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Two new species of calcareous nannofossils from Jaddala Formation, type section, Northwestern Iraq

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[Abstract]

Two new species are recorded *Chiasmolithus* *Jaddalaensis* sp.nov. and *Tribrachiatus* *sinjarensis* sp.nov. from surface type section Jaddala Formation (Early- Middle Eocene) that exposed at southern limb of Sinjar anticline, northwestern Iraq.

[Keywords: Iraq, Jaddala, Eocene, Nannofossils]



نوعين جديدين لمتحجرات النانو الكلسية من المقطع النموذجي لتكوين جدالة،

شمال غربي العراق

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[الملخص]

تم تسجيل وتسمية النوعان *Chiasmolithus Jaddalaensis* sp.nov. and *Tribrachiatus*

sinjarensis sp.nov. من المقطع السطحي لتكوين جدالة (الأيوسين المبكر – الأوسط) المكتشف على

الجناح الجنوبي لطية سنجار المحدبة، شمال غربي العراق.

[الكلمات الدالة: العراق، جدالة، الأيوسين، متحجرات النانو]

Introduction

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Jaddala Formation was first described by Henson, 1940 (unpublished report in Bellen et al., 1959) near Jaddala village at southern limb of Sinjar anticline NW Iraq, it is about 342 m. in thickness and consisting of marly Limestone, chalky Limestone and Marlstone [5].

Author	Formation	Age	Area
El- Dawoody and Elewi, 1984	Jaddala	Early-Middle Eocene	Iraq (Sinjar)
Al- Hashimi and Amer, 1985	Jaddala	Middle Eocene	Iraq (Sinjar)
البدراني، 2007	Jaddala	Middle Eocene	Iraq (Sinjar)
Al- Badrani, 2011	Jaddala	Eocene	Iraq (Khleisia Well)
محمود، 2011	Jaddala	Middle Eocene	Iraq (Sinjar)
العبيدي، 2012	Jaddala	Middle Eocene	Iraq (central Iraq)

