

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

GRIGORE Dan

Abstract. This paper deals with the taxonomic study of the Idoceratinae species (for *Idoceras* and *Nebrodit* 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: Heribich, Neumayr, and Preda. Species *Nebrodit* *hetaerus* described by HERBICH is confirmed here for the first time.

Keywords: Idoceratinae, taxonomy, Hăghimaș.

Rezumat. Idoceratinae (genurile *Idoceras* și *Nebrodit*) din „Stratele cu *Acanthicum*” din Munții Hăghimaș (Carpații Orientali, România). În lucrare este prezentat studiul taxonomic al speciilor din familia Idoceratinae (genurile *Idoceras* și *Nebrodit*) 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: Heribich, Neumayr și Preda. Specia *N. heaterus* 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 *Nebrodit* 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, *Nebrodit* *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 _i = 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 _e = number of external ribs (secondary) | F17 = Outcrop from “Ciofronca” |
| (for the same whorl as N _i 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 | Ni |
|----------|------|-----|----|----|------|----|------|------|------|------|----|
| 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 *Nebrodit* BURCKHARDT 1912

Nebrodit *agrigentinus* *agrigentinus* (GEMMELLARO 1872)

Pl. 1, Figs. 8, 10, 11

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

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

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

1959 *Nebrodit* (*Nebrodit*) *agrigentinus* (GEMMELLARO)–ZIEGLER; p. 33; pl. 1, Fig. 12

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

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

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

1993 *Nebrodit* *agrigentinus* *agrigentinus* (GEMMELLARO) morphotyp *agrigentinus*–SARTI; p. 95

1994 *Nebrodit* *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 *Nebrodit*.

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.

Nebrodit *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 (= *Nebrodit* *doublieri* *doublieri*)

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

1993 *Nebrodit* *agrigentinus* *contortus* (NEUMAYR) morphotyp *contortus*–SARTI; p. 95

1994 *Nebrodit* *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.

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

Nebrodit *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-LORIOI; p. 105; pl. 16, Fig. 6

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

1994 *Nebroditites 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 Lorio'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.

Nebroditites doublieri lavaronensis SARTI 1994

Pl. 1, Fig. 6

1994 *Nebroditites lavaronensis* 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.

