

Asteromonas gracilis a multipurpose algal “tool”

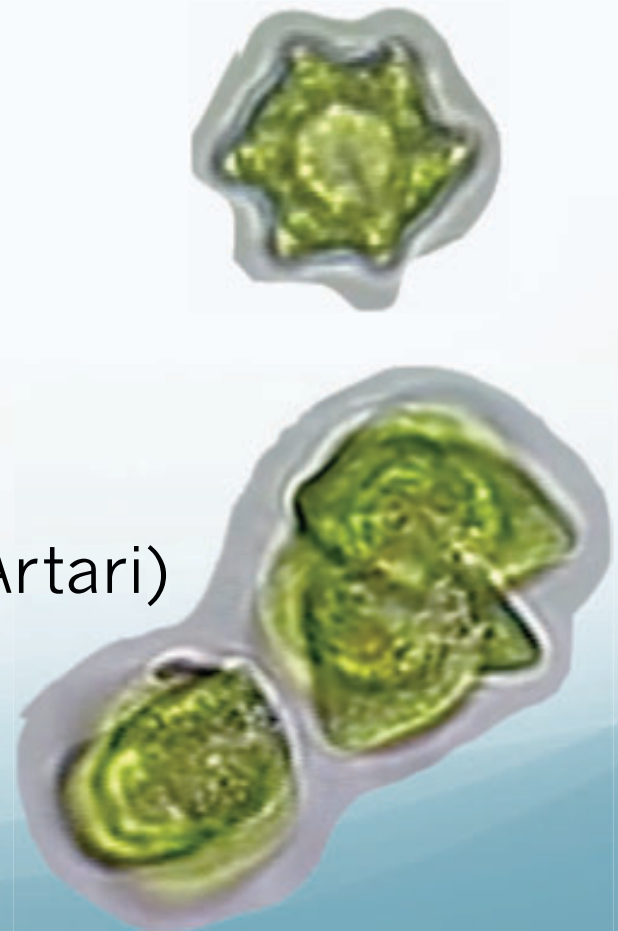


“Who is who” of *Asteromonas gracilis*

**An extremely halotolerant green wall-less microalga
with an appealing appearance**

Kingdom: Protista
Phylum: Chlorophyta
Class: Chlorophyceae
Order: Chlamydomonadales
Family: Asteromonadaceae
Genus: *Asteromonas*
Species: *Asteromonas gracilis* (Artari)

Size range: 18 – 25 m

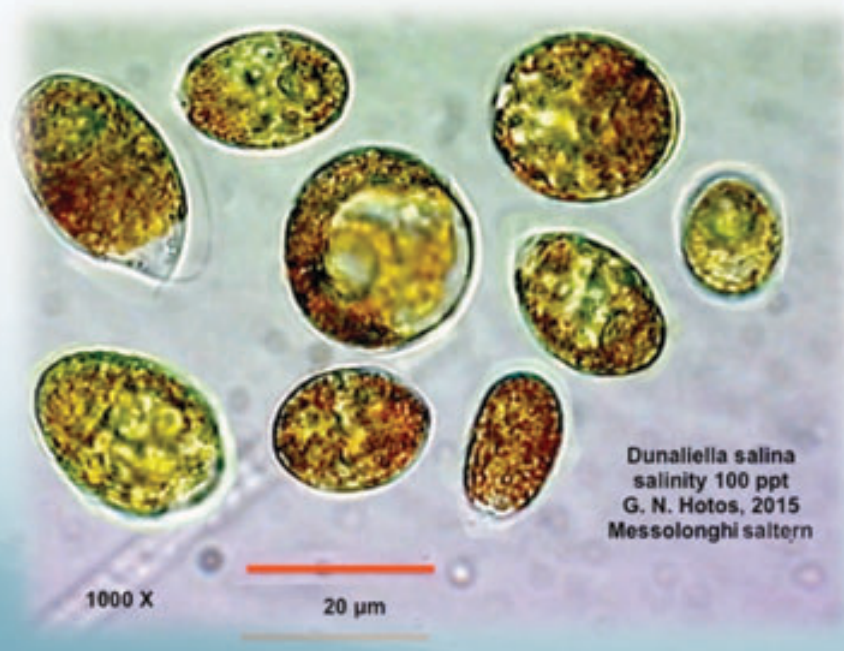


“Three of a kind”

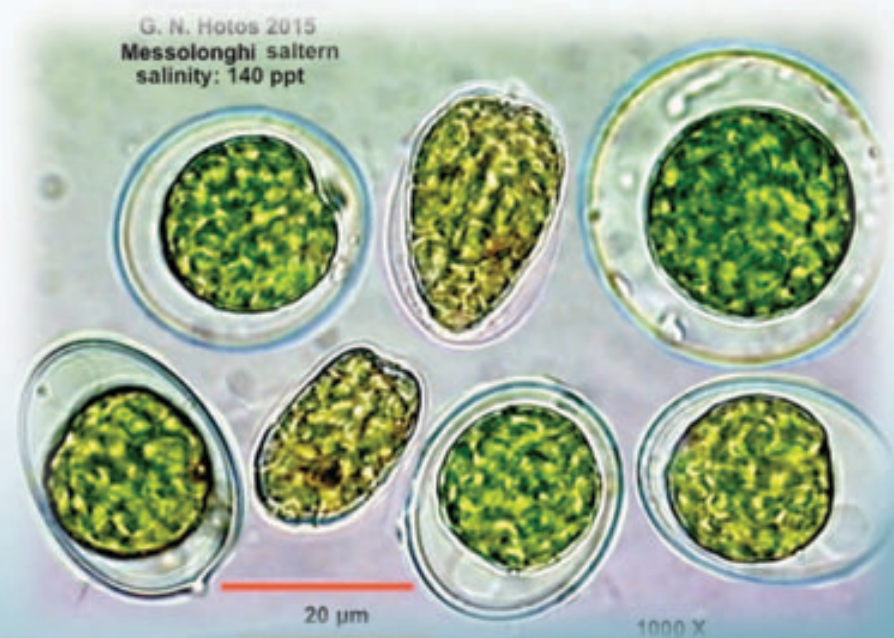
Asteromonas-Dunaliella-Tetraselmis

- In the salterns ponds thrive the three halotolerant green microalgae, *Asteromonas gracilis*, *Dunaliella salina*, *Tetraselmis marina*

