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THE DISTRIBUTION OF OSTRACODA IN THE QUATERNARY DEPOSITS OF THE SOUTH - CASPIAN BASIN AND THEIR STRATIGRAPHICAL SIGNIFICANCE

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ABSTRACT

Ostracoda are of great importance for biostratigraphical research in separation of Quaternary deposits in South - Caspian basin.

The successive change of genuses and species of Ostracoda can be observed on the base of study for Ostracoda in Quaternary deposits sections in investigated region and analysis of their vertical and horizontal distribution. It allowed for the first time to develop detailed scheme for separation of the Quaternary deposits of this region (table 1).

KEY WORDS: Separation, Ostracoda, Stratigraphy, horizon, lap, Quaternary, morphology, family, genus, species.

INTRODUCTION

The growing interest for Ostracoda has maed them ones of the important oganisms in separation the Quaternary, Pliocene and Neocene deposits.

Research carried out by D.A. Agalarova, S.A. Kuliyeva (1961), E.A. Gofman (1956), G.I. Karmishina (1975), A.T. Javadova (1985) and others on study of stratigraphy of Eopleistocene, Pleistocene and Holocene of Caspian area can demonstrate the important significance of Ostracoda for biostratigraphical research and correlation of sections.

The recognition of horizons and more small stratigraphical subdivisions (laps) is founded on successive change of zonal complexes, genus and species groups (table 2).

Before our research the layer study of species content of Ostracoda in Quaternary deposits in the region has been carried out on the base of rare fraqmentary sections. At the same time the research first conducted by our efforts, which were based upon large factual material showed the recognized Ostracoda laps in the Quaternary deposits of Apsheron archipelago. They are set in continuous sections and can be observed on territory of research region.

ASPHERON REGIOSTAGE

Apsheron deposits of the South - Caspian basin are very rich in Ostracoda fauna. Here the redeposition foraminifera: *Rotalia beccarii (Linne), Nonion granosus Orb., N. soldanii Orb.* and other., embryonic shells of pelecypods, gastropods, fish otolithes and plant resudia are rarely found.

As it is mentioned above Ostracoda are of great importance for stratigraphical separation of Apsheron deposits. Here the different complexes of saltwater Ostracoda can be recognized. And many species from them are found first in Apsheron period, and some ones came from Akchagyl. Productive series and Pontian. Ostracoda complex defined in Apsheron deposits consists of mainly representatives of two

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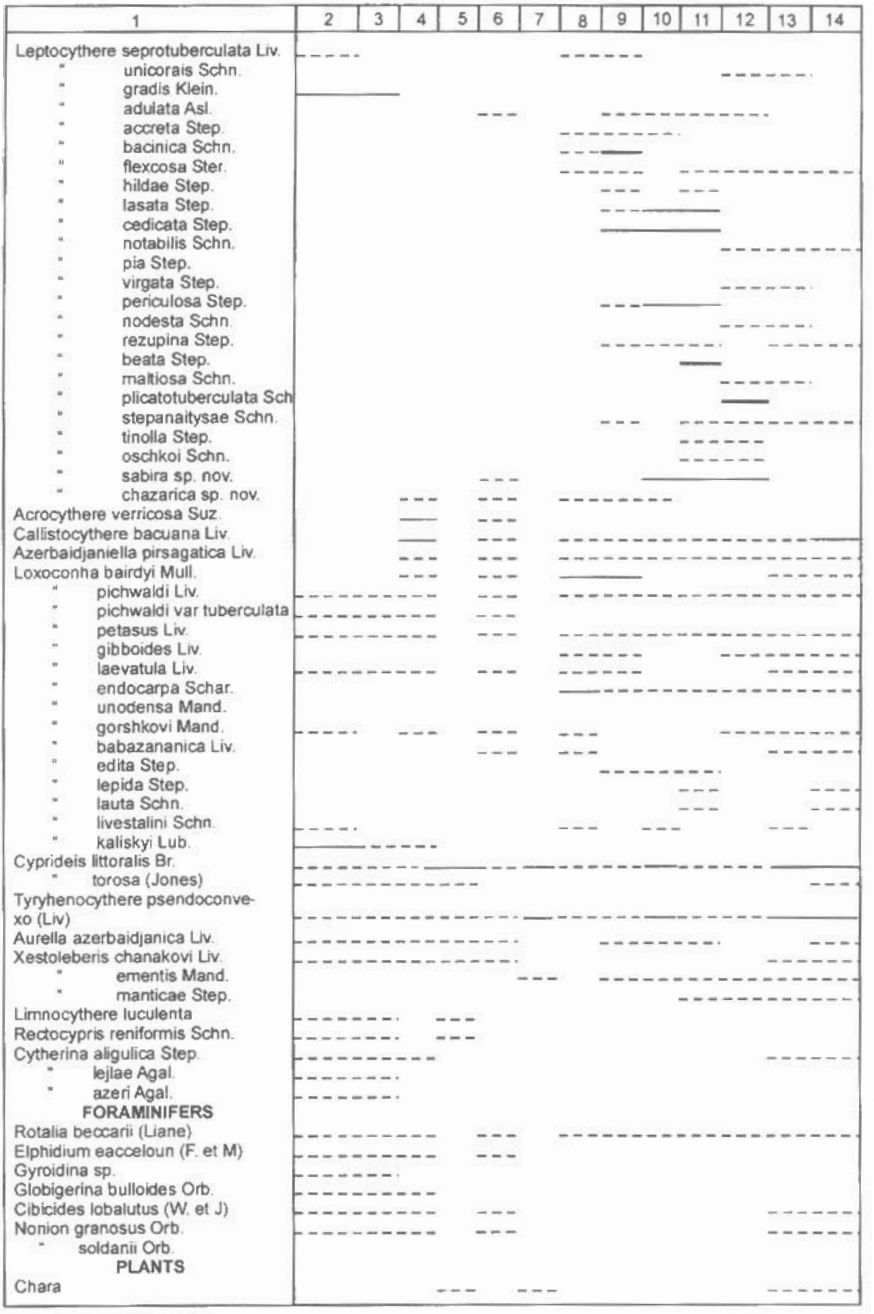
Table 1: The development of Ostracoda and foraminifera in the Quaternary deposits of the Caspian basin

