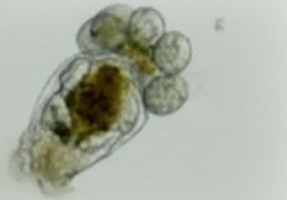
Lab practical in population ecology (EEE330)

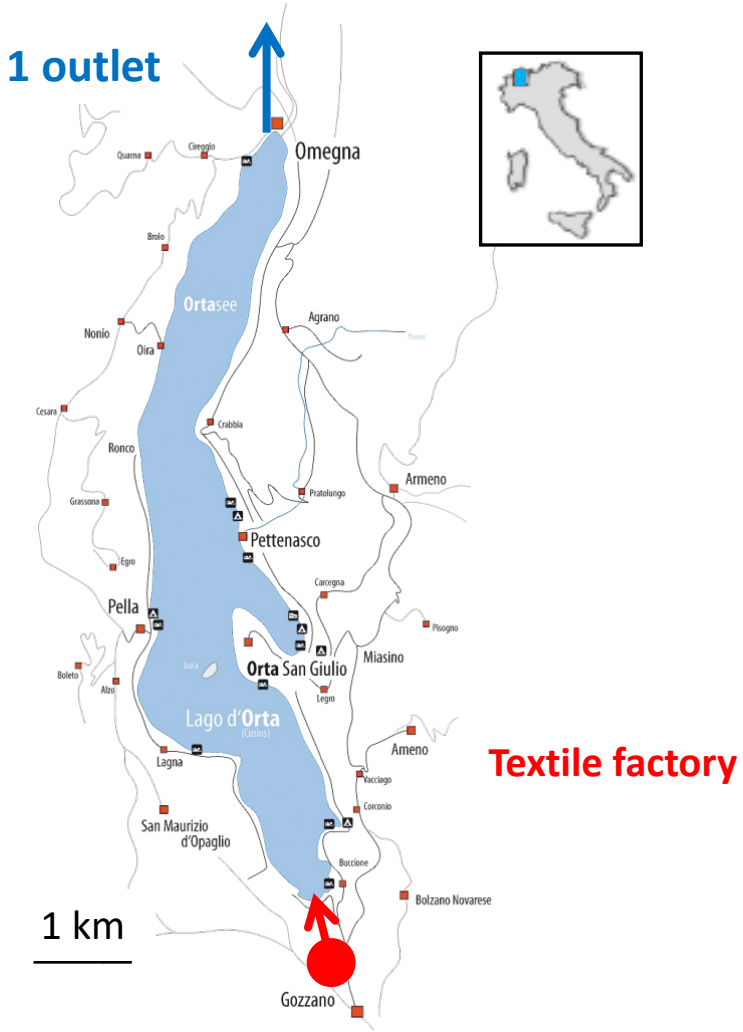
1. Lake Orta history

2. Rotifer life cycle

3. Rotifer experiment

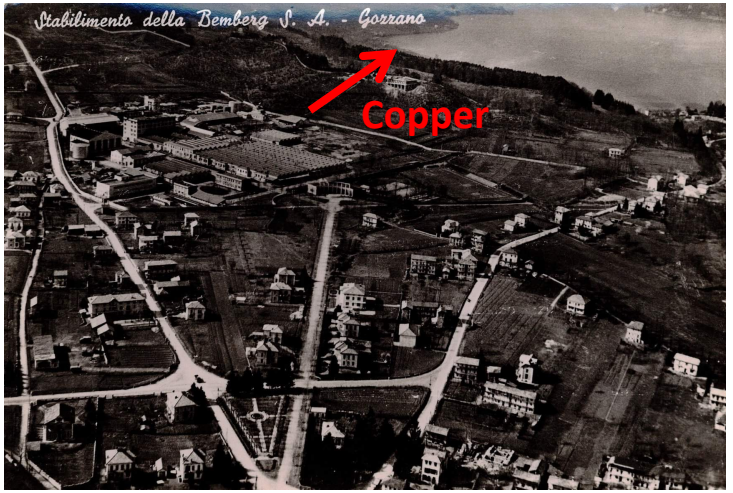
Brachionus calyciflorus



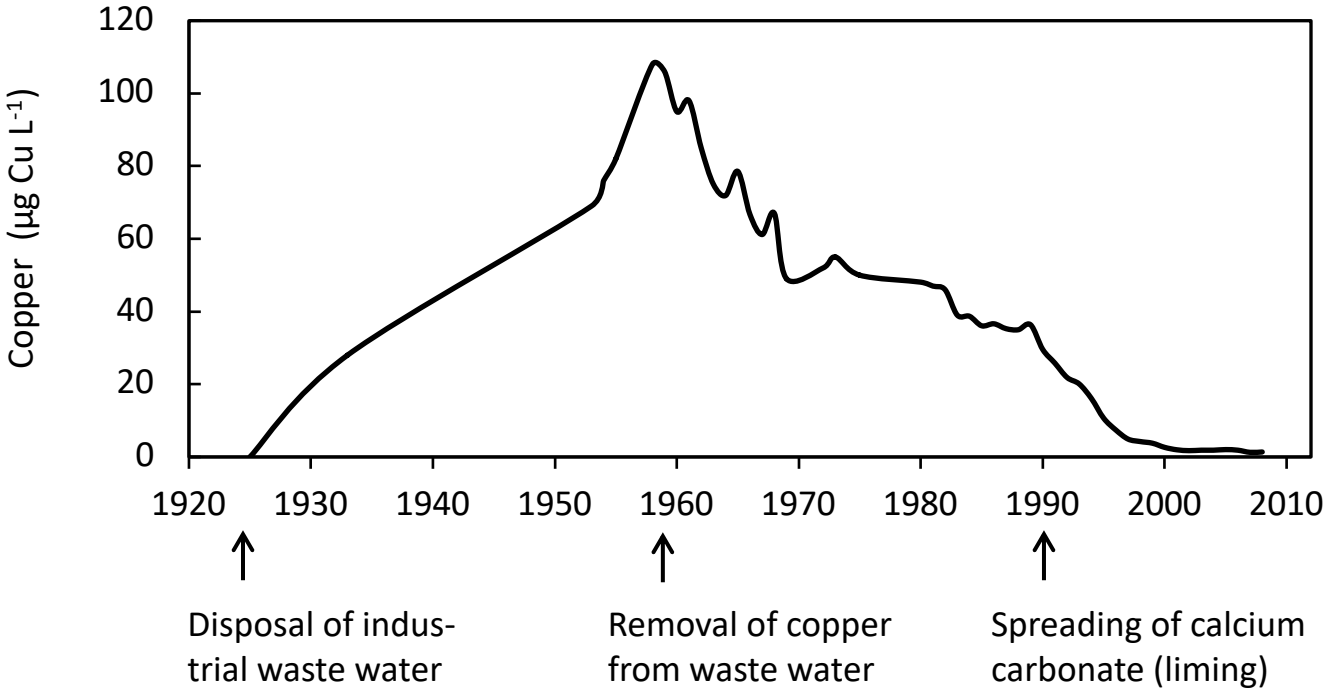


Textile factory





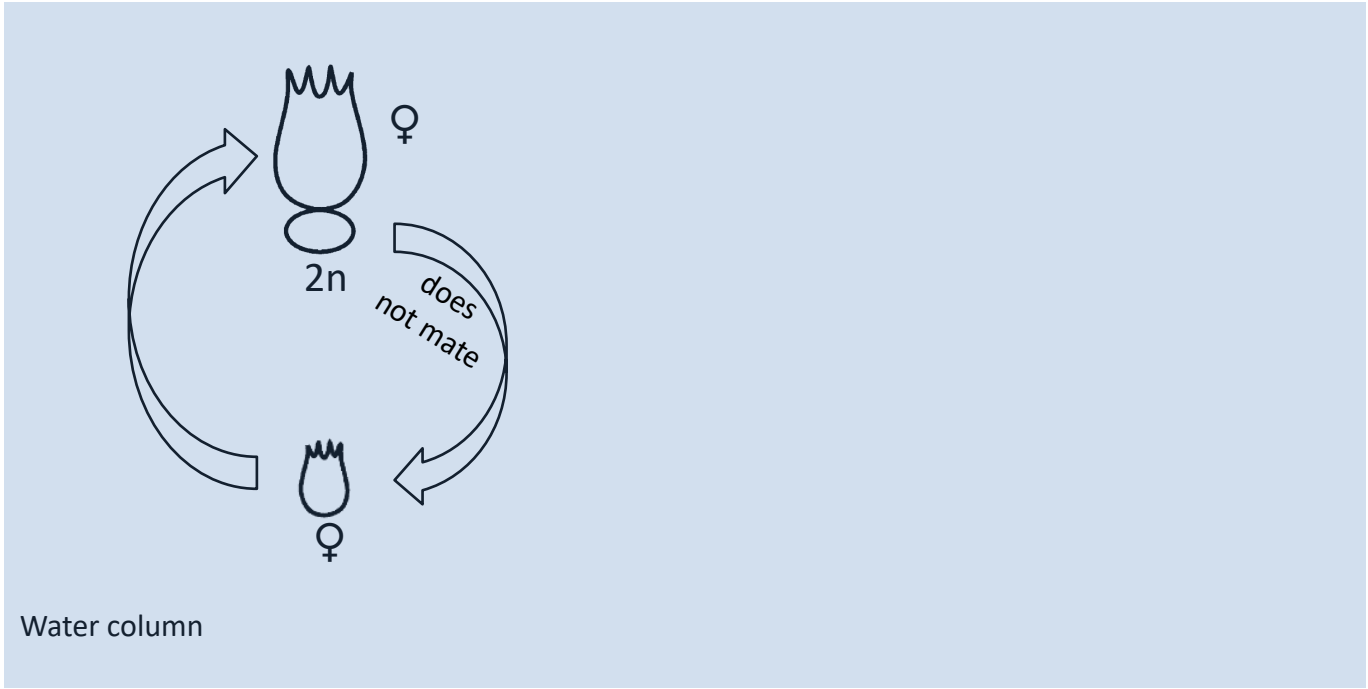
Pollution profile



Lake Orta video

Brachionus life cycle

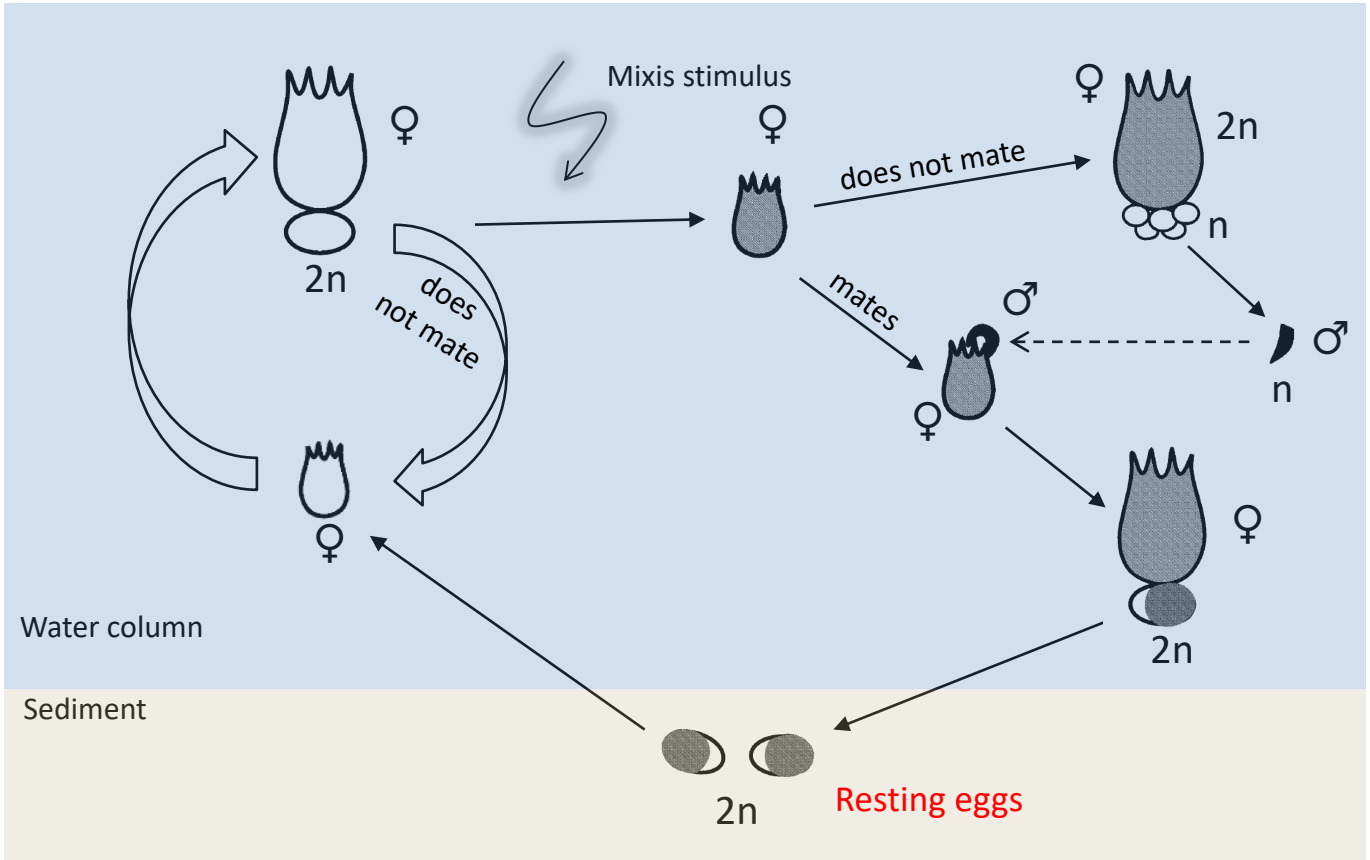
Amictic (= asexual) reproduction



Brachionus life cycle

Amictic (= asexual) reproduction

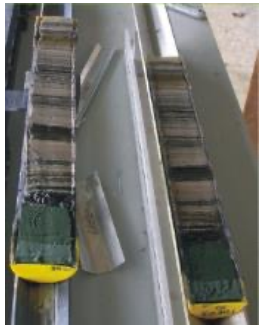
Mictic (= sexual) reproduction



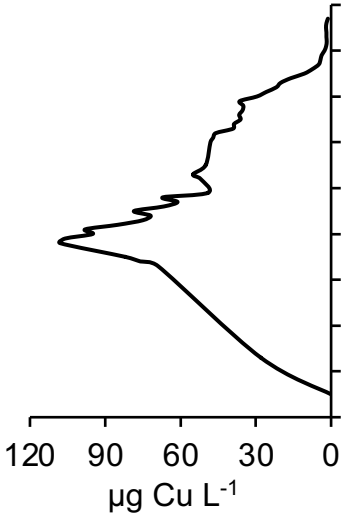
Resting egg extraction from sediment

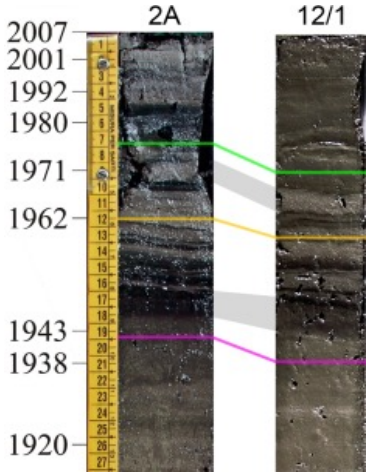






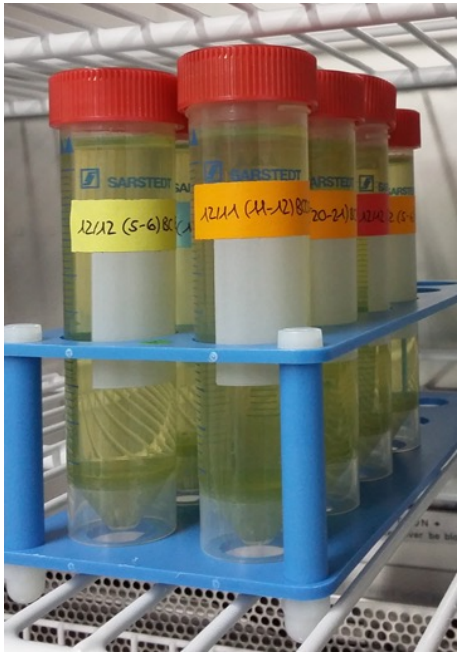








Rotifer & algal cultures



Brachionus calyciflorus

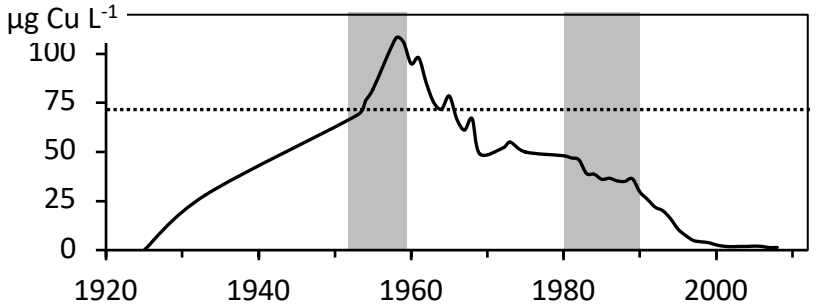


Chlorella vulgaris

Experiment

Culturing conditions:

