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A new ostracode species, *Neomonoceratina chomentovens* sp. n., from the Korytnica Basin (Middle Miocene; Holy Cross Mountains, Central Poland)

ABSTRACT: A new ostracode species, *Neomonoceratina chomentovens* sp. n., is described from the Middle Miocene (Badenian) deposits of the Korytnica Basin (southern slopes of the Holy Cross Mountains, Central Poland). It is regarded as a descendant of *N. helvetica* OERTLI, 1958, known from the older Miocene deposits of both the Tethys and the Paratethys. Special attention is paid to the well pronounced sexual dimorphism in the newly established species, which is well marked even in premature individuals. Suggested is also a value of the newly established species in biostratigraphic zonation of the Miocene deposits of the Central Paratethys.

INTRODUCTION

Within a rich and diversified assemblage of ostracodes occurring in the Middle Miocene (Badenian) deposits of the Korytnica Basin, developed on the southern slopes of the Holy Cross Mountains, Central Poland (see BAŁUK & RADWAŃSKI 1977), a new species of the genus *Neomonoceratina* KINGMA, 1948, has recently been recognized by the author while collecting material for a comprehensive monograph of the Korytnica ostracodes. The genus *Neomonoceratina* ranges since the Miocene through Recent and is presently confined to shallow marine environments, primarily in the Mediterranean and tropical zones. In the Miocene deposits of the Paratethys, one species of this genus has hitherto been reported, viz. *N. helvetica* OERTLI, 1958; it is of much importance

for biostratigraphic correlations in both the Tethyan and the Paratethyan realms.

The described material is housed at the collection of the Institute of Paleobiology, Polish Academy of Sciences (abbreviated as ZPAL) in Warsaw.

The SEM-micrographs (see Pls 1–2) were taken at the Electron Microscopy Laboratory of the Nencki Institute of Experimental Biology in Warsaw.

PALEOENVIRONMENTAL SETTING

The newly established species *Neomonoceratina chomentovensis* sp. n. was discovered in the Middle Miocene (Badenian) deposits exposed in a small sand-pit at Chomentów in the Korytnica Basin (see BAŁUK & RADWAŃSKI 1977, Text-figs 1 and 4). The studied specimens were obtained from three samples taken at 6.8, 7.6, and 8.1 m below the upper surface of the sand-pit, i. e., from the marly sands with scarce fossils, mostly microfauna (unit 1 in RADWAŃSKI 1977, Text-fig. 1).

The associated microfauna consists of foraminifera, other ostracodes, and microproblematics, all of them slightly varying in composition between the samples. The benthic foraminifera are dominated by the genera *Elphidium*, *Ammonia*, *Cibicides* (one species only, *C. lobatulus*), *Protelphidium*, *Asterigerina*, *Cancris*, *Reussella*, *Pararotalia*, *Glabratella*, *Rosalina*, *Florilus*, *Bolivina*, *Bulimina*, *Fursenkoina*, and the miliolids. The planktic foraminifera are less frequent and include mainly globigerins and globigerinoids.

Among the ostracodes, the most abundant are representatives of the genera *Cytheridea*, *Cnestocythere*, *Callistocythere*, *Cyamocytheridea*, *Falunia*, *Loxoconcha*, *Paracytheridea*, *Semicytherura*, *Aurila*, *Pontocythere*, *Pseudocytherura*, *Phlyctenophora*, and *Cytheretta*. Representatives of *Pterygocythereis*, *Acanthocythereis*, *Costa*, *Cytherella*, *Krithe*, and *Incongruella* are extremely rare, and they may be derived from the substrate, i. e. the Korytnica Clays, in which they are quite common. All these ostracodes are represented primarily by separate valves of various ontogenetic stages (both juveniles and adults), thus suggesting their provenance from a definite biocoenose (cf. WHATLEY 1983). All the species are typically thin-shelled, and their valves are well preserved.

The microproblematics are represented mainly by the species *Bolboforma metzmacheri* (CLODIUS, 1922), the taxonomy and occurrence of which are discussed in a separate paper (SZCZUCHURA 1987).