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

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

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

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

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

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

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

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

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

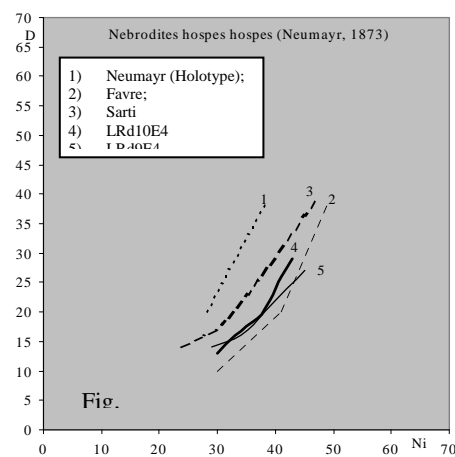
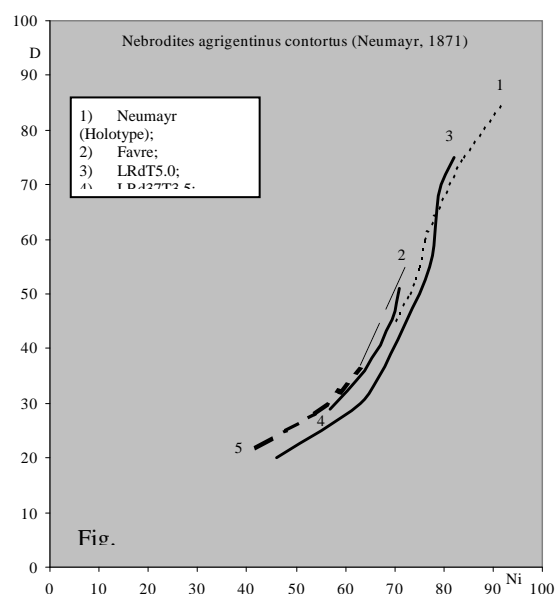
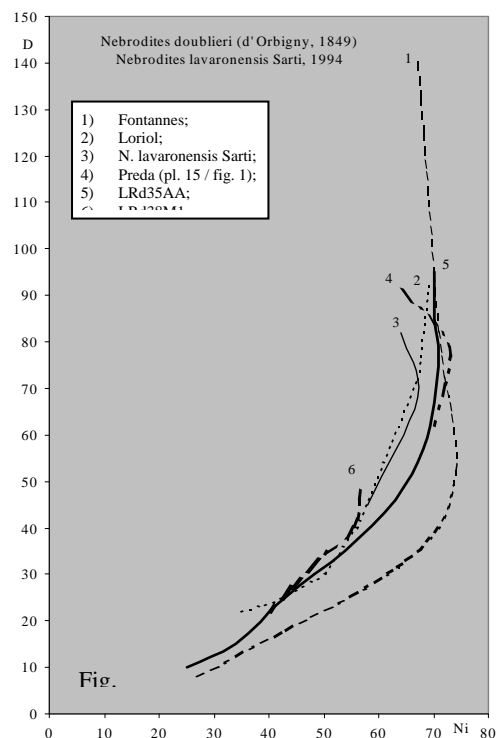
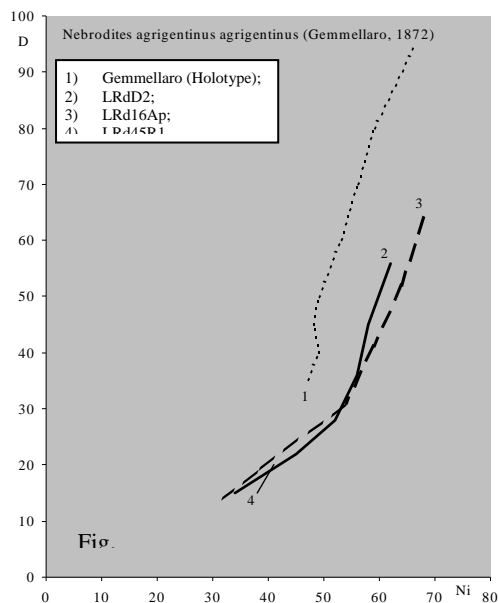
Material: LRd10F8, LRd9F8, LRd25A4, LRd26A2, LRd44R0.5, LRd30A3 Grigore Collection in GIR; Neumayr's holotype: the Collection of GIA, originates from red nodular limestones of Ciofronca outcrop; Paratype (pl. 39, Fig. 3), originates from red nodular limestones of Ghilcoș outcrop; Preda's specimen ("*Perisphinctes*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

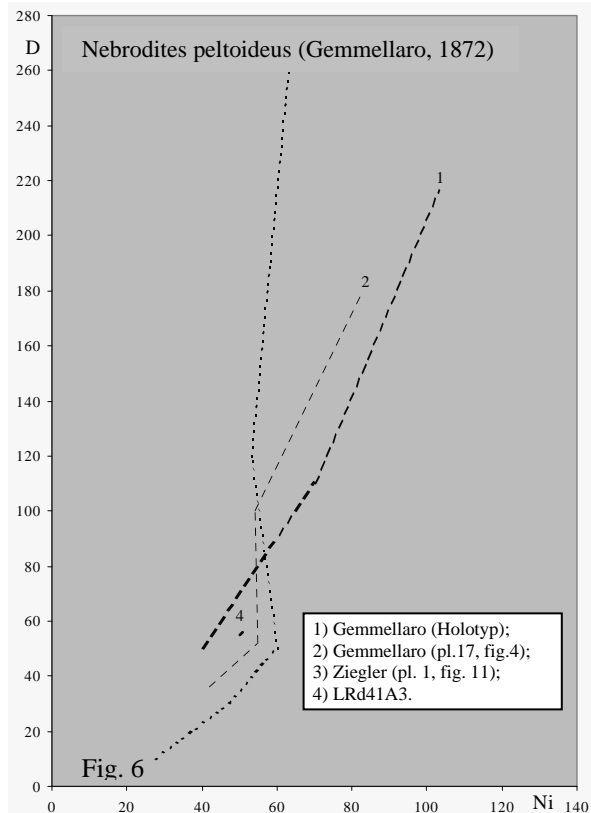
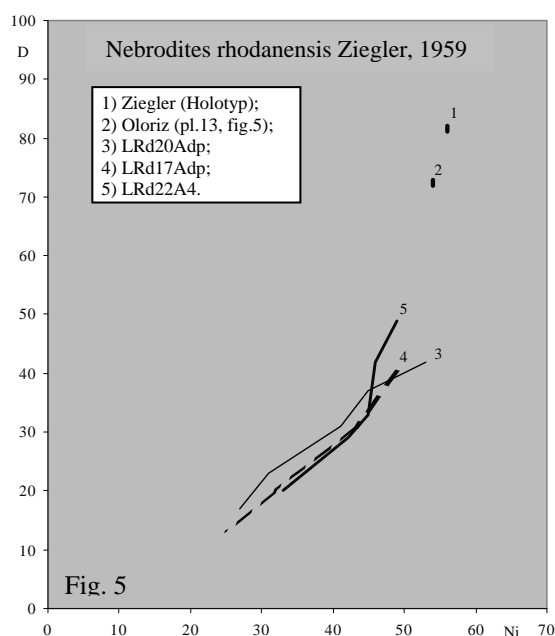
Pl. 3, Figs. 1, 2, 4, 6

