Testing the effectiveness of floating bags to promote healthy *Posidonia australis* meadows around oyster farms

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Ferretto *et al.*, in review.

Giulia Ferretto
just finished PhD at UNSW!

- Ecosystem functions of the seagrass *Posidonia australis*

- Optimise *P. australis* restoration

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Why *Posidonia australis*?

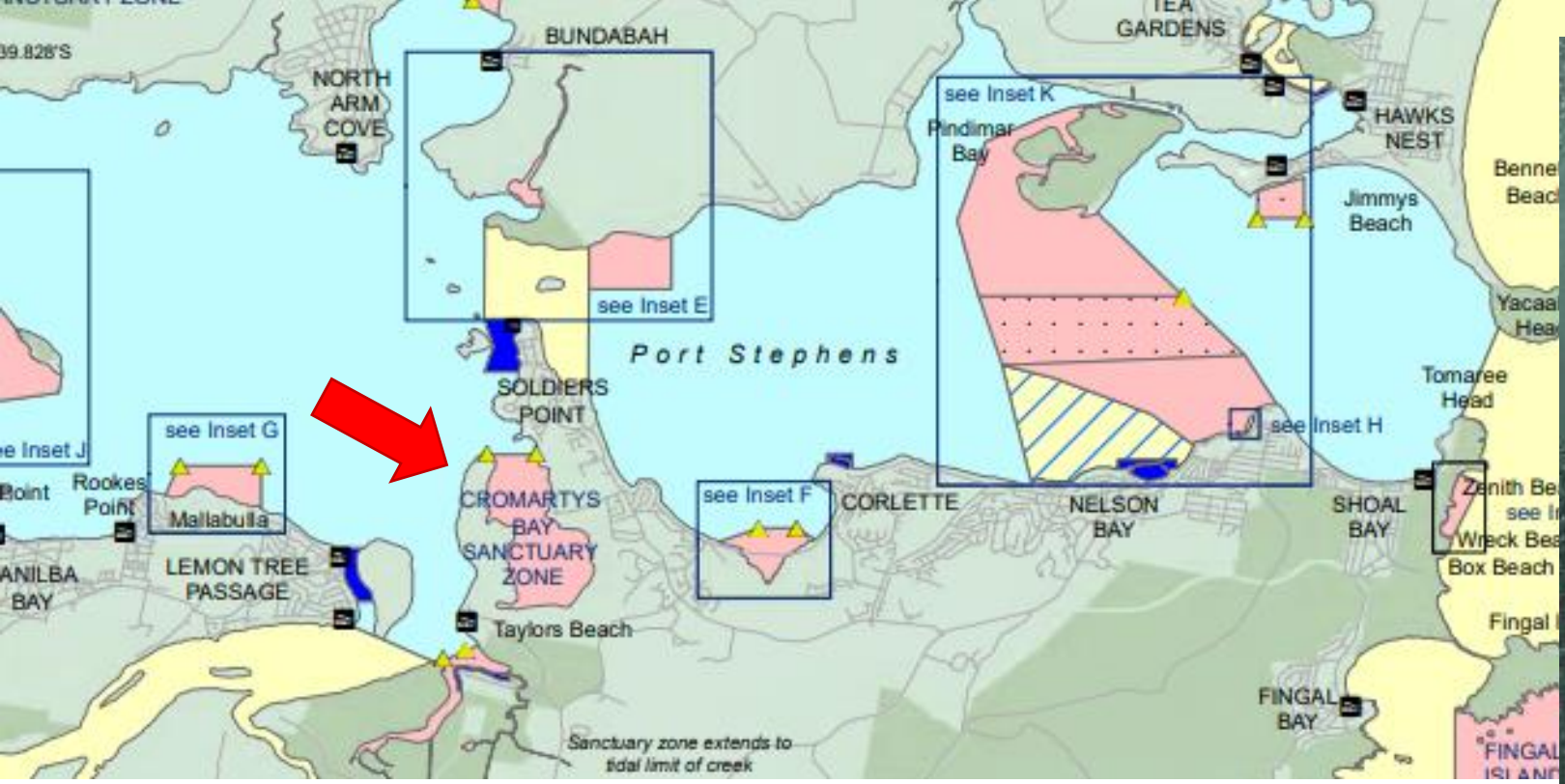
- Important habitat-forming seagrass
- Very slow rate of growth and recovery

Posidonia: Endangered in 6 NSW Estuaries

***Posidonia australis* distribution**

- Endangered ecological communities by the NSW government in 2011
- Australian Commonwealth Government (EPBC Act) in 2015
- Some populations are continuing to decline, despite this protection

Creese *et al.* 2009, Glasby and West 2015, Evans *et al.* 2018



SITE: Mud Point - oyster lease OL76/027 of Paul North (PrimeAqua Oysters)

