

The First Record of a Late Tithonian Ammonite in the Feodosiya Section of Eastern Crimea

V. V. Arkadiev

St. Petersburg State University, Universitetskaya nab. 7–9, St. Petersburg, 199034 Russia

e-mail: vsegei@wplus.net

Received April 14, 2003

Abstract—A Late Tithonian ammonite, *Oloriziceras schneidi* Tavera, 1985, is recorded for the first time in the Feodosiya section of the Tithonian–Berriasian boundary beds of Eastern Crimea.

Key words: ammonites, Late Tithonian, Feodosiya section, Eastern Crimea.

INTRODUCTION

Tithonian–Berriasian boundary beds are widespread in eastern Crimea. They are represented by clayey-carbonate flyschoid series up to several hundred meters thick. The most complete and best exposed sections are located near Feodosiya, on St. Iliya Cape and in Dvuyakornaya Bay (Fig. 1). These sections have been studied for over a hundred years. Various authors have described a rich ammonite assemblage in this section, which they assigned either to the Tithonian (Sokolov, 1886; Retowski, 1893; Druschits, 1975) or Berriasian (Kilian, 1907–1913). This assemblage is characteristic of the Feodosiya Marl Member rather than of the entire section (Sokolov, 1886).

The first scheme of zonal subdivision of the Tithonian–Berriasian boundary beds in Feodosiya was proposed by Sazonova and Sazonov (1974), who recognized the two upper zones of the Tithonian and all the zones of the French Berriasian (Le Hégarat, 1973). However, the records of the typical Late Tithonian ammonite *Paraulacosiphonites transitorius* that they indicated have not been supported by further evidence.

Later, the section on St. Iliya Cape (Fig. 1A) was studied by many geologists (Bogdanova *et al.*, 1981, 1984; Glushkov, 1997). They confirmed the Berriasian age of the Feodosiya Marl Member and recognized the *jacobi-grandis* and *occitanica* zones (Bogdanova *et al.*, 1999). Of the 80-m section, the Feodosiya Marl Member, which contains ammonites, comprises only the upper 13 m. The age of the lower, larger portion of the section has not been paleontologically determined.

In 2001, Yu.N. Savel'eva and I found Berriasian ammonites in the lower part of this section. Arkadiev (2002) and Arkadiev and Savel'eva (2002) proposed the subdivision of the *jacobi-grandis* Zone (presently named the *jacobi* Zone) (Hoedemaeker and Bulot,

1990) into *Berriasella chomeracensis* and *Pseudosubplanites grandis* subzones.

In 2002, Yu.N. Savel'eva (St. Petersburg State University), A.A. Fedorova (All-Russia Oil Geological Prospecting Institute), F.A. Trikolidi (St. Petersburg State University), V.B. Ershova (St. Petersburg State University), E.L. Grundan (St. Petersburg State University), and I studied the lowermost beds of the Feodosiya Section, which are exposed on the shore of the Black Sea in Dvuyakornaya Bay (Fig. 1B). Stratigraphically, these beds are below those exposed on St. Iliya Cape. They are represented by a flyschoid series of clayey-carbonate sediments about 215 m in diameter (Fig. 2). In this section, which is about 40 m below the level with the first Berriasian ammonites *Pseudosubplanites lori-*

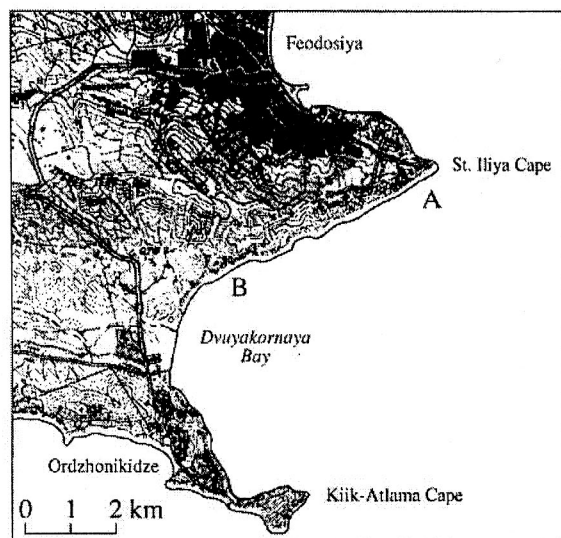


Fig. 1. Schematic map showing the sections studied: (A) on St. Iliya Cape, (B) in Dvuyakornaya Bay.

