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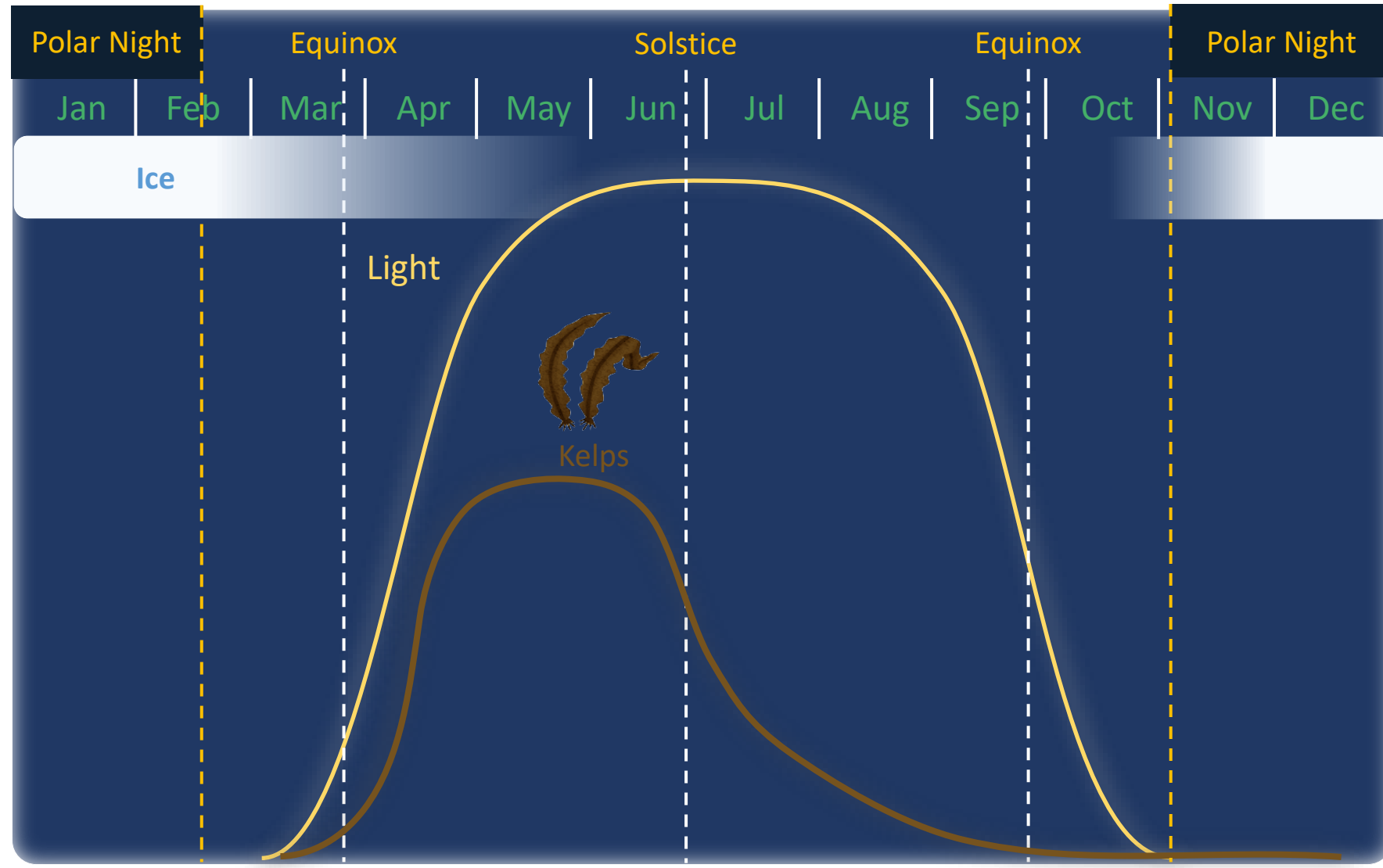
A photograph of a snowy Arctic village at night. The buildings are illuminated with warm yellow lights, and a prominent red light is visible on a tower. The sky is dark with a vibrant green aurora borealis visible in the background. The foreground is a snowy, flat landscape.