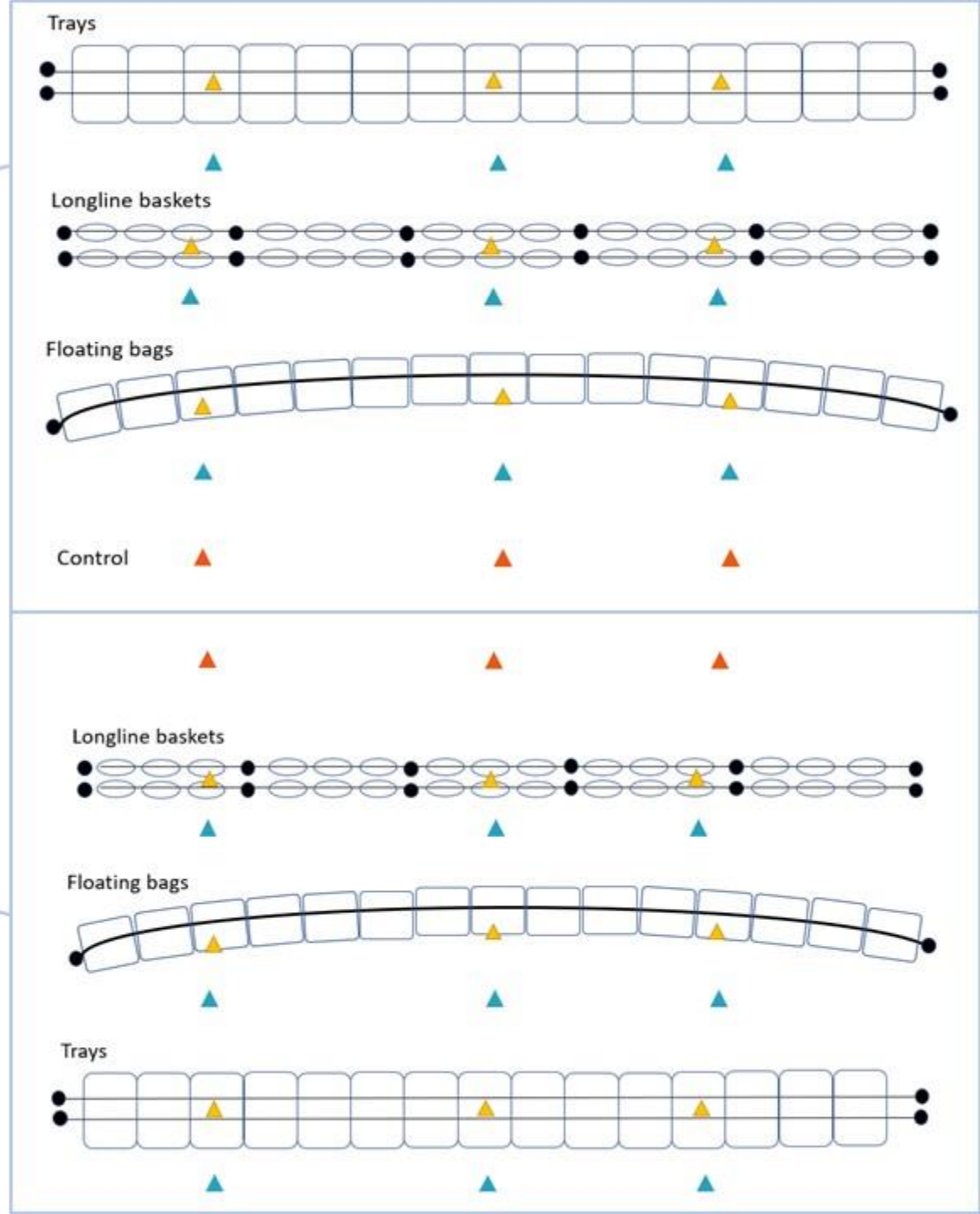
Finished construction mid-March 2020

Rigid intertidal structures that occupy a fixed position

~ 300 oysters per tray
(~150 oysters/m^2)

~ 60 oysters per basket
(~120 oysters/m^2)

Line securing the floating bags moves with tides and currents
~ 60 oysters per tray (~60 oysters/m^2)



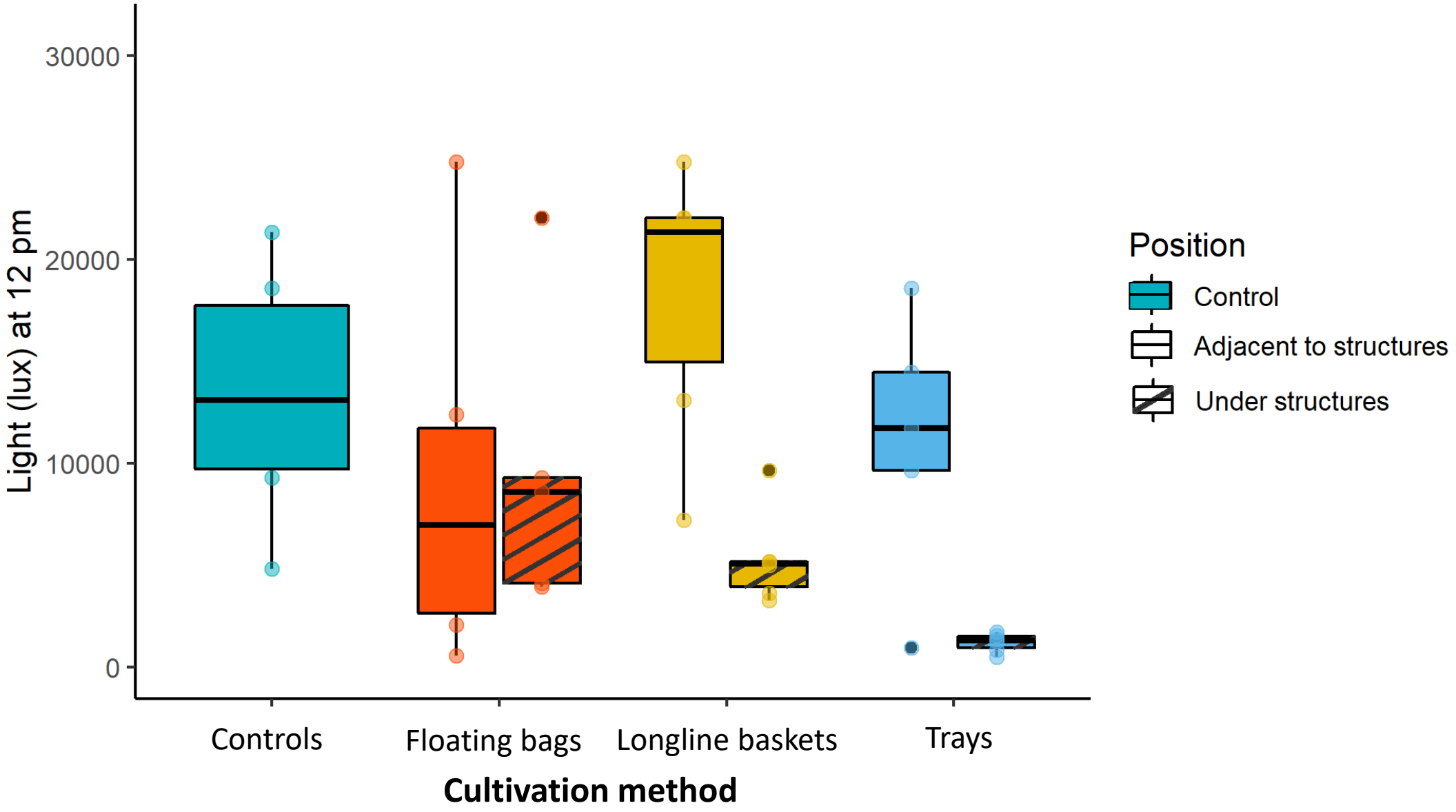
Position of sampling point

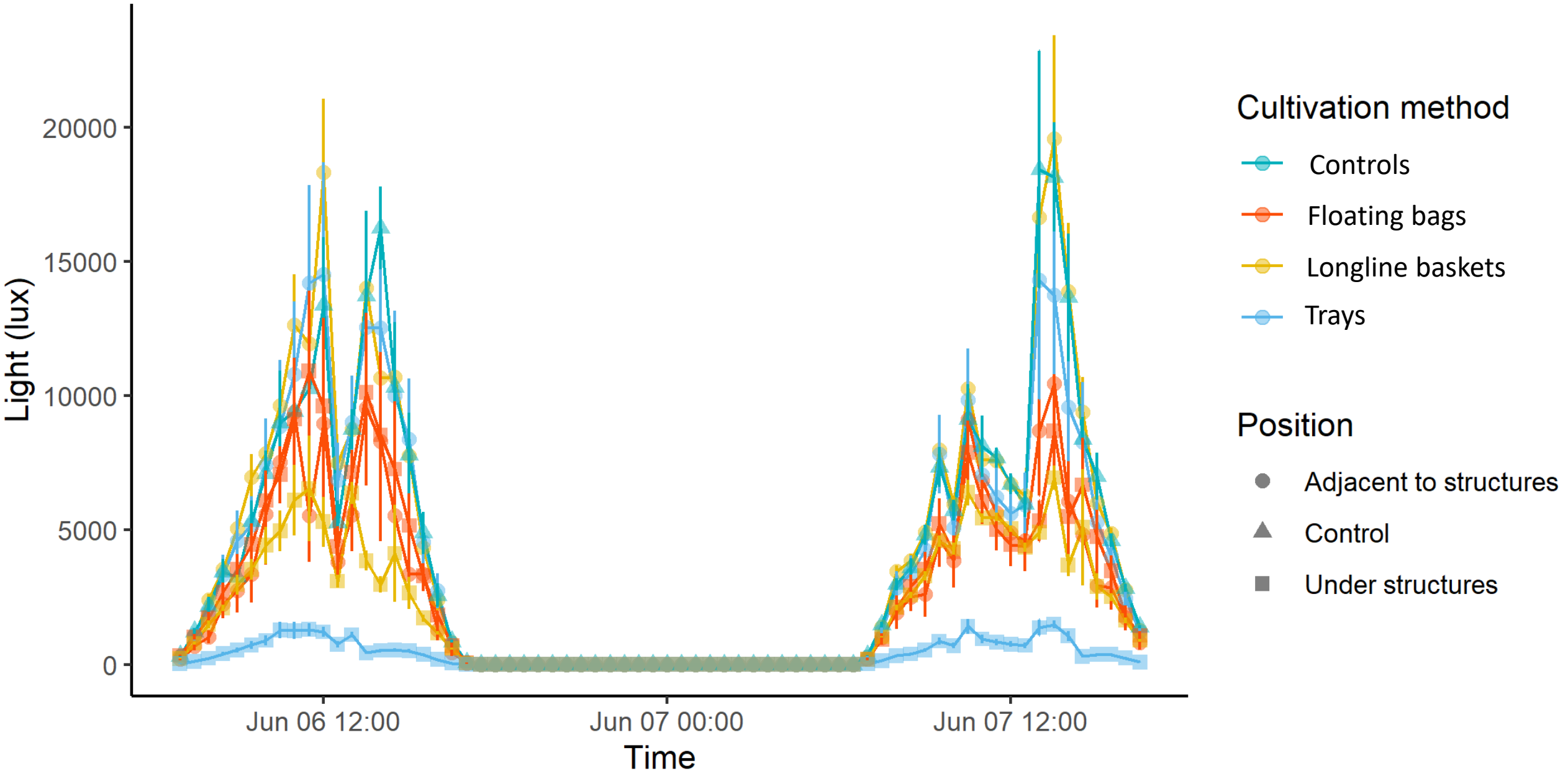
- Under structures
- Adjacent to structures
- Control

1. Does the cultivation method affect light availability?

Measurements	After 3 months (Jun 2020)	After 6 months (Sep 2020)
Light availability	✓	X
Shoot photosynthetic efficiency	✓	X

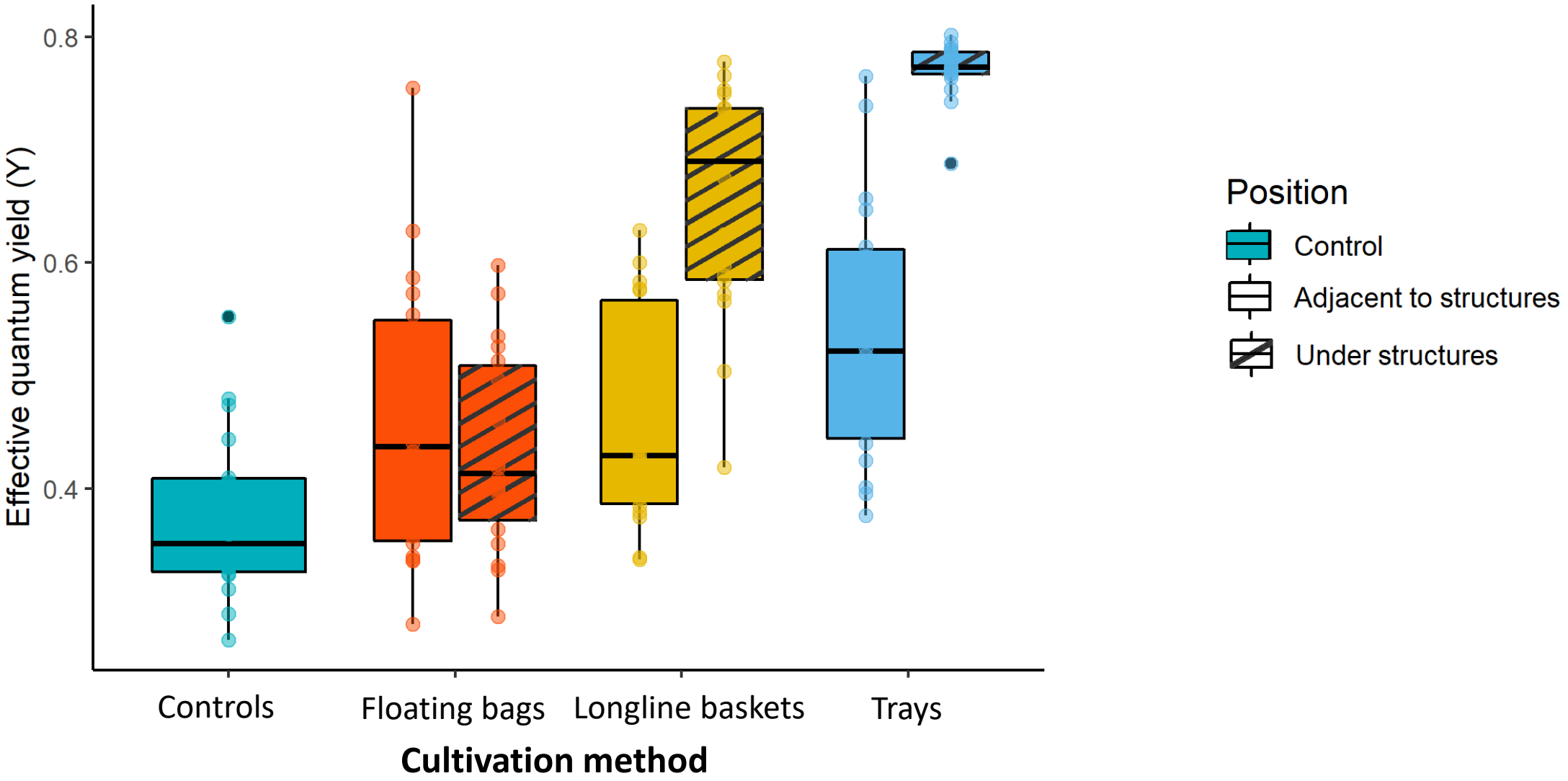
Reduced light availability under baskets and trays




Light (lux)
20000
15000
10000
5000
0
Jun 06 12:00
Jun 07 00:00
Jun 07 12:00
Time
Cultivation method
Controls
Floating bags
Longline baskets
Trays
Position
Adjacent to structures
Control
Under structures

