



# SESAME TRAINING WORKSHOP "METHODS ON PLANKTON PRODUCTION"

Anavyssos, 2-7 July 2007



# PELAGIC FOOD WEB

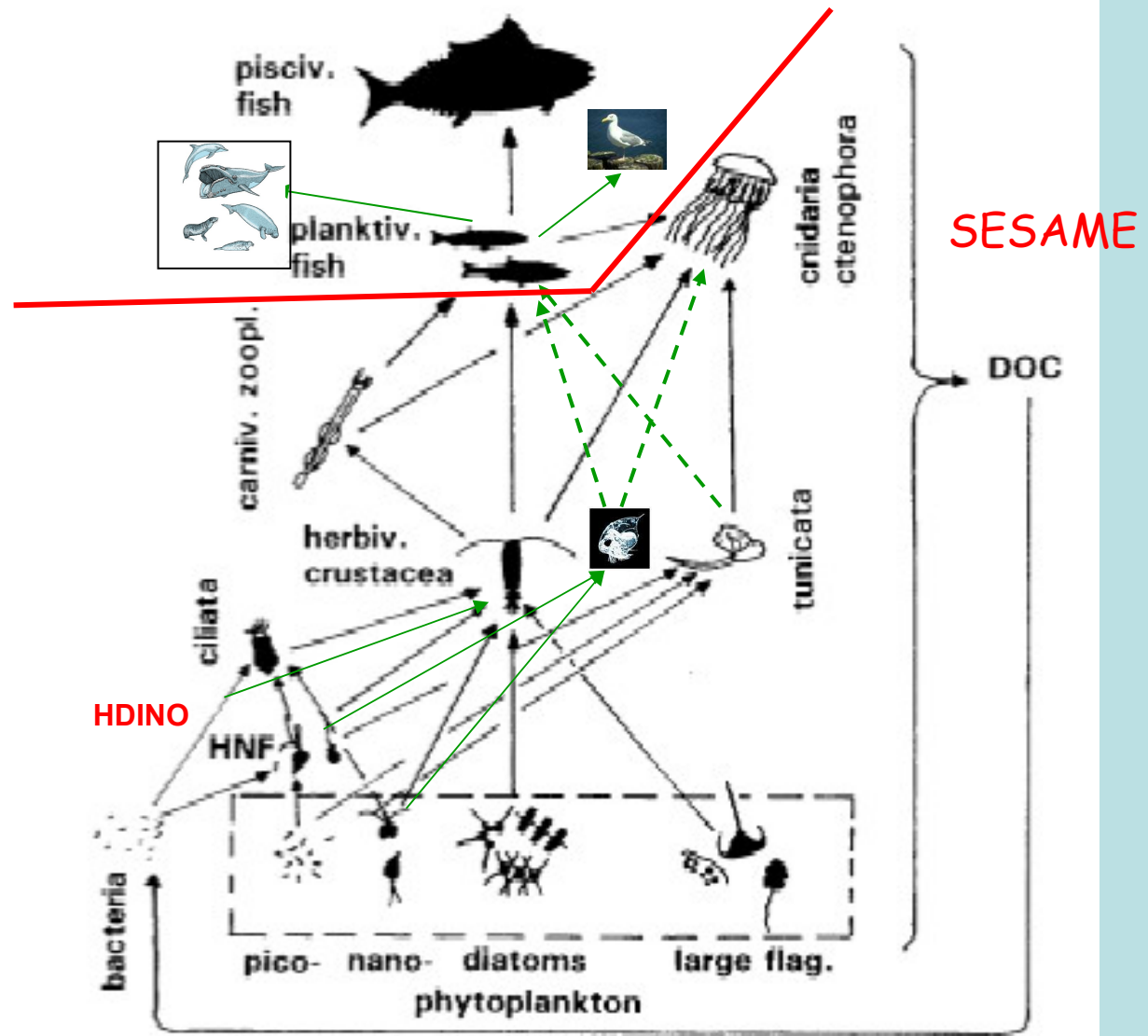


Figure 1. Generalised pelagic food web.