Name of taxons	akchakil stage	The Quaternary deposits												
		eoplaystosen				playstosen						holosen		
		apsheron				baki			chazar		chvalis	novoka-spijsky		
		lower	middle	fresh-water	upper	turcan	lower	upper	lower	upper		lower	recent sedimen	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Caspiocypris cardida Liv.														
" rotulata Liv.														
" lyrata Liv.														
" filona Liv														
Caspiella acronazuta Liv.														
" grasilis Liv.														
" liventalini (Evl).														
Bacuniella dorsoarcuata (Zal)														
Ilosypris bradyi Sars.														
" gibba (Rand).														
Cypris sandeistani Lab.														
Darvinula stevensoni (Br. et Norn)														
Candona rostrata (Br et N)														
" cavis Kand in litt.														
" neglecta Sars.														
" elongata Schn.														
Candoniella albicans Br.														
" subelipsoida Schar														
Cypris sabclobosaSow.														
Paracyprideis naphtatschola (Liv), Cryprocyprideis bogats-chovi Liv.														
Advenocypris kurovdagensis														
Mediocytherideis apatoica (Scw)														
Cytherideis subulata Br.														
Leptocythere andrussovi Liv.														
" saljanica Liv.														
" camelii Liv.														
" andrussovi yamormalis														
" olivina Liv.														
" saljanica var nostras														
" apsheronica Suz.														
" argunica Liv.														
" saluta Liv.														
" qubkini Liv.														
" bornii Liv.														
" arevina Liv.														
" ofortha Liv.														
" propinqua Liv.														
" bicornis Liv.														
" picturata Liv.														
" pictunata var venata Liv.														
" rostrata Liv.														
" malva Liv														
" litica Liv.														
" martha Liv.														
" striatocostata Schn.														
" caspia Liv.														
" bosqueti Liv.														
" praebosqueti Suzin.														
" celulla var typica Liv.														
" celulla Liv.														
" celulla var frequens Liv.														
" celulla var remissa Liv.														
" leonidi Liv.														
" quadrituberculata Liv.														
" praeclara Step.														
" multituberculata Liv.														
" quinquetuberculata Sch.														
" palinspsesta Liv.														
" bendovanica Liv.														
" explicata Klein.														
"														



_ _ _ _ _ _ _ rarely and usually found species
_____ frequently found species
_____ species - indexes