Reduced light affects the photosynthetic efficiency of *P. australis*

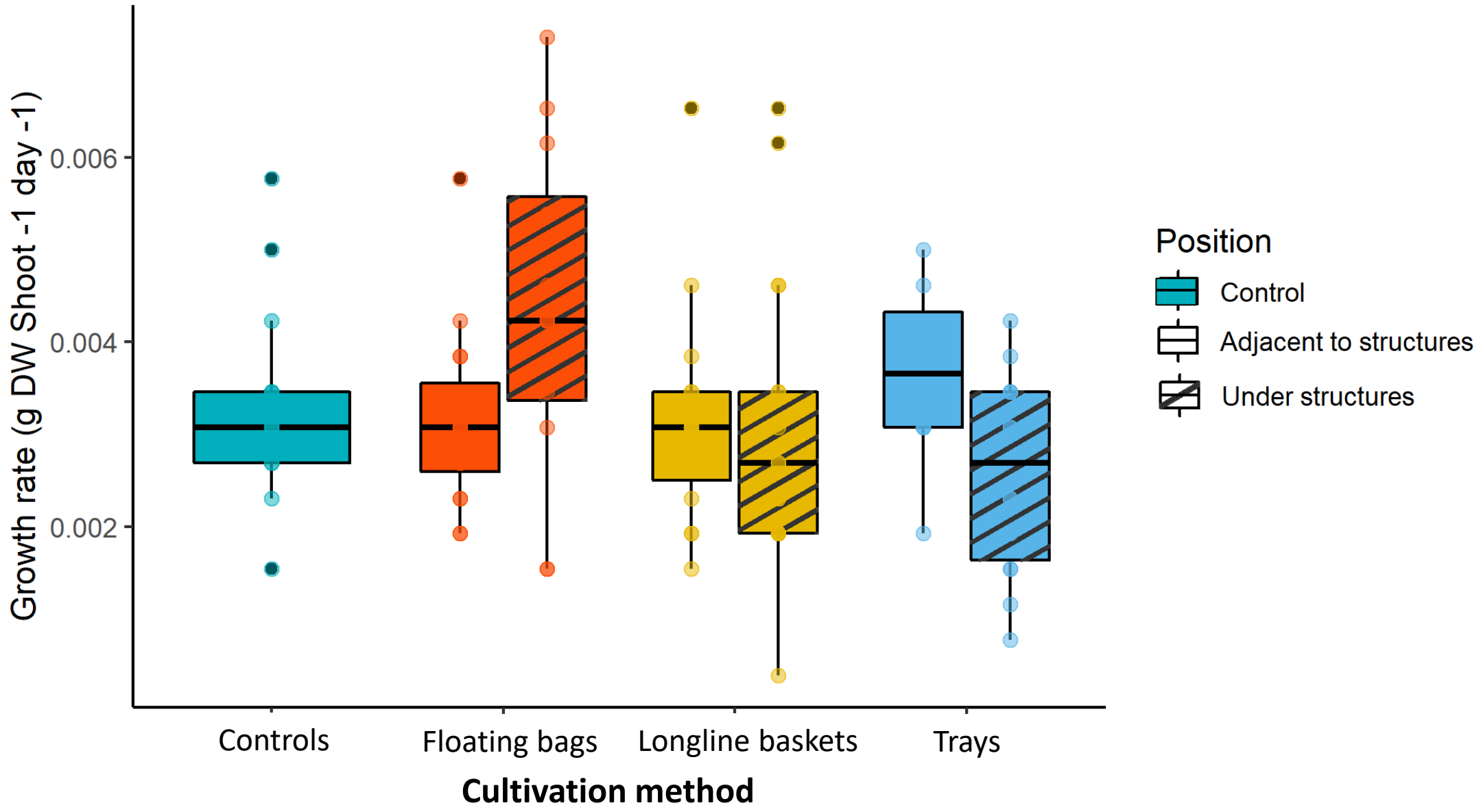
(the seagrass becomes more photosynthetically active to compensate for reduced light)



