

A NEW RECORD OF THE PHYLLOCARID CRUSTACEAN (CRUSTACEA: PHYLLOCARIDA) IN THE SERPUKHOVIAN (MISSISSIPPIAN) OF THE DONETS BASIN, UKRAINE

(Представлено членом редакційної колегії д-ром геол. наук, проф. В.В. Озарем)

Background. The Carboniferous phyllocarid crustaceans of the Donets Basin are not well studied and are represented by the genus *Dithyrocaris* and undefined remains referred to *Phyllocarida* indet. The study of fossil phyllocarids is of great palaeobiogeographical importance, at least for the Carboniferous marine palaeobasins of the northern hemisphere.

Methods. Two specimens of carapace valves of the phyllocarid *Ceratiocaris* sp. are examined in this study. The fossils originate from the Serpukhovian of the western Donets Basin, eastern Ukraine. The Serpukhovian deposits in the Donets Basin are represented by the Samara Formation and most of the Kalmis Formation, but it is impossible to determine which formation the studied material comes from.

Results. The described *Ceratiocaris* sp. is very similar to *Ceratiocaris truncatus* Woodward, 1871 in terms of the outline of the valve. However, there are some differences, namely: the described valve is somewhat wider compared to the *Ceratiocaris truncatus*, the line of the greatest width of the studied valve is between its centre and the anterior part, while in *Ceratiocaris truncatus* the ventral and anterior margins form a semi-elliptical line. The posterior margin of *Ceratiocaris* sp. is wider and more concave than that of *Ceratiocaris truncatus*, while the rostral notch is narrower and shallower. *Ceratiocaris* sp. differs from *Ceratiocaris oretonensis* Woodward, 1871, in the outline of the valve: in *C. oretonensis* it gradually narrows anteriorly, while in *C. sp.* it widens rapidly to about 33 % of the valve length and then sharply narrows. In addition, the posterior margin of *Ceratiocaris oretonensis* is much more concave and narrower.

Conclusions. In the Carboniferous succession of the Donets Basin, phyllocarids are predominantly distributed in the Bashkirian interval. Only two taxa, *Dithyrocaris granulata* doneziana Riabin, 1921 and *D. tricornis aisenvergi* Krestovnikov, 1961, occur from outside the Bashkirian interval, namely the Serpukhovian and Upper Pennsylvanian, respectively. Thus, today, Carboniferous phyllocarids in the Donets Basin are represented by only two genera, *Dithyrocaris* Scouler in Portlock, 1843 and *Ceratiocaris* M'Coy, 1849.

Key words: *Phyllocarida*, Mississippian, Serpukhovian, Donets Basin, Ukraine.

Background

Phyllocarids (Phyllocarida Packard, 1879) constitute a relatively diverse group of crustaceans that are distributed nearly globally (Rolfe, 1969; Rode, & Lieberman, 2002; Briggs et al., 2011; Liu et al., 2023). The first appearance of Phyllocarida was during the Late Cambrian, and the group includes the extinct order Archaeostraca Claus, 1888, as well as the extant order Leptostraca Claus, 1880 (Collette, & Hagadorn, 2010).

The Carboniferous phyllocarid crustaceans of the Donets Basin are not well studied. Riabinin (1921) provided a description of *Dithyrocaris granulata* var. *doneziana* Riabin, 1921 from the D₁ limestone bed in the Serpukhovian part of the Kalmius Formation. Krestovnikov (1961) recorded three species of the genus *Dithyrocaris* Scouler in Portlock, 1843 across three distinct stratigraphic levels: *D. colei* Portlock, 1843 from the upper Bashkirian rocks recovered by the borehole No. 816 (depth interval 335.65–339.40 m) drilled near the town of Petropavlivka (Synel'nykove Rayon, Dnipropetrovsk Oblast), *D. tricornis* var. *aisenvergi* Krestovnikov, 1961 from the Upper Pennsylvanian strata recovered in the depth interval of 396.0–398.2 m by the borehole No. 9 drilled near the village of Oskil in Kharkiv Oblast, and *Chaenocaris tenuistriata* (M'Coy, 1844) (= *Dithyrocaris tenuistriata* M'Coy, 1844) from the lower Bashkirian Amvrosiyivka Formation in the borehole No. 2295 (depth interval 213.35–214.0 m), Pokrovs'k Rayon, Donetsk Oblast (Krestovnikov, 1961).

