**Proceedings of the Kazan Golovkinsky Stratigraphic Meeting 2021**

**Template**

Deadline for Proceedings submission is August 01, 2021. Please send your articles to urazaeva.m.n@mail.ru (copy to nika\_zharinova@mail.ru).

**1. Key requirements**

The following lists the essential requirements for an article to be published in Proceedings:

*•* the page size should be A4;

*•* each page should have clear margins of 4cm (top), 2.5cm (left and right) and 2.7cm (bottom);

*•* pages should not contain page numbers, running heads or footlines;

*•* all articles *must* contain an abstract;

*•* in the PDF, all fonts should be embedded.

*1.1. Layout of the title page*

The title should be followed by a list of all authors’ names and their affiliations. The style for

the names is initials (no periods) followed by the family name. The authors’ affiliations follow the author list. If there is more than one address then a superscripted number should come at the start of each address; each author should also have a superscripted number or numbers following their name to indicate which address, or addresses, are the appropriate ones for them.

E-mail addresses may be given for any or all of the authors.

The abstract follows the list of addresses. The abstract text should be indented 25 mm from

the left margin. As the abstract is not part of the text it should be complete in itself; no table

numbers, figure numbers, references or displayed mathematical expressions should be included.

It should be suitable for direct inclusion in abstracting services.

**2. The text**

The text of your article should start on the same page as the abstract. Any Acknowledgments

should be placed immediately after the last numbered section of the paper, and any appendices after the Acknowledgments section. **The length limit will be provided by the conference organizer.**

**3. Figures and tables**

Figures and tables should be numbered serially and positioned (centred on the width of the

page) close to where they are mentioned in the text, not grouped together at the end. Each

figure and table should have a brief explanatory caption.

*3.1. Colour figures*

There are no restrictions on the use of colour in the online version of your article. However,

you should bear in mind that any print version of your article is likely to be in black and white

which may make coloured lines difficult to distinguish.

**4. Supplementary data**

We are happy for authors to submit supplementary data attachments to enhance the online

versions of published articles. Supplementary data enhancements typically consist of video

clips, animations or supplementary data such as data files, tables of extra information or extra

figures.

**5. References**

Online references will be linked to their original source or to the article within a secondary

service such as INSPEC or ChemPort wherever possible. To facilitate this linking extra care

should be taken when preparing reference lists.

A complete reference should provide enough information to locate the article concerned in

print or electronic form. If you are unsure of a particular journal’s abbreviated title it is best

to leave the title in full. The terms *loc. cit.* and *ibid.* should not be used.

*5.1. References to printed journal articles*

References to printed journal articles should typically contain:

*•* the authors, in the form: family name (only the first letter capitalized) followed by initials

with no periods after the initials;

*•* the year of publication;

*•* the article title (optional) in lower case letters, except for an initial capital;

*•* the journal title (italic and abbreviated). Parts denoted by letters should be inserted after

the journal in Roman type;

*•* the volume number in bold type;

*•* the article number or the page numbers.

*5.2. A typical (numerical) reference list*

**References**

[1] Strite S and Morkoc H 1992 *J. Vac. Sci. Technol.* B **10** 1237

[2] Gusev A A *et al* 2011 *J. Phys.: Conf. Series* **291** 012052

[3] Kurata M 1982 *Numerical Analysis for Semiconductor Devices* (Lexington, MA: Heath)

[4] Kunze K 2003 T-duality and Penrose limits of spatially homogeneous and inhomogeneous cosmologies *Phys. Rev.* D **68** 063517 (*Preprint* gr-qc/0303038)

[5] Milson R, Coley A, Pravda V and Pravdova A 2004 Alignment and algebraically special tensors *Preprint* gr-qc/0401010

[6] Caplar R and Kulisic P 1973 *Proc. Int. Conf. on Nuclear Physics (Munich)* vol 1 (Amsterdam: North-Holland) p 517

[7] Kuhn T 1998 *Density matrix theory of coherent ultrafast dynamics Theory of Transport Properties of Semiconductor Nanostructures* (Electronic Materials vol 4) ed E SchЁoll (London: Chapman and Hall) chapter 6 pp 173–214

Appendix

Early Triassic conchostracans from the Tiryakh-Kobyume Section (Southern Verkhoyanie, Republic of Sakha (Yakutia))

VV Zharinova1, RV Kutygin2 and VV Silantiev1

1 Kazan Federal University, Kazan, Russia

2 Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences, Yakutsk, Russia

E-mail: vevzharinova@kpfu.ru

Abstract

Conchostracans (Сrustacean) from the Induan deposits of the Tiryakh-Kobyume section (South Verkhoyanie) were studied. We identified seven conchostracan species of five genera: *Pseudestheria* Raymond, 1946*, Сyclotunguzites* Novojilov, 1958*, Sphaerestheria* Novojilov, 1954*, Lioestheria* Deperet et Mezeran*,* 1912, *Wetlugites* Novojilov, 1958. Most of the species identified in the Tiryakh-Kobyume section (*Pseudestheria sibirica*, *Ps. tumaryana*, *Ps.kashirtzevi* and *Sphaerestheria aldanensis*) were described in the middle of the last century from the base of the Triassic of the Western Verkhoyanya (Balbuk section). It is necessary to revise these species based on new methodology of conchostracan classification.

