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# The Tithonian-Berriasian ammonites of Georgia and their distribution

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## RIASSUNTO

Nei depositi carbonatici titonici e berriasiani della Georgia le ammoniti sono rare e si rinvengono sporadicamente. Gli strati sono normalmente privi di fossili e, al momento, sono conosciuti solo pochi affioramenti nei quali banchi isolati contengono ammoniti.

Perciò il nostro materiale è frammentario e non ci permette di caratterizzare con sufficiente completezza l'evoluzione delle ammoniti titonico-berriasiane. In alcuni strati tuttavia è possibile provare l'esistenza di piani, sottopiani o zone isolati.

Abbiamo trovato uno di tali affioramenti nella valle del fiume Arcva, tributario destro del fiume Psou (Abkhazia occidentale).

Qui le arenarie argillose grigie del Titonico superiore contengono Dalmasiceras subloevis Mazenot, D. kiliani Djanélidzé, D. gevreyi (Jacob et Kilian); queste sono sormontate da marne e calcari argillosi nei quali sono state raccolte le ammoniti berriasiane. Sono descritte: Berriasella privasensis (Pictet), B. oxycostata (Jacob), B. jacobi (Mazenot), Fauriella gauthieri Le Hegarat, F. boissieri (Pictet), F. iberi ca n. sp., F. hoedemaeckeri n. sp., Malbosiceras paramimounum (Mazenot), M. malbosi (Pictet), Jabronella incomposita (Retowski), J. hegarati n. sp., J. erdenensis Nikolov, J. pacquieri (Simionescu), Tirnovella alpillensis (Mazenot), T. allobrogensis (Mazenot), T. suprajurensis (Mazenot).

Questa fauna indica che negli strati del fiume Arcva sono presenti le zone a Jacobi-Grandis, Occitanica e Boissieri.

Le ammoniti titoniche e berriasiane della Georgia appartengono al dominio tetisiano e assomigliano a quelle dell'Appennino Centrale. L'evidenza paleogeografica, sedimentaria e faunistica suggerisce condizioni di acque basse vicino alla costa.

#### ABSTRACT

In the Tithonian and Berriasian carbonate deposits of Georgia the fossil ammonites are rare and occur sporadically. The beds usually are devoid of fossils and presently only a few outcrops are known, where the isolated layers contain the ammonites.

Therefore our materials are fragmentary and do not permit us to characterise with sufficient completeness the evolution of the Tithon-Berriasian Ammonites. But in some outcrops it is possible to prove the existence of isolated stages, substages or zones. We have found one of such outcrops in the valley of the river Arcva, the right tributary of the Psou River (Western Abkhazia). Here the Upper Tithonian gray shaly argillaceous sandstones contain Dalmasiceras subloevis Mazenot, D. kiliani Djanélidzé, D. gevreyi (Jacob et Kilian); they are conformably overlain by marls and argillaceous limestones in which the Berriasian ammonites are collected. There are described: Berriasella privasensis (Pictet), B. oxycostata (Jacob), B. jacobi (Mazenot), Fauriella gauthieri Le Hegarat, F. boissieri (Pictet), F. iberica n. sp., F. hoedemaeckeri n. sp., Malbosiceras paramimounum (Mazenot), M. malbosi (Pictet), Jabronella incomposita (Retowski), J. hegarati n. sp., J. erdenensis Nikolov, J. pacquieri (Simionescu), Tirnovella alpillensis (Mazenot), T. allobrogensis (Mazenot), T. suprajurensis (Mazenot).

This fauna suggests that in the outcrop of River Arcva the Zones of Jacobi-Grandis, Occitanica and Boissieri are presented.

The Tithonian and Berriasian ammonites of Georgia belong to the Tethyan realm and resemble those of Central Apennines. Paleogeographical, sedimentary and faunal evidence suggests shallow water near shore conditions.

KEY WORDS Ammonites, Jurassic, Georgia, Biostratigraphy, Paleogeography.

## 1. INTRODUCTION

The Tithonian and Berriasian is represented in Georgia by three different facies of deposits: lagunar, shallow marine deposits of periphery of Georgian plate, and flysh deposits of the geosyncline of South slope of Chief Caucasian Range.

Lagunar and continental deposits of Georgian plate are represented in the Western Georgia by the red sandstones, red and green sandy clays and gypsum of so called particouloured suite, which in some cross-sections is of significant thickness, but does not contein the macrophossils.

