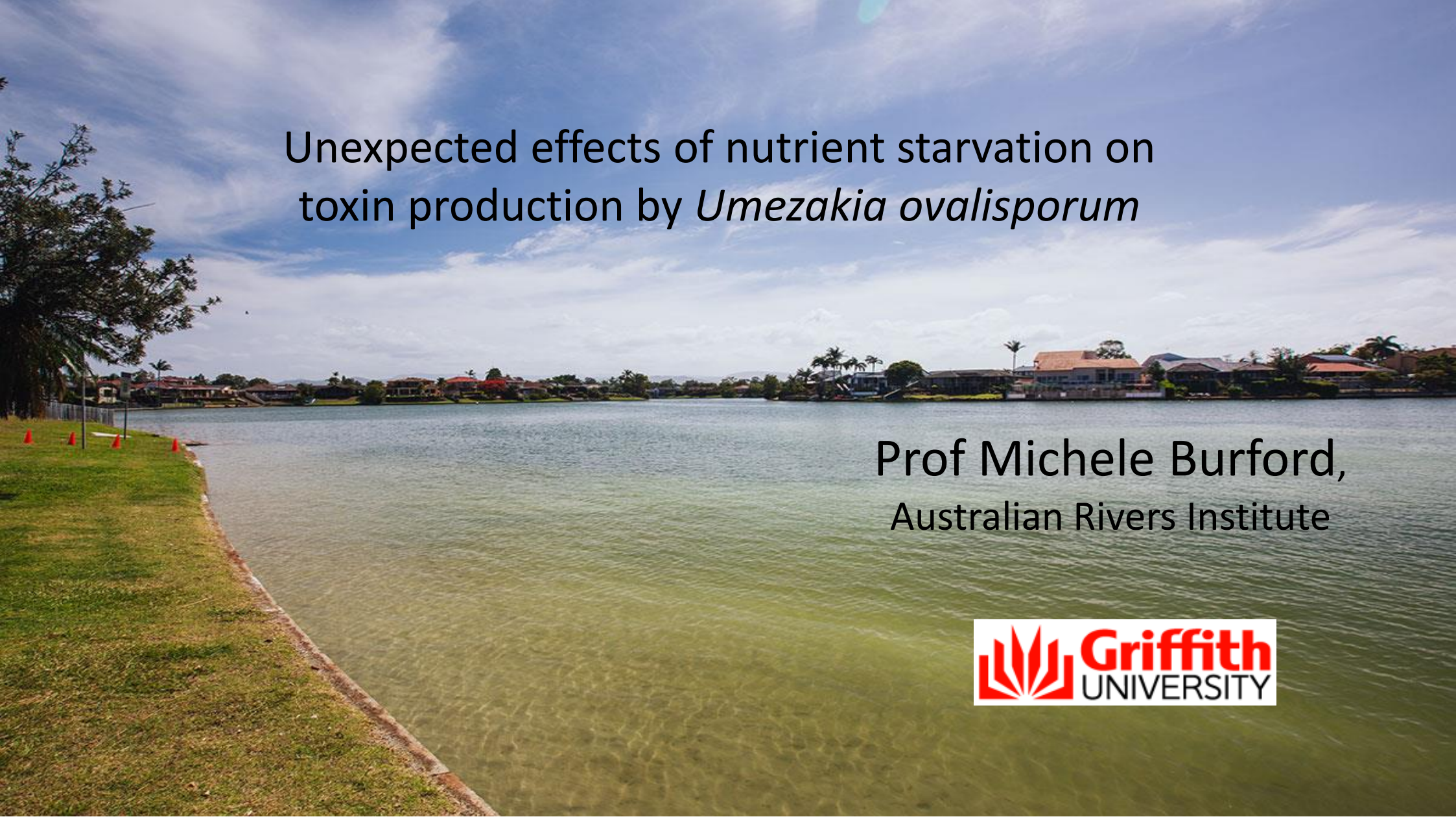

Unexpected effects of nutrient starvation on toxin production by *Umezakia ovalisporum*

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Australian Rivers Institute

Griffith UNIVERSITY

Acknowledgements

- Eliza Williams (Honours student)
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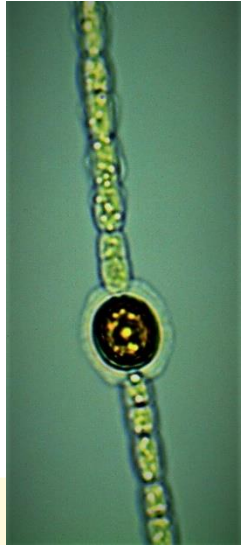
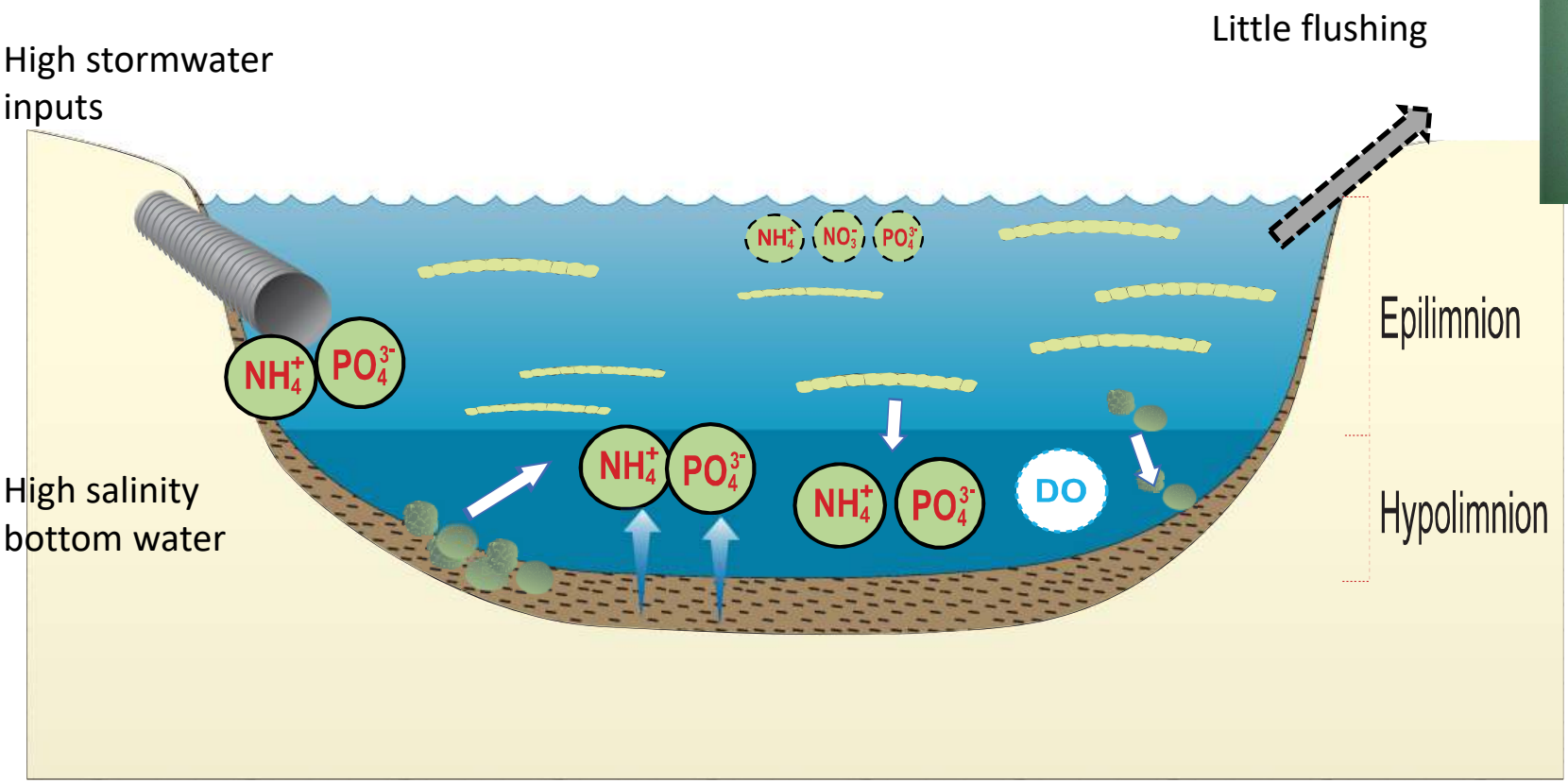
- City of Gold Coast


Nobby Beach
5 Bribie Court, Mermaid Waters
Mermaid Beach
Lake Hugh Muntz
Built as a stormwater retention pond
Used for recreation

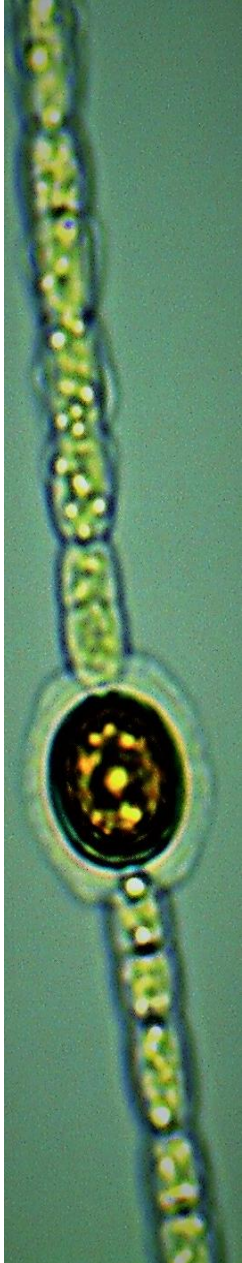
How LHM works



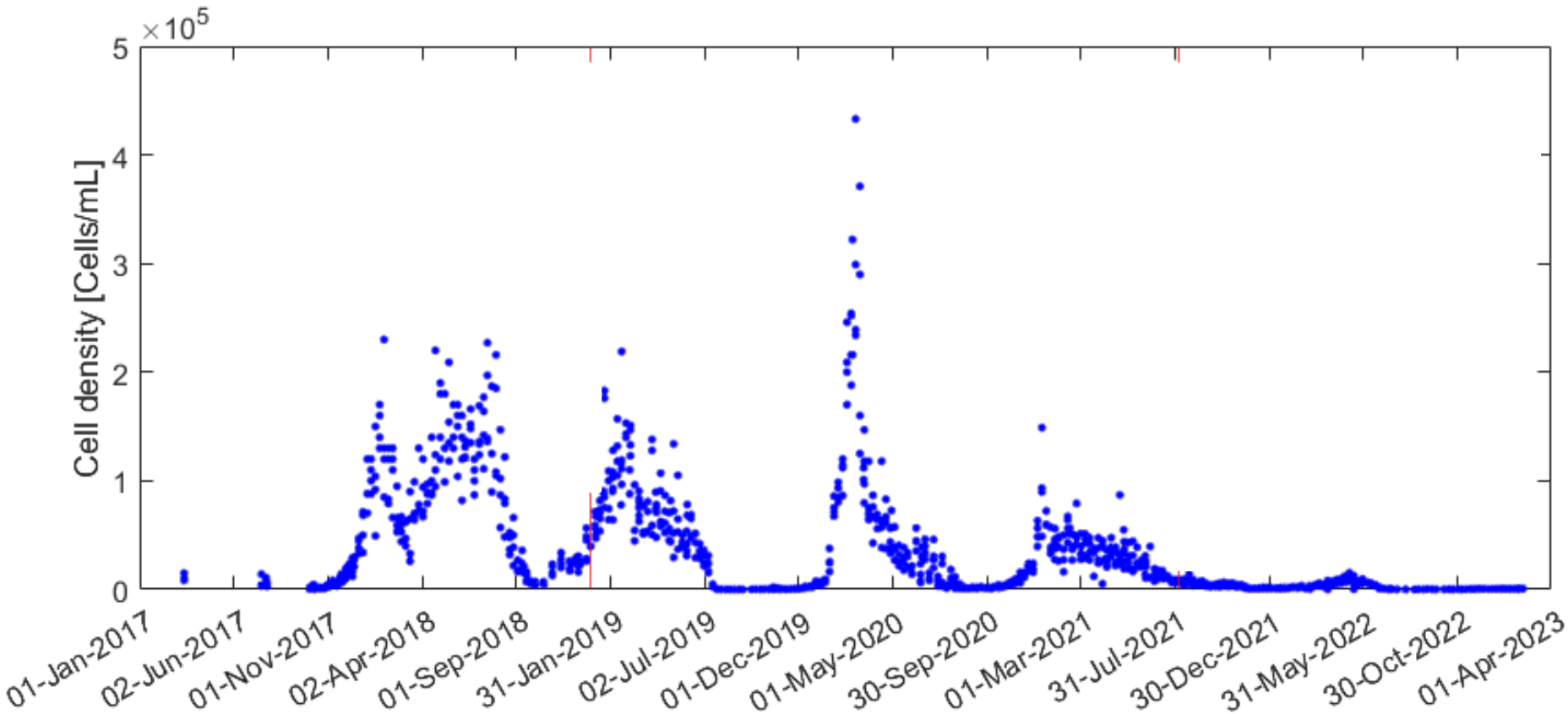


Umezakia ovalisporum

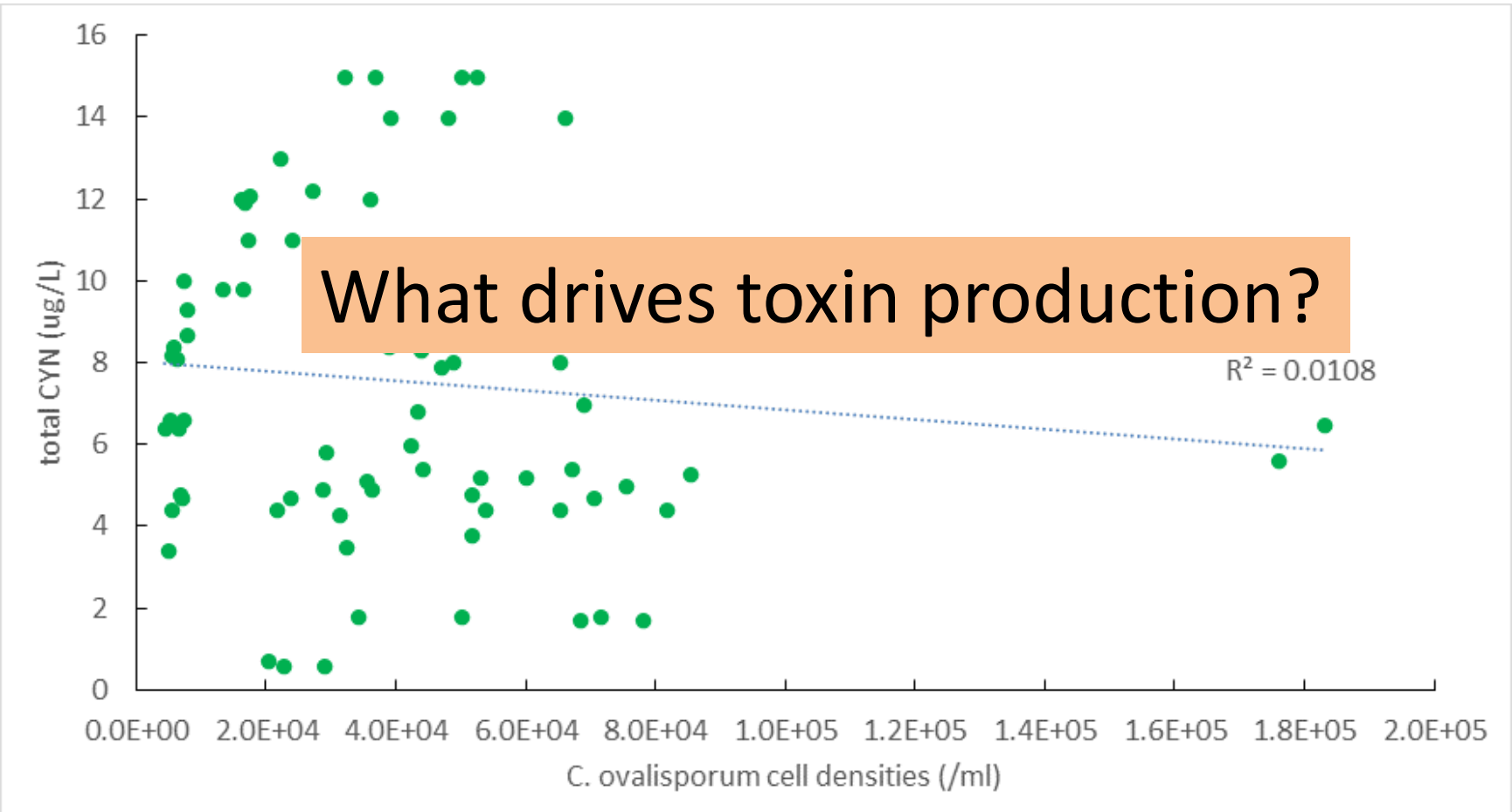
- Filamentous cyanobacterium
- Positively buoyant
- Fixes nitrogen – has heterocysts
- Resting cysts (akinetes)
- Produces toxins:
  - cylindrospermopsin
  - deoxycylindrospermopsin