Keywords: Conchostraca, Early Triassic, Southern Verkhoyanie, biostratigraphy.

**1. Introduction**

Conchostracans are small ephemeral crustaceans with a bivalved carapace. They are widespread all around the world and exist in continental basins (ponds, lakes or puddles). Conchostracan eggs are microscopic in size. They are easily transported over long distances by wind or other animals. In addition, conchostracan eggs may quickly shift from biological activity to an anabiotic state in extreme environment.

Сonchostracans are one of the best fauna for biostratigraphy and interregional correlations. Some species often appear in Permian and Triassic deposits all around the world and have a narrow stratigraphic range.

**2. Material and Methodology**

The Permian and Triassic Tiryakh-Kobyume section (thickness is more than 3000 m) is located near the mouth of the Tiryakh-Yuryakh river, the right tributary of the Kobyume river in the Southern Verkhoyanie (Republic of Sakha (Yakutia)). It is stratotype for all formations of the Permian system of the Kobyume structure-facies zone [1]. The upper part of the section consists of the Permian– Privol'nyj (thickness is about 600 m) and Triassic Nekuchan formations (Fm) (thickness is more than 500 m). The outcrop of the lower part of Nekuchan Fm was studied on the right bank of the Kobyume river, 2.5 km downstream from the mouth of the Tiryakh-Yuryakh river [2].

Figure 1. Finds of Induan conchostracans in Verkhoyanie: the Permian-Triassic boundary interval of the Tiryakh-Kobyume section with localities of conchostracans, ammonoids and bivalves, the location of the Tiryakh-Kobyume (new finds of conchostracans) and Balbuk (conchostracans were collected by A.S. Kashirtsev in 1951 [4]) sections on Eastern Siberia and the location of the conchostracans on the Kobyume River (Tiryakh-Kobyume section).

Lower part of Nekuchan Fm is represented by close-grained siltstone with rare interlayers of fine-grained sandstones and numerous carbonate-siliceous concretions (Figure 1). Bed 34 is the lower unit of the Nekuchan Fm. Ceratitida of *Otoceras* occurs in bed 34. This genus often occurs in the Permian and Triassic transition deposits of Northern Asia and North America [2]. The ash layers are found in the basement of bed 34. Occurrence of the species *Otoceras boreale* Spath allows to determine the Permian-Triassic boundary in the section in 2.5 m above a basement of bed 34. Numerous carbonate-siliceous concretions from bed 35 includes the remains of ammonoids, conchostracans and bivalves. Ammonoids of the genus *Tompophiceras* indicate that bed 35 belongs to the Lower Induan.

Conchostracans are collected in the Tiryakh-Kobyume section (bed 35, Nekuchan Fm) during field work in 2019. About 150 conchostracan specimens are obtained.

Some conchostracan shells are well preserved. Their size ranges from small to medium. Some specimens have possessed shell substance.

The optic microscope Zeiss with the digital ocular Zeiss DiscoveryV8 and special software application Zeiss Axio Vision are used during the study of conchostracans.

Conchostracan species are determined by using a modern methodology of conchosstracan classification [3]. This method is based on measuring the main parameters of conchostracan shell (size and shape of conchostracan shells, length of dorsal margin, position of the umbo in the horizontal and vertical directions, size of the larval valves, as well as maximal curvatures at the anterior, posterior, and dorsal margins).

**Results and Discussion**

Assemblage includes seven species of conchostracans: *Pseudestheria sibirica* Novojilov, 1959, *Ps. tumaryana* Novojilov, 1959, *Ps. kashirtzevi* Novojilov, 1959, *Sphaerestheria aldanensis* Novojilov, 1959, *Lioestheria ignatjevi* Novojilov, 1959, *Wetlugites pronus* Novojilov, 1958, *Cyclotunguzites gutta* (Lutkevich, 1938).

Holotypes and paratypes of four species (*Pseudestheria sibirica*, *Ps. tumaryana*, *Ps. kashirtzevi*, *Sphaerestheria aldanensis*) was collected by A.S. Kashirtsev in 1951 on the Balbuk river (right tributary of the Tumara river, Aldan river basin, Western Verkhoyanie), in 18 km higher up the mouth, in the lower part of Triassic. These species were first described by N.I. Novojilov [4, 5]. It is necessary to revise these species based on new methodology (biometry, microsculpture etc.). These species are widespread in the Induan and Olenekian deposits of northern part of Yakutia, Induan deposits of the Volga Region and Pechora Coal Basin [4, 5, 6]. It is worth to remark that V.A. Molin and N.I. Novojilov [5] noted occurrence of species *Ps. sibirica* and *S. aldanensis* in Triassic deposits in the basin of the Kobyume river. Unfortunately, the precise locations of these species are still unknown. Species *Ps. kashirtzevi* and *Ps. sibirica* were previously found in Indian deposits in the Pechora Coal Basin [6].

The species *Lioestheria ignatjevi* is known fromthe Lower Triassic sediments (Induan stage) of the Volga Region, South Urals and northern part of Yakutia [5]. Holotype of this species was collected from the Induan deposits of the Volga Region, the Vetluga Basin [4, 5].

The species *Wetlugites pronus* occurs in the Lower Triassic sediments (Induan stage) in the Volga Region and northern part of Yakutia. This species is also reported from the Lower Triassic sediments of the Kobyume river basin [5]. Holotype of *W. pronus* was sampled in the Induan deposits of the Vyatka river (Volga Basin), in 3 km north of Putyatino village [6, 7].

Finding a species of *Cyclotunguzites gutta* is important forbiostratigraphy of the Southern Verkhoyanie. This species is widespread in Induan and Olenekian deposits of northern part of Yakutia and Induan deposits of the Volga Region and Pechora basin [6]. Earlier we found *C. gutta* in the Lower Triassic deposits (Maltsevo Fm) in the Babii Kamen section (Kuznetsk Coal Basin) [8] and in the Induan deposits of the Pechora basin [6]. Holotype of this species is known from the Induan deposits of Northern European Russian [5, 9].

**Conclusion**

Conchostracan assemblage in the Tiryakh-Kobyume section contains several species characterized by wide geographic and narrow stratigraphic range. For biostratigraphy, it is essential to study conchostracan from this section because they were found in the same stratigraphic layer with Early Induan ammonoids. The validity of *Ps. sibirica*, *Ps. tumaryana*, *Ps.kashirtzevi*, *S. aldanensis* must be revised by using new methodology and equipment.

**Acknowledgments**

We thank our colleagues, Vladimir I. Davydov, Afanasiy N. Kilyasov, Igor V. Budnikov, for their assistance during the sampling procedures and description of the section. The work is supported by the Russian Science Foundation grant No. 19-17-00178.

**References**

[1] Abramov B S 1974 Stratigrafiya verhnepaleozojskih otlozhenij Yuzhnogo Verkhoyan'ya [Stratigraphy of the Upper Paleozoic sediments in the South Verkhoyansk region] *Novosibirsk*, *Nauka*, p 96. (In Russian)

[2] Kutygin R V, Budnikov I V, Biakov A S, Davydov V I, Kilyasov A N, Silantiev V V 2019 Pervye nahodki tseratitov roda *Otoceras* v Kobyuminskoi zone Uzhnogo Verkhoyaniya, severo-vostok Rossii [First findings of Otoceras (Ceratitida) in the Kobyuma zone of the Southern Verkhoyansk region, Northeastern Russia] *Uchenye Zapiski Kazanskogo Universiteta. Seriya Estestvennye Nauki, vol 161, no 4.* (In Russian)

[3] Scholze F and Schneider J W 2015 Improved methodology of ‘conchostracan’ (Crustacea: Bran-chiopoda) classification for biostratigraphy *Newsl. Stratigr*., *vol 48, no 3,* pp 287–298. doi: 10.1127/nos/2015/0065.

[4] Novozhilov N I 1959 Novye permskie i triasovye Conchostraca iz juzhnoj Belorusii, Priuraliya [New Permian and Triassic Conchostraca from the South Belarus, Ural] *Materialy k «Osnovam Paleontologii»*, *Мoskva*, *vol. 3*, pp 84–103. (In Russian)

[5] Molin V А and Novojilov N I 1965 Dvustvorchatye listonogie Permi i Triasa Severa SSSR [Permian and Triassic Bivalved Phyllopods from the North of the USSR] *Nauka,* p 116 (In Russian)

[6] Zharinova V V and Silantiev V V 2018 About Early Triassic conchostracans of Pechora syneclise. *Paleostrat-2018. Moskva, 29-31 yanvarya 2018 g.* [Paleostrat-2018. Moscow, January 29–31, 2018]. *Moscow,* pp 30–31. (In Russian)

[7] Novojilov N I 1950 Recueil D’Articles sur les Phyllopodes Conchostraces*. Nauka*, p 128. (In French)

[8] Davydov V I, Zharinova V V and Silantiev V V 2019 Late Permian and Early Triassic conchostracans from the Babii Kamen section (Kuznetsk coal basin) *Uchenye Zapiski Kazanskogo Universiteta. Seriya Estestvennye Nauki, vol 161, no 2* pp 339–347. doi: 10.26907/2542-064X.2019.2.339-347.

[9] Lutkevich Е М 1938 Triasovye Estheriae iz verkhov Tunguskoj serii [Triassic Estheriae from upper part of the Tunguska Series] *Trudy arkticheskogo institute*, pp 155–164. (In Russian)