Marine deposits of periphery of the Georgian plate are build up by limestons, breckchial limestons, zoogene detrital limestons, dolomites and dolomite limestons. In Abkhazia they attein some hundred metres in thickness and contain only very rare fossil remnants of molluscs and thatfore till now are not divided in stages.

Flysh deposits of Southern slope, represented by rhitmic alternation of limestons, shaly marls and argillaceous shists also do not contain the macrofossils except the very rare belemnites and aptychs.

Thus, the rare founds of ammonites in Georgia are connected chiefly with the Upper Tithonian rifogenous limestons of Northern periphery of Georgian plate, which stretch in general Caucasian direction and make isolated outcrops in valleys of Liakhvi, Ksani, Aragvi and Jory Rivers and in neighbourhood of town Tsiteli Tskaro in East Georgia. This ammonites described by Khimchiachvili (1957) contain the species characteristic for the Thetian zoogeographical realm.

In Berriasian deposits the ammonites were collected in Western Georgia, in region transitional between the Georgian plate and the geosyncline of Southern slope of Caucasus. This deposits are represented in Psou Valley (West Abkhazia) by alternation of limestons, marls and argillaceous sandstons. The Berriasian is conformerly deposited on the Upper Tithonian limestons, brekchial limestons and marls with *Dalmasiceras subloevis* Mazenot, *D. kiliani* Djanélidzé, *D. gevreyi* (Jacob and Kilian). The Berriasian is characterised by the ammonite fauna formerly described by Khimshiashvili (1976). Now from the marls and argillaceous and sandy limestons of Berriasian of Psou Valley we have new supplementary founds of ammonites (see plate 1-3).

As shows the stratigraphical distribution of here mentioned forme, the presence in Berriasian of River Psou of the Jacobi-Grandis Zone is confirmed by such species as *Berriasella oxycostata* (Jacob), *Fauriella iberica* n. sp., *Tirnovella allobrogensis* (Mazenot) and *T. suprajurensis* (Mazenot).

For the Occitanica Zone characteristic forms are: Berriasella privasensis (Pictet) and Fauriella gauthieri Le Hégarat.

The guide forms of Upper Berriasian Boissieri Zone, are: Fauriella boissieri (Pictet), Malbosiceras paramimounum (Mazenot), M. malbosi (Pictet), Jabronella (Erdenella) erdenensis Nikolov, E. (E.) paquieri (Simionescu) and Tirnovella alpillensis (Mazenot).

In the fauna of ammonites of Tithonian and Berriasian of Georgia there are represented only speciese, characteristic for the Thetian paleozoogeographical realm. Most of Upper Tithonian species are identish to the species, described by prof. K. Zittel from Central Appennines.

Paleogeographical conditions of Upper Tithonian sea, the lithology of sediments - rifogenous limestons, limestone brekchies and detrital limestons and the composition of the faune of corals, gastropods and lamellibranchiate suggests the near-shore conditions of sedimentation in the shallow sea of normal salinity.

#### 2. PALAEONTOLOGICAL DOCUMENTATION

Genus Barriasella Uhlig, 1905

#### Berriasella privasensis (Pictet, 1867) (Pl. I, fig. 4)

- pars 1867 Ammonites privasensis Pictet, p. 84, pl. 18, fig. 1ab, non fig. 2 = B. picteti (Jacob.)
  - 1973 Berriasella privasensis Le Hegarat, p. 61, pl. 5, fig. 3-9; pl. 38, fig. 9.
  - 1976 Berriasella privasensis Khimchiachvili, p. 84, pl. 5, fig. 1-3.
  - 1982 Berriasella privasensis Nikolov, p. 57, pl. II, fig. 2-4 (synonymy).

Dimensions - N 5064 / D-52 (1) / H-18 (0,34) / U-20 (0,38)

The incomplete inner cast is slightly deformed, but the ratio of dimensions and main characters of the sculpture allow us to assign this specimen to the species, described by Pictet. There are 21 ribs on the half of the whorl. The most of them are bifurcate nearly above the middle of the whorl height. The anterior (adoral) one continues the direction of the primary rib, an the other branch is curved posteriorly. Undivided ribs are also present.

Locality - Arkva River, along the road to Aibga I, 100-150 m from the old bridge. Sample number 5064.