The content of the whole microfaunal assemblage suggests a normal marine, shallow-subtidal to sublittoral (since nil to 50 m in depth), plant-rich and rather low-energy environment, well connected with an open sea situated south of the Korytnica Bay (see BAŁUK & RADWAŃSKI 1977). The presence of forms redeposited from the Korytnica Clays, and rarely also of mid- to Upper Cretaceous foraminifera derived from the

shorezone, may suggest temporary changes of hydrodynamic activity in the discussed environment.

GEOLOGICAL AGE

The precise stratigraphic age of the investigated section, as well as of the whole sedimentary sequence of the Korytnica Basin, has been recognized by MARTINI (1977) who, on the basis of the coccoliths, attributed this sequence to the Middle Badenian (upper part of NN 5 and lower part of NN 6 nannoplankton zones).

In the ostracode biozonation of the Paratethys Miocene (JIŘIČEK 1983), the investigated deposits from the Korytnica Basin should be assigned to the Middle Badenian NO 8 Zone. This is indicated by the presence, in the samples yielding *Neomonoceratina chomentovens* sp. n., of the species *Eocytheropteron inflatum* and *Falunia spinulosa*, both of which are the index forms of this very zone and do not occur in older strata (BRESTENSKÁ & JIŘIČEK 1978, JIŘIČEK 1983).

Another associated species, *Acanthocythereis hystrix*, was restricted to the Lower Badenian NO 7 Zone according to these authors; thus its presence could have indicated the Lower/Middle Badenian boundary as the age of these deposits. The accepted ostracode biostratigraphic subdivision of the Miocene of the Tethyan realm (JIŘIČEK 1983), however, demonstrates that the deposits yielding *Neomonoceratina chomentovens* sp. n. in the Korytnica Basin belong to the middle, not the lower part of the Badenian. The presence of the species *Bosquetina carinella* and *Cytherella postdenticulata* in the Korytnica Clays, underlying the marly sands exposed at Chomentów, is indicative also of the NO 8 Zone (younger Langhian and older Serravallian); that is, the middle, not the older part of the Middle Miocene.

SYSTEMATIC ACCOUNT

Family Cytheridae BAIRD, 1850

Subfamily Cytherinae BAIRD, 1850

Genus *Neomonoceratina* KINGMA, 1948

Neomonoceratina chomentovens sp. n.

(Pl. 1, Figs 1—8 and Pl. 2, Figs 1—11)

HOLOTYPE: The specimen (arVF) * presented in Pl. 1, Fig. 6.

PARATYPES: Three specimens presented in Pl. 1, Figs. 1—2 and 7.

TYPE LOCALITY: Chomentów in the Korytnica Basin, southern slopes of the Holy Cross Mountains, Central Poland.

TYPE HORIZON: Middle part of the Middle Miocene (Middle Badenian).

DERIVATION OF THE NAME: *chomentovens* — after the name of Chomentów village.

* Abbreviations used in the description and explanations to figured specimens (Pls 1—2): J — juvenile, a — adult, L — left, R — right, V — valve, C — complete carapace, M — male, F — female.

DIAGNOSIS: A *Neomonoceratina* with a network-like ornamentation of valves, except their most admarginal posterior and anterior parts; an arcuate rib bounds externally the anterior and posterodorsal valve inflation; with distinct inflation in the posterior part.

MATERIAL: 35 specimens (isolated valves and complete carapaces), belonging to adult and juvenile individuals; all well preserved.

DIMENSIONS (in mm):