**Temperature effects on growth and photosynthesis
reactivation after the polar night in two Arctic kelp species**

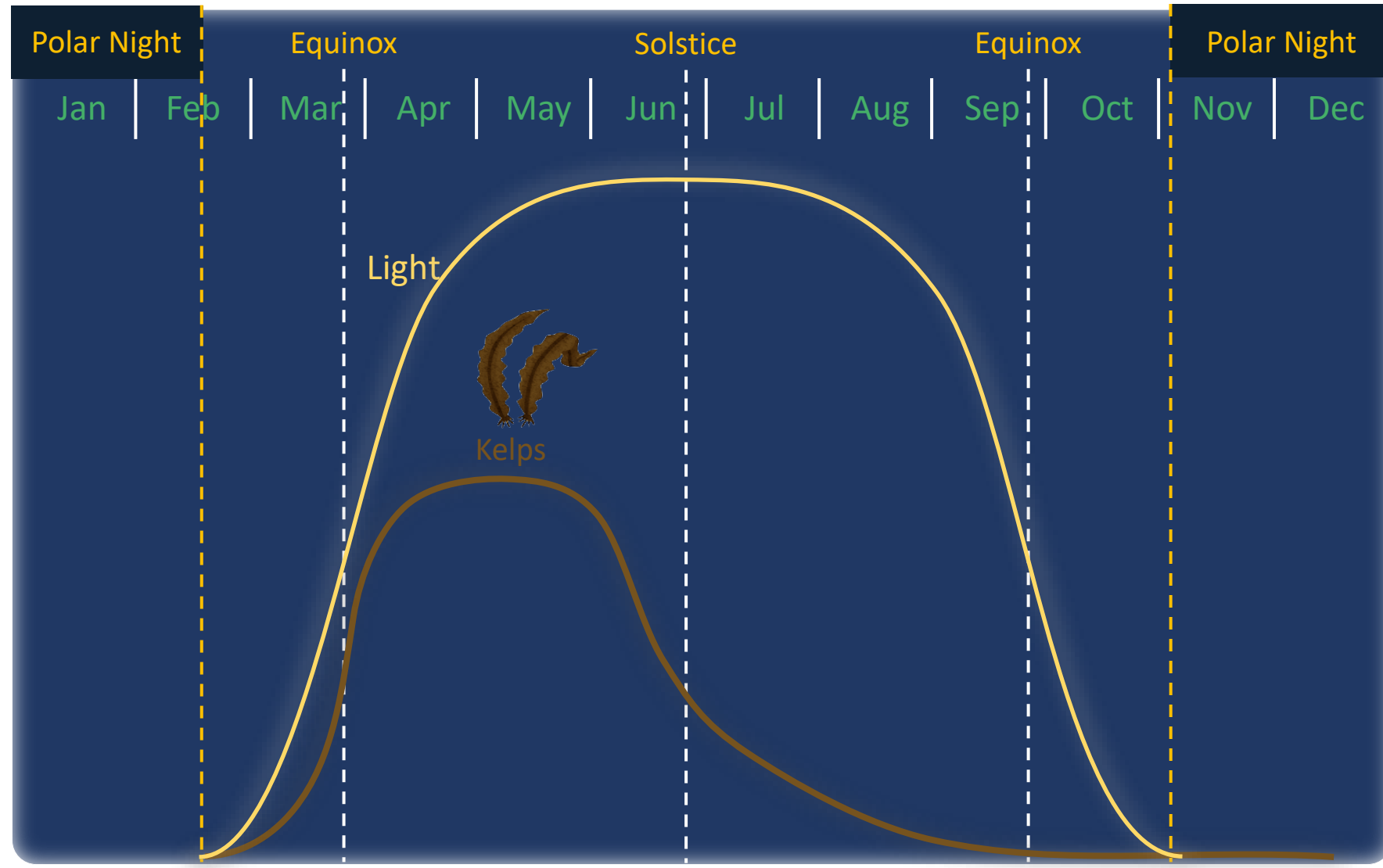
1- INTRODUCTION



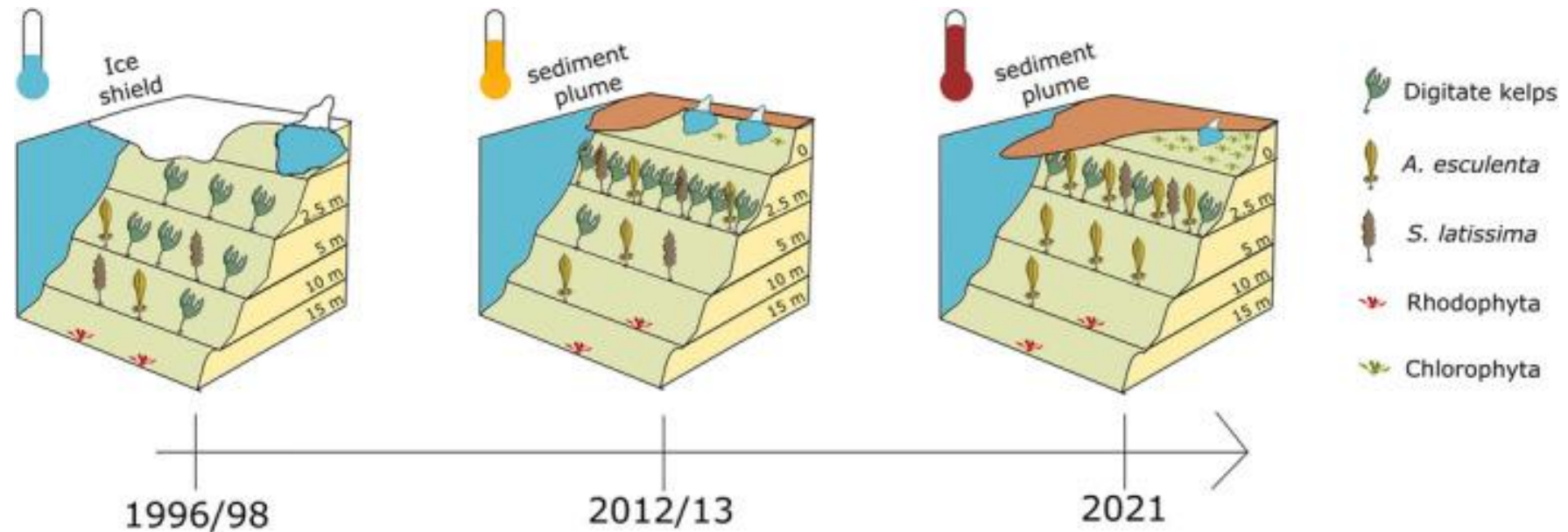
FJORD ANUAL CYCLE



FJORD ANUAL CYCLE



1- INTRODUCTION



Düsdeau et al. 2024, Ecol evol.