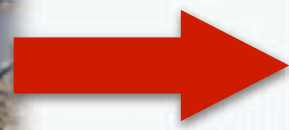
Dunaliella salina



Tetraselmis marina

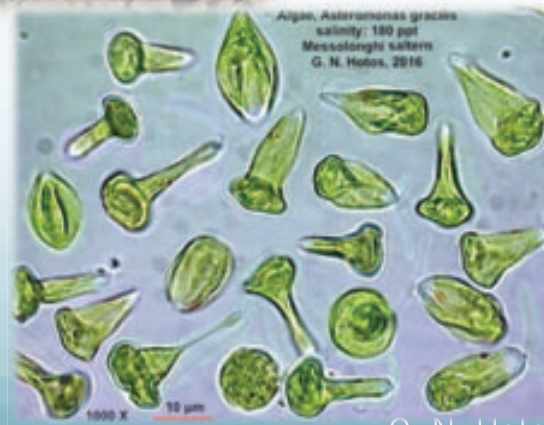


A. gracilis is found in extreme salinity (tolerates 25-300 ppt)

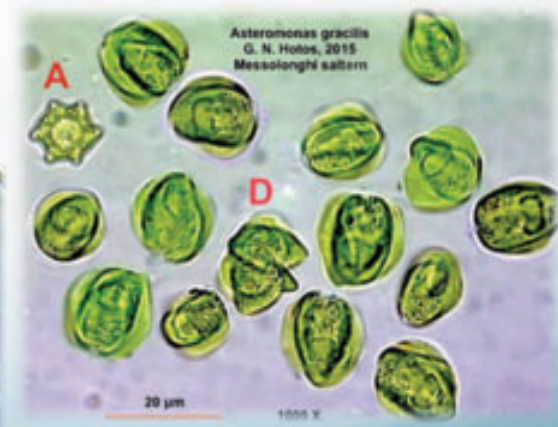


Asteromonas gracilis, forms
G. N. Hotos, 2015

Exhibiting the most amazing polymorphism among microalgae



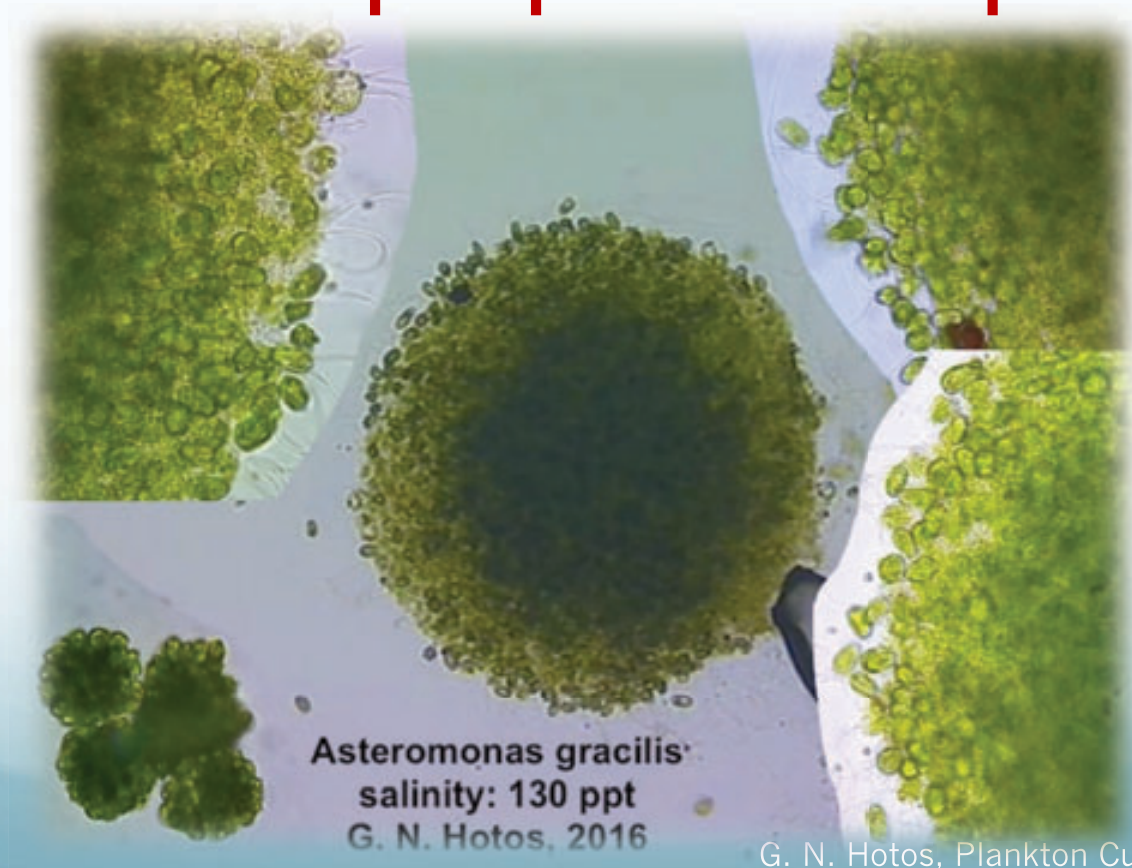
Algae, *Asteromonas gracilis*
salinity: 190 ppt
Messolonghi salttern
G. N. Hotos, 2015



