

Silicon isotopes: linking soil Si availability and plant Si strategies

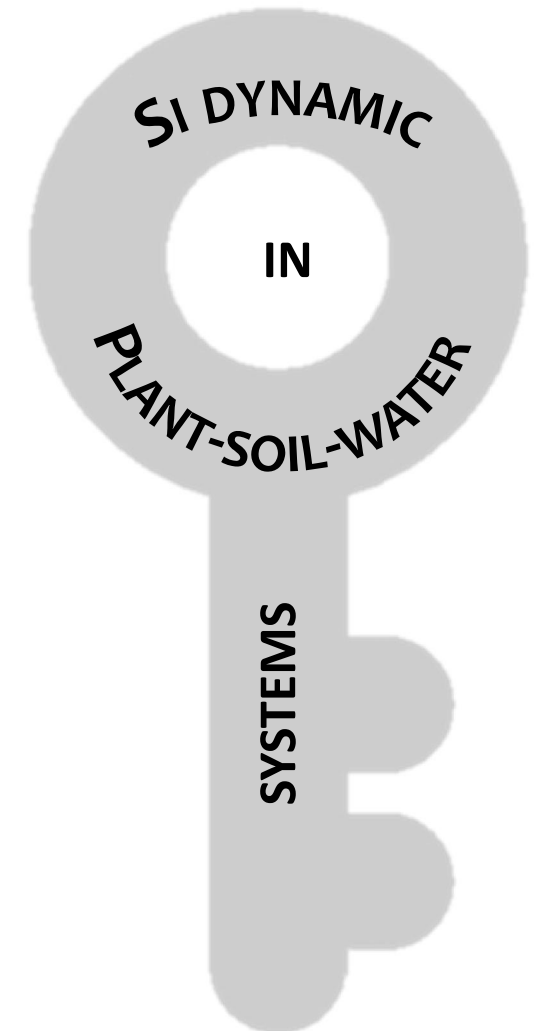
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Plant fitness
benefits

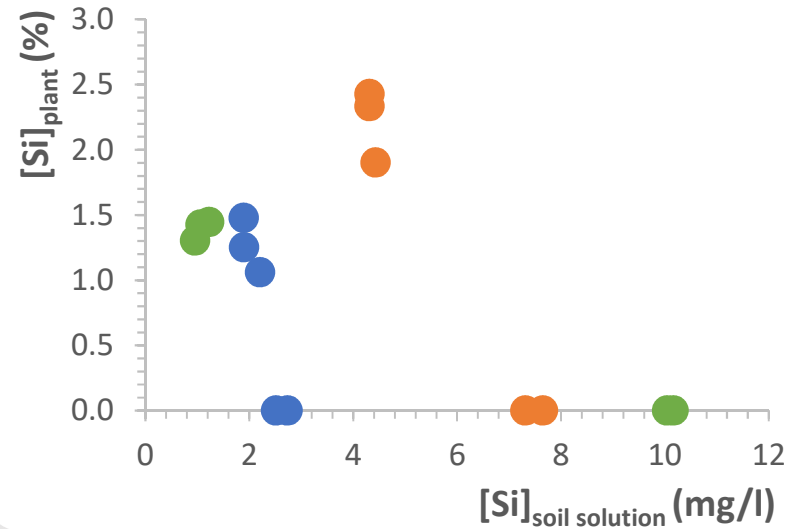
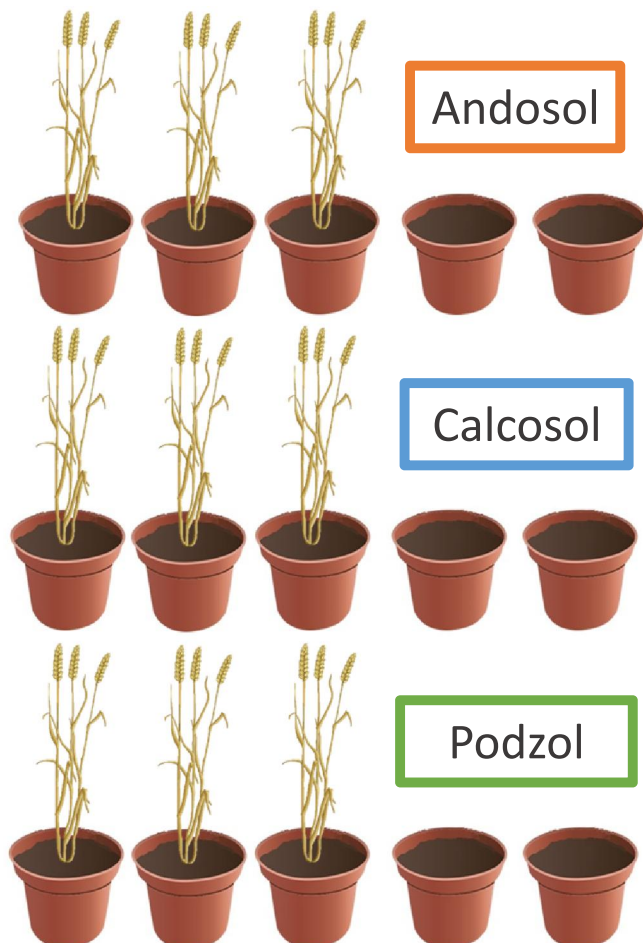
Sustainability
of agronomical
practices

