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SystemLink

Phenolic compounds from invasive *Fallopia japonica* inhibit nitrification

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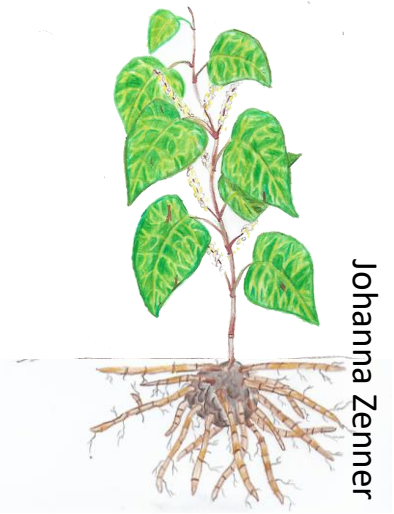
Fallopia japonica and copper inhibit nitrification?



Fallopia japonica

stresses

Copper

BioRender.com

Production of

Polyphenols

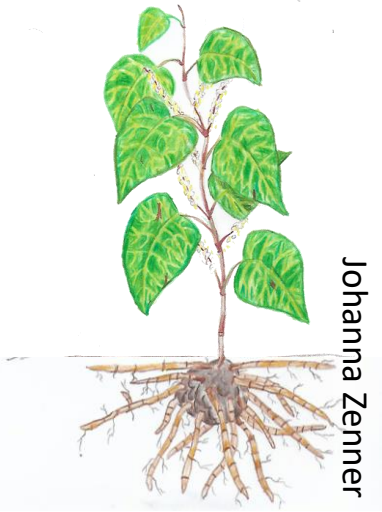
Inhibition of

Inhibition of

Nitrification

NH_4^+ Ammonium → NO_3^- Nitrate

Fallopia japonica and copper inhibit nitrification?



Fallopia japonica

stresses

Copper

BioRender.com

Production of **Polyphenols**

Inhibition of

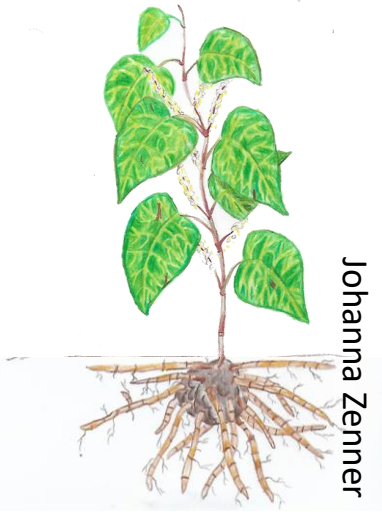
? Inhibition of

Nitrification

NH_4^+ Ammonium → NO_3^- Nitrate

? ↓ ↓ ↓ ?

Fallopia japonica and copper inhibit nitrification?



Fallopia japonica ↑

stresses

Copper ↑

Production of ↑ **Polyphenols** ?

? Inhibition of

Inhibition of

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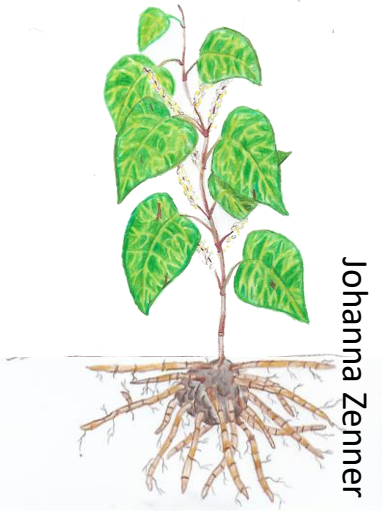
NH_4^+ Ammonium → NO_3^- Nitrate

? ↓↓↓ ?

Fallopia japonica and copper inhibit nitrification?



Fallopia japonica

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Production of **Polyphenols** ?

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NH_4^+ Ammonium → NO_3^- Nitrate

? ↓↓↓ ?

Fallopia japonica and copper inhibit nitrification?