Sommer et al., 2002



## WP-2 and WP-3 cruises in the Mediterranean and Black seas

### Biological parameters

#### •Plankton biomass:

autotrophs per size class,  
picoheterotrophs (bacteria),  
nano- and micro-heterotrophs (microzooplankton),  
mesozooplankton

#### •Plankton production:

primary per size class  
bacterial  
mesozooplankton

#### •Plankton vital rates:

grazing rates of mesozooplankton on autotrophs  
and heterotrophs  
fecal pellets production rates  
respiration rates of phyto-, mesozoo-  
excretion rates of mesozoo-  
growth rates of phyto, microzoo-, mesozoo-



Need for common methodology

Based on recent literature

e.g. *ICES Zooplankton Methodology Manual*,  
(Harris et al., 2004)

Experience of collaboration among mediterranean institutes e.g.  
within the mediterranean targeted projects, MATER 1997-1999

Training workshop

Laboratory and field experiments for the estimation of

- plankton production
- Phytoplankton diversity and cultures
- Microzooplankton communities
- mesozooplankton grazing rates
- fecal pellets production rate



Monday Lectures + Experiments

Tuesday Lectures + Experiments

**Wednesday**

**Cruise in the Saronikos gulf on board of R/V AEGAEO**

- Departure at 7.50 from MINAVRA Hotel (with bus)
- Boarding at 8.50
- Return at ~ 23.00 in the port, return at the hotel by bus

Thursday Experiments

Friday Elaboration of data

In groups

Rooms: Amfitriti (phyto)

Kirki (mesozoo)

Laborat. Bact +microzoo



Use of obtained data for the estimation of carbon budget through the pelagic food web within a given water column e.g. 0-100m

