphotype (SARTI, 1994). Other specimens are less well preserved, with umbilicus narrower and the whorl section more depressed than the holotype.

Occurrence: Late Kimmeridgian–*Acanthicum* Zone in F1 and F2 outcrops (T and A profiles); Late Kimmeridgian–*Acanthicum* Zone in Italy, Switzerland, France and Austria.

*Nebroditis doublieri* (D'ORBIGNY 1850) SARTI emended, 1994

*Nebroditis doublieri doublieri* (D'ORBIGNY 1850)

Pl. 1, Fig. 1

1850 *Ammonites Doublieri*–D'ORBIGNY; p. 351

1876 *Ammonites Doublieri* D'ORBIGNY–DUMORTIER & FONTANNES; p. 120; pl. 17, Fig. 3

1878 *Ammonites (Simoceras) Doublieri* D'ORBIGNY-LORIOU; p. 105; pl. 16, Fig. 6

1973 *Simoceras contortum* NEUMAYR-PREDA; pl. 15, Fig. 1

1994 *Nebrodités doublieri doublieri* (D'ORBIGNY)-SARTI; p. 332; pl. 2, Fig. 1

Material: LRd35AA Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	-	-	52	31	11	12	0.60	0.22	0.23	1.09	54	-
Fontannes specimen	91	-	91	55	19	-	0.61	0.21	-	-	70	77
Preda (1d LGB)	87	75	74	42	18	19	0.57	0.24	0.26	1.05	73	98
LRd35AA	95	77	75	43	17	19	0.57	0.23	0.25	1.12	71	73

Remarks: the specimen "*Simoceras contortum*" presented by PREDA (1973) is a *N. doublieri* by its ribbing style (ribbing curve in Fig. 2). It preserves ¼ from the body chamber. Compared with the holotype it has a narrower umbilicus. My specimen LRd35AA is similar with the specimen of Preda, but with a curve of ribbing more close to that of LorioU's specimen (Fig. 2), with only two bifurcated on the last whorl. These two specimens may be transitional forms towards *venetianus* subspecies or even more towards *Presimoceras* group (i.e. *P. teres* group), with some thickening of the ribs.

Occurrence: Early Kimmeridgian-Divisum Zone in F2 outcrop ("A" profile); Kimmeridgian in France, Switzerland, Early Kimmeridgian-Divisum Zone in Spain, Bulgaria and Late Kimmeridgian-Acanthicum Zone in Italy.

*Nebrodités doublieri lavaronsensis* SARTI 1994

Pl. 1, Fig. 6

1994 *Nebrodités lavaronsensis* nov.sp.-SARTI; p. 335; pl. 1, Figs. 1, 2

Material: LRd38M1 Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	119	75	106	60	25	24	0.57	0.23	0.22	0.96	67	80
LRd38M1	50	42	43	25	11	10	0.58	0.25	0.23	0.91	56	72

Remarks: my specimen is easily deformed and preserves ¼ from the body chamber. Its morphology (see the ribbing curves in Fig 2) is comparable with that of the specimen described by SARTI (1994).

Occurrence: Early Kimmeridgian-Divisum Zone in F2 outcrop (M profile); Kimmeridgian-Uhlandi /Acanthicum interval in Italy.

*Nebrodités hospes hospes* (NEUMAYR 1871)

Pl. 1, Figs. 5, 7, 9, 12; pl. 2, Fig. 3

1871 *Perisphinctes hospes*-NEUMAYR; p. 23

1873 *Perisphinctes hospes* NEUMAYR-NEUMAYR; p. 185; pl. 39, Figs. 3 a, b

1877 *Ammonites (Perisphinctes) Allobrogicus* PILLET-FAVRE; p. 50; pl. 5, Figs. 4 a, b

1888 *Ammonites* cf. *Balderus* OPPEL-QUENSTEDT; p. 978; pl. 108, Fig. 12

1912 *Nebrodités Haizmanni* nov.sp.-BURCKHARDT; p. 89; pl. 22, Figs. 2, 3, 4

1959 *Nebrodités (Nebrodités) hospes hospes* (NEUMAYR)-ZIEGLER; p. 38; pl. 1, Figs. 15, 16

1966 *Nebrodités (Nebrodités) hospes suteri* nov.subsp.-GEYSSANT; p. 107; pl. 1, Figs. 2, 3, 4

1973 *Perisphinctes* sp.-PREDA; pl. 12, Fig. 5

1977 *Nebrodités (Nebrodités) hospes* (NEUMAYR)-SAPUNOV; pl. 1, Fig. 3

1978 *Nebrodités (Nebrodités) hospes minor* (QUENSTEDT)-OLORIZ; p. 172; pl. 14, Fig. 1

