

Wastewater-recovered struvite: Advancing sustainable agriculture and the circular economy



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Acknowledgements

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Funding partners & collaborators

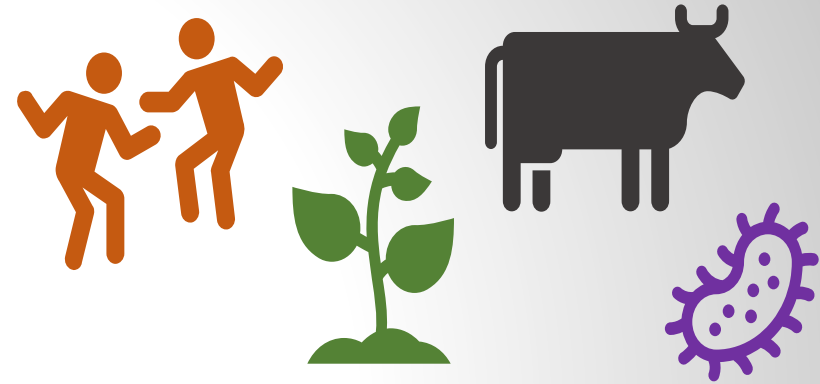


Mike Carroll Travel Fellowship

Phosphorus

- Essential element for living beings
- Green revolution
- World population

- Phosphorus use
- Phosphorus dispose



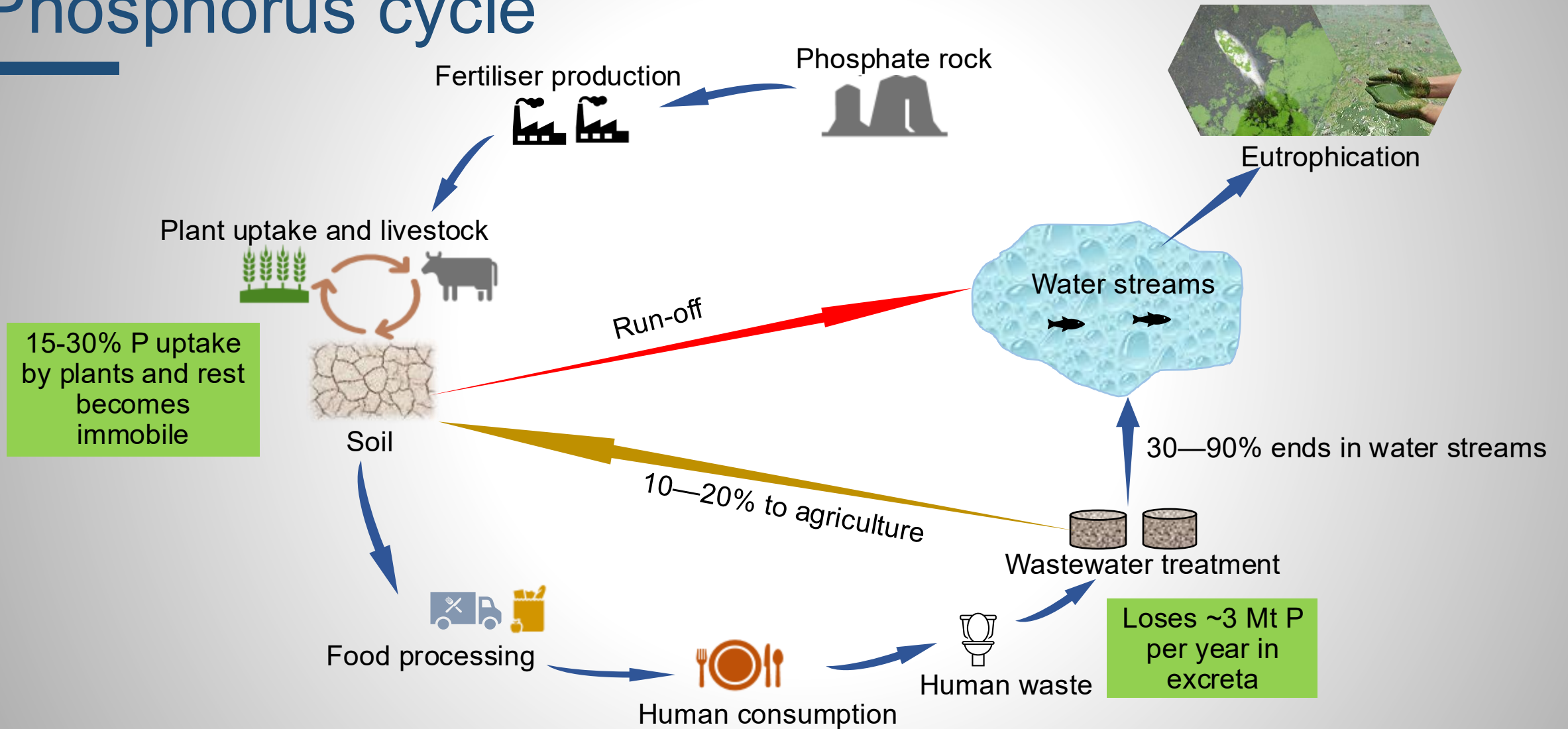
Major Problem



Disrupted phosphorus cycle

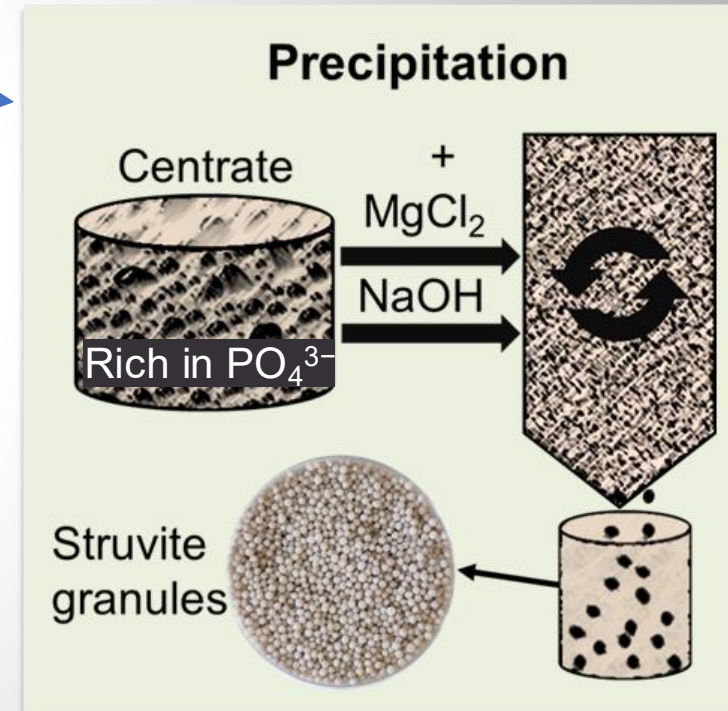
Problem

Phosphorus cycle



Struvite

- A salt builds up in treatment plant pipes
- Derived from recycling of wastewater
- Gaining attention as an alternative P source



