The Roscoff Culture Collection

Daniel Vaulot

European Phycology Congress
2023-08-24

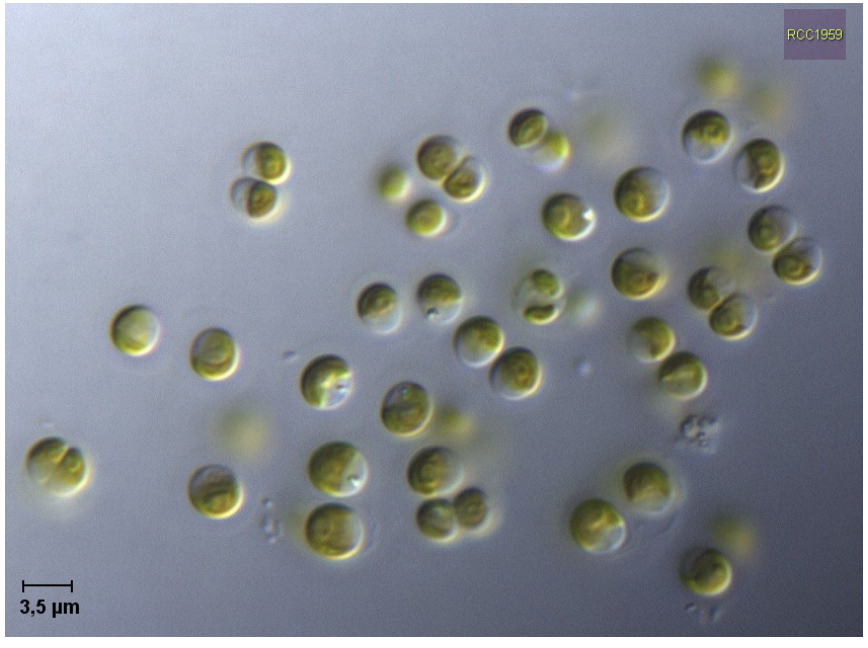
CNRS • SORBONNE UNIVERSITÉ
Station Biologique
de Roscoff

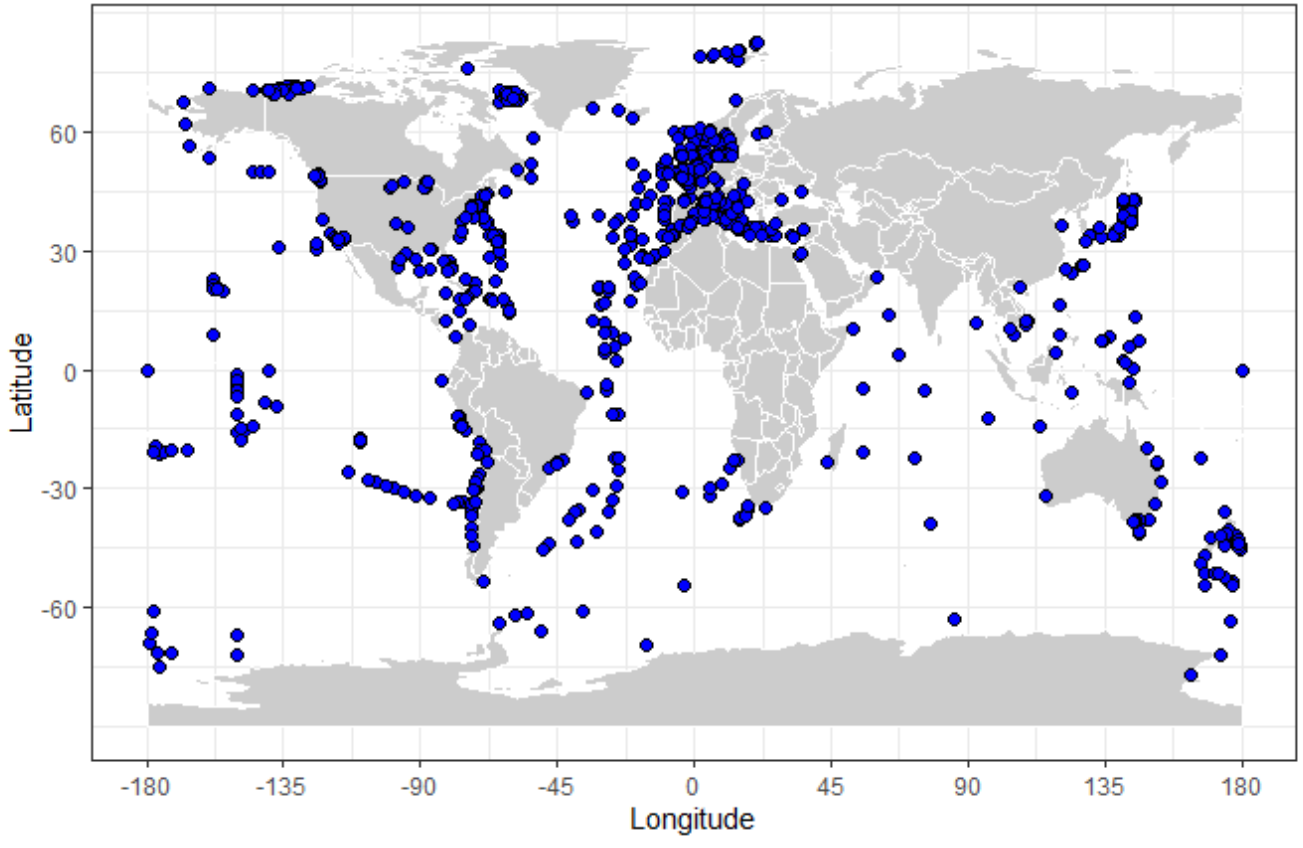
La Station Biologique de Roscoff

- 1872 - Antoine Lacaze-Duthiers (150 years ago)
- CNRS and Sorbonne Université
- Staff: 350
- Students : 1,000-2,000 per year

The Roscoff Culture Collection

- Set up in 1998 from research collection
- 6,136 strains (Aug 2023)
- Mostly marine microalgae
- Also macroalgae, bacteria, viruses
- Large phylogenetic coverage
- Large coverage of oceanic regions





Personnel

RCC				
Ian	PROBERT	IR	SU	Director
Priscillia	GOURVIL	IE	CNRS	Curator
Martin	GACHENOT	AI	CDI SU	Orders/Transfers
Michele	GREGO	AI	CDD SU	Orders/Transfers
Katell	HERVEOU	T	CDD SU	Transfers
Charles	BACHY	Postdoc	CDD SU	

Support				
Daniel	VAULOT	DRE	CNRS	Database
Dominique	MARIE	IRE	CNRS	Flow cytometry
Christian	JEANTHON	DR	CNRS	Bacteria
Anne-Claire	BAUDOUX	CR	CNRS	Viruses
Laurence	GARCZAREK	DR	CNRS	Cyanobacteria
Emeline	CREIS			Macroalgae

