Potential impact of small copepods on a changing pelagic ecosystem: the case study of *Oithona similis* in the Arctic

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Small copepods (≤1mm)

→ **underestimated by 200 µm net**

Galienne and Robins 2001, Arashkevich *et al.* 2002

Low biomass contribution in the Arctic

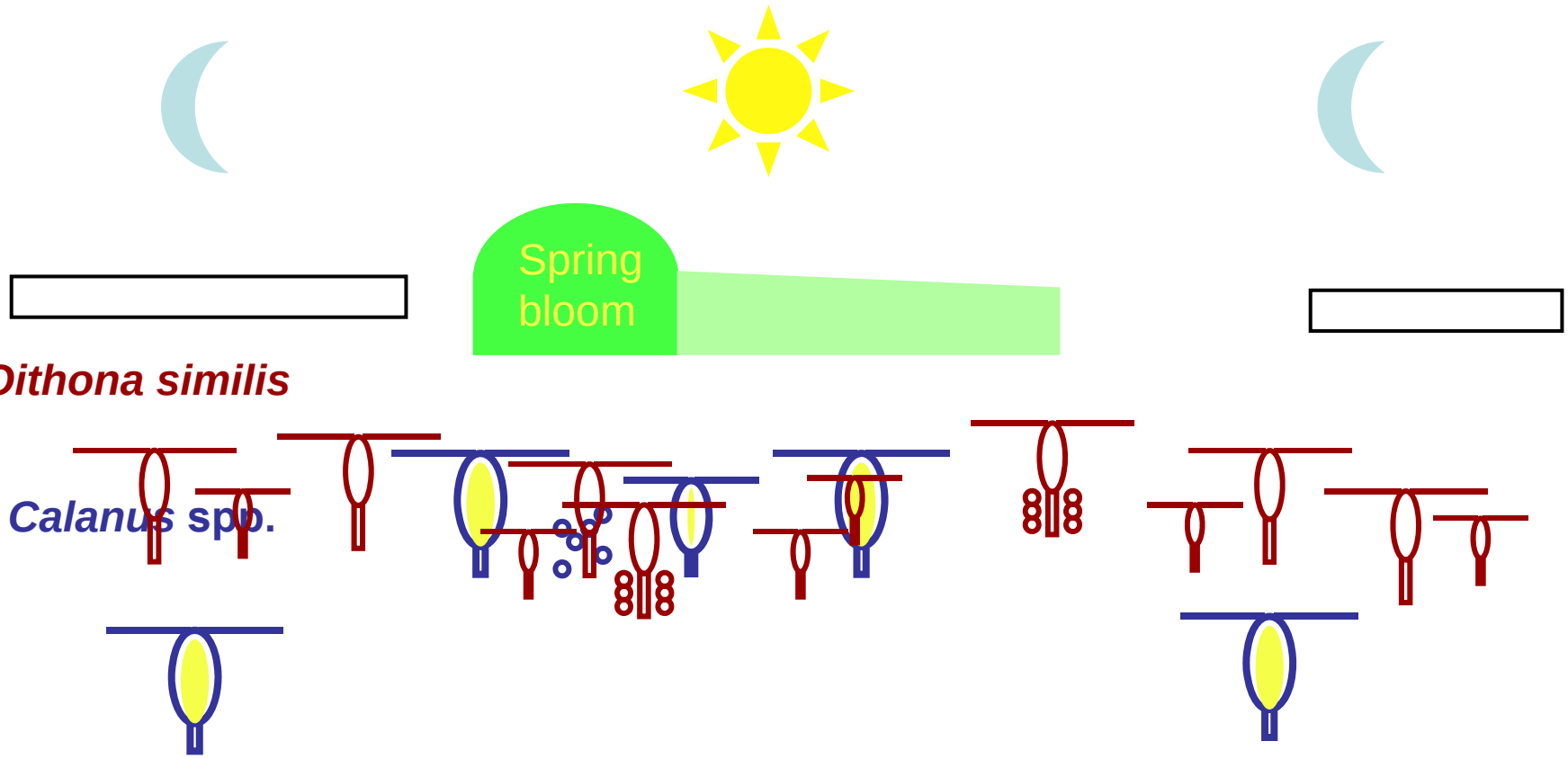
But significant production

