Biostratigraphy of the Ruteh Formation at Harijan section (Central Alborz) northern Iran using foraminifera and conodont

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Abstract

In order to study the fossil contents of the Ruteh Formation for biostratigraphical purposes, the 200 meters thick section was sampled at Harijan section, Central Alborz. The sequence is mainly made up of limestone and shale's. The lower contact of the formation with Dorud Formation is disconform while the upper contact with under learing Dorud Formation is disconformable with overling Nesen Formation is as well as disconformable. Fifty four species belonging to 27 genera (foraminifera and conodonts) were identified and three biozones were differentiated. These are formation: 1-*Schubertell*a *giraudi- Codonofusiella distincta* Assemblage Zone, 2-*Cribrigenerina sumatruna- Langella ocarina* Assemblage Zone, 3- *Sweetognathus whitei* Biozone. Based on, these an age of Yackhtaschian - Murghabian is quoted to the formation.

Keywords: Ruteh Formation, Foraminifera, Conodont, Biozone

Introduction

The systematic study of benthic foraminifera in isolated form for biozonation and precise age dating of the Ruteh Formation at Harijan section, Central Alborz was the major aim of this research. A sum of 33 SEM images were obtained and presented in one plate (Plate1).

Stratigraphy

The Ruteh Formation is one of the upper Permian rock units in the Central Alborz sedimentary basin in northern of Iran. The Harijan section of the formation with a thickness of 200m (E: 51, °20′, 00″, N: 36°, 14′, 18″) is located on the Tehran-Karaj-Chalus road, some 130 km to the northeastern of Karaj (Fig.1) and contains 5 lithological units mainly made up carbonate rock bearing gastropod and brachiopods (Fig2). At the Harijan section alike all other regions the lower contact of the formation with Dorud Formation is disconform. But the upper contact with Nesen Formation is disconform.