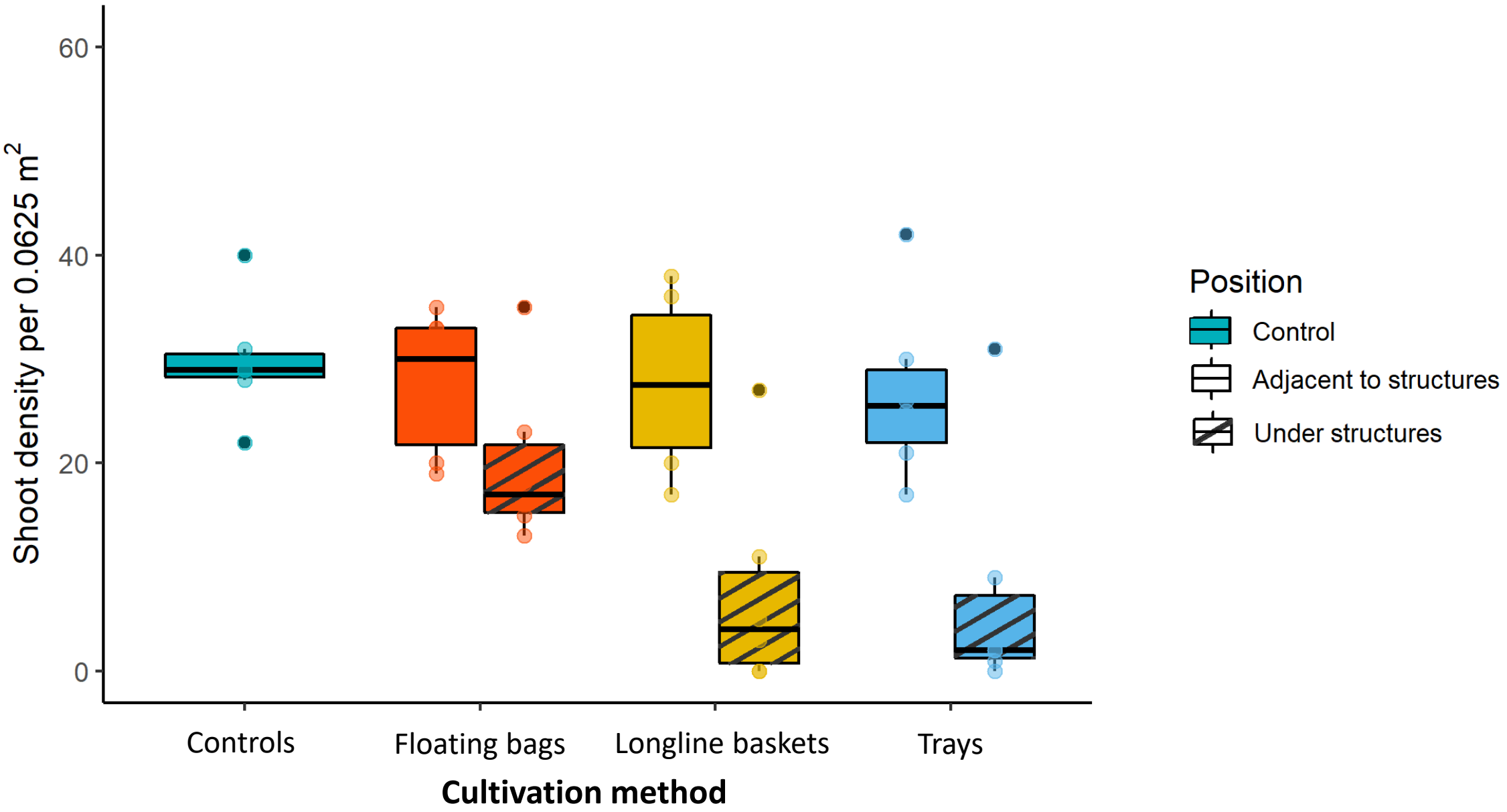
2. Does the reduced light affect seagrass?

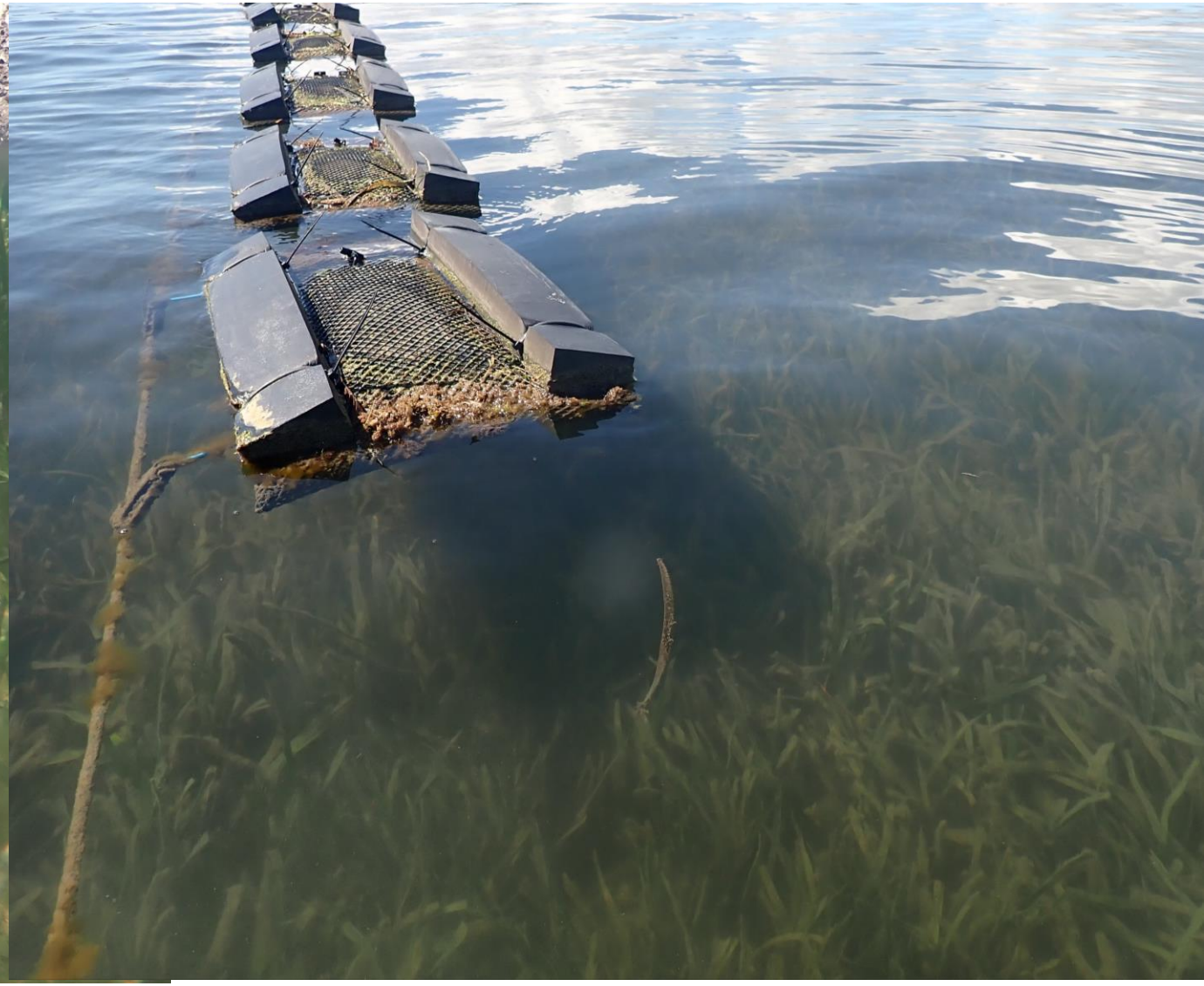
Measurements	After 3 months	After 6 months
Leaf growth rate	✓	X
Seagrass density	✓	✓
Area lost	✓	✓