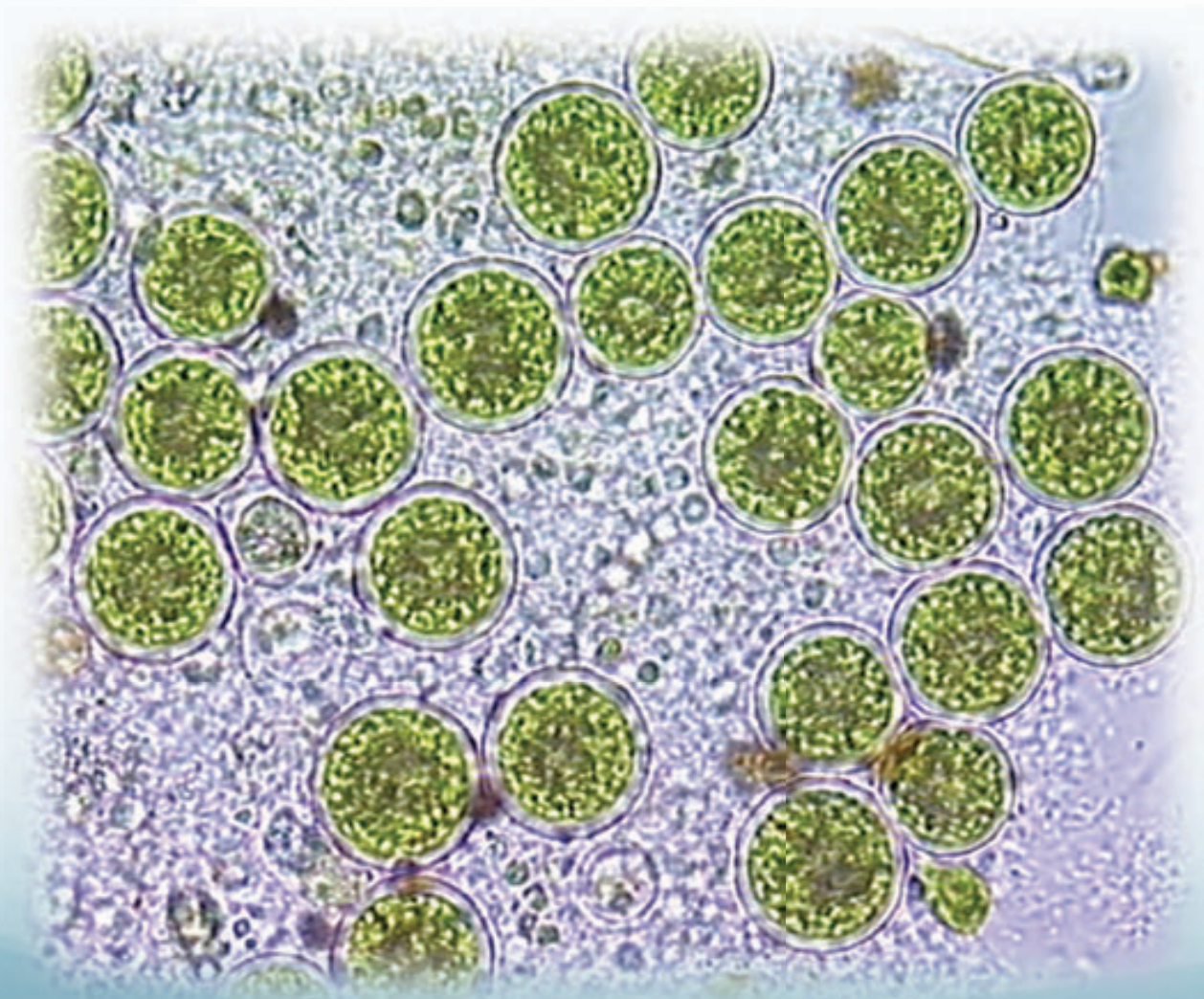
Asteromonas gracilis
G. N. Hotos, 2015
Messolonghi salttern

Survival strategies of *Asteromonas gracilis*

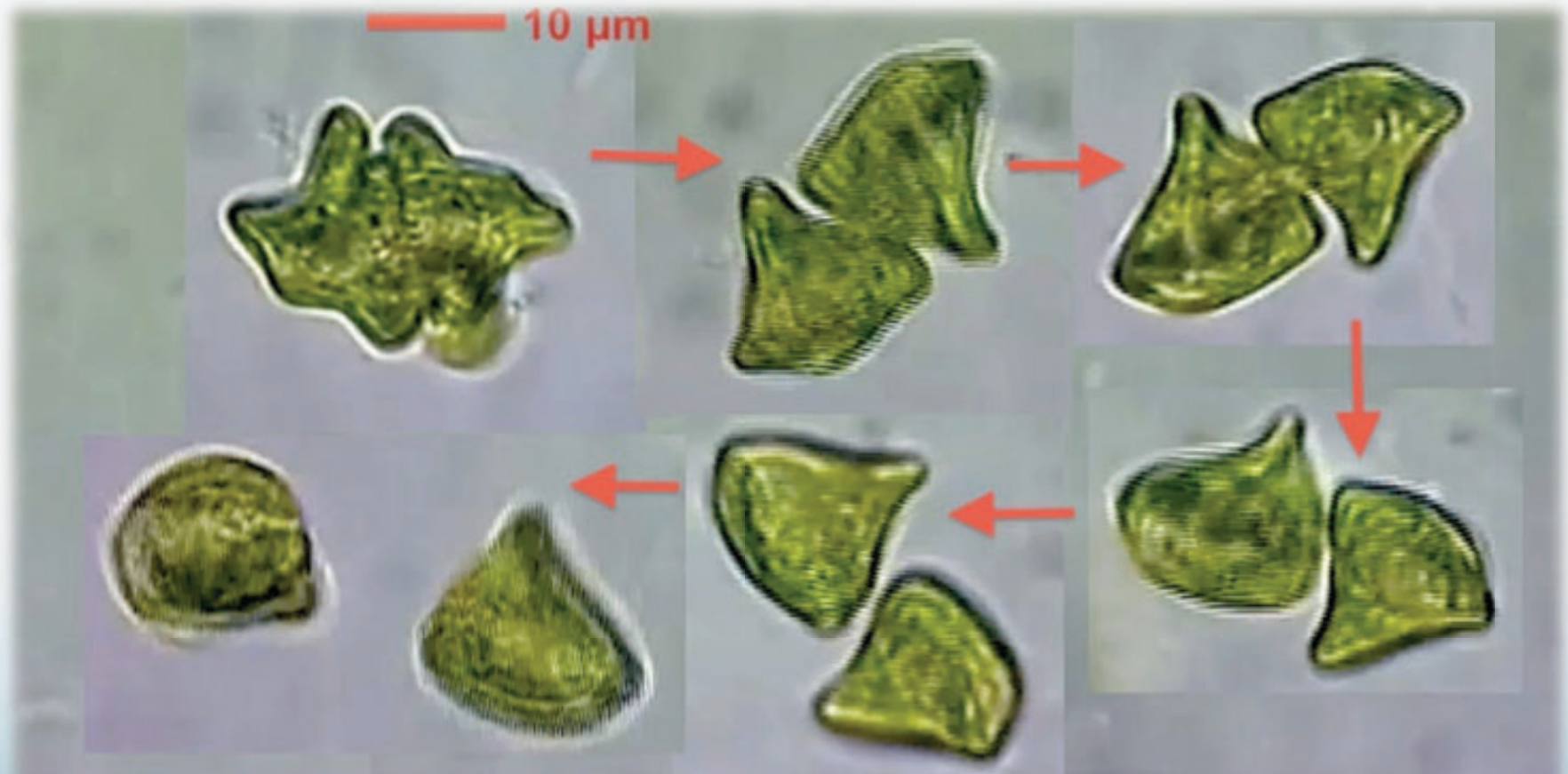
**When its living medium worsens,
e.g. depletion of nutrients,
it sum up in peculiar lumps.**



**or, transforms into cysts
that remain viable for months or years**



and when nutrients are restored, it
“wakes up” and multiplies fast



Asteromonas gracilis, salinity 13%, G. N. Hotos 2016

CULTURE CONDITIONS

Can be grown easily needing:

- A medium amount of light (~2000 lux or more)
- No vitamins
- Moderate aeration and in small volumes none
- Salinity from 25 ppt to 300 ppt
- Temperature from 10 to 35 °C
- Practically unaffected in a wide pH range (7-9)
- With a very short lag phase
- With a very long healthy stationary phase
- Can be kept in moist salt for years

“The problem of **monoculture**”

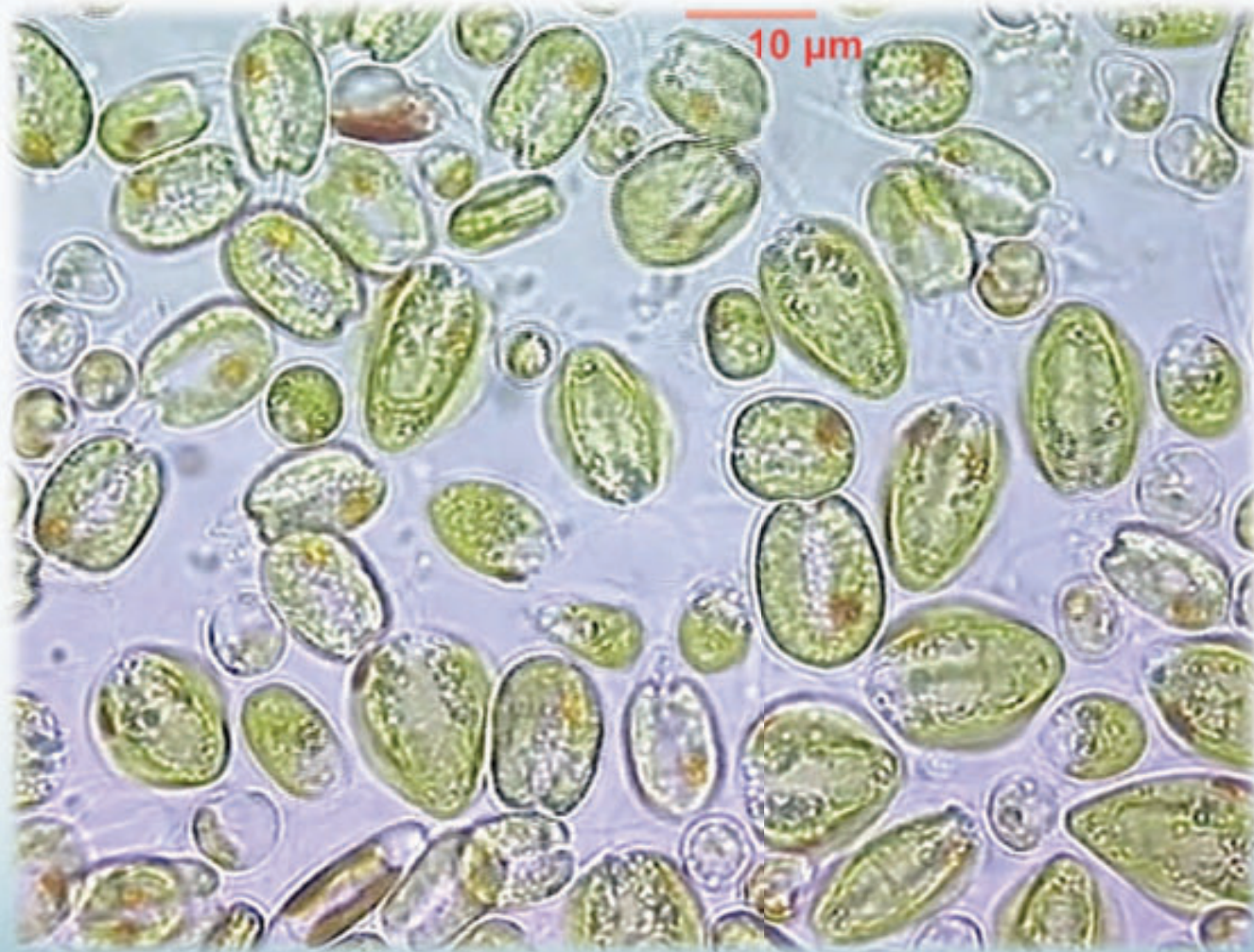
- When *Asteromonas* is mixed with other species in a culture vessel e.g. *Rhodomonas salina*, *Tetraselmis suecica*, *Isochrysis galbana* and *Dunaliella salina*



All begin normally at 30 ppt salinity



**But as salinity is raised gradually
above 80 ppt ...**



All other species except *Asteromonas* (and *Dunaliella*) start suffering

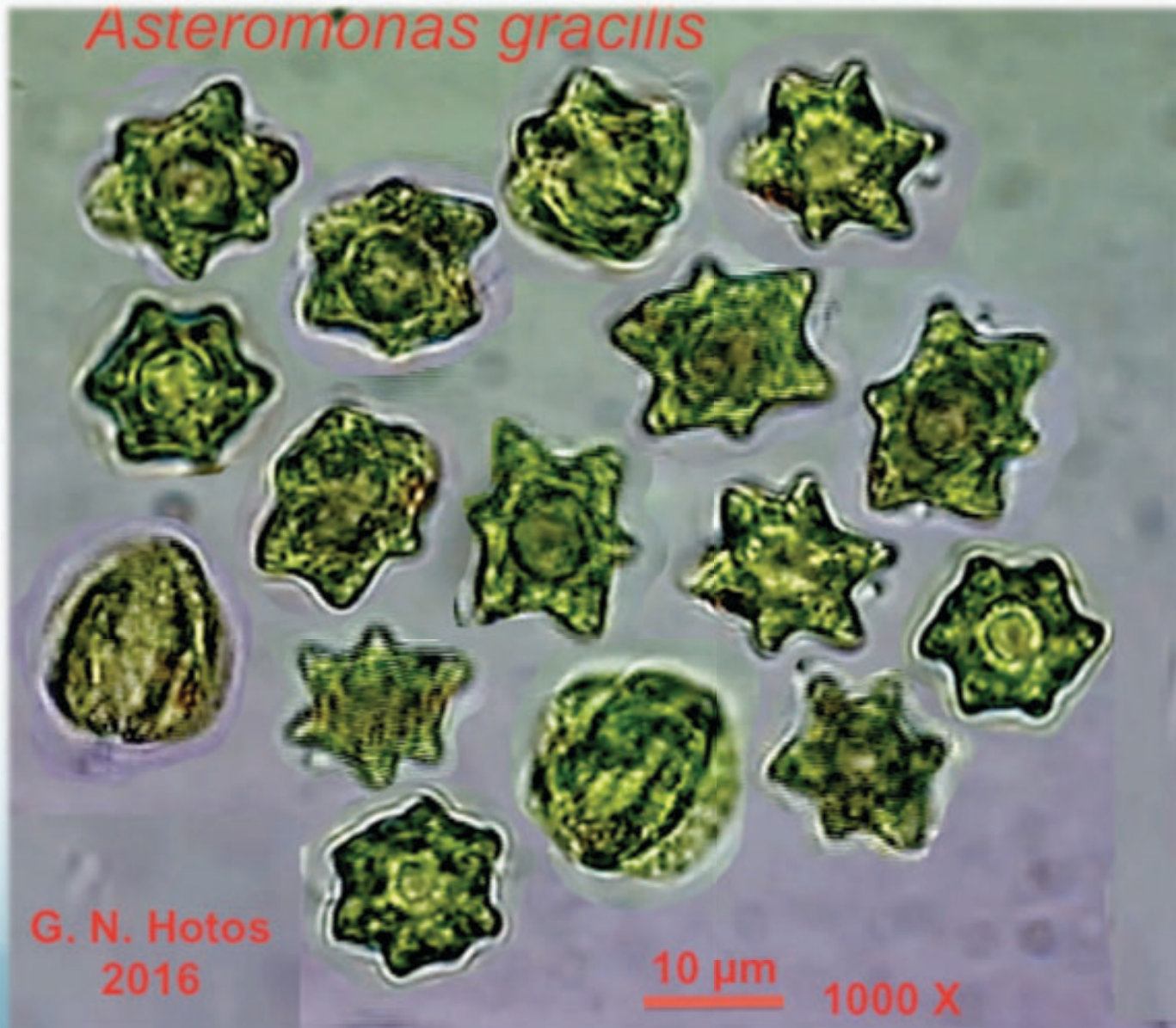
**And eventually above 100 ppt start
to die out**



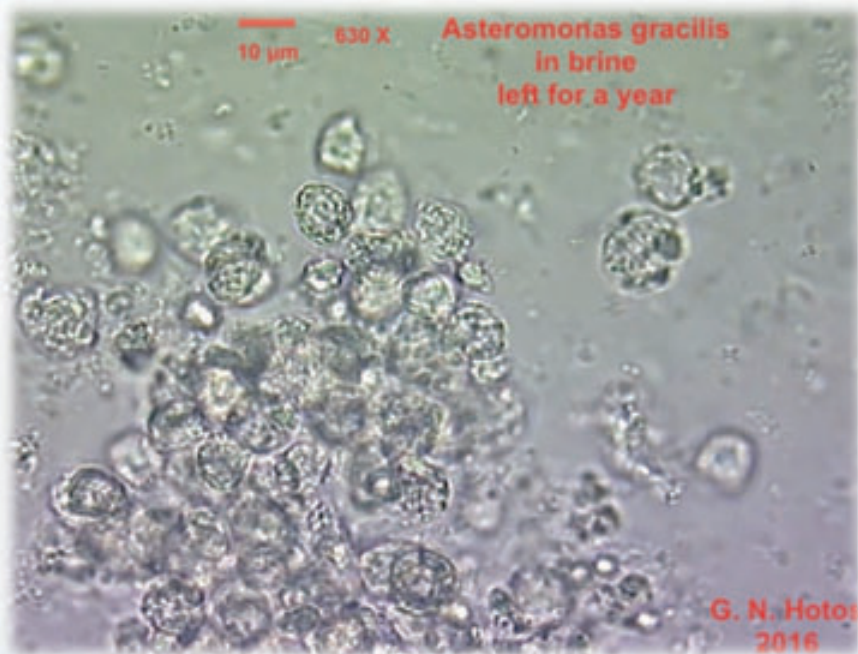
Only *Asteromonas* and *Dunaliella* (if present) survive above 130 ppt



To be the “super star” of the culture



And if happened to be “forgotten” for a year.. or so.. in pure salt ..



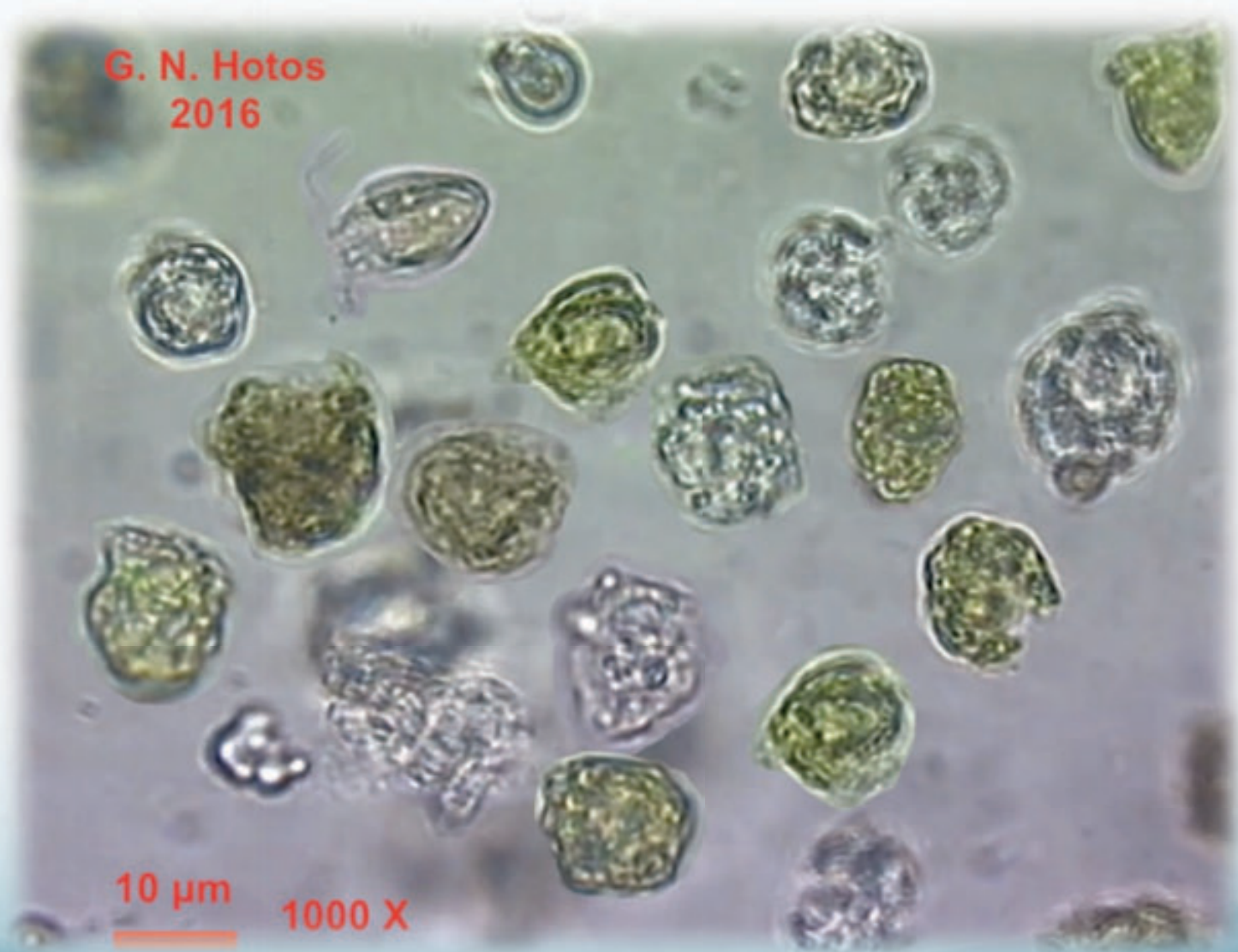
Its cysts although decolorized in the dark, due to loss of pigments, remain alive



It “wakes up” after watering, lighting and addition of nutrients



And through greening ...



Becomes the *Asteromonas* we want to see ...

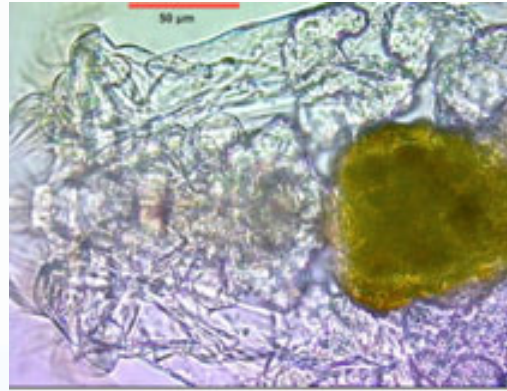
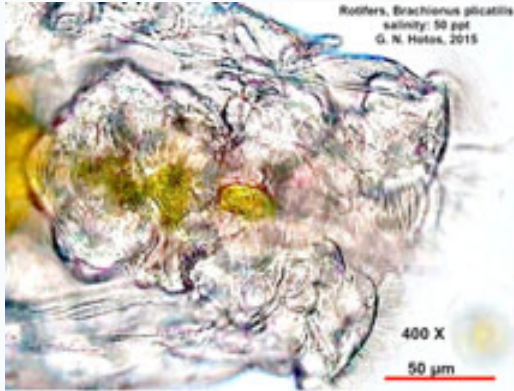


What we actually get from *Asteromonas*?

- It is a big easily observable microalgae, ideal for teaching
- It moves slowly and gracefully, trackable microscopically
- It endures every salinity from 25 ppt and up
- It is hardy, growing with minimum of prerequisites
- Its culture practically “never” collapses
- It can be kept unattended for years in moist salt
- Can get rid of other species by increasing salinity
- It is an all purpose effective food for filter feeders
- A promising candidate for culture in hypersalinity

Who eats Asteromonas?

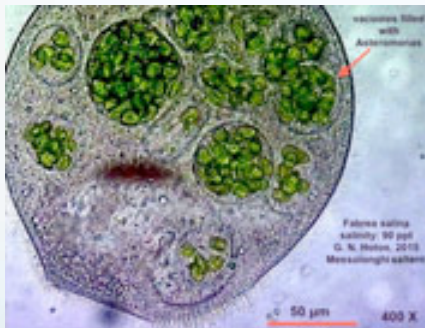
Rotifers, *Brachionus plicatilis*



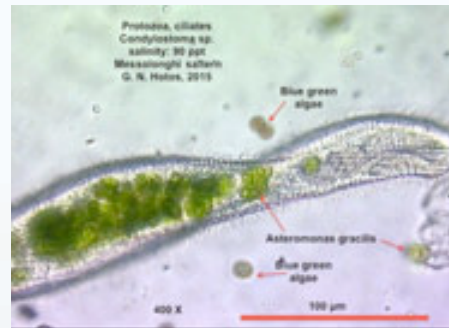
Protozoa various species *Euplotes*



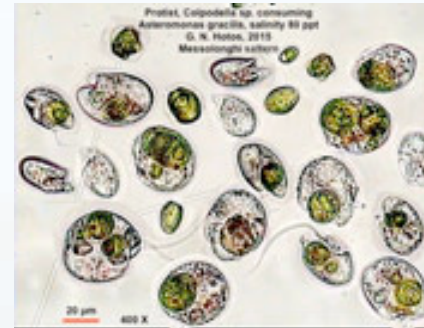
Protozoa, *Fabrea salina*,



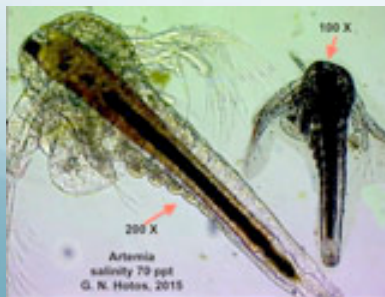
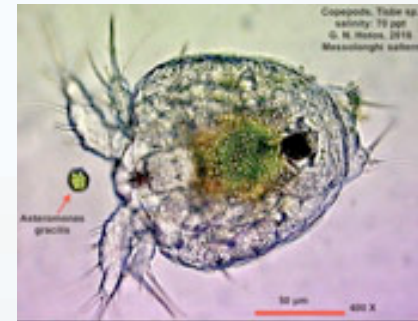
***Condylostoma* sp,**



