



Probes targeting novel stramenopiles

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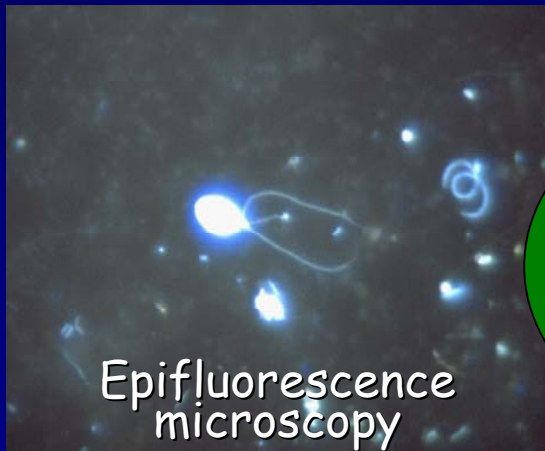
Institut de Ciències del Mar, Barcelona, Spain

Marine picoeukaryotes

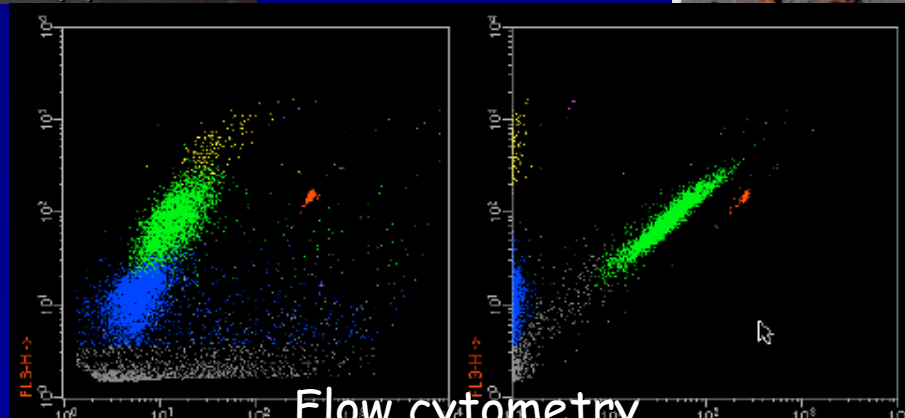
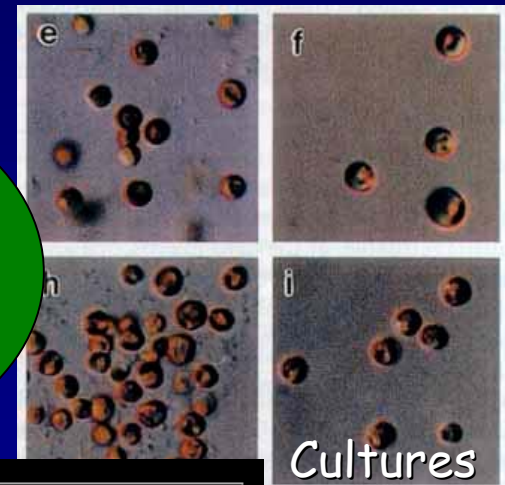
Ubiquitous and significant members of the plankton