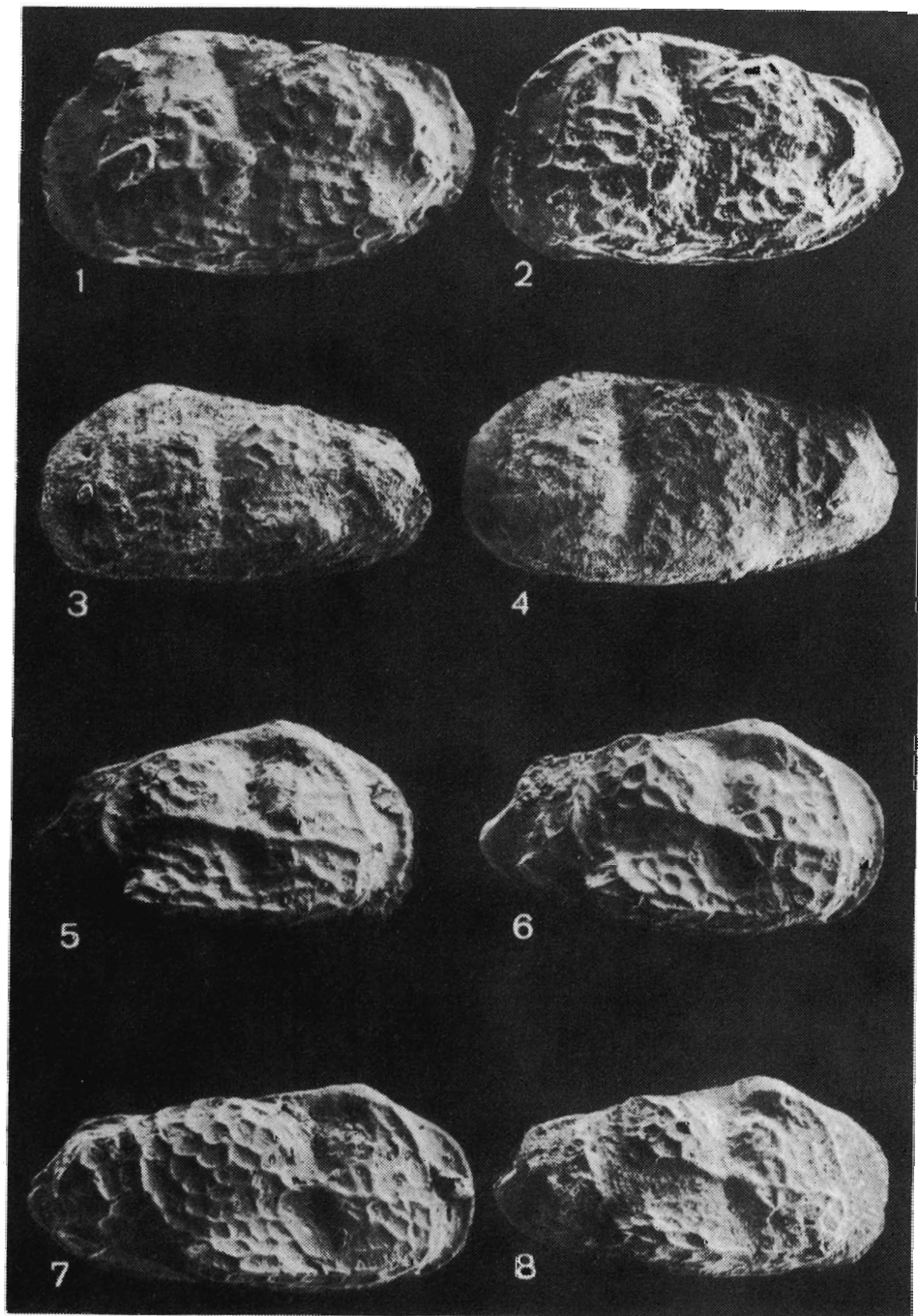
	ZPAL O.XXX/1	O.XXX/4	O.XXX/6 (holotype)	O.XXX/7
	aLVF	aLVM	aRVF	aRVM
Length	1.01	1.20	0.96	1.07
Height	0.68	0.65	0.60	0.55

DESCRIPTION: Valves of medium size, massive, with dorsal and lateral outline typical of the genus. Maximum height anteriorly, greatest width posteroventrally. Both valves slightly differ in size and shape, the left one being larger and less truncated postero- and anterodorsally. Dorsal margin straight, ventral margin rather coincident with it, rounded and concave in its middle part. Anterior margin broadly and somewhat obliquely rounded, posterior margin less broadly rounded, with a short subdorsal caudal process. Anterior cardinal angle better developed than the posterior one, and it is more distinct in the right valve. Lateral inflation divided by the subcentral, vertical sulcus, and in its lower part it reminds a bluntly ended wing. Lateral and ventral sides, except the most admarginal areas of both ends, covered by network-like ornamentation; in the ventral side, elements of ornamentation tend to parallel the contact line. A weak, broadly arcuate rib, originating in the eye region, borders frontally on the anterior inflation, while another and more pronounced rib bounds externally the posterodorsal valve inflation. Median rib extends from the middle part of the anterior rib up to the posterodorsal inflation where it gently disappears. A thin, frill-like list (rarely preserved) runs along the anterior margin. Duplicature rather narrow, wider anteriorly. Hinge schizodont, with a well developed, round anteromedian tooth below the bar in the left valve; median element serrate. Muscle scars consist of four adductor scars of the main group and round, singular scars in the front of the former. Marginal pore canals are invisible.