Ian

Pris

Martin

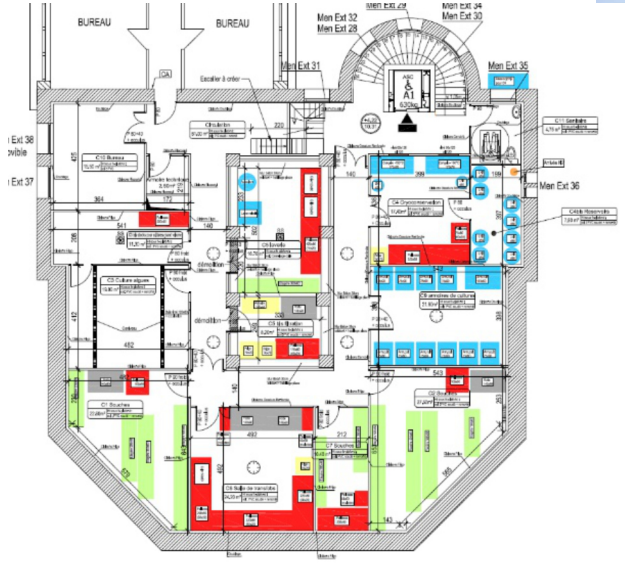
Michele

Infrastructures

Centre de Ressources Biologique » - 240 m²

Rooms

- 3 culture rooms: 4°, 15°, 22°
- 14 controlled chambers (Sanyo)
- Transfer room



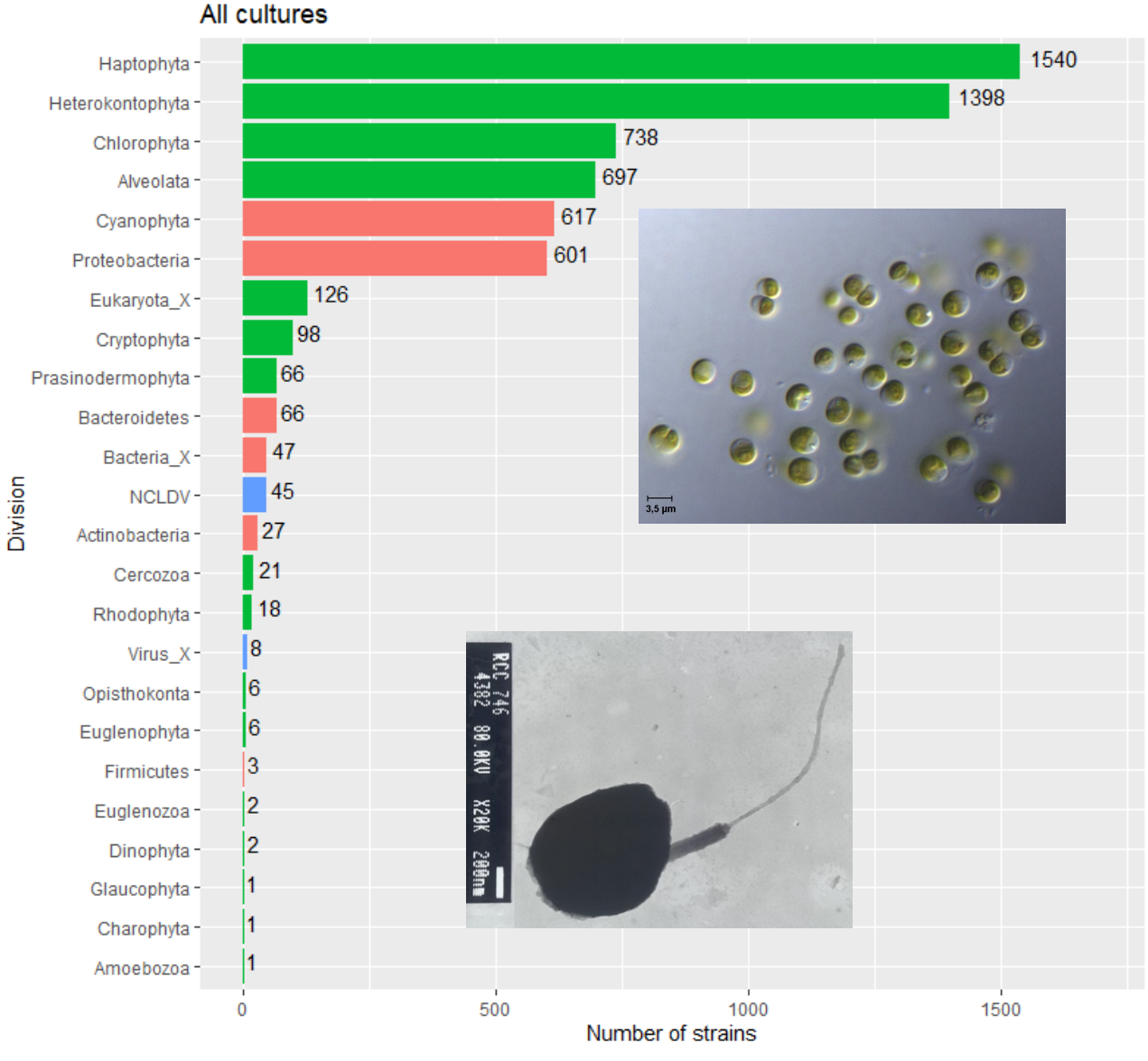
Equipment

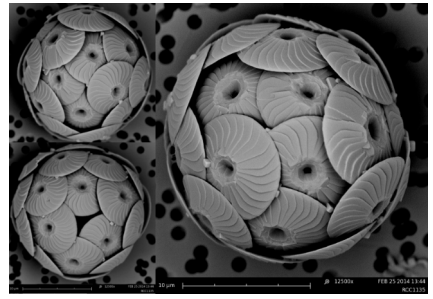
- Microscopes (light, fluo, SEM, TEM)
- Flow cytometers (sorter)
- HPLC

Cryoperservation

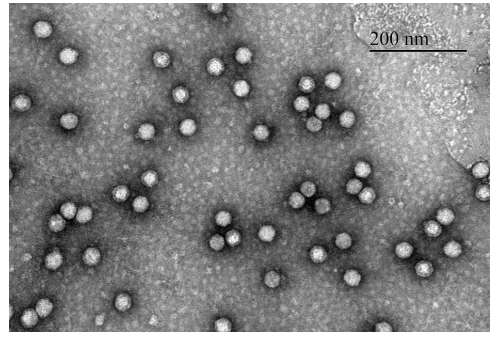
- Progressive cryofreezer
- Liquid nitrogen tanks for storage
- -150° Freezers

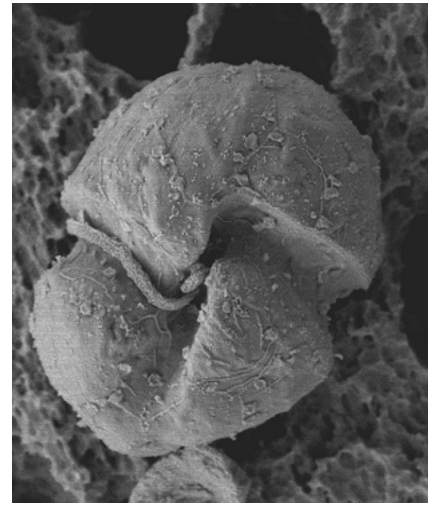
Major taxonomic groups

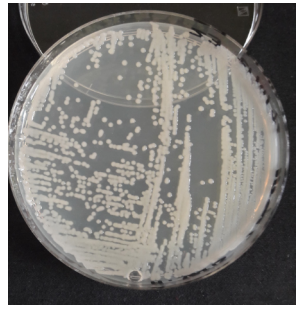




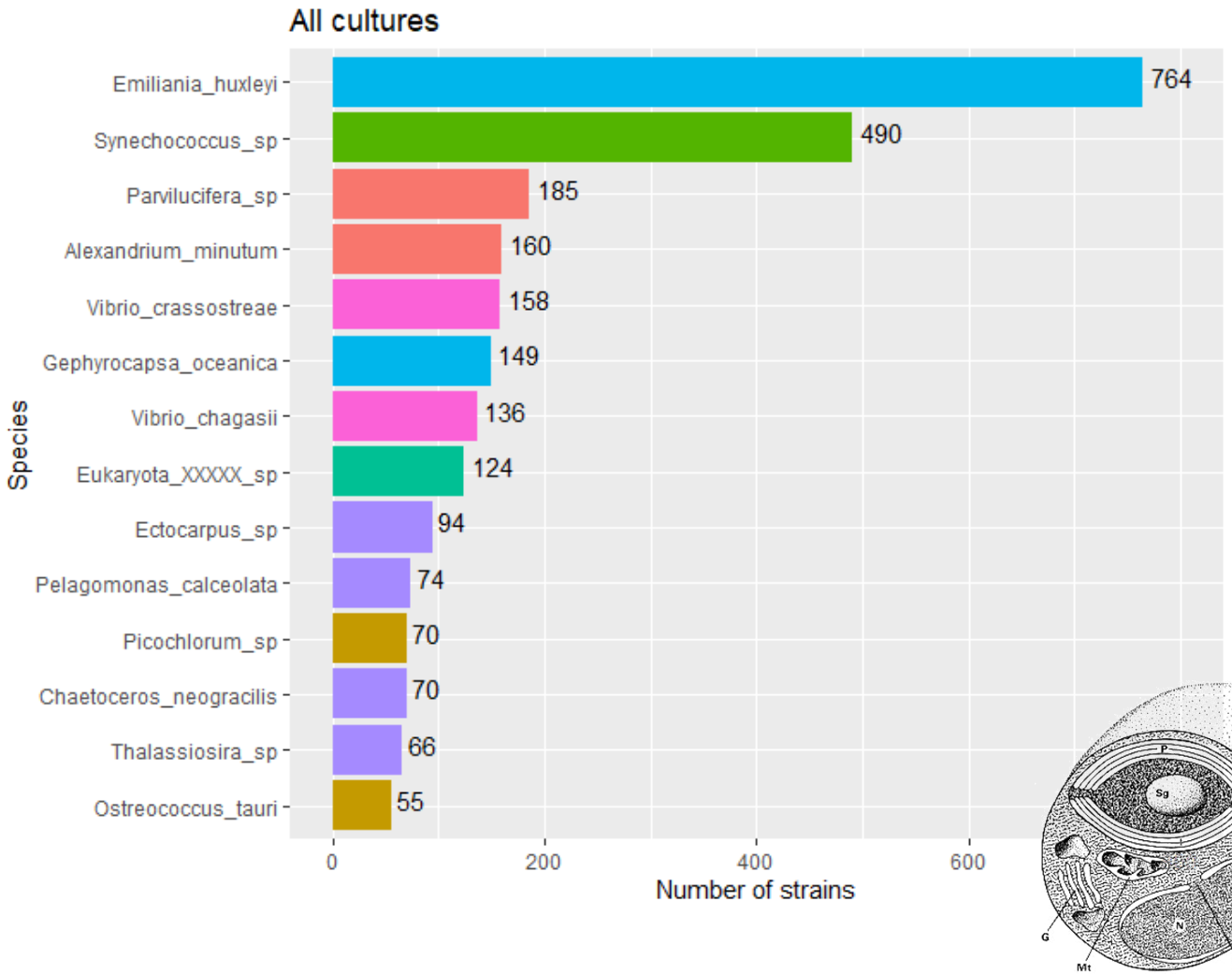
domain
- Bacteria
- Eukaryota
- Virus

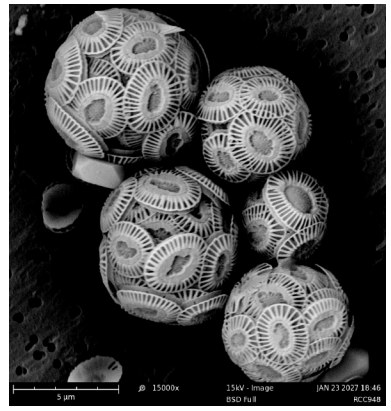


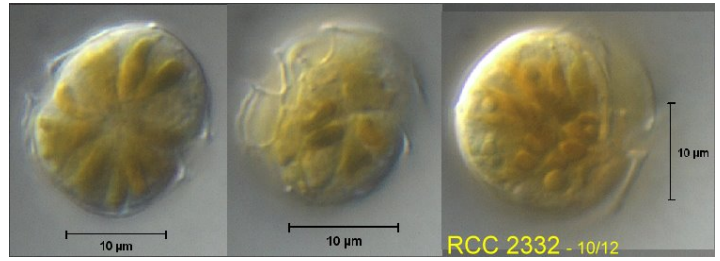


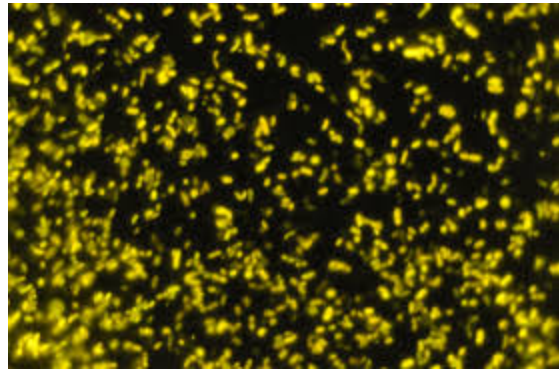


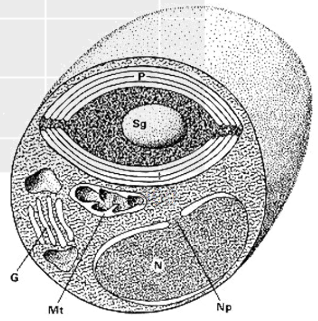
Major species











Isolation by flow cytometry sorting

J. Phycol. *, ***–*** (2017)

DOI: 10.1111/jpy.12495

IMPROVEMENT OF PHYTOPLANKTON CULTURE ISOLATION USING SINGLE CELL SORTING BY FLOW CYTOMETRY[1]

Dominique Marie, Florence Le Gall, Roseline Edern, Priscillia Gourvil, and Daniel Vaulot[2]

UPMC Université Paris 06, CNRS, UMR7144, Station Biologique de Roscoff, Sorbonne Universités, Roscoff, France

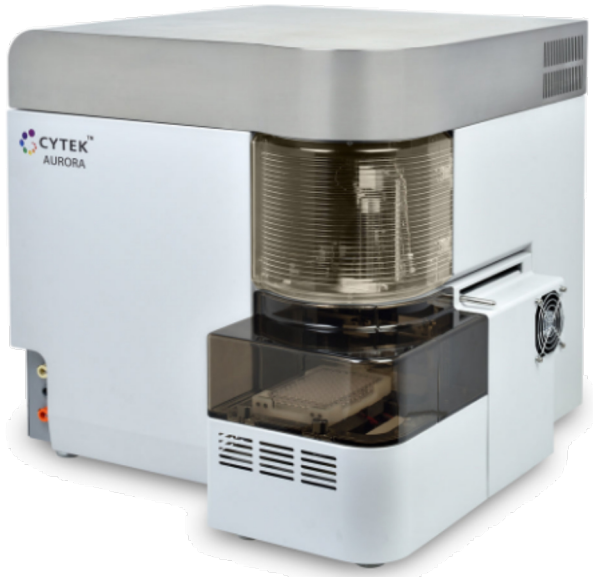
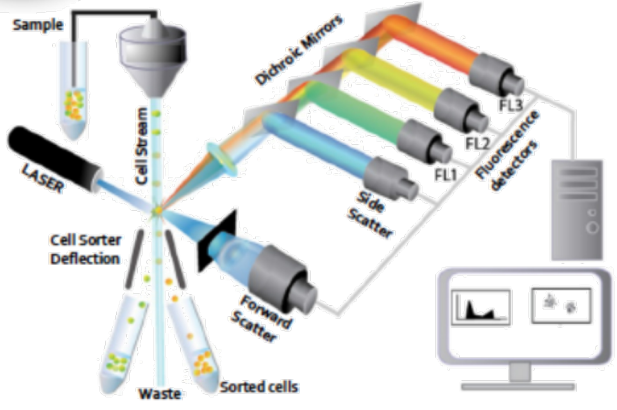
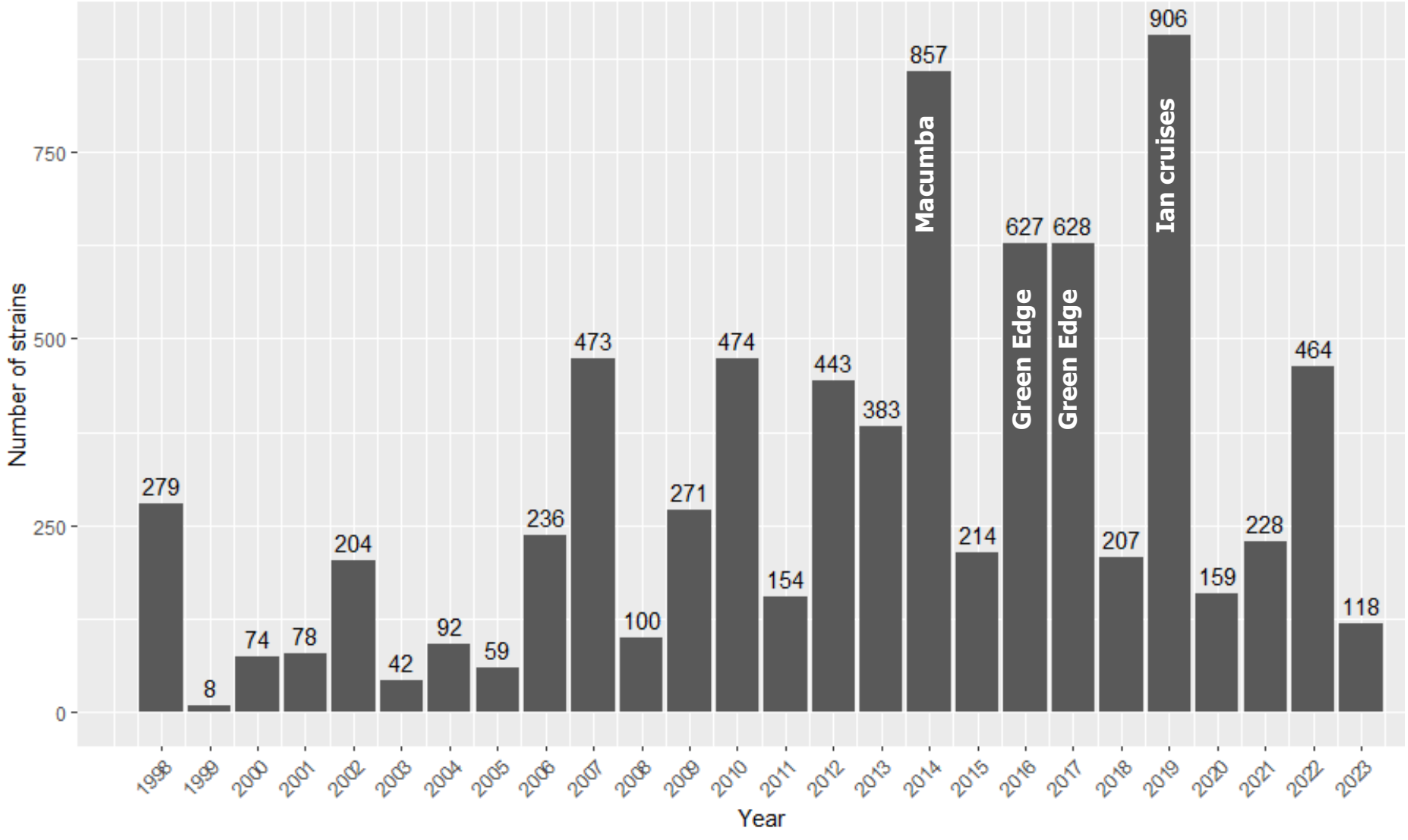


TABLE 6. Comparison of the taxonomic identity of the cultures obtained by single-cell flow cytometry sorting versus dilution or enrichment. Black rectangles correspond to the conditions that allowed the isolation of a given genus.

Division	Class	Genus	Number of precultures where genus isolated	Cell sorting	Dilution	Enrichment
Bacteria	Cyanophyceae	*Synechococcus*	8			
Heterokontophyta	Pelagophyceae	*Pelagomonas*	8			
Chlorophyta	Mamiellophyceae	*Micromonas*	5			
Haptophyta	Prymnesiophyceae	*Phaeocystis*	5			
Chlorophyta	Prasinophyceae	Clade VII	4			
Haptophyta	Prymnesiophyceae	*Emiliania*	3			
Haptophyta	Prymnesiophyceae	*Imantonia*	3			
Heterokontophyta	Pelagophyceae	Undescribed	2			
Chlorophyta	Trebouxiophyceae	Unknown	1			
Heterokontophyta	Bacillariophyceae	*Pseudo-nitzschia*	1			
Heterokontophyta	Chrysophyceae	*Spumella*	1			
Heterokontophyta	Unknown RCC853	Unknown	1			
		Total number of genera isolated		8	5	6



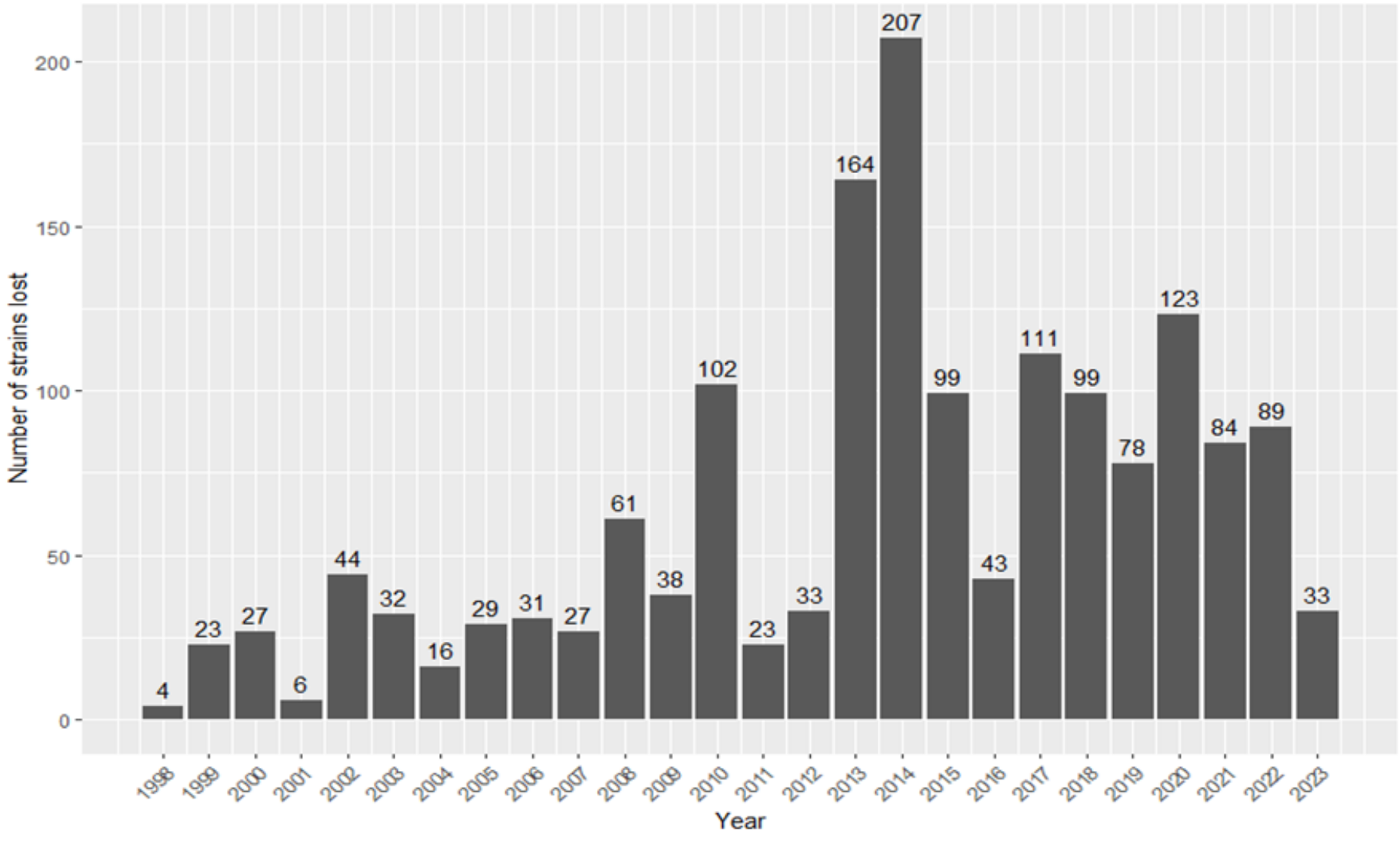
Strains added per year



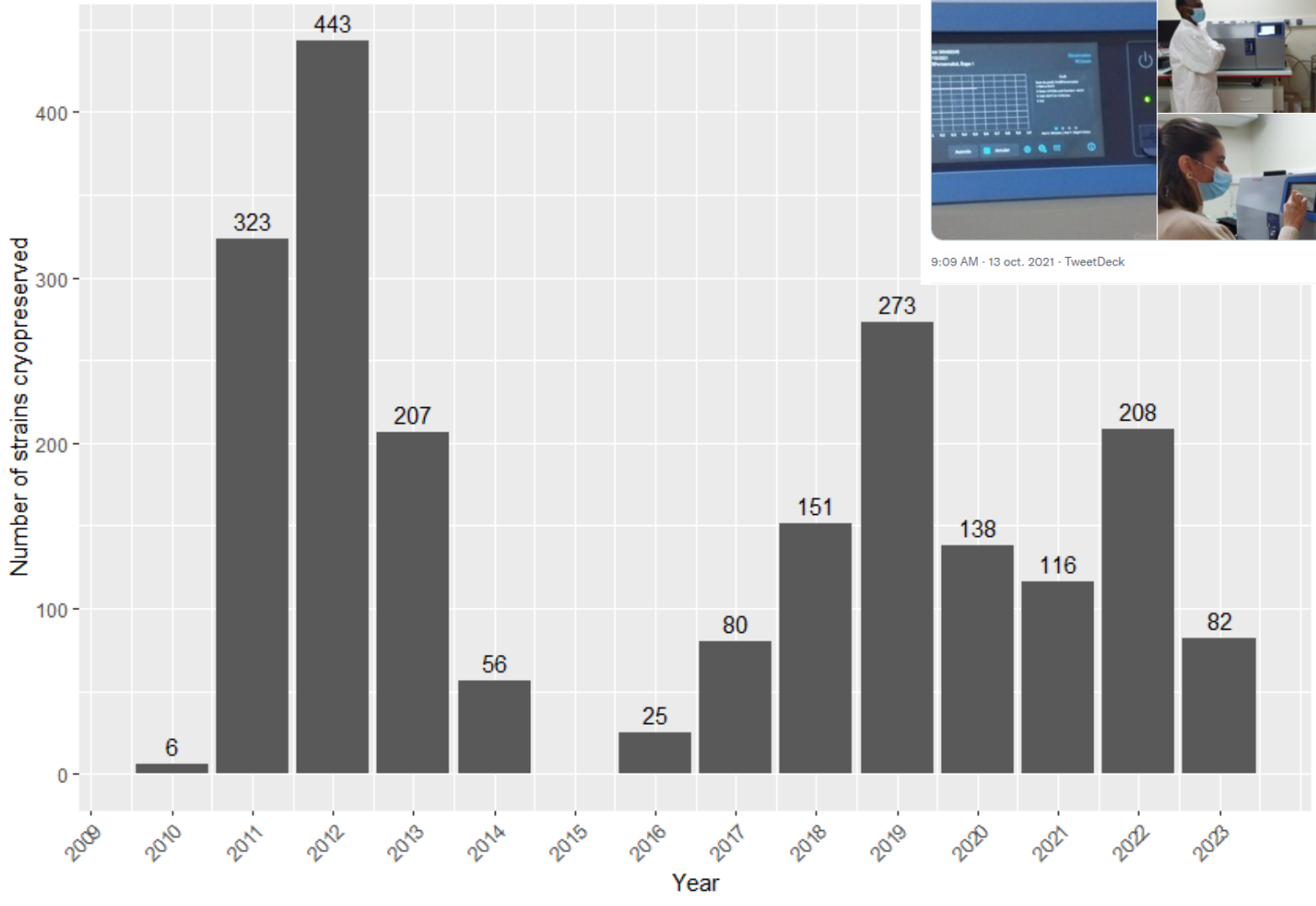
Maintenance

- Strains
  - Unialgal
  - Mostly clonal
  - Non-axenic
- Small volume (10-25ml) liquid culture
- Plastic tubes or plastic flasks
- Transfer once 1-3 weeks

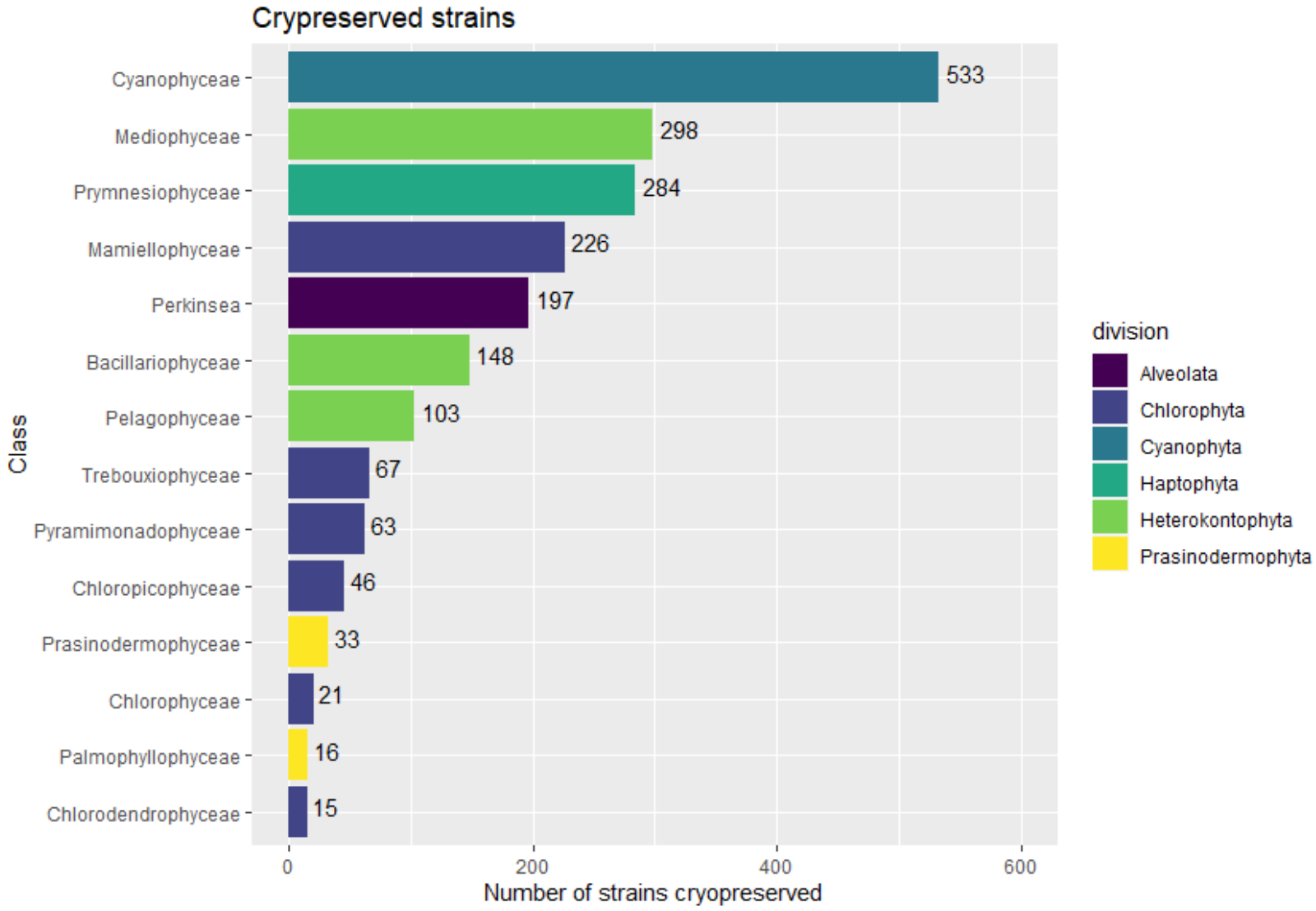
But we keep also loosing strains



Cryopreservation

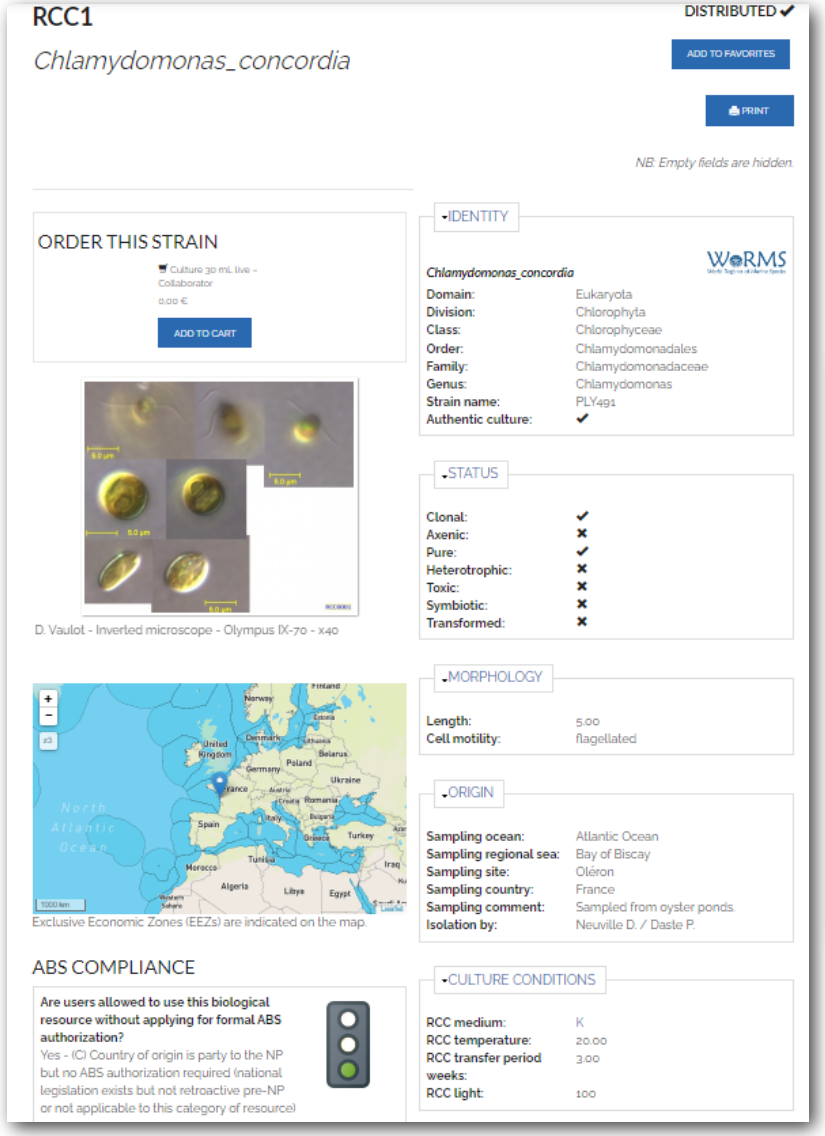


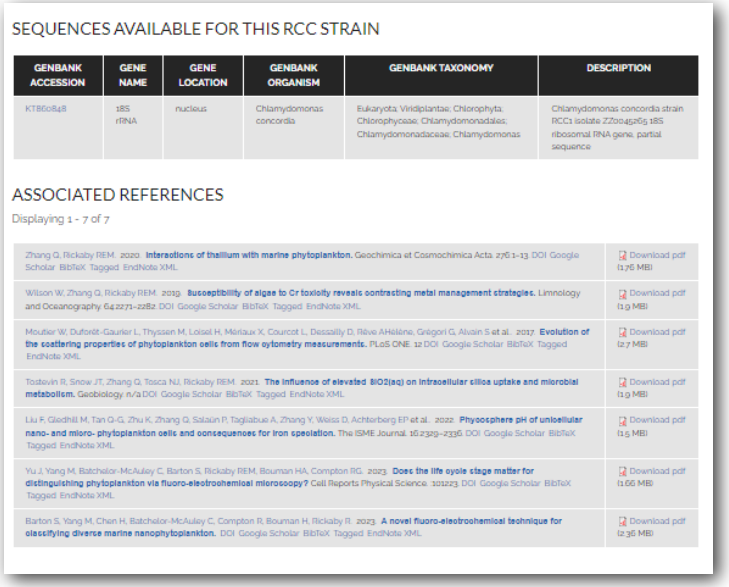
Cryopreserved classes



Strain metadata

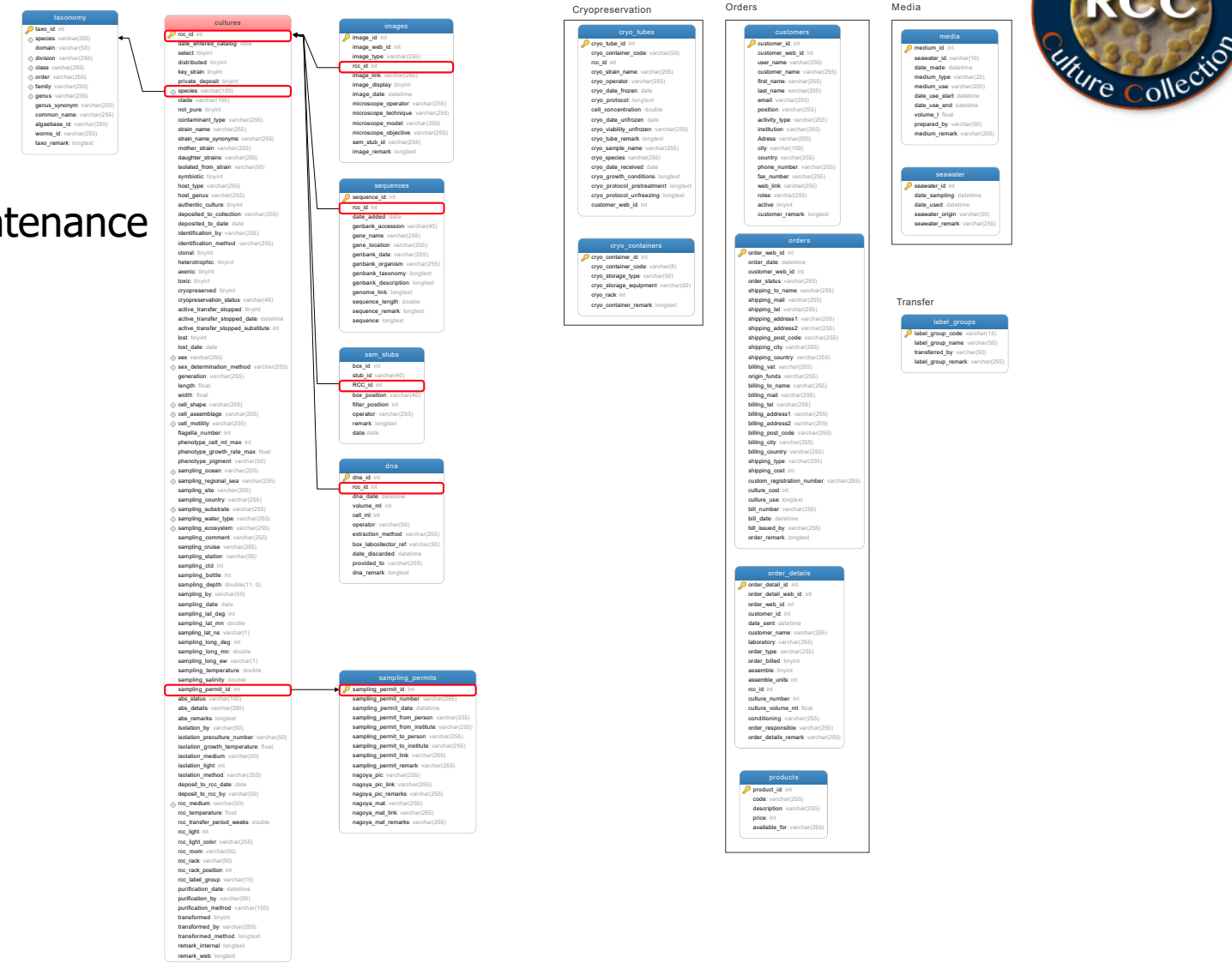
- Unique identifier
- Unified taxonomy (Algaebase)
- Origin
- ABS status
- Images
- Maintenance conditions
- Sequences
- Publications





Data management

- MySQL database
- Hosted on cloud
- Use Access interface for daily maintenance
  - Strain information update
  - Labels for transfer
  - Manage orders
- Link to web site (Drupal)



Culture management

RCC number: 1 Filter Print Axenic Clonal Toxic Mode Edition

Domain Eukaryota Division Chlorophyta Class Chlorophyceae Type strain for species

Order: Chlamydomonadales Family Chlamydomonadaceae

Genus: Chlamydomonas Species Chlamydomonas_concordia clade

Genus_synonym:

Strain name PLY491 Strain name synonyms

Cell shape: Cell assemblage: Cell motility: flagellated Number of flagella

Sex: Sex Determination Method: Generation: length 5 um width: um

Heterotrophic Mixed contaminant_typ

Mother strain : Daughter strains :

Isolated from strain (for virus and AAPB): Identified by: Identification method: sequence

Symbiotic Host type : Host genus :

Culture isolation Ocean: Atlantic Ocean Regional Sea: Bay of Biscay Site Oléron Country France

Substrate: Water type: Ecosystem: Sampling_comment: Sampled from oyster ponds.

Culture conditions Roscoff Transfer period SBR (weeks) 3 Portoir SBR: 20-8.E2. Etiquettes: groupe C

rcc_medium: K Temperature SBR (°C): 20 Light SBR (uE): 100 rcc_room: CRBM-C1 20

Lost Lost Date: Select

Date entered RCC: 01/11/1998 Distributed

Key strain

Deposited to RCC date

Deposited to RCC by PLY

Deposited to other collection

Deposited to collection date:

Cryopreserved

Active transfer stopped

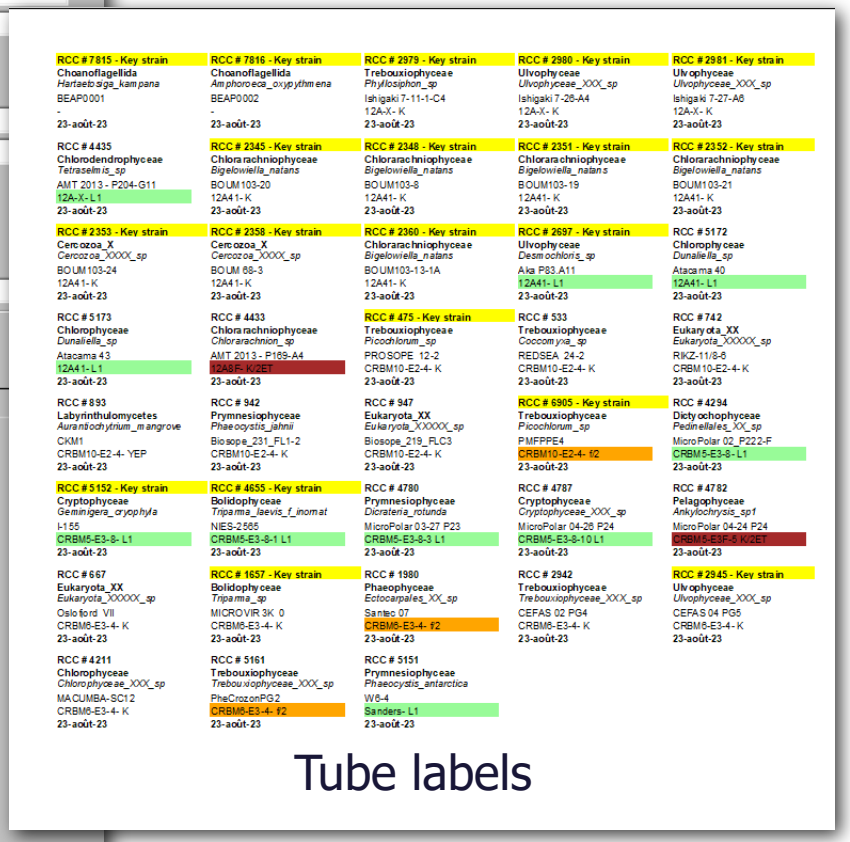
Date strop transfer :

RCC strain subsitute :

Remarks | Picture | Genetic data | Isolation data | Cryotubes | DNA | SEM_stubs | Envoi des cultures | Projects

RCC	strain_name	Date envoi	Species	Destinataire	Laboratoire	Volur	Forme	Resp
1	PLY491	25-sept.-00	Chlamydomonas_concordia	Melkonian	University of Cologne	50	Live culture	FLG
1	PLY491	06-août-99	Chlamydomonas_concordia	Guilloux	SOMAIGE	10	Live culture	FLG
1	PLY491	06-mars-98	Chlamydomonas_concordia	Lemée		5	Fixed sample	SB
1	PLY491	15-nov.-04	Chlamydomonas_concordia	Janvier	Lycée Saint Louis	50	Live culture	FJ
1	PLY491	19-nov.-04	Chlamydomonas_concordia	Nilès	Collège J. Prévert	50	Live culture	FLG
1	PLY491	12-janv.-05	Chlamydomonas_concordia	Dizien	Lycée Saint Louis	50	Live culture	FJ
1	PLY491	12-janv.-05	Chlamydomonas_concordia	Ramani	Lycée Saint Louis	50	Live culture	FJ
1	PLY491	24-nov.-05	Chlamydomonas_concordia	Grob	University of Warwick	500	Live culture	FLG
1	PLY491	17-sept.-07	Chlamydomonas_concordia	Wang	Umea University	50	Live culture	PG
1	PLY491	11-août-08	Chlamydomonas_concordia	Qi	National Institute of Bio	50	Live culture	PG
1	PLY491	02-sept.-08	Chlamydomonas_concordia	Qi	National Institute of Bio	50	Live culture	PG
1	PLY491	22-oct.-08	Chlamydomonas_concordia	Dessen	SBR EPPO	50	Live culture	PG
1	PLY491	09-oct.-09	Chlamydomonas_concordia	Marie	SBR DPO	50	Live culture	PG
1	PLY491	12-déc.-11	Chlamydomonas_concordia	Lindsay	Centre for ecology an	30	Live culture	RE
1	PLY491	16-janv.-12	Chlamydomonas_concordia	Chris	ENS	30	Live culture	RE
1	PLY491	18-févr.-13	Chlamydomonas_concordia	Shin	Plant Developmental G	30	Live culture	AL
1	PLY491	23-avr.-13	Chlamydomonas_concordia	Simon	SBR DPO	30	Live culture	RE
1	PLY491	03-mars-14	Chlamydomonas_concordia	Lucile	UMR LOG 8187	1000	Live culture	PG

Record: 1 of 21 No Filter Search



Tube labels

Services

- Live cultures
- Frozen pellets
- Culture medium
- Strain cryopreservation
- Strain identification (image, sequence)
- Strain deposit
  - Free for academics
  - Paid for private

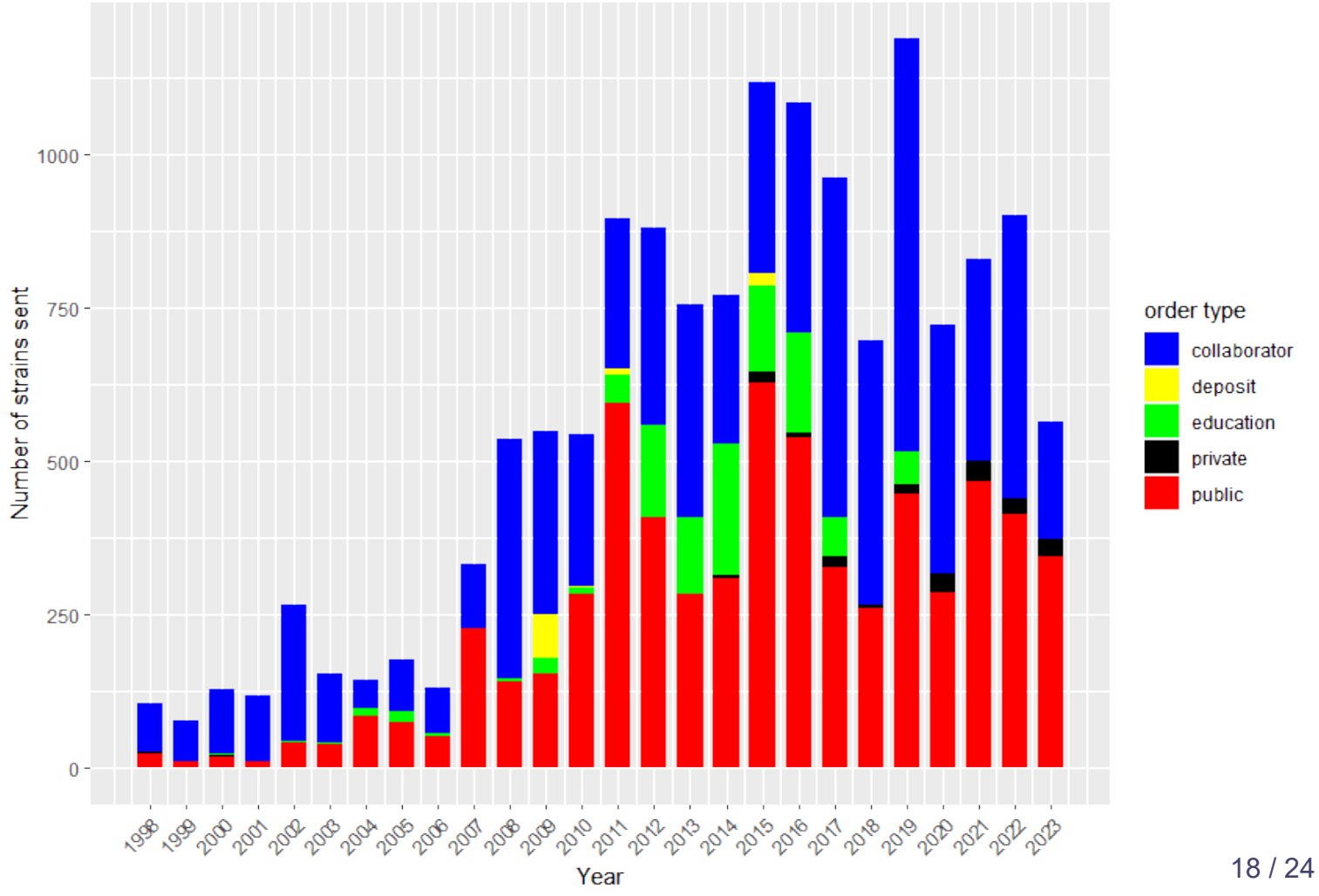
Item	UNIT PRICE	
	Public sector (University, Research center)	Private company
Culture 30 mL live	50 €	150 €
Culture 1 L live	100 €	300 €
Culture 30 mL frozen pellet	150 €	450 €
Culture 1 L frozen pellet	300 €	900 €
Culture medium 1 L	50 €	100 €
Strain identification	50 €	150 €
Strain cryopreservation	50 €	150 €
Private strain deposit (live)	150 € / year	450 € / year
Private strain deposit (cryopreserved)	50 € / year	150 € / year

Citation

Distribution of strains

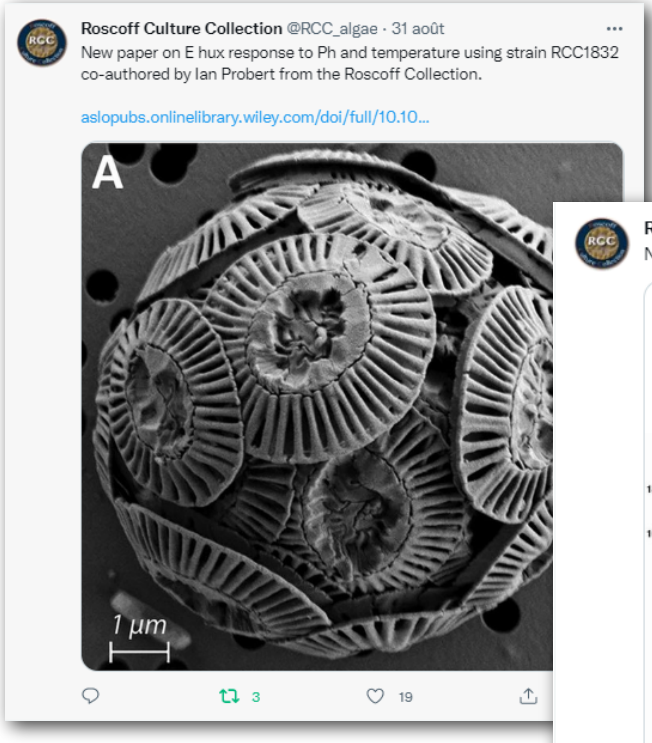
- Education
  - Free of charge for school
  - > 700 strains proviced
  - Advice on projects

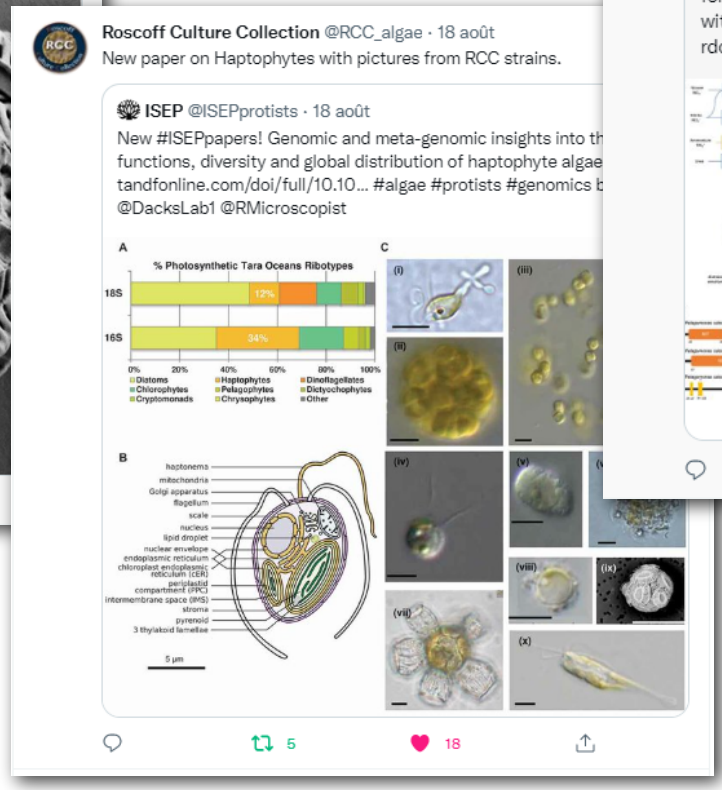
- Private sector
  - Strain
  - Strain identification
  - Strain deposit
  - Cryopreservation

