Mediterranean Marine Science

Vol 13, No 2 (2012)

Epistomaroides punctatus (Said, 1949) - a new alien foraminifera found at Akhziv - Rosh HaNikra, northern Israel, eastern Mediterranean Sea

A. ALMOGI-LABIN, O. HYAMS-KAPHZAN

doi: 10.12681/mms.311

Short Communication

Mediterranean Marine Science
Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS
The journal is available on line at http://www.medit-mar-sc.net

Epistomaroides punctatus (Said, 1949) - a new alien foraminifera found at Akhziv - Rosh HaNikra, northern Israel, eastern Mediterranean Sea

A. ALMOGI-LABIN AND O. HYAMS-KAPHZAN

Geological Survey of Israel, 30 Malchei Israel St., Jerusalem 95501, Israel

Corresponding author: almogi@gsi.gov.il

Received: 26 October 2012; Accepted: 2 November 2012; Published on line: 12 November 2012

Abstract

The alien benthic foraminifera *Epistomaroides punctatus* (Said) is reported for the first time from the northern part of the Israeli coast. Three living specimens were collected in April 2005, at the vermetid reefs of Akhziv - Rosh HaNikra. *Epistomaroides punctatus* has so far only been reported from the Indo-Pacific realm; thus, it is suggested to be a Lessepsian invader.

Keywords: *Epistomaroides punctatus*, Foraminifera, alien species, Northern Israeli coast, eastern Mediterranean.

Introduction

Since the opening of the Suez Canal in 1869 we are witnessing a rapid change in the composition of the marine biota of the eastern Mediterranean due to the invasion of alien species (Rilov & Galil, 2009; Zenetos *et al*., 2010). Species belonging to the phylum Foraminifera are among the hundreds of species that have invaded the Mediterranean. Recently, an increasing number of papers report on the occurrence of invasive foraminiferal species along the coast of Egypt, Israel, Turkey and Greece (e.g. Basso & Spezzaferri, 2000; Samir *et al.,* 2003; Meric *et al.,* 2004; Hyams-Kaphzan *et al.,* 2008; Langer, 2008; Koukousioura *et al.*, 2010). The majority of the invasive foraminifera are tropical, of Indo-Pacific origin and have entered the Mediterranean from the Red Sea through the Suez Canal. Hyams *et al.* (2002) and Hyams-Kaphzan *et al.* (2008) were the first to report on the occurrence of invasive foraminifera on the Israeli coast. Lazar (2007) and Hyams-Kaphzan *et al.* (2008) pointed out that the highest numbers of invasive species were collected from the coasts of Akhziv - Rosh HaNikra, northern Israel. This study reports the first occurrence of *Epistomaroides punctatus* on the coast of Akhziv - Rosh HaNikra.

Material and Methods

Three specimens of *Epistomaroides punctatus* (Said) were collected at Akhziv - Rosh HaNikra (Fig. 1), northern Israeli coast (33 ^{0}05’27’N/35^{0}06’19’E) on the 19th of April, 2005 at a water depth of less than 0.5 m. The specimens were collected within the framework of a project that aimed to study the foraminiferal assemblage composition of the rocky vermetid reef environment. For that purpose, *Jania rubens* (Linnaeus), a coralline algae predominant in this habitat, was sampled and preserved in a Rose Bengal solution (2g/l of 90% ethanol). For the foraminiferal analysis, the samples were treated in the laboratory several weeks after being collected and were dried in 50° C in an oven. The foraminifera were collected and identified from the dry residue > 63 μm. The specimens were photographed using a digital microscope colour camera (Leica DFC295) and scanned using a scanning electron microscope (SEM) at the Geological Survey of Israel.

Results

Epistomaria punctata; Said, 1949 (original description)

Locality type: Northern Red Sea (27 ° 54’57’’N/ 35 ° 37’38’’E), water depth 24 m, Said, 1949, p. 37, Plate 4, Figs. 23a-c). The substrate was not indicated. The holotype is deposited at the Cushman Collection, no. 55675.

Anomalina punctulata d’ Orbigny, 1826; Hansen & Roegl, 1980, p. 153-155, Pl. 1, Figs 4-8. The authors suggest that *Anomalina punctulata* is a senior synonym of *Epistomaroides punctata* (Said) and suggest, according to the International Commission on Zoological Nomenclature, suppression of the incorrectly understood genus *Anomalina* d’Orbigny 1926 and recognition of the Genus *Epistomaroides* Uchio, 1952. The material that

Fig. 1: Map showing the location of the sampling area on the Akhziv – Rosh HaNikra coast, Northern Israel, eastern Mediterranean.

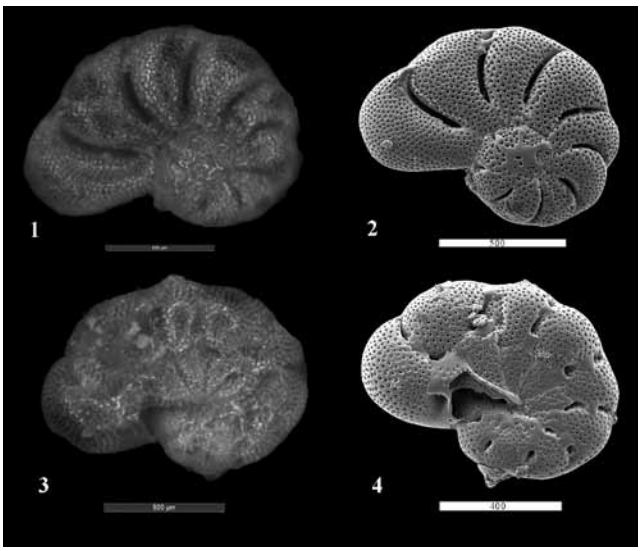

Fig. 2: *Epistomaroides punctatus*: 1-2. The spiral side of the same specimen photographed using: 1. Digital camera; 2. SEM. 3-4. The umbilical side of the same specimen photographed using: 3. Digital camera; 4. SEM. The triangular folium in figs. 3 & 4 is partially broken. The red staining (by Rose Bengal) in Figs. 1 and 3 indicates that the specimens were collected alive. Figs. 1-3. Scale bar = 500 μm; Fig. 4. Scale bar = 400 μm.

d'Orbigny studied came from Mauritius, western Indian Ocean.

Epistomaroides punctatus (Said); Hottinger *et al.* 1993, p. 131-132, Pl. 180-181. A very detailed systematic description of this species appears in their Atlas "Recent Foraminiferida", accompanied by high quality SEM photographs that show, in high resolution, the external and internal structure of this species. The description is based on specimens collected from the northernmost part of the Gulf of Aqaba and from Ras Muhamad, at the southern extreme of the Sinai Peninsula (overlooking the Gulf of Suez to the west and the Gulf of Aqaba to the east).

The size of an adult specimen collected from the Israeli coast is 1.0 mm (Fig. 2), similar to the size of adult specimens from the G. Aqaba, Red Sea (Hottinger *et al.* 1993). The species has a very low trochospiral evolute spiral side and an involute umbilical side. Triangular foliums cover the umbilical side. The periphery is strongly rounded. The species is coarsely perforated and the chambers increase rapidly in size with 9 chambers per whorl. The sutures are deeply sunken on both sides.

Discussion

The three specimens of *Epistomaroides punctatus*, found on the Akhziv - Rosh HaNikra coast, were collected from shallow water of less than 0.5 m. Hottinger *et al.* (1993) reported that this species was found At Ras Muhamad at ~1 m water depth and in somewhat deeper water, 24 m, in the northern G. Aqaba. Perelis-Grossowicz *et al.* (2008) and Perelis-Grossowicz, personal communication, reported that in the northernmost G. Aqaba this species was found at a depth between 20 and 50 m, during a project that studied sediments at a depth of over 20 m. The species appears in low numbers in the G. Aqaba, comprising less than 3% of the entire foraminiferal assemblage. Makled & Langer (2011, Pl. 9, Figs. 25-29) reported recently that in the Chuuk Lagoon Atoll system of the Caroline Islands, Pacific Ocean, *E. punctatus* constitutes 0.5-3% of the foraminiferal community.

Epistomaroides punctatus is an epiphytic species found attached to *Jania rubens*. During the removal of one of the specimens from the *Jania*, its last triangular folium was partially broken (Fig. 2, 3-4). The specimens were collected alive, as evidenced by the Rose Bengal staining of the two specimens (Fig. 2, 1, 3).

High numbers of invasive species were found on the Akhziv - Rosh HaNikra coast (Hyams *et al.,* 2002; Hyams-Kaphzan *et al.*, 2008). In addition, the alien miliolids *Borelis schlumbergeri*, a larger symbiont-bearing benthic foraminifera and *Pseudohauerinella dissidens* (McCulloch) were collected only from this coast. On this coast, Lazar (2007) documented the highest numbers of *Amphistegina lobifera* that comprise nearly 90% of the local foraminiferal community. This might indicate that the Akhziv - Rosh HaNikra coast can be considered as a "hotspot" for invasive species and therefore deserves further investigation.

Acknowledgements

The authors are much indebted to M. Kitin and R. Bodzin from the Geological Survey of Israel for technical help throughout this study. Special thanks are due to the journal Editor A. Zenetos for providing constructive criticism on the manuscript.

References

Basso, D. & Spezzaferri, S., 2000. The distribution of living (stained) benthic foraminifera in Iskenderun Bay (eastern Turkey): a statistical approach. *Bollettino della Società Paleontologica Italiana*, 39: 359-379.

Hansen, H.J. & Roegl, F., 1980. On *Anomalina punctulata* d'Orbigny, 1826. *Journal of Foraminiferal Research*, 10 (2): 153-155.

Hottinger, L., Halicz, E. & Reiss, Z., 1993. *Recent Foraminiferida from the Gulf of Aqaba, Red Sea*. Ljubljana, Slovenia, Slovenska Akademija Znanosti in Umenosti, 179 pp..

Hyams, O., Almogi-Labin, A. & Benjamini, C., 2002. Larger foraminifera of the southeastern Mediterranean shallow continental shelf off Israel. *Israel Journal of Earth Sciences*, 51 (3-4): 169-179.

Hyams-Kaphzan, O., Almogi-Labin, A., Sivan, D. & Benjamini, C., 2008. Benthic foraminifera assemblage change along the southeastern Mediterranean inner shelf due to fall-off of Nile-derived siliciclastics. *Neues Jahrbuch für Geologie & Paläontologie*, 248 (3): 315-344.

Koukousioura, O., Dimiza, M.D. & Triantaphyllou, M.V., 2010. Alien foraminifers from Greek coastal areas (Aegean Sea, Eastern Mediterranean). *Mediterranean Marine Science*, 11 (1): 155-172.

Langer, M.R., 2008. Foraminifera from the Mediterranean and the Red Sea. p. 397-415. In: *Aqaba-Eilat, the Improbable Gulf: Environment Biodiversity and Protection*. Por, F.D. (Ed). Jerusalem, Magnes Press.

Lazar, S., 2007. Recent and late Pleistocene carbonate-rich sediments in the Mediterranean shelf of Israel: sedimentary, biogenic and genetic analysis. *Geological Survey of Israel Bulletin,* GSI/08/07. Jerusalem, Ben-Gurion University of the Negev, 107 pp.

Makled, W.A.A. & Langer, M.R., 2011. Benthic foraminifera from the Chuuk Lagoon Atoll System (Caroline *Islands, Pacific Ocean). Neues Jahrbuch für Geologie & Paläontologie Abhandlungen*, 259 (2): 231-249.

Meriç, E., Avsar, N. & Bergin, F., 2004. *Benthic foraminifera of Eastern Aegean Sea (Turkey) systematics and autoecology.* Istanbul, Turkish Marine Research Foundation, 306 pp.

Orbigny, A.d'., 1826. Tableau méthodique de la classe des Céphalopodes. Annales des Sciences Naturelles, 7: 245-314.

Perelis-Grossowicz, L., Edelman-Furstenberg, Y. & Almogi-Labin, A., 2008. Characteristics of the shallow- water benthic foraminifera in the northernmost Gulf of Eilat. p. 439-458. In: *Aqaba-Eilat, the Improbable Gulf: Environment Biodiversity and Protection*. Por, F.D. (Ed). Jerusalem, Magnes Press.

Rilov, G., & Galil, B., 2009. Marine bioinvasions in the Mediterranean Sea - History, distribution and ecology. p. 549-575. In: *Biological invasions in marine ecosystems ecological studies*. Rilov, G. & Crooks, J. A. (Eds). Berlin, Springer-Verlag..

Said, R., 1949. Foraminifera of the Northern Red Sea. *Cushman Laboratory for Foraminiferal Research. Special Publication No. 26,* 44 pp.

Samir, A.M., Abdou, H.F., Zazou, S.M. & El-Menhawey, W.H., 2003. Cluster analysis of recent benthic foraminifera from the northwestern Mediterranean coast of Egypt. *Revue de Micropaléontology*, 46 (2): 111-130.

Uchio, T., 1952. Foraminiferal assemblage from Hachijo Island, Tojkyo Prefecture, with description of some new genera and species. *Japanese Journal of Geology & Geography*, 22: 1-158.

Zenetos, A., Gofas, S., Verlaque, M., Cinar, M.E., Garcia Raso, J.E. *et al.,* 2010. Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part I. Spatial distribution. *Mediterranean Marine Science,* 11(2): 381-493.