VARIABILITY: It is expressed in size of the specimens (see Text-fig. 1), as well as in their shape and ornamentation. The shape of the carapace varies due to differential development of the caudal process (see Pl. 1, Figs 1—2) and the lateral inflation. Variability in ornamentation concerns both its conspicuousness (or perhaps preservation) and pattern. All the main ribs, the median one including, may be very poorly developed or absent.

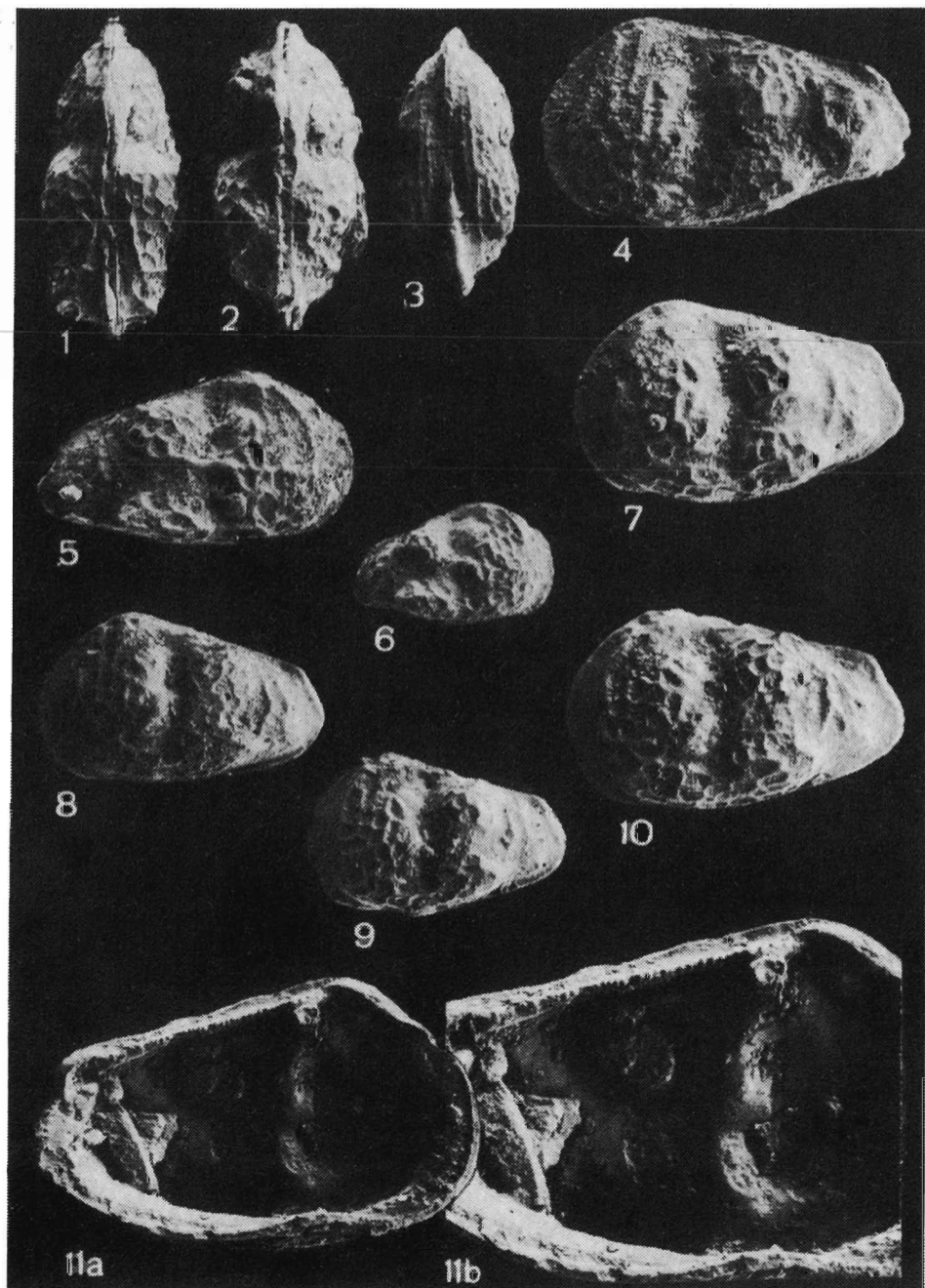
DIMORPHISM and ONTOGENY: The sexual dimorphism is well pronounced. The male carapaces are longer and posteriorly more convex than the female ones. The juvenile carapaces are subtriangular in lateral view, while the adults become oval. The carapaces of the preultimate stage display sexual dimorphism of the same kind as in the adults (compare Pl. 1, Figs 1—8 and Pl. 2, Fig. 4).