1979 *Nebrodités (Nebrodités) hospes* (NEUMAYR)-SAPUNOV; p. 115; pl. 31, Fig. 2

1986 *Nebrodités hospes* (NEUMAYR)-SARTI; p.509; pl. 6, Fig. 6

1993 *Nebrodités hospes hospes* (NEUMAYR)-SARTI; p. 96; pl. 15, Fig. 2

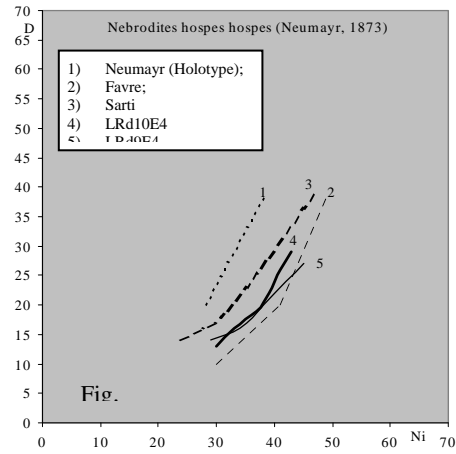
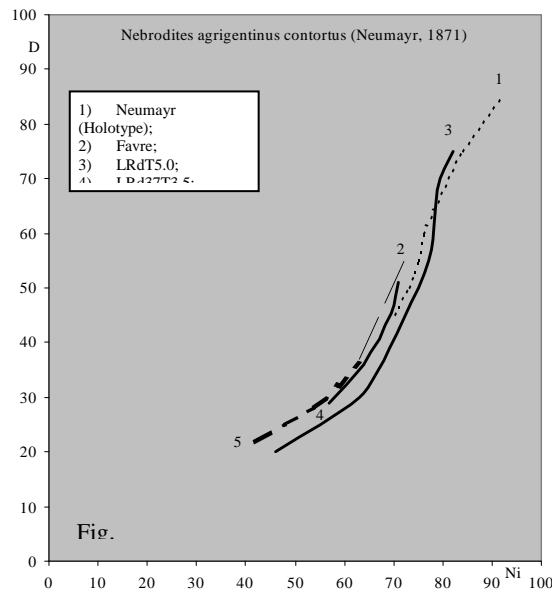
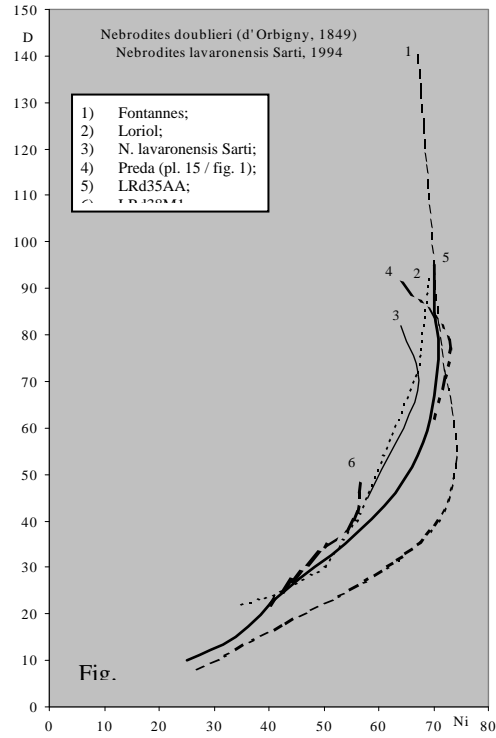
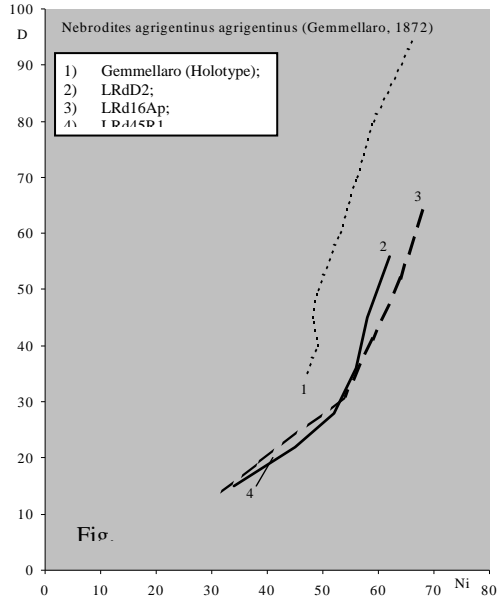
Material: LRd10F8, LRd9F8, LRd25A4, LRd26A2, LRd44R0.5, LRd30A3 Grigore Collection in GIR; Neumayr's holotype: the Collection of GIA, originates from red nodular limestones of Ciofronca outcrop; Paratype (pl. 39, Fig. 3), originates from red nodular limestones of Ghilcoș outcrop; Preda's specimen ("*Perisphinctes* sp.", pl. 12, Fig. 5): the Collection of MNISP and originates from grey nodular limestones of Ghilcoș (F2) outcrop.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	34	-	34	16	10	7	0.48	0.29	0.21	0.70	38	-
Paratype	37	-	37	17	12	9	0.46	0.32	0.24	0.75	37	71
Sarti specimen	38	-	38	19	11	8	0.50	0.28	0.21	0.73	-	-
Preda specimen	35	-	35	17	11.5	9	0.48	0.32	0.26	0.78	39	59
LRd10F8	29	29	29	15	8	7	0.52	0.27	0.24	0.87	43	77
LRd9F8	27	27	27	14	7	7	0.52	0.26	0.26	1	45	75
LRd25A4	33	30	33	15	11	9	0.45	0.33	0.27	0.81	36	63
LRd26A2	35	35	35	15	11	10	0.43	0.31	0.27	0.91	38	61
LRd44R0.5	30	-	30	14	9	8	0.47	0.30	0.26	0.89	34	60
LRd30A3	26	26	26	12	8	7	0.46	0.31	0.27	0.87	32	56

We took into account Sarti's (1993) revision of *Nebrodites hospes*, which includes two subspecies: *N. hospes hospes* (NEUMAYR) and *N. hospes minor* (QUENSTEDT).

Remarks: all my specimens are phragmocones that varies from small to medium size. Only three of them (LRd10F8, LRd25A4 and LRd26A2) are better preserved. Specimens LRd44R0.5 and LRd26A2 have no constrictions; the other preserve up to 4 /whorl and deeper. Simple/bifurcate ratio varies on each specimen. Preda's specimen is a phragmocone well preserved and very close to holotype's features (ribbing curves in Fig. 4).



Occurrence: Early Kimmeridgian–Strombecki /Divisum interval in F1, F2 and F17 outcrops (A, F, R, K profiles); Early Kimmeridgian–Strombecki /Divisum interval in Germany, Bulgaria, Spain and Herbichi Zone in Italy, France.

*Nebrodites rhodanensis* ZIEGLER 1959

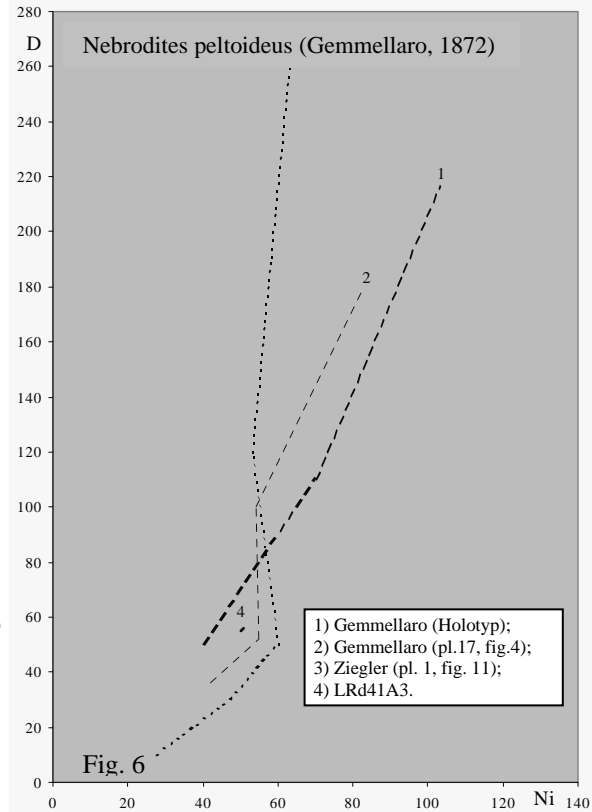
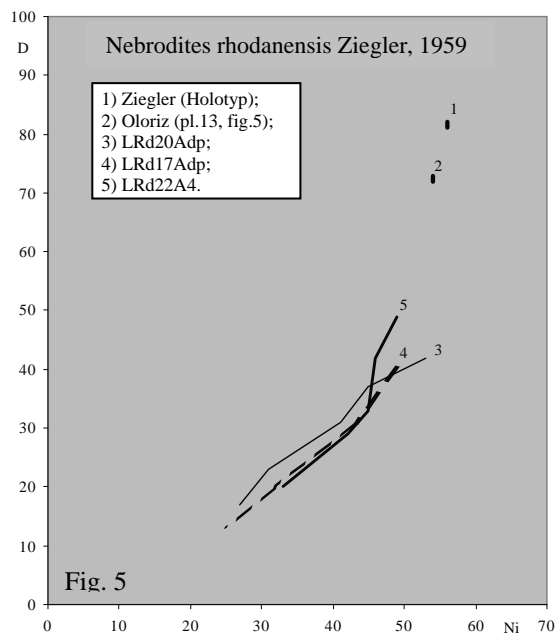
Pl. 3, Figs. 1, 2, 4, 6