O. similis + 2 others = only 5% of biomass ⇒ **25% production** of metazoan zooplankton

Hopcroft *et al.* 2005

Oithona similis, most abundant mesozooplankton

Specificity of the Arctic pelagic ecosystem
Calanus vs. *Oithona*



O. similis **is active and reproducing year round**
→ alternative life strategy…

Lischka and Hagen 2005
Ashjian 2003

Changes in life mode and trophic flexibility

Hagen and Auel 2001

Research questions

- **Life strategy: seasonality, adaptation to the Arctic?**

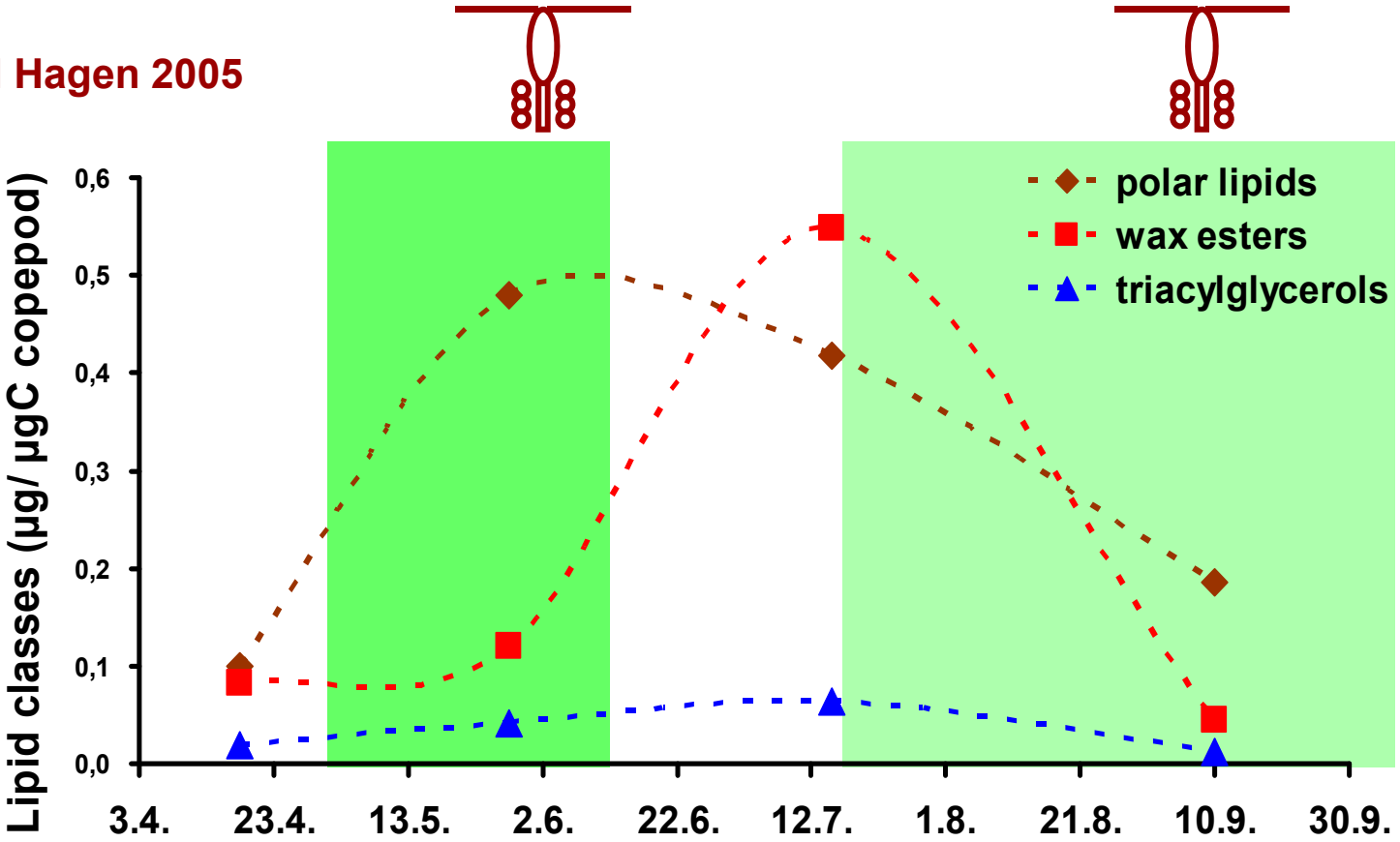
Insights from lipid reserves…

→ Lipid classes from biochemistry
→ Individual variability from an optical approach

- **Trophic interactions with lower trophic levels**

Lipid reserves dynamic

Lischka and Hagen 2005

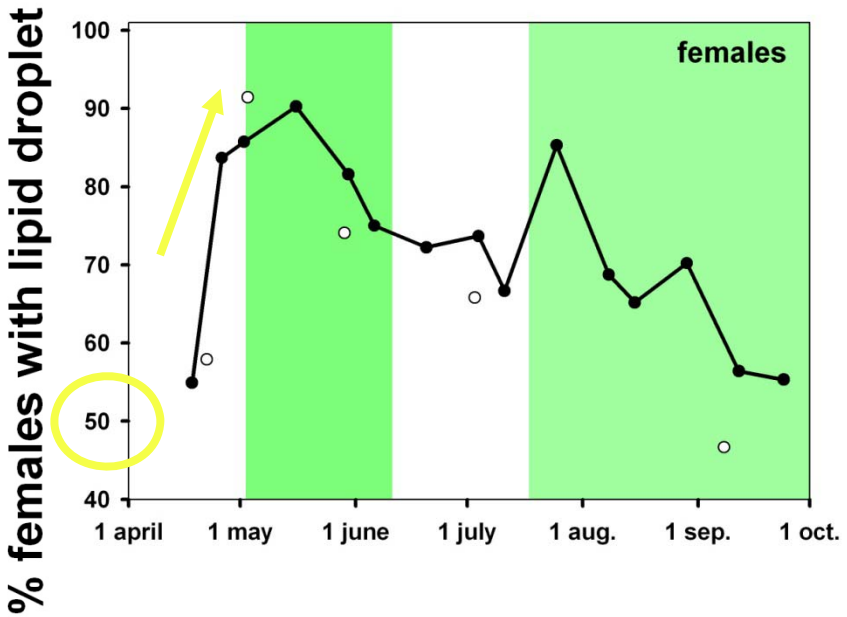


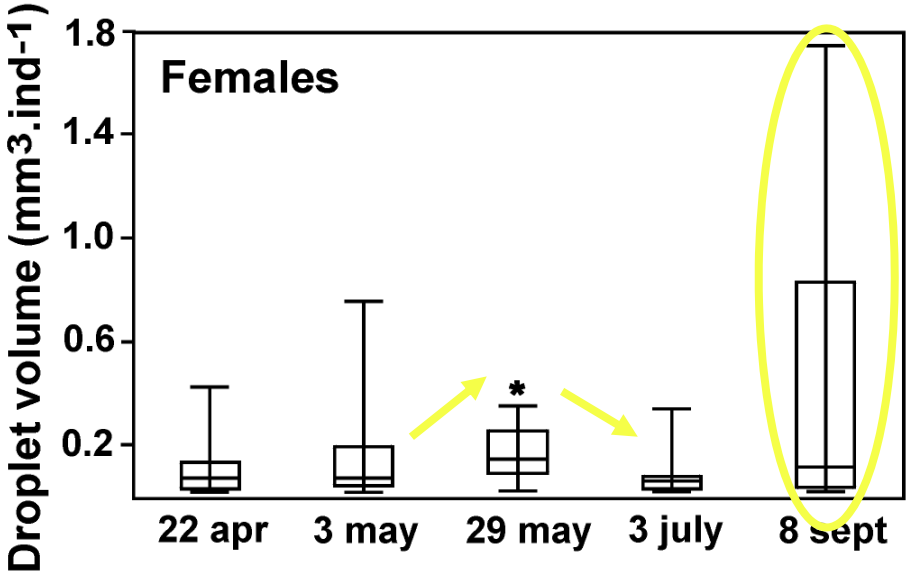
Polar lipids ↑ **Polar lipids ↓**

Reserves ↑ **Reserves ↓**

?