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 pelloideus (GEMMELLARO 1872)

Pl. 2, Figs. 1, 2

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

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

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

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

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

1993 *Nebrodites pelloideus* (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)

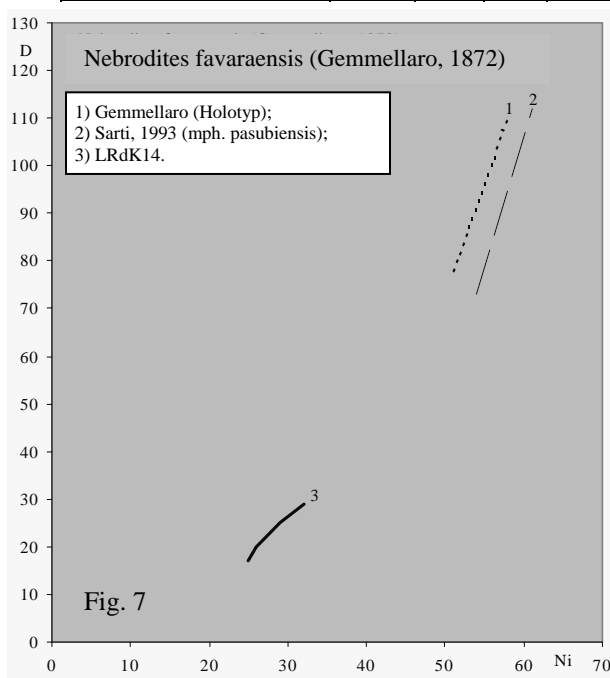
Pl. 2, Figs. 5, 6

1872 *Simoceras Favaraense* nov.sp.-GEMMELLARO; p. 50; pl. 8, Fig. 41877 *Ammonites (Simoceras) Favaraensis* GEMMELLARO-FAVRE; p. 56; pl. 6, Fig. 31959 *Nebrodites (Nebrodites) favaraensis* (GEMMELLARO)-ZIEGLER; p. 381978 *Nebrodites (Nebrodites) favaraensis* (GEMMELLARO)-OLORIZ; p. 167; pl. 13, Fig. 11986 *Nebrodites favaraensis* (GEMMELLARO)-SARTI; p.510; pl. 7, Fig. 31993 *Nebrodites favaraensis* (GEMMELLARO) morphotype *favaraensis* (GEMMELLARO)-SARTI; p. 981993 *Nebrodites 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 *Nebrodites 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 prorsiradial, 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.

Nebrodites heimi (FAVRE 1877)

