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# **New data on foraminifers of Jurassic sedimentary basin of Bukhara - Khiva oil and gas region**

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**ABSTRACT:** The **Protozoa** are defined as a diverse group of unicellular eukaryotic organisms. Historically, **protozoa** were defined as single-celled animals or organisms with animal-like behaviors, such as motility and predation. The group was regarded as the zoological counterpart to the "protophyta", which were considered to be plant-like, as they are capable of photosynthesis.

The terms *protozoa* and *protozoans* are now mostly used informally to designate single-celled, non-photosynthetic protists, such as the ciliates, amoebae and flagellates. Different types of protozoa are discussed in this paper.

**KEYWORDS:** Foraminifera, Jurassic, oil, gas, carbonate formation, clastic formation, sedimentation, paleogeography, stratigraphic scheme.

## **I. INTRODUCTION**

Bukhara - Khiva oil and gas region (BHR) - one of the main oil and gas producing regions of Uzbekistan. Currently in development are introduced so-called hard-to-reserves - stratum with low-permeability collectors, oil-water zones, and small thickness of productive horizons. Under these circumstances, for further broaden the base of hydrocarbon raw materials necessary to carry out research and exploration and up to exploration works, in particular on structures identified in sediments clastic formation, which should be based on modern stratigraphic basis. In addition, despite the high explored of mineral resources, definition of stratigraphic position and capacity of local stratigraphic subdivisions has not lost urgency so far. Creating such a database is possible only on the basis of lithological - biostratigraphic schemes, supported by paleontological data. In BHOAGR paleontological research conducted with 60 - x of the last century, such researchers as GS Abdullaev, K. Alimov, Iminov YA.H., VV Kurbatov Mirkamalov HH, Saidusmanov W., Hachiev LS, ST Khusanov and others. Quite well studied leaf prints, spores and pollen, corals, bivalves and ammonites, but microfossils, such as foraminifera, remain poorly studied.

However, the core material remains of Jurassic deposits macrofauna, including orthostratigraphic group of organisms - ammonites are rare. Therefore, one of the first places put forward such parastratigraphic group as foraminifera, which play an important role in the stratification and correlation of Jurassic strata, primarily in the areas of deep. World practice of exploration for oil and gas has confirmed the importance of foraminifera in the development of bio - stratigraphic schemes, because study of phasing of development, tectonic dynamics and species diversity can significantly refine the stratification of sediments.

Foraminifera, which are found in the sediments of clastic and carbonate formations of Jurassic age to 60 -70 years of the last century on the territory of Uzbekistan almost did not attract the attention of researchers. Foraminifera found in Jurassic deposits of south-western spurs of the Hissar Range in 1960 specifically studied VV Kurbatov After 1963 VV Kurbatov These complexes are traced in the South and in some areas in the south-western Uzbekistan. Since the mid-seventies to the early nineties of the twentieth century, the study was conducted foraminifera from the Late

Jurassic carbonate strata, predominantly south-western spurs of the Hissar Range and remained virtually unexplored in the Bukhara-Khiva oil and gas region.

In recent years, accumulated micropaleontological material on average (bayos- Callovian) - upper (oxford - kimeridzh) jure by a significant number of wells drilled in the various fields BHOAGR. Micropaleontological studies revealed a rich and taxonomically diverse foraminifera association, including taxa identified migrant wide geographical distribution, allowing to carry out inter-correlation.

In this paper we present a monographic description of the most characteristic species of foraminifera for terrigenous (Middle Jurassic - Bajocian - Callovian) and carbonate formations (nizhniy- middle Callovian - Kimmeridgian).