1959 *Nebrodites (Nebrodites) rhodanensis* nov.sp.-ZIEGLER, in HOLDER & ZIEGLER; p. 131; pl. 21, Figs. 1-3

1959 *Nebrodites (Nebrodites) rhodanensis* ZIEGLER-ZIEGLER; p.36; pl.1, Fig.13

1978 *Nebrodites (Nebrodites) rhodanensis* ZIEGLER-OLORIZ; p.160; pl.13, Fig.5

1979 *Nebrodites (Nebrodites) rhodanensis* ZIEGLER-SAPUNOV; p.118; pl.32, Fig.1



Material: LRd17Ap, LRd19Ap, LRd20Ap, LRd22A4 Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	80*	68	68	30	22	18.5	0.44	0.32	0.27	0.84	59*	98*
LRd17Ap	40	36	40	16	14	11	0.40	0.35	0.27	0.78	49	73
LRd19Ap	55	52	50	23	16	14	0.46	0.32	0.28	0.87	-	-
LRd20Ap	42	42	38	18	12	10	0.47	0.32	0.26	0.83	51	89
LRd22A4	50	50	48	23	15	13	0.48	0.31	0.27	0.87	49	87

Remarks: all the specimens are small sized. The specimens LRd17Ap and LRd19Ap preserve a part from the body chamber. Only the LRd22A4 specimen is better preserved, the others being deformed. At this size there are some differences from Ziegler's specimen: umbilicus is larger and the whorl section is depressed; the ornamentation style being characteristic (Fig. 5).

Occurrence: Early Kimmeridgian - Divisum Zone from Ghilcoș (outcrop F2, A profile); Early Kimmeridgian - Divisum Zone in France, Germany and Bulgaria; Kimmeridgian – Divisum /Compsum (*Acanthicum*) interval in Spain.

*Nebrodites peltoideus* (GEMMELLARO 1872)

Pl. 2, Figs. 1, 2

1872 *Simoceras peltoideum* nov.sp.-GEMMELLARO; p. 47; pl. 8, Fig. 6

1959 *Nebrodites (Nebrodites) peltoideus* (GEMMELLARO)-ZIEGLER; p. 37; pl. 1, Fig. 11

1978 *Nebrodites (Nebrodites) peltoideus* (GEMMELLARO)-OLORIZ; p. 163; pl. 14, Fig. 5

1979 *Nebrodites (Nebrodites) peltoideus* (GEMMELLARO)-SAPUNOV; p.117; pl. 31, Fig. 5

1986 *Nebrodites peltoideus* (GEMMELLARO)-SARTI; p. 509; pl. 7, Fig. 2

1993 *Nebrodites peltoideus* (GEMMELLARO)-SARTI; p. 101; pl. 15, Fig. 1

Material: LRd40A3, LRd41A2, LRd60Ap Grigore Collection in GIR.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H
Holotype	225	-	225	117	61	45	0.52	0.25	0.20	0.74
Sarti (1986) specimen	188	-	188	93	55	42	0.49	0.24	0.22	0.76
LRd40A3	>71	>71	71	32	23	17	0.45	0.32	0.24	0.74
LRd41A2	96	96	96	43	30	21	0.45	0.31	0.22	0.70

Remarks: all specimens are medium sized phragmocones. Only the LRd41A2 specimen is better preserved. At this size, they have a narrow umbilicus and a section more compressed, but the evolution of their ornamentation is characteristic (ribbing curves in Fig. 6).

Occurrence: Kimmeridgian-Divisum Zone in F2 outcrop (A profile); Kimmeridgian-Divisum /*Acanthicum* interval in Italy, Spain, Germany, France and Bulgaria.

*Nebrodites favaraensis* (GEMMELLARO 1872)

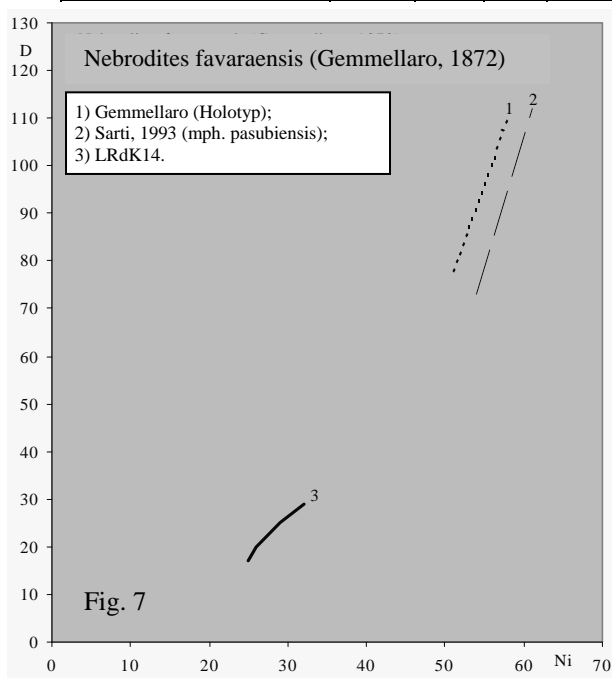
Pl. 2, Figs. 5, 6

1872 *Simoceras Favaraense* nov.sp.-GEMMELLARO; p. 50; pl. 8, Fig. 41877 *Ammonites (Simoceras) Favaraensis* GEMMELLARO-FAVRE; p. 56; pl. 6, Fig. 31959 *Nebrodites (Nebroditis) favaraensis* (GEMMELLARO)-ZIEGLER; p. 381978 *Nebroditis (Nebroditis) favaraensis* (GEMMELLARO)-OLORIZ; p. 167; pl. 13, Fig. 11986 *Nebroditis favaraensis* (GEMMELLARO)-SARTI; p.510; pl. 7, Fig. 31993 *Nebroditis favaraensis* (GEMMELLARO) morphotype *favaraensis* (GEMMELLARO)-SARTI; p. 981993 *Nebroditis favaraensis* (GEMMELLARO) morphotype *pasubiensis* SARTI-SARTI; p. 99; pl. 16, Figs. 1a, b, c; pl. 17, Fig. 1

Material: LRd59T2.0, LRd62J, LRd43A8 Grigore Collection in GIR.

## Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	142	-	142	75	41	33	0.53	0.29	0.23	0.80	68	-
Morphotype <i>pasubiensis</i>	81	-	81	38.5	23.5	18	0.47	0.29	0.22	0.76	54	-
LRd62J	39	35	36	18	12	10	0.50	0.33	0.28	0.83	42	76
LRd59T2.0	29	29	29	15	9	7	0.52	0.31	0.24	0.78	37	57
LRd43A8	>120	~90	110	53	34	27	0.48	0.31	0.24	0.79	62	119



We took into account SARTI'S (1993) revision on *Nebroditis favaraensis*, which includes two morphotypes: *favaraensis* (GEMMELLARO) and *pasubiensis* SARTI.

Remarks: morphotype *favaraensis* - LRd62J specimen is small and preserve 1/5 from the body chamber.

- Morphotype *pasubiensis* - LRd43A8 and LRd59T2 specimens. The first one is big sized, with 1/3 from the body chamber and is badly preserved (deformed); it has prorsiradiate, coarse ribs and some superficial constrictions. The second one is a small sized phragmocone, with four deep constrictions on the last whorl.

Occurrence: Kimmeridgian – Divisum / *Acanthicum* interval in F1 and F2 outcrops (T and A profiles); Kimmeridgian–Divisum / *Acanthicum* interval in Italy, Spain, Switzerland and Germany.

*Nebroditis heimi* (FAVRE 1877)

Pl. 3, Figs. 5, 10

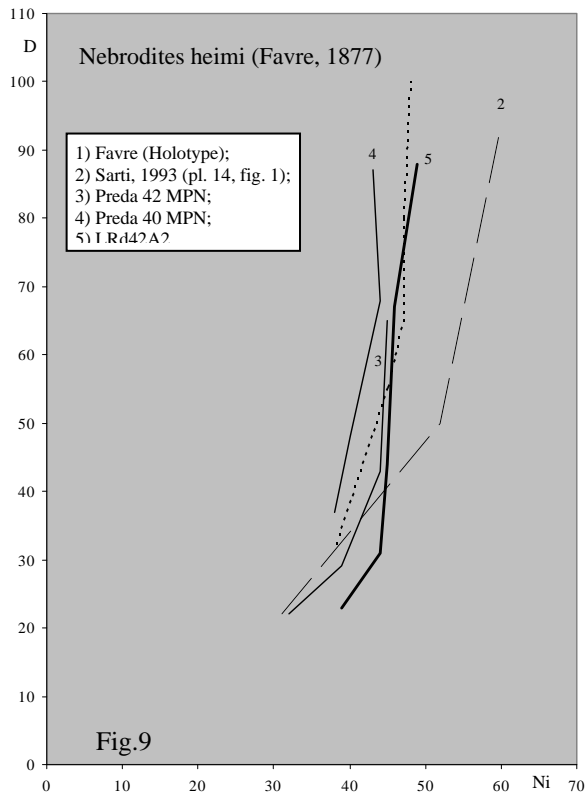
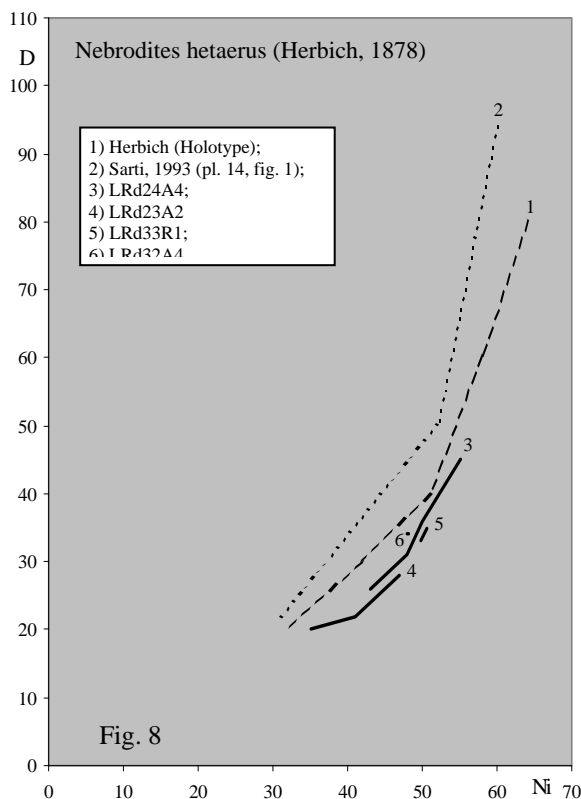
1877 *Ammonites (Perisphinctes) heimi* nov.sp.-FAVRE; p. 49; pl. 5, Fig. 31888 *Ammonites planula planus* nov.sp.-QUENSTEDT; p. 982; pl. 109, fig 41959 *Nebroditis (Nebroditis) heimi* (FAVRE)-ZIEGLER; p. 135; pl. 1, Fig. 141959 *Nebroditis (Mesosimoceras) teres* (NEUMAYR)-ZIEGLER; pl. 1, Fig. 191973 *Perisphinctes heimi* FAVRE-PREDA; pl. 14, Fig. 21973 *Idoceras* sp.-PREDA; pl. 12, Fig. 41978 *Nebroditis (Nebroditis) heimi* (FAVRE)-OLORIZ; p. 156; pl. 12, Fig. 21979 *Nebroditis (Nebroditis) heimi* (FAVRE) - SAPUNOV; p. 115; pl. 30, Figs. 3 a, b; pl. 31, Fig. 11993 *Nebroditis heimi* (FAVRE)-SARTI; p. 97; pl. 14, Figs. 1, 2

Material: LRd42A2 Grigore Collection in GIR; Preda's specimens: the Collection of MNSPN, 40MPN – it originates from red nodular limestones; 42MPN ("*Idoceras* sp.") – it originates from grey nodular limestones; both from Ghilcoș outcrops.

## Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	97	-	97	49.5	26	17.5	0.51	0.27	0.18	0.67	46	72
Preda 40 MPN	87	>87	72	34	21	19	0.47	0.29	0.26	0.90	40	72
Preda 42 MPN	65	65	54	26	16	12	0.48	0.30	0.22	0.75	43	71
LRd42A2	89	89	89	41	29	21	0.46	0.32	0.23	0.72	50	86

Remarks: the LRd42A2 specimen is a large phragmocone with the specific, well preserved ornamentation (see the ribbing curves Fig. 9). It presents some differences from the type specimen (Favre): it has a narrower umbilicus, isometric whorl section and bifurcated ribs predominate. The 42MPN specimen (Preda) is a medium sized phragmocone of a *N. heimi* (not an *Idoceras* species) by its tabulated, not carinated venter (i.e., with section rectangular). The 40MPN specimen is a phragmocone of big size, slightly deformed and by its features (the ribs density until 35 mm diameter, descent of bifurcation on the last whorl and its morphometrical parameters) is close to the Favre’s holotype specimen.