Pl. 3, Figs. 5, 10

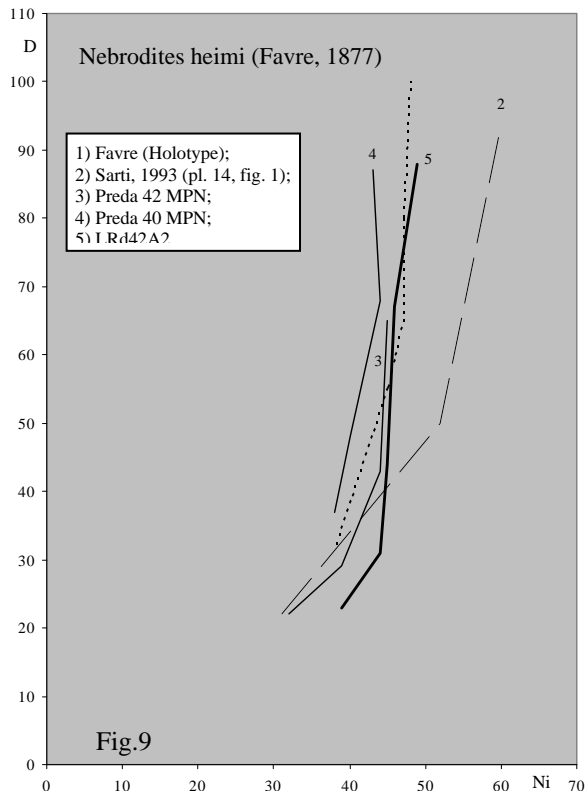
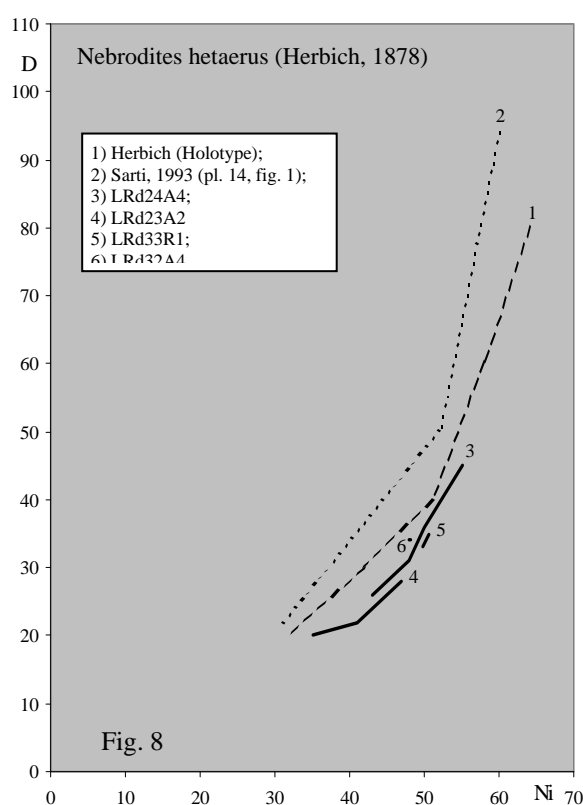
1877 *Ammonites (Perisphinctes) heimi* nov.sp.-FAVRE; p. 49; pl. 5, Fig. 31888 *Ammonites planula planus* nov.sp.-QUENSTEDT; p. 982; pl. 109, fig 41959 *Nebrodites (Nebrodites) heimi* (FAVRE)-ZIEGLER; p. 135; pl. 1, Fig. 141959 *Nebrodites (Mesosimoceras) teres* (NEUMAYR)-ZIEGLER; pl. 1, Fig. 191973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

Material: LRd42A2 Grigore Collection in GIR; Preda's specimens: the Collection of MNISP, 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 Baciș for helping me with the material of Preda Collection from the Natural Science Museum from Piatra Neamț. I would like to thanks 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 Herbach 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).