- 8 mL, 20 °C, darkness
- 1 million algae per mL, renewed daily



Starting population: 8 juveniles

Population *µg Cu L^{-1}*	**1950s**	**1980s**	**USA**
0	6-8 reps	6-8 reps	6-8 reps
50	6-8 reps	6-8 reps	6-8 reps

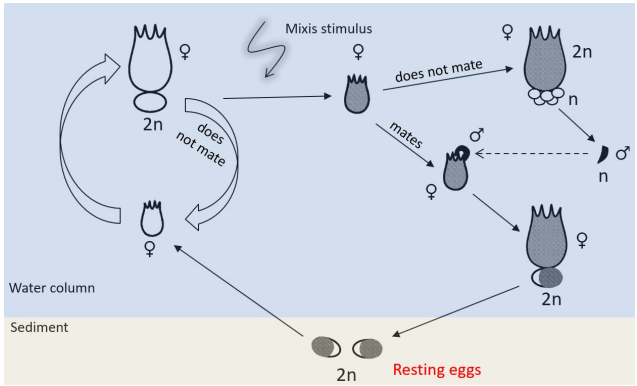
Starting population: 6 amictic adults

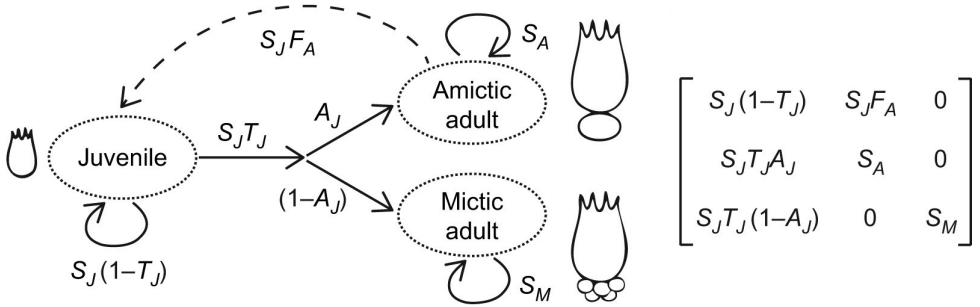
Population *µg Cu L^{-1}*	**1950s**	**1980s**	**USA**
0	6-8 reps	6-8 reps	6-8 reps
50	6-8 reps	6-8 reps	6-8 reps

Data collection

Tuesday → **Wednesday** → **Thursday**

Document population growth: count live and dead individuals <u>per life stage</u>





$$\begin{bmatrix} S_J(1-T_J) & S_J F_A & 0 \\ S_J T_J A_J & S_A & 0 \\ S_J T_J (1-A_J) & 0 & S_M \end{bmatrix}$$

Data collection

Tuesday → **Wednesday** → **Thursday**

Document population growth: count live and dead individuals per life stage

Research questions

- How do survival, maturation, and fecundity respond to copper pollution?
- How do these individual-level responses affect population growth?
- Do the populations (1950s, 1980s, USA) respond differently?
- Other?

Amictic female
(with female eggs)



Juvenile



Mictic female
(with male eggs)



Mictic female
(with resting egg)



Experimental procedures

- Copper concentrations: B, C
- Populations: R, O, Y
- Starting populations: J, A
- Replicates: 1, 2, 3, etc.

➔ Culture-tube ID: for example, **B-R-J-1**





Day 1 (Tuesday): Start of experiment

1. Per student, randomly select 4 culture tubes and label them with your name.
2. To each tube, add 8 mL of the indicated medium: B or C.
3. To each tube with a **blue cap** and the letter J, add 8 juveniles from the indicated population: R, O or Y (rinse pipette with water before switching to a new population).
4. To each tube with a **red cap** and the letter A, add 6 amictic adults from the indicated population: R, O, or Y (rinse pipette with water before switching to a new population).

The Excel file for entering your data

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Copper** (B or C)	**Population** (R, O, or Y)	**Start** (J or A)	**Replicate** (1, 2, 3 etc.)	**Day** (1, 2, or 3)	**Live juveniles**	**Live amictic adults**	**Live mictic adults**	**Dead juveniles**	**Dead amictic adults**	**Dead mictic adults**	**Comments**
2					1			0	0	0	0	To tubes with blue caps and the letter J, **add 8 juveniles (J)**
3					1			0	0	0	0	To tubes with red caps and the letter A, **add 6 amictic adults (A)**
4					1			0	0	0	0	
5					1			0	0	0	0	
6					2							
7					2							
8					2							
9					2							
10					3							
11					3							
12					3							
13					3							
14												