

Establishing Baseline Transfer Factors and Investigating the Role of Competition on Uptake of Per- and Polyfluoroalkyl Substances (PFAS) in *Solanum Lycopersicum*, *Lactuca sativa*, and *Schedonorus arundinaceus*

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The Agroecology Lab

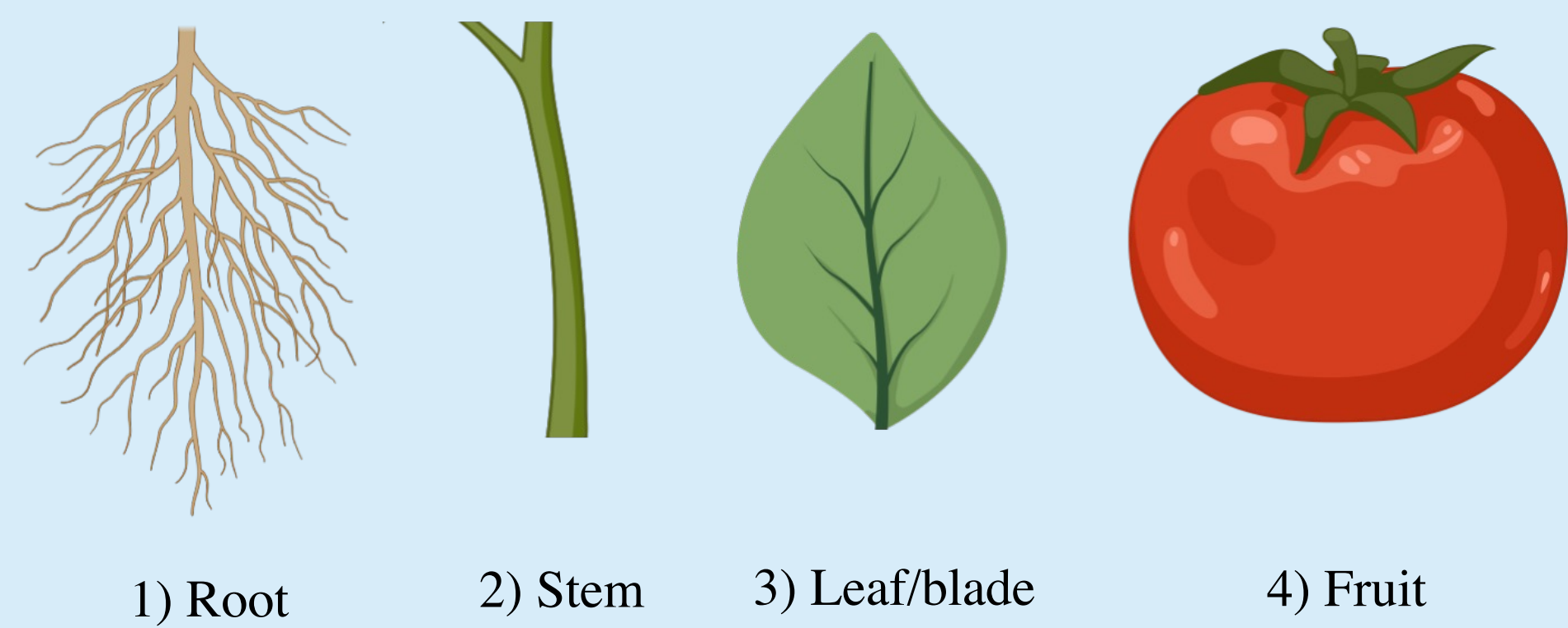
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Introduction

PFAS in agroecosystems pose a threat to farm viability. The lack of data on the movement of PFAS from soil to crops slows development of regulations for crops and guidance for grower decision-making. There is variation in transfer factors (TFs) within and between studies, making it difficult to understand driving mechanisms of PFAS uptake. Our work seeks to elucidate these drivers by evaluating the way that PFAS uptake is altered by plant physiology, competition, and experimental conditions.

Questions

How does PFAS uptake differ among plant parts?