REFERENCES

- BURCKHARDT C. 1906. *La faune jurassique de Mazapil avec un appendice sur les fossiles du Crétacique Inferieur*. Bolletino Instituto Geologico Mexico. **23**: 1-217.
- DUMORTIER E. & FONTANNES F. 1876. *Description des ammonites de la zone a Ammonites tenuilobatus de Crussol (Ardèche) et de quelques autres fossiles jurassiques nouveaux au peu connus*. Mémoires de l'Académie de Lyon, Classe Sciences. Lyon. **21**: 187-342.
- FAVRE E. 1877. *La zone a Ammonites acanthicus dans les Alpes de la Suisse et de la Savoie*. Memoire Société Paléontologique Suisse. Geneve. **4**(3): 1-113.
- GEMMELLARO G. G. 1872. *Sopra I cefalopodi della zona con Aspidoceras acanthicum Opp. sp. di Burgilami presso Favara, provincia di Grigenti*. Giornale Scienza Naturale Economia. **8**: 30-52.
- GEYSSANT J. R. 1966. *Étude de quelques Ammonites (Nebrodites et Simosphinctes) du Jurassique supérieur de la zone pré-rifaine du Moyen Ouerrha*. Notes du Service géologique du Maroc. **26**: 105-112.
- GRIGORE D. 2002. *Formațiunea cu Acanthicum din regiunea Lacu Roșu (Msv. Hăghimaș-Carpații Orientali) - posibil hipostratotip al limitei Kimmeridgian – Tithonic*. Stratigrafie.Paleontologie. Teză Doctorat, Univ. „Al. I. Cuza” Iași: 347.
- GRIGORE D. in press. *Kimmeridgian – Lower Tithonian Ammonite Assemblages from Ghilcoș – Hăghimaș Massif (Eastern Carpathians – Romania)*. Acta Palaeontologica Romaniaae. Cluj Napoca. 7.
- GRIGORE D., LAZĂR IULIANA, GRASU C., GHEUCA I., CIOBANETE D., CONSTANTINESCU A., MARCU IULIA. 2009. *Paleontological sites from Cheile Bicazului – Hășmaș National Park*. Oltenia. Studii și Comunicari. Stiințele Naturii. Craiova. **25**: 355-365.
- HERBICH F. 1878. *Das szeclerland mit Berücksichtigung der Angrenzenden Landesteile*. Mittheilungen aus dem Jahrbuch der Koeniglichen Ungarischen geologischen Reichsanstalt in Budapest. **5**: 19-363.
- HOLDER H. & ZIEGLER B. 1959. *Stratigraphische und faunistische Beziehungen im Weissen Jura (Kimmeridgien) zwischen Süddeutschland und Ardeche*. Neue Jahrbuch Geologische Palaontologische Abhandlungen. Stuttgart. **108**: 150- 214.
- LORIOU P. 1878. *Monographie paleontologique des couches de la zone a Ammonites tenuilobatus de Baden*. Memoire Societe Paleontologique Suisse. Basel. **4-5**: 200.
- NEUMAYR M. 1873. *Die Fauna der Schichten mit Aspidoceras acanthicum*. Abhandlungen der kaiserliche und koenigliche geologische Reichsanstalt. Wien. **5**(6): 141-257.
- OLORIZ F. 1978. *Kimmeridgiense-Tithonico inferior en el Sector central de las Cordilleras Béticas (Zona subbética)*. Paleontologia, Bioestratigrafia. Tesis Doctoral Universidad Granada. **184**(1-2): 1-758.
- ORBIGNY A. 1842-49. *Paleontologie française. Terrains jurassiques. I. Cephalopodes*. Masson et Cie. Paris: 1-642.
- PELIN M. 1976. *Asupra jurasicului superior de la izvoarele Piriului Haghimas (Carpații Orientali)*. Studii și Cercetări de Geologie, Geofizica, Geografie. Geologie. București. **21**: 113-130.
- PREDA I. 1973. *Variațiile de facies și biostratigrafia Jurasicului superior din Munții Hăghimaș*. Studii și Cercetări de Geologie, Geografie și Biologie, Seria Geologie Geografie. Piatra Neamț. **2**: 11-21.
- QUENSTEDT F. A. 1888. *Die Ammoniten des Schwabischen Jura. III. Der Weisse Jura*. E. Schweizerbart'sche Verlagshandlung: 817-1140.
- SAPUNOV I. G. 1979. *Les fossiles de Bulgarie. III. 3. Jurassique supérieur. Ammonoidea*. Academia Bulgaria Science. Sofia: 1-263.
- SARTI C. 1988. *Due nuove specie di Idoceratinae (Ammonoidea) del Kimmeridgiano delle Prealpi Venete (Nord Italia)*. Bolletino Societa Paleontologica Italiana, Modena. **27**(3): 291-299.
- SARTI C. 1993. *Il Kimmeridgiano delle Prealpi Veneto-Trentine: fauna e biostratigrafia*. Memorie Museo Civico scienze Naturale, Verona. Sezione Scienze della Terra. **5**: 1-144.
- SARTI C. 1994. *Revisione di Nebrodites (Ammonoidea) del grupo agrigentinus (Gemmellaro)*. Palaeopelagos species publication 1, 3rd Pergola, Int. Symp., Roma: 327-342.
- ZIEGLER B. 1959. *Idoceras und verwandte Ammoniten-Gattungen im Oberjura Schwabens*. Eclogae Geologicae Helvetiae, Basel. **52**(1): 19-56.