Simplified food web-microbial+classic

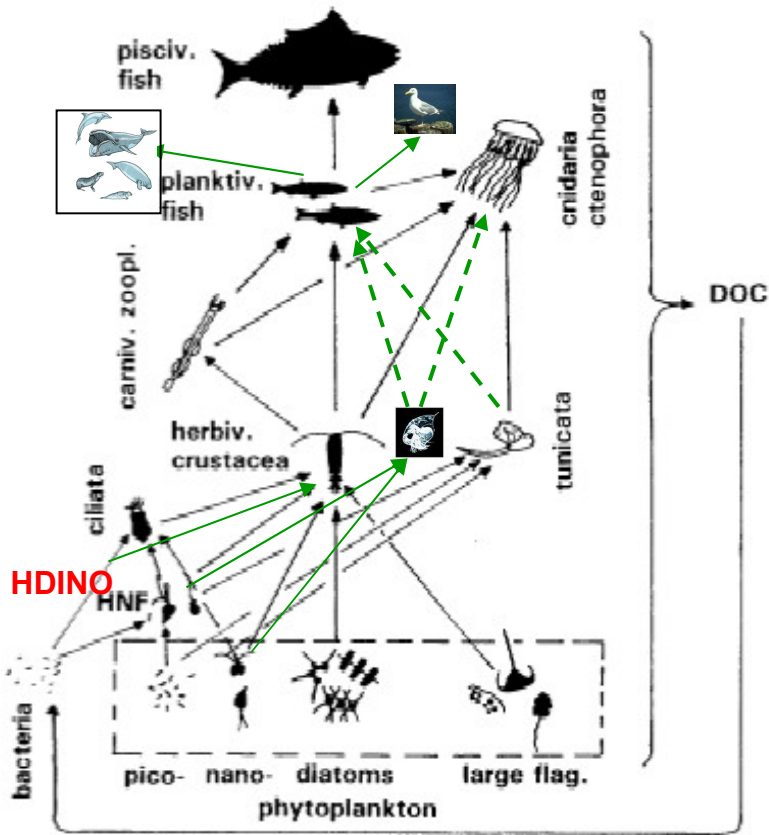
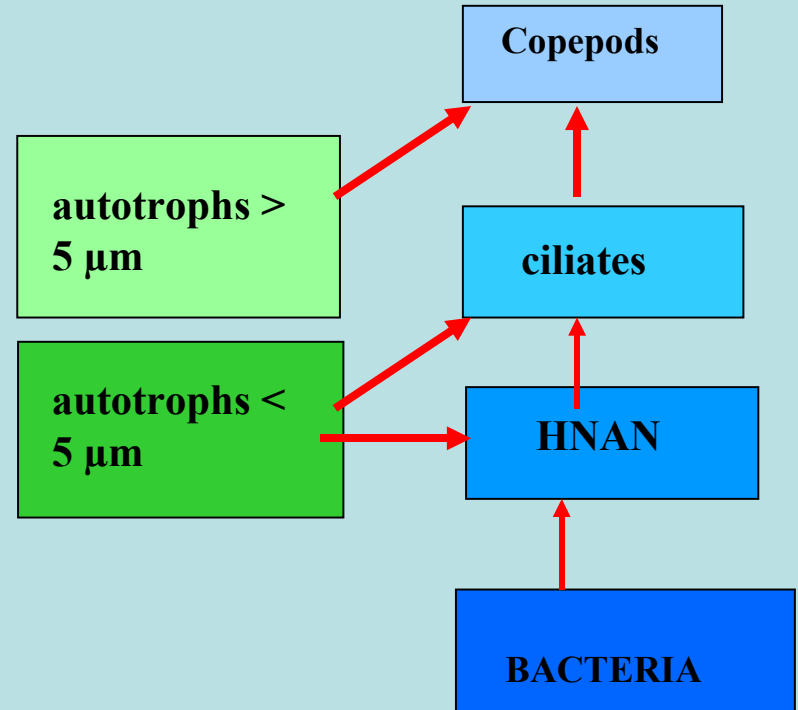
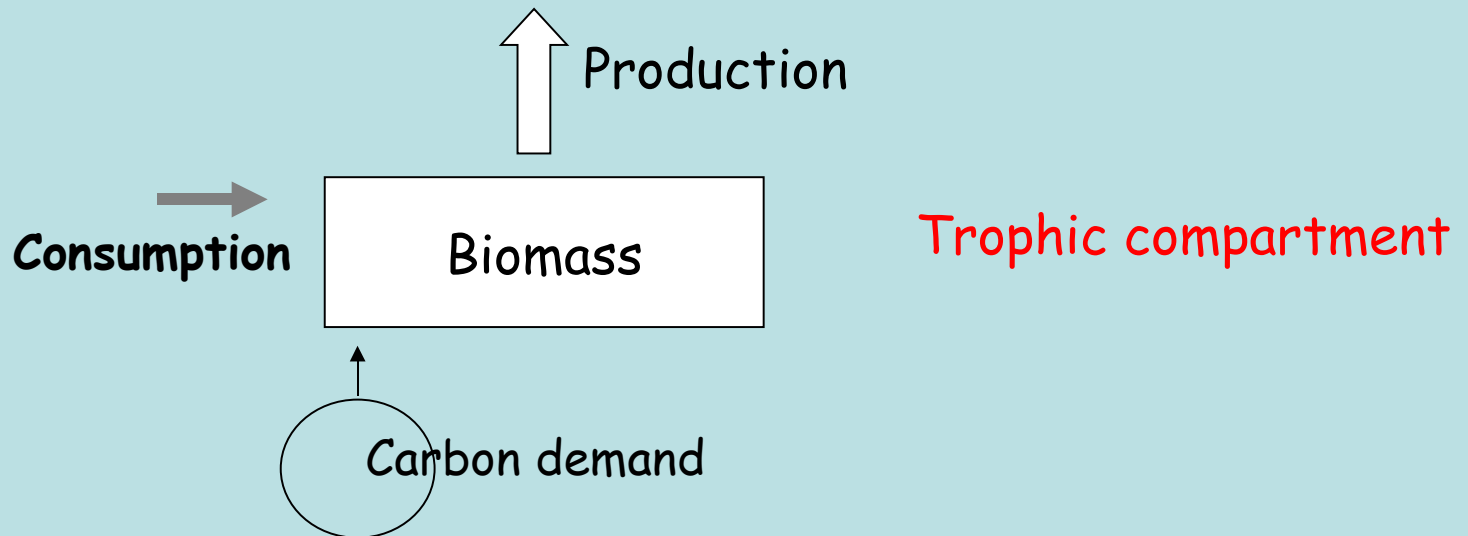


Figure 1. Generalised pelagic food web.





