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### Project Rationale and Goals

- Traditional corn and soybean cropping systems **leave