Occurrence: Kimmeridgian–*Acanthicum* Zone (and possible *Divisum* Zone) in F1 and F2 outcrops (A, K and T profiles); Kimmeridgian-in Switzerland, France and Germany, *Acanthicum* Zone in Italy and *Divisum* /*Acanthicum* interval in Spain and Bulgaria.

*Nebrodites hetaerus* (HERBICH 1878)

Pl. 1, Fig. 2; pl. 3, Figs. 3 (Holotype), 7, 8, 9

1878 *Perisphinctes hetaerus* – HERBICH; p. 167; pl. 10, Fig. 1

Material: LRd24A3, LRd23A2, LRd33R1, LRd32A4 Grigore Collection in GIR; Holotype: inv. 5367UC in UBB Collection, it originates from red nodular limestones from Ghilcoș outcrop. In his paper, Herbich mentioned a second specimen from the Ciofronca outcrop, which is lost (or destroyed) now from UBB collection; the holotype is damaged on the last whorl.

Measurements:

Specimen	Dmax	Dph	D	U	H	W	U/D	H/D	W/D	W/H	Ni	Ne
Holotype	78	78	78	33.5	26.5	17	0.43	0.34	0.22	0.65	44	54
LRd24A3	45	45	41	20	13	9	0.49	0.32	0.22	0.69	52	70
LRd23A2	28	28	28	14	9	6.5	0.50	0.32	0.23	0.72	42	62
LRd33R1	35	30	35	16	11	8	0.44	0.31	0.23	0.72	48	69
LRd32A4	34	30	28	13	8	7	0.46	0.28	0.25	0.87	48	75

Remarks: all specimens are small in size and two (LRd33R1, LRd32A4) preserve a small part from the body chamber. The whorl section is rectangular with slowly flattened flanks and ornate with simple ribs, more or less projected. All specimens keep the evolution of ribbing (density) similar to Herbich’s specimen (ribbing curves in Fig. 8). This data along with a narrow umbilicus and a high whorl are distinctive features for this species. These specimens, from the same region with the holotype confirm the Herbich’s species, which was previously put in synonymy of *N. heimi* or *N. favaraensis*.

Occurrence: Late Kimmeridgian–*Acanthicum* Zone (A, R and possible K, T profiles), known only from F1 and F2 outcrops of the Ghilcoș Mts until now.

## ACKNOWLEDGMENTS

I am grateful to Professor Ilie Turculeț from University “Al.I.Cuza” - Iași and to Dr Emil Avram from IGR for helping in my studies. Sincere thanks to Reader Sorin Baci for helping me with the material of Preda Collection from the Natural Science Museum from Piatra Neamț. I would like to thank to Professor Ioan Bucur and Ass. Mirela Popa from “Babeș Bolyai” University - Cluj Napoca (Paleontology Department) for helping me with the material from Neumayr and Herlich collections. Same sincere thanks to Professor Vlad Codrea from the same department, also to Dr. Eugen Grădinaru from Bucharest University and Mr. Aurelian Popescu, museographer from the Museum of Natural Science from Craiova, which made possible the publication of this study.

Part of this study was financially supported by National Centre for Projects Management (CNMP) in the GEOBIOHAS Project (31-059 CTR/2007).