PLATE 1 / PLANȘA 1

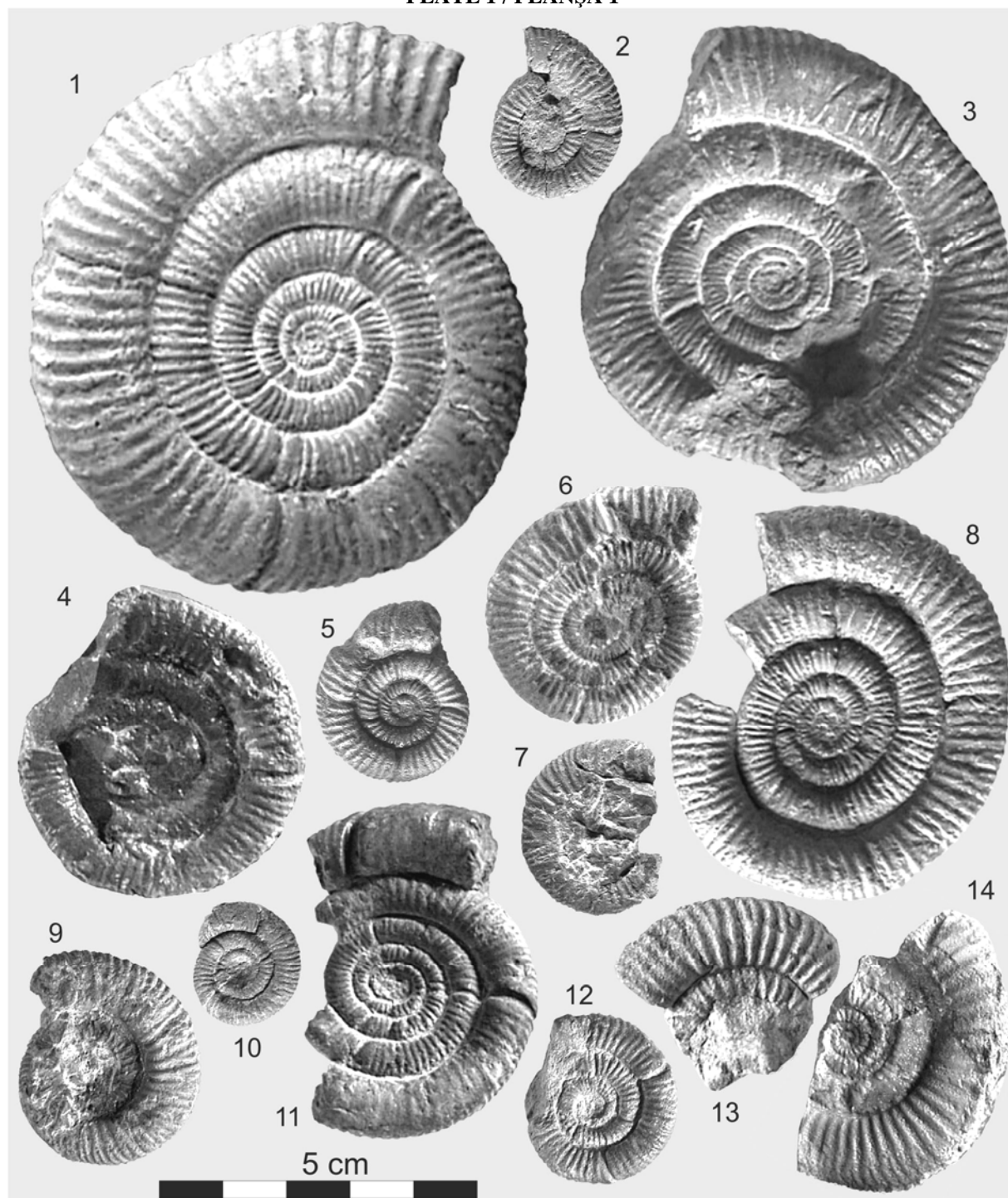


Figure 1. *Nebrodites doublieri doublieri* (D'ORBIGNY) (LRd35AA), Macroconch; green nodular limestone, Early Kimmeridgian – Divisum Zone; F2-Ghilcoș outcrop. / Figura 1. *Nebrodites doublieri doublieri* (D'ORBIGNY) (LRd35AA), Macroconch; calcare nodulare verzui, Kimmeridgian inferior - Zona Divisum;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