Phototrophic: 10^3 - 10^4 cells ml⁻¹

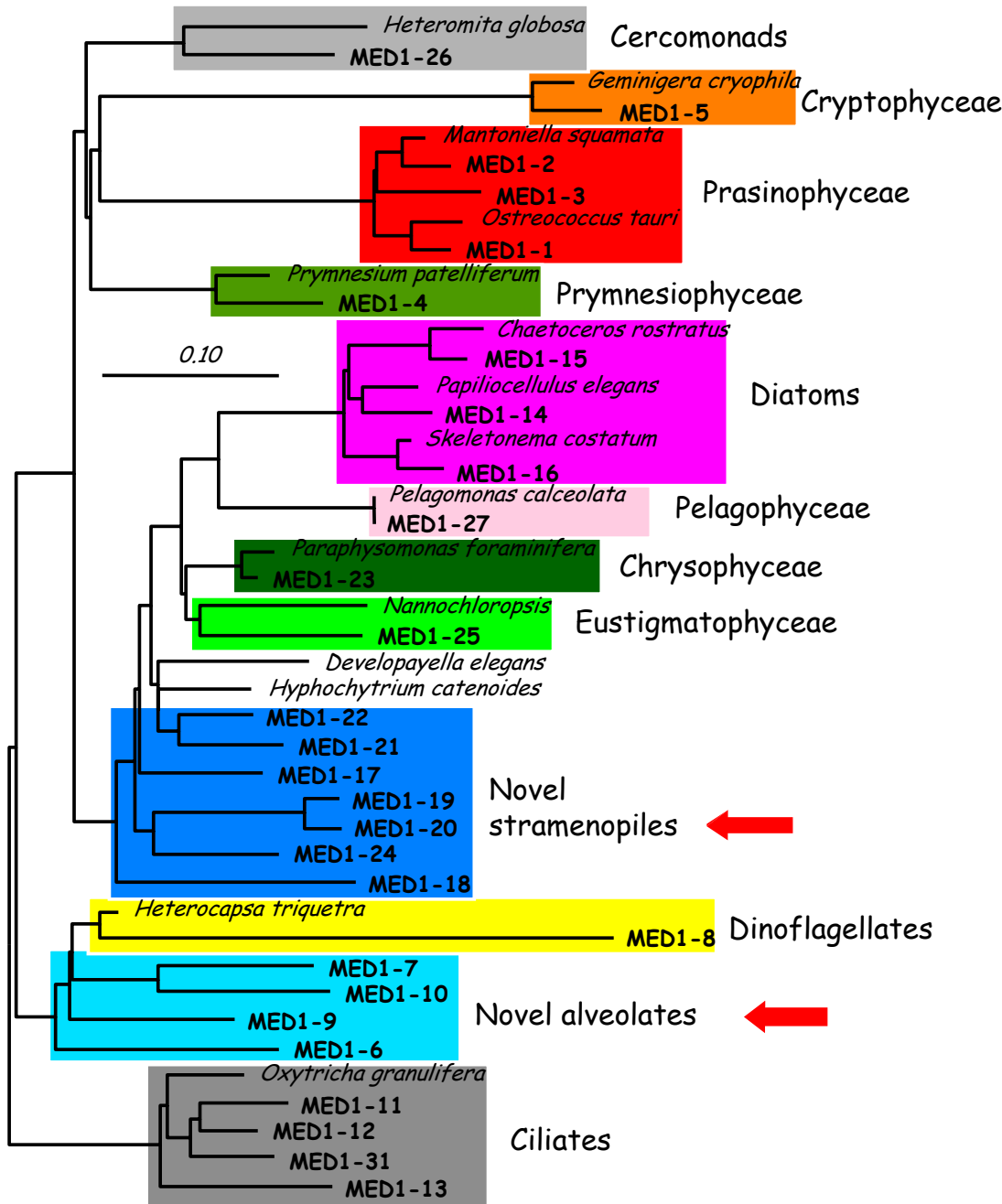
Heterotrophic: 10^2 - 10^3 cells ml⁻¹



Observation and
count

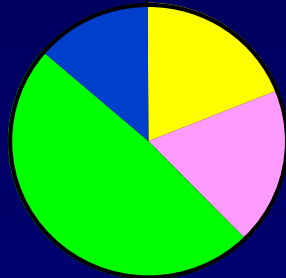


Genetic library of 18S rRNA genes

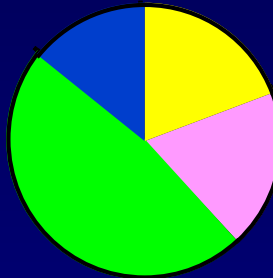


Sample analyzed
Alboran Sea (NW Med) - 5m
Fraction: 0.2 - 5 μ m

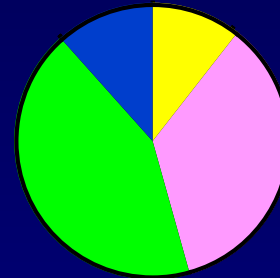
Novel groups are abundant and widespread