Oyster cultivation method does not influence growth of *P. australis*



P. australis density declines after 3 months

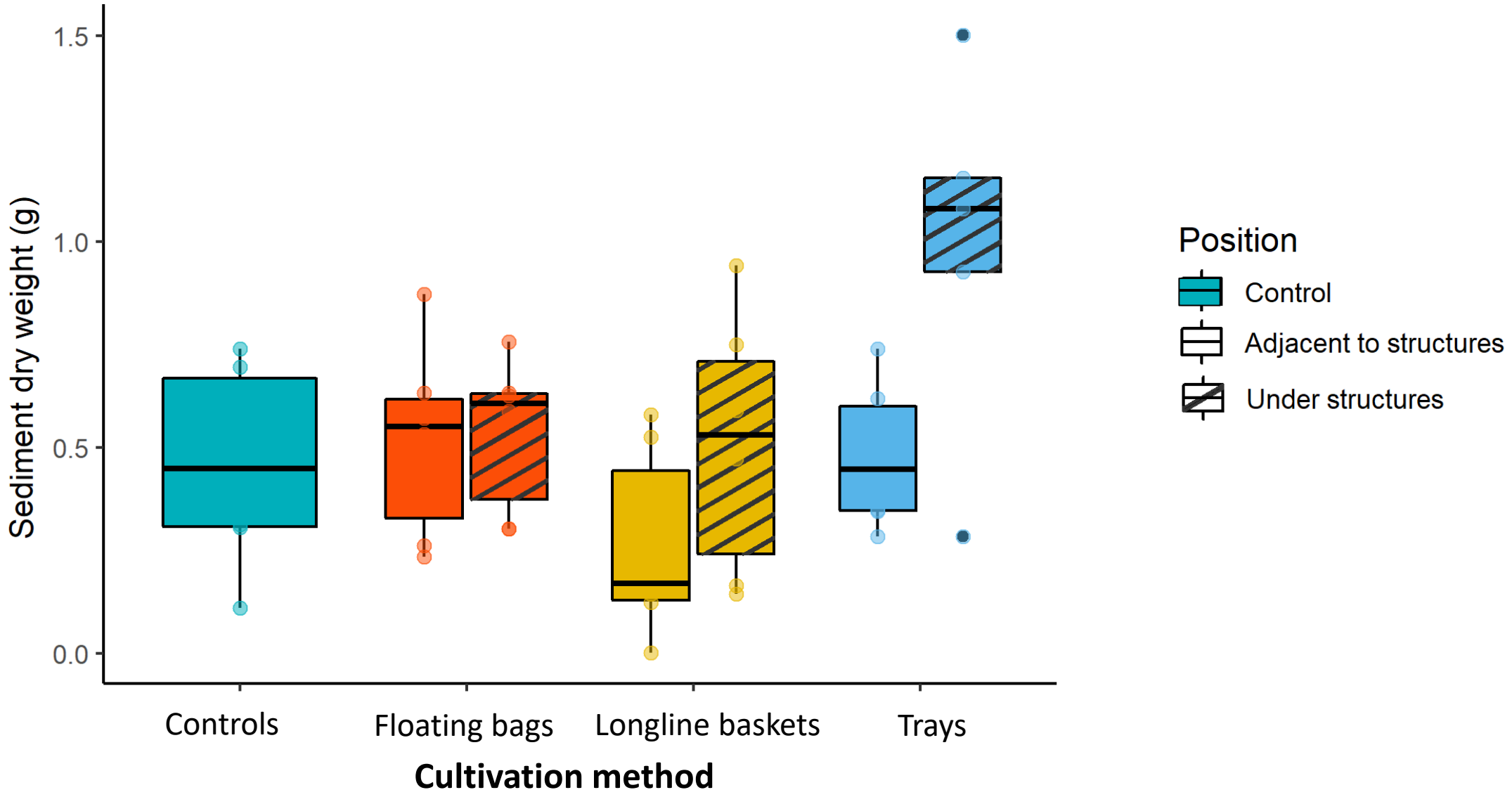




3. Does the method affect sedimentation/nutrient supply?

Measurements	After 3 months
Amount of sediment collected by sediment traps	✓
Organic matter from sediment traps and surface sediment	✓
Nutrient concentration in sediments (%C and %N)	✓
Sediment grain-size	✓