Dernov & Udovychenko (2019, fig. 2.5, 2.9) and Dernov (2023, fig. 3) figured specimens of *Dithyrocaris* sp. from the late Bashkirian-aged Mospyne Formation, which are exposed in the southern part of Luhansk Oblast. The poorly preserved specimens *Phyllocarida* indet. co-occured with probable phyllocarid resting traces belonging to *Hankoichnus bandersnatchi* Dernov, 2023 were described

from black shales of the lower Bashkirian part of the Dyakove Group in the southern part of Luhansk Oblast (Dernov, 2023; Dernov, & Poletaev, 2024).

The present paper presents the results of a study of newly discovered specimens of the phyllocarids *Ceratiocaris* sp. from the Serpukhovian coal-bearing paralic succession of the western Donets Basin (eastern Ukraine). The data obtained clarify the systematic diversity of Mississippian phyllocarid crustaceans of the Donets Basin. The study of fossil phyllocarids is of great palaeobiogeographical importance, at least for the Carboniferous palaeobasins of the northern hemisphere.

Methods

Two moderately-well and poorly preserved specimens of carapace valves of the phyllocarid *Ceratiocaris* sp. preserved in black shale are examined in this study. The black shales were recovered at a depth interval of 875.0–876.3 m by the borehole No. 9240 drilled near the town of Kurakhove (Donetsk Oblast, eastern Ukraine) (Fig. 1A, B, D). According to the original field label, the strata recovered at the depth interval are of the Serpukhovian age (Fig. 1C).

The collector of the studied material is not known, but it is likely to be one of the local Donetsk geologists. In the 1980s, this material was transferred for study to the Department of Stratigraphy and Palaeontology of Palaeozoic Sediments, Institute of Geological Sciences of the Academy of Sciences of the Ukrainian SSR (now: Institute of Geological Sciences of the National Academy of Sciences of Ukraine, Kyiv). The late Dr David Aisenverg classified these fossils as phyllocarids, but was unable to define their genus or species. Presently, the studied phyllocarids are part of a small collection of Serpukhovian–early Bashkirian fauna (NMNH-G 8637) stored in the Department of Geology, National Museum of Natural History of the National Academy of Sciences of Ukraine, Kyiv.

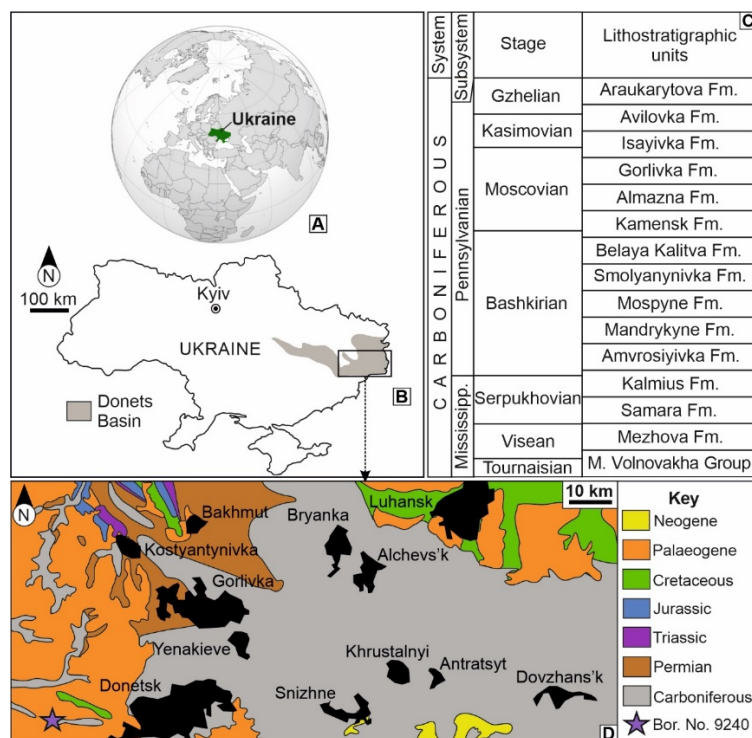


Fig. 1. Geographical location and stratigraphic position of the borehole No. 9240