Impact of land
use on marine
ecosystems

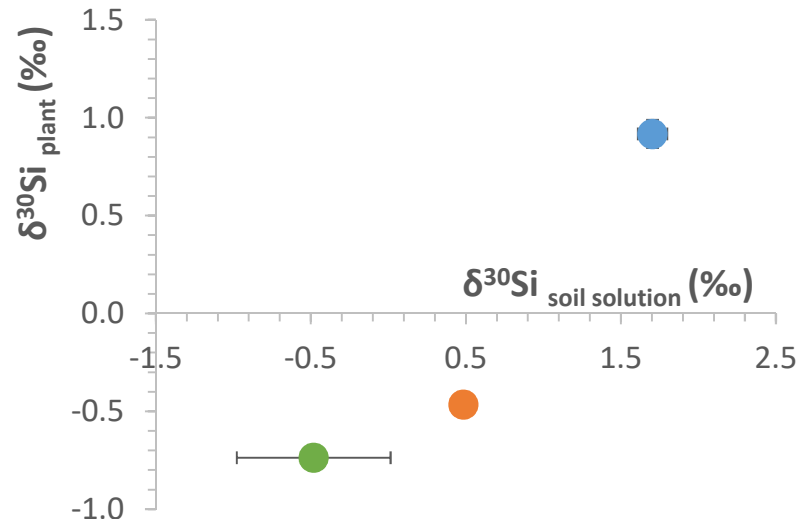


Is the plant Si strategy linked to soil Si availability?

Experiment: Durum wheat grown on 3 different soils

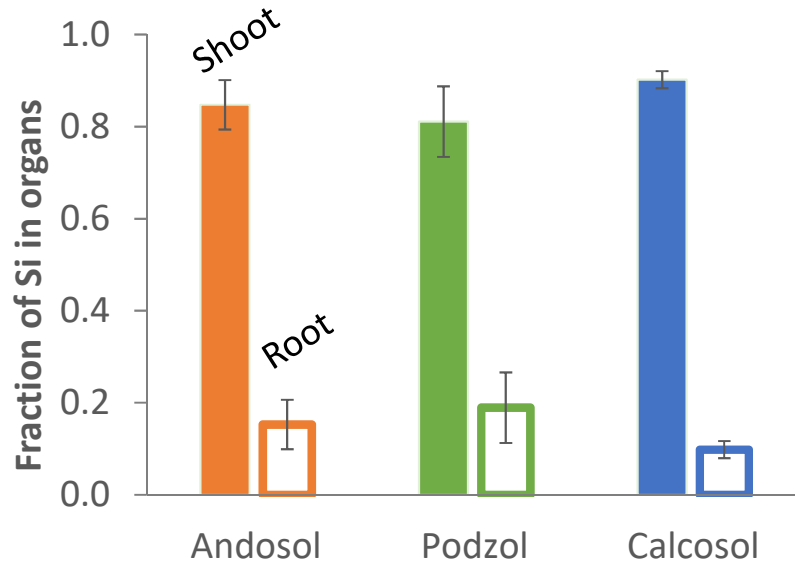


- Si availability affect plant Si content
- Plants exhaust soil solutions by 24%, 42% and 86% for calcosol, andosol and podzol

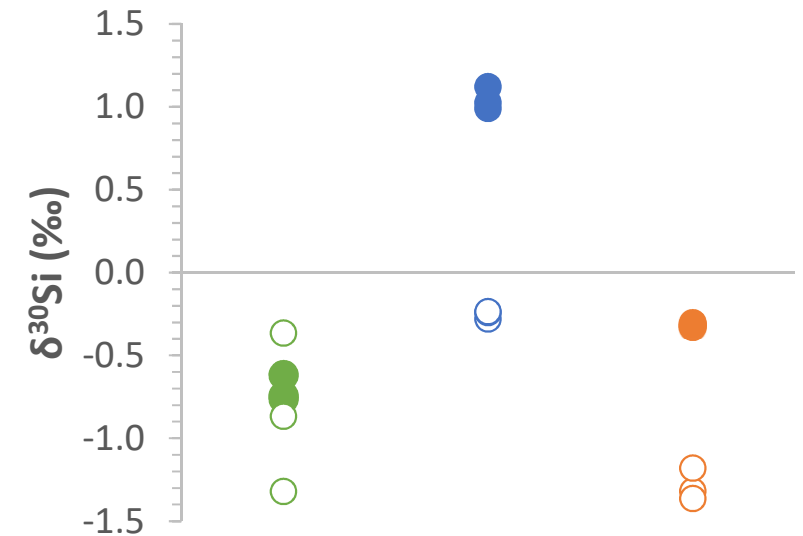


- $\delta^{30}Si_{\text{plant}}$ is controlled by $\delta^{30}Si_{\text{soil solution}}$
- Si availability doesn't affect $\Delta^{30}Si_{\text{uptake}} = -1.0 \pm 0.24 \text{ ‰}$
Be careful to consider that the soil solution is exhausted by plants => Rayleigh system

Is the plant Si strategy linked to soil Si availability?



- Si availability does not affect plant Si distribution within the plant
- The Si isotopes fractionation at the root-shoot interface,
$$^{30}\Delta Si_{\text{intraplant}} = (\delta^{30}Si_{\text{shoot}} - \delta^{30}Si_{\text{plant}}) / f Si_{\text{shoot}}$$
dramatically changes from one soil to another:
 $2.1 \pm 0.1\text{‰}$, $0.6 \pm 0.1\text{‰}$ and $0.2 \pm 0.1\text{‰}$ for calcosol, andosol and podzol



THANK YOU