Distribution - South-Eastern France, Bulgaria, Northern Caucasus, Africa. First appearance - in the Subalpina Subzone, the most abundant - in the Privasensis Subzone and disappearing in the Dalmasi Subzone. Berriasella (Picteticeras) oxycostata Mazenot, 1939 (Pl. 1, fig. 2, 5)

- 1904 Hoplites oxycostatus Jacob in coll. (Fac. sc. Grenoble)
- pars 1939 Berriasella oxycostata Mazenot, p. 51, pl. 3, fig. 9 a-j, non fig. 10.
  - 1965 Berriasella oxycostata Büsnardo, Le Hégarat, Magne, p. 12, p. 29, pl. 8.
  - 1973 Berriasella (Picteticeras) oxycostata Le Hégarat, p. 78, pl. 8, fig. 4-6; pl. 40, fig. 2-4.
  - 1982 Berriasella (Picteticeras) oxycostata Nikolov, p. 70, pl. 15, fig. 2.

Dimensions - N 5073 / D-41 (1) / H-16 (0,39) / U-13,5 (0,33)

This fragment represents one half the whorl, of the small and flattened shell with hight and slowly increased in height whorls. The edge of the umbilicus is roun, superficial and of middle size. Slightly convexed whorl sides gradually connected with the compressed by deformation, narrow external border. Thys external border because of these hight and sharp ribs has a shewronlike outline. Distant ribbing is characteristic of this species and distinguished it from the other representatives of thys genus. About 30 ribs are on the last whorl (about 15 per half whorl). The most of ribs bifurcate near the ventral third of the whorl side. Undivided ribs and the intermediate ribs are also present.

Locality - Arkva River, along the road to Aibga I, 100-150 m from the old bridge. Sample number 5073.

Distribution - Jacobi Zone, rare in the Grandis Zone of France, Bulgaria, Rumania, Georgia and Tunisia.

Berriasella jacobi (Mazenot, 1939) (Pl. 1, fig. 1, 6)

- pars 1939 Berriasella jacobi Mazenot, p. 54, pl. 4, fig. 1a, b; 2a, b; 4.
  - 1953 *Berriasella jacobi* Arnold-Saget, p. 33, pl. 3, fig. II abc; pl. 4, fig. Iabc.
  - 1973... Berriasella (Berriasella) jacobi Le Hegarat, p. 56, pl. 6, fig. 9-12; pl. 38, fig. 3, 6, 8.
    - 1982 Berriasella (Berriasella), jacobi Nikolov, p. 51, pl. 8, fig. 4-8 (synonymy).
- Dimensions N 5050 / D-44 (1) / H-17 (0,38) / U-15 (0,34) N 4915 / D-40 (1) / H-16 (0,40) / U-14 (0,35)

Shells of small size, thay have narrow and hight oval whorls, slightly flattened from the siphonal side. Whorl sides slightly convex. The height of whorl is considerably larger then its widt. From the umbonal edge towards the siphonal side the whorls become slightly narrower. The shell is sculptured by narrow sinusoidal prorsiradiate ribs. Little upper the middle hight of whorls the ribs divide at two branches and transverse the outer side. The simple individed ribs also occur frequently. At the last whorl there are 40-43 ribs. At the end of the living chamber little lappet is present.

Our samples are crushed and the widt of the whorls can not be measured.

Locality - Right bank of Psou River, 500 m upstream from the bridge to Aibga 4. Sample number 4915; Arkva River, old road after bridge to Aibga 1. 100-150 m. Sample number 5050.

Distribution - Lower Berriasian (Jacobi Zones) of the South-Eastern France, Bulgaria and Georgia.

Genus Fauriella Nikolov, 1966

Fauriella gauthieri (Le Hegarat, 1973) (Pl. 2, fig. 3, 4)

- pars 1939 Berriasella abscissa Mazenot, p. 105, pl. 14, fig. 2ab; 3ab.
  - 1973 Fauriella gauthieri Le Hegarat, p. 160, pl. 22, fig. 6-8; pl. 46, fig. 8.
  - 1982 Fauriella gauthieri Nikolov, p. 116, pl. 32, fig. 2, 3.
- Dimensions N 5040 / D-40 (1) / H-15 (0,37) / U-13 (0,32) N 5070 / D-62 (1) / H-23 (0,37) / U-19 (0,31)

The discoidal shell with whorls rapidly increasing in height and flat but clear-cut umbilicus. Slightly convex sides are converging in direction of narrow rounded outer side. The whorls have narrow-elliptical cross section. Ornamentation is presented by very thin numerous (60 per whorl) notably prorsiradiate ribs. There are single simple ribs bifurcating at the outer third of sides and fasciculated ribs dividing from little radially prolonged nodes at the umbonal edge.