A, B, D – maps showing general and specific geographical location of the borehole No. 9240.

C – Carboniferous stratigraphy of the Donets Basin. Abbreviations: Bor. – borehole, M. – Mokra, Mississipp. – Mississippian

Geological setting. The Serpukhovian deposits in the Donets Basin are represented by the Samara Formation and most of the Kalmius Formation (stratigraphic interval bounded by the D₁ and D₅^{8Lower} limestone beds) (see Fig. 1C), but it is impossible to determine which formation the studied material comes from.

The Samara Formation is composed of a paralic succession of mudstones, cross-bedded siltstones, and fine-grained sandstones. Coarse-grained sandstones and conglomerates are rare. The formation contains 30 to 75 coal beds and up to 10 thin beds of argillaceous, often sandy or crinoidal limestones. Fossils are few and represented by foraminiferans, bryozoans, brachiopods, and bivalves. The thickness of the formation varies from 390 m in the western part of the Donets Basin to 530 m in the area of the city of Donetsk (central part of the basin). The formation is of early Serpukhovian age; the conventionally Visean–Serpukhovian boundary in the Donets Basin is located at the base of the C₁ limestone bed, the basal layer of the Samara Formation (Aisenverg et al., 1963; Feofilova, & Levenshtein, 1963; Levenshtein, & Shirokov, 1963; Dunaeva, 1969; Shulga, 1972; Poletaev, & Vdovenko, 2013).

The Kalmius Formation is represented by a paralic succession of sandstones, siltstones, mudstones, coals (7–11 beds), and limestones (up to 35 beds). The characteristic sandstone beds of the Kalmius Formation have their own names (e.g., the Feninian sandstone bed) and are used for local section correlation. The thickness of the formation ranges from 530 to 800 m (Aisenverg et al. 1963; Levenshtein, & Shirokov 1963; Feofilova, & Levenshtein 1963; Dunaeva, 1969; Poletaev, & Vdovenko, 2013). The limestones of the lower part of the formation, in the interval from the D₁ to D₅ limestone bed inclusive, are characterised by the abundance of corals (especially in the D₃, D₄, and D₅ limestone beds). Among the diverse limestones of the upper part of the Kalmius Formation, in the interval D₅ to E₁, it is worth noting the wide development of oolitic ones (especially

in the group of the D₇ limestone bed) (Feofilova, & Levenshtein, 1963).

The Serpukhovian paralic deposits of the Donets Basin were accumulated mainly in a large alluvial-deltaic plain, which was flooded periodically by warm epicontinental seas (Logvinenko, 1953). Only the central part of the Donets Basin was characterized by a continuous regime of marine sedimentation in the Serpukhovian and Bashkirian (Reznikov, 1993; Dernov, & Poletaev, 2024). This area was located in a humid tropical and/or subtropical climate (Novik, 1952, 1974; Logvinenko, 1953; Fissunenkov, 2000). This palaeobasin, surrounded on the south and west by land on the site of the Ukrainian Shield, was located on the southeastern periphery of Laurussia and freely connected with Palaeotethys and the east and had intermittent connections with basins located to the west.

Systematic palaeontology

Phylum Arthropoda Gravenhorst, 1843
Class Malacostraca Latreille, 1806
Subclass Phyllocarida Packard, 1879
Order Achaeostraca Claus, 1888
Family Ceratiocarididae Salter, 1863
Genus *Ceratiocaris* M'Coy, 1849

Type species. *Ceratiocaris solenoides* M'Coy, 1849; by original designation.