Table 2: Division of the Quarternary deposits of Caspian basin

Section	regiostage & horizons	Hori-sub-sonts and layer	Lona	South C a s p i a n basin	
				ostrakods	molluska
Holosen	novokaspijsky	recent sediments		Rotalia beccari (L), Leptocythere caspia Liv, L.striatocostata Schn, Callistocythere bacuana Liv., Liv. Candoniella albicans Br. Candona elongata Schn, Cyprideis Littopralis Br., Trachyleberis pseudoconvexa Liv.	Mytilaster lineatus Gn, Micromelania caspia Eichw
		lower		Leprocythere caspia Liv., L.striatocostata Schn, L.quinquetuberculata Schn, Callistocythere bacuana Liv, Cytherissa napthatscholana Liv, C.bogatchovi Liv, Cyprideis Littoralis Br, Trachyleberis pseudoconvera Liv, Rotalia beccari Liv.	Cardium edile (Linne), Didacna crassa (Eichw), D. baeri Gr, D. baeri Grivaralata Gedj
Playstosen	chvalin	upper	Leptocythere plicatotuberculata	Leptocythere adulata Asl, L.Virgata Step, L.maltiosa Sch, L.modesta St, L. notabilis Sch, L. tinulla Step, L. unicornis Schw, L. plana Asl, L.lumata St, Loxoconha unodensa Mand.	Didacna praetrigonoides Nal.
		lower			D. paralella Bag Dreis sensia polymorpha Pall.
		upper karachuchur	Leptocythere beata	Leptocythere medicata Step, L.hildae Step, L. tinulla St, L.uschkoi Schn, Xestoleberis manticae St, Candona rostrata (Br et Nor), C. neglegta Sars, Loxoconha lepida St, L. lauta Step, L. edita Step.	Didacna peleotrigonoides Fed, D. nalivkini Wass, Dteissensis polymorpha Pall.
		lower gurgan		Cyprideis Ittoralis Br, Trachyleberis pseudoconvexa Liv., Candona elongata Schn, Candoniella albicans Br., C. subellipsoida Sch, Leptocythere praeclara Step, L. adulata Asl,. L.lunata Step, L.medicata Step, L. periculosa Step, L. plana Aslan	Didacna eulachia (Bog) Fed.
	baki	upper	Leptocythere bacinica	Leptocythere medicata Step, L. stepanaitysae Sch, L. periculosa Step, L. zezupina St, L. lumata Step, L. praeclara Step, Loxoconha edita Step	Didacna rudis Nal, D. carditoies Eichw.

Table 2: Division of the Quarternary deposits of Caspian basin (cont.)

Section	regiostage & horizons	Hori-sub-sonts and layer	Lona	South C a s p i a n basin	
				o s t r a k o d s	m o l l u s k a
Playstosen	baki	lower		Leptocythere quadriturculata Liv, L. argunica Liv, L. affpravoslavlevi Schn, L. accreta Step, L. flexuosa Step, L. bacinica Schn, Loxoconha unodensa Mand, L. endocarpa Schn, Candona elongata Schn, Caspiella liventalini (Evl), Advenocypris kurov dagensis Kl.	Didacna parvula Nal, Dreissenia polymorph Pall.
		turkan		Cyprideis littoralis Br, Trachyleberis pseudoconvexa Liv, Zonocypris membranae Liv, Ilyocypris bradyi Sars	pelesipods and gastropods Dreissensia polymorpha Pall.
eoplaystonsen	apsheron	upper	Caspiocypris filona	Caspiocypris filona, C.lyrata (Liv) C. rotulata Liv, Leptocythere andrussovi Liv, L. picturata varverata Liv, L. rostrata Liv, L. arevina Liv, L.adulata As, L.plana Asl, Loxoconha eichwaidi vartuberculata Liv.	Monodacna bacuana And, Apsheronia propinqua Eichw.
		fresh waret layer		Ilocypris bradyi Sars, Il. gibba Rand, Leptocythere multituberculata Liv, Cyprideis littoralis Br.	pelesipods and gastropods Dreissensia
		middle	Leptocythere apsheronica	Azerbaidjaniella pirsagetica Liv, Acrocythere verricosa Suz, Leptocythere Kl, L. saljanica var nostras Liv, L. palinpsesta Liv, L. schagdagica sp nov, Callistocythere bacuana Liv, Loxoconha bairdyi Mull, L. kaliskyi Lub.	Apscheronia calvescens And, Monodacna beibatica And.
		lower	Leptocythere ereexplicata	Caspiocypris rotulata Liv, C. lyrata (Liv), C. filona Liv, Candona cavis Mand, Leptocythere saluta Asl, L. ofortha Liv, L. rostrata Liv, L. bosqueti Liv, L. bendovanica Liv, L. praebosqueti Suz, L. leonidi Liv, L. gubkini Liv, L. grandis Kl,Cytherina lejlae Agal, C azeri Agal	Apsheronia rarecostata Sjg. Adelinqa voluta And.

families: *Cypridae* and *Cytheridae* and the representatives of *Darvinulidae* family can be mentioned only few. The lower and middle parts of Apsheron are mainly characterized by representatives of *Cytheridae* family, one of the genuses gets rich growth with more than several tens of species. Among them some species form typical complexes for these horizons. Morphological peculiarities of the genus allow to distinguish typical features in development of sculpture, hinge line, muscleprints of this genus. The favourable saltwater regime provided the rich growth of this genus in the early and middle apsheron. The more coarse - cellular forms with good developed hinge lines appeared. The more developed species form association form typical for each horizon. Each association is good determined of typical species.

In the middle Apsheron at place of these species *Leptocythere apscheronica* are widely spread and along all section *Leptocythere malva Liv., L. picturata Liv., Loxoconcha eichwaldi* are sporadically found. The surface of shells of *Loxoconcha* genus found in the middle Apsheron is deep - cellular, it shows the saltwater rgime of basin for this period. Considering the upper beds the Apsheron species haven't been changed from morphological point of view. Only some species in quantative regard are found in different ways along the section: they either die at all or can be found very few in stunted form. The other species of mentioned families though are monotonous but very often they are widely represented in quantative regard.

The change of Ostracoda fauna has been occuring gradually on the border of Akchagyl and Apsheron centuries.

At the beginning of the century the species which had come from more ancient basins existed in Apsheron basin. Some species of *Leptocythere, Lexoconcha, Caspiocypris, Cyprideis, Paracyprideis* passes all Pliocene and continue to exist in Apsheron basin. Some species *Candona* and *Leptocythere* genuses come to Apsheron from Akchagyl, continue to exist at the beginning of Apsheron century and die out only to the end of lower Apsheron. In middle Apsheron the rich growth of *Leptocythere, Loxoconcha, Caspiella, Tyrrhenocythere* and other genuses occur.

It sould be noted that *Caspiocyprus candida Liv.* and *C. rotulata Liv.* species found in the lower and middle Apsheron can be observed in different way along the section in quantative regard. Unlike the middle and upper Apsheron these species are rarely found in the lower Apsheron. However, these species got their rich growth in the upper Apsheron and are included in zonal association.

In the upper Apsheron the *Caspiocypris* genus started growing at the place of *Leptocythere* and *Loxoconcha* genuses. The species got prevailing role in the lower and the middle apsheron are frequently found. It should be mentioned that between the middle and upper Apsheron but not everywhere along the bed with freshwater *Ilyocypris bradyi Sars. I. gibba Ramd., Cyprideis littoralis Liv.* species was discloses. *Leptocythere multituberculata Liv.* species are relatively few here. The saltwater species except *Leptocythere multituberculata Liv.* died out completely here. It indicates on special stage of Ostracoda fauna development for short period of time in Apsheron century.

BAKU HORIZON

In Baku deposits microfauna is represented mainly by Ostracoda. Foraminifera are found sporadically and mainly are redeposited execpt *Rotalia beccarii (Linne).* Sometimes embryos of macrofauna and also plant residua are found on cores. Tyurkyan horizon bedded between lower Baku and upper Apsheron deposits is characterized by freshwater species of Ostracoda. They are *Ilyiocypris bradyi Sars. I. gibba Ramd., Lonocypris membranae Liv.* The euryhaline *Tyrrhenocythere pseudoconvexa Liv.* and *Cyprideis littoralies Br.*, much of plant residua are also found. It shows the continental regime of that period of time.

However, some species, for example, *Azerbaijanella pirsagatica Liv., L. multituberculata Liv.*, in spite of saltwater lifestyle during Tyurkyan period adapted to this freshened basin. The fauna analysis shows that some species from Tyurkyan deposits continue to live in the lower and in the upper Baku subhorizons. The content of the upper Baku and lower Baku subhorizons is similar, in spite of some apsheron species continue to exist in the lower Baku subhorizon except *Caspiocypris filona Liv., C. Lyrata Liv., C. rotulata Liv.* and some representatives of *Leptocythere* genus. However, for the first time *Bacuniella dorsoacurata*

(Zal.), Leptocythere basinica Sheid., Loxoconcha unodensa Mand and other species appear here and in the upper subhorizon other species can be observed. The are *Leptocythere medirata Step., L. stepanaitysae Sch., L. perculosa Step., L. lunata Step, etc.* Leptocythere quadrituberculata Liv., Caspinella liventalina (Evl.), etc. species die out here.

Ostracoda complex of Baku age completely transfered from Apsheron. Major species of Ostracoda are known from lower and middle Pliocene. However, during long period of the upper Pliocece these species haven't been observed. They appeared in Baku period but in another morphologically changed form.

Strong change of Ostracoda fauna is observed on the border of the lower Baku and Tyurkyan subhorizons. It is vividly expressed in freshwater formations o Tyurkyan subhorizon. Probably there were strong changes of conditions for sedimentation, shoaling and freshening of the basin during Tyurkyan century. As its was mentioned above this fact provided the growth of freshwater and euryhaline forms related to families: *Cypridae, Cytheridae* and *Darwinulidae.* It should be mentioned that the representatives of *Leptocythere, Loxoconcha* genuses are found frequently in the lower and in the upper Baku subhorizons. Special growth of these genuses are observed in the upper Baku century.

KHAZAR HORIZON

The deposits of this horizon can be characterized by content of freshwater, euryhaline and saltwater Ostracoda. Ostracoda fauna of these deposits hasn't been changed in morphological way. It shout be mentioned that wuantaty of freshwater forms increases a little in the upper Khazar. However, saltwater individuals play prevailing role. For the first time *Leptocythere tinulla Step. Candona rostrata (Br. et N.), C. neglecta Sars* and other species appear in the upper Khazar, which in future khvalyn period, getting rich growith fill the typical association.

KHVALYN HORIZON

Deposits of Khvalyn horizon due to mollusk fauna are divided into the lower - and upper Khvalyn subhorizons. The deposits of the lower Khvalyn are haracterized by Ostracoda and redeposited foraminifera. Major species of Ostracoda in the lower Khvalyn subhorizon are spread along all the Quaternary section. But some species of *Leptocythere* genus first discovered by T.F. Shneider in deposits of the same age on Krasnovodsk peninsula, are new ones. Due to Ostracoda fauna the deposits of all Khvalysk horizon can be related to single lap *Leptocythere pliratotuberculata.*

As it was mentioned above Ostracoda fauna of the upper and the lower Khvalyn is the same. However, the typical fauna of mollusks provides the appearance of *Didacna praetrigonoides Nal.* Vivedely separated the lower suhborizon, a *D. paralella Bog.* indicates on the deposits of the upper Khvalyn subhorizon.

The analysis of Ostracoda fauna of Khvalyn horizon shows that Ostracoda fauna *Leptocythere beata Step.* is found a little in section sometimes very few examples. The availability of new species *(Leptocythere virgata Step., L. maltiosa Schn., L. modesta Step.)* appeared at this time, allows to define strictly the borders of Khvalyn horizon. Above mentioned species haven't been changed in morphological way. It should be mentioned that representatives of *Leptocythere* genus got rich growth in Khvalyn age.

NEWCASPIAN HORIZON

The deposits of this horizon are characterized by rich Ostracoda fauna and redeposited foraminifera Ostracoda are represented by some species of genuses from *Cytheridae* family. They are: *Cyprideis, Paracyprideia, Crytocyprideis, Leptocythere* and *Loxoconcha.* Alla these species are widely spread in the Quaternary section. *Candona edule (Linne)* is almost always in the focus, and it allows to recognize newcaspian horizon. Analysing the content of fauna of newcaspian deposits one can notice that all species here have more smoothed morphological forms. The speak exactly about modern Ostracoda fauna is impossible as the formation of sedimentation hasn't been finished yet and in future the fauna content will be able to change. In spite of monotony of fauna of newcaspian horizon and modern deposits there are differences. In particular, the newcaspian deposits have more species of *Candona* and *Candoniella* genuses that

the deposits of lower - newcaspian subhorizon have.

CONCLUSIONS

In general due to analysis of Ostracoda fauna of Quaternary deposits of South - Caspian basin there is an exact stratigraphical position of this system, in spite of many species have transitive development of some taxons one can come to conclusion that Ostracoda have an important significance for correlation as the typical species are characterized by wide geographical spread. The difficulties in study of Quaternary Ostracoda complexes are follows: they are differed insignificantlydue to content of typical species for main subdiisions of Pleistocene and Holocene. However, the dorders of stratigraphical subdivisions of Quaternary system are separated due to recognized laps and complexes.

So, Ostracoda complexes of Quaternary deposits with different levels of reliability allow to define the age and genesis of the deposits.

REFERENCES

D.A., AGALAROVA; Z.K., KADYROVA; S.A., KULIYEVA: Ostracoda of Pliocene and postPliocene deposits. Baku, Azerneshr, 1961, p. 416.

GOFMAN, E.A.; Ecology of modern and newcaspian Ostracoda of the Caspian sea. M. Nauka, 1966, p. 182.

A.T. JAVADOVA; Correlation of sections and biostratigraphy of Quaternary of Apsheron and Baku archipelagoes. Baku, 1995, Dep. Az. NITI, p. 19.

G.I., KARMISHINA; Ostracoda of Pliocene in South - European area of USSR, publ. Saratov University, 1975, p. 1-376.