Le Hegarat notes the particularly thin ribbing of inner whorls as a distinctive sign of this species. Our sample has partly preserved adoral part of the last whorl which indicates the second characteristic sign - the ribbing becomes significantly more rough and rare.

From the similar species *F. rarafurcata* (Pictet) and *F. gallica* (Mazenot) this species easily distinguished by dence and fine ribs.

*Locality* - Arkva River, from the old bridge leading to Aibga 1 100-150 m.

Distribution - Privasensis and Paramimounum Subzones of South-Eastern France and Bulgaria.

Fauriella boissieri (Pictet, 1867) (Pl. 2, fig. 6; pl. 3, fig. 1)

- 1867 Ammonites boissieri Pictet, p. 79, pl. 15, fig. 1-3.
- pars 1939 Berriasella boissieri Mazenot, p. 106, pl. 15, fig. 2ab; pl. 16, fig. 1ab; fig. 3, 4ab.
  - 1973 Fauriella boissieri Le Hégarat, p. 149, pl. 21, fig. 1-3; pl. 48, fig. 1.
  - 1982 Fauriella boissieri Nikolov, p. 110, pl. 31, fig. 3; pl. 32, fig. 1; pl. 33, fig. 1, 2; pl. 34, fig. 1-2 (synonymy)

Moderate-size flat-discoidal (platycone) shell with narrow oval cross section of high whorls and wide shallow umbilicus. Greatest width of whorls is near the umbilicus. The sides of the whorls are almost flat, but very slightly convex. On the last whorl there are about 60 fine, slightly curved ribs. Below the middle of the whorl height ribs are bifurcated. The posterior branch curves slightly backward (adapically). Rare undevided ribs also present. Small prolongated nodes appear at the umbonal and auter ends of ribs.

*Locality* - Arkva River, along the road to Aibga 1 100-150 m from old bridge. Sample number 5033, 5034.

*Distribution* - Upper Berriasian of France, Bulgaria, Tunisia, Caucasus and Madagascar.

Fauriella iberica n. sp. (Pl. 2, fig. 5)

Dimensions - N 5036 / D-54 (1) / H-23 (0,39) / U-18 (0,33)

Holotype - N 5036 / Berriasian of the Arkva River Basin (Abkhazia)

Discoidal shell with whorls rapidly increasing in hight. Whorl sides slightly concave, almost flat, gently converging to the outer side. The edge of the flat umbilicus is rounded. High whorls with narrow oval cross section. Sculpture consist of straight, radial, slight prorsiradiate ribs which are narrower then the spaces between ribs. At the end of the last whorl the ribs become more inclined and more curved; from the umbilicus ribs are curved toward the aperture (adorally); at the middle of the whorl height ribs change their direction and curve away from the aperture (adapically). In upper third of the whorl height ribs divide and change their direction again and become prorsiradiate. There are three types of ribs: normal bifurcating, undivided and bidichotomous ribs, which divide at first from the node at the umbilical edge. Characteristic feature for this species is the large number of undivided ribs. There are 46 ribs on the last whorl 9 of them are undivided. The succession of ribs of various types is not regular, but frequently undivided ribs appear until dichotomous ribs. On the living chamber bidichotomous ribs are more numerous (in the second half of the last whorl there are six).

By the shape of the shell and its sculpture, this species resembles *Fauriella carpathica* (Zittel) but distinguished from it by having less numerous (46 vs. 60) ribs which are thicker and more curved, and by the larger number of undivided ribs.

Locality - Arkva River, along the road to Aibga 1, 100-150 m from the old bridge.

Sample number - 5036.

Distribution - Berriasian of Georgia, Boissieri Zone.