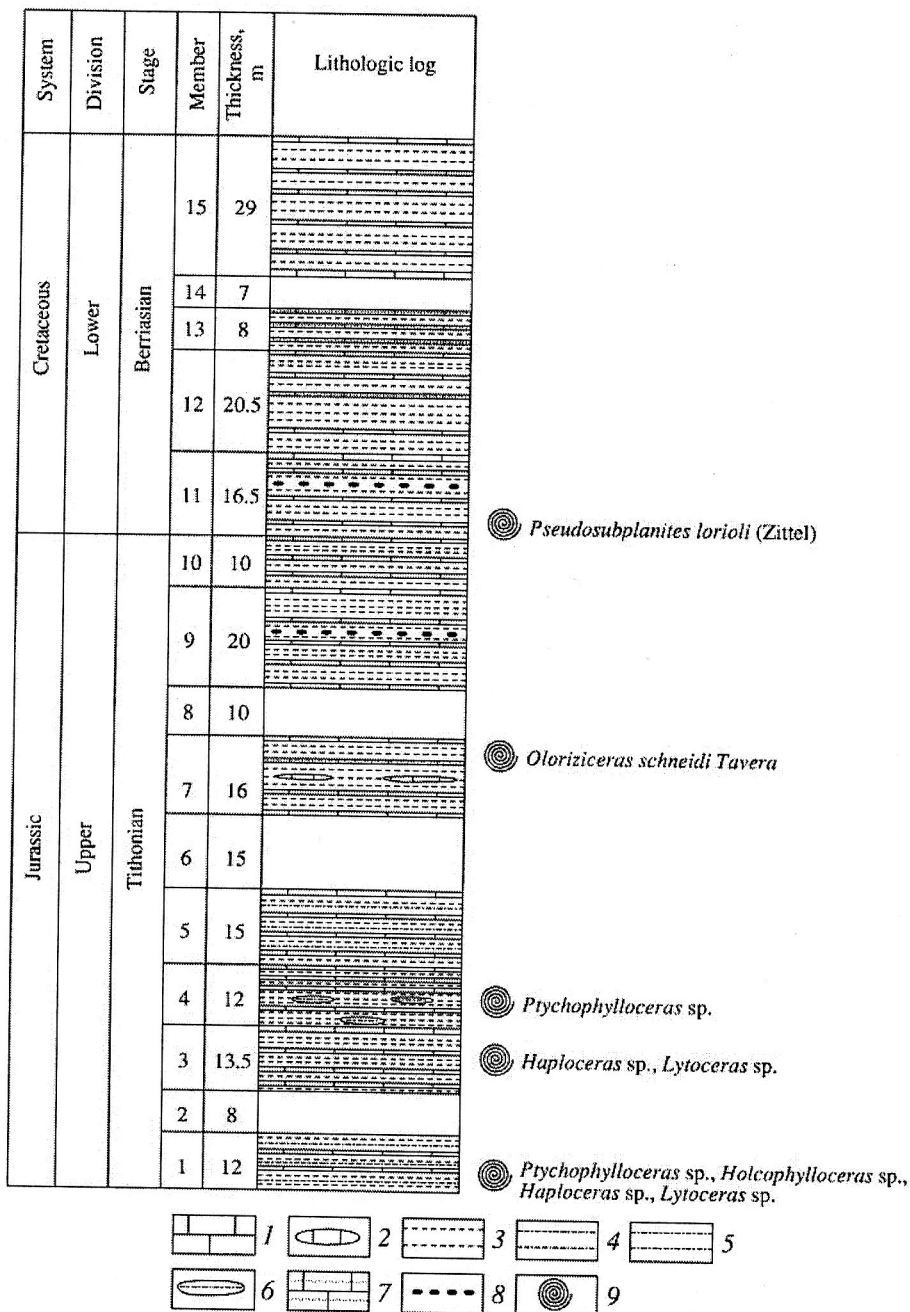


Fig. 2. The section of the Tithonian–Berriasian beds in Dvuyakornaya Bay. Explanations: (1) limestone, (2) limestone lenses, (3) clay, (4) sandy clay, (5) siltstone, (6) siltstone lenses, (7) calcareous sandstone, (8) siderite nodules, and (9) ammonite shells.