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## PLATE 1 / PLANȘA 1

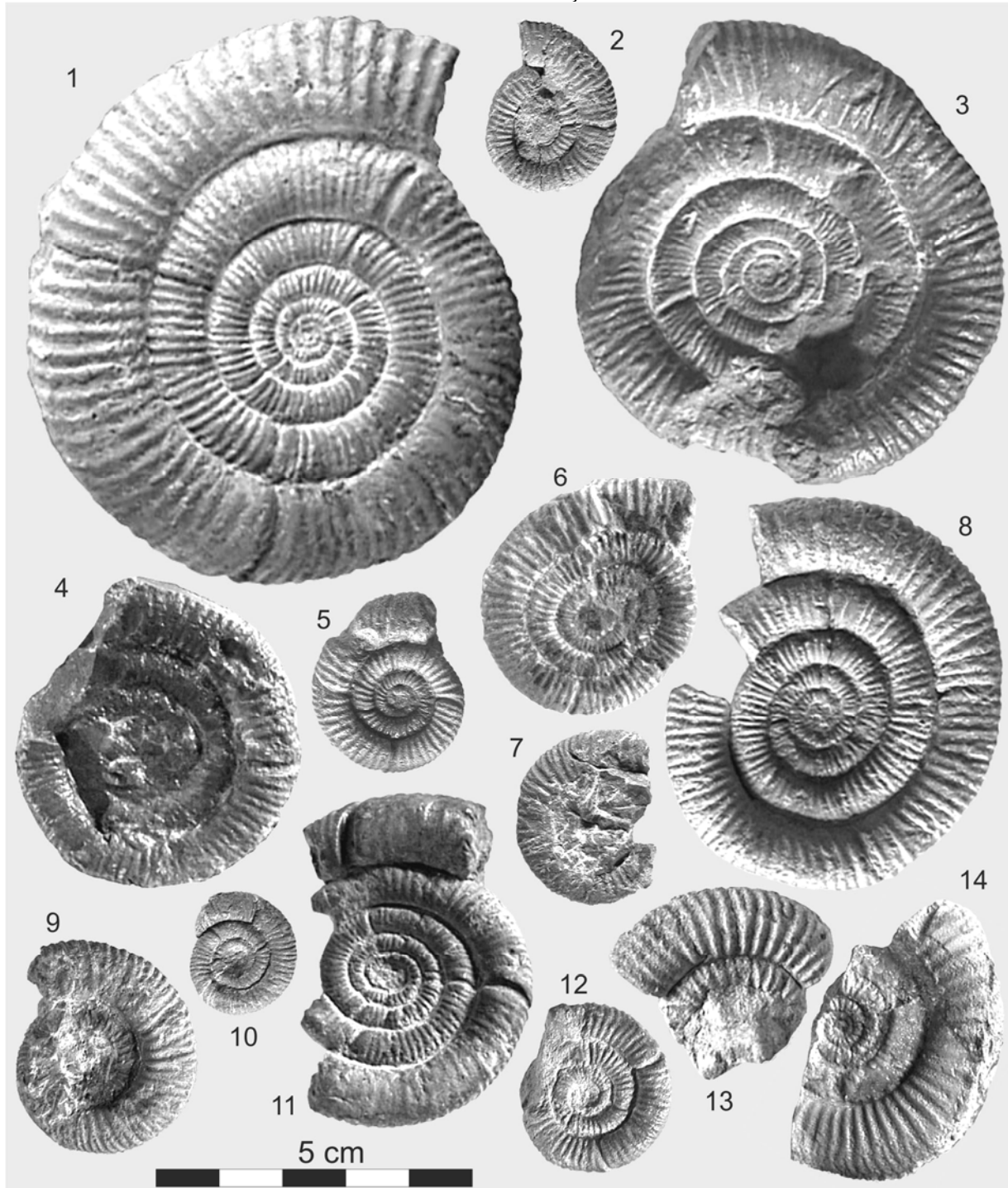


Figure 1. *Nebrodités doublieri doublieri* (D'ORBIGNY) (LRd35AA), Macroconch; green nodular limestone, Early Kimmeridgian – Divisum Zone; F2-Ghilcoș outcrop. / Figura 1. *Nebrodités doublieri doublieri* (D'ORBIGNY) (LRd35AA), Macroconch; calcare nodulare verzui, Kimmeridgian inferior - Zona Divisum; afloriment F2-Ghilcoș. (x 1); Figure 2. *Nebrodités hetaerus* (HERBICH) (LRd23A2), juvenile; green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoș outcrop. / Figura 2. *Nebrodités hetaerus* (HERBICH) (LRd23A2), individ juvenil; calcare nodulare verzui, Kimmeridgian inferior - Zona Divisum, afloriment F2-Ghilcoș. (x 1); Figure 3. *Nebrodités agrigentinus contortus* (NEUMAYR) (LRd36T5.0); red nodular limestone, Late Kimmeridgian – *Acanthicum* Zone, F1-Ghilcoș outcrop. / Figura 3. *Nebrodités agrigentinus contortus* (NEUMAYR) (LRd36T5.0); calcare nodulare roșii, Kimmeridgian superior - Zona *Acanthicum*, afloriment F1-Ghilcoș. (x 1); Figure 4. *Nebrodités agrigentinus contortus* (NEUMAYR) (LRd37T3.5), red nodular limestone, Early Kimmeridgian – Divisum Zone (Uhlandi Subzone), F1-Ghilcoș outcrop. / Figura 4. *Nebrodités agrigentinus contortus* (NEUMAYR) (LRd37T3.5), calcare nodulare roșii, Kimmeridgian inferior - Zona Divisum (Subzona Uhlandi), afloriment F1-Ghilcoș. (x 1); Figure 5. *Nebrodités hospes hospes* (NEUMAYR) (LRd10F8); green nodular limestone, Early Kimmeridgian - Hypselocyclum Zone (Strombecki), F2-Ghilcoș outcrop. / Figura 5. *Nebrodités hospes hospes* (NEUMAYR) (LRd10F8); calcare nodulare verzui, Kimmeridgian inferior - Zona Hypselocyclum (Strombecki), afloriment F2-Ghilcoș. (x 1); Figure 6. *Nebrodités doublieri lavaronsensis* SARTI (LRd38M1); green nodular limestone, Early Kimmeridgian–Divisum Zone, F2-Ghilcoș outcrop. / Figura 6. *Nebrodités doublieri lavaronsensis* SARTI (LRd38M1); calcare nodulare verzui, Kimmeridgian inferior – Zona Divisum, afloriment F2-Ghilcoș. (x 1); Figure 7. *Nebrodités hospes hospes* (NEUMAYR) (LRd44R0.5); red nodular limestone, Early Kimmeridgian – Divisum Zone, F1-Ghilcoș outcrop. / Figura 7. *Nebrodités hospes hospes* (NEUMAYR) (LRd44R0.5); calcare nodulare roșii, Kimmeridgian inferior - Zona Divisum, afloriment F1-Ghilcoș. (x 1); Figure 8. *Nebrodités agrigentinus agrigentinus* (GEMMELLARO) (LRd16Ap);

green nodular limestone, Kimmeridgian, F2-Ghilcoş outcrop. / Figura 8. *Nebrodités agrigentinus agrigentinus* (GEMM.) (LRd16Ap); calcare nodulare verzui, Kimmeridgian, afl. F2-Ghilcoş. (x 1); Figure 9. *Nebrodités hospes hospes* (NEUMAYR) (LRd26A2); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoş outcrop. / Figura 9. *Nebrodités hospes hospes* (NEUMAYR) (LRd26A2); calcare nodulare verzui, Kimmeridgian inferior - Zona Divisum, afloriment F2-Ghilcoş. (x 1); Figure 10. *Nebrodités agrigentinus agrigentinus* (GEMMELLARO) (LRd45R1.0), microconch; red nodular limestone, Early Kimmeridgian – Divisum Zone, F1-Ghilcoş outcrop. / Figura 10. *Nebrodités agrigentinus agrigentinus* (GEMMELLARO) (LRd45R1.0), microconch; calcare nodulare roşii, Kimmeridgian inferior - Zona Divisum, afloriment F1-Ghilcoş. (x1); Figure 11. *Nebrodités agrigentinus agrigentinus* (GEMMELLARO) (LRd29D2), microconch; green nodular limestone, Late Kimmeridgian – *Acanthicum* Zone, F2-Ghilcoş outcrop. / Figura 11. *Nebrodités agrigentinus agrigentinus* (GEMMELLARO) (LRd29D2), microconch; calcare nodulare verzui, Kimmeridgian superior - Zona *Acanthicum*, afloriment F2-Ghilcoş. (x 1); Figure 12. *Nebrodités hospes hospes* (NEUMAYR) (LRd9F8); green nodular limestone, Early Kimmeridgian - *Hypselocyclum* Zone (Strombecki), F2-Ghilcoş outcrop. / Figura 12. *Nebrodités hospes hospes* (NEUMAYR) (LRd9F8); calcare nodulare verzui, Kimmeridgian inferior - Zona *Hypselocyclum* (Strombecki), afloriment F2-Ghilcoş. (x 1); Figure 13. *Idoceras* cf. *sautieri* (FONTANNES) (LRd61A4); green nodular limestone, Early Kimmeridgian–Divisum Zone, F2-Ghilcoş outcrop. / Figura 13. *Idoceras* cf. *sautieri* (FONT.) (LRd61A4); calc. nodulare verzui, Kimmeridgian inferior–Zona Divisum, afl. F2-Ghilcoş. (x1); Figure 14. *Idoceras sautieri* (FONTANNES) (LRd28A10); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoş outcrop. / Figura 14. *Idoceras sautieri* (FONT.) (LRd28A10); calc. nodulare verzui, Kimmeridgian inferior - Zona Divisum, afl. F2-Ghilcoş. (x 1)

