



## ***Amphistegina lobifera*, a larger symbiont-bearing foraminiferal migrant from the Red Sea, now dominates rocky coasts of the Israeli Mediterranean**

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The opening of the Suez Canal ~135 years ago opened the gates to a major faunal invasion from the Red Sea to the southeastern Mediterranean, the warmest and the most oligotrophic region in the entire Mediterranean. *Amphistegina lobifera* is the most common and successful species of symbiont-bearing larger foraminifera to take hold there. *A. lobifera* was first recorded on the Israeli shelf during the late 1950's in rather low numbers (10%). We here have investigated annual population dynamics of this species off Tel Shikmona, Haifa Bay, Israel, in a rocky area densely covered by macroalgae. We have found that *A. lobifera* is an invader that lives on the edge of its environmental tolerance, but is changing the rocky environments in an irreversible manner.

Sampling was carried out every 3-5 weeks from August 2003 to September 2004. Sea surface temperatures vary between 14.88 and 30.3 °C, salinity between 38.5 and 40 psu, and nutrient concentrations are raised in winter but much lower in summer. *A. lobifera* reproduces asexually once a year during peak summer season (July-August), unlike its counterparts in the Gulf of Aqaba, Red Sea which reproduce twice a year

(June and January). During the summer reproductive season the population of *A. lobifera* is composed mainly of juveniles in low, constant numbers,  $\sim 150$  specimens /g dry algae. As the yearly cycle progresses, the numerical abundance of the population can significantly fluctuate, from 50/g to 700 specimens /g dry algae, and is almost totally composed of adult individuals. This unique numerical abundance of stable, low numbers of juveniles during summer alternating with highly fluctuating numbers of adults during the rest of the year may reflect sensitivity of this species living in shallow water to high light intensities during the summer. It can survive the low winter temperatures of 15 -17 °C of the eastern Mediterranean, but fails to reproduce in the winter.

*A. lobifera*, known to be a major carbonate producing foraminifera, with a contribution of at least  $260 \text{ g CaCO}_3 \text{ m}^{-2} \text{ yr}^{-1}$ , today forms up to 90% of the rocky foraminiferal assemblage off northern Israel, between  $\sim 10$  and 30 m water depth. The invasion and subsequent dominance of this species, suppressing the native inhabitants of these rocky environments, is a prime example of how faunal migration from the Red Sea is changing the biota on the Israeli shelf in a major way.