REMARKS: The newly established species, *Neomonoceratina chomentovens* sp. n. is related to *N. helvetica* OERTLI, 1958. As kindly suggested by Dr. H. OERTLI (pers. comm.), it simply belongs to the *N. helvetica* group. The new species differs from typical forms of *N. helvetica* mainly by the lack of ornamentation in the most admarginal part of the ends of its carapace, and by the lack of



Neomonocerotina chomentovensis sp. n.

1— aLVF, ZPAL O.XXX/1; 2— aLVF, ZPAL O.XXX/2; 3— jLVM, ZPAL O.XXX/3;
 4— aLVM, ZPAL O.XXX/4; 5— jRVF, ZPAL O.XXX/5; 6— aRVF (holotype), ZPAL
 O.XXX/6; 7— aRVM, ZPAL O.XXX/7; 8— jRVM, ZPAL O.XXX/8; all taken $\times 60$



Neomonoceratina chomentowensis sp. n.

- 1—dorsal view, aCM, ZPAL O.XXX/9, $\times 45$; 2—dorsal view, aCF, ZPAL O.XXX/10, $\times 45$; 3—ventral view, aCF, ZPAL O.XXX/11, $\times 40$; 4—jLVM, ZPAL O.XXX/12, $\times 60$; 5—jRVF, ZPAL O.XXX/13, $\times 60$; 6—jRV, ZPAL O.XXX/14, $\times 60$; 7—jLVF, ZPAL O.XXX/15, $\times 60$; 8—jLV, ZPAL O.XXX/16, $\times 60$; 9—jLV, ZPAL O.XXX/17, $\times 60$; 10—jLVF, ZPAL O.XXX/18, $\times 60$; 11a—inner view, aLVF, ZPAL O.XXX/19, $\times 60$; 11b—close-up view, to show the hinge margin, $\times 100$

lateroventral rib; it also possesses arcuate ribs rimming outerly both the anterior and the posterodorsal inflations. Sexual dimorphism is more pronounced in the new species than in *N. helvetica*.

PHYLOGENETIC RELATIONS

The species *Neomonoceratina helvetica* OERTLI, described from the Lower Miocene (Helvetian) deposits of Switzerland, is also known from coeval deposits of the Vienna Basin and the Rhone Basin. Its distribution throughout these areas allows for its use as a correlation key between the Tethyan and Paratethyan realms; and thus the Superzone with *N. helvetica* has been established by CARBONNEL & JIŘIČEK (1977).

According to GÖKÇEN (1984), however, *Neomonoceratina helvetica* occurs in Turkey not only in the Lower but also in the lower part of the Middle Miocene. Moreover, JIŘIČEK (1983) illustrated from the Lower Miocene (Eggenburgian) of the Vienna Basin some forms designated as "*Neomonoceratina aff. helvetica*" which are very similar to the male individuals of *N. chomentovens* sp. n. The present author submits therefore that the species *N. chomentovens* sp. n. evolved from the *N. helvetica* stock already in the late Lower Miocene, and it then began to