## PLATE 2 / PLANŞA 2

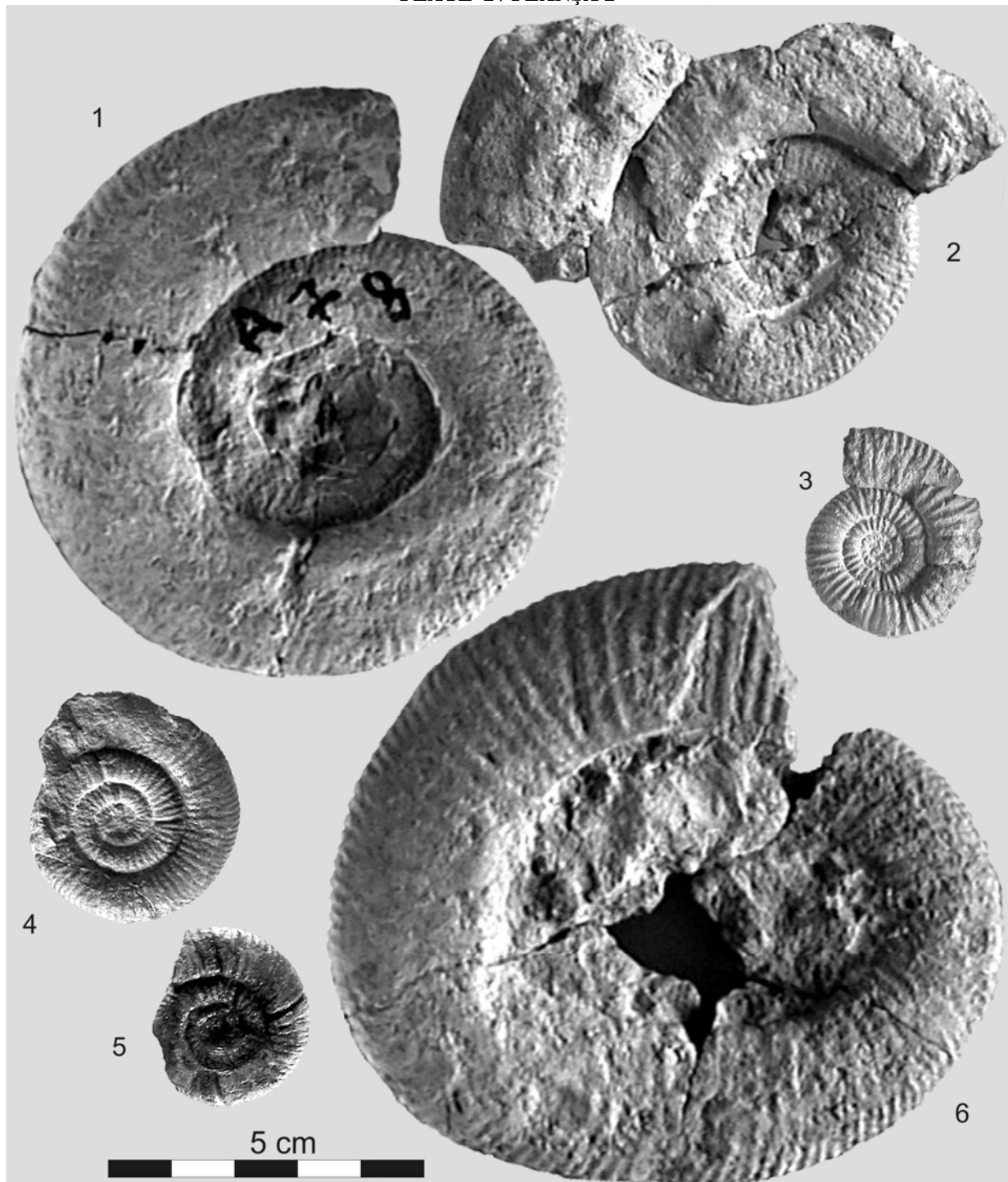


Figure 1. *Nebrodités peltoideus* (GEMM.) (LRd41A2); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoș outcrop. / Figura 1. *Nebrodités peltoideus* (GEMM.) (LRd41A2); calc. nodulare verzui, Kimm. Inf. - Zona Divisum, afl. F2-Ghilcoș. (x1); Figure 2. *Nebrodités peltoideus* (GEMM.) (LRd40A3); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoș outcrop. / Figura 2. *Nebrodités peltoideus* (GEMM.) (LRd40A3); c. nodulare verzui, Kimm. Inf. - Zona Divisum, afl. F2-Ghilcoș. (x1); Figure 3. *Nebrodités hospes hospes* (NEUMAYR) (LRd25A4); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoș outcrop. / Figura 3. *Nebrodités hospes hospes* (NEUM.) (LRd25A4); calc. nodulare verzui, Kimm. Inf. - Zona Divisum, afl. F2-Ghilcoș; Figure 4. *Nebrodités* sp. (LRd14E), microconch; green nodular limestone, Early Kimmeridgian - Hypselocyclum Zone (Strombecki), F2-Ghilcoș outcrop. / Figura 4. *Nebrodités* sp. (LRd14E); calcare nodulare verzui, Kimm. inf. - Zona Strombecki, afl. F2-Ghilcoș. (x 1); Figure 5. *Nebrodités favaraensis* (FONTANES) morphotype *pasubiensis* Sarti (LRd59T2.0); red nodular limestone, Early Kimmeridgian – Divisum Zone, F1-Ghilcoș outcrop. / Figura 5. *Nebrodités favaraensis* (FONTANES) morfotip *pasubiensis* SARTI (LRd59T2.0); calcare nodulare rosii, Kimmeridgian inferior - Zona Divisum, afloriment F1-Ghilcoș. (x 1); Figure 6. *Nebrodités favaraensis* (GEMMELLARO) (LRd43A8); green nodular limestone, Early Kimmeridgian – Hypselocyclum Zone (Strombecki), F2-Ghilcoș outcrop. / Figura 6. *Nebrodités favaraensis* (GEMMELLARO) (LRd43A8); calcare nodulare verzui, Kimmeridgian inferior - Zona Hypselocyclum (STROMBECKI), afloriment F2-Ghilcoș. (x 1)