Low solubility
in water and
alkaline soils

Highly soluble in
acidic soil and
organic acids

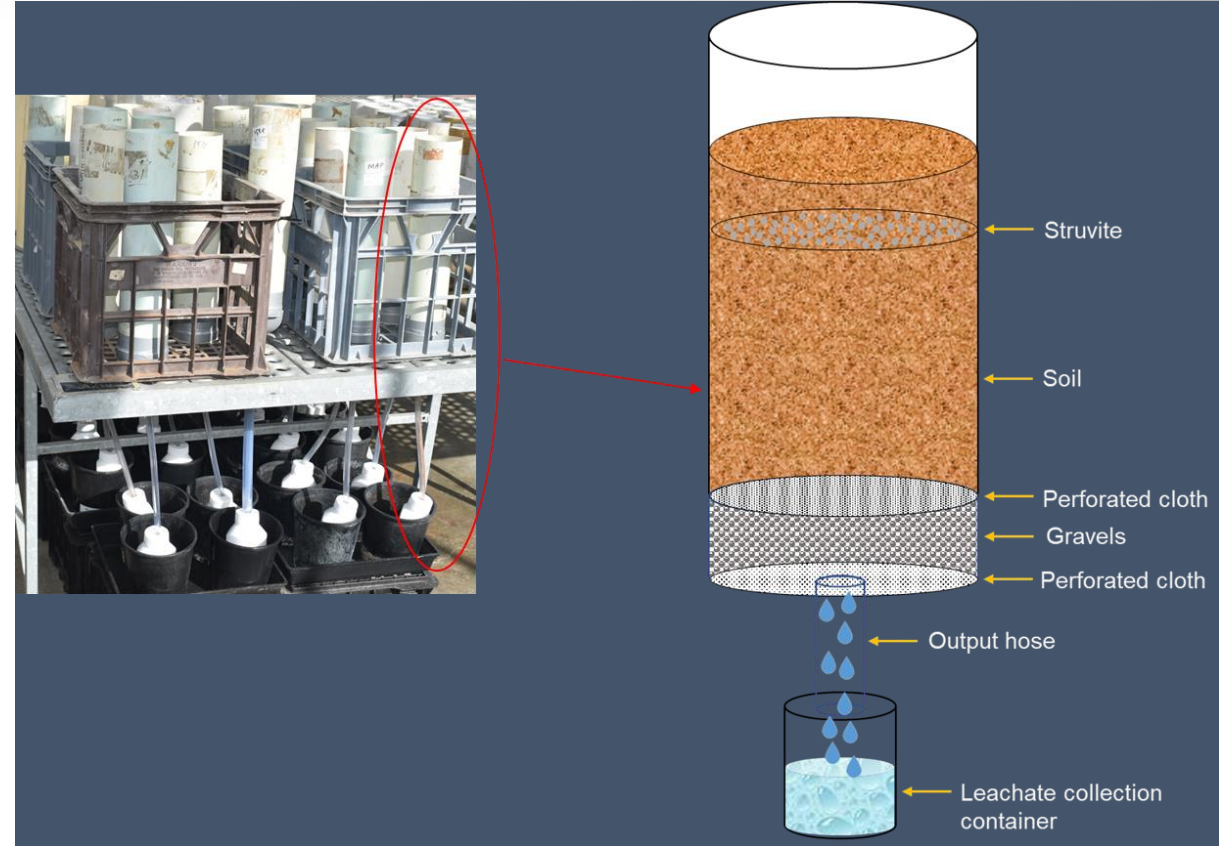
~13% P
~6% NH_4
~10% Mg

Struvite

Methods

Experiments

- Evaluate the P leaching from struvite
- Assess the plant growth response to struvite