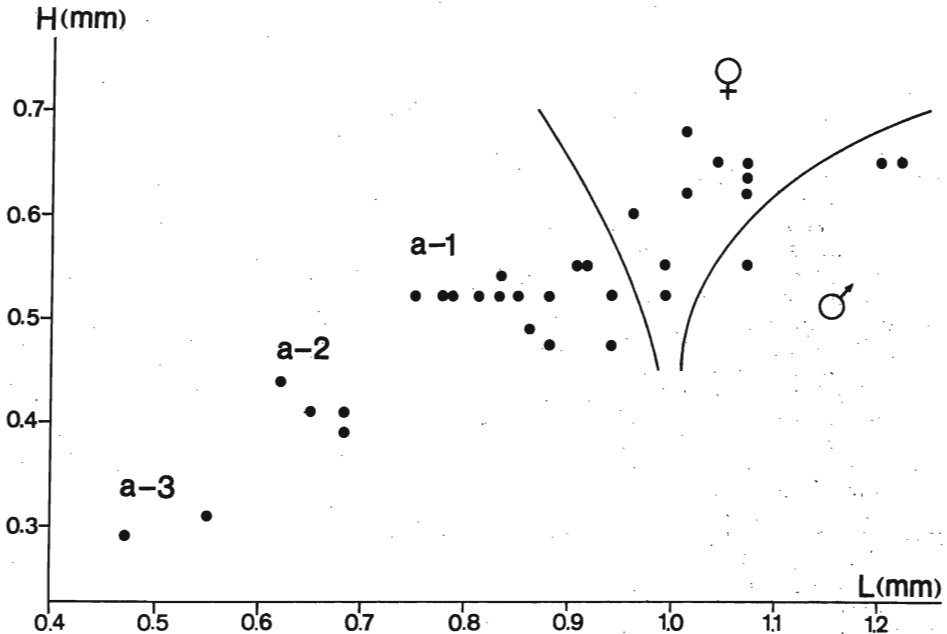


Fig. 1. Variation in length/height ratio among 32 adult (male and female) and juvenile specimens of *Neomonoceratina chomentovens* sp. n.

migrate northwards within the Paratethyan basins. The species *N. helvetica* persisted till the Middle Miocene solely in the south-Mediterranean regions of the Tethys. The distribution and evolution of *N. helvetica* in the European Miocene was certainly controlled by environmental conditions, as suggested by CARBONNEL & JIŘIČEK (1977) who also attributed its disappearance to a progressive decrease in water salinity.

Both CARBONNEL (1969) and GÖKÇEN (1984) indicate that their specimens of *N. helvetica* deviate from the typical forms described by OERTLI (in: RUTSCH & al. 1958). It is thus highly possible that this taxon is systematically even more complex than it has so far been recognized.

It may also be added that the newly established species, *Neomonoceratina chomentovenssis* sp. n., resembles the species *Schneiderina dromas* (SCHNEIDER, 1939) reported from the Tarchanian and Tschokrakian stages (i. e., the Middle Miocene according to RÖGL & STEININGER 1983) of the eastern Paratethys (STANCHEVA 1974, 1977). Compared to the specimens of the latter species which have been kindly supplied by Dr. M. STANCHEVA, the carapaces of *Neomonoceratina chomentovenssis* sp. n. are less ovate in lateral outline and less evenly inflated laterally; they also are less regularly but more distinctly ornamented.

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**NOWY GATUNEK MAŁŻORACZKA, *Neomonoceratina chomentovensis* sp. n.,
Z BASENU KORYTNYCY**

(Streszczenie)

Przedmiotem pracy jest opis nowego gatunku małżoraczka, *Neomonoceratina chomentovensis* sp. n., występującego w piaskach marglistych odsłaniających się w Chomentowie, a spoczywających ponad ilami korytnickimi. Nowo ustanowiony gatunek (patrz fig. 1 oraz pl. 1—2) uznano za filogenetycznie potomny w stosunku do *N. helvetica* OERTLI, znanego ze starszych osadów miocenijskich zarówno Tetydy jak i Paratetydy. Prześledzenie linii ewolucyjnych w obrębie rodzaju *Neomonoceratina* na obu tych obszarach pozwala wyrazić pogląd o przydatności badanych małżoraczek jako wskaźników biostratygraficznych. W opisie paleontologicznym nowo ustanowionego gatunku zwrócono uwagę na wydatnie zaznaczający się dymorfizm płciowy, rozpoznawalny już u form przeddorosłych.