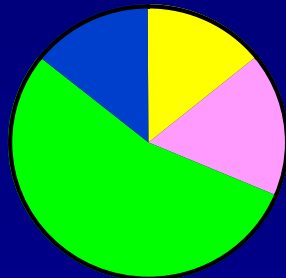
North Atlantic



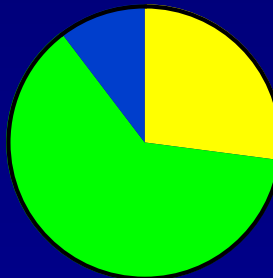
Mediterranean Open sea



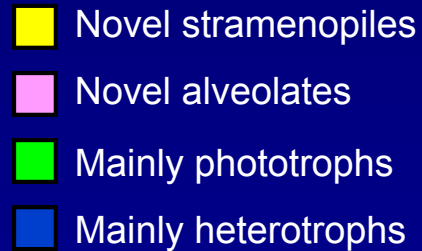
Mediterranean Coast



Equatorial Pacific

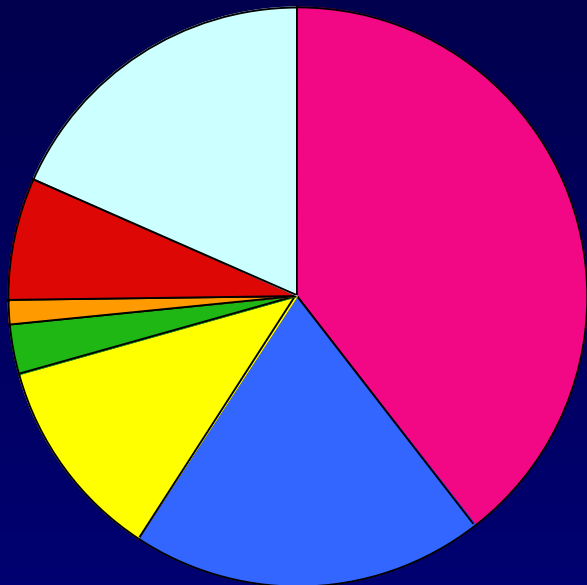


Antarctica

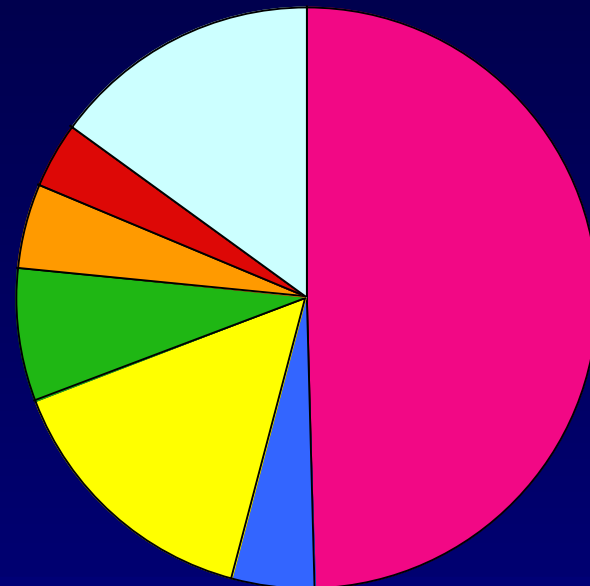


Díez et al. 2001
López-García et al. 2001
Moon van der Staay et al 2001

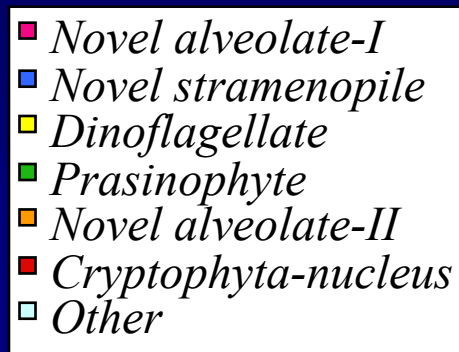
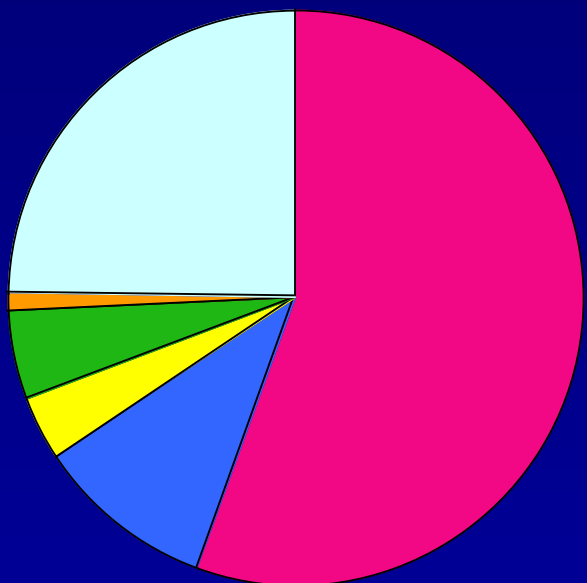