## II.Types of Protozoa

**Class : Sarcodina**

**Subclass : Foraminifera**

**Family HauraniidaeSeptfontaine, 1988**

**Subfamily AmijellinaeSeptfontaine, 1988**

**Rhode AlveoseptaHottenger, 1967**

**Alveoseptajaccardi (Schrodt), 1894**

**Table. 1, FIG. 1**

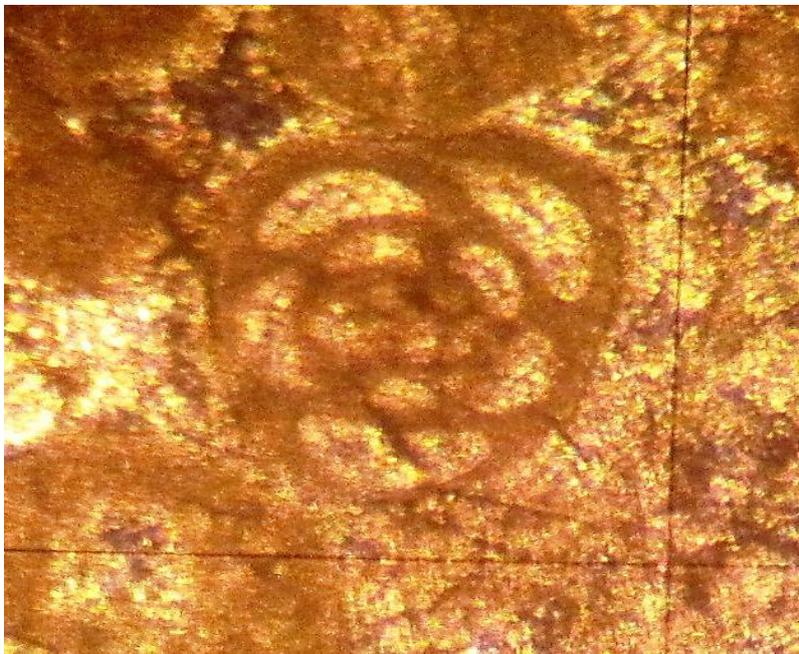


Fig.1.*Alveoseptajaccardi*(Schrodt).BHOAGR, Pamuk, well. № 18 , int. 2845 – 2847m, mubarek suite, lower - middle oxford. Increase.9 x 15.Nikoli<sup>+</sup>.

*Cyclamminajaccardi*: Schrodt, 1893. 734 C. FIG. 1,2 (n.v).

*Pseudocyclamminaseguana* (Meriam) var *major*: Mohler, 1938. S. 16, Table. I, FIG. 3.4; Maync, 1952.Table. 12, FIG. 4;

*Pseudocyclamminaukrainica*: Dain, 1958. S. 21, Table. 4, FIG. 10, 11;

*AlveoseptajaccardiSchrodt*: Hottenger, 1967. 79 S., Tab. 15, FIG. 9-18; Table. 16, FIG. 1-9;

**The holotype.** Described from the Upper Oxfordian - Kimmeridgian lower Morocco.

**Material** - 8 specimens.

**Description.** Sink at all stages of the spiral-planar, relatively large, involute, sometimes slightly unfolded. Founded 2, at least 3 turns of the spiral. In thin section differ 9- to 10 cameras in the last turnover, the initial camera is rounded, often illegible. Camera wrong, almost quadrangular, slightly swollen, increasing in size with each successive turnover spiral. Septal sutures arc.

The walls of the carbonate, dual layer. In thin sections of the outer layer is almost not visible. The inner layer is quite wide (up to 0.04 mm) and is composed of dark gray, microgranular limestone.

**Dimensions** in mm: D1-0,8-1,2; D2-0,7-, 09; T-0.3.

**Comparison.** In forms, defined in the Bukhara-Khiva region, slightly smaller size compared with the forms described from the southwestern spurs of the Hissar ridge. The walls are made only microgranular limestone, without the inclusion of calcite.

Distribution and stratigraphic position. Upper Oxfordian Israel upper Oxfordian - Kimmeridgian lower Morocco, Switzerland, Poland, Ukraine, the North Caucasus, Georgia. Tajikistan, southern slope of the Hissar, Sangmilya, Lower and Middle Oxfordian; BHOAGR, Mubarek Formation, Lower and Middle Oxfordian, Buzahur, wells. Number 2; Kamashi, wells. Number 3,5; Pamuk, wells. Number 18, Gumbulak, wells. Number 1.