1. Effect of increased temperature on kelp survival during the polar night
2. How fast this species will be able to resume growth and photosynthesis at the onset of the polar day
3. Effect of increased temperature on growth and photosynthetic recovery

1- INTRODUCTION

Alaria esculenta

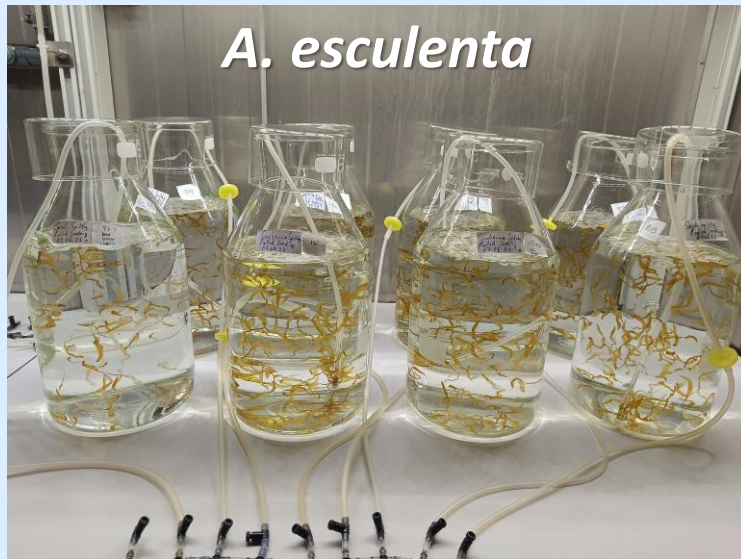
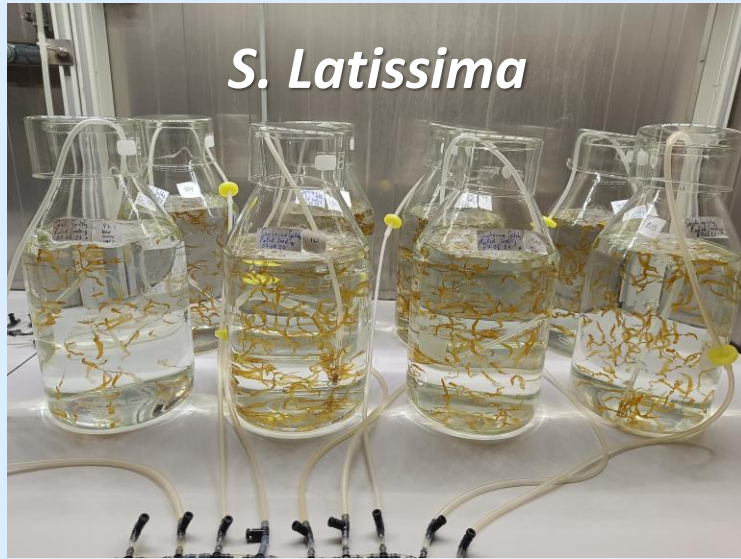