Diagnosis. See Collette, & Rudkin (2010: p. 119) and Collette, & Hagadorn (2010: p. 802).

Stratigraphic range. Upper Ordovician–Permian.

Ceratiocaris sp.

Material. One complete valve of the carapace (specimen NMNH-G 8637/87) and one small fragment of a valve (specimen NMNH-G 8637/88).

Description. The better-preserved specimen (NMNH-G 8637/87) is represented by a left valve of a supposedly sub-triangular carapace, which has a straight dorsal hinge line with a very slightly concave wide rostral notch. Anterior and ventral

margins are broadly rounded, postero-lateral angles are blunt, posterior margin is straight, extends obliquely (at an angle close to 50°) to the axis of symmetry of the carapace. A narrow border, which gradually thickens (from 0.3 mm to 0.7 mm) from the posterior to the anterior margin, is present along the ventral margin of the valve. Valve surface is smooth (Fig. 2B). The valve is 20 mm in length and 10 mm in maximum width (the length to width ratio is 2.0).

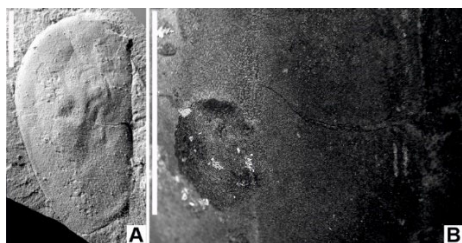


Fig. 2. *Ceratiocaris* sp. from the Serpukhovian of the Donets Basin, specimen NMNH-G 8637/87

A – general view of the valve,
B – enlarged part of the valve. Scale bars=5 mm

Remarks. *Ceratiocaris* sp. is morphologically very similar to *Ceratiocaris truncatus* Woodward, 1871 in terms of the outline of the valve. However, there are some differences, namely: (1) the described valve is somewhat wider compared to the specimen of *Ceratiocaris truncatus*, figured by Jones, & Woodward (1888, pl. 10, fig. 10); (2) the line of the maximum width of the valve in the specimen NMNH-G 8637/87 is located between the valve centre and the valve anterior part, while in *Ceratiocaris truncatus* the ventral and anterior margins form a semi-elliptical line. The posterior margin of the specimen NMNH-G 8637/87 is wider and more concave than that of *Ceratiocaris truncatus*, while the rostral notch is narrower and shallower.

Ceratiocaris sp. differs from the other Carboniferous species, *Ceratiocaris oregonensis* Woodward, 1871, in the outline of the valve: in *C. oregonensis* it gradually narrows anteriorly, while in *C. sp.* described above it widens rapidly to about 33 % of the valve length and then sharply narrows. In addition, the posterior margin in *Ceratiocaris oregonensis* is much more concave and narrower.

Distribution. *Ceratiocaris* M'Coy, 1849 occurs in the Upper Ordovician–Permian of Europe and North America.

System	Subsystem	Stage	Lithostratigraphic unit	Taxa	Some phyllocarids
CARBONIFEROUS	PENNSYLVANIAN	Gzhelian	Araukarytova Formation		
			Avilovka Formation		
		Kasimovian	Isayivka Formation		
			Gorlivka Formation		
		Moscovian	Almazna Formation		
			Kamenskaya Formation		
			Belaya Kalitva Formation		
		Bashkirian	Smolyanynivka Formation		
			Mospyne Formation		
			Mandrykyne Formation		
			Amvrosiyivka Formation		
	MISSISSIPPIAN	Serpukhovian	Kalmius Formation		
			Samara Formation		
		Visean	Mezhova Formation		
		Tournaian	Mokra Volnovakha Group		

Fig. 3. Stratigraphic distribution of the phyllocarid taxa in the Carboniferous of the Donets Basin