Lipid reserve dynamic





- **Increase of droplets during spring, starting before Chl*a* max**
- **High inter-individual variability**
  !! September: “young” + “old” females?

Narcy *et al.*, Polar Biol 2009

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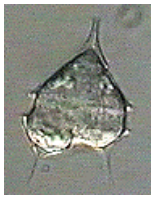
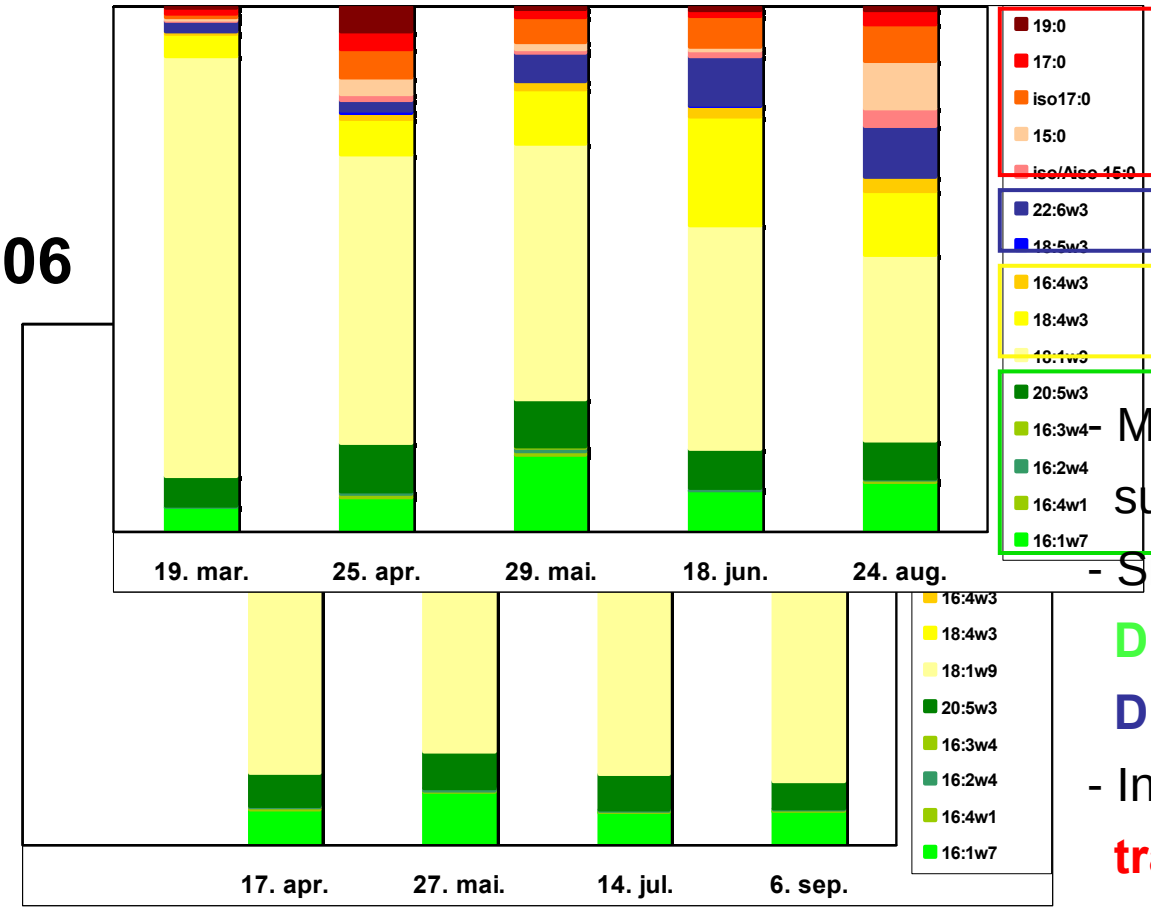