Bloom pattern

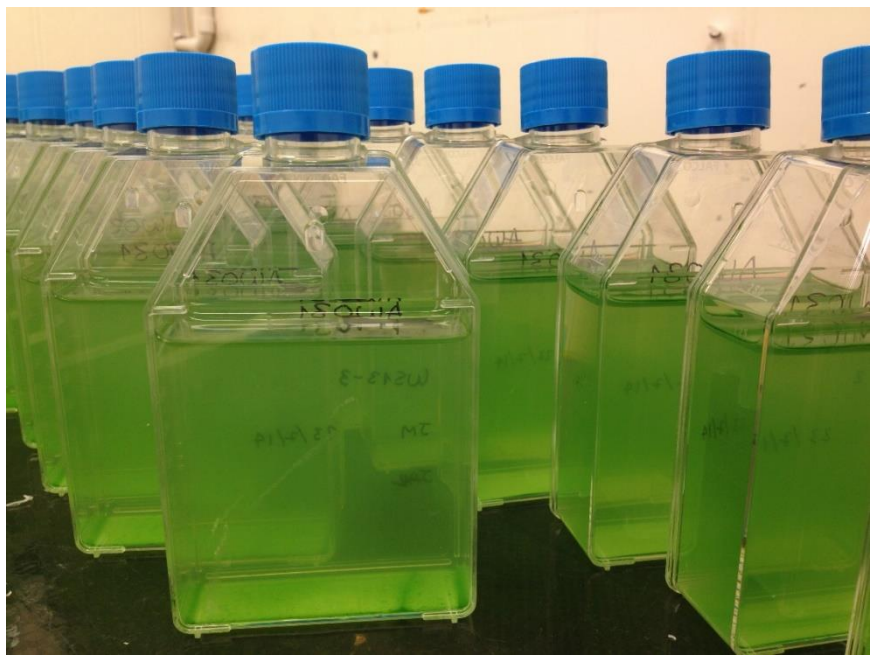


No correlation between toxin levels and cell densities

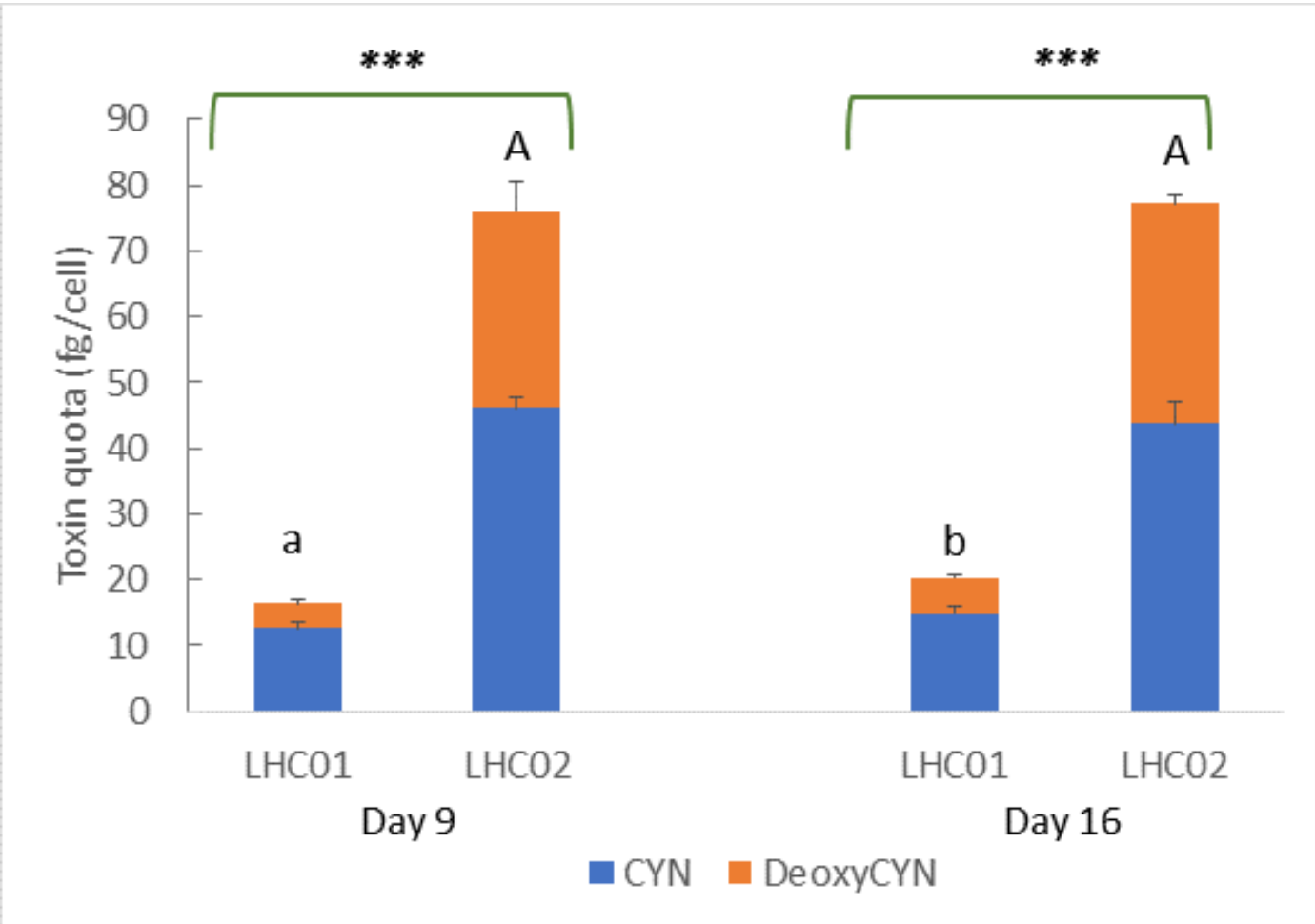


What factors can affect toxin production?