Fauriella hoedemaekeri n. sp. (Pl. 2, fig. 7)

Dimensions - N 5026 / D-95 (1) / H-36 (0,38) / U-35 (0,36) Holotype N 5026 / Berriasian of the Arkva River Basin (Abkhazia)

On the inner cast of big shell the peculiar sculpture of the last whorl is well observed. The ribs are beginning at the umbilical edge by little radially elongated nodes, from which the ribs bifurcate. The anterior branch often is undivided but the posterior one divides in two auter ribs at the middle height of whorl side. Isolated intercalatory ribs are also present. All ribs in lower part of whorl are prorsiradiate, at the middle of the whorl side they slightly curve backward and once again curve forward in outer part of whorl. The distances between the ribs are significant and markedly increases to the end of the last whorl. The nearly flat sides of the whorl converging to the siphonal side. The width of the umbilicus is smaller then the hight of the whorl.

New species is similar to *F. boissieri* (Pictet), but has coarser and widely spaced ribs, higher whorls and narrow umbilicus.

Locality - Arkva River, along the road to Aibga 1, 100-150 m from the old bridge; sample number 5026.

Distribution - Upper Berriasian of Georgia.

Genus Malbosiceras Grigorieva, 1938

Malbosiceras paramimounum (Mazenot, 1939) (Pl. 1, fig. 8)

- 1939 Berriasella paramimouna Mazenot, p. 92, pl. 11, fig. 1ab; pl. 12, fig. 2ab.
- 1968 Berriasella paramimouna Le Hégarat et Remane, p. 28, pl. 2, fig. 6.
- 1973 Malbosiceras paramimounum Le Hégarat, p. 92, pl. 11, fig. 5-6; pl. 12, fig. 1, 2; pl. 40, fig. 7.
- 1976 Malbosiceras paramimounum Khimchiachvili, p. 97.
- 1982 *Malbosiceras paramimounum* Nikolov, p. 132, pl. 44, fig. 2-4; pl. 45, fig. 1.

The inner cast of this ammonite is deformed and the widht of the whorl can not be measured, but it is lesser than the hight of the whorl. Primary ribs bear the umbonal and lateral nodes and are deviding in 2 or 3 outer ribs; between the main ribs the intermediate ribs are present, they are beginning from the outer side of whorl and gradually fade out at the level of the filiation of the main ribs. At the inner whorls the numerous thin, etwas prorsiradiate ribs are developed.

This species differs from *M. malbosi* (Pictet) by the thinner ribbing and the tardy appearence of the nodes. *Locality* - Arkva River, along the road to Aibga 1,

100-150 m from the old bridge. Sample number 5072. Distribution - Boissieri Zone, guide form of the Lower

Subzone (Paramimounum). South-Eastern France, Bulgaria, Carpathians, Northern Caucasus.

# Malbosiceras malbosi (Pictet, 1867) (Pl. 2, fig. 1)

- 1867 Ammonites malbosi Pictet, p. 77, pl. 14, fig. 1 abcd; 2 ab.
- 1935 Protacanthodiscus (Malbosiceras) malbosi Grigorieva, p. 110, pl. 5, fig. 1 a-c.
- 1939 Berriasella malbosi Mazenot, p. 98, pl. 8, fig. 8 abc; pl. 14, fig. 1.
- 1967 *Malbosiceras malbosi* Le Hegarat, p. 87, pl. 9, fig. 5; pl. 10, fig. 1-5.
- 1976 Malbosiceras malbosi Khimchiachvili, p. 95, pl. 8, fig. 1.
- 1982 Malbosiceras malbosi Nikolov, p. 134, pl. 45, fig. 2; pl. 46, fig. 1, 2 (synonymy).

The shell is deformed and sloped in such a way, that the height of the last whorl is - 30 mm from one side and 28 mm from the other; it seams that average ratio of the whorl height to the diameter of the shell should be between 0,40-0,43 and the ratio between the whorl widht and diameter of the shell should be more then 0,26. On the half whorl there are 11 main ribs, ornamented by the umbonal and the lateral nodes. Separate intermediate ribs from the outer side are gradually fading out and are descending etwas lower the level of the filiation of the main ribs.

Locality - Psou River, 9-th km from Aibga. Sample

number 4625.

*Distribution* - Berriasian, Boissieri Zone. South-Eastern France, Bulgaria, Algeria, Crimea and Northern Caucasus.