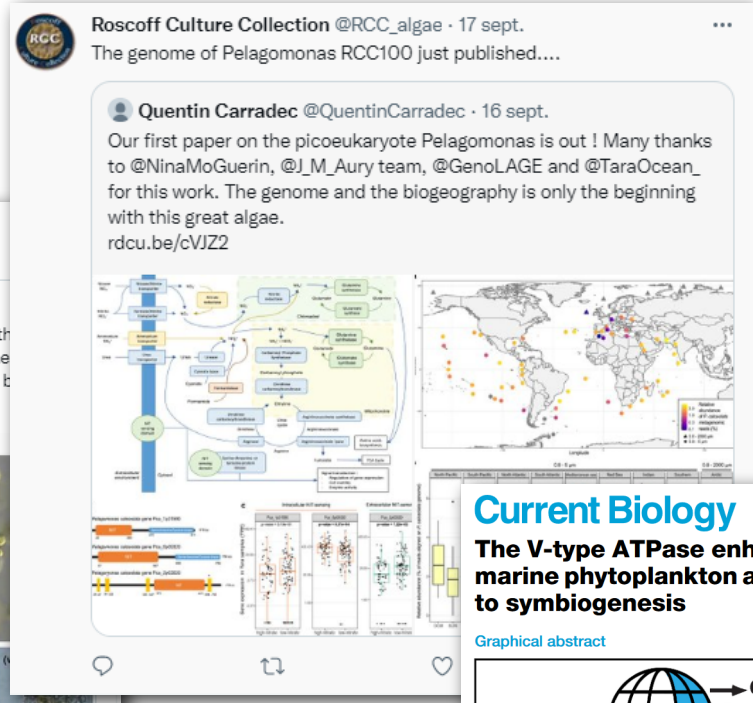


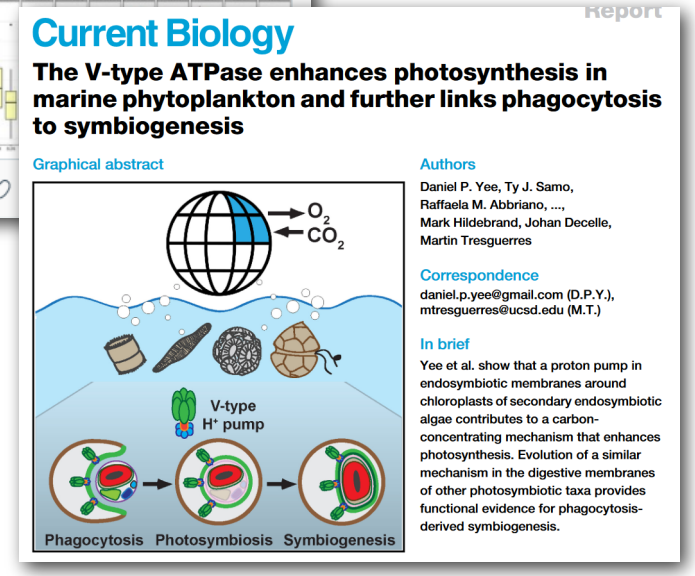
Citation

Papers published on RCC strains 529



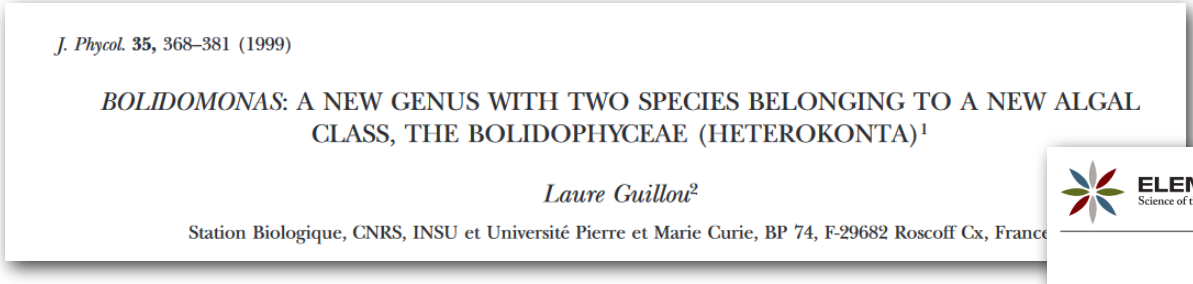






https://roscoff-culture-collection.org/strains/strain-references

Internal research



J. Phycol. 35, 368–381 (1999)

BOLIDOMONAS: A NEW GENUS WITH TWO SPECIES BELONGING TO A NEW ALGAL CLASS, THE BOLIDOPHYCEAE (HETEROKONTA)[1]

Laure Guillou[2]

Station Biologique, CNRS, INSU et Université Pierre et Marie Curie, BP 74, F-29682 Roscoff Cx, France

ELEMENTA Science of the Anthropocene

Gérikas Ribeiro, C, et al. 2020. Culturable diversity of Arctic phytoplankton during pack ice melting. *Elem Sci Anth*, 8: 6. DOI: https://doi.org/10.1525/elementa.401

RESEARCH ARTICLE

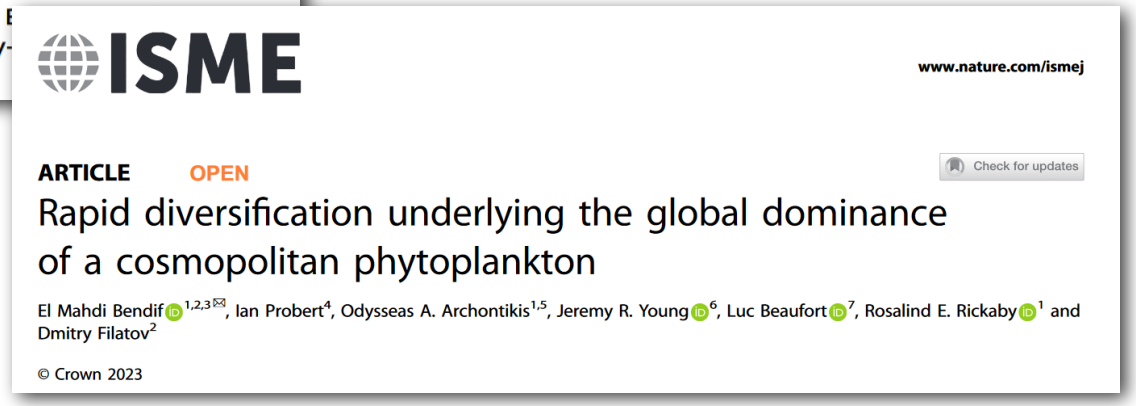
Culturable diversity of Arctic phytoplankton during pack ice melting

Catherine Gérikas Ribeiro[*,†], Adriana Lopes dos Santos[†,‡], Priscillia Gourvil[§], [illegible][*], Dominique Marie[*], Margot Tragin[*], Ian Probert[§] and Daniel Vaulot[*,‡]

OPEN

Chloropicophyceae, a new class of picophytoplanktonic prasinophytes

Adriana Lopes dos Santos[1,5], Thibaut Pollina[1,2], Priscillia Gourvil[1], [illegible], Dominique Marie[1], José Luis Garrido[3], Francisco Rodríguez[4], Mary-[illegible] Vaulot[1] & Wenche Eikrem[2,7]



ISME

www.nature.com/ismej

ARTICLE OPEN

Check for updates

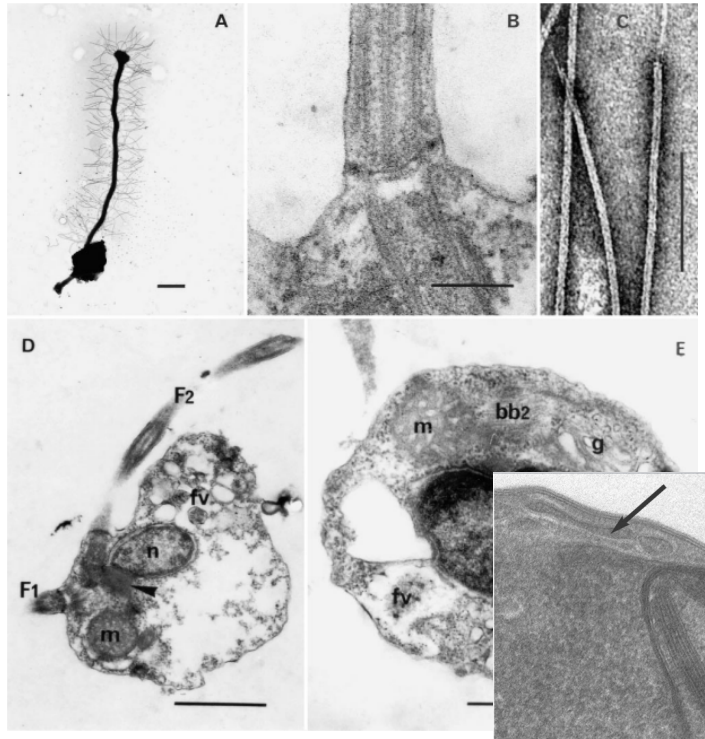
Rapid diversification underlying the global dominance of a cosmopolitan phytoplankton

El Mahdi Bendif[1,2,3✉], Ian Probert[4], Odysseas A. Archontikis[1,5], Jeremy R. Young[6], Luc Beaufort[7], Rosalind E. Rickaby[1] and Dmitry Filatov[2]