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

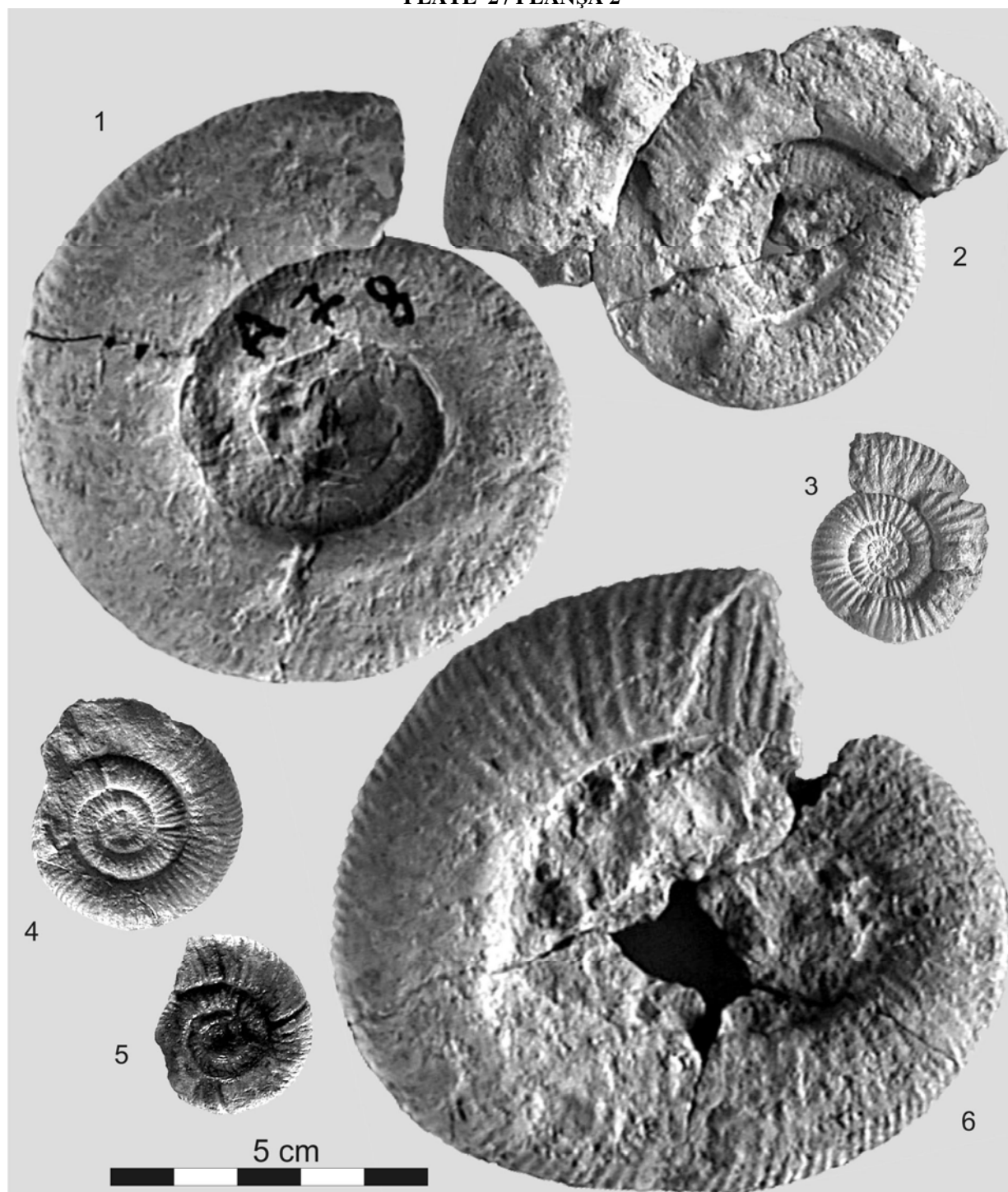


Figure 1. *Nebrodites peltoides* (GEMM.) (LRd41A2); green nodular limestone, Early Kimmeridgian – Divisum Zone, F2-Ghilcoș outcrop. / Figura 1. *Nebrodites peltoides* (GEMM.) (LRd41A2); calc. nodulare verzui, Kimm. Inf. - Zona Divisum, afl. F2-Ghilcoș. (x1); Figure 2. *Nebrodites peltoides* (GEMM.) (LRd40A3);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