Genus Jabronella Nikolov, 1966

#### Jabronella incomposita (Retowski, 1893) (Pl. 3, fig. 5)

- 1893 Hoplites incompositus Retowski, p. 67, pl. 4, fig. 6.
- 1939 Berriasella incomposita Mazenot, p. 113, pl. 18, fig. 4ab.

Dimensions - N 5005 / D-117 (1) / H-42 (0,36) / U-46 (0,39)

Somewhat flattened cast of large specimen, has a sculpture, characteristic for the species of Retowski. On the inner whorls it has stright, slightly prorsiradiate ribs. At the beginning of the last whorl primary ribs form slightly elongated and well developed nodes from which ribs are bifurcating. The ribs bifurcate again at the mid-point of the whorl side. At the end of the last whorl the weackly developed nodes are appeared. Our specimen shaws us the peculiar bifurcation of the ribs: frequently the anterior rib rests undivided, but the posterior one bifurcates again at the midpoint of the flank. Ventral intermediate ribs which die out about the middle of the flank also are present.

Jabronella paquieri (Simionescu, 1899) is similar to this species in overall shape, but it has the nodes on the middle height of whorl, which are less developed, or missing in J. incomposita.

It should be mentioned that the umbilicus of our specimen is narrower than the same element of the specimen, illustrated by Retowski.

Locality - Right bank of Psou River, from the bridge to Aibga 4. Up-stream 500 m (N 5005).

Distribution - Berriasian of Crimea, South-Eastern France, Alps.

Jabronella hegarati n. sp. (Pl. 2, fig. 2)

## 1973 Jabronella aff. jabronensis (Mazenot) Le Hegarat, p. 198, pl. 31, fig. 4; pl. 51, fig. 4.

Dimensions - N 5015 / D-66 (1) / H-24 (0,37) / U-23 (0,33) Holotype N 5015 / Berriasian of the Psou River Basin

Moderately large discoidal shell with large umbilicus and sligthly convex high whorls. Height of whorls markedly prevails the width of the umbilicus. The ribs are etwas thickened and not numerous. At the last whorl there is 50 primary ribs. It is characteristic the presence of pair primary ribs on the last whorl beginning from the umbilical nodes; with them intercalate single ribs dividing upper the mid-height of whorl and rare simple undivided ribs. At the end of the last whorl markedly increases the strenght of ribs, the space between them and lateral nodes appear.

From the most of representatives of genus *Jabronella* this species differs by the narrow umbilicus and greater hight of whorl. By the character of ornamentation it resembles to *Jabronella jabronensis* (Mazenot), but our species differs from it by the more rough and rare ribbing.

Exactly by this sign our sample is very similar to *J.aff.jabronensis*, described by Le Hegarat. Comparing the relative measures of whorl height and of width of umbilicus, mentioned by Le Hegarat with those of our sample, we see notable differences. But on the sample, figured by Le Hegarat on the plate 51, fig. 4 it is clear that the height of whorl of this sample notably exceeds the width of its umbilicus. So, this two forms are also similar by these features.

Locality - Right bank of Psou River upstream of the bridge leading to Aibga 4. 500 m. Sample number 5015.

Distribution - In South-Eastern France is frequent in Paramimounum Subzone and rare in Privasensis and Dalmasi Subzones.

Jabronella (Erdenella) erdenensis (Nikolov, 1979) (Pl. 3, fig. 4)

- 1979 Jabronella (Erdenella) erdenensis Nikolov, p. 337, pl. 4, fig. 1.
- 1982 Jabronella (Erdenella) erdenensis Nikolov, p. 192, pl. 68, fig. 4; pl. 69, fig. 1.

Dimensions - N 4932 / D-100 (1) / H-37 (0,37) / U-35 (0,35).

Flat discoidal shell, with high oval, rapidly increasing in growth whorls. Whorl sides slightly convex. Umbilicus wide, shallow, with rounded edges. In inner whorls ribs are closely spaced, fine slightly prorsiradiate. Some primary ribs divide near the umbilical edge and branch again near the mid of the whorl side. In the last whorl ribs start from the umbilical nodes and divide again at secondary ribs from the lateral nodes near the mid-point of the whorl side. Secondary ribs are curved adorally and increase in width near the ventral periphery but die out near the mid-point of the flank; thus the dorsal part of the whorl is smooth. The number of the intercalatory ribs increases with the spacing of the primary ribs.