Soil type

- Acidic (pH 5.0)
- Loamy sand

Species

- Chickpea



Wheat

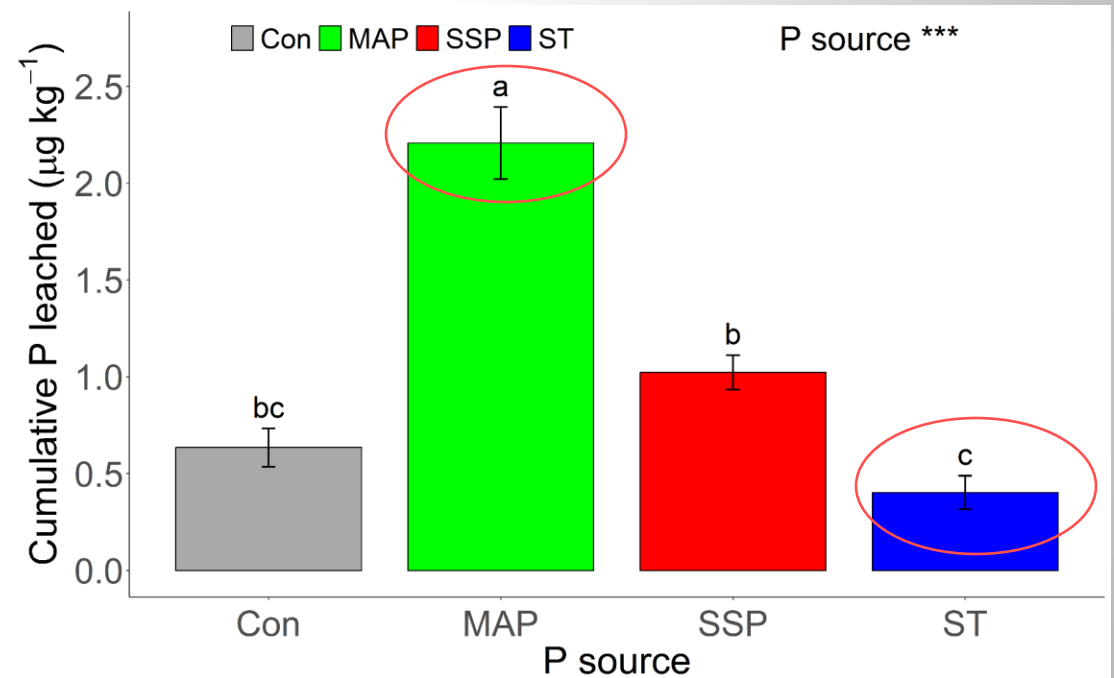
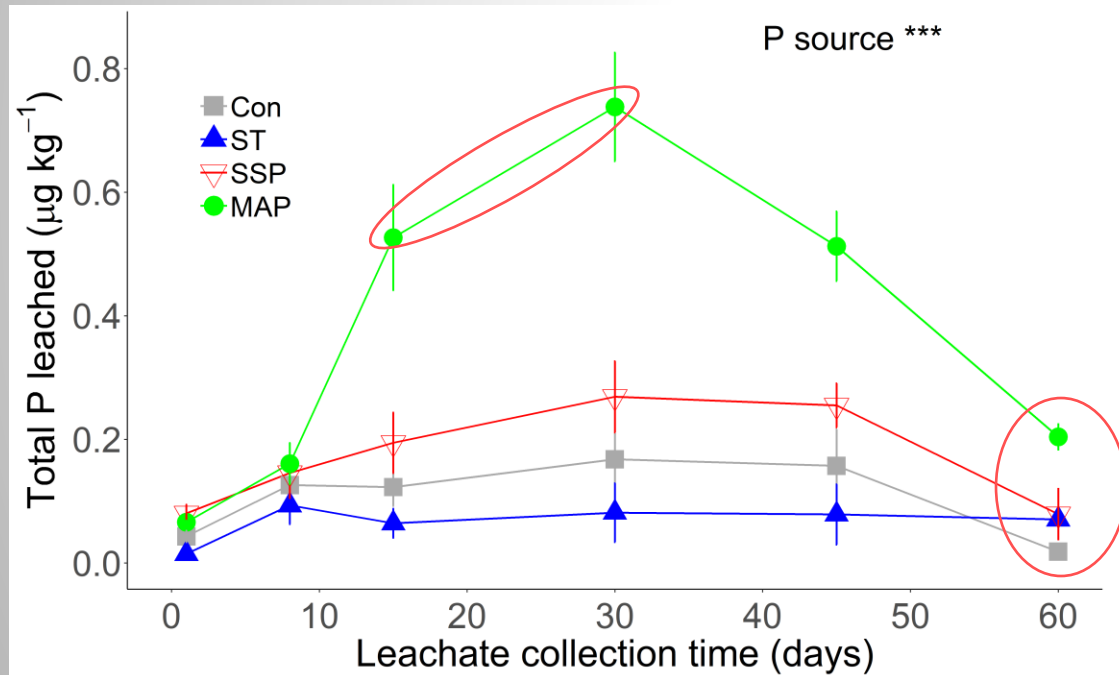


Phosphorus (P) sources (90 $\mu\text{g P g}^{-1}$ dry soil)

- Struvite (ST)
- Mono-ammonium phosphate (MAP)
- Single superphosphate (SSP)
- Control (Con, No-P)

Results

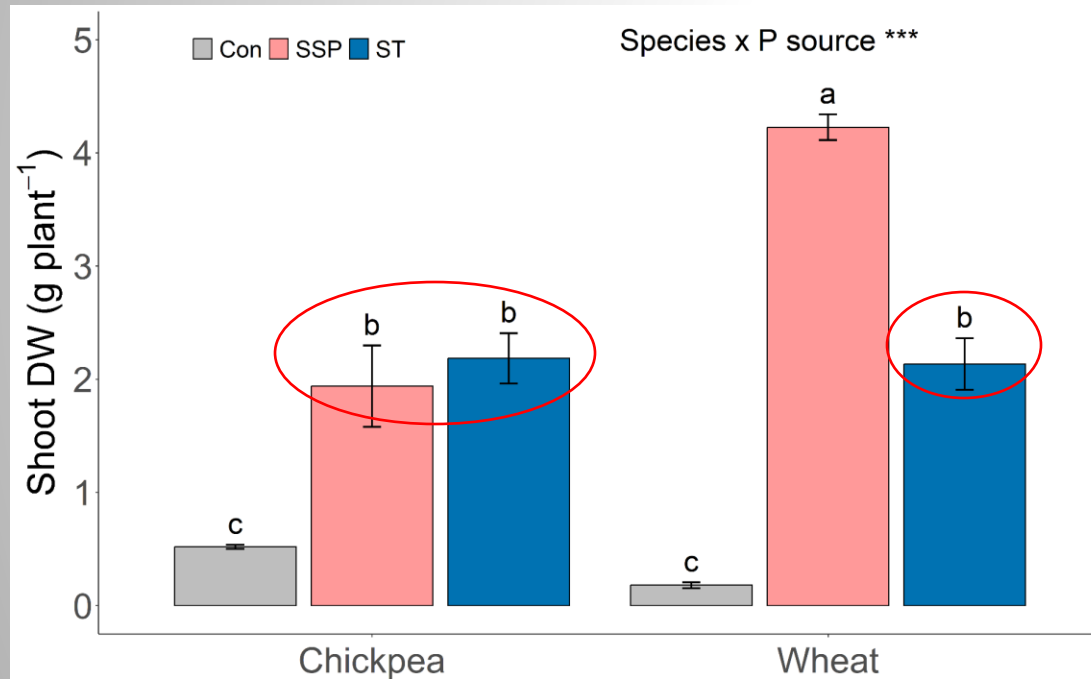
Leaching experiment



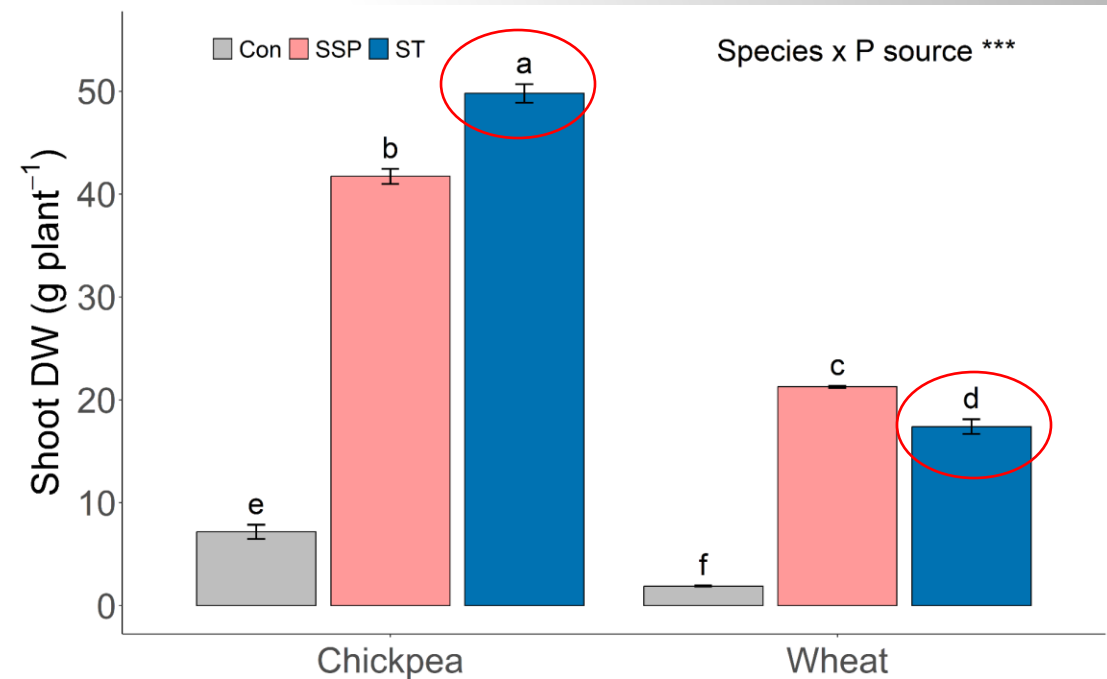
Results

Plant growth experiment

Early growth (8 weeks after sowing)



Physiological maturity



Shoot Dry weight (DW)

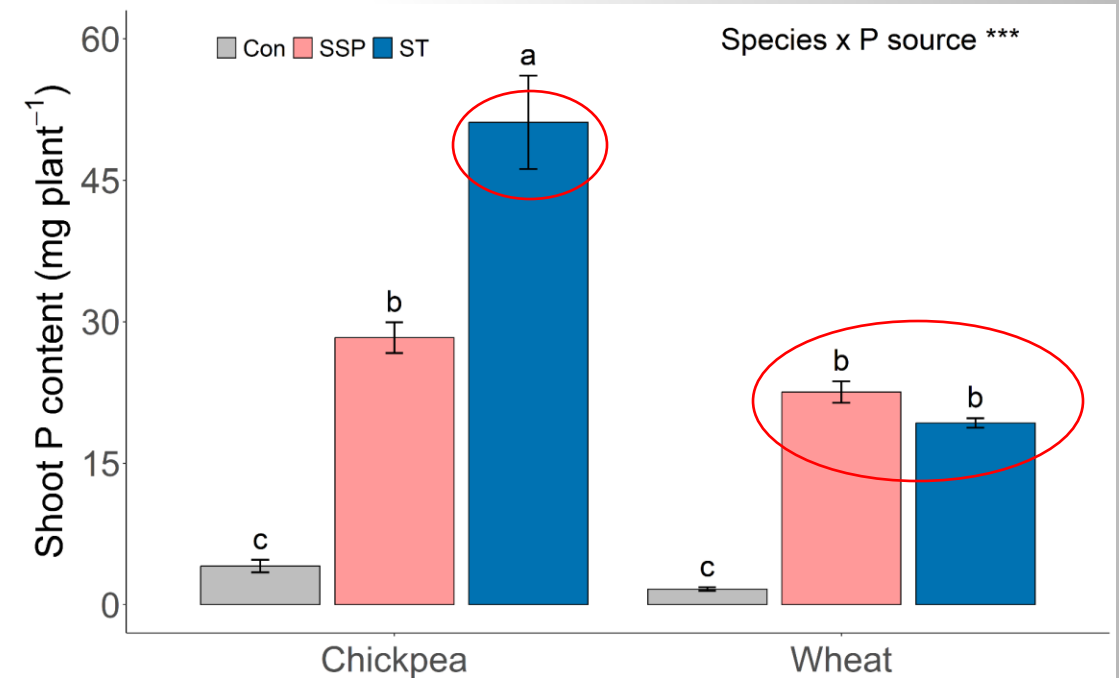
Results

Plant growth experiment

Early growth (8 weeks after sowing)



Physiological maturity



Shoot phosphorus content

Results

Plant growth experiment

Agronomic P-use efficiency

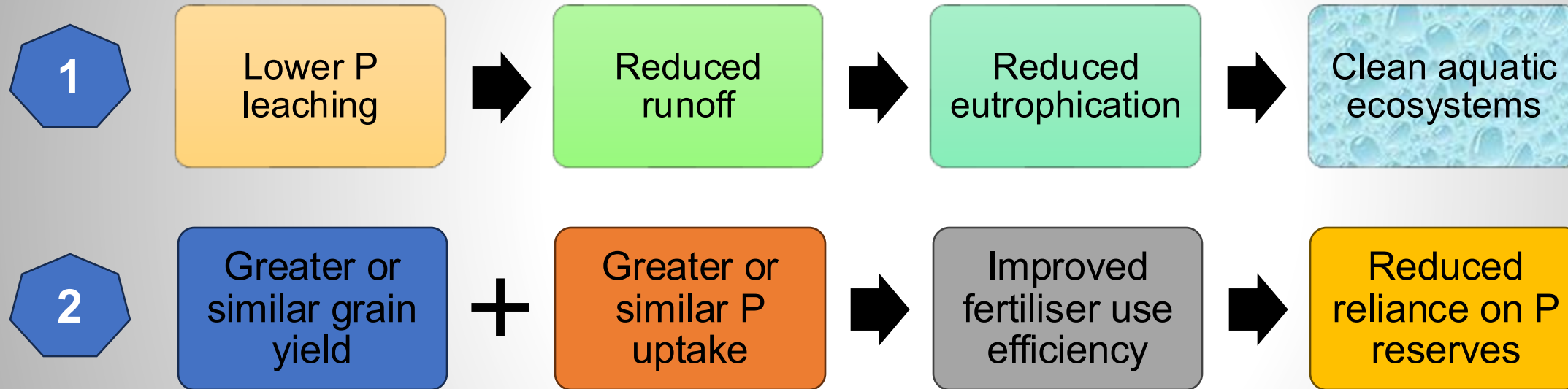


Grain yield



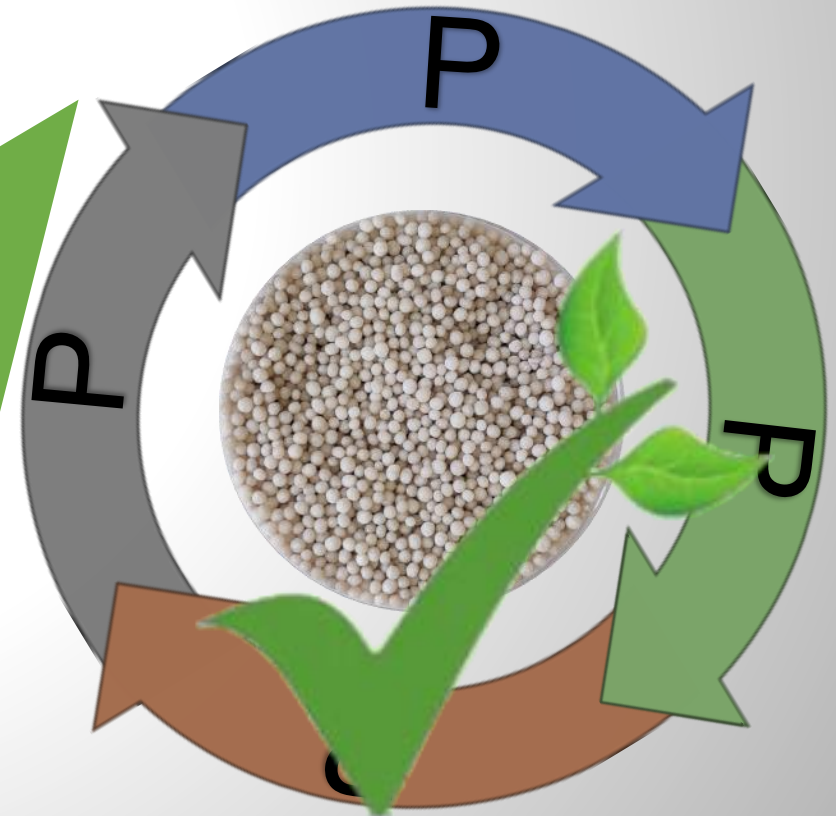
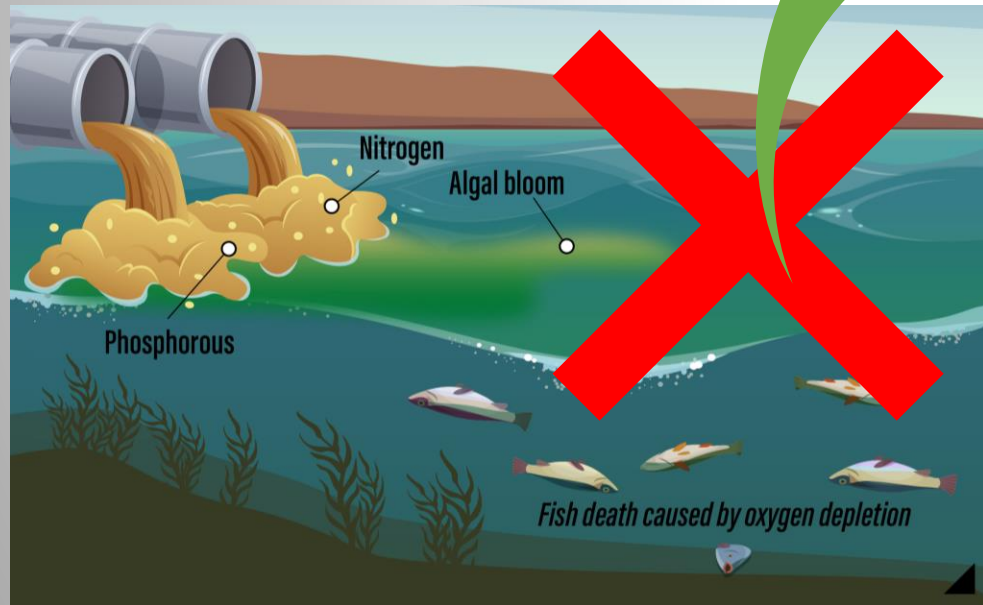
Conclusions

Under struvite fertilisation



Take home message

Struvite can be a promising sustainable alternative P fertiliser, offering both **agronomic** and **environmental** benefits.



Thanks



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