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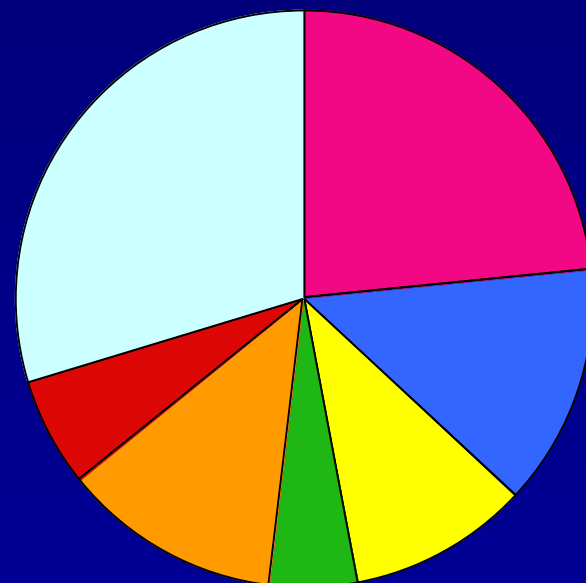
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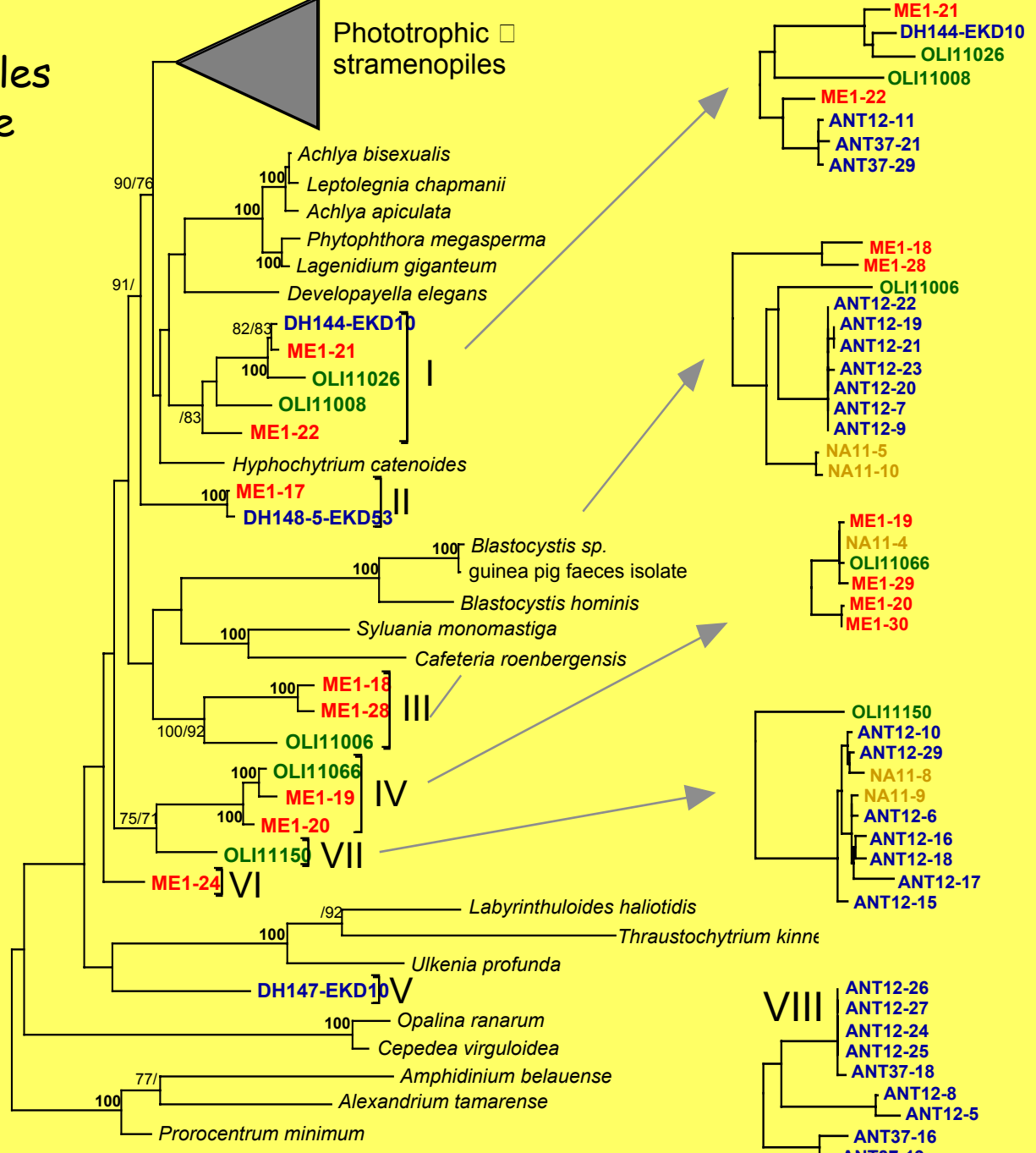
BL010320



BL010625



Novel stramenopiles
are very diverse



Distribution of clones inside clusters

	Mediterranean	North Atlantic	Antarctica	Eq Pacific	Antarctica-deep	SUM
I	2	0	4	2	1	9
II	1	0	0	0	1	2
III	3	4	7	1	0	15
IV	4	1	0	1	0	6
V	0	0	0	0	1	1
VI	2	0	1	0	0	3
VII	0	2	8	1	0	11
VIII	0	0	14	0	0	14
SUM	12	7	34	5	3	61