This speices resambles *Jabronella jabronensis* Mazenot, but the latter has a wider umbilicus, a slower increase in hight of the whorls and the nodes arise at the later stage of development. From *J. (Erdenella) paquieri* (Simionescu) it differs by the thinner ribs of inner whorls, the later development of nodes and more distinctly isolated, widely spaced main ribs on the living chamber.

Locality - Right bank of Psou River, 500 meters upstream from the bridge leading to Aibga 4. Sample number 4932.

Distribution - Bulgaria. Boissieri Zone, Paramimounum Subzone.

#### Jabronella (Erdenella) paquieri (Simionescu, 1899) (Pl. 3, fig. 2, 3)

- 1899 Hoplites paquieri Simionescu, p. 7, pl. 1, fig. 6 ab.
- 1939 Berriasella paquieri Mazenot, p. 116, pl. 20, fig. 8 ab.
- 1973 *Jabronella paquieri* Le Hegarat, p. 200, pl. 32, fig. 3-5; pl. 50, fig. 1, 3; pl. 51, fig. 5.
- 1982 Jabronella paquieri Nikolov, p. 190,pl. 48, fig. 2, 3; pl. 49, fig. 2 (synonymy).

The fragment of inner cast not reaching half of the whorl. It bears such a characteristic sculpture, that we are sure that it belongs to the species of Simionescu. There are two kinds of clear-cut radials ribs: some of them are ornamented by two-umbonal and lateral rows of nodes, the others are devoid of them. On the outer side of whorl the ribs are inclined adorally.

Locality - Right bank of Psou River, 500 m upstream from the bridge to Aibga 4. Sample number 4933.

Distribution - Berriasian, Picteti and Callisti Subzones of Sout-Eastern France, Algeria and Bulgaria.

Genus Tirnovella Nikolov, 1966

Tirnovella alpillensis (Mazenot, 1939) (Pl. 1, fig. 9)

- 1939 Berriasella alpillensis Mazenot, p. 73, pl. 6, fig. 22 abc.
- 1953 Berriasella alpillensis Arnold-Saget, p. 48, pl. 5, fig. 2 abc; texte fig. 15.
- 1973 Tirnovella alpillensis Le Hégarat, p. 178, pl. 27, fig. 1-3; pl. 28, fig. 5; pl. 49, fig. 1-3.
- 1982 *Tirnovella alpillensis* Nikolov, p. 233, pl. 84, fig. 2; pl. 85, fig. 1-3.

### Dimensions - N 4999 / D-65 (1) / H-27 (0,42) / U-16 (0,24)

Typical for this species is the rapid increase of hight of the last whorl. Sides slightly convex. Umbilicus narrow, with sharp umbilical edge. Ventral side of whorl is narrow. The greatest width of whorls is on the lower third of the whorl. Towards the end of the last whorl, numerous narrow radial ribs become increasingly inclined adorally. Numerous ribs divide at the umbilical edge and once again at the mid-point of the whorl side. Between them occur undivided ribs and rarely the trifurcate virgatotome ribs, in which secondary branches emerge on the adapical side of the major rib and curve in adoral direction. This makes impression that all ribs are slightly biconvex and inclined forward (prorsiradiate). These features are best observed at the end of the last whorl.

There are compressed inner casts in our disposal, on which we see well developed outer border of inner whorl, spirally drawing at the mid-hight of whorl and showing the overlaying ratio near 0,5. The lower part of inner whorls bearing numerous thin radial ribs.

Described forms differ from the typical by the etwas narrower umbilicus. Closely alike species T. subalpina (Mazenot) differs from this species by the more straight and narrow ribs and by more wide umbilicus.

Locality - Arkva River, along the road to Aibga 1, 100-150 m from the old bridge. Sample number 4999.

Distribution: South-Eastern France, Bulgaria, Tunisia, Caucasus. Upper Berriasian (Boissieri Zone, Picteti and chiefly Callisto Subzones).

### Tirnovella allobrogensis (Mazenot, 1939) (Pl. 1, fig. 7)

- 1939 Neocomites allobrogensis Mazenot, p. 210, pl. 33, fig. 4 ab.
- 1951 Neocomites allobrogensis Arnold-Saget, p. 74, pl. 8, fig. 1 abc.
- 1973 Tirnovella allobrogensis Le Hégarat, p. 177, pl. 24, fig. 6.

- 1979 Tirnovella allobrogensis Sapunov, p. 196, pl. 59, fig. 3.
- 1982 Tirnovella allobrogensis Nikolov, p. 223, pl. 82, fig. 3-6.

Dimensions - N 5023 / D-50 (1) / H-21 (0,42) / U-13 (0,26)

Little size shell with the narrow umbilicus and whorls rapidly growing in height. It differs from the most of the representantives of this genus and especially from *T. alpillensis* (Mazenot) by the thinner and dense ly spaced ribs. *T. suprajurensis* (Mazenot) is very bigger and has thinner and densely spaced ribs.

Locality - River Arkva, along the road to Aibga 1, 100-150 m from the old bridge. Sample number 5023.

Tirnovella suprajurensis (Mazenot, 1939)

- 1939 Neocomites suprajurensis Mazenot, p. 211, pl. 33, fig. 5 abc.
- 1951 Neocomites suprajurensis Arnold-Saget, p. 76, pl. 7, fig. 12 a,b,c.

In our disposal is the fragment of the big shell, which has hight and slightly convex whorls, narrow umbilicus and characteristic fine and very dense ribbing. That allows us to attribute it to the species detaily described by Mazenot.

Locality - Psou River, 9-th km of the road from Aibga. Sample number 4955.

Distribution - Lower Berriasian, (Jacobi Zone) of South-Eastern France and Georgia.

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Plate I

- Fig. 1, 6 Barriasella jacobi (Mazenot, 1939). Fig. 1. n 4915 Right bank of River Psou 500 upstream from the bridge leading to v. Aidga 4. Fig. 6. n 5050, Arkva River, old road after bridge to Aibga 1, 100-150 m.
- Fig. 2, 5 Barriasella (Picteticeras) oxycostata (Jacob in Mazenot 1939), Arkva River along the road to v. Aibga I 100-150 m from the old bridge. Fig. 2 n° 5073, fig. 5 n° 5077.
- Fig. 3 Jabronella jabronensis (Mazenot, 1939).
- Fig. 4 Barriasella privasensis (Pictet, 1867) n 5064, Arkva River along the road v. Aiba I 100-150 m from the bridge
- Fig. 7 Tirnovella allobrogensis (Mezanot, 1939), n 5023, same locality.
- Fig. 8 Malbosiceras paramimounum (Mazenot, 1939) n. 5072, same locality.
- Fig. 9 Tirnovella alpillensis (Mazenot, 1939) n 4999, Arkva River along the road to v. Aiba I, 100-150 m from the old bridge.



# Plate II

- Fig. 1 Malbosiceras malbosi (Pictet, 1867) n 4625, Psou River, 9 km from Aibga.
- Fig. 2 Jabronella hegarati n. sp. Holotype n 5015 Right bank of Psou River upstream of the bridge leading to v. Aibga 4 500.
- Fig. 3-4 *Fauriella gauthieri* Le Hégarat 1973, nn 5040, 5070, Arkva River, from the old bridge leading to aibga I 100-150 m.
- Fig. 5 *Fauriella iberica* n. sp. Holotype n 5036 Arkva River along the road to Aibga I 100-150 m from the old bridge × 1.2.
- Fig. 6 Fauriella boissieri (Pictet, 1867) n 5034, same locality.
- Fig. 7 Fauriella hoedemaekeri n. sp. Holotype n 5026, same locality.



Plate III

- Fig. 1 Fauriella boissieri (Pictet, 1867) n 5033, Arkva River along the road to v. Aibga I 100-150 m from old bridge.
- Fig. 2 Jabronella (Erdenella) paquieri (Simionescu, 1899) n 4933, Right bank of Psou River 50° m upstream from the bridge to v. Aibga 4.
- Fig. 3 Jabronella (Erdenella) paquieri (Simionescu, 1899) n 5049 Arkva River along the road to Aibga I 100-150 m. from the old bridge.
- Fig. 4 Jabronella (Erdenella) erdenensis Nikolov, 1979 n 4932 Right bank of Psou River 500 m. upstream from the bridge leading to v. Aibga 4.
- Fig. 5 Jabronella incomposita (Retowsky, 1893) n 5005 Right bank of Psou River, from the bridge to v. Aibga 4 upstream 500 m.

All the samples in Museum of Institute of Paleobiology of the Georgian Academy of Sciences SSR.