Parameters to be measured and/or estimated for each trophic compartment

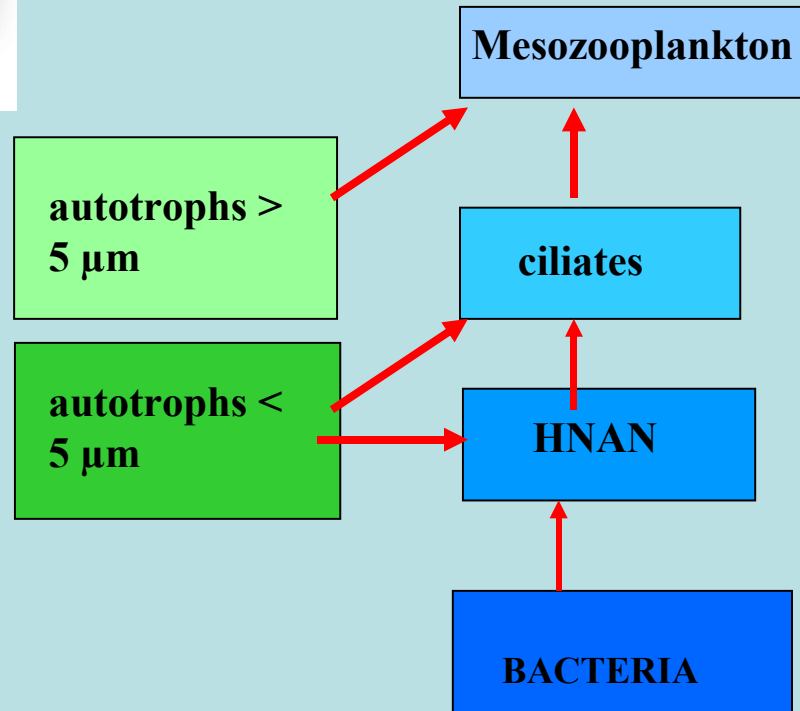


Biomass in  $\text{mg C m}^{-2}$

Production, Carbon demand and Consumption in  $\text{mg C m}^{-2} \text{ d}^{-1}$



Biomass is measured for all compartments



**Mesozooplankton:**  
Carbon measurements  
on dried material

**HNAN and ciliates:**  
abundance, application  
Biovolume-carbon  
conversion factors (lit)

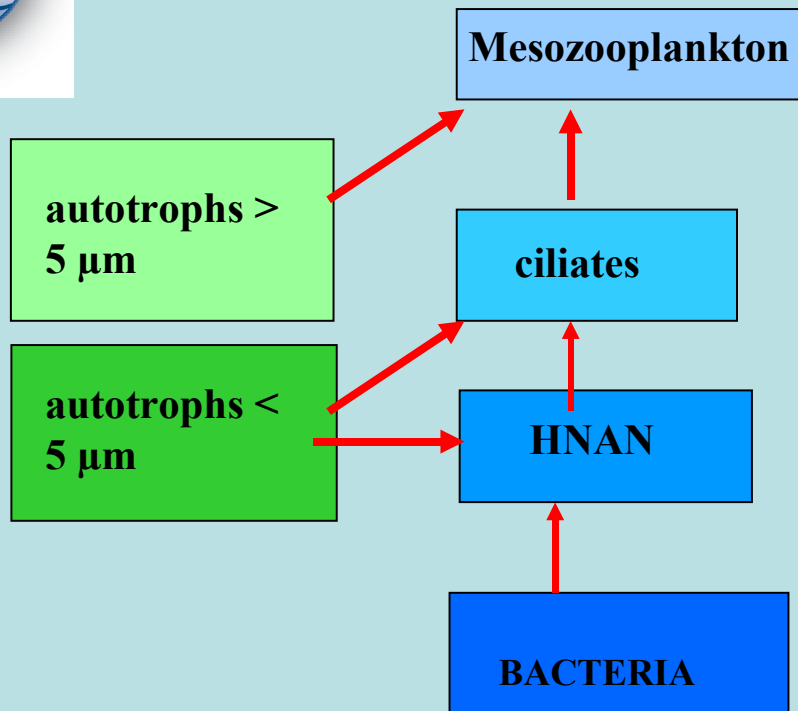
**Bacteria:** abundance data  
converted into C  
(conversion factor)