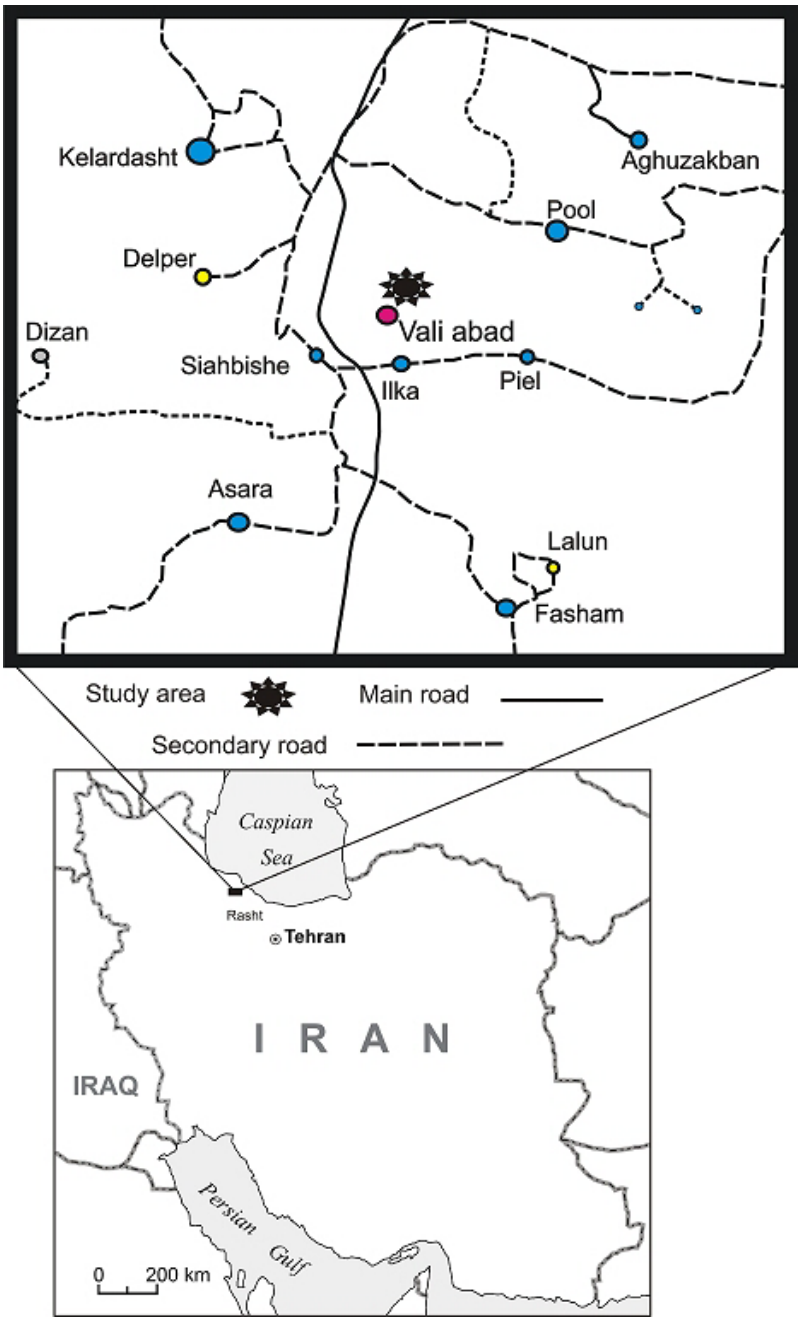

Fig1. The geographical map and the ways to the region of the study.

Fig2- Lithostratigraphy column of Ruteh Formation at Harijan section

Method

One hundred and five samples were gathered from the Harijan section of the Ruteh Formation. Of the only 50samples were included in this study. Forty five samples were excluded evidences. Due to the evidences indicating reworking and seven more due to the dissolving. Depending on their lithology, the samples were washed in two methods. The lime and marls samples were put in H_2O_2 10% for a day after being crushed into small pieces. The residues were then washed with water on the screeners assigned with meshes125 and 63µm (Zepeda 1998).

Biostratigraphy using benthic foraminifera

Thirty seven species of benthic foraminifera belonging to 30 genera were identified based on the references were elucidated (, Altiner, *et al*, 1979, Assereto, 1963, Bengston. 1976 Bozorgnia, 1973 Clark, & Behnken 1971 Aldridge, 1986). The well-preserved forms were photographed using SEM model VEGA TESCAN (plate1). The specimens are retained at the Museum of the Geology Department of the University of ShahidBeheshti, Iran. Based on the recorded indices forms, two biozones were differentiated indicating in age of Yackhtaschian - Murghabian for the formation (Fig3).

1- *Schubertella giraudi- Codonofusiella distincta* Assemblage Zone, 2- *Cribrigenerina sumatruna- Langella ocarina* Assemblage Zone. Some of the famous fossils of this zone are explained as following:

Langella perforata, *Langella cukurkoyi*, *Langella conica*, *Langella ocarina*, *Langella uralica*, *Langella venosa*, *Pachypholoia cukurkoyi*, *Pachypholoia ovata*, *Pachypholoia schwageri*, *Pachypholoia pedicula*, *Geinitzina taurica*, *Geinitzina uralica*, *Geinitzina postcarbonica*, *Geinitzina reperta*, *Geinitzina chapmani*, *Geinitzina* cf *postcarbonica*, *Pseuolangella fragilis*, *Globivalvulina bulloides*, *Globivalvulina beserialis*, *Globivalvulina gracea*, *Glomospira* sp, *Neoendothyra bronnimani*, *Neoendothyra parva*, *Neoendothyra reicheli*, *Schubertella Giraud*, *Codonofusiella distinct*, *Eotuberitina reitlingerae*, *Climacammina moeleri*, *Climacammina sphaerica*, *Climacammina major*, *Cribrigenerina sumatruna*, *Boultonia heeseni*, *Misellina* sp, *Agatamina subfusiform*, *Codonofusiell* cf *paradoxica*, *Polysphaerinella bulla*, *Pseudoschwagerina* sp, *Nummlustogina velebitana*, *Cryptoseptida anatoliensis*, *Staffella* sp, *Dunbarulla* sp, *Nankinella* sp, *Schuzenella* sp.

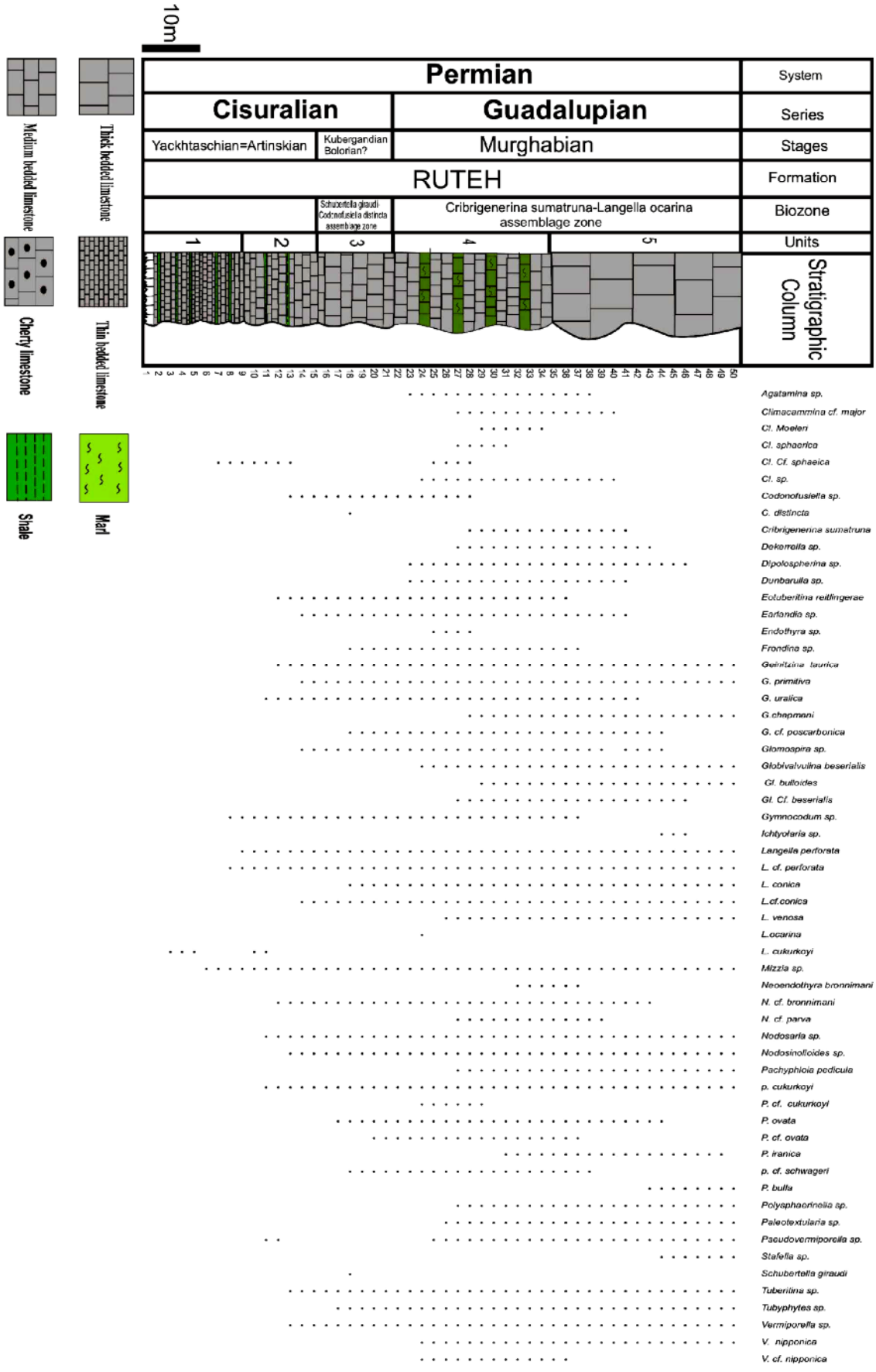

Fig3. Range chart of the recorded foraminifer's species throughout the Ruteh Formation.

Also the studies of conodont elements identified 10 species belonging to 7 genera. According to the assemblage conodont elements in Ruteh Formation distinguished,1 biozon was demonstrated which they show the Yackhtaschian - Murghabian for this formation (Fig4).

1-*Sweetognathus whitei* zone

Some of the famous fossils of this zone are explained as following:

Hindeodus sp. (Pa-element), *Hindeodus* sp.(Sa-element), *Hindeodus minutes* (Pa-element), *Hindeodus excavates* (Pa-element), *Hindeodus typicalis* (Pa-element), *Hindeodus minutus minutes*, *Hindeodus* sp (Pb-element), *Ozarkodina* sp, *Ellisonia excavata* (Lb - element), *Ellisonia teicherti* (La-element), *Ellisonia teicherti* (U-element), *Ellisonia confelex* (Sa-element), *Sweetognathus whitei*, *Cypriododella* sp, *Hindeodella triassica* (Sc-element).

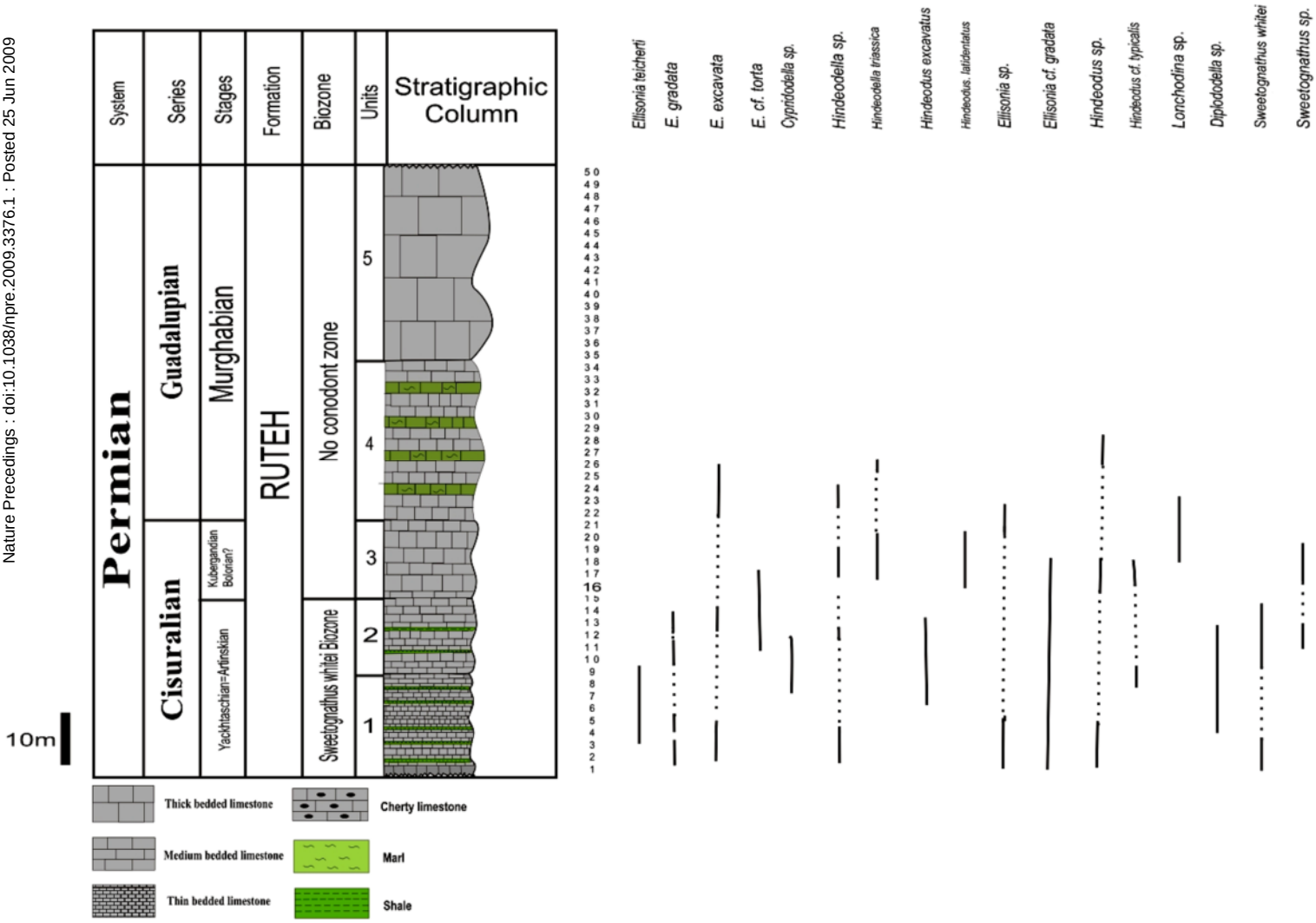

Fig4. Range chart of the recorded conodont species throughout the Ruteh Formation

Discussion

The studies of isolated benthic foraminifer's samples in the region of the study caused to identification and distinguish of 37 species and 30 genuses. Kinds of development of these biozones are explained as following:

1- *Schubertella giraudi- Codonofusiella distincta* Assemblage Zone, 2- *Cribrigenerina sumatruna- Langella ocarina* Assemblage Zone and also study of conodont elements identified resulted 10 species belonging to 7 genera. According to the assemblage conodont elements in Ruteh Formation distinguished 1 biozon were demonstrated which they show which totally cover Yackhtaschian - Murghabian. distinguished 1 biozon were demonstrated which they show which totally cover Yackhtaschian - Murghabian.

Acknowledgments

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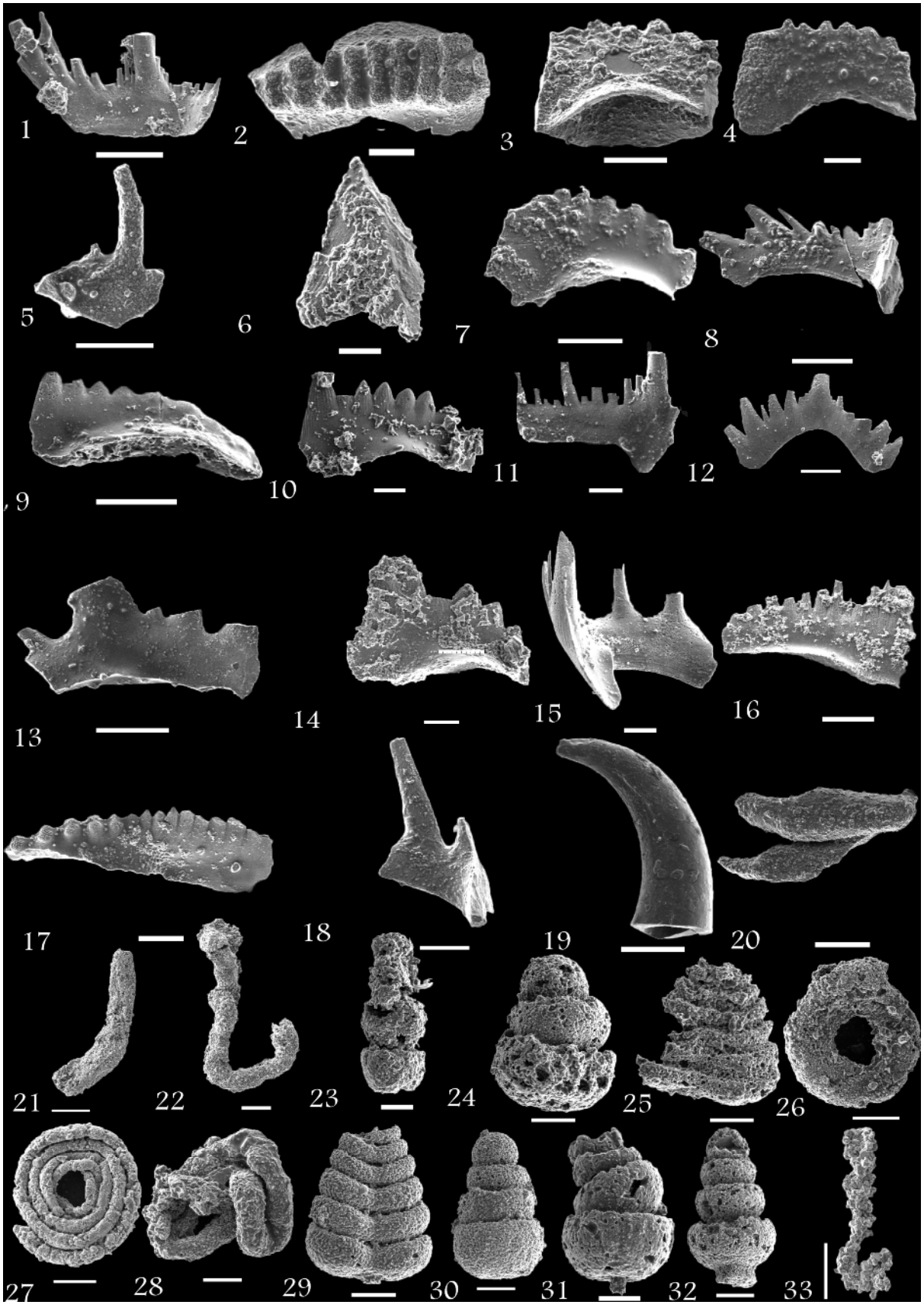

Plate 1: 1- *Hindeodella triassica* ,2- *Sweetognathus whitei* , 3- *Hindeodus* sp. 4- *Hindeodus typicalis* , 5- *Hindeodella nevadensis*, 6-Fish scale, 7-*Hindeodus typicalis* ,8- *Hindeodella* sp. 9- *Hindeodus excavatus* , 10-*Hindeodus* sp. 11- *Hindeodus latidentatus* , 12- *Pachycladina symmetrica* , 13- *Hindeodus* sp. 14- *Ellisonia* cf. *torta* , 15- *Cypridodella mulleri* , 16- *Hindeodus* sp. 17- *Hindeodus excavates*, 18- *Hindeodella* sp. 19,20- prabebly Fish teeth, 21,22-*Tolypammina* sp, 23-24- *Climacammina* sp, 25- *Palaeotextularia* sp, 26-Aperture of *Paleobigenerina* sp. 27,28- *Amodiscus* sp, 29- *Palaeotextularia* sp, 30-31,32- *Climacammin* sp, 33- *Palaeotextularia* sp. Scale bar represents 100µm except for Samples 5-19 which represents 200µm.