**Family : Textulariidae Ehrenberg, 1838**

**Subfamily : Textulariinae Ehrenberg, 1838**

**Rhode : Textularia De France, 1824**

***Textularia jurassica* Gumbel**

**Table 1, Fig. 2.**



Fig.2. *Textularia jurassica* Gumbel. BHOAGR, North Urtabulak, well. № 1, int. 2470-2473m, kushab suite, upper oxford-kimmeridj. Increase. 9 x 15. Nikoli<sup>+</sup>.

Textulariajurassica: Gümbel, 1862, p.228, Table 4, 17a, b; Paalzow, 1932, p.94, Table 4, fig.21-23; Seibold E. und J., 1955, p.98, tex. Fig. 2a, b, Table 13, Figure 1; Kaptarenko-Chernousov, 1959, p.48, Table 7, 8a-in; Bielecka, 1960, p.40, Table 1, Figure 6; Khabarova 1969, p.247, Table 2, Figure 4a, b; Azbel, 1977, Table 3, fig.1,2.

Plecatiumdepravatum: Schwager, 1865, p.93, Table 2, Figure 3.

**The holotype.**Gümbel, 1862 Table 4, 17a, b; West Germany; Oxford.

**Material.**15 copies.

**Description.** Sink tongue-and gradually widening towards the end of the wellhead. The cross-section of the two-lane oval. Two-row portion consists of 5-8 pairs of rounded-rectangular, slightly convex, lower and wider cameras. Their height is approximately half the width. The cameras are oriented perpendicular to the median suture. There is an uneven increase in the size of chambers from the start to the last. Septal seams straight and narrow. Peripheral margin slightly rounded. The wall is composed of fine-grained calcite.

**Dimensions** in mm: L 0.5 - 0.7 0.2 0.4 SH-

**Comparison.** It differs from close TextulariamjatliukaeMakarjeva (Makarjeva, 1971, p.44, Table 3, 5a-in, Table 10, Figure 4. Table 11, Figure 1) rounded-rectangular shape of the chamber. Our specimens are most similar to TextulariajurassicaGümbel (SeiboldE.und J., 1955, p.98, Table 13, Figure 1, Khabarova, 1969, p.247, Table 2, Figure 4a, b). Compared with the holotype (Gümbel, 1862, p.228, Table 4, 17a, b) they are smaller, with an equal number of chambers, septal horizontal seams.

Spread. Germany, North Caucasus, Moldova, England, Poland, France, the Dnieper-Donets Basin, YUZOG, Gaurdak reef complex BHOAGR Sq. Borkon, wells.Number 1; North.Urtabulak, wells. Number 1; kushabskaya Formation, Upper Oxfordian-Kimmeridgian, Zevardy, wells. Number 19, Shurtan, wells. Number 7; Rudaksay wells. Number 1,2, Dengizkul, wells. Number 21 urtabulakskaya Formation, Upper Oxfordian-Kimmeridgian.