PLATE 3 / PLANȘA 3

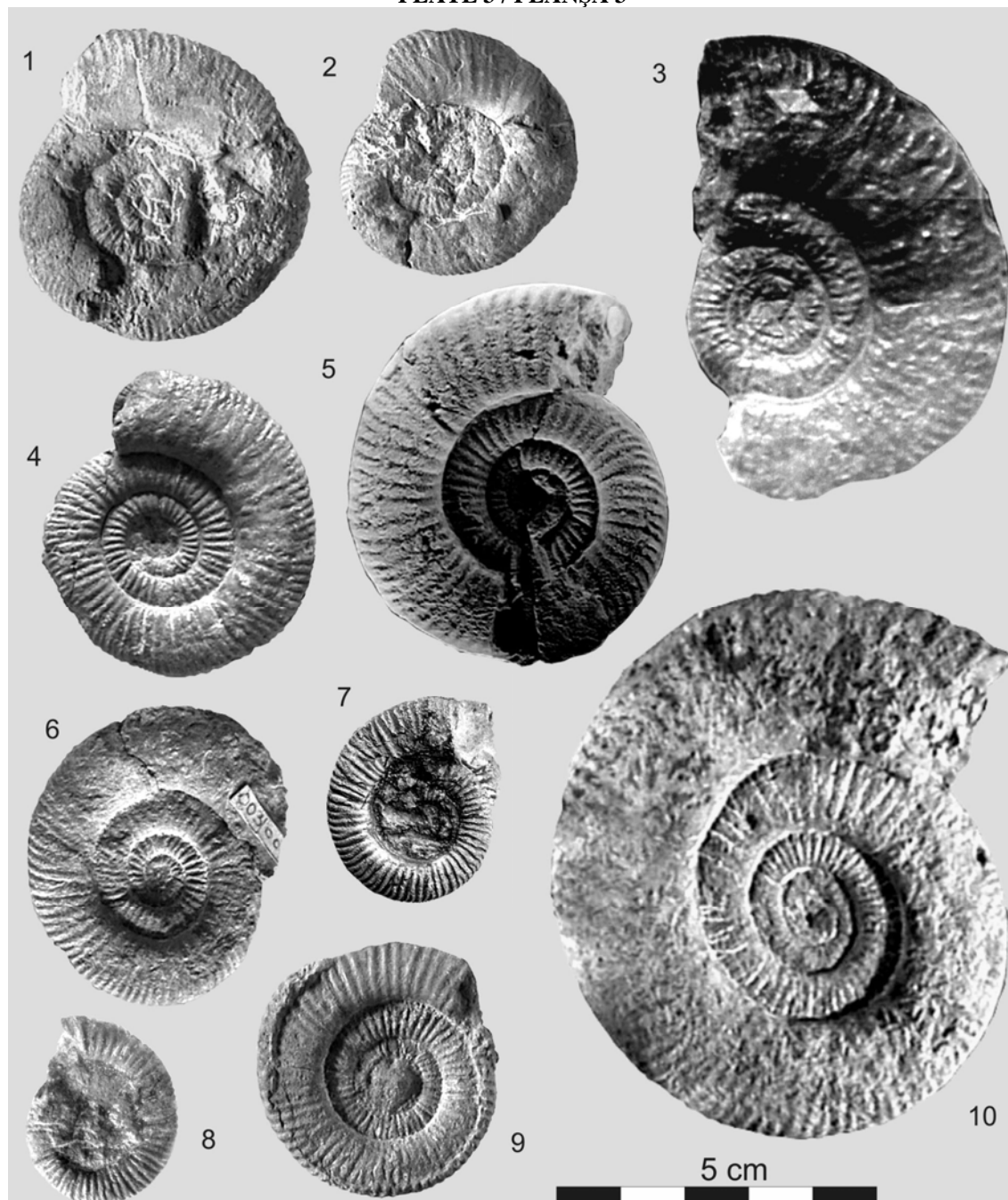


Figure 1. *Nebroditis rhodanensis* ZIEGLER (LRd19Ap); green nodular limestone, Kimmeridgian, F2-Ghilcoș outcrop. / Figura 1. *Nebroditis rhodanensis* ZIEGLER (LRd19Ap); calcare nodulare verzui, Kimmeridgian, afloriment F2-Ghilcoș. (x 1); Figure 2. *Nebroditis rhodanensis* ZIEGLER (LRd17Ap); green nodular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

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

Dan Grigore

Geological Institute of Romania,
Caransebeş 1st, Bucharest 012721, Romania
E-mail: dan1_grigore@yahoo.com

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