Copper gradient

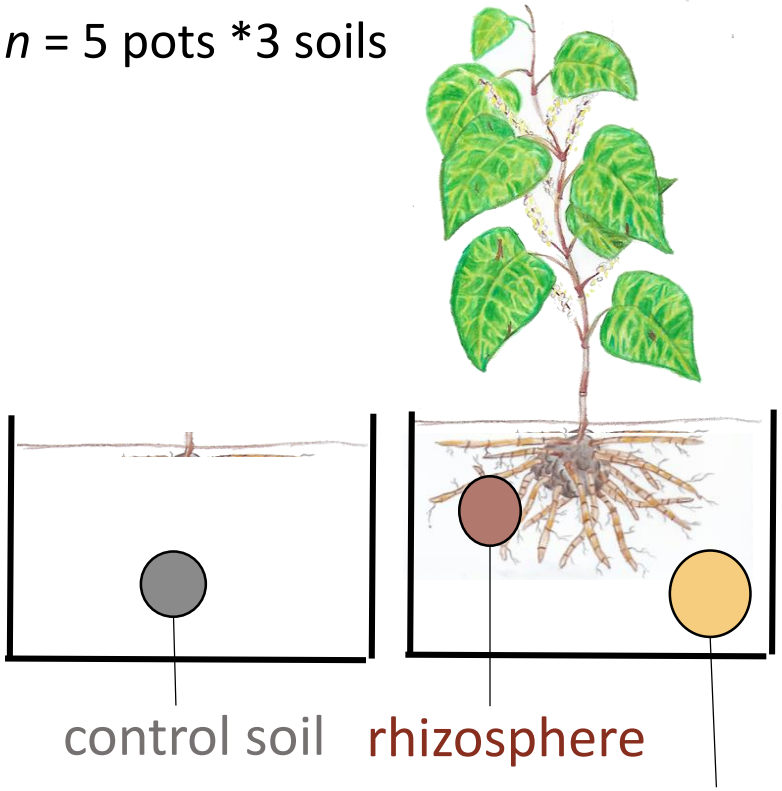
n = 4

addition of:
0 - 810 mg Cu*kg soil $^{-1}$

x

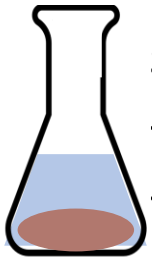
Plant influenced soil

n = 5 pots *3 soils



Measure
potential nitrification rate