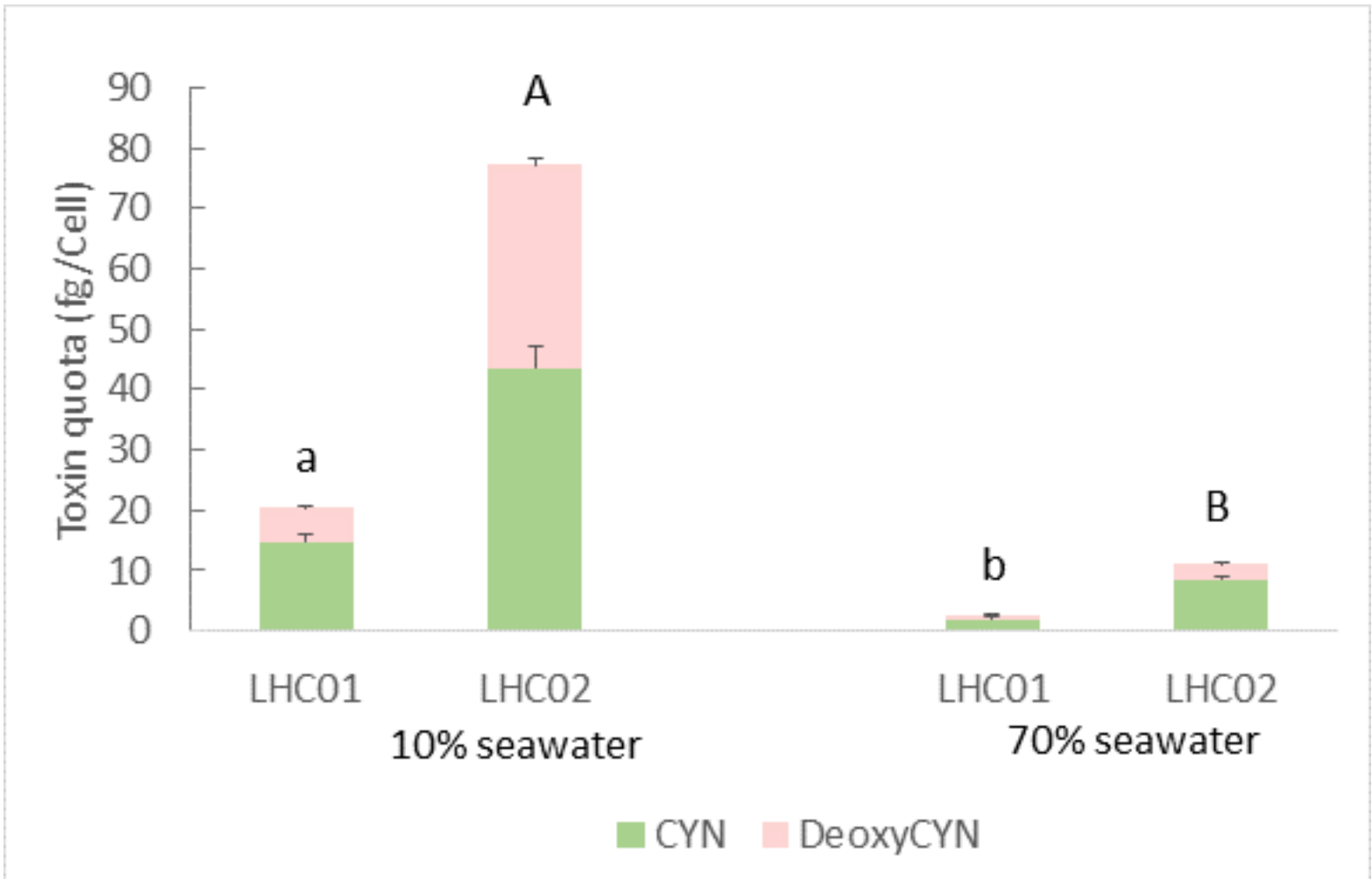
- Growth phase
- Environmental conditions
  - Such as nutrient status, temperature
- Strain variation
- Stress
  - Such as extracellular release of toxins



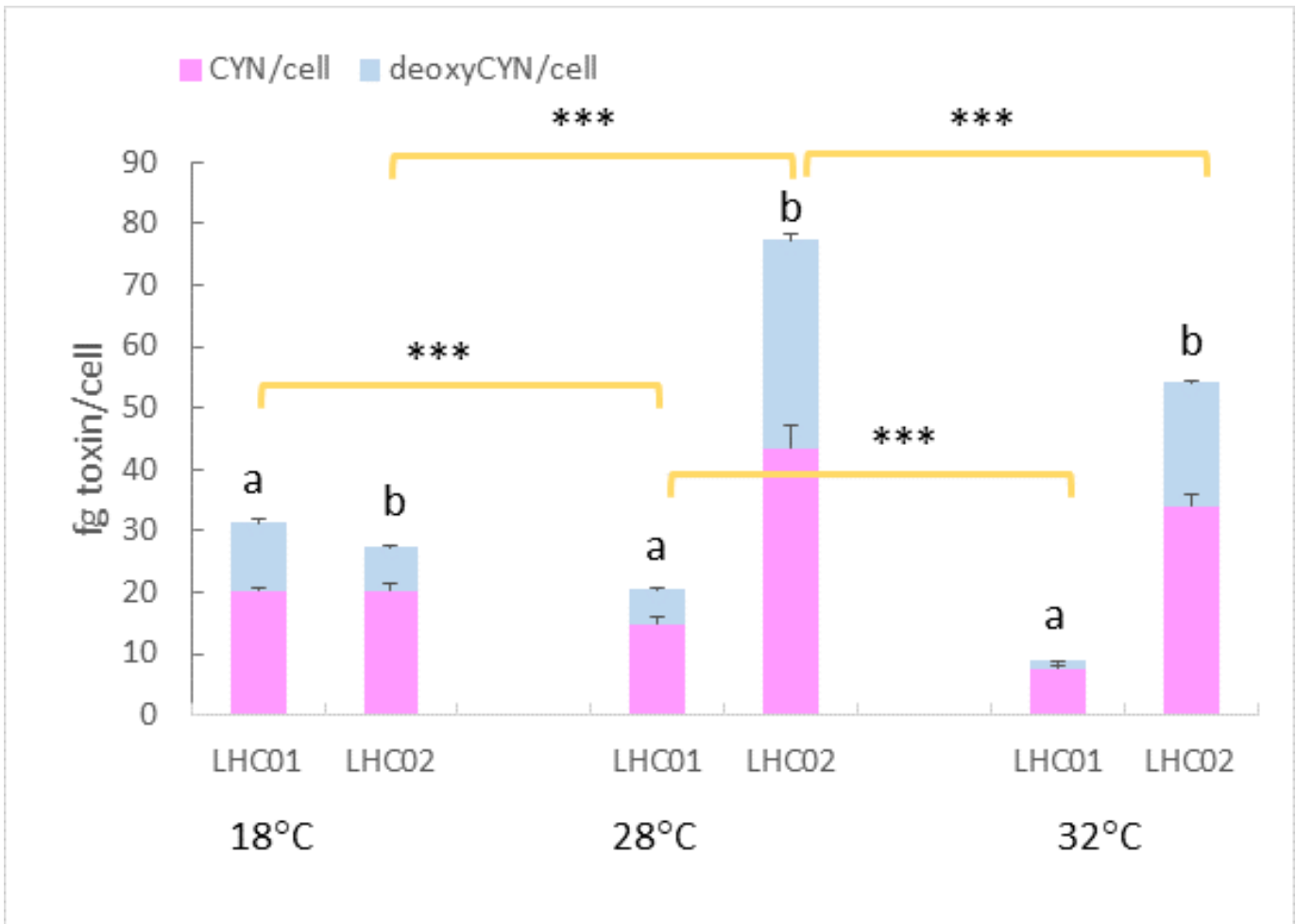
Growth phase had little effect on toxin cell quotas



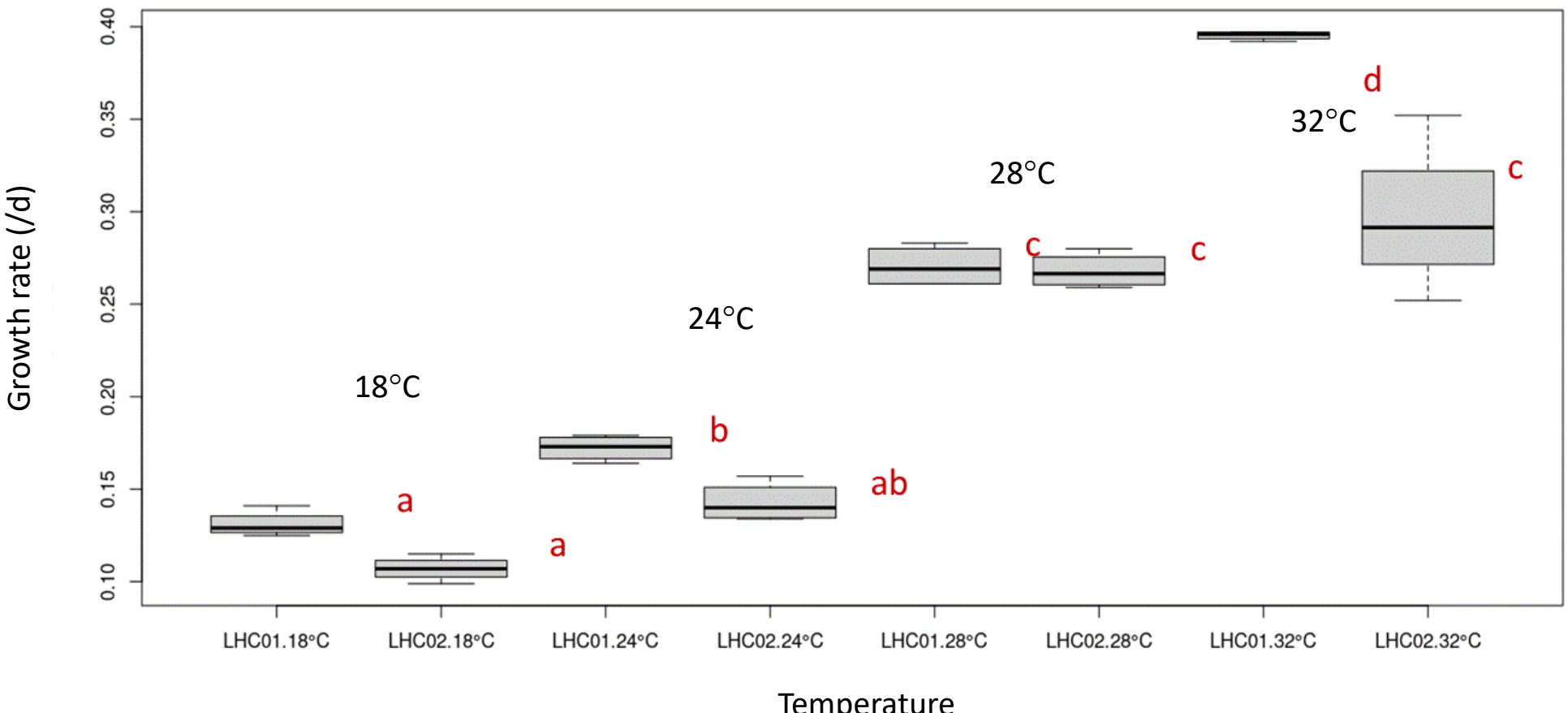
Lower salinity treatments had higher toxin cell quotas