## PLATE 3 / PLANȘA 3

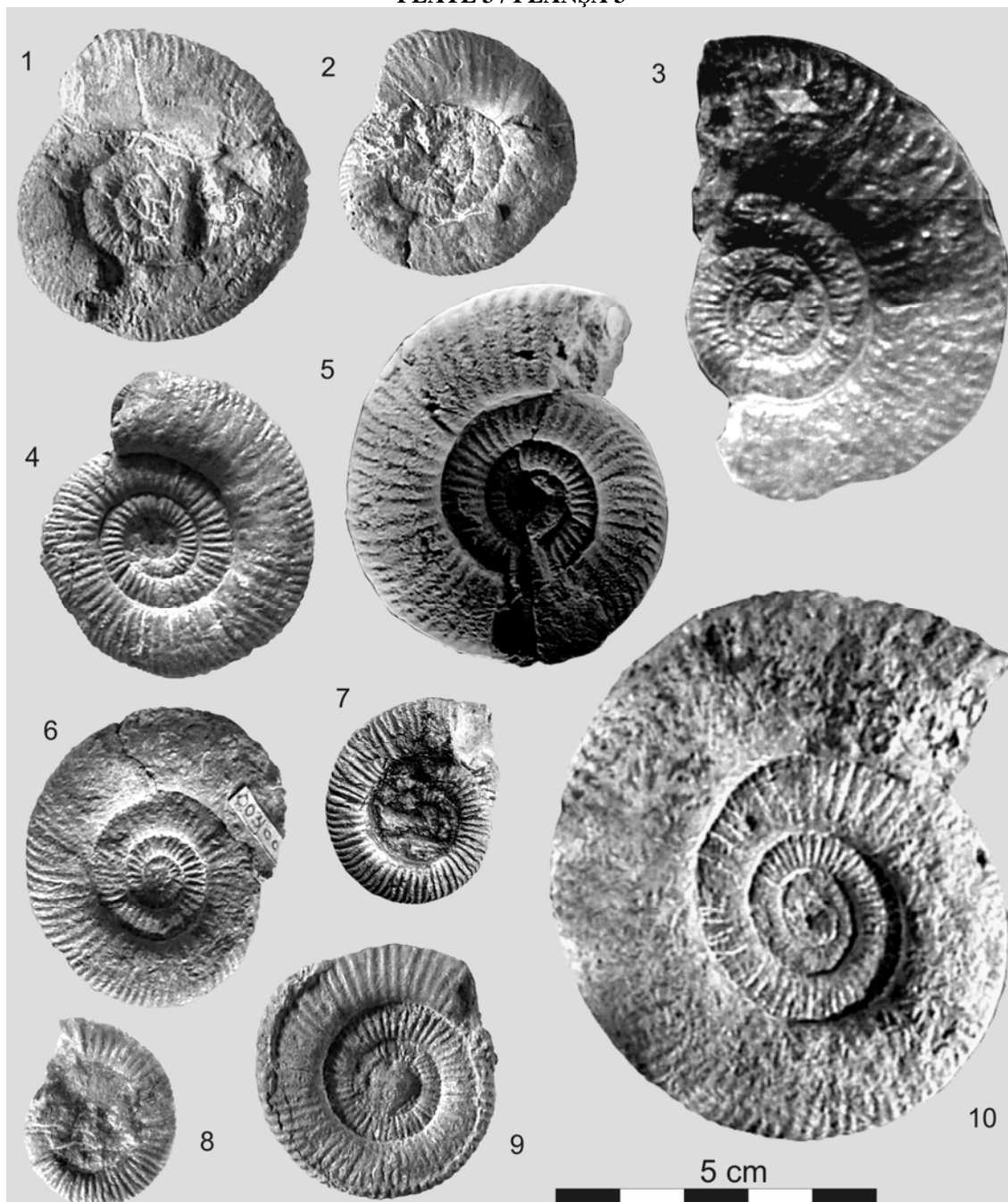


Figure 1. *Nebrodités rhodanensis* ZIEGLER (LRd19Ap); green nodular limestone, Kimmeridgian, F2-Ghilcoș outcrop. / Figura 1. *Nebrodités rhodanensis* ZIEGLER (LRd19Ap); calcare nodulare verzui, Kimmeridgian, afloriment F2-Ghilcoș. (x 1); Figure 2. *Nebrodités rhodanensis* ZIEGLER (LRd17Ap); green nodular limestone, Early Kimmeridgian–Divisum Zone, F2-Ghilcoș outcrop. / Figura 2. *Nebrodités rhodanensis* ZIEGLER (LRd17Ap); calcare nodulare verzui, Kimm. inferior-Zona Divisum, afl. F2-Ghilcoș. (x1); Figure 3. *Nebrodités haeterus* (HERBICH) Holotype (5367 UC); red nodular limestone, Kimmeridgian, F1-Ghilcoș outcrop. / Figura 3. *Nebrodités haeterus* (HERBICH) Holotip (5367 UC); calcare nodulare rosii, Kimmeridgian, afloriment F1-Ghilcoș. (x 1); Figure 4. *Nebrodités rhodanensis* ZIEGLER (LRd22A4); green nodular limestone, Early Kimmeridgian–Divisum Zone, F2-Ghilcoș outcrop. / Figura 4. *Nebrodités rhodanensis* ZIEGLER (LRd22A4); calcare nodulare verzui, Kimm. inferior

– Zona Divisum, afl. F2-Ghilcoş. (x1); Figure 5. *Nebrodites heimi* (FAVRE) (42MPN); Kimmeridgian, Ghilcoş outcrop. / Figura 5. *Nebrodites heimi* (FAVRE) (42MPN); Kimm, Ghilcoş; Figure 6. *Nebrodites rhodanensis* ZIEGLER (LRd20Ap); calcare nodulare verzui, Kimm. inf. - Zona Divisum, afl. F2-Ghilcoş. (x 1); Figure 7. *Nebrodites hetaerus* (HERBICH) (LRd33R1.0); red nodular limestone, Early Kimmeridgian – Divisum Zone, F1-Ghilcoş outcrop. / Figura 7. *Nebrodites hetaerus* (HERB.) (LRd33R1.0); calc. nodulare rosii, Kimm. inferior - Zona Divisum, afl. F1-Ghilcoş. (x 1); Figure 8. *Nebrodites hetaerus* (HERBICH) (LRd32A6), microconch; green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoş outcrop. / Figura 8. *Nebrodites hetaerus* (HERB.) (LRd32A6); calc. nodulare verzui, Kimm. inf. – Zona Divisum, afl. F2-Ghilcoş. x1; Figure 9. *Nebrodites hetaerus* (HERBICH) (LRd24A3); green nodular limestone, Early Kimmeridgian–Divisum Zone, F2-Ghilcoş outcrop. / Figura 9. *Nebrodites hetaerus* (HERBICH) (LRd24A3); calcare nodulare verzui, Kimm. inferior – Zona Divisum, afl. F2-Ghilcoş. (x 1); Figure 10. *Nebrodites heimi* (FAVRE) (LRd42A2); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoş outcrop. / Figura 10. *Nebrodites heimi* (FAVRE) (LRd42A2); calcare nodulare verzui, Kimmeridgian inf. - Zona Divisum, afl. F2-Ghilcoş. (x 1)

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Received: April 4, 2010  
Accepted: August 25, 2010