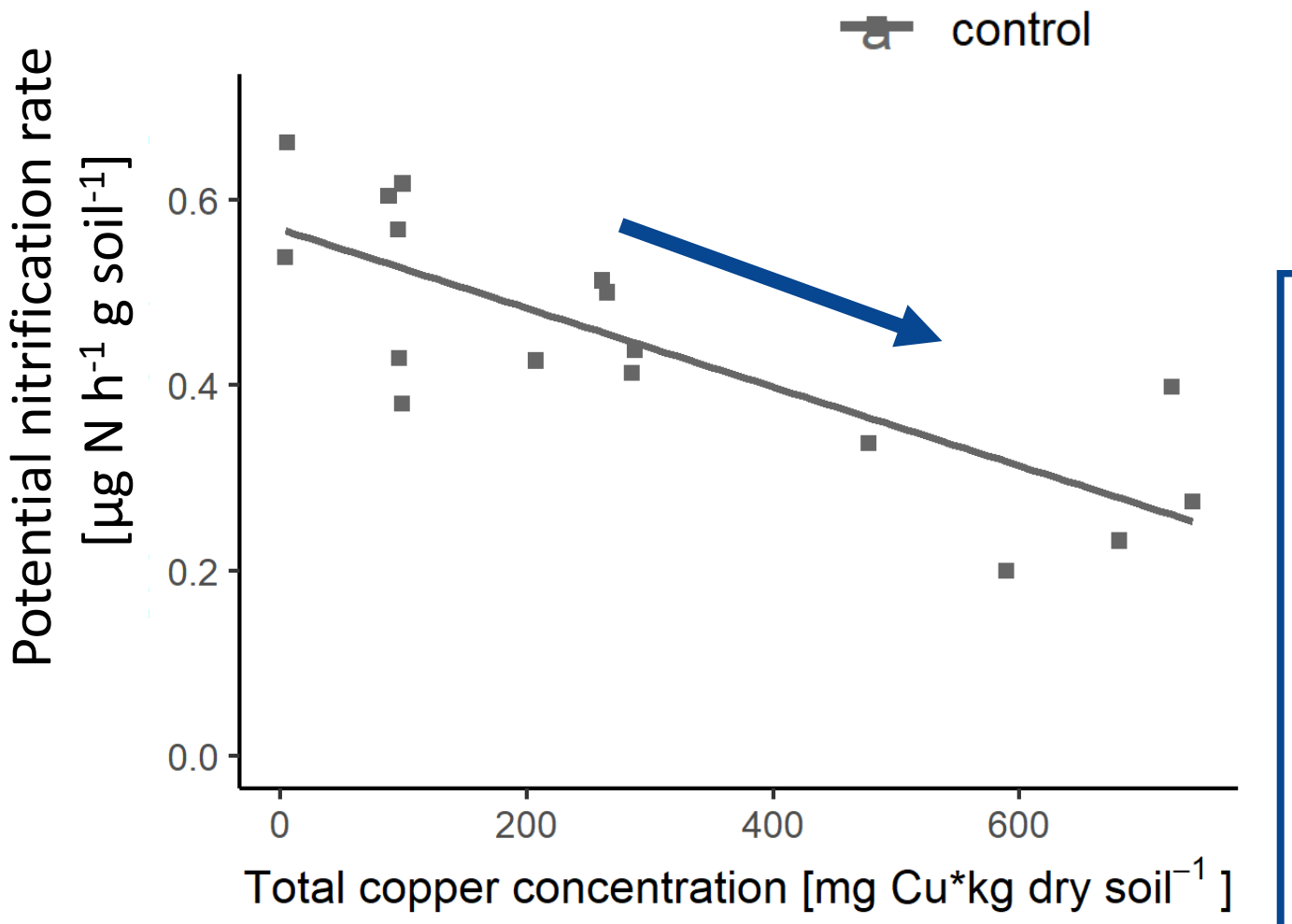
n = 60



soil
+ ammonium solution
+ buffer

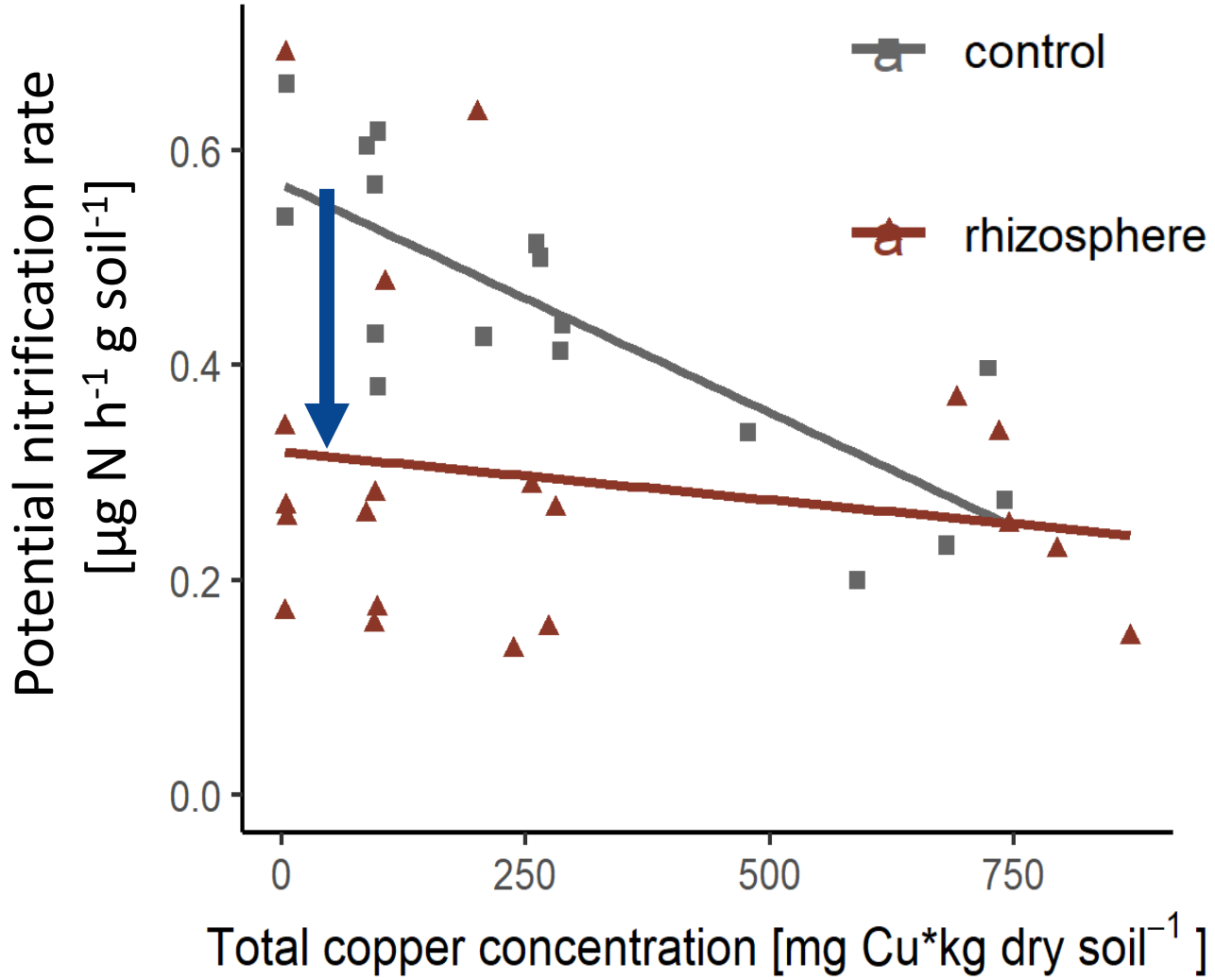
Measure nitrate production

Copper inhibits nitrification!



copper -> nitrification

Fallopia japonica and copper inhibit nitrification, individually!