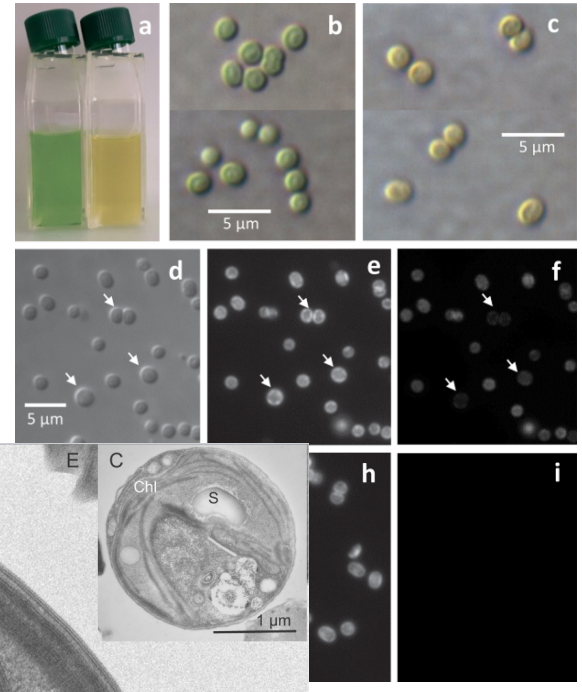
New species, genera, classes

- *Bolidomonas* (now *Triparma*)
- *Picophagus* & *Symbiomonas*
- *Florenciella*
- *Partenskyella* & *Lotharella*
- *Chloropicon* & *Chloroparvula*
- *Prasinoderma*
- *Mantoniella*
- *Micromonas*
- *Pseudohaptolina*
- *Acaryochloris*
- *Gephyrocapsa huxleyi…*

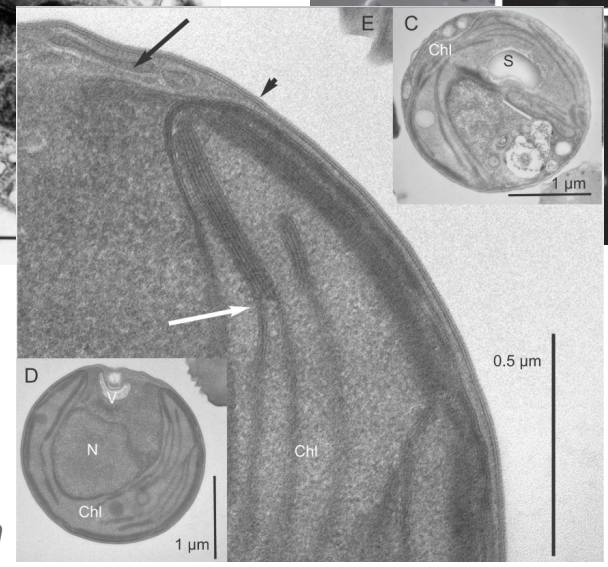
Picophagus



Acaryochloris



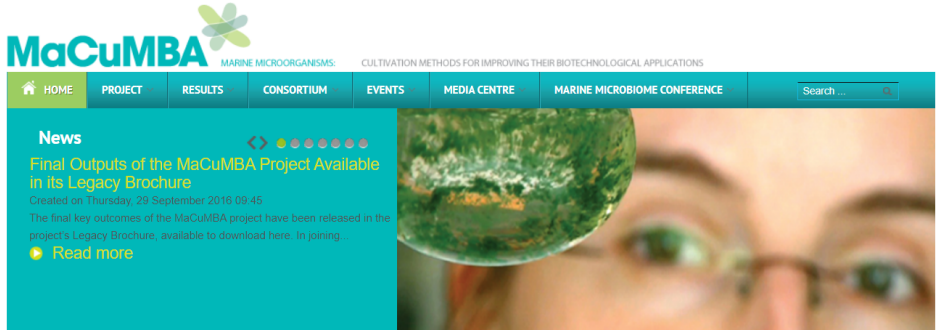
Chloropicon



Projects

Past

- MACUMBA - EU (2012-2016)
- ASSEMBLE - EU
- EMBRIC - EU
- NomorFilm - EU
- Polyalgues - ANR



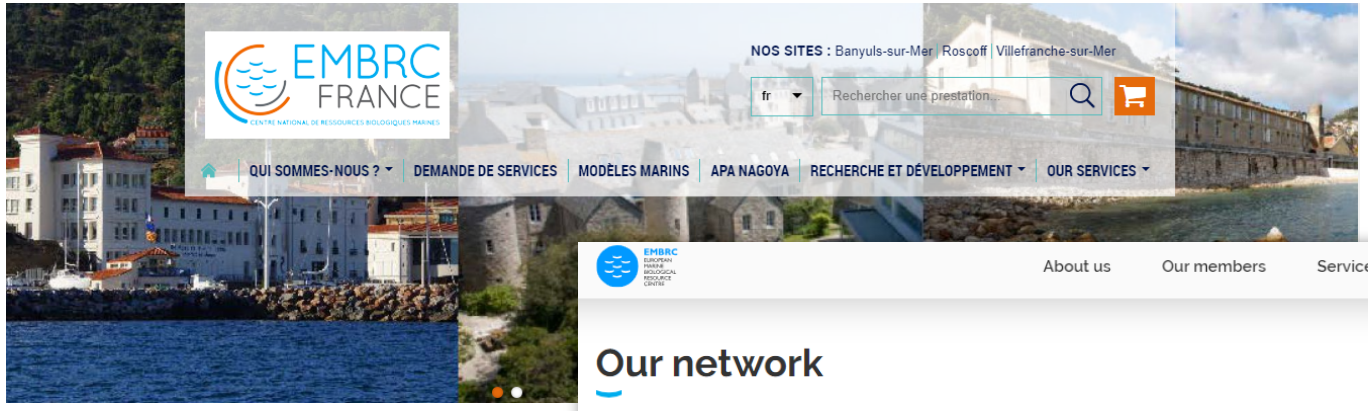
Current

- Phenomap - ANR (2020-2023) - Strain characterisation
- PelagoAdapt - ANR (2023-2026) - Pelagophyceae
- Taxi - ANR (2023-2026) - Taxonomie cyanobacteria
- ATLASea - ANR PEPR - 700 genomes
- BlueRemediomics - EU (2022-2026)
- MICROBES - EU (2022-2026)

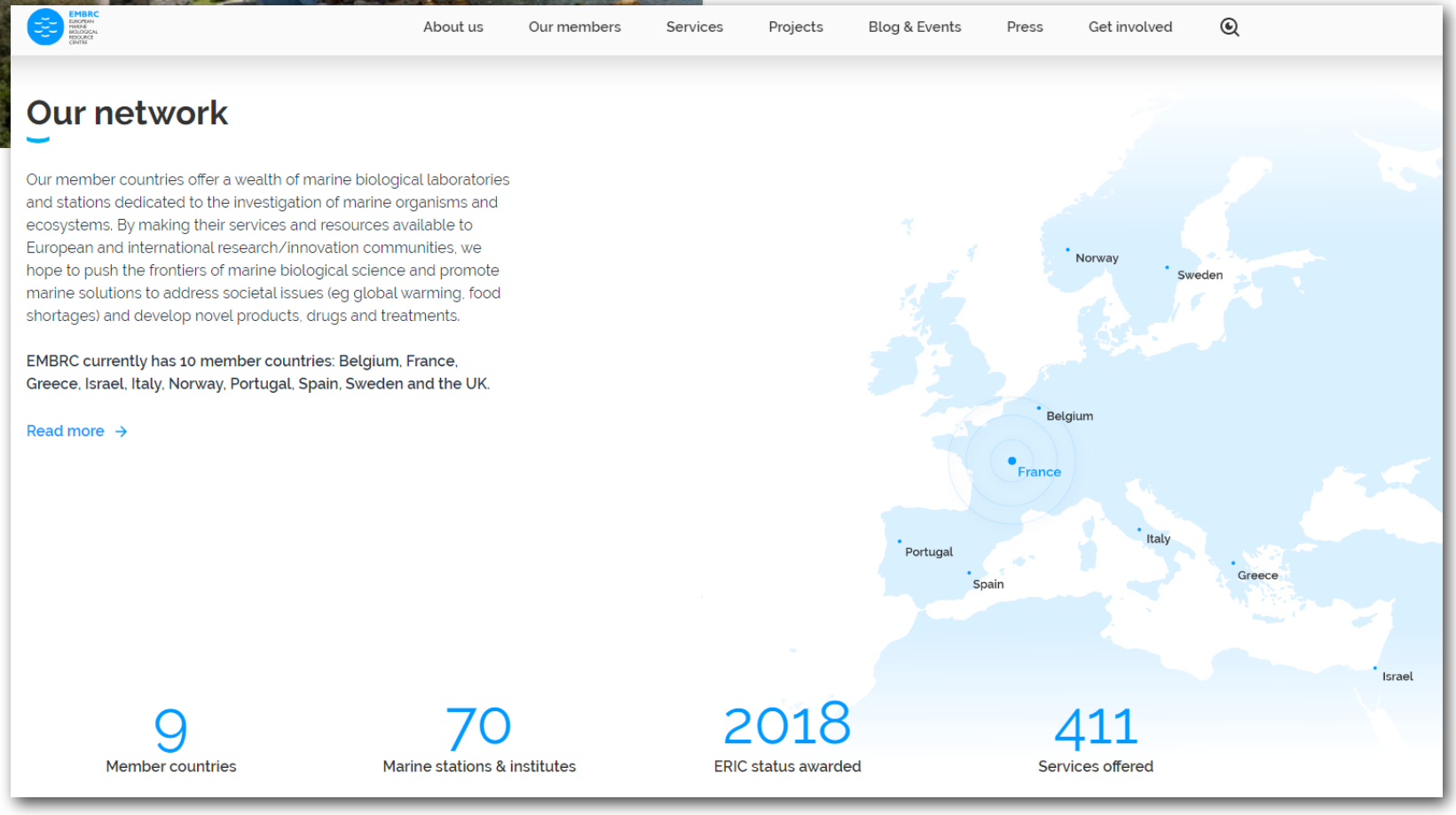
ATLASea - Atlas des génomes marins : des données massives à l'innovation

Co-piloté par le CNRS et le CEA, le programme de recherche exploratoire Atlasea vise à séquencer le génome de 4 500 espèces marines de la zone économique exclusive française. Financé à hauteur de 41 millions d'euros sur 8 ans dans le cadre de France 2030, il permettra entre autres, de comprendre, de protéger et d'étudier l'ensemble des formes du vivant dans toute leur diversité.

EMBRC-France



- Roscoff
- Banyuls
- Villefranche/Mer



Questions ?