**Autotrophs by size classes:**

- size fractions of chl<sub>a</sub>, conversion of chl<sub>a</sub> values to C values based on C/Chl<sub>a</sub> ratios (liter)
- abundance and biovolume of cells per species, conversion of biovolume to C (lit)



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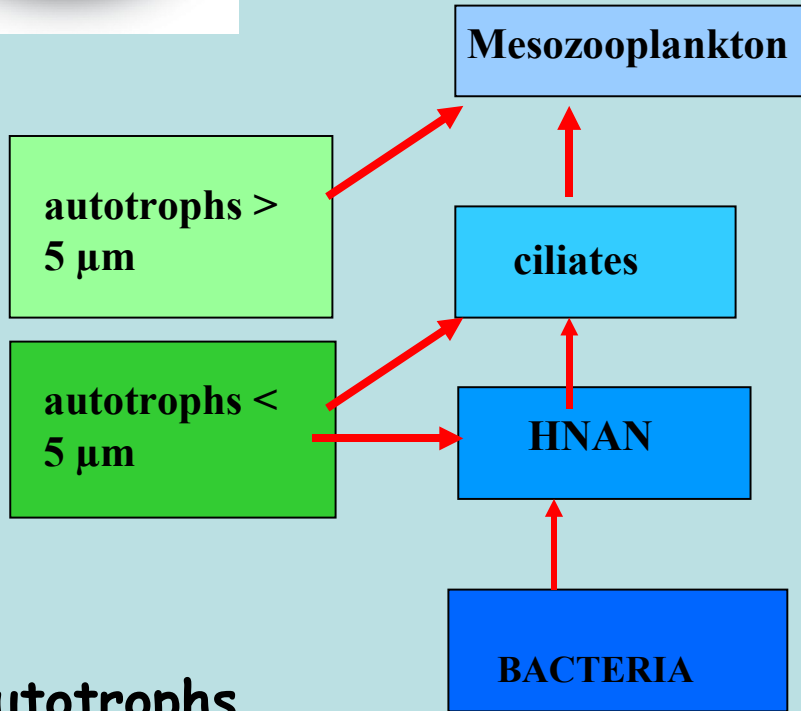
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## Production



**Autotrophs**  
measured by size  
fractions of  
primary production

## Mesozooplankton:

- estimation of copepod production by measurements of copepod egg production.
- **Estimation of cladocerans...?**
- **Estimation of appendicularians ?**