$R^2 = 0.65$, $p = < 0.0001$

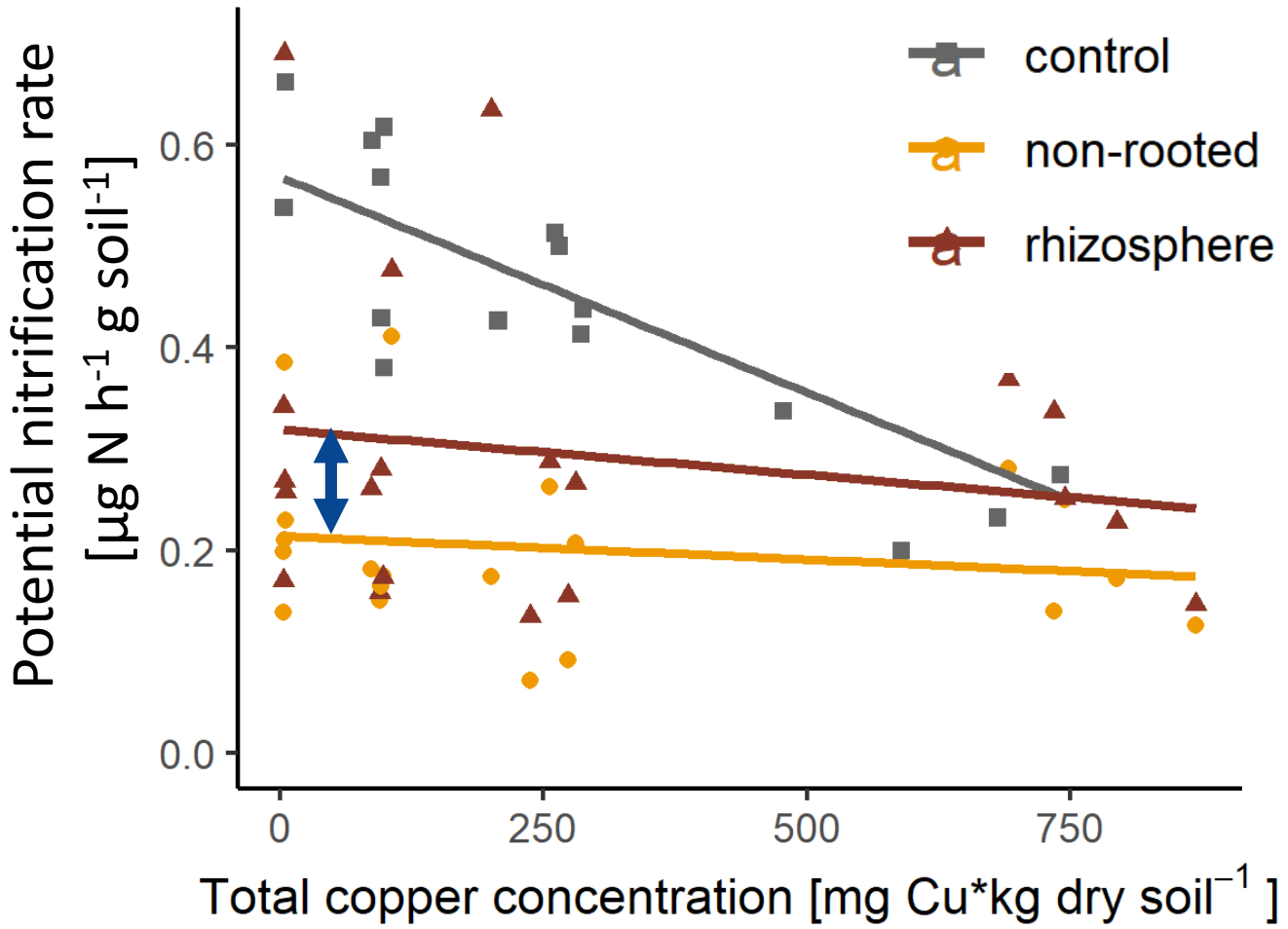
$R^2 = 0.03$, $p = 0.45$

copper -> nitrification ↓

Fallopia -> nitrification ↓

No synergistic effect X

Fallopia japonica and copper inhibit nitrification, individually!



