

# Case Study

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1). Unique Geography

2). Mnemiopsis leidyi

3) Beroe odata

4) Harmful Algal Blooms

# Mnemiopsis leidyi



# Mnemiopsis leidyi





## Biology

- 1). Their body contains 97% water. Maximum body length of roughly 7- 12 centimetres (3- 5 in) and a diameter of 2.5 centimetres (1 in).
- 2). Able to occupy and establish itself in any temperate or subtropical productive or eutrophicated coastal area, semi-closed seas or estuaries where salinity is not less than 4‰ and temperature not higher than 28°C.
- 3). Capable of self-fertilization; therefore, a single adult individual may give birth to a viable posterity before they reach the size of an adult individual.
- 4). Individuals began to produce eggs in 13 days after hatching when they reached a mean length of 26 mm; their maximal fertility - 6,000 to 12,000+ eggs.
- 5). Eggs are spheres are 0.3--0.4 mm in diameter. At a temperature of 22-23°C, approximately a day later, a larva emerges from the egg.
- 6). They do not sting.



## Black Sea

### 1). Nutrification by Drainage

Diatoms to Dinoflagellates - 20% to 60%

Blooms of Jellyfish.

Anoxia

### 2). Affect higher organisms

Spiral effects

Filter feeders 1sq km – 15- 20 cu metres

### 3). Overfishing 26 Commercial fish reduced to 5

Mackerel (Uskumru) reduced – eradicated by 1970.

### 4). Jellyfish bloom – 600 per square meter

### 5). Other reasons

Anchovy Collapse – more food for jellyfish

Less food for other fish

No predators

# Invasions



- 1). North American Species
- 2) First discovered in the northwestern Black Sea in November 1982
  - introduced with ballast waters from the northern American coastal area.
- 3). Autumn of 1988 it was found everywhere in the Black Sea
- 4). Sea of Azov appears in 1989
- 5). 1989-1990 it spread to the Sea of Marmara
- 6). 1990 -1996 Aegean Sea
- 7). Syrian coastal waters in 1993
- 8). 2005 Gulf of Trieste (Adriatic Sea)
- 9). 2006 Kiel Bay of the Baltic Sea and in the North Sea



# Beroe ovata



16 cm long



# Beroe ovata



- Best candidate to control *M. leidyi* population size
  - Shown in the Black Sea by a natural experiment.
- *B. ovata* is only able to eat planktivorous jellyfish. Highly specific in its feeding, so that even its larval stage feeds on *M. leidyi*
- It controls its own population size by stopping reproduction in the absence of available prey; large adult individuals are eliminated and others stay near the bottom without movements until prey is available.
- Its reproductive rate and fecundity are almost as great as that of *M. leidyi*, so that its population can grow at similar rates to its prey.
- Can eat as much as four times its body weight each day



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