oli (Zittel) characteristic of the *jacobi* Zone, we found an ammonite that was identified as *Oloriziceras schneidi* Tavera, 1985. Tavera (1985) has described similar shells from the Upper Tithonian of Spain. Thus, this find allows, for the first time, positive dating of the lower horizons of the Feodosiya section as Late Tithonian. This ammonite, which is housed in the Museum of the Department of Historical Geology of St. Petersburg State University (coll. no. 376/1), is described below.

SYSTEMATIC PALEONTOLOGY
Family Perisphinctidae Steinmann, 1890
Genus *Oloriziceras* Tavera, 1985

Oloriziceras schneidi Tavera, 1985

Oloriziceras schneidi: Tavera, 1985, p. 68, pl. 6, figs. 2, 3, text-fig. 6.

H o l o t y p e. Specimen no. W.GA₁₀-3.56 (Tavera, 1985, pl. 6, fig. 3); Upper Tithonian of Spain.

S h e l l s h a p e. The shell is discoidal and evolute, with flattened flanks. The shape of the venter is indeter-

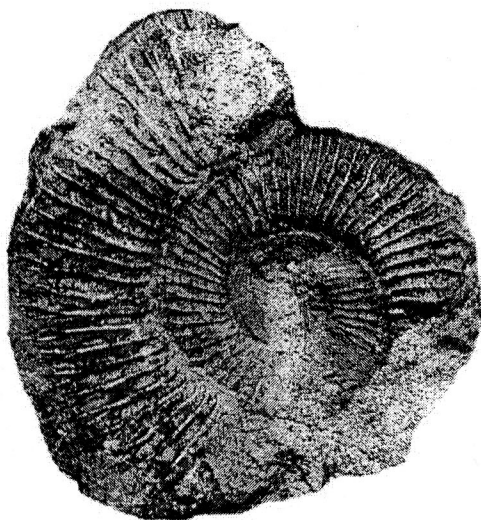


Fig. 3. *Oloriziceras schneidi* Tavera, 1985; specimen no. 376/1, lateral view, $\times 1$; Dvuyakornaya Bay; Upper Tithonian.

minate. The cross section is highly oval, most likely rounded-rectangular. The umbilicus is wide and shallow, with a steep wall.

Ornamentation. The flanks are covered by thin sharp bifurcating ribs. The ribs begin from the seam. On the umbilical wall, they are weakly inclined backward and, then, run straight across the flank. At approximately two-thirds of the length of the flanks, the ribs bifurcate into two equal secondary branches. The posterior branch is weakly inclined backward, while the anterior branch is slightly inclined forward. The shape of the ribbing on the venter is unknown. The density of ribbing on the observed inner and outer whorls is the same. The shell with $Dm = 41.0$ mm possesses about 50 inner ribs, while the remaining part of the adult shell (somewhat smaller than half of the whorl) has 23 inner ribs.

Dimensions in mm and ratios in %:

Specimen no.	Dm	WH	WW	UW	WH/Dm	WW/Dm	UW/Dm
376/1	61.0	22.0	-	32.0	36	-	52

Suture was not observed.

Comparison. Judging from morphological characters (shell coiling, bifurcating ribs), the specimen described is certainly a perisphinctid. Unfortunately, the character of the venter remains unstudied: judging, however, from the shape of the flanks, it is most similar to specimens that were described and figured as a new genus and species—*Oloriziceras schneidi*—by Tavera (1985).

Remarks. The genus *Oloriziceras* is distinguished from the other perisphinctids described by Tavera from the Upper Tithonian of Spain by its more evolute shell. This character and the very slow expansion of whorls distinguish *O. schneidi* from all species of *Berriasella*.