Previous studies for jaddala formation

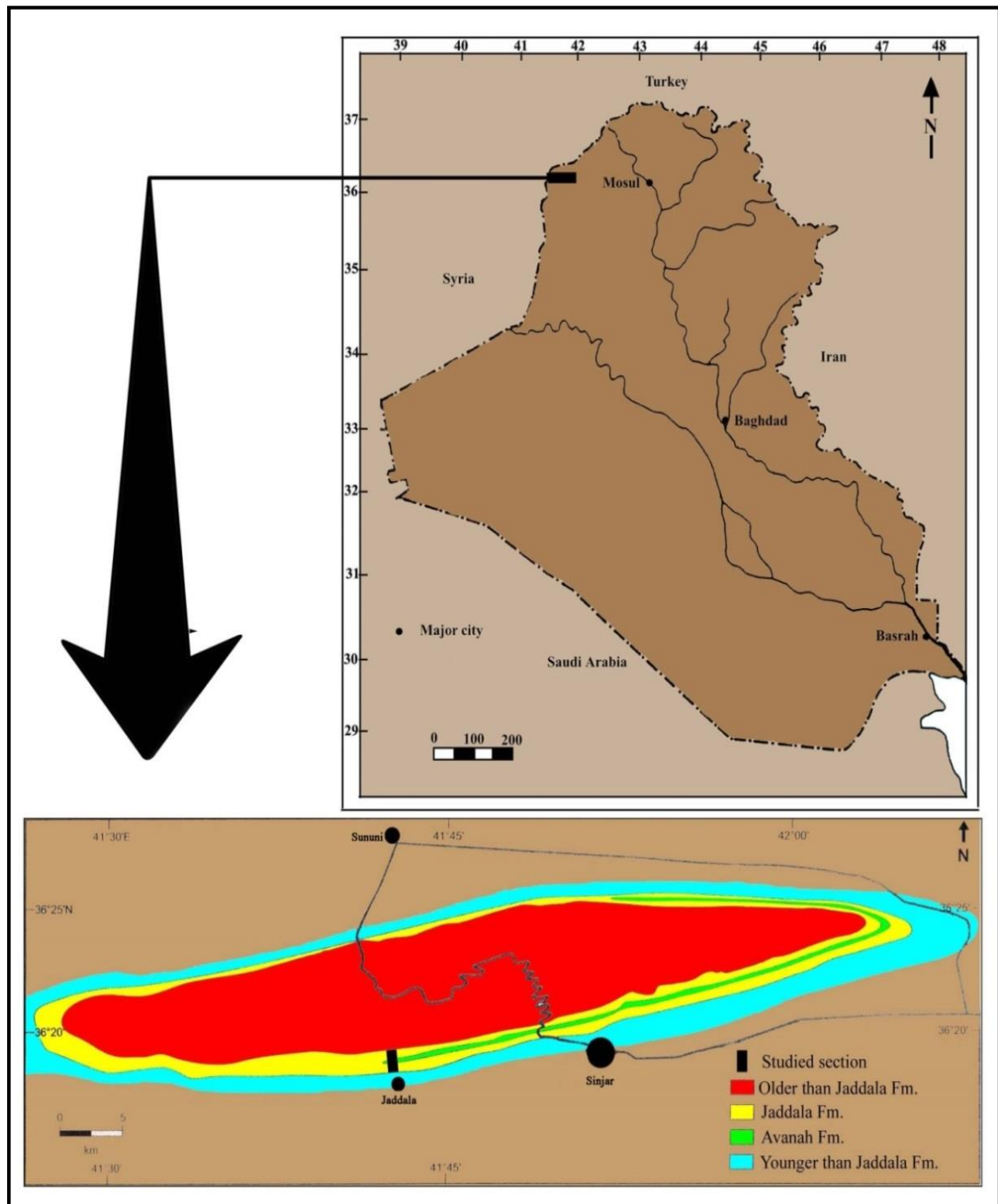


Fig.1: Location map of studied outcrop section

Systematic Paleontology



The Classification was based on Perch-Nielsen (1985) ,Young and Bown(1997).

Kingdom Protista

Division Chrysophyta Rothmaler, 1949

Class Coccolithophyceae Rothmaler, 1949

Family Coccolithaceae Poche, 1913 emend. Young and Bown, 1997

Genus *Chiasmolithus* Hay and Wade, 1966

Type species: *Tremalithus oamaruensis* Defladre and Ferth, 1954; Ann . Paleont.,
Vol. 40, p. 154, pl. 11, fig. 22.

***Chiasmolithus Jaddalaensis* sp.nov.**

Pl. 1, Figs. 1, 2, 3.

Derivation of name: From Jaddala village sinjar area northwestern Iraq.

Holotype: Mos. Geo. N. T. (J21, J23, 1, 2){ Mos: Mosul; Geo: Dept. of Geology;
N.T.: Nannofossils Tertiary collection}.

Type locality and Stratum: Northwestern Iraq, the type section near Jaddala village at the southern limb of Sinjar Anticline, Jaddala Formation from Marly Limestone from sample No. (21, 22, 23), where located at 134-148 from the lower boundary.

Materials Examined: Two Heterococcoliths placolith elliptical to sub circular coccoliths.

Dimensions: Longitudinal (5 micron), Traverse (3 micron).

Diagnosis: the most important characteristic of this species is small size, and form the central area a third of the length of the diameter at the short axis of the coccolith, distal shield large than proximal shield is composed from calcareous



elements is the axis of the c-axis vertical on the shield for that shows the dark in light polarized (isogyre).

Description: Heterococcolith Plicolith elliptical to sub circular shape, diagonal, usually offset, cross in central-area, the bars of which show a median extinction line in XPL; the central-distal cycle forms a distinct collar around contact with V-units, it is reaching about 5 microns in length.

Discussion: this species is different from the rest of species genus *Chiasmolithus* Hay and Wade, 1966 being very small in size, this species similar to some extent species *Chiasmolithus titus* Gartner, 1970 but the latter species differs being the central area giving of cross (x) one being straight and oblique to turn of the long axis to the coccolith, while the second transverse (S) shaped which extends and parallel to the short axis of the coccolith. Where in the cross in the central area of this study of mostly straight in addition to being smaller size. this species were identified by Mahmood, 2011 and age determined in middle Eocene, and in this study determined Middle Eocene (Lutetian).

Family Lithostromationaceae Deflandre, 1959

Genus *Tribrachiatus* Shamrai, 1963



Type species: *Tribrachiatus* Shamrai, 1963: izv, vyssh, uchelo, zaved, Geol, I Razv., 6 (4), 27 - 40.

***Tribrachiatus sinjarensis* sp.nov.**

Pl. 1, Figs. 4, 5, 6.

Derivation of name: From Sinjar city northwestern Iraq.

Holotype: Mos. Geo. N. T. (J17, J50, J51, 1- 4){ Mos: Mosul; Geo: Dept. of Geology; N. T.: Nannofossils Tertiary collection}.

Type locality and Stratum: Northwestern Iraq, sinjar area the type section near Jaddala village at the southern limb of Sinjar Anticline, which composed of from Marly Limestone from sample no. (17,50.51), where located at 100-335 from the lower boundary.

Materials Examined: Four Nannoliths.

Dimensions: Longitudinal (4-20 micron).

Diagnosis: *Tribrachiatus* genus consists of two units where each one consisting of three rays, but the species in this study contains from three rays of equal thickness with branched ends.

Description: initially hexaradiate, formed by two superposed triplets of rays. Triplets rotate through evolution to become parallel giving triradiate nannolith with bifurcate ray tips.

Discussion: Genus *Tribrachiatus* is quite different from the genus *Nannotetrani*, It was remarkable observation that the second genus was containing a four rays with sharp ends Gartner, 1970, Furthermore , this rays takes of forms (+) and not (X) Shamrai, 1963, also differs from the *Tribrachiatus orthostylus* Shamrai, 1963, being has four rays instead of three rays of each unit, in addition these rays are



equal thickness, the age of these species were determined in Al- Badrani, 2007 from (Eocene), The species described in this study are interest in the stratigraphical of the select age, Early to Middle Eocene (Ypresian, Lutetian).