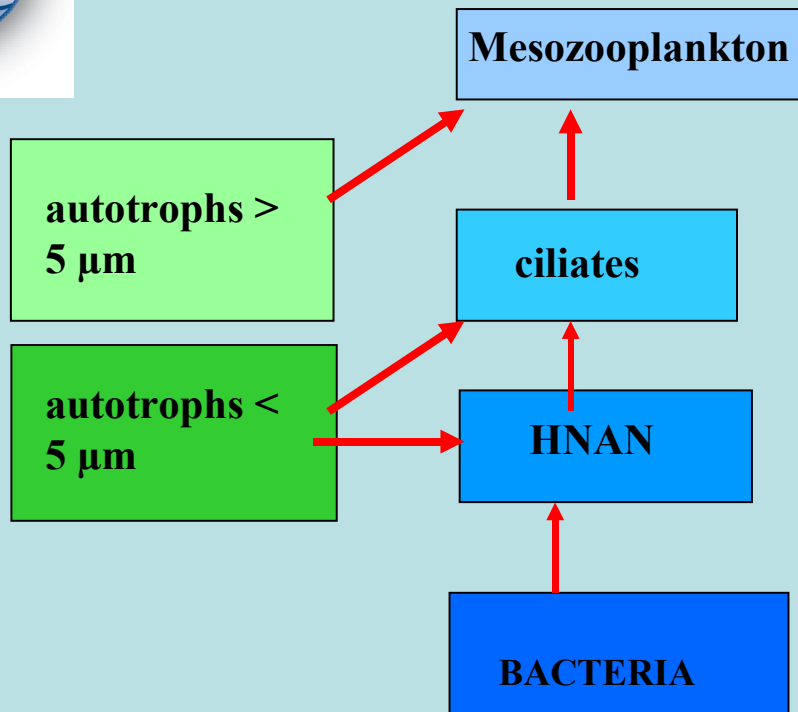
**Ciliates** : calculated as biomass  
X growth rate (0.55 day<sup>-1</sup>)

**HNAN**: calculated as biomass  
X growth rate (lit)

**Bacteria: Bacteria:**  
measured in situ



## Carbon demand



### Mesozooplankton:

Copepods: estimation from production rates by assuming one-third gross growth efficiency

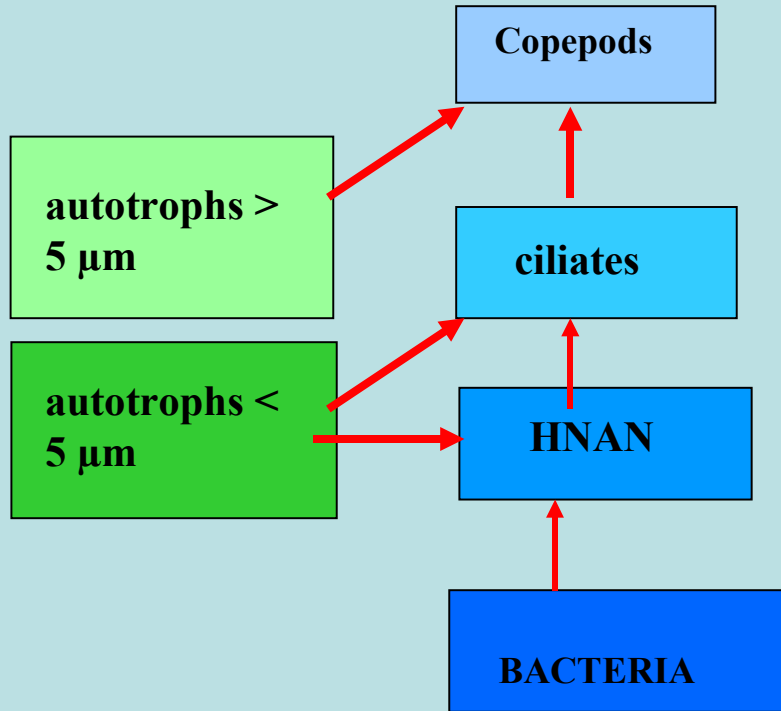
### HNAN and ciliates:

Calculation assuming a growth yield of 33%



## Consumption

- I) Of autotrophs by mesozooplankton
  - a) gut content
  - b) bottle experiments