***Oxyrrhis* sp**



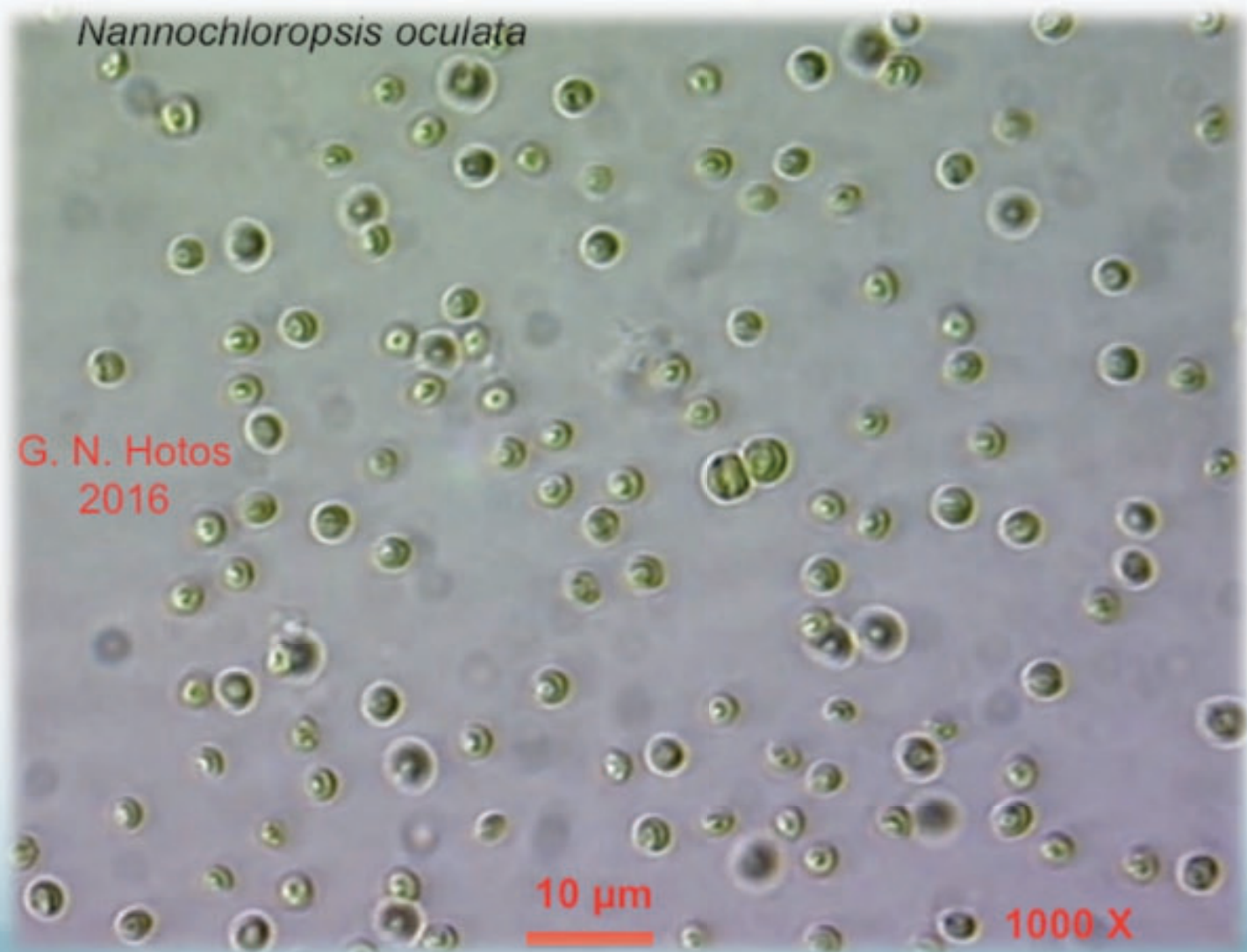
Copepods, *Tisbe* sp



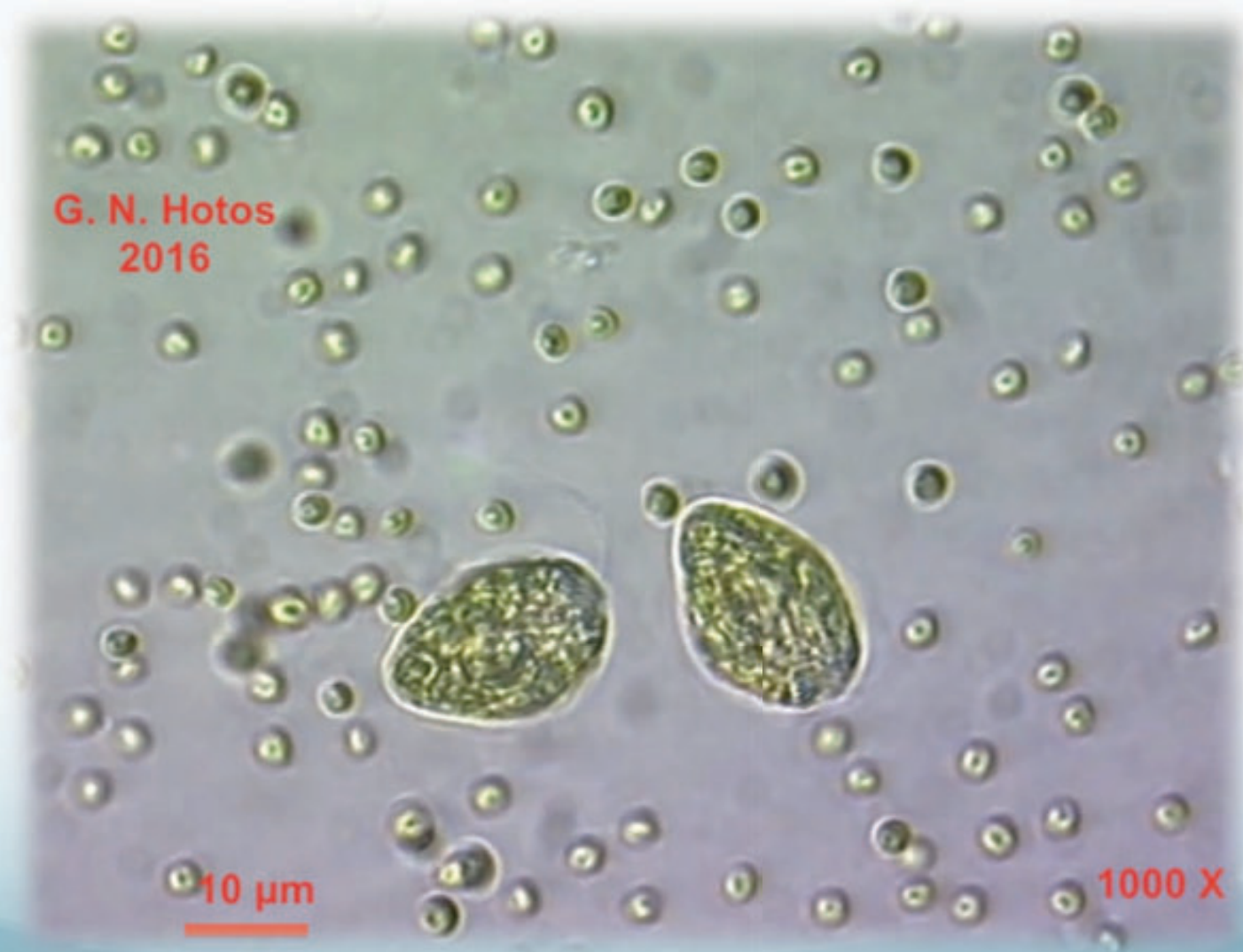
And of course *Artemia*



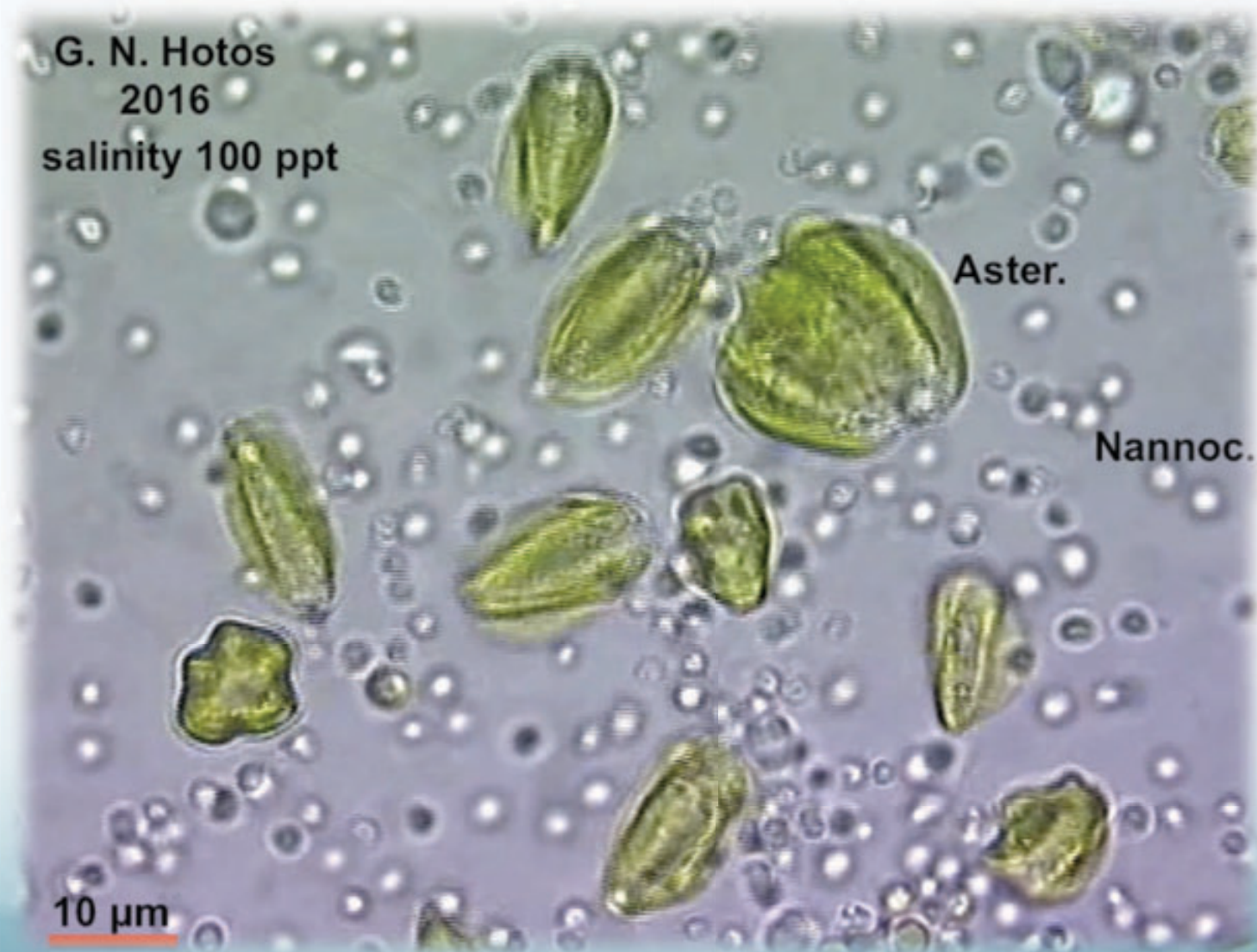
Studying the minute algae (e.g. *Nannochloropsis oculata*) is an ordinary case



But studying... with *Asteromonas* becomes more educationally fun ..



And by raising salinity to 100 ppt even the hardy Nanno succumbs ...



Thank you

Search YouTube for:
“Dr G. Hotos Lab, Greece”

to enjoy Asteromonas and her
companion in motion ..