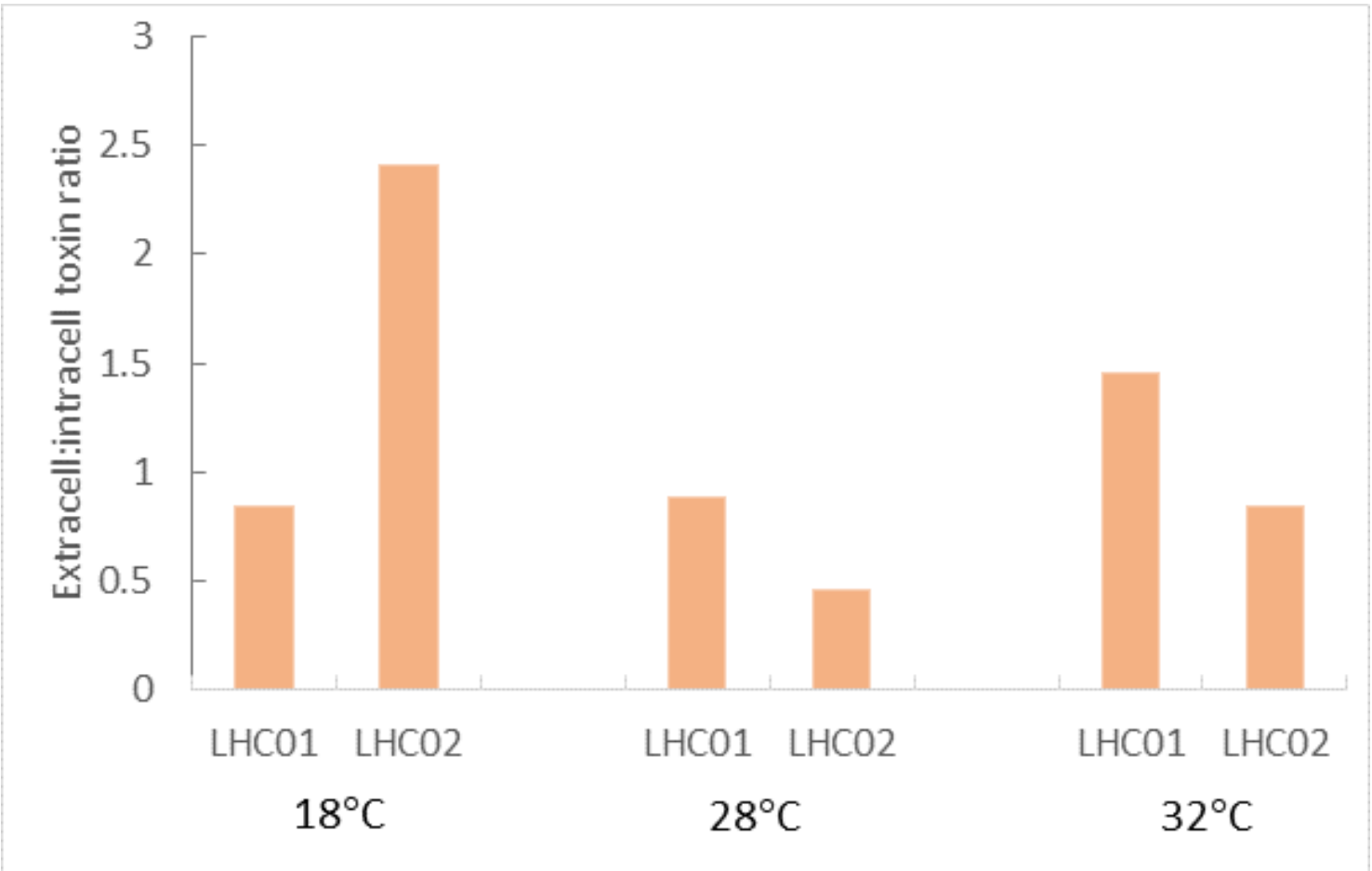
No consistent response to different temperatures