R^2 = 0.65 , p = < 0.0001

R^2 = 0.03 , p = 0.49

R^2 = 0.03 , p = 0.45

copper -> nitrification ↓

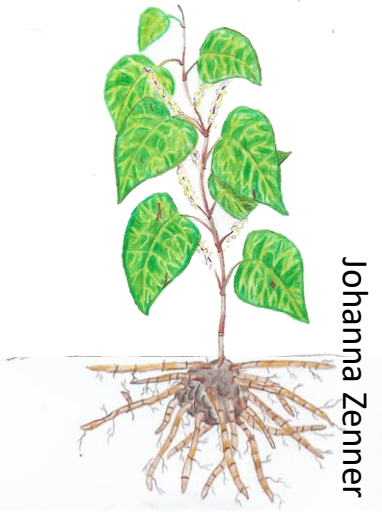
Fallopia -> nitrification ↓

No synergistic effect X

Nitrification inhibition:

↓↓non-rooted soil >rhizosphere↓

Which polyphenols inhibit nitrification?



Fallopia japonica ↑

stresses

Copper ↑

Production of ↑ **Polyphenols** ?

Inhibition of

? Inhibition of

Nitrification

NH_4^+ Ammonium → NO_3^- Nitrate

? ↓↓↓ ?

Which polyphenols inhibit nitrification?

Johanna Zenner

Fallopia japonica

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Production of

Emodin & Resveratol

Inhibition of

? Inhibition of

Nitrification

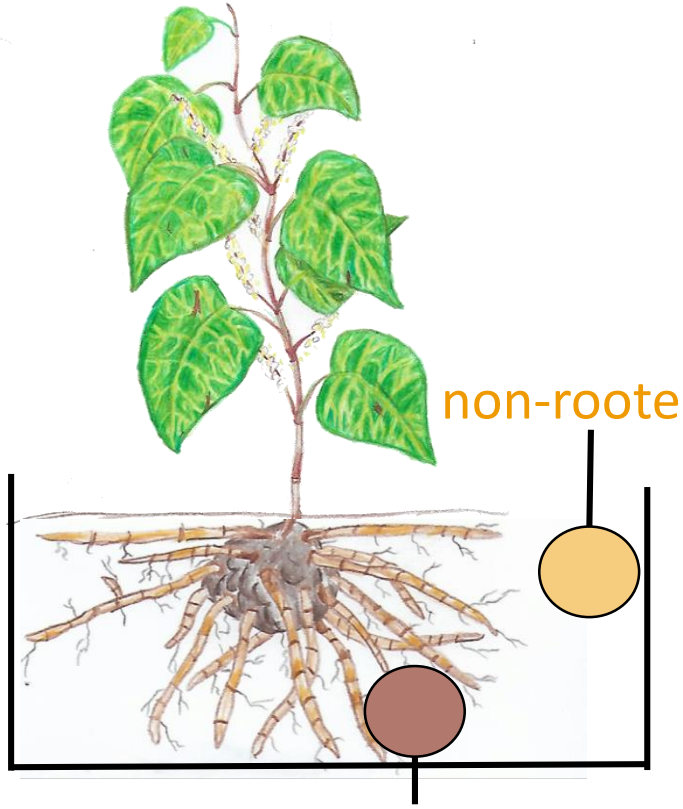
NH_4^+ Ammonium → NO_3^- Nitrate

? ↓ ↓ ?

Do **emodin** and **resveratol** inhibit nitrification?