**Troop AtaxophragmiidaFurssenko, 1958**

**Superfamily : DorothiinaeBalakhmatova, 1972**

**Family : AtaxophragmiidaSchwager, 1877**

**Rhode : Marssonella Cushman, 1933**

**Marssonelladoneziana Dain**

**Table. 2, 1**

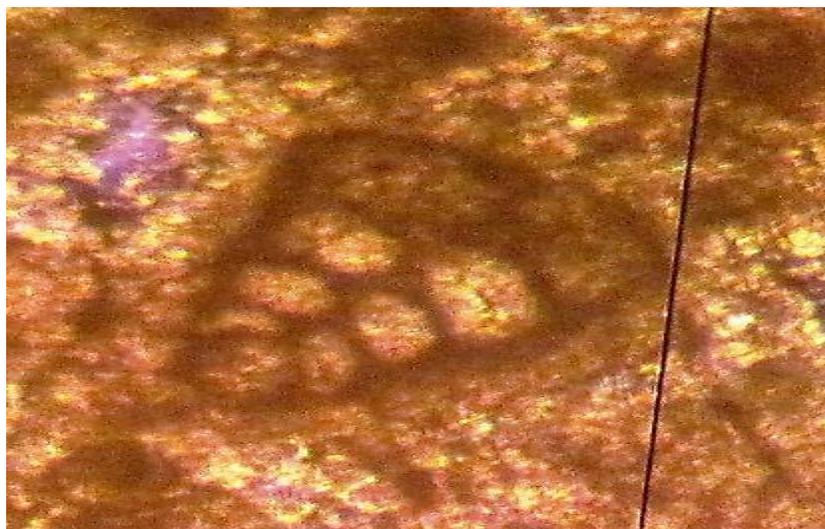


Fig. 1. *Marssonelladoneziana*Dain. BHOAGR, field Buzaxur, well № 2, int. 3105 – 3109m, mubarek suite, lower - middle oxford. Increase.9 x 15.Nikoli<sup>+</sup>.

Marssonelladoneziana: Dain et al, 1958, p.25, Table 3, fig.9,10;. Kaptarenko - Chernousov, 1959, p.49, Table 7, 10a, b.

**The holotype.** Collection of All-Union Oil Research Institute of Geological Exploration (VNIGRI), №1880; Donets Basin, Petrovsky District, Farm Zavod; Lower Oxford.

**Material.** 12 copies.

**Description.** Sink with priostrennym conical base and a smooth side surface. Spiral formed 5-7 turns, gradually expanding with the growth. The first turns are made up of 4 cameras, and the last - of the Camera 3. wrong rhomboidal form; their width is approximately 2 times greater than their height. Septal sutures narrow, slightly curved. Wellhead shell side flattened, folded three chambers, of which the latter more than the previous almost 2 times. The wall of the fine-grained.

**Dimensions** in mm: L 0.4 - 0.6 0.3 0.6 SH-

**Comparison.** It differs from the original MarssonellajurassicaMitjanina (Mityanin 1957, s.210, Table 1, Figures 5-7, 1957, p.122, Table 1, 7-12) in the presence of the last turnover of the three chambers instead two fewer and smaller degree of elongation; by M. metaeformis J. Espitalie et J. Sigal (Espitalie, Sigal, 1963, p.23, Table 4, Figure 2) - three-chambered latest traffic and a lesser degree of elongation.

Spread. Callovian, Oxfordian Germany, East Caucasus, Upper Callovian - lower oxford, oxford bottom of the Dnieper-Donets Basin and the Western Black Sea oxford, BCR, pl. Buzahur, wells. Number 2; Kamashi, wells. Number 3,5; Pamuk, wells. Number 18, Gumbulak, wells. Number 1 Borkon, wells. Number 2, Zevardy, wells. Number 19, Shurtan, wells. Number 7.21, Sev.Urtabulak, wells. Number 1, Mubarek Formation, Lower - Middle Oxfordian.

**Family : Trochamminidae Schwager, 1977**

**Rhode : Trochammina Parker et Gones, 1959**

**Trochamminakiziltamensis Kurbatov**

**Table.2, 2.**

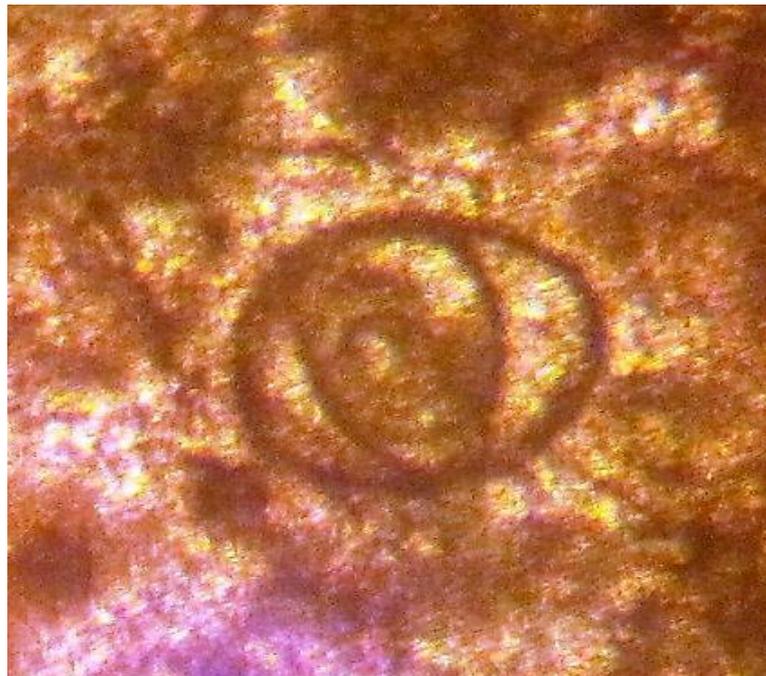


Fig. 2. *Trochamminakiziltamensis* Kurbatov. BHOAGR, Beshepe, well. 1P, int. 2614 – 2618m, degibadam suite, upper bayos. Increase. 9 x 15. Nikoli<sup>+</sup>.

**The holotype.** №935 / 1 from the upper Bajocian degibadamskoy suites r.Tyrna, Yakkabagmountains YUZOG.

**Material.**10 copies.

**Description.** Shell medium-sized, round, trochoid, the chamber interior is not divided. The peripheral edge of the well-rounded, paddle. The shell is formed by 11-17, at least 22 cameras located at a low spiral trochoid forming 2.5-3 turns. In each of them there are 5 to 6 chambers in the last whorl often 5 cameras. Initial chamber spherical fine. Subsequent chamber inflated, increasing rather rapidly, especially in dorsoventrally. Width speed increases gradually. On the dorsal side of the camera the wrong square, elongated, their length is 1.5-2 times greater than the width. On the ventral side of the inflated chambers, rounded-triangular. Septal sutures distinct, thin, radial, tapered and slightly curved in the opposite winding. The wall of the fine-grained, clastic material stozhena.

**Dimensions** in mm. D1 - 0, 3, D2 - 0.175 T - 0.08.

**Comparison.**From TrochamminakiziltamensisKurbatov, described YUZOG studied specimens are large in size and large (up to 17) the number of cameras, the camera also has a few, but longer and more pronounced blade circumferential edge.

Distribution and stratigraphic position. YUZOG, YakkabagmountainsTyrna, BHOAGR Sq. Bestepe, skv.1P, Havana, skv.1, skv.2, Sev.Syuzma, sev.1, Urtaulak, wells. 102, Shurtan, skv.25, degibadamskaya Formation, Upper Bajocian.

**Rhode : EomarssonellaLevina, 1972**  
**Eomarssonella (?)ShormazarensisKurbatov**  
**Table.3, FIG. 1.**

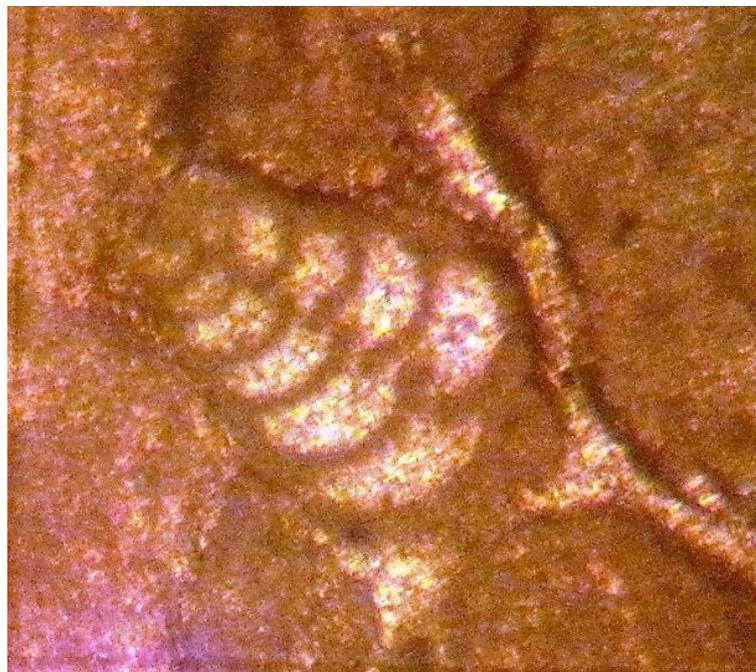


Fig.1.*Eomarssonella (?) shormazarensis*Kurbatov. BHOAGR, Zekri, well.3, int. 3590 – 3594m ,baysun suite, lower kelovey. Increase.9 x 15.Nikoli<sup>+</sup>.