Greater bio-deposition under trays



Conclusions

	Pros	Cons
Trays * ~ $2900 * Trays supplied by DPI	- Very resistant to wind and storms	- More infrastructure to build - Cause shading -> impact on seagrass - Higher sedimentation
Longline Baskets ~ $1000	- Less impacts on seagrass than trays	- Cause shading -> impact on seagrass - Less resistant to winds than trays
Floating bags ~ $800	- Less infrastructure to build - Minor impacts on seagrass - Oysters grow faster because they are in the water most of the time	- Higher risk of fouling and “over catch”? - Need sheltered location - Require more maintenance (flipping + after storm)

Outreach and SciComm

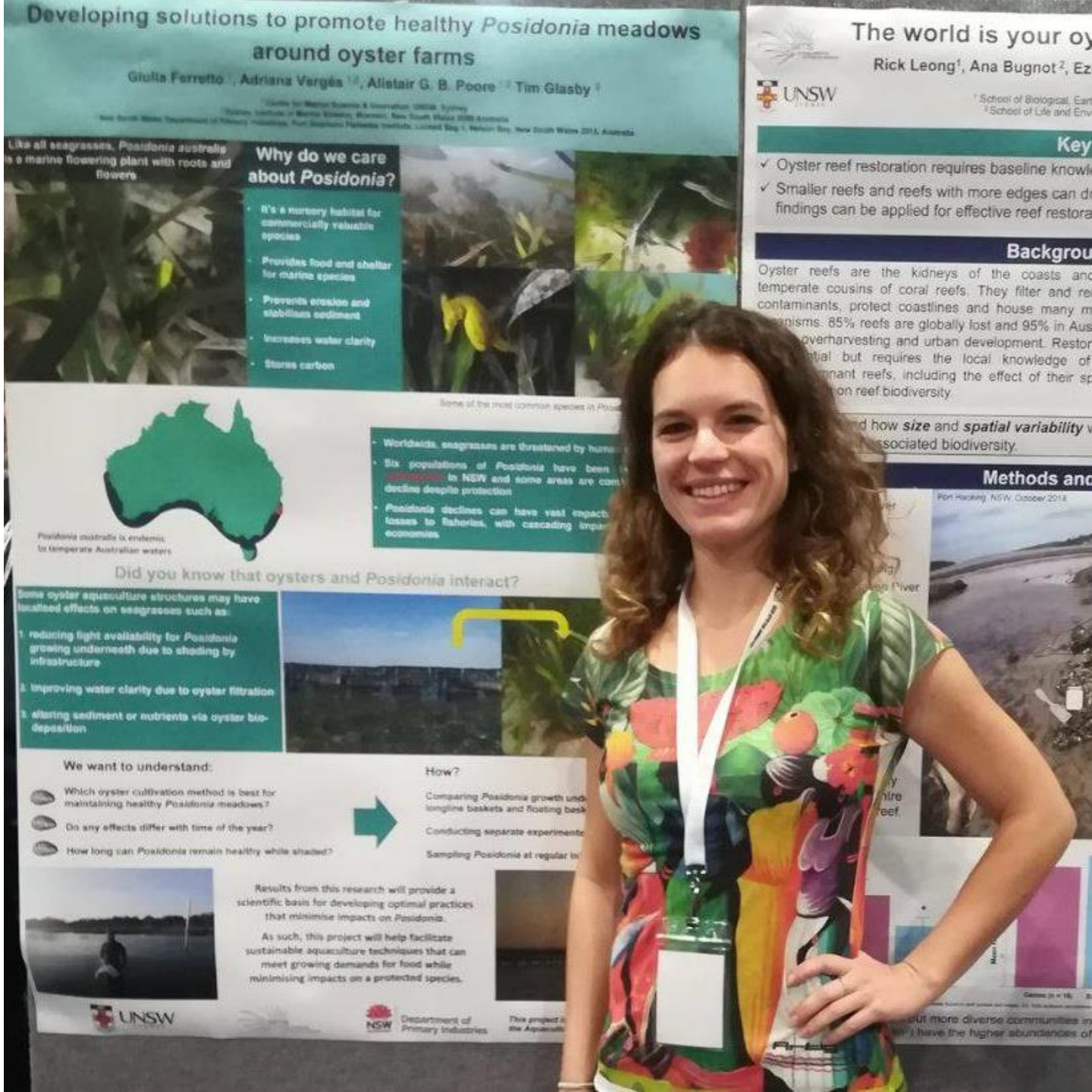
- Poster with plans at the NSW Oyster Conference in Wallis Lake on the 6th, 7th & 8th August 2019

- Poster with plans at the NSW Coastal Conference in Terrigal – November 2019

- 3 minutes thesis competition at UNSW November 2020 – Winner!

- Poster with findings during AMSA Conference (27 June to 2 July 2021)

- Scientific paper in review



THANK YOU!

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