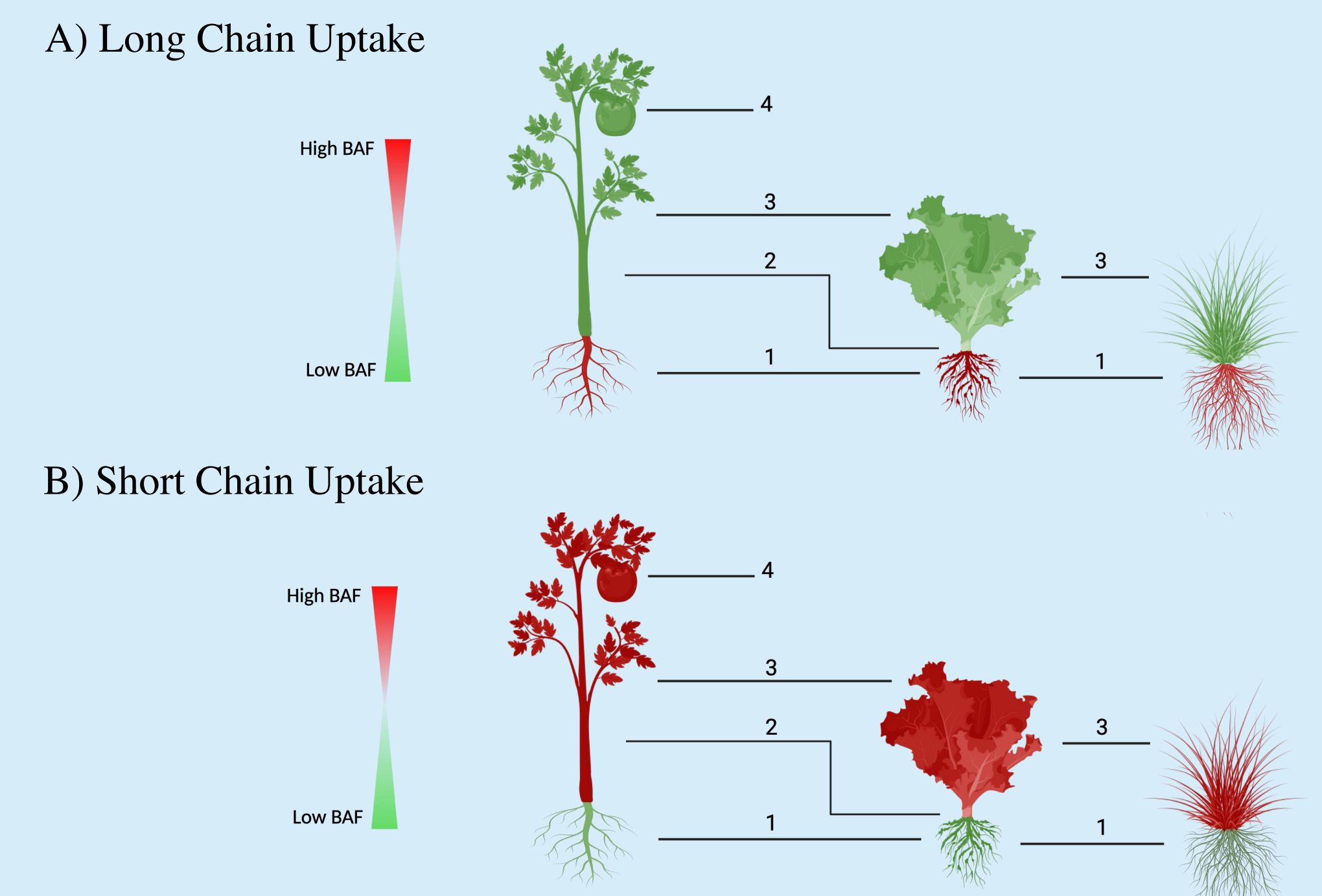
Methods

3 species, 4 PFAS compounds



Hypotheses

Chain length will drive uptake