Measure potential nitrification rate

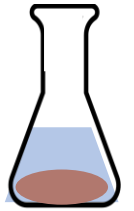
n = 5 pots * 2 soils



x

n = 3

add:
ammonium
+ buffer + …



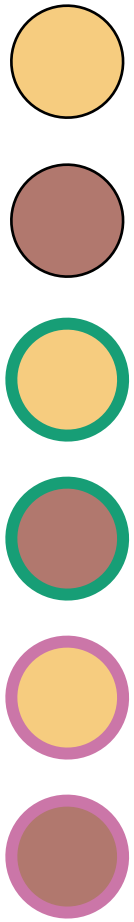
no addition

emodin

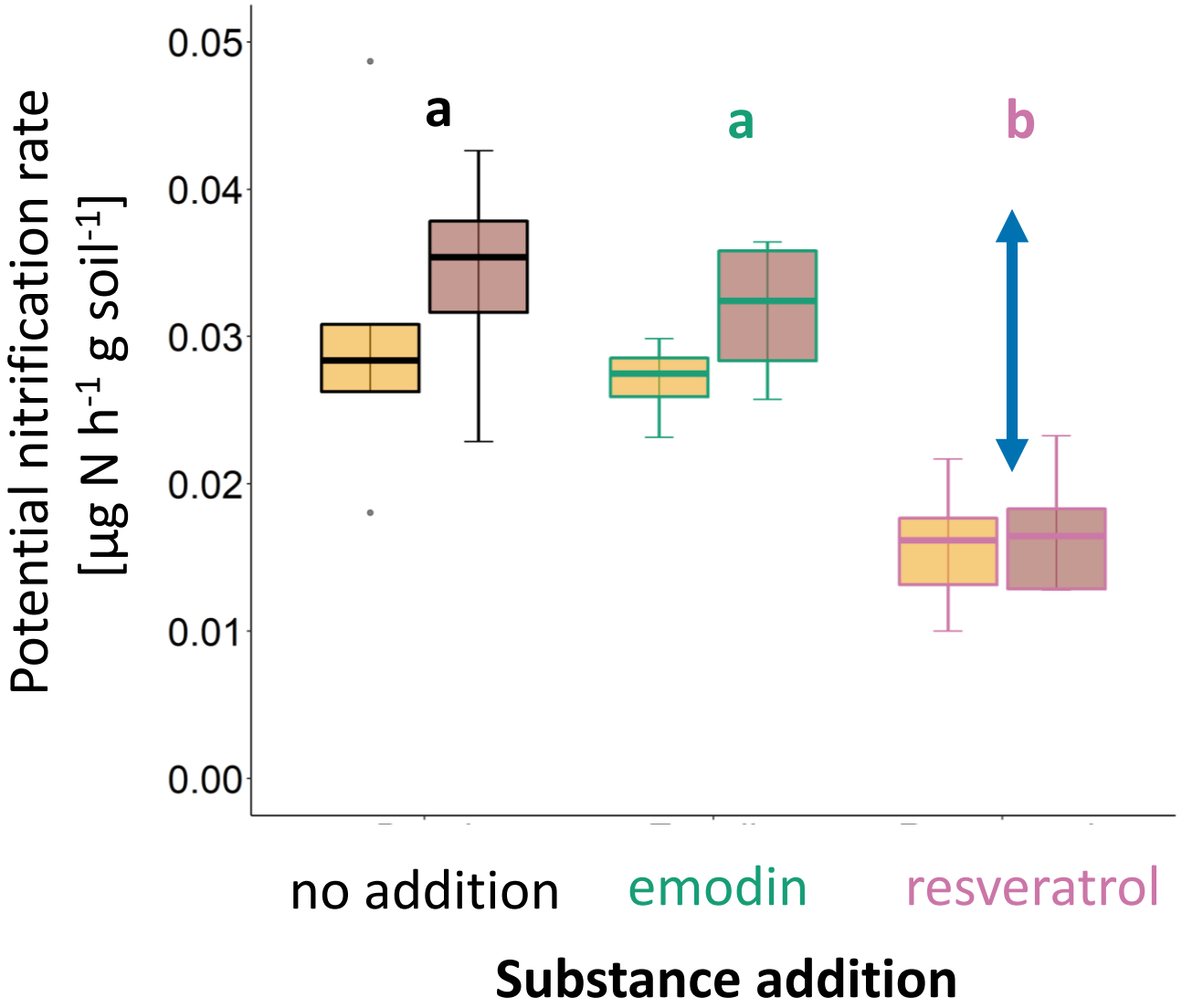
resveratrol

=

n =30



Resveratrol inhibits nitrification!



- Resveratrol inhibits nitrification

Take home messages

- *Fallopia japonica* strongly decreased nitrification
- No synergistic effect with copper

- Stronger nitrification inhibition in non-rooted than rhizosphere soil

- Resveratrol has capacity to inhibit nitrification

Acknowledgements

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Code for OSPP: