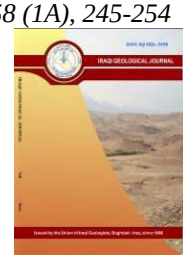
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Identifying New Ostracods Species of Genera *Bairdia*, *Bythocypris*, *Paracypris* and *Abyssocypris* Belongs to Aaliji Formation from Borehole Jambour (46) in Kirkuk Area, Northeastern Iraq

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Abstract

Four new ostracod species belong to the four genra are identifying from the Aaliji Formation (Paleocene-Early Eocene) in the Kirkuk area, Jambour well (46), Northeastern Iraq, were identified. These species are, *Bairdiaazizi* sp.nov., *Bythocyprisaalijiensis*sp. nov., *Paracyprisjambourensis* sp.nov., *Abyssocypriswaleedi* sp. nov. These genera are showing strong affinities to faunas from India, Pakistan, Saudi Arabia, the Eastern Mediterranean, East Africa and the Middle East (Southern New Tethys).

Keywords: Ostracods:Aaliji Formation; New Ostracod species; Systematic study; Paleocene- Early Eocene; Kirkuk area; NE Iraq

1. Introduction

The current study is considered as a part of an ostracod investigation in the Aaliji Formation (Paleocene-Early Eocene) from Jambour well (46), in Kirkuk area, northeastern Iraq. The thickness of Aaliji Formation in Iraq as of the supplementary type (Kirkuk well 109) is about 167 m, while in the studied section, about 165 m (Abdo, 1994). The location of the studied area is determined by the coordinates 18'32'44" N and 09°35′46" E, it is located at the Low Folded Zone as shown in (Fig.1). The lower contact of the Aaliji Formation with the Shiransh Formation is unconformable which is indicated by the interruption in the faunal assemblage and the absence of the Latest Maastrichtian-Early Paleocene sediments. The upper contact of the Aaliji Formation with the unconformable overlying Formation of Jaddala is also, this is represented by the absence of some Early Eocene sediments (Abdo, 1994). The Aaliji Formation was described by (Bellen et al., 1959) from the Meidannki area in northwest Syria. Lithologically, the Aaliji Formation consists of alternations of marly limestone, argillaceous limestone, and chalky limestone, whereas the Shiranish Formation consists of marly limestone and chalky limestone beds, as demonstrated in (Fig. 2).

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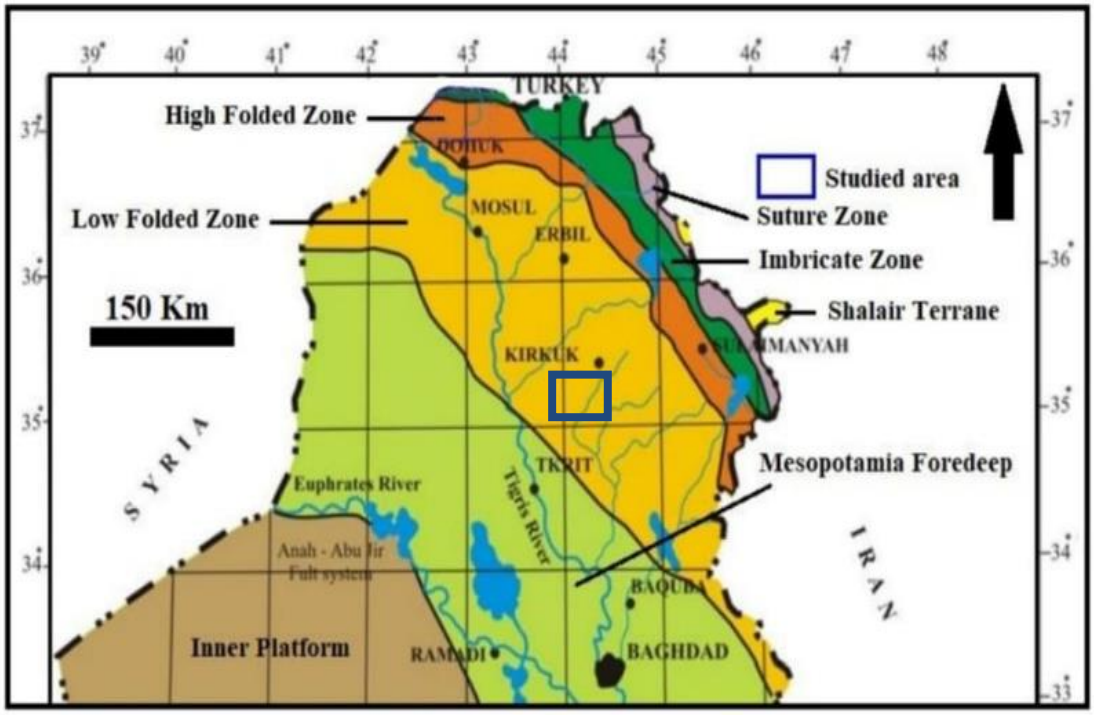


Fig .1. Map showing the location of the studied area and the tectonic division of Iraq (Fouad, 2015)

The previous paleontological studies of Aaliji Formation can be given as:

Bellen et al. (1959). Studied the type section of Aaliji Formation in Meidannki area in northwest Syria and determined its age as (Paleocene-Early Eocene).

Al-Omari (1970) determined the boundary of Mesozoic/Cenozoic in three oil wells in Butmah No.9, Ain Zalah No. 16, and No. 17 to the north-west of Iraq and determined its age as Early Paleocene-Early Eocene.

Kassab (1972, 1975, 1978) Studied the Aaliji Formation in several wells, such as, Ain Zalah (16), Jawan (2), Kirkuk (116, 117), and Anjana (15), where they were divided into several biozone and subzone.

Al-Safawee (1980) studied the Aaliji Formation in Sasan well (No. 1), where such Formation was divided into five Biozone whereas its age was determined as Middle Paleocene-Lower Eocene.

Ghafor (1988) conducted a study on the planktic foraminifera and biostratigraphy of the Aaliji Formation even the type and nature of its contact with the underlying Formation of Shiranish in the well (No. 1) of Tel-Hajar, Sinjar area, in which five biozones with age of Middle Paleocene lower-Early Eocene were determined.

Aziz (1997) determined the age of the Aaliji Formation as Paleocene-Early Eocene in an open sea environment, where its depositional environment depends on ostracods Fauna.

Abawi and Abdo (2001) determined the Biostratigraphy of the Aaliji Formation (Paleocene-EarlyEocene) in Jumbour well (No. 18), northern Iraq.

Al-Jubouri (2011) studied the Aaliji Formation and concluded its age in the Upper Paleocene.

Kadhim et al. (2017) investigated the microfacies and the sedimentary environment of the Aaliji Formation in some selected wells in the North of Iraq, in which three main microfacies were distinguished and the deposition of such formation was determined as in deep Bathyal environment with the assigning age to be Late Paleocene, which depending on the recorded planktic foraminifera.

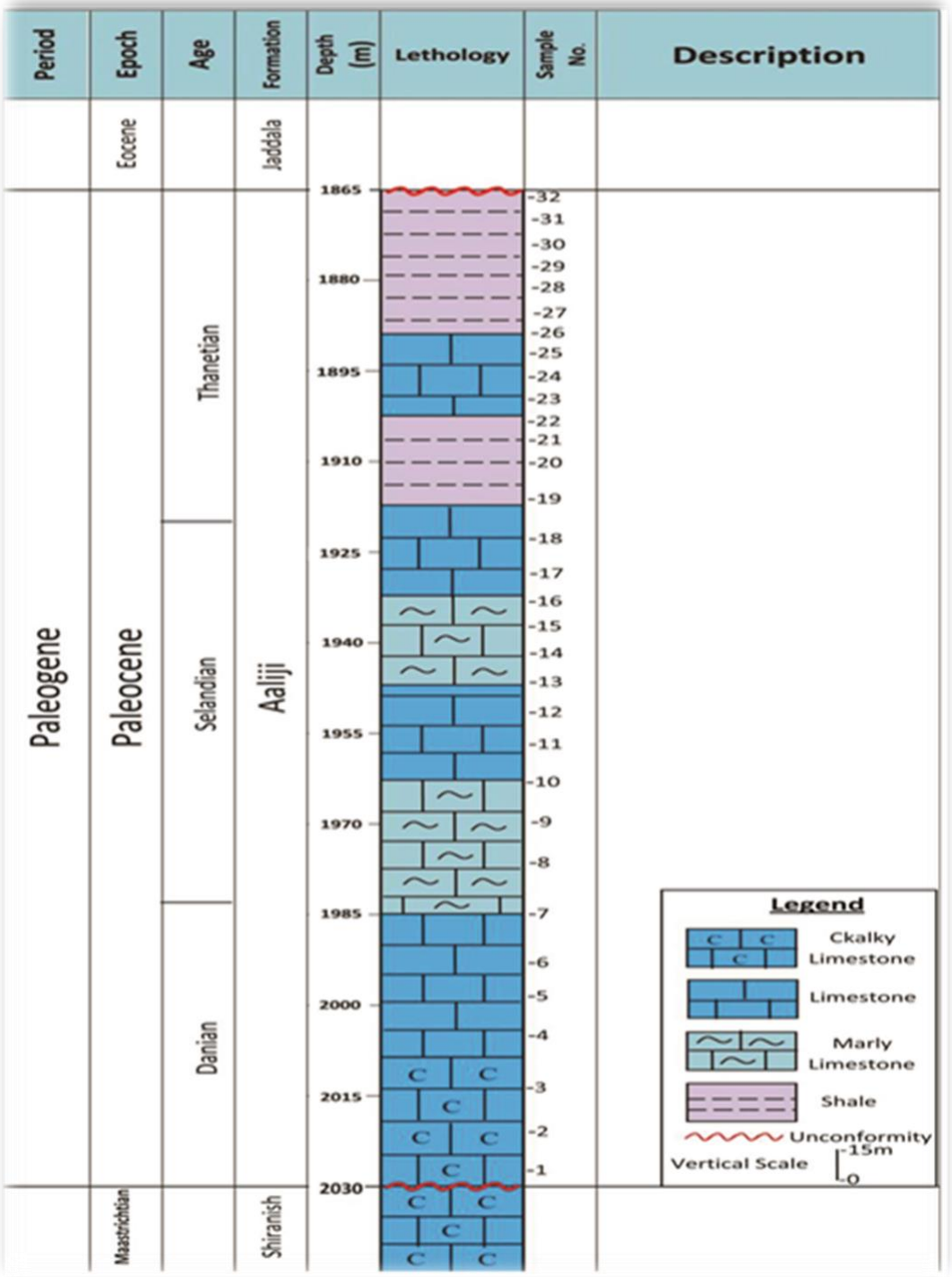


Fig.2. Lithological section of Aaliji Formation in Jambour-46

2. Materials and Methods

Thirty-two samples of subsurface cutting rock have been collected from Aaliji Formation, borehole Jambour (-46), at Kirkuk City. The rock samples are first sorted, in the laboratory, according to their locations in the study section. Based on the principles set by (Moore and Pitrat, 1961) for microfossils preparations, which involve the process of cutting the samples using a hammer into the size

of about 1 cm^3 then these pieces were soaked in water for 24 hours, the samples were boiled and then H2O2 was added to them (when needed). So, they were washed in a 100@@@ mesh-sized sieve. After that, the dry residual is sieved again by using five sieves of different sizes, given as (40, 60, 80, 100, 120, mesh@@@) alternatively to isolate the various sizes needed for picking up the ostracods specimens, which then will be stored in suitable slides. These specimens were studied using a binocular microscope (KERN OSE brand) and photographed by means of using a digital camera. However, a specific linear scale is used to determine the real size of each species in the image within the plates. The imaging technique by the scanning electron microscope (SEM) has not been used because the device is not available. The obtained ostracods were reposited in the dept. of Geology, College of Science, Mosul University, under the titled abbreviations: Aa.F.Ja (Aaliji Formation Jambour).

3. The Systematic Descriptions

In this study, Ostracoda fossils were accurately classified on the basis of many references and scientific research such as (Morkhoven, 1963) and (Hartmann and Puri, 1974), the ranges of the described species are shown in (Fig. 3). The abbreviation (Aa.S.No.) refers to Aaliji Sample Number.

Kingdom	Animalia	Linnaeus, 1785
Phylum	Arthropoda	Siebold andStannius, 1845
Subphylum	Crustacea	Pennaut, 1777
Class	Ostracoda	Latreille, 1806
Subclass	podocopida G.W	Muller,1894
Order	podocopida	Muller,1894
Suborder	Platycopina	Sars,1866
Genus	*Bairda*	Mc,Coy,1844
Type species	*Bairdiacurtus*	

*Bairdiaazizi*sp. nov

(Pl.1, Figs. 1-3)

Derivation: The name was derived from the name of the professor Dr. Nisreen M . Aziz for her contribution to the micro palaentological studies in Iraq (Aziz,1997).

Diagnosis: A species of *Bairdia* with subtriangle and swollen in the middle of the carapace. The posterior end elongated with producing centrally as a caudle process.

Holotype: Carapace, Mo.T.Aa . 1

Paratype: Carapace, Mo.T.Aa.2,3

Type Locality: Aaliji Formation, Ja.- 46., Kirkuk area

Type Horizon: Aa.S.No.28

Materials: Twenty carapaces

Dimensions in (µm): The length is 124, the width is 620 and the height is 810.

Description; the carapace is a sub-fusiform in the shape of a lateral view, the extreme height and length are found in the middle, whereas the maximum width can be observed in the area near the middle, which then can be noticed as the isrounded-shaped. The posterior end exists as centrally caudle process, the dorsal margin is convex and slopping in a steep manner towards the posterior end less towards anterior. The Ventral margin is featured with a weakconvex and dorsal view biconvex. The overlapping is clear around the dorsal and ventral margins. As for the left valve, it is bigger than the right one and the outer surface is characterized as being a smooth one.

Affinities: The current species demonstrates some similar testo *Bairdia*sp, which was originally described by (morsi et al., 2008) from the Maastrichtian-Early Eocene of Egypt, and also recorded by (Al-Badrani et al., 2021) from the Cammpanian in middle of Iraq, but it is different in terms of having a ventral margin with board convex and the dorsal margin slopping less towards the posterior. *Bairdia*sp.

(Diop et al., 1982) from the Paleocene of Sengal shows some affinities with these species, but differs in terms of having a dorsal margin that is strongly arched and a more elongate posterior end caudal process near the ventral margin.

Family:	Bythocyprididae	Maddocks, 1969
Genus:	*Bythocypris*	Brady, 1880
Type species:	*Bythocyprisreniformis*	Brady, 1880

Bythocyprisaalijiensis sp. nov.

(Pl. 1, Figs. 4-6)

Derivation of the name: The name was derived from the name of the formation in which the species were found first.

Diagnosis: A species of *Bythocypr* is distinguished by its reniform in lateral view, large size obliquely rounded anterior and ends that are posterior, with strongly-arched dorsal and ventral, which is concave.

Holotype: Carapace,Mo.T.Aa. 4

Paratype: Carapace, Mo.T.Aa.5,6

Locality of the type: Aaliji Formation, Borehole Ja. 46., Kirkuk area.

Type Horizon: Aa.S.No.21

Materials: Nine carapaces

Dimension (µm): The length is 780, width:270 and the height is 440.

Description: The carapace is elongated subreniform in the view, which is lateral. The maximum length is almost represented as one-third of height and the maximum height is located behind the center. The anterior is lower than the posterior one in the lateral view, anterior margin somewhat tapered. The posterior is very rounded and higher than the anterior. The dorsal margin is strongly convex and characterized as a pointed highest point in the left valve. The ventral margin is concave and the outer surface of the carapace featured is being smooth. The valve on the left is larger than the right one. Obviously, it is observed that the overlapping is located around both the dorsal margin and the ventral one.

Affinities: The current species resembles the *Bythocypris* sp. B. that was illustrated by Reyment, 1981 from the Paleocene of Nigeria, but it is different as it is larger with a less concave ventral margin. *Bythocypris*sp (El-Sogher, 1991) from the Paleocene of Libya but it is different in terms of having a convex ventral margin and a posterior with more tapered.

Superfamily:	Cypridacea	Baird, 1845
Family:	Parcyprididae	Sars, 1923
Genus:	*Paracypris*	Sars, 1866
Type species:	*Paracyprispolita*	Sars, 1866

*Paracyprisjambourensis*sp.nov.

(Pl. 1, Figs. 7-9)

Derivation of the name: Relative to the name of the studied well Jambour, North Iraq.

The diagnosis: A *Paracypris* species with shape like a bean and it has symmetrical arched dorsal margin and the maximum length that is attained in a ventral way.

Holotype:Carapace, Mo.T.Aa. 7

Paratype:Carapace, Mo.T.Aa. 8,9

The type of Locality: Aaliji Formation, Borehole Ja. 46., Kirkuk area.

Type Horizon: Aa.S.No.3

Materials: Sixteen carapaces

Dimension (µm): Length is: 820, Width:290 and the height is 390.

Description: The carapace is a bean-shaped and it is elongated in the view which is lateral, greatest height central greatest length is attained shortly above ventral margin. The anterior margin broader, rounded in a symmetrical manner, and the margin to the posterior is rowly rounded, ventrally situated. Dorsal margin symmetrically arched, joined smoothly to end margins, the right valve dorsal margin is made up of three parts, which are joined smoothly to each other. The ventral margin of left valve is straight and slightly sinuous in right valve. The outer surface is smooth. In the dorsal view, carapace elongated ovate, and the greatest thickness is just behind the middle, in addition to that the internal features which are not accessible and dimorphism has not been observed.

Affinities:*Paracyprissokotoens* is (Reyment, 1981), was described originally from the Paleocene of Nigeria, also been recorded by (Hamid and Al-Shareefi, 2022) from Late Cammpanian-Early Maastrichtian in Iraq, but it is different from the species, in which it is new in terms of being higher and somehow angular dorsal margin, with sinuous ventral margin even with a feature of being more acuminate posterior margin. *Paracypriseskeri* (Bassiouni and Morsi, 2000), from the Paleocene and Early Eocene of Tunisia (Esker, 1968); (Donze et al., 1982), and Egypt (Bassiouni and Luger, 1990), (Bassiouni and Morsi, 2000), is chiefly distinguished from P. Jambourensissp. nov. asits dorsal margin is made up of three parts that are flattened and joined altogether at obtuse angles.

Family:	Pontocyprididae	Muller, 1894
Genus:	*Abyssocypris*	Van den Bold, 1974
Type species:	*Abyssocypristepic*	Van den Bold, 1974

*Abyssocypriswaleedi*sp. nov.

(Pl. 1, Figs. 10-12)

Derivation of the name: In honour of my teacher Waleed younis Al-Obidee for his kindness and help in collecting the materia of this study .

Diagnosis:The species of ostracoda genus *Abyssocypris*is characterized as being thin, small, tumid with adistinct overlapping arouned the ventral and posterior end and the dorsal margin is slightly convex to the posterior.

Holotype: Carapace,Mo.T.Aa. 10

Paratype: Carapace,Mo.T.Aa. 11,12

Type Locality: Aaliji Formation, Borehole Ja. 46., Kirkuk area.

Horizon of the Type: Aa.S.No.21

Materials :11carapaces

Dimension (µm): The length is 280, the width is 600 and the height is 350.

Description: A small Carapace, tumid with moderately-rounded anterior and tapering to the posterior. The dorsal margin is convex and the lateral surface is characterized in being smooth and fine pitted. However, the left valve overlaps with the right valve along the ventral and the posterior end. All of the specimens possess closed carapaces, so that the internal characteristics is not possible to be seen.

Affinities: The current species resembles the *Abyssocyprisadunca* (Donze et al., 1982); from the Paleocene-Early Eocene of Tunsia, but it is different in terms of being higher, posteriorly inflated and in having posterior that is rounded, in addition to a ventral corner. The Iraqi species is also characterized by its tumid, maximum height anterior to the middle. *Abyssocypris* sp. (Morsi et al., 2008) from (the Paleocene-Eocene) of Egypt manifests certain similarities to the Iraqi specimens, though it differed in having more convexity towards the dorsal margin and also in possessing a less rounded anterior end. The current species demonstrates a set of similarities to the *Abyssocypriszumarensis*sp,nov (Aziz, 2013) from Paleocene-Eocene in Northwest Iraq (Ain-Zalah well 29), but it is different in terms of having an anterior that is less rounded, in addition to a distinct overlapping along all the margin.

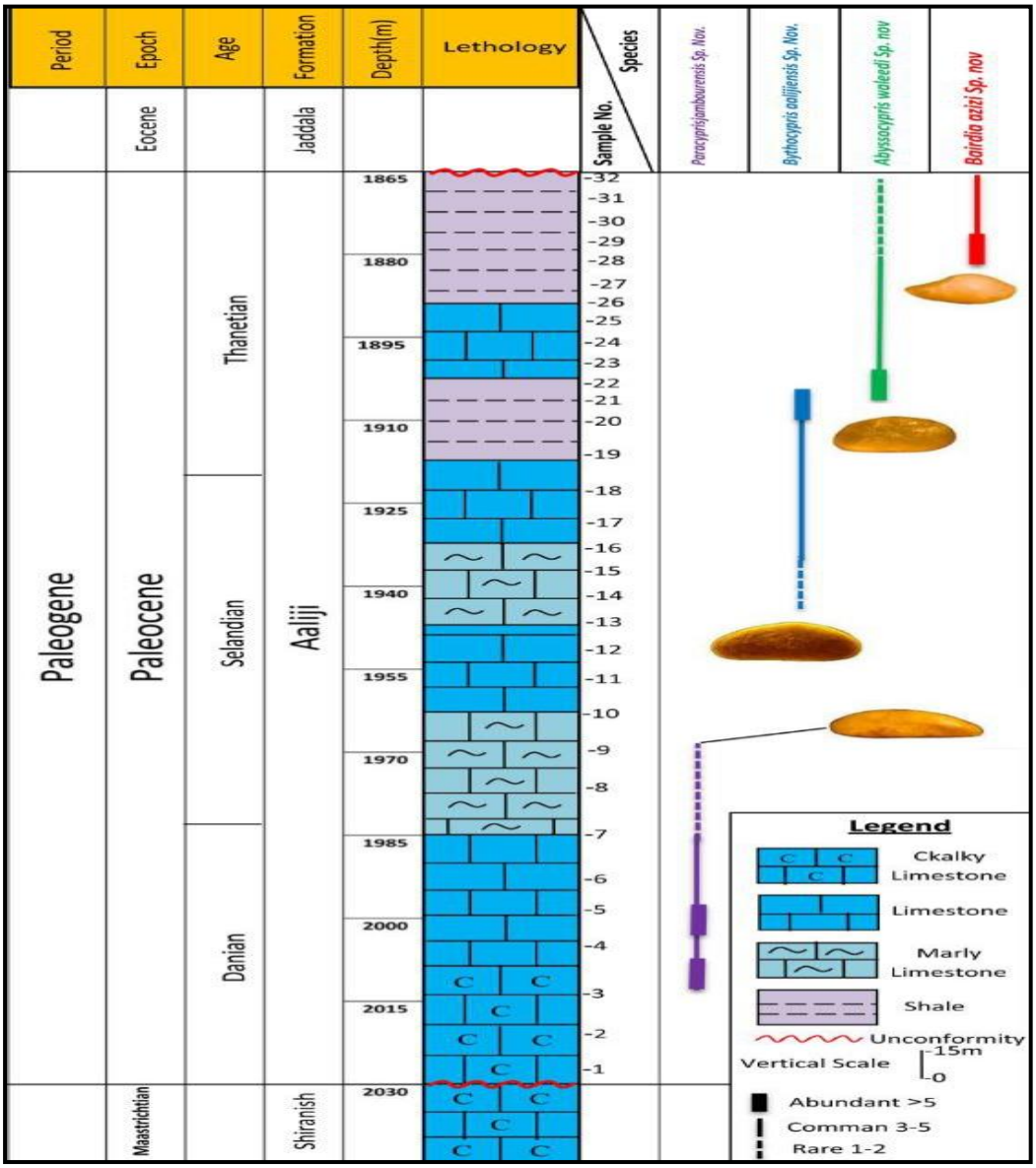


Fig.3. Distribution of the obtained Ostracods from Aaliji Formation



Plate 1

Explination of plate 1: 1-3.*Bairdiaazizi*sp.nov.,1. left valve, 2. dorsal view, 3. right valve. 4-6. *Bythocyprisaalijiensis* sp. nov., 4. left valve, 5. dorsal view, 6. right valve. 7-9. *Paracyprisjambourensis*sp.nov.,7.leftvalve,8.dorsalview,9.rightvalve.10-12. *Abyssocypriswaleedi*sp. nov. 10. left valve, 11. dorsal view, 12. right valve.

4. Conclusions

Four new ostracod species belong to the four genera from the Aaliji Formation (Paleocene-Early Eocene) in the Jambour – 46, Kirkuk City, Northeastern Iraq are identified. These species are, *Bairdiaazizi*sp.nov,*Bythocyprisaalijiensis*sp.nov., *ParacyprisJambourensis*sp. nov, *Abyssocypriswaleedi*sp. nov .

The ostracod species of (Paleocene-Early Eocene) from the Aaliji Formations of North, West and the Middle of Iraq demonstrates fairly high similarities with the faunas in India, Saudi Arabia, Pakistan, East Africa, East of the Mediterranean and the Middle East (Southern New Tethys).

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References

Abawi, T. S., Abdo, G. S., 2001. Biostratigraphy of Aaliji Formation (Paleocene-Eocene) in Jumbor well 18-Northern Iraq. Rafidain Journal of Science, 12 (1), 60-69.

Abdo, G. S., 1994. Biostratigraphy of Aaliji Formation at Jambour Oil Field-Northern Iraq. Unpublished M.Sc. thesis, University of Mosul, Iraq. 112. In Arabic with English Abstract.

Al-Badrani, O. A., Hassan, F. N., Al-Hadeedy, M. N., 2021. Calcareous Nannofossil Biostratigraphy and Ostracoda Paleoecology of Hartha Formation from Balad (1) well, Central Iraq. Iraqi Journal of Science, 62(11), 3962- 3972.

Al-Jubouri, F. N., 2011. Biostratigraphy of floating Foraminifera, depositional environment, and sequence stratigraphy of the Upper Cretaceous-Middle Eocene sequences of selected wells from the Khabbaz Oil Field, Northeastern Iraq. Unpublished doctoral dissertation, University of Mosul.

Al-Omari, F. S., 1970 . Upper Cretaceous and Lower Cenozoic Foraminifera of Three Wells in Northwestern Iraq." Unpublished Ph.D. dissertation, University of Missouri-Rolla, United States of America. 208.

Al-Safawee, N. M., 1980. Foraminiferal Study of the Mesozoic Cenozoic Transition of Sasan Well No.1, Northwestern Iraq, M.Sc. Thesis, University of Mosul. 145.

Aziz, N. M., 2013. Paleocene-Eocene OstracodaFrom selected wells in West, North and central Iraq. Iraqi National Journal of Earth Sciences, 13 (2), 47-66.

Aziz, N. M., 1997. Paleocene-Eocene Ostracoda from Selected Well In West, Northern and Middle Iraq". Unpublished. Ph.D. Thesis, University of Mosul, Iraq. 1-295

Bassiouni, M. A., Luger, P., 1990. Maastrichtian to Early Eocene ostracoda from southern Egypt. Paleontology, Paleoecology, Paleobiogeography.

Bassiouni, M. A., Morsi, A. M., 2000. Paleocene lower Eocenel ostracodes from El Quss Abu Said Plateau (Farafra Oasis), Western Desert, Egypt. Paleontographica, A, 257, 27–84.