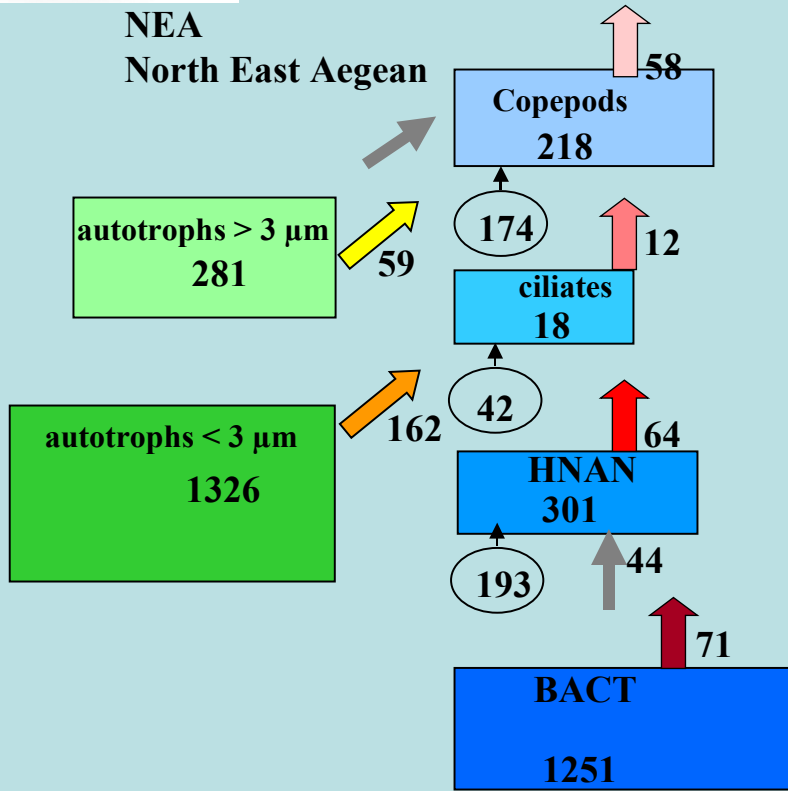
- II) Of HNAN and ciliates by mesozooplankton: bottle experiments

- III) Of Bacteria by HNAN  
measurements of ingestion on  
fluorescent-labelled minicells

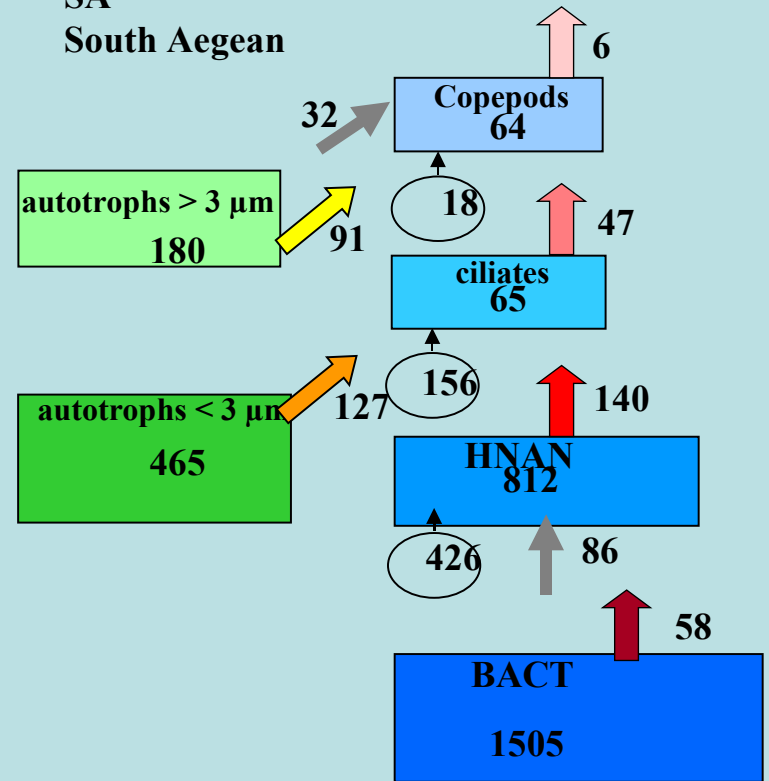


SEPTEMBER 97

NEA  
North East Aegean



SA  
South Aegean



H.C.M.R