Conclusion

The recent two new species recorded from Early to Middle Eocene (Ypresian, Lutetian) Fig.2, and need another study to determinate if is index fossils for calcareous nanno fossils, while it is occur in jaddala formation mean the flora lived in warm water within tropical to sub-tropical.

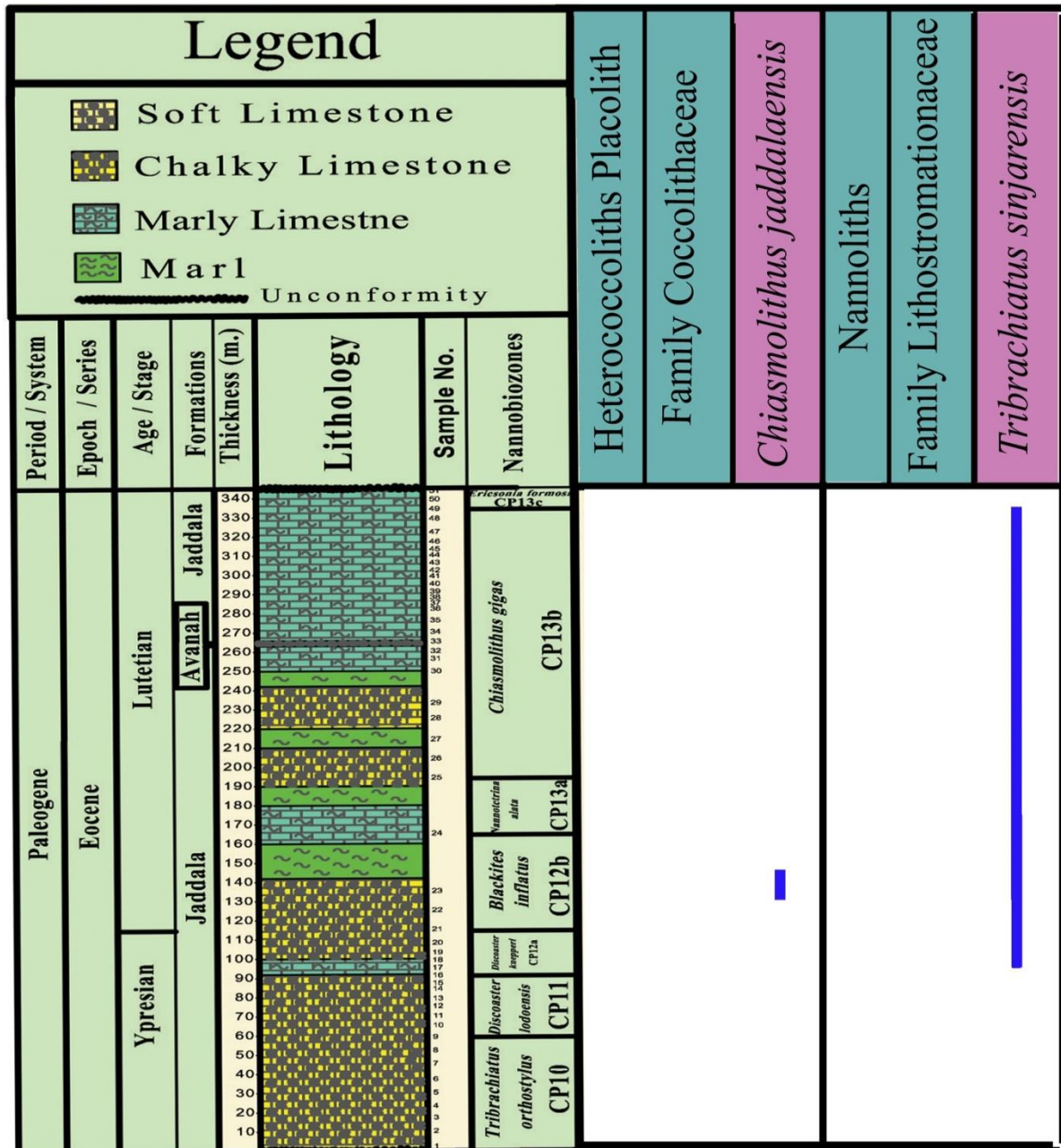


Fig.2: Stratigraphic column section of jaddala formation showing distribution the two new species and samples numbers

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Plate 1



1 – 3 *Chiasmolithus Jaddalaensis* sp.nov. , sample No. 20, 22, bar = 5 micron,
(1) Normal Light Photo (2) Normal Light Photo (3) Polarized Light Photo. Scale
Bar equal to 5 micron

4 – 6 *Tribrachiatus sinjarensis* sp.nov. , sample No. 17, 50, 51, bar = 5 micron,
(4) Normal Light Photo (5) Normal Light Photo (6) Normal Light Photo. Scale
Bar equal to 5 micron