results more than plant part



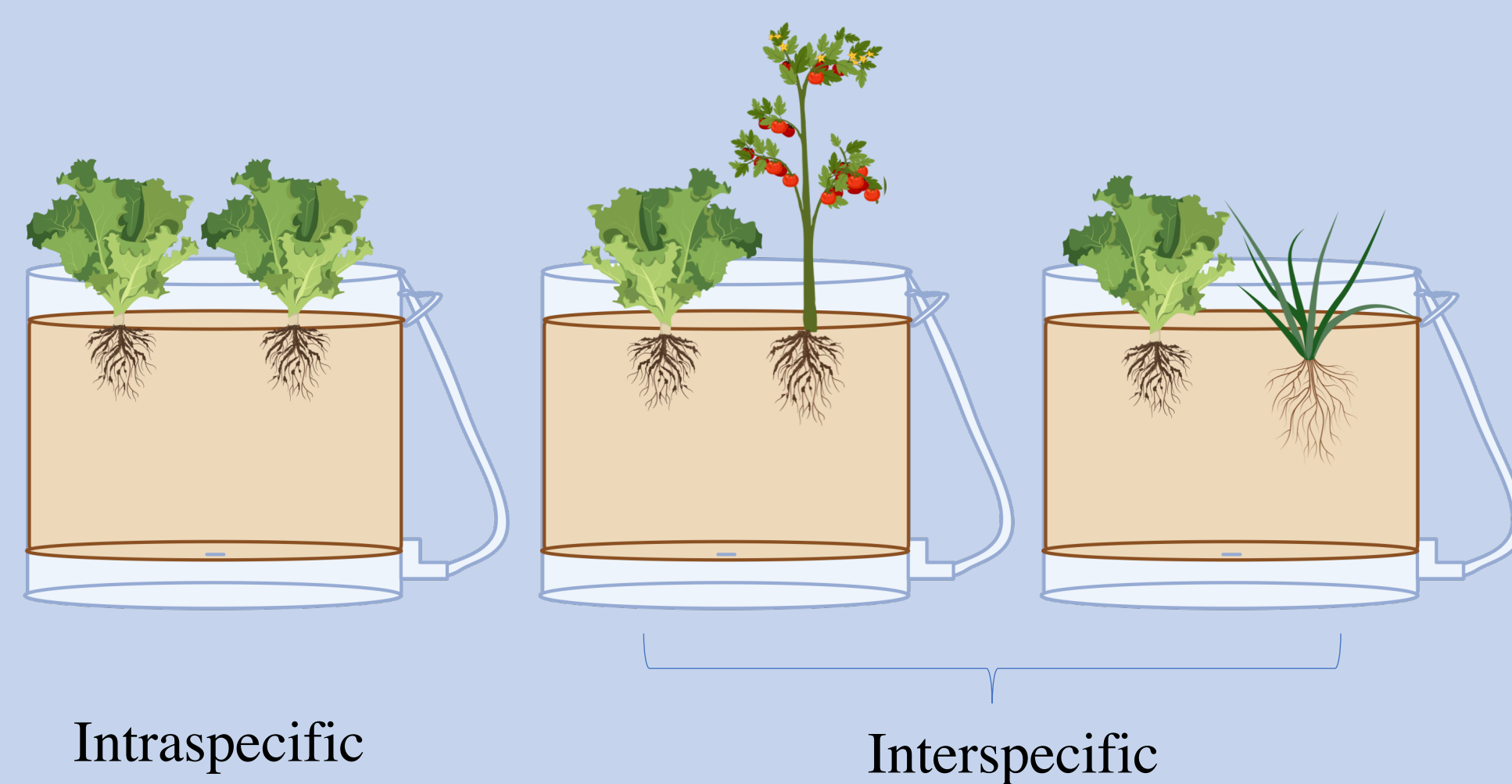
Do end groups and chain length influence PFAS uptake?