*Eomarssonella (?)Shormazarensis*Kurbatovsp.n .: Kurbatov, 1971, pp 126, pl. III, Fig. 1-5.

**The holotype.**Number 222/42, Uzbekistan, YUZG, Baysuntau, Derbent, Baisun Formation, upper baht.

**Material.**10 copies.

**Description.** Shell spiral bevel, cross-sectional diameter is gradually increased from the early to the later stages of development. Wellhead surface flattened or slightly depressed. Early one or two turns trochoid consist of 4 perhaps 5 cameras each subsequent spiral bevel speed their number is reduced to 3, with three-row arrangement, continuing up to the last turn. Cameras on the side surface of the swollen, distinct. Septal and spiral seams are thin septal sutures oblique. Chambers last one or two turns quickly increase in size, have the shape of an irregular pentagon. The wall of the fine-grained, calcareous.

**Dimensions.** D1 - 0.2 - 0.3 mm, D2 - 0,6-0,8mm.

**Comparison.** The closest to describing the shape is a genus *Marssonella* Gushman, 1933. Their single principle brings shell structure, cone-shaped, flattened-pressed ventral surface. The significant difference is the absence of representatives of *Eomarssonella* he DIP Department, which in the genus *Marssonella* occupies a large part of the shell, while the shell development in *Eomarssonella* always ends with three-row side. Copies studied in BCR has a rather inflated chambers on the lateral surface, which distinguishes them from the holotype.

Distribution and stratigraphic position. YUZOG upper baht - the lower Callovian, Baisun entourage Chakchar, Derbent, Baysuntau, Shatut, Yakkabag mountains BHOAGR Sq. Karim, skv.4, Havana, skv.1, Zekri, skv.3, skv.4, Baisun Formation, Lower Callovian.

#### **Troop Miliolida**

**Family : Orthalmiedae** Qushman, 1927

**Rhode : Orthalmidium** Zwingli et Kübler, 1970

**Orthalmidium** *serdjanticakintalensis* Kurbatov

**Table.3 2.**



Fig.2. *Ophthalmidium serdjanticakintalensis* Kurbatov. BHOAGR, Dayaxatin, well 6, int. 2390 – 2395m, tangiduval suite, lower - middle baht. Increase. 9 x 15. Nikoli<sup>+</sup>.

**The holotype.** Number 955/5, YUZOG, Baysuntau, Derbent, tangiduvalskaya Formation, Lower and Middle baht.

**Material.** 5 copies.



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**Description.** Shell spiral planar, evolute, oval, tapered edge wellhead. It consists of a primary chamber and followed by a spiral - the tube, forming 2-3 turns, and then of helically arranged tubular chambers 2-3 in circulation. Length exceeds 1.5 times the width. The mouth of a short, roundish. The last two chambers almost twice as wide as the previous one. Between the chambers there is additional skeletal material. Interchamber curved seams. The wall is composed of carbonaceous material.

**Dimensions in mm.** Length - 0.7 W - 0.4 T - 0,07mm.

**Comparison.** From nizhnekelloveyskih copies *Ophthalmidiumserdjantica* Kurbatov described sinks are large in size. From morphologically close *Spirophthalmidium birmenstorffensis* (Kubleret Zwingli) described species of *lichatsya* large size, a broader and more depressed in *sredinnoy* field (not convex), a sink, a thicker wall and broader interchamber cavities.

Distribution and stratigraphic position. YUZOG, Derbent, Baysuntau, BHOAGR Sq. Kandim wells. 1 Kokcha, wells. 2, Uchbash, wells. 1H, Alat, skv.3, Dayahatyn, wells. 6, tangiduvskaya Formation, the lower-middle part.

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