

THE LIFE CYCLE OF THE SYMBIONT-BEARING LARGER FORAMINIFERA *AMPHISTEGINA LOBIFERA*, A NEW ARRIVAL ON THE ISRAELI SHELF

Limor Gruber¹, Ahuva Almogi-Labin²*, Dorit Sivan¹ and Barak Herut³

¹ Recanati Institute for Maritime Studies, Haifa University, Haifa 31905, Israel

² Geological Survey of Israel, Jerusalem 95501, Israel - almogi@gsi.gov.il

³ Israel Oceanographic & Limnological Research, Tel Shikmona, P.O.B. 8030 Haifa, Israel

Abstract

The SE Mediterranean, the warmest and the most oligotrophic region in the entire Mediterranean, was invaded lately by *Amphistegina lobifera*. This symbiont-bearing larger foraminifera proliferates along the Israeli coast mainly on rocky substrate. *A. lobifera* reproduces once a year, during summer (July-August), unlike its counterparts in the Gulf of Aqaba which reproduce twice a year (June and January). It therefore can survive the low winter temperatures of 15° -17° C of the eastern Mediterranean, but it fails to reproduce in the winter. *A. lobifera* is a major carbonate producer, with a contribution of about 200 g CaCO₃ m⁻² yr⁻¹ on rocky coasts of Israel.

Keywords : Foraminifera, Migrant Species, Eastern Mediterranean, Life Cycles.

Introduction

The opening of the Suez Canal 135 years ago opened the gates to a major faunal invasion from the Red Sea to the eastern Mediterranean. The widespread invasion is changing the biota on the Israeli shelf, in particular suppressing the native inhabitants on rocky environments. *Amphistegina lobifera* is the most common species among the symbiont-bearing larger foraminifera that invaded the southeastern Mediterranean [1, 2]. In this study, we investigate the population dynamics of *A. lobifera*, as an example of an invader species living on the edge of its environmental tolerance. The Mediterranean is one of the northernmost locations in the world where this low latitude shallow water species lives today.

A. lobifera was first recorded on the Israeli shelf during the late 1950's [3] occurring in rather low numbers (10%). Recently it was found that this species comprises the majority up to 90% of the rocky foraminiferal assemblage off Akhziv and Haifa, between ~10 and 30 m water depth [2].

Material and methods

The annual population dynamics of *A. lobifera* was studied off Tel Shikmona, Haifa, Israel in a rocky area densely covered by macroalgae. Sampling was carried out by scuba diving at ~1.5 m water depth, every 3-5 weeks from August 2003 to September 2004, in triplicate samples of intergrowing brown algae *Cystoseira* sp. and the red coralline *Jania rubens*. The abundance of the entire foraminiferal population was normalized against the total dry algal weight.

Results and discussion

Sea surface temperatures vary between 15 and 30° C, salinity between 38.5 and 40 permil, and nutrient concentrations are raised in winter but much lower in summer. *A. lobifera* is the most common larger foraminifera off Shikmona, occurring throughout the year.

summer is 2.2%, slowing during winter, at adult stage, to 0.3%. Full-sized specimens (up to 1.5mg) were recorded during fall and winter. *A. lobifera* is a major carbonate producing foraminifera, with a contribution of about 200 g CaCO₃ m⁻² yr⁻¹ on rocky coasts of Israel. In some samples it is the largest single contributor to carbonate production.

References

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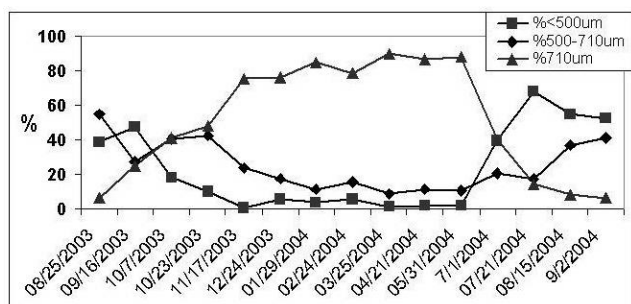


Fig. 1. Variations in relative abundance of *Amphistegina lobifera* population including juveniles <500 um, intermediate growth stage 500-710 um and adults >710 um, off Tel Shikmona, Haifa, Israel.

Its numbers vary considerably indicating patchy distribution with somewhat higher numbers in late summer/early fall and late winter/early spring (650 specimens/g dry algae) and low numbers during summer (100 specimens/g dry algae). The reproduction period is short and is restricted to July and August, as evident by the high percentages of juveniles (Fig. 1). Light intensity and water temperature seems to regulate its reproduction cycle in the eastern Mediterranean. Daily juvenile growth rate during