From early spring to late summer: different *in situ* food conditions

→ Fatty acid trophic markers
→ Bottle experiments

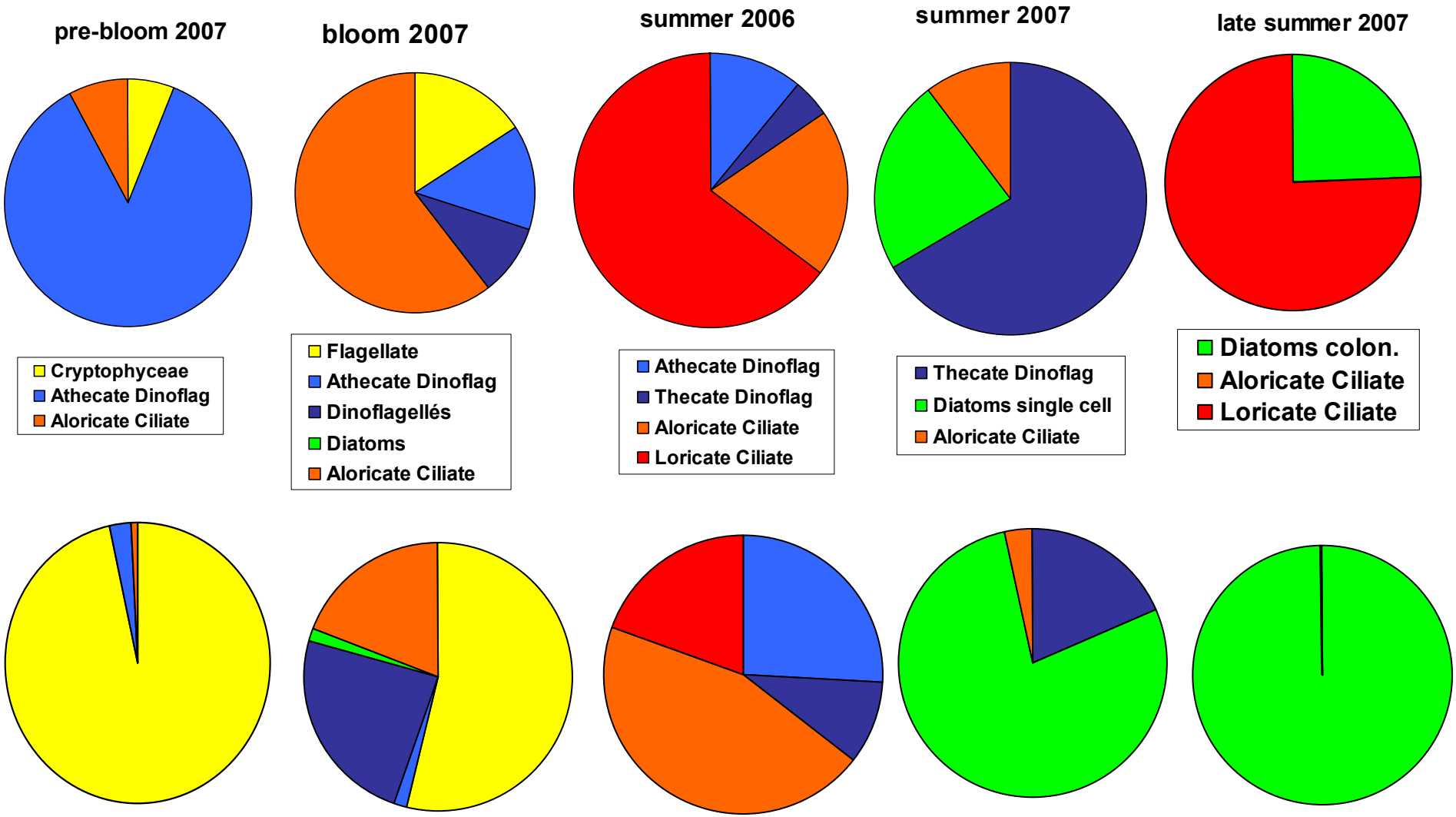
Fatty Acid Trophic Markers
= prey signatures in the wax esters reserves