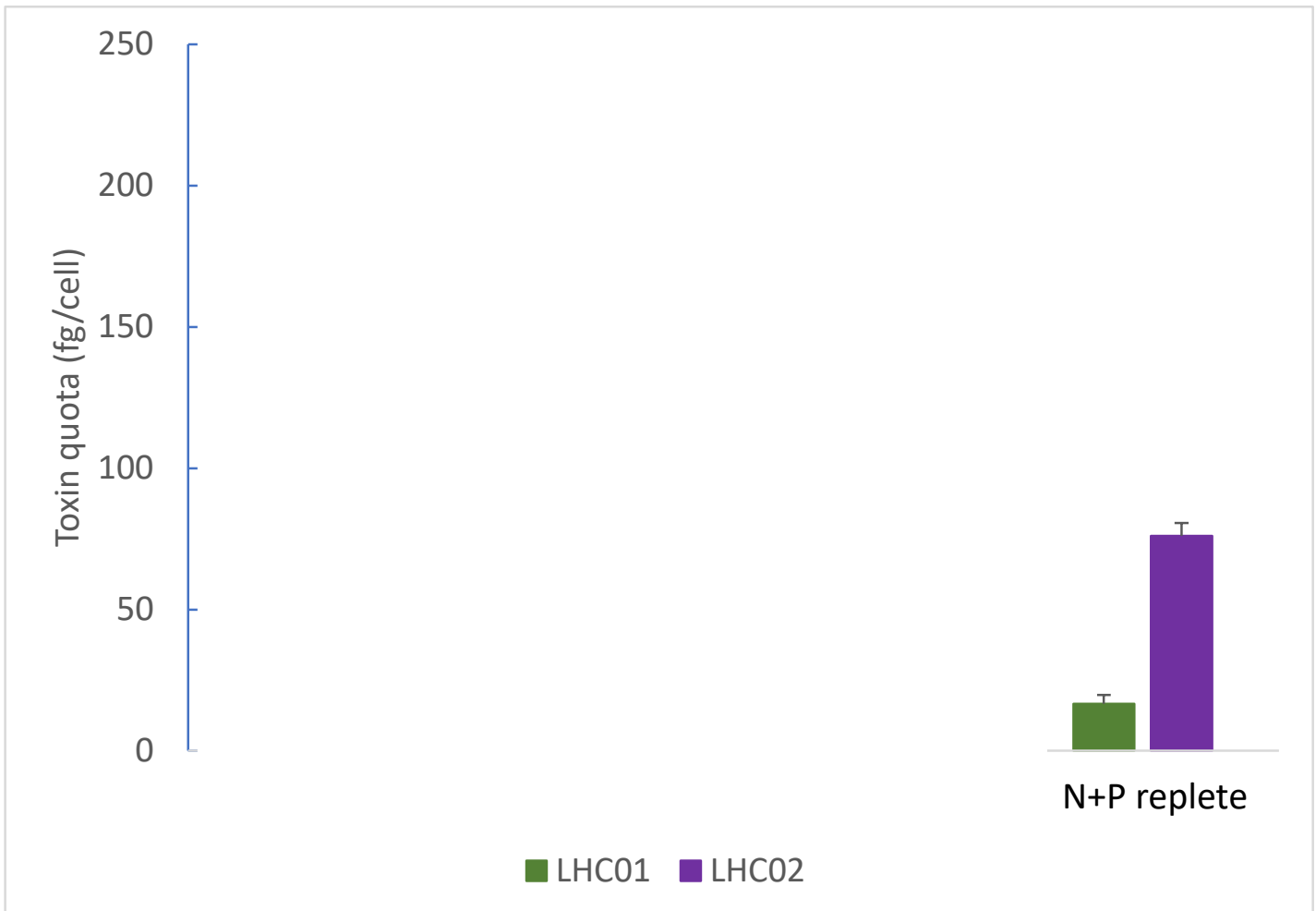
Optimal temperatures for growth



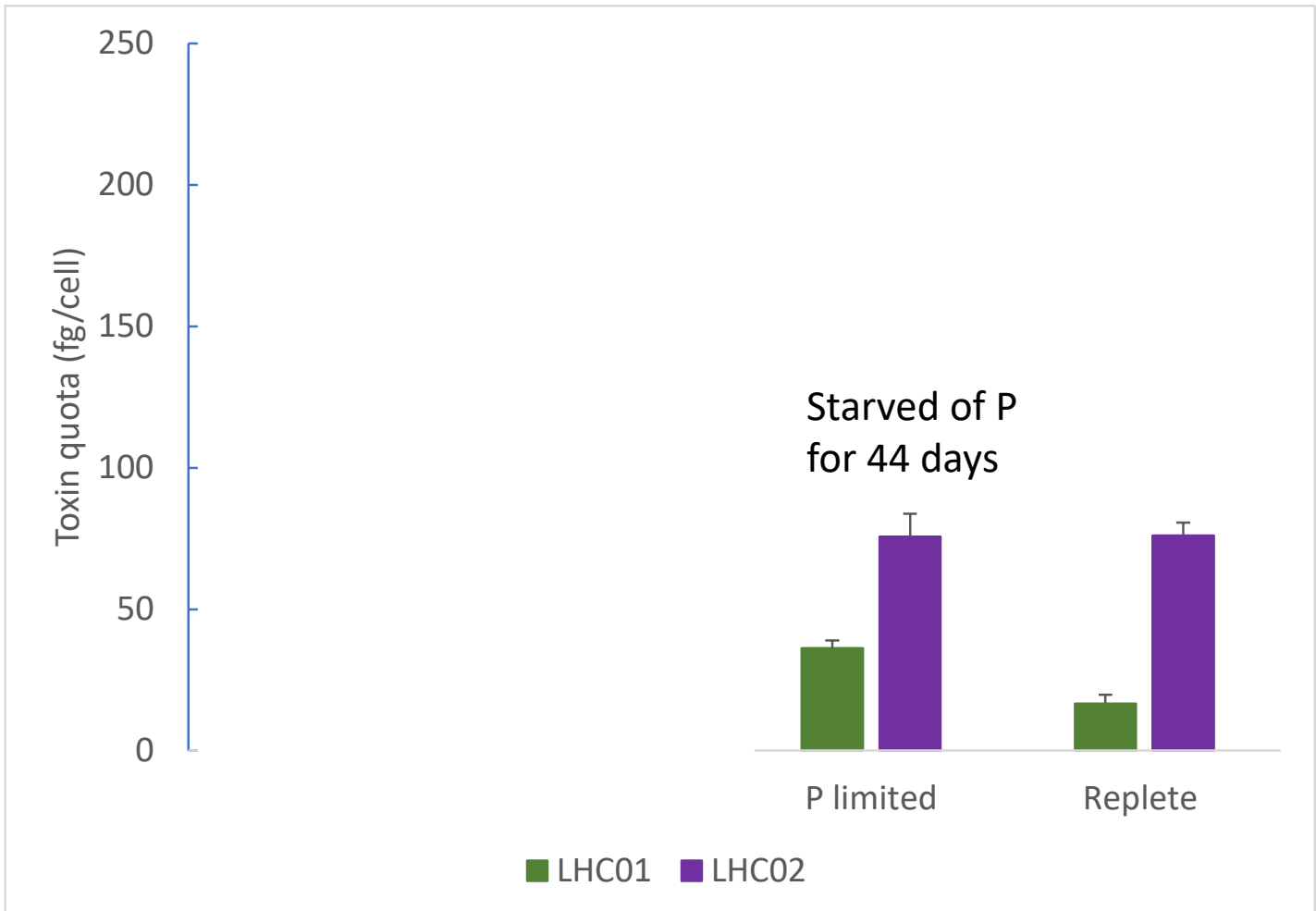
Proportion of extracellular toxin can be high



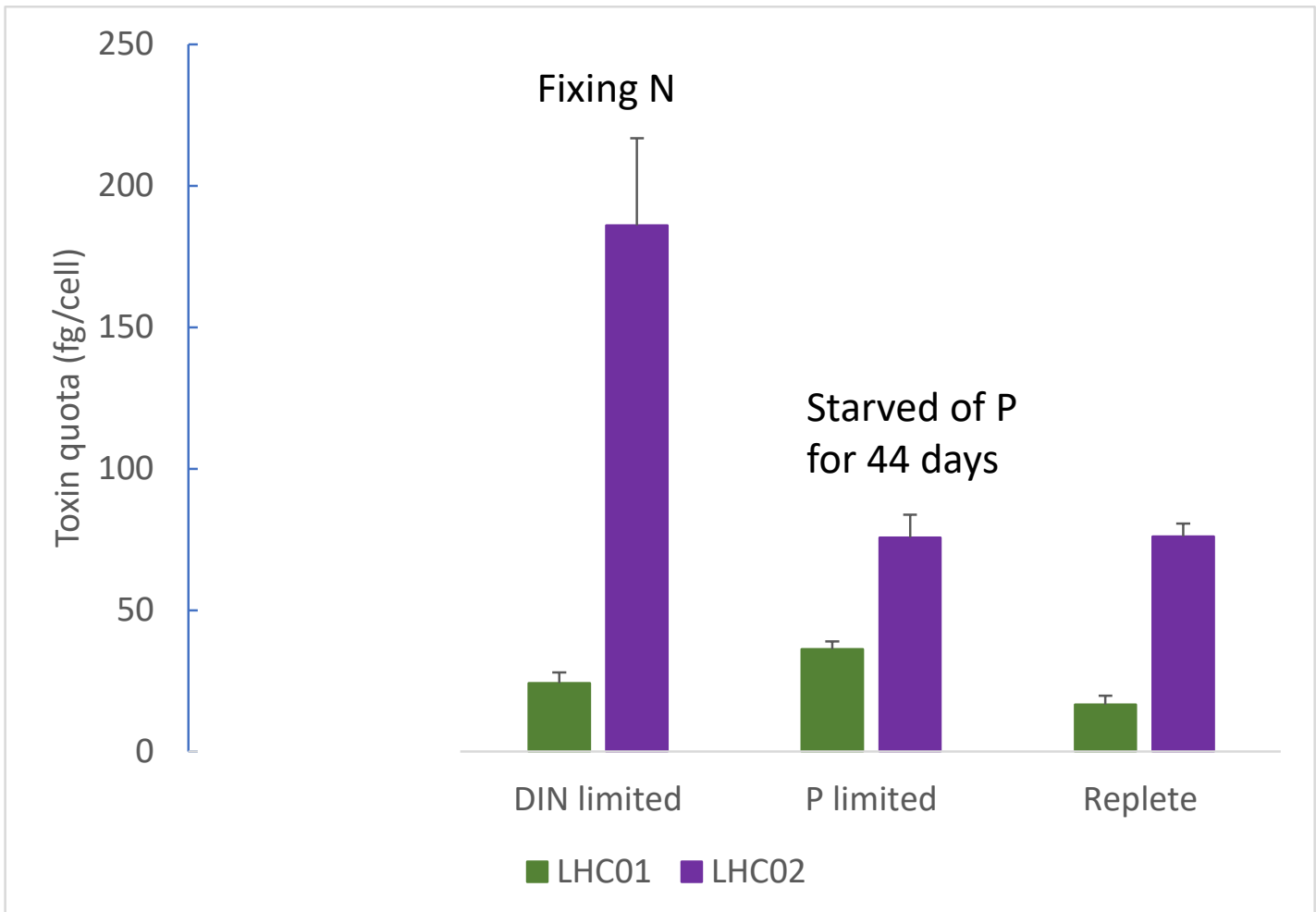
Strains of different toxin quotas



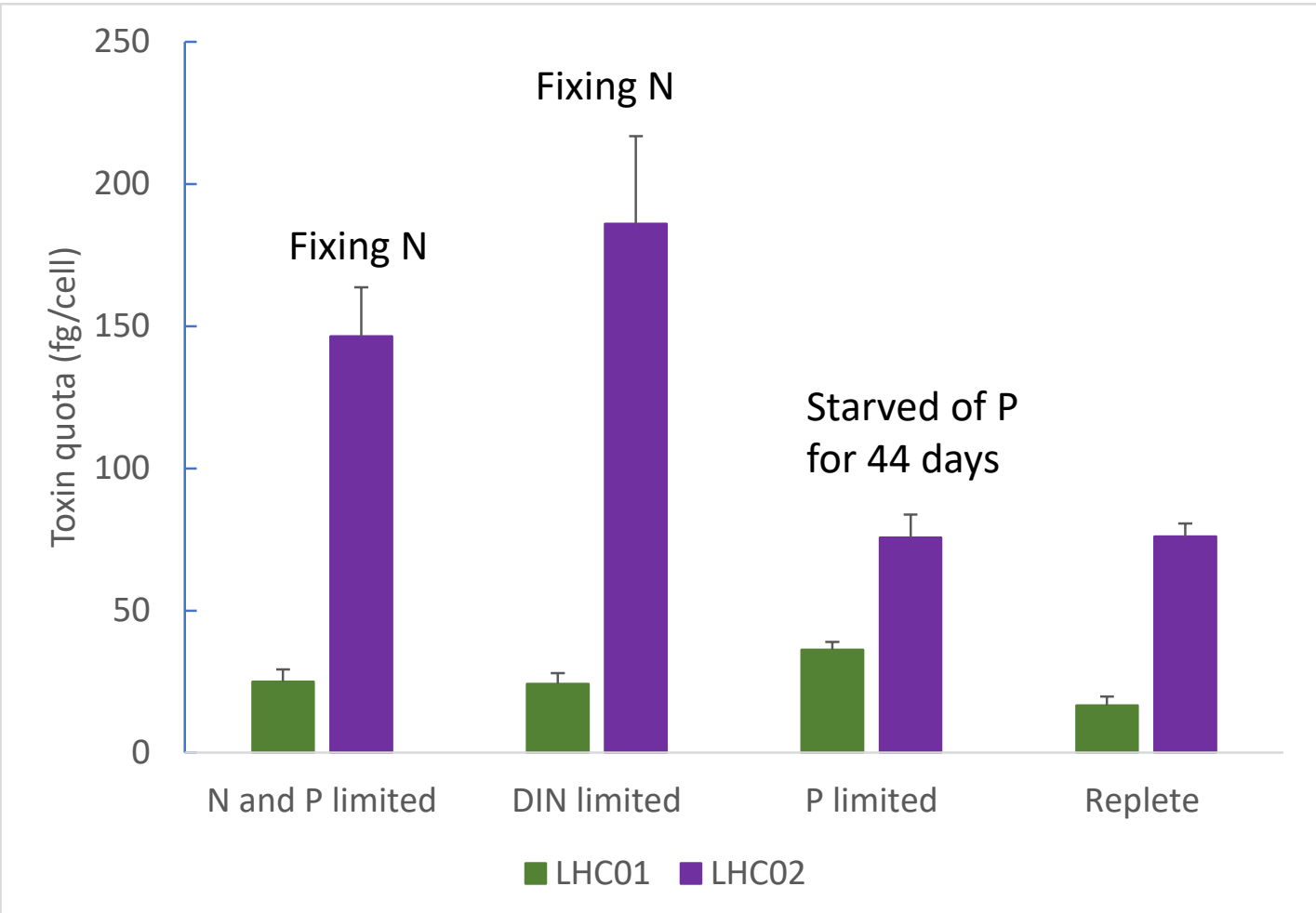
P starvation increases toxin quota in one strain



N fixation increases toxin quota in the other strain



P starvation & N fixation results in higher toxin quota for one strain



Toxin levels affected by:

- Strain variation
- Environmental conditions – nutrient status, temperature, salinity
- Lower nutrients seem to increase toxin production
- Significant proportion of extracellular toxin