

# Diversity of marine *Synechococcus* and picoeukaryote plastids

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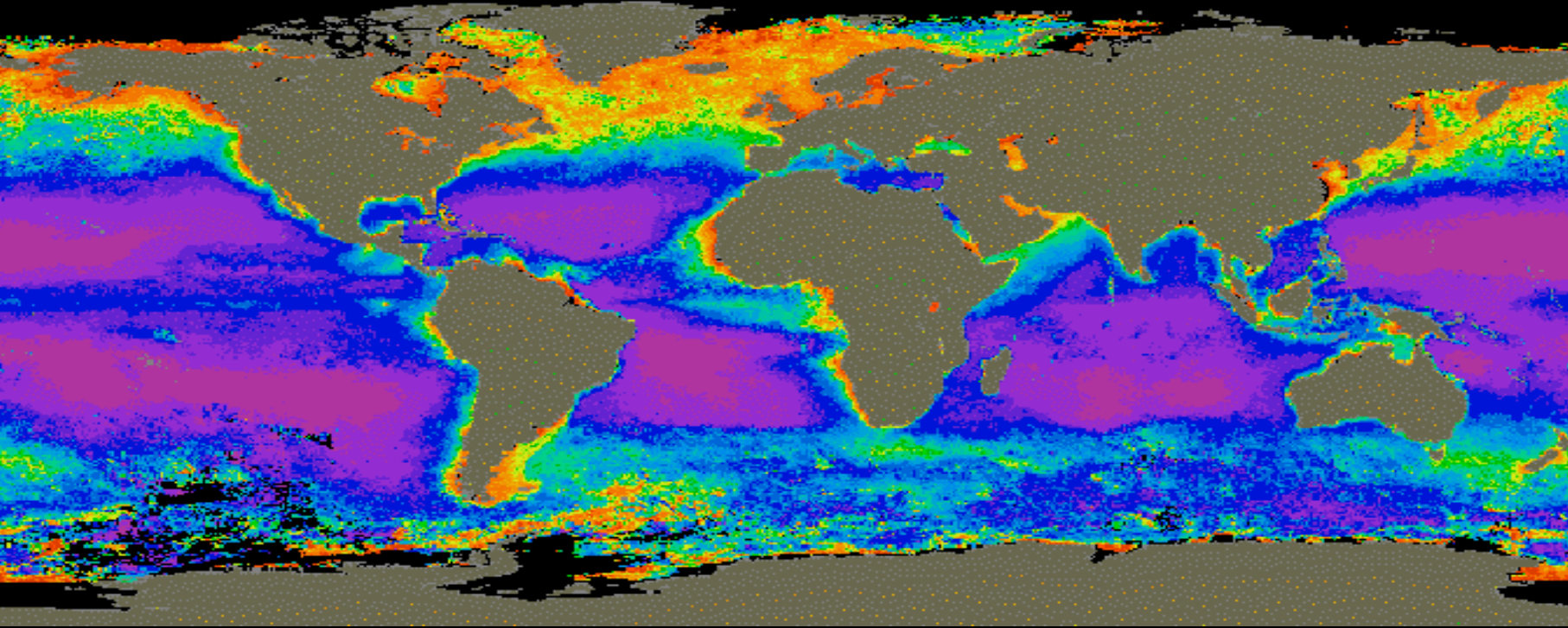
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# 1. *Synechococcus*



- Global distribution
- Mesotrophic-oligotrophic
- $10^4 - 10^5$  cells  $\text{ml}^{-1}$
- Throughout euphotic zone
- Significant contribution to marine C-fixation

## Aims

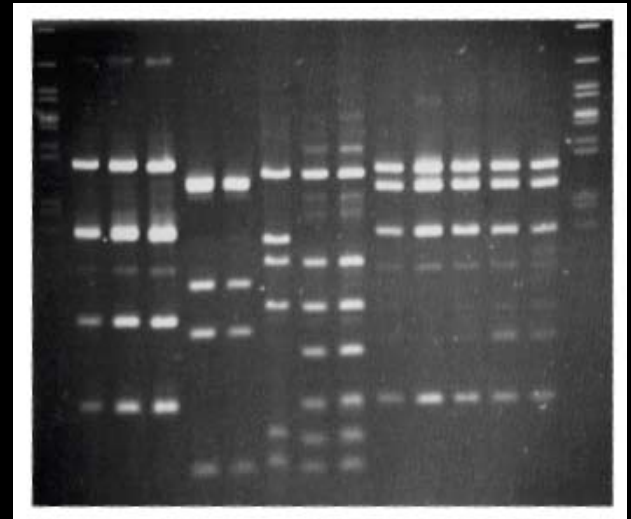
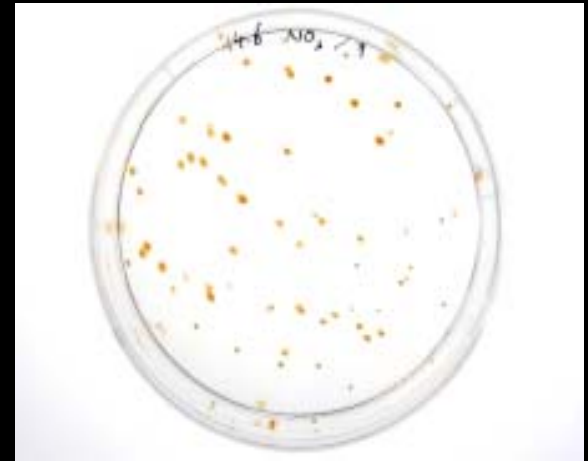
- Determine the diversity of marine *Synechococcus* using 16S rRNA
- Design oligonucleotide probes specific for the different *Synechococcus* clades
- Application of probes to marine systems

# Strain isolation

Isolation & purification  
on plates (250)



Screening isolates (*ntcA* RFLP)



6 RFLP types; 21 clonal *Synechococcus* strains

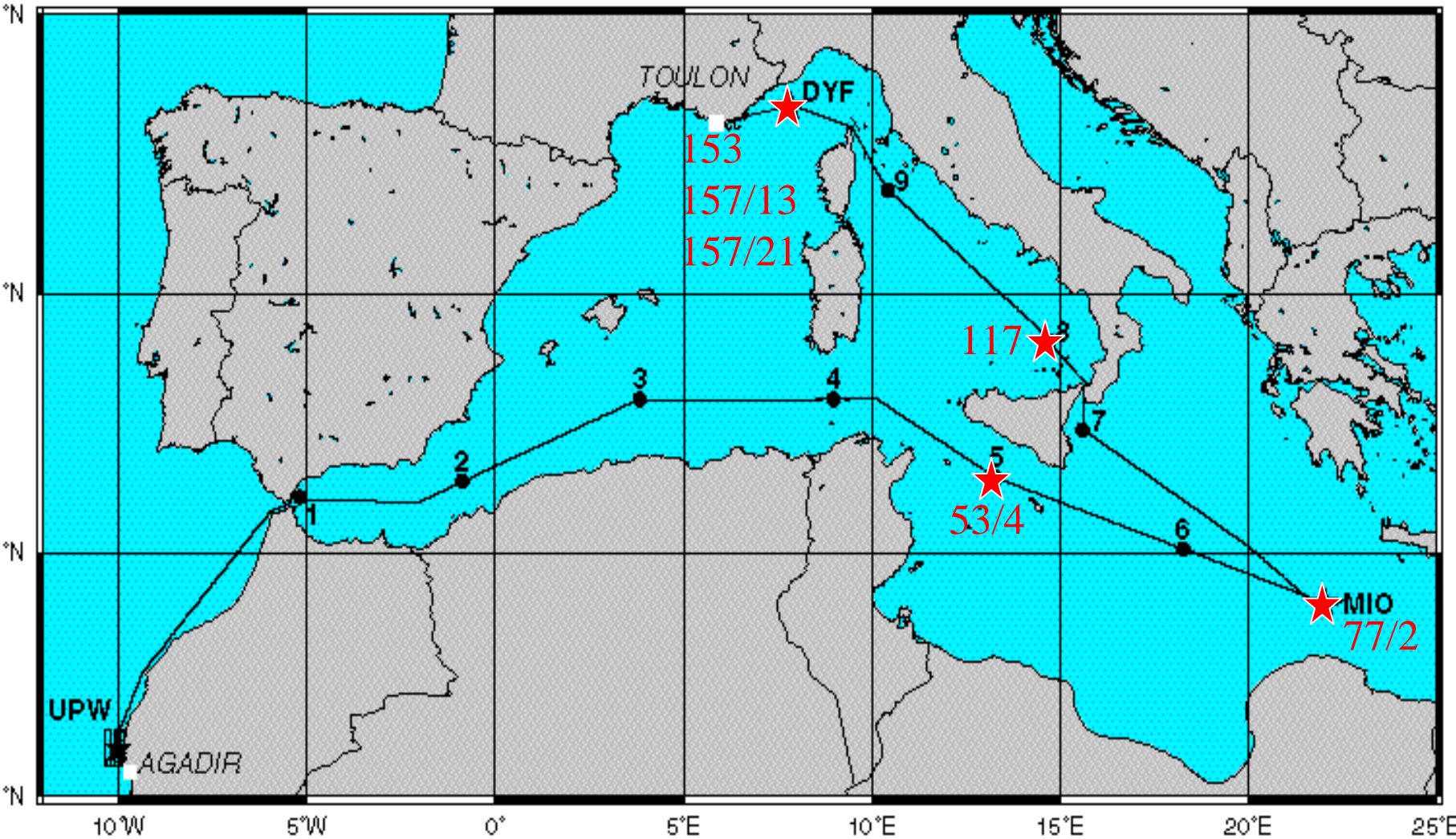
# Red Sea *Synechococcus* strains

Strain	Depth m	Date of Isolation	PUB/PEB ratio	Obligately marine	Growth on N source	ntcA RFLP type
RS9901	1	29.3.99	0.7	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	I
RS9902	1	29.3.99	1.4	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	II
RS9903	10	11.5.99	2.0	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	III
RS9904	10	14.6.99	1.5	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	III
RS9905	10	18.7.99	1.0	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	IV
RS9906	10	23.8.99	NA	-	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	N/A
RS9907	10	23.8.99	0.5	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	II
RS9908	10	7.9.99	0.5	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	II
RS9909	10	7.9.99	NA	-	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	N/A
RS9910	10	7.9.99	0.5	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	II
RS9911	10	11.5.99	0.8	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	V
RS9912	10	23.8.99	0.5	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	N/A
RS9913	10	7.9.99	NA	-	NH <sub>4</sub> <sup>+</sup>	N/A
RS9914	10	18.10.99	NA	-	NH <sub>4</sub> <sup>+</sup>	N/A
RS9915	10	18.10.99	0.8	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	IV
RS9916	10	22.11.99	0.7	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	I
RS9917	10	22.11.99	NA	-	NH <sub>4</sub> <sup>+</sup>	N/A
RS9918	10	22.11.99	NA	-	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	N/A
RS9919	50	22.11.99	1.8	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	V
RS9920	150	22.11.99	1.7	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	VI
RS9921	150	22.11.99	0.7	+	NO <sub>3</sub> <sup>-</sup> /NH <sub>4</sub> <sup>+</sup>	I

# Other *Synechococcus* strains

<b>Strain</b>	<b>Isolation Location</b>	<b>Depth m</b>	<b>Isolation Date</b>	<b>PUB/PEB ratio</b>	<b>Isolated by</b>
Almo3	Mediterranean Sea	0	1.5.91	0.4	Partensky & LeGall
Bright	North Sea			NA	Partensky & LeGall
Dim	North Sea			0.5	Partensky & LeGall
Eum14	Tropical Atlantic	105	1.10.91	2.2	Partensky & LeGall
Max42	Sargasso Sea	120	9.10.87	1.6	Partensky & LeGall
Minos12	Mediterranean Sea	20	19.6.96	1.8	Partensky & LeGall
Minos2	Mediterranean Sea	15	26.5.96	1.6	Partensky & LeGall
Oli31	Equatorial Pacific	70	11.11.94	1.7	Partensky & LeGall
Minos11	Mediterranean Sea	20	19.6.96	0.7	Partensky & LeGall
Minos1	Mediterranean Sea	15	26.5.96	0.7	Partensky & LeGall
53/4	Mediterranean Sea	5	19/9/99		Partensky & LeGall
77/2	Mediterranean Sea	5	20.9.99		Partensky & LeGall
117/	Mediterranean Sea	5	27.9.99		Partensky & LeGall
153	Mediterranean Sea	25	30.9.99		Partensky & LeGall
157/13	Mediterranean Sea	15	30.9.99		Partensky & LeGall
157/21	Mediterranean Sea	15	30.9.99		Partensky & LeGall
BL8	Mediterranean Sea	0	21.9.00		Guillou
C129	Gulf of Aqaba			0.9	Lindell & Post
CC9311	California Current	95	1993	1.16	Palenik
CC9605	California Current		1996	2.1	Palenik
WH5701	Long Island South		1957	NA	Waterbury
WH7803	Sargasso Sea		1.7.78	0.5	Waterbury
WH8002	Gulf of Mexico		15.4.80	0.48	Waterbury
WH8016	Woods Hole		6.80	0.40	Waterbury
WH8018	Woods Hole		6.80	No PUB	Waterbury
WH8020	Sargasso Sea	50	26.6.80	0.78	Waterbury
WH8103	Sargasso Sea		17.3.81	1.3	Waterbury
WH8100	Sargasso Sea		6.81	0.80	Waterbury

# Origin of PROSOPE *Synechococcus* strains



# Synechococcus 16S rRNA