***Rev.* Dasldgaard *et al.* 2003**



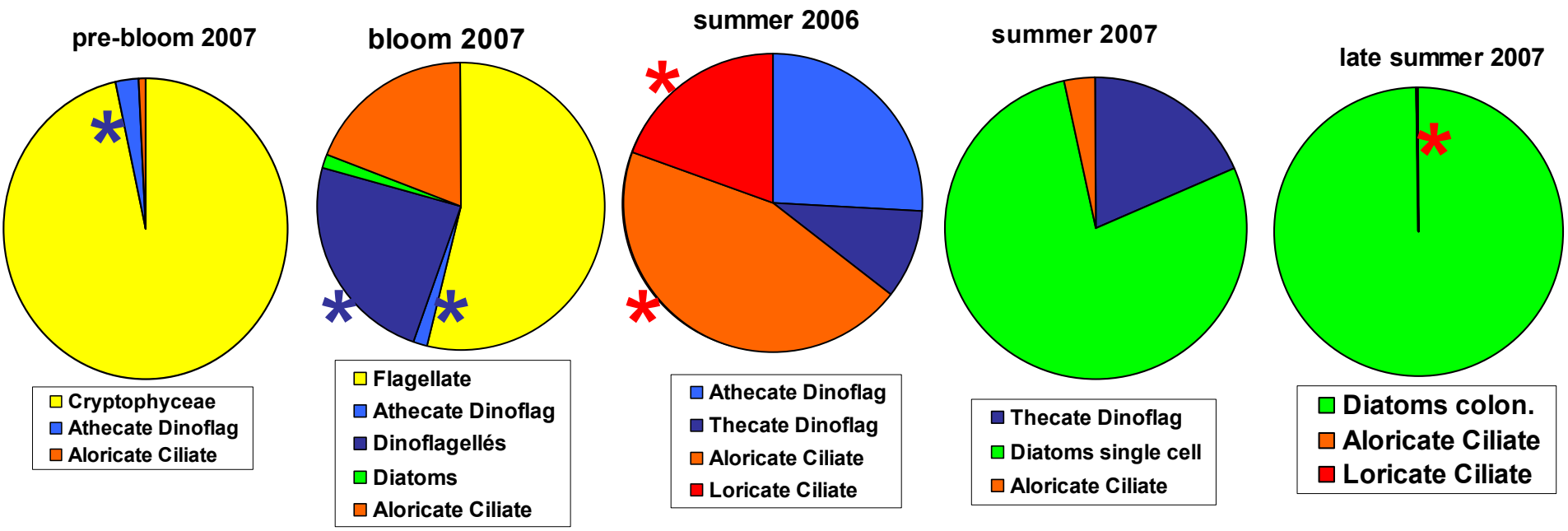
- Mainly **Flagellates** such as *Phaeocystis*
- Significant variations in **Diatoms** higher in spring **Dinoflag.** higher in summer
- Increase of **bacterial tracers** in summer

Diversity of prey in the diet
CARBON



NB CELL

Diversity of prey in the diet and selection
NB CELL



Oithona similis is a true omnivore:

able to catch preys over wide size and taxonomic ranges

Selecting preferentially microzooplankton:

Dinoflag. In spring and Ciliates in summer

Ciliates diet linked to the bacterial tracers in fatty acids?

Concluding remarks

✓ **Although not responsible for the major energy flow trough the Arctic pelagic ecosystem, might play a key role in the ecosystem functioning…**

- Different timing, size, functional group than *Calanus*
- Bridging the microbial food web to higher trophic levels

✓ **A better evaluation of their role would help appreciating the climate change effects in the Arctic**

→ **Highly flexible - less affected by changing conditions?**

→ **"Stabilization factor"?**

✓ **Their role could increase with the increasing Atlantic influence in the european Arctic**

Greater importance of small taxa, microzooplankton and small copepods is predicted in the future (West Greenland)
Hansen et al., 2003

Thanks to…

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Arctic Scholarship

MARICLIM project

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