	Short Chain	Long Chain
Sulfonate	PFBS	PFOS
Carboxylic acid	PFBA	PFOA

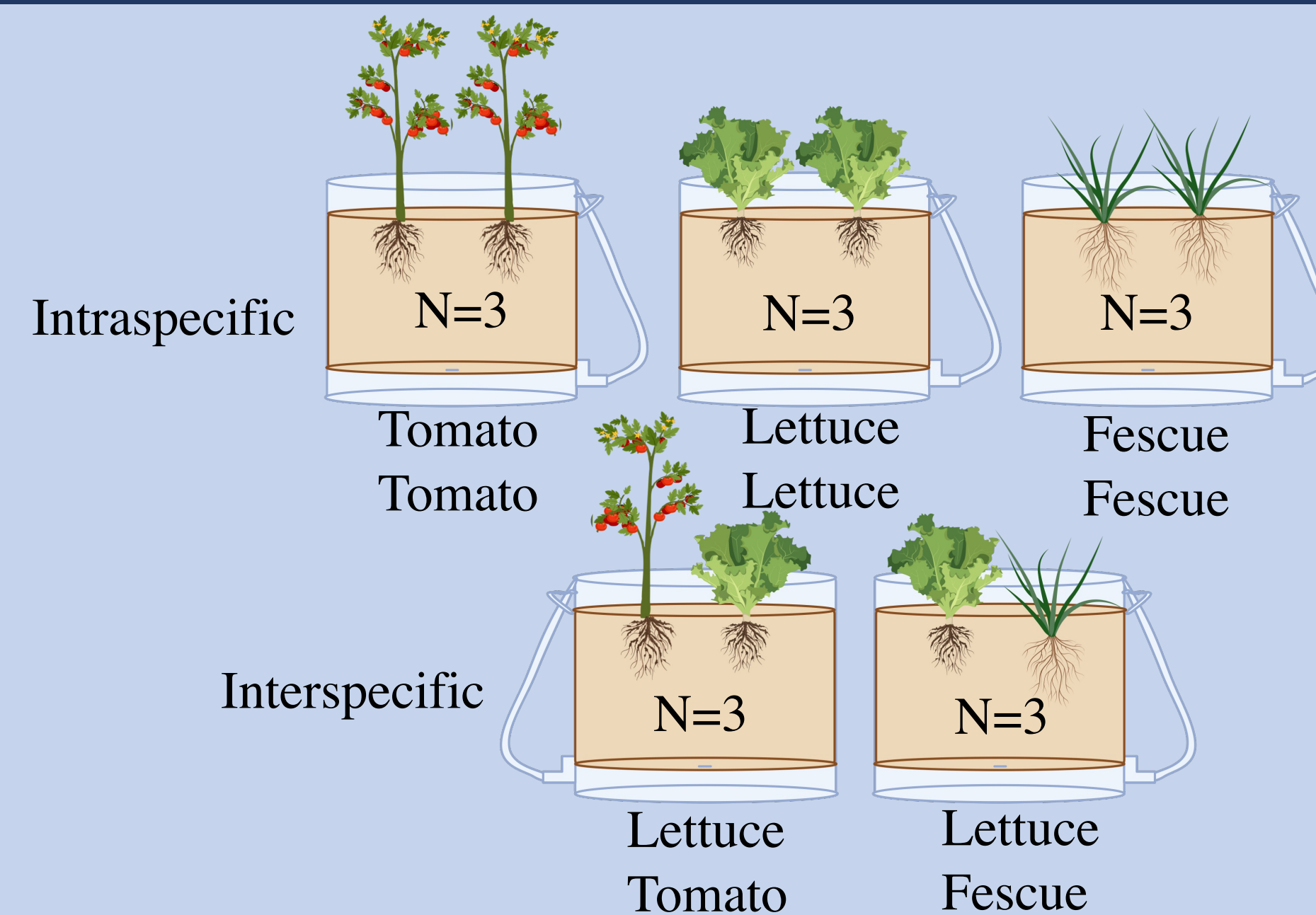
Greenhouse soil was spiked with PFBS, PFOA, PFBA, and PFOS, and field soil contained these compounds from historical spreading of biosolids.

Long chain compounds (A) will be in higher concentration belowground, while short chain compounds (B) will be in higher concentration aboveground.

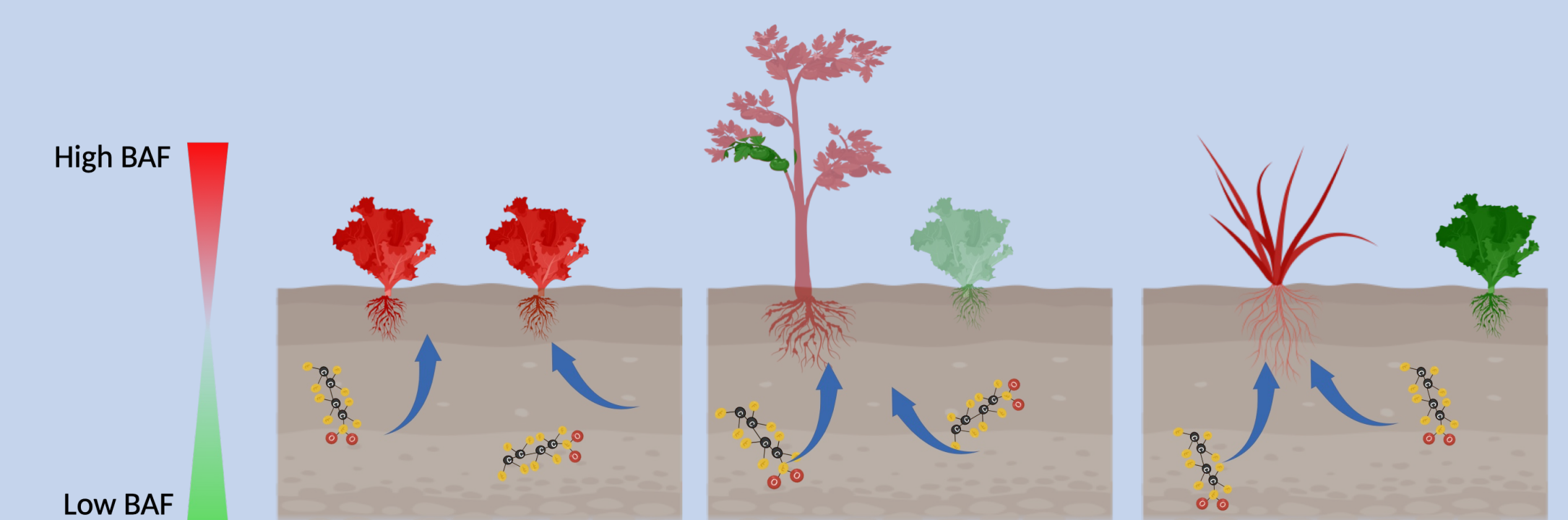
Is PFAS uptake mediated by plant neighbor?



5 cropping conditions

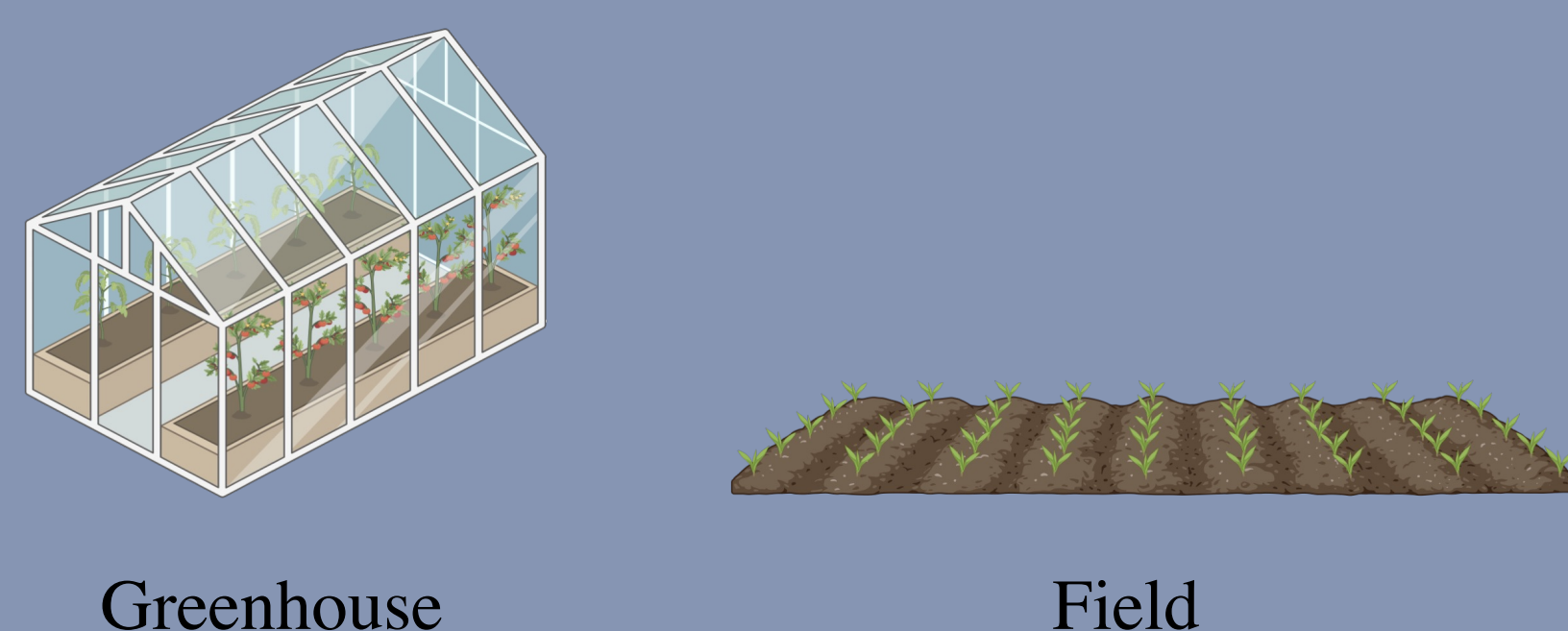


Plants will have less PFAS uptake in interspecific combinations



Competition for nutrients and water will alter uptake, and plants with larger root systems (fescue and tomato) will take up more PFAS than lettuce.

Do greenhouse and field studies yield statistically similar levels of PFAS uptake?



Greenhouse

Field

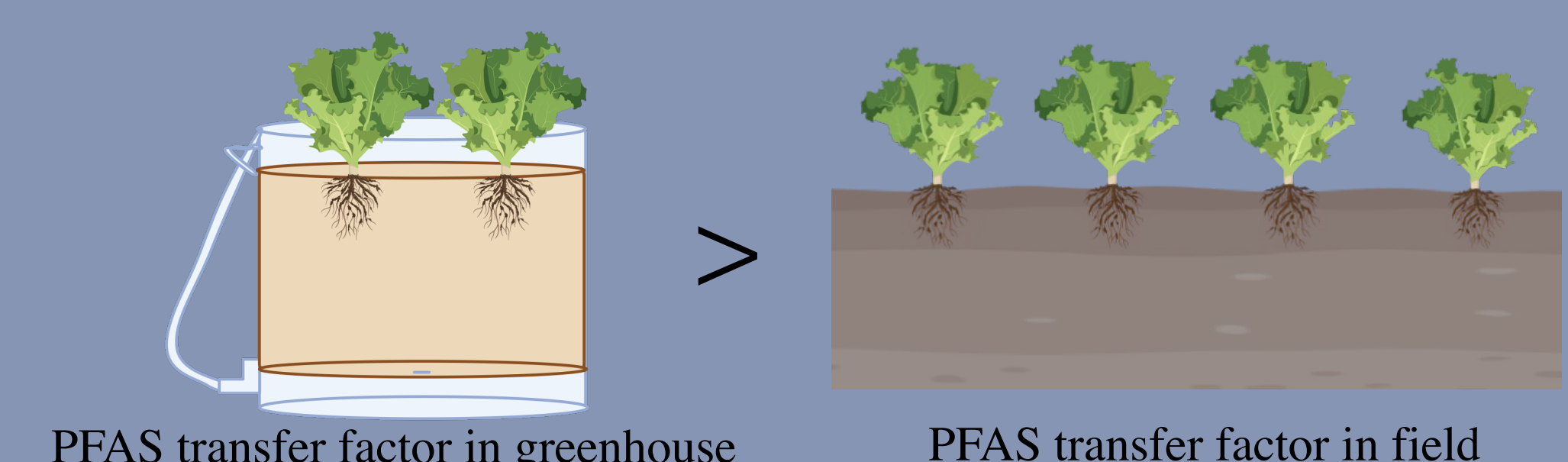
2 experimental conditions



Greenhouse
Orono, ME

Hunter Farm
Unity, Maine

Greenhouse studies may overstate uptake levels



PFAS transfer factor in greenhouse

PFAS transfer factor in field

We expect greenhouse conditions to increase the mean TFs but decrease the variation in TFs among plants within a single pot.

Acknowledgements

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