A – *Dithyrocaris tricornis aisenbergi* Krestovnikov, 1961 (after Krestovnikov, 1961: pl. 3, fig. 7); B, E – *Dithyrocaris colei* Portlock, 1843 (after Krestovnikov, 1961: pl. 3, fig. 6 (Fig. 3B) and the specimen GM LNU-45/02 in the Geological Museum of the Luhansk Taras Shevchenko National University, Poltava (Fig. 3E)); C – *Dithyrocaris tenuistriata* M'Coy, 1844 (after Krestovnikov, 1961: pl. 3, fig. 5); D – *Dithyrocaris cf. granulata* Woodward & Etheridge, 1873 (specimen IGS NASU-41/01 in the Institute of Geological Sciences of the NAS of Ukraine, Kyiv); F – Phyllocarida indet. (after Dernov and Poletaev, 2024: Fig. 6I). Abbreviation: D. – *Dithyrocaris*

Discussion and conclusions

In the Carboniferous succession of the Donets Basin, phyllocarids are predominantly distributed in the Bashkirian interval, where *Dithyrocaris tenuistriata* M'Coy, 1844 (Krestovnikov, 1961), *D. colei* Portlock, 1843 (Krestovnikov, 1961 and author's unpublished data), *D. cf. granulata* Woodward, & Etheridge, 1873 (author's unpublished data), and Phyllocarida indet. (Dernov, 2023; Dernov, & Poletaev, 2024) recorded (Fig. 3). Only three taxa, *Dithyrocaris granulata doneziana* Riabin, 1921 and *Ceratiocaris* sp., as well as *Dithyrocaris tricornis aisenvergi* Krestovnikov, 1961, occur from outside the Bashkirian interval, namely the Serpukhovian and Upper Pennsylvanian, respectively (Riabin, 1921; Krestovnikov, 1961; this study). Thus, Carboniferous phyllocarids of the Donets Basin are represented by only two genera, *Dithyrocaris* Scouler in Portlock, 1843 and *Ceratiocaris* M'Coy, 1849.

All records of phyllocarids in the Carboniferous of the Donets Basin are confined to black shales formed in dysaerobic marine conditions (Krestovnikov, 1961; Dernov, & Poletaev, 2024; this study). The palaeoenvironmental context of occurrence of *Dithyrocaris granulata doneziana* Riabin, 1921 is somewhat unclear. The D₁ limestone bed in the Kalmius Formation (the D₁⁵ limestone bed in the modern Carboniferous lithostratigraphic scheme of the Donets Basin) from which this subspecies originated, contains rich marine biota consisting of calcareous algae, foraminifers, corals, bryozoans, brachiopods, bivalves, gastropods, cephalopods, crinoids, echinoids etc., and forming a small bioherm (Aisenverg et al. 1987; Poletaev et al. 1988). It is possible that *Dithyrocaris granulata doneziana* comes from the shale bed separating the limestone beds of the D₁ limestone group consisting of five beds, from the D₁ bed to the D₁⁵ bed (Poletaev, & Vdovenko, 2013).

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References

- Aisenverg, D. Ye., Brazhnikova, N. Ye., Novik, Ye. O., Rotai, A. P., & Shulga, P. L. (1963). *Carboniferous stratigraphy of the Donets Basin*. Publishing of the Academy of Sciences of the Ukrainian SSR [in Russian]. [Айзенверг, Д. Е., Бражникова, Н. Е., Новик, Е. О., Ротай, А. П., & Шульга, П. Л. (1963). *Стратиграфия каменноугольных отложений Донецкого бассейна*. Издательство АН УССР].
- Briggs, D. E. G., Rolfe, W. D. I., Butler, P. D., Liston, J. J., & Ingham, J. K. (2011). Phyllocarid crustaceans from the Upper Devonian Gogo Formation, Western Australia. *Journal of Systematic Palaeontology*, 9(3), 399–424. <https://doi.org/10.1080/14772019.2010.493050>
- Claus, C. (1888). Über den Organismus der Nebaliden und die systematische Stellung der Leptostraken. *Arbeiten aus dem zoologischen Institut der Universität Wien und der zoologischen Station in Triest*, 8, 1–148.
- Collette, J. H., & Hagadorn, L. W. (2010). Early evolution of phyllocarid arthropods: phylogeny and systematics of Cambrian-Devonian archaestracons. *Journal of Paleontology*, 84(5), 795–820. <https://doi.org/10.1666/09-092.1>
- Collette, J. H., & Rudkin, D. M. (2010). Phyllocarid crustaceans from the Silurian Eramosa Lagerstätte (Ontario, Canada): taxonomy and functional morphology. *Journal of Paleontology*, 84(1), 118–127. <https://doi.org/10.1666/08-174.1>
- Dernov, V. (2023). *Hankoichnus* ichnogen. nov., a new arthropod (?) trace fossil from the Carboniferous of the Donets Basin (Ukraine). *Geological Journal (Ukraine)*, 382, 53–58. <https://doi.org/10.30836/igs.1025-6814.2023.1.265486>

- Dernov, V. S., & Poletaev, V. I. (2024). New geological and palaeontological data of the Dyakove Group (Carboniferous) and age-related rock formations of the central Donets Basin, Ukraine. *Geological Journal (Ukraine)*, 386, 3–21. <https://doi.org/10.30836/igs.1025-6814.2024.1.285644>
- Dunaeva, N. M. (1969). Open Donets Basin. In: V. G. Bondarchuk (Ed.), *Stratigraphy of the Ukrainian SSR. Volume 5. Carboniferous* (pp. 21–48). Naukova Dumka [in Ukrainian]. [Дунаева, Н. М. (1969). Відкритий Донбас. В. Г. Бондарчук (ред.), *Стратиграфія УРСР. Том V. Карбон* (с. 21–48). Наукова думка].
- Feofilova, A. P., & Levenshtein, M. L. (1963). *Features of the sedimentation and coal accumulation in the Early and middle Carboniferous of the Donets Basin*. Publishing House of the Academy of Sciences of the USSR [in Russian]. [Феофилова, А. П., & Левенштейн, М. Л. (1963). *Особенности осадко- и угленакпления в нижнем и среднем карбоне Донецкого бассейна*. Издательство АН СССР].
- Fissunencko, O. P. (2000). *On the problem of the Moscovian Stage*. Publishing House of the Luhansk University [in Russian]. Фисуненко, О. П. (2000). *К проблеме московского яруса*. Издательство Луганского университета].
- Gravenhorst, J. L. C. (1843). *Vergleichende Zoologie. Graß, Barth & Comp.* <https://doi.org/10.5962/bhl.title.58729>
- Jones, T. R., & Woodward, H. (1888). A monograph of the British Palaeozoic Phyllopoda (Phyllocarida, Packard). Part I. Ceratiocaridæ. *Monographs of the Palaeontographical Society*, 41, 1–72. <https://doi.org/10.1080/02693445.1888.12027998>
- Krestovnikov, V. N. (1961). New phyllocarid crustaceans from the Palaeozoic of the Russian plate, the Urals, Timan, and Donets Basin. *Transactions of the Geological Institute*, 52, 1–67 [in Russian]. [Крестовников, В. Н. (1961). Новые ракообразные филлокариды палеозоя Русской платформы, Урала, Тимана и Донбасса. *Труды Геологического института*. 52, 1–67].
- Latreille, P. A. (1806). *Genera Crustaceorum et Insectorum secundum ordinem naturalem in familias disposita, iconibus exemplaribus plurimis explicata*. Paris & Argentorati. <https://doi.org/10.5962/bhl.title.34916>
- Levenshtein, M. L., & Shirokov, A. Z. (1963). Lower Carboniferous. In I. A. Kuznetsov (Ed.), *Geology of coal and oil shale deposits of the USSR. Volume 1. Coal basins and deposits in the south part of the European part of the USSR* (pp. 164–174). State scientific and technical publishing house of literature on geology and subsoil protection [in Russian]. [Левенштейн, М. Л., & Широков, А. З. (1963). Нижний карбон. Кузнецов И. А. (Ред.), *Геология месторождений угля и горючих сланцев СССР. Том 1. Угольные бассейны и месторождения юга европейской части СССР*. Гос. НТИ литературы по геологии и охране недр].
- Liu, Y., Poschmann, M. J., Fan, R., Zong, R., & Gong, Y. (2023) Silurian phyllocarid crustaceans (Phyllocarida, Archaestraconia) from South China. *Journal of Systematic Palaeontology*, 21(1), article 2187718. <https://doi.org/10.1080/14772019.2023.2187718>
- Logvinenko, N. V. (1953). *Lithology and palaeogeography of the Carboniferous coal-bearing deposits of the Donets Basin*. Publishing House of the Kharkiv University [in Russian]. [Логвиненко, Н. В. (1953). *Литология и палеогеография продуктивной толщи донецкого карбона*. Издательство ХГУ].
- M'Coy, F. (1844). A synopsis of the characters of the Carboniferous limestone fossils of Ireland. Williams & Norgate. <https://doi.org/10.5962/bhl.title.11559>
- M'Coy, F. (1849). On the classification of some British fossil Crustacea, with notices of new forms in the University of Cambridge. *The Annals and Magazine of Natural History*, 2(4), 412–414. <https://doi.org/10.1080/03745486009494843>
- Novik, Ye. O. (1952). *Carboniferous flora of the European part of the USSR*. Publishing House of the Academy of Sciences of the USSR [in Russian]. [Новик, Е. О. (1952). *Каменноугольная флора Европейской части СССР*. Издательство АН СССР].
- Novik, Ye. O. (1974). *Regularities of development of the Carboniferous flora of the south of the European part of the USSR*. Naukova Dumka [in Russian]. [Новик, Е. О. (1974). *Закономерности развития каменноугольной флоры юга Европейской части СССР*. Наукова думка].
- Packard, A. S. Jr (1879). The nebalid Crustacea as types of a new order. *American Naturalist*, 13, 128. <https://doi.org/10.1080/00222937908562419>
- Poletaev, V. I., & Vdovenko, M. V. (2013). Lower Carboniferous (Mississippian). In P. F. Gozhik (Ed.), *Stratigraphy of the Upper Proterozoic and Phanerozoic of Ukraine. Volume 1. Stratigraphy of the Upper Proterozoic, Palaeozoic and Mesozoic* (pp. 250–283). LAT&K [in Ukrainian]. [Полетаев, В. І., & Вдовенко, М. В. (2013). Нижній карбон (міссісипій). П. Ф. Гожик (Ред.), *Стратиграфія верхнього протерозою та фанерозою України. Т. 1. Стратиграфія верхнього протерозою, палеозою та мезозою України* (с. 250–283). LAT&K].
- Portlock, J. E. (1843). *Report on the geology of the county of Londonderry, and of parts of Tyrone and Fermanagh*. Longman, Brown, Green and Longmans. De Gruyter. <https://doi.org/10.1519/9783112391341-021>
- Reznikov, A. I. (1993). The Dyakove Group and its stratigraphic position in the Carboniferous succession of the Donets Basin. *Geological Journal (Ukraine)*, 262, 52–57 [in Russian]. [Резников, А. И. (1993). Дьяковская серия и ее положение в стратиграфической схеме карбона Донбасса. *Геологический журнал*. 262, 52–57].
- Riabinin, A. N. (1921). Notes on some fossil Phyllocarida. *Yearbook of the Russian Palaeontological Society*, 3, 23–33 [in Russian]. [Рябинин, А. Н.

(1921). Заметка о некоторых ископаемых Phyllocarida. *Ежегодник Русского палеонтологического общества*, 3, 23–33].

Rode, A. L., & Lieberman, B. S. (2002). Phylogenetic and biogeographic analysis of Devonian phyllocarid crustaceans. *Journal of Paleontology*, 76(2), 271–286. <https://doi.org/10.1017/s0022336000041706>

Rolfe, W. D. I. (1969). Phyllocarida. In R. C. Moore (Ed.), *Treatise on Invertebrate Paleontology. Part R, Arthropoda* 4(1) (pp. 296–331). Geological Society of America and University of Kansas Press.

Salter, J. W. (1863). Note on the Skiddaw Slate fossils. *Quarterly Journal of the Geological Society of London*, 19, 135–140.

Shulga, V. F. (1972). Regularities of changes in coal-bearing and cyclicity in the Samara Formation of the western Donets Basin. *Lithology and Mineral*

Resources, 5, 51–66 [in Russian]. [Шульга, В. Ф. (1972). Закономерности изменения угленосности и цикличности в самарской свите Западного Донбасса. *Литоология и полезные ископаемые*, 5, 51–66].

Woodward, H. (1871). On some new phyllopodous crustaceans from Palaeozoic rocks. *Geological Magazine*, 8, 104. <https://doi.org/10.1017/s0016756800161205>

Woodward, H., & Etheridge, R. (1873). *Explanation of sheet 23. Memoirs of the Geologic Survey, Scotland*, 1–99.

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НОВА ЗНАХІДКА ФІЛОКАРИДИ (CRUSTACEA: PHYLLOCARIDA) В СЕРПУХОВСЬКИХ ВІДКЛАДАХ (МІССІСІПІЙ) ДОНЕЦЬКОГО БАСЕЙНУ (УКРАЇНА)

Вступ. Кам'яновугільні філокариди Донецького басейну недостатньо вивчені і до останнього часу були представлені родом *Dithyrocaris* та невизначеними рештками, віднесеними до *Phyllocarida* indet. Вивчення викопних філокарід має велике палеобіогеографічне значення, принаймні для кам'яновугільних морських палеобасейнів північної півкулі.

Методи. Розглянуто два зразки стулок панцира філокарід *Ceratiocaris* sp. Скам'янілості походять з відкладів серпуховського ярусу західної частини Донбасу. Серпуховські відклади на Донбасі представлені самарською світою та більшою частиною кальміуської світи, але неможливо визначити, з якої саме світи походить досліджений матеріал.

Результати. Описаний *Ceratiocaris* sp. за обрисами стулки дуже схожий на *Ceratiocaris truncatus* Woodward, 1871. Проте є деякі відмінності, а саме: описана стулка дещо ширша порівняно з *Ceratiocaris truncatus*, лінія найбільшої ширини дослідженої стулки розташована між її центром і передньою частиною, тоді як у *Ceratiocaris truncatus* вентральний і передній краї утворюють напівеліптичну лінію. Задній край у *Ceratiocaris* sp. ширший і більш увігнутий, ніж у *Ceratiocaris truncatus*, тоді як ростральна виїмка вужча і дрібніша. *Ceratiocaris* sp. відрізняється від *Ceratiocaris oretonensis* Woodward, 1871 обрисами стулки: у *C. oretonensis* вона поступово звужується до переднього краю, тоді як у *C. sp.* вона швидко розширюється приблизно до 33 % довжини стулки, а потім різко звужується. Крім того, задній край *Ceratiocaris oretonensis* набагато більш увігнутий і вужчий.

Висновки. У кам'яновугільних відкладах Донецького басейну філокариди поширені переважно у відкладах башкирського ярусу. Лише два таксони, *Dithyrocaris granulata doneziana* Riabin, 1921 та *D. tricornis aisenvergi* Krestovnikov, 1961, походять з-поза меж башкирського інтервалу, а саме із серпуховського ярусу та верхнього пенсильванію, відповідно. Отже, на сьогодні кам'яновугільні філокариди Донбасу представлені лише двома родами: *Dithyrocaris* Scouler in Portlock, 1843 та *Ceratiocaris* McCoy, 1849.

Ключові слова: *Phyllocarida*, міссісіпій, серпуховський ярус, Донецький басейн, Україна.

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