Saccharina latissima

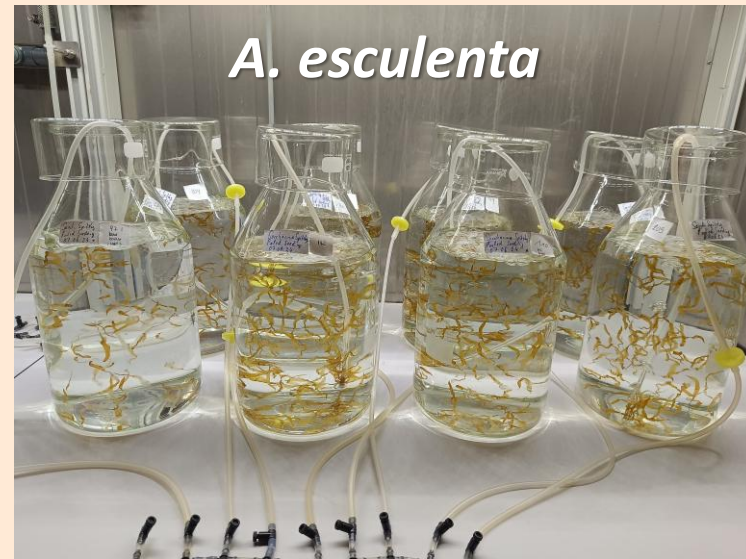
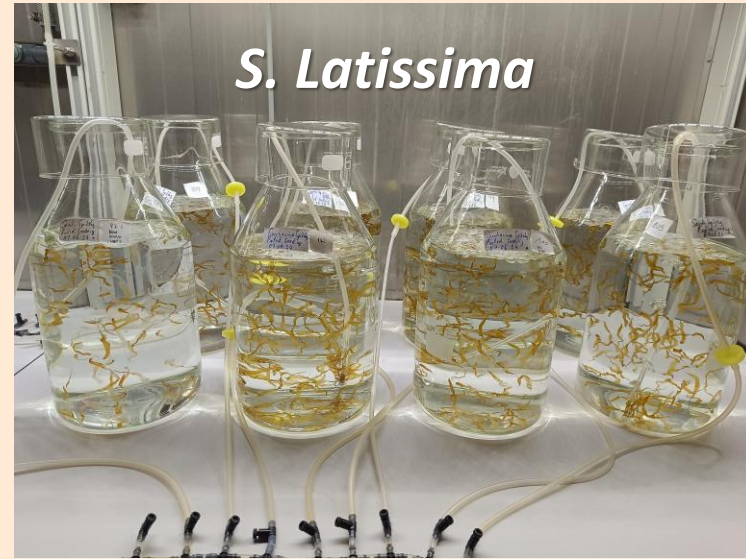


2- MATERIAL AND METHODS

1 °C



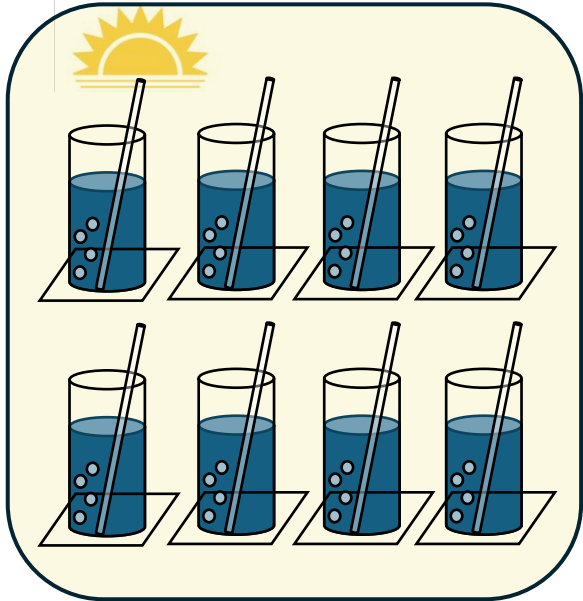
5 °C



2- MATERIAL AND METHODS

📅 9 DAYS

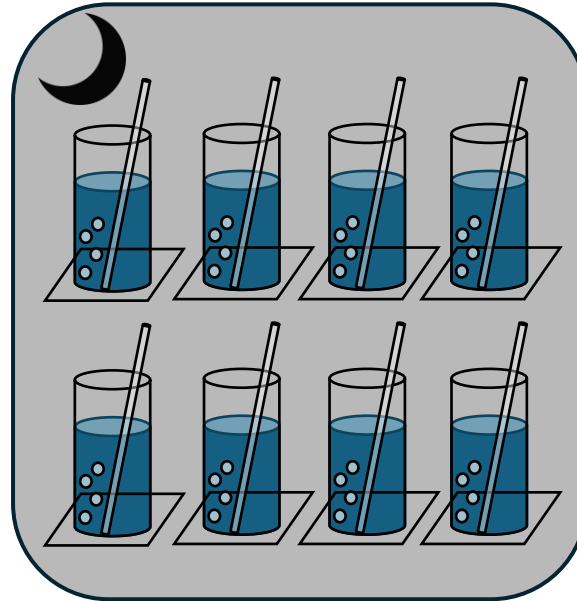
Decreasing photoperiod
and light intensity



Initial sampling

📅 8 WEEKS

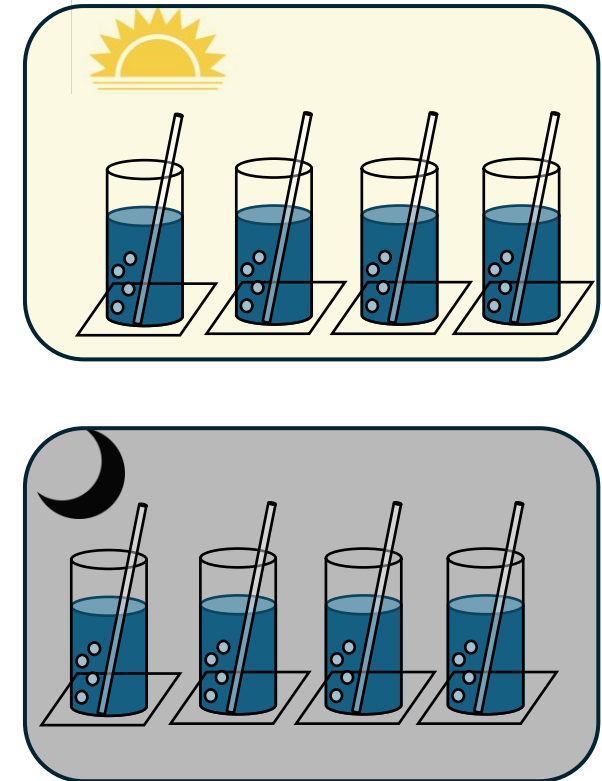
Total darkness



Darkness sampling

📅 2 WEEKS

“Awakening experiment”

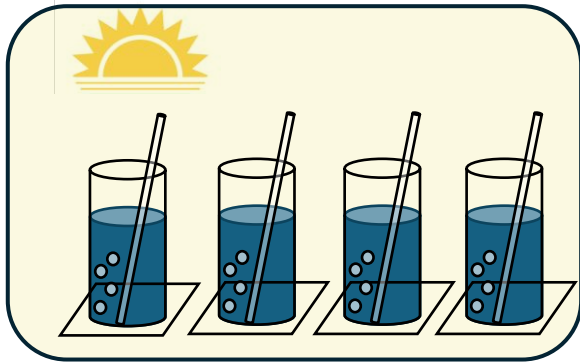


Awakening samplings

2- MATERIAL AND METHODS

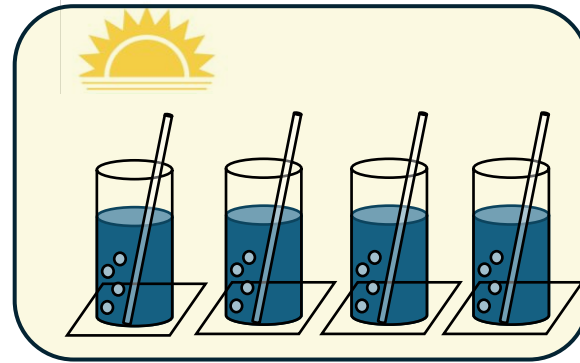
 DAY 1

1 hour of light
 $3 \mu\text{mol photons m}^{-2} \text{s}^{-1}$



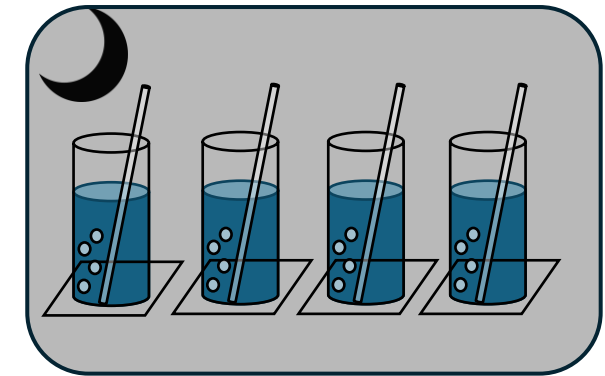
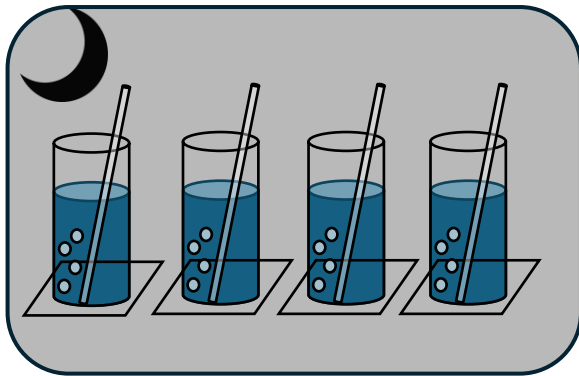
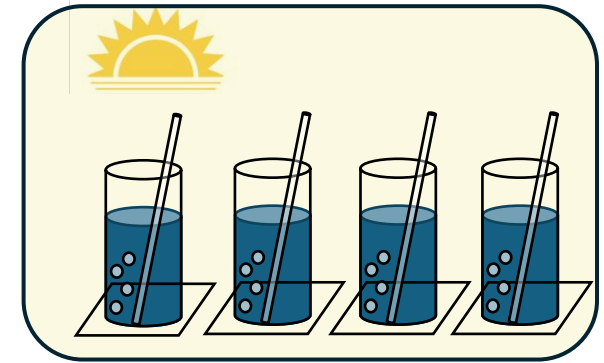
 DAY 7

4 hours of light
 $10 \mu\text{mol photons m}^{-2} \text{s}^{-1}$



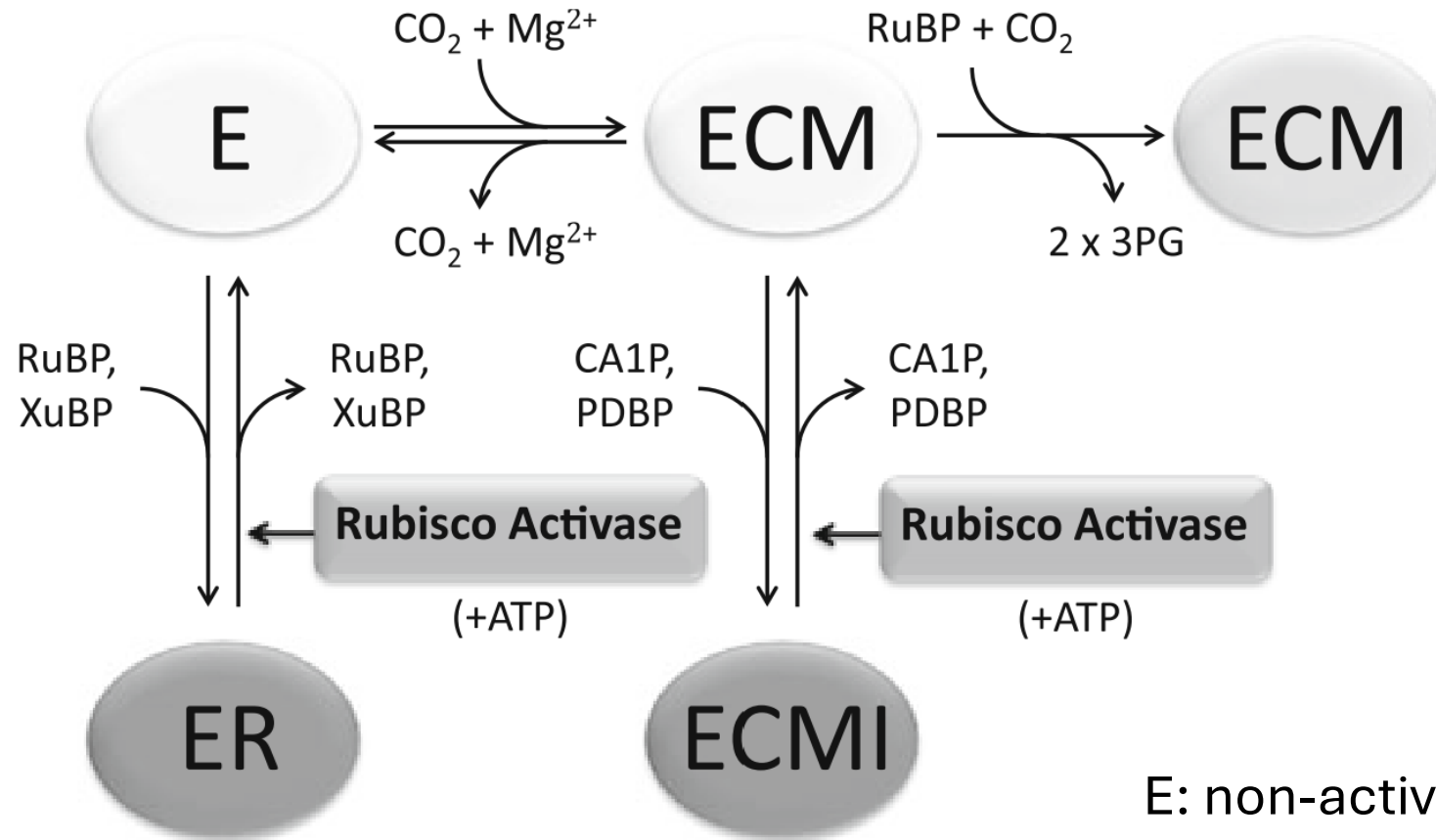
 DAY 14

7.5 hour of light
 $15 \mu\text{mol photons m}^{-2} \text{s}^{-1}$



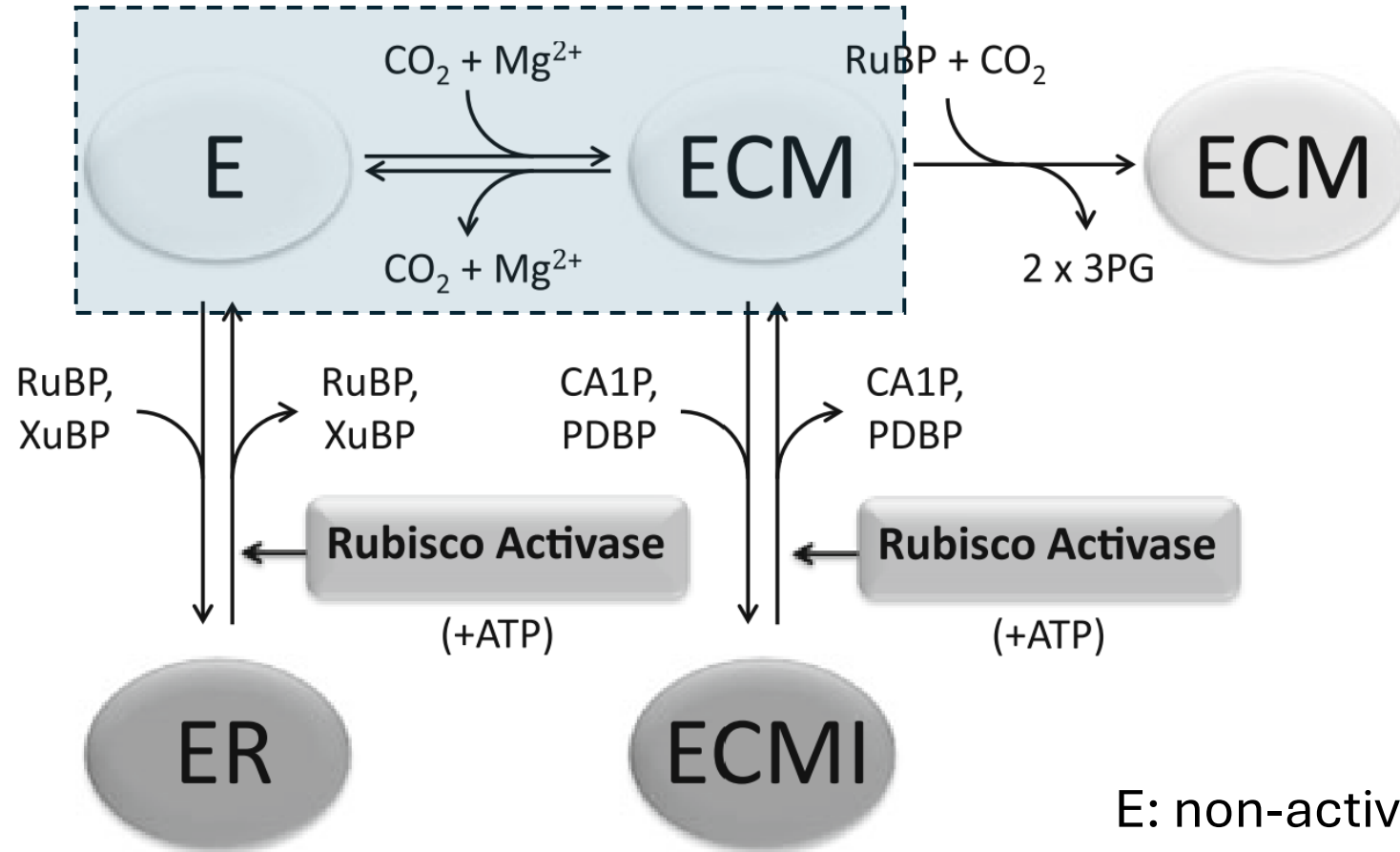
* Irradiance levels were adapted from environmental data

3- RESULTS AND DISCUSSION: RUBISCO QUANTITY



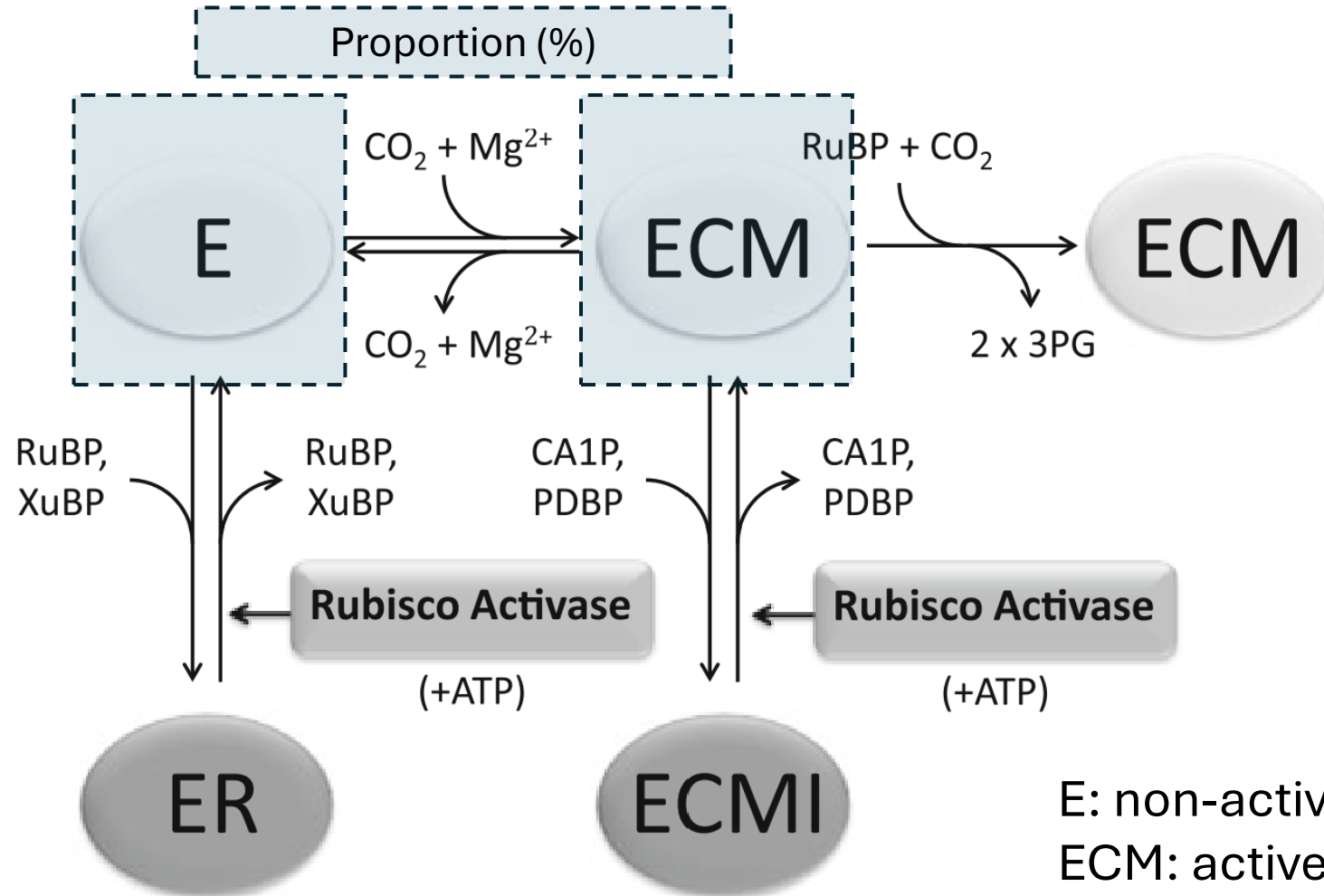
E: non-activated rubisco
ECM: active rubisco
ER and ECMI: inhibited forms

3- RESULTS AND DISCUSSION: RUBISCO QUANTITY



E: non-activated rubisco
ECM: active rubisco
ER and ECMI: inhibited forms

3- RESULTS AND DISCUSSION: RUBISCO ACTIVATION STATE

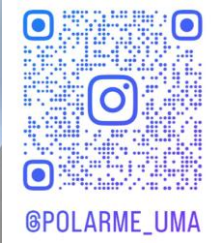


E: non-activated rubisco
ECM: active rubisco
ER and ECMI: inhibited forms

- Measured in macroalgae for the first time.
- The protocol was optimized for these organisms.



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