Bellen, R. C. Van, Dunnington, H. V., Wetzel. R, Morton, D., 1959. Lexique Stratigraphique International. Asie, Iraq. 3c (10a): 333.

Diop, A., Guernet, C., Poignant, A., 1982. Microfaune du Paléocene de QuelquesSondages de dôme du Sénégal Occidental; observations sur les Ostracodes. Géobios, 15, fasc. 1; 19-31, 2Fig., 1 tabl., 2pl. Lyon, février.

Donze, P., Colin, J.-P., Damotte, R., Oertli, O., Peypouquet, J.-P., Said, R., 1982. Les ostracodes du Campanien terminal à l'Eocèneinférieur de la coupede Kef, Tunisie Nord Occidentale. Bulletin des Centres de Recherche Exploration-Production Elf-Aquitaine 6, 273-355.

El-Sogher, A. M., 1991. Late Cretaceous and Paleocene Ostracods from the Waha and Heira Formations of the Sirte Basin, PH.D Thesis, Libya. 319.

Esker, C. G., 1968. Danianostracodes from Tunisia. Micropaleontology, 14, 3, 319-333, pls.1-4.

Fouad, S. F., 2015. Tectonic map of Iraq, scale 1: 1000 000, 2012. Iraqi Bulletin of Geology and Mining, 11(1), 1-7.

Ghafor, L. M., 1988. Planktonic Foraminifera and Biostratigraphy of Aaliji Formation and its Nature of Contact with Shiranish Formation in Tel Hajar well No. 1, Sinjar Area, North West Iraq. Unpublished M.Sc. thesis, University of Salah Al-Deen, Iraq. 178.

Hamid, M. Z., Al-Shareefi, L. Y.. 2022. Ostracoda assemblages of the Hartha Formation (Late Campanian-Early Maastrichtian) from Balad (8) well, Central Iraq. Iraqi National Journal of Earth Science, 22 (1), 15-37.

Hartmann, G., Puri, H. S., 1974. Summary of Neontological and Paleontological classification of Ostracoda, Mitt Hammdurg. Zool. Museum Inst., Band. 70, 7–37 .

Kadhim, L. S., Hassan, F. N., Mansour, T. H., 2017. Microfacies and sedimentary environment of Aaliji Formation in selected wells from Kirkuk oil fields north Iraq. Tikrit Journal of Pure Science, 8 (22): 126-136, ISSN: 1813-1662 (Print), E-ISSN: 2415–1726 On Line.

Kassab, I. I. M., 1975. Biostratigraphy study of the subsurface Upper Cretaceous - Lower Tertiary of Well Injana no. 5, northeastern Iraq. Journal of the Geological Society Iraq, Special Issue, 181-189, Pls.1-2, 5figs.

Kassab, I. I. M., 1978. Biostratigraphy of Upper Cretaceous Lower Tertiary of North Iraq. Annales des Min. Geol., Tunis, 28(2), 277-325, Actes due Colloq. Afric. Micropal. Tunis.

Kassab, I. I., 1972. Micropaleontology of the Upper Cretaceous-Lower Tertiary of North Iraq. University of London, (Unpub. Ph. D. Thesis), 310.

Moore, R. C., Pitrat, G. W., 1961. Treatise on invertebrate. Paleontology, Part Q Arthropoda 3 Crustacea Ostracoda. Geological Society of America Bulletin, University Of Kansas press, LawranceKanasa, 442.

Morsi, A. M., Faris, M., Zalat, A. E., Salem, F. M., 2008. Maastrichtian Early Eocene ostracodes from West Central Sinai, Egypt Taxonomy, biostratigraphy, paleoecology and paleobiogegeography, Revue de paleobiologie, Geneve, 27, 1, 159-189.

Reyment, R. A., 1981. The ostracoda of the Kalambaina Formation (Paleocene), northwestern Nigeria. Bulletin of the Paleontological Institut of the University of Uppsala 9, 51-65.

Morkhoven F. P., 1963. Post Paleozoic Ostracoda: Their Morphology, Taxonomy, and Economic Use. Elsevier Publishing Co., 1–478.