Probes for novel stramenopiles

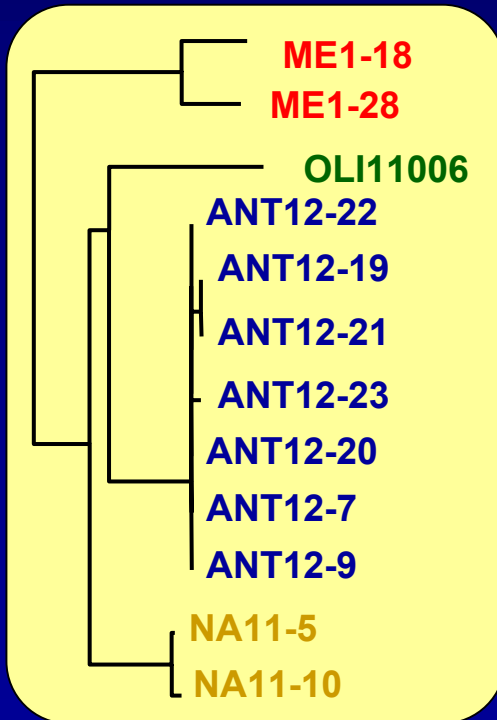
846

NS3 ATTACCTTGGCCTCC-AAC

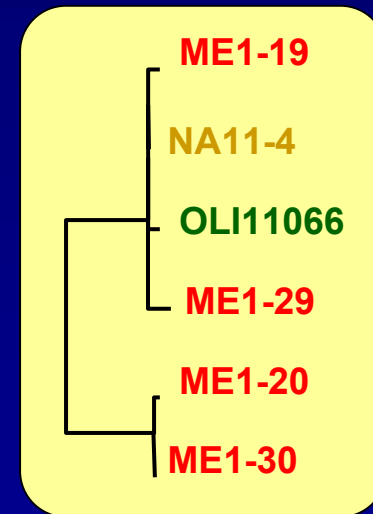
828

NS4 TACTTCGGTCTGCAAAACC

Cluster III



Cluster IV

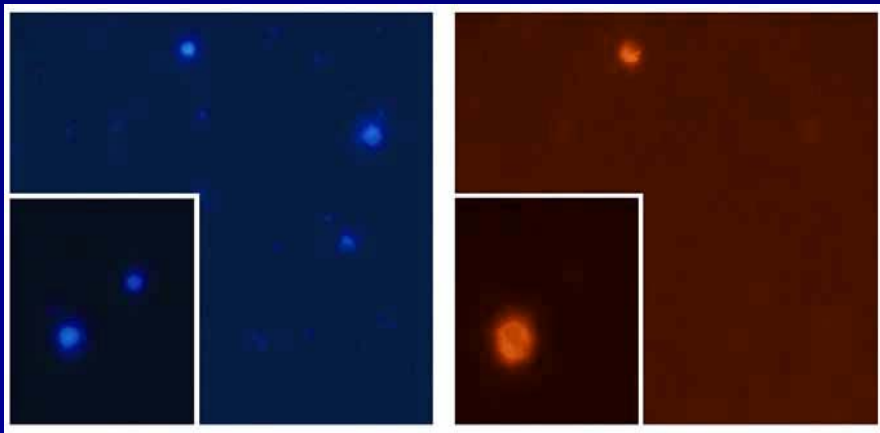


Detection of novel stramenopiles by FISH

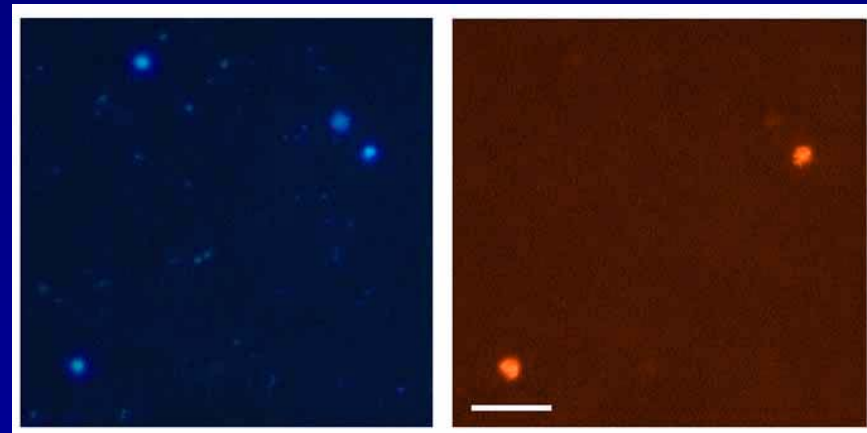
Cultures used as negative controls:

- Prasinophyte
- Prymnesiophyte
- Cryptophyte
- Stramenopiles
 - Eustigmatophyte
 - Chrysoomonad
 - Bicosoecid

Cluster III

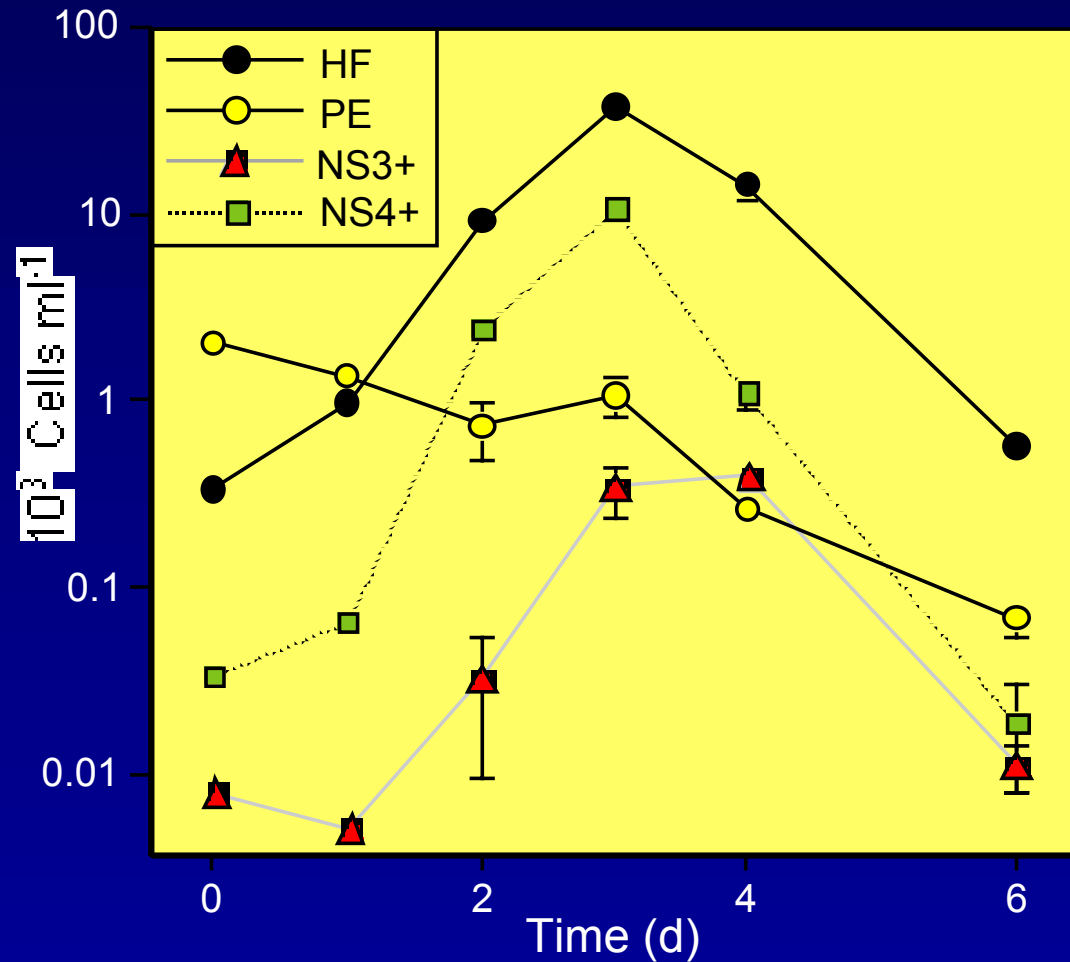


Cluster IV



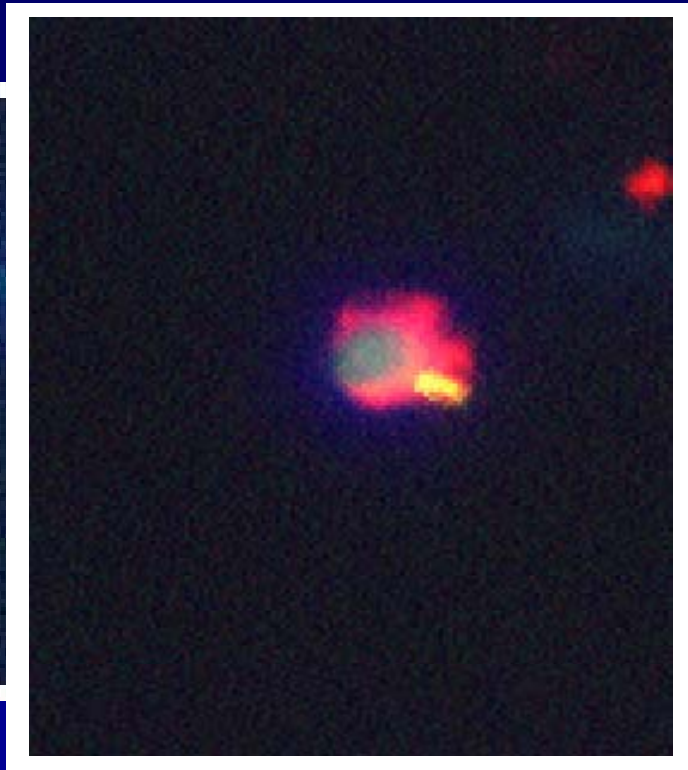
Dynamics during an enrichment culture

Blanes Coast sample
2 μm filtrate

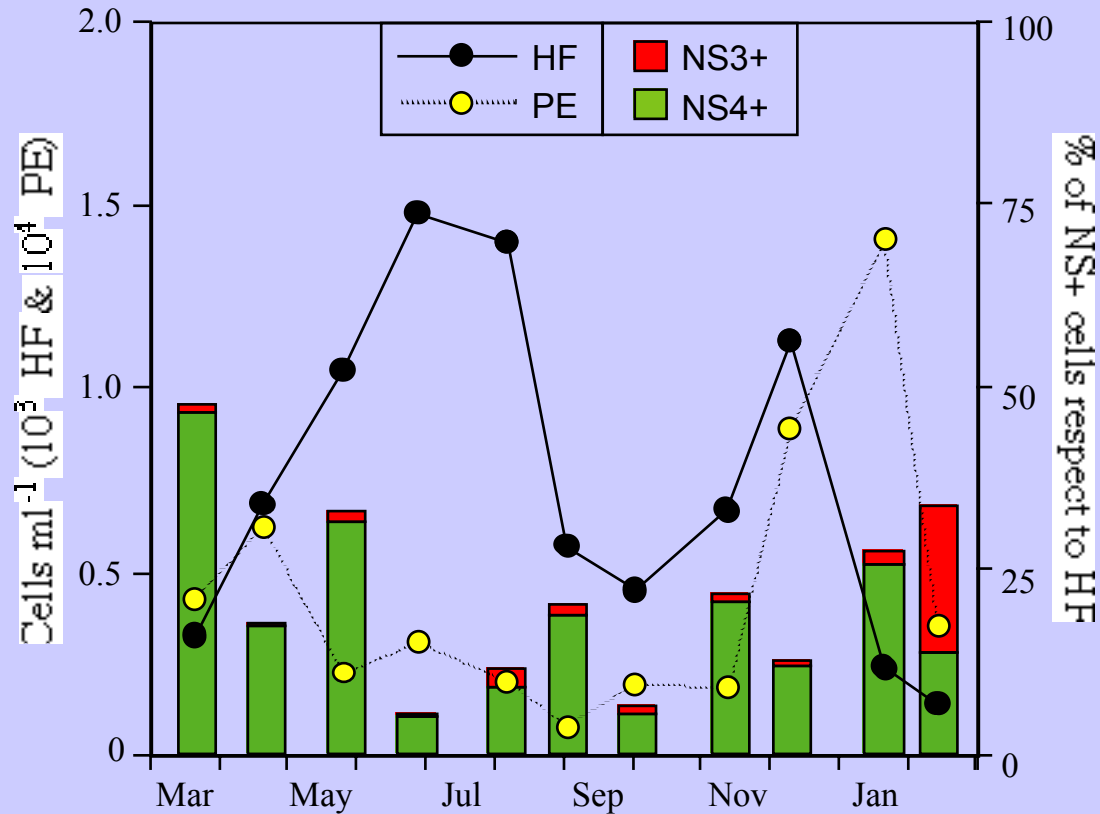


Experiment of bacterivory

Ingestion of FLB
 10^6 FLB ml⁻¹ in the enrichment culture for
2 hours



Abundance in situ - Blanes Coast



Seasonal average

- NS3+ cells: 12 cells ml⁻¹ (3% of HF)
- NS4+ cells: 120 cells ml⁻¹ (20% of HF)

Summary

Novel stramenopiles are . . .

- Abundant and widespread in genetic libraries of marine picoeukaryotes
- Phylogenetically very diverse, likely including different organisms
- Some are bacterivorous heterotrophic flagellates
- They comprise a significant fraction of natural HF assemblages

Future

Add partial sequences from other studies

Design more probes

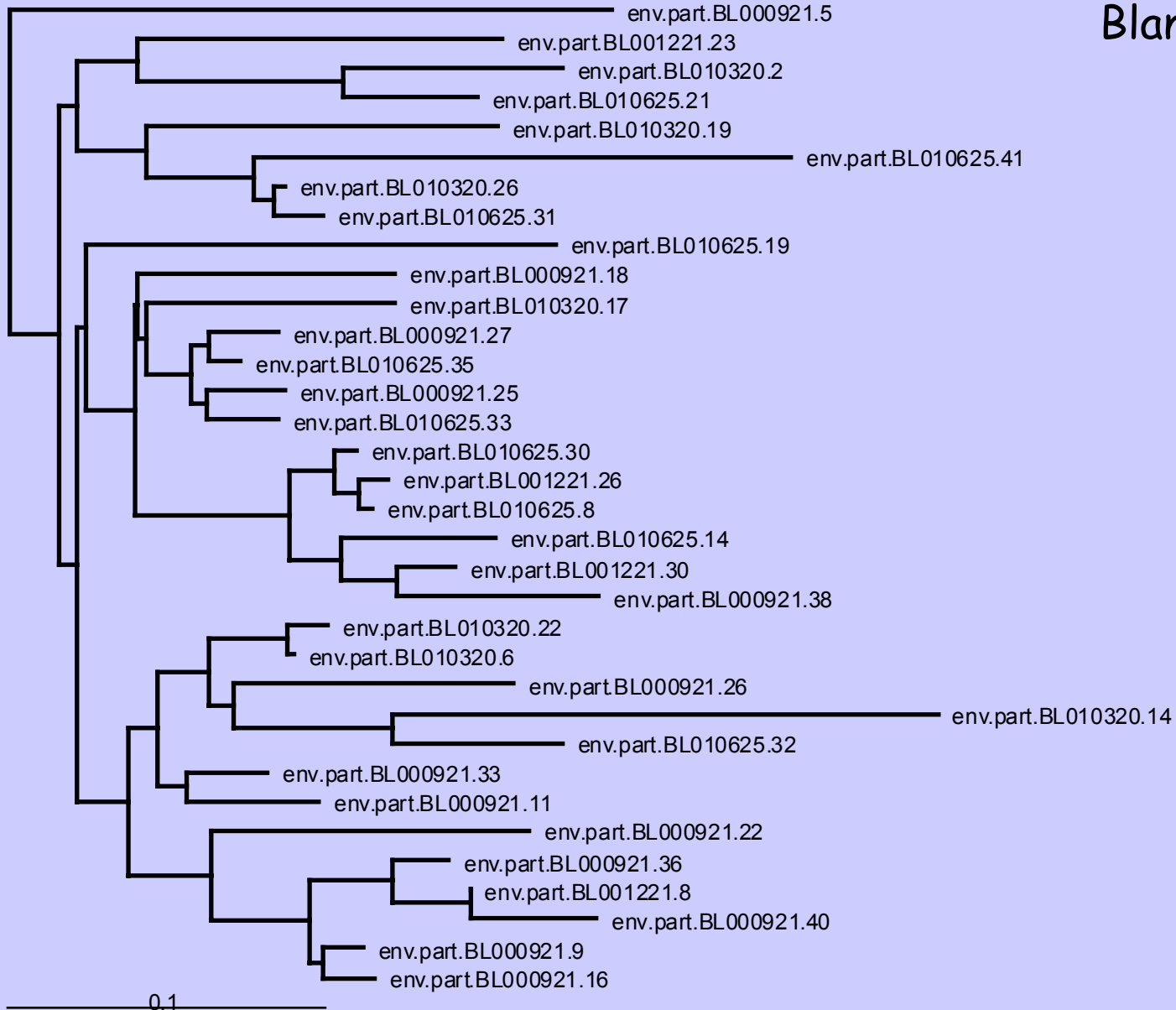
Apply probes to natural samples

Libraries already analyzed (n=52)

Libraries already analyzed (n=52)			
	Mediterranean Sea	ME1	10
	Antartica	ANT12	22
	Antartica	ANT37	7
	Antartica	DH147	3
	North Atlantic	NA11	5
	Equatorial Pacific	OLI011	5

Libraries from PICODIV (n=120)			
	Mediterranean Sea	BL000921	12
		BL001221	4
		BL010320	5
		BL010625	8
	Equatorial Pacific	OLI	2
	English Channel	RA000412	13
		RA000609	5
		RA000907	2
		RA001219	7
		RA010412	6
		RA010516	7
		RA010613	10
		RD010517	1
	North Sea	He0003xx	1
		He000427	6
		He000803	6
		He001005	6
		HE001206	5
		HE010218	3
	North Atlantic	Or0004xx	11

Novel stramenopiles from Blanes



Libraries from other groups (n=71)		
Anoxic sediments - Dawson & Pace 2002. PNAS		
	BAQD	9
	BAQA	2
	BOLA	2
Guaymas Basin hydrothermal vent - Edgcomb et al. 2002		
	CS_E0	8
	C1_E0	6
	C2_E0	9
	C3_E0	9
	A3_E0	26