Occurrence. Upper Tithonian of Spain and Crimea.

Material. One specimen from Dvuyakornaya Bay.

ACKNOWLEDGMENTS

I am grateful to E.D. Kalacheva and I.I. Sei for consultations in identification of the fossil. The study was supported by a grant of the Ministry of Education of the Russian Federation in the Field of Natural Sciences (no. E02-9.0-111).

REFERENCES

1. V. V. Arkadev, "The *Berriasella jacobii*-*Pseudosubplanites grandis* Zone of the Berriasian in the Crimean Mountains," in *Abstracts of Papers of the 1st All-Russia Conference: Cretaceous System of Russia. Problems in Stratigraphy and Paleogeography (Moscow, February 4-6, 2002)* (Mosk. Gos. Univ., Moscow, 2002), pp. 8-9.
2. V. V. Arkadev and Yu. N. Savel'eva, "The *jacobii*-*grandis* Zone of the Berriasian in the Crimean Mountains" in *Abstracts of Papers of the 48th Session of the Paleontological Society on Problems of Biochronology in Paleontology and Geology, St. Petersburg, April 8-12, 2002* (St. Petersburg, 2002), pp. 11-13.
3. T. N. Bogdanova, E. D. Kalacheva, and I. I. Sei, "On the Presence of the *Tirnovella occitanica* Zone (Lower Cretaceous, Berriasian) in the Feodosiya Section in the Southern Crimea," *Regional'naya Geol. i Metallogeniya*, No. 9, 27-32 (1999).
4. T. N. Bogdanova, S. V. Lobacheva, V. A. Prozorovskii, and T. A. Favorskaya, "On Subdividing the Berriasian Stage in the Crimean Mountains," *Vestn. Leningr. Univ.*, No. 6, 5-14 (1981).
5. T. N. Bogdanova, S. V. Lobacheva, V. A. Prozorovskii, and T. A. Favorskaya, "Berriasian in the Eastern Crimea and the Jurassic-Cretaceous Boundary," *The Boundary Stages of the Jurassic and Cretaceous Systems* (Nauka, Moscow, 1984), pp. 28-35 [in Russian].
6. V. V. Druschits, "The Berriasian of the Crimea and Its Stratigraphical Relations," *Mém. Bur. Rech. Géol. Minér.*, No. 86, 337-341 (1975).
7. A. Yu. Glushkov, "On the First Find of the Index Species to the Lower Zone of the Berriasian Stage in the Crimea," *Vestn. S.-Peterb. Univ. Ser. 7. Geol., Geogr.*, No. 1(7), 90-93 (1997).
8. P. J. Hoedemaeker and L. Bulot, "Preliminary Ammonite Zonation for the Lower Cretaceous of the Mediterranean Region," *Géol. Alpine* **66**, 123-128 (1990).
9. W. Kilian, *Letaea geognostica. Das Mesozoicum. Kreide* (Stuttgart, 1907-1913), Vol. 3.
10. G. Le Hégarat, "Le Berriasien du Sud-Est de la France," *Doc. Lab. Géol. Fac. Sci. Lyon* **43** (1), 1-309 (1973).
11. O. Retowski, "Die tithonischen Ablagerungen von Theodosia," *Bull. Soc. Natur. Mosc. N. Sér.* **7** (2-3), 206-301 (1893).
12. I. G. Sazonova and N. T. Sazonov, "Comparative Stratigraphy and Fauna of Jurassic-Cretaceous Boundary Beds of Eastern Europe," *Tr. Vses. Nauchno-Issled. Geologorazved. Inst.*, No. 152, 194-314 (1974).
13. V. D. Sokolov, "Material to the Geology of the Crimean Peninsula: Crimean Tithonian," *Izv. Mosk. O-va Lyub. Estestvozn. Antropol. Etnogr.* **14**, 1-43 (1886).
14. J. M. Tavera, *Los ammonites del tithónico superior-berriasense de la zona Subbética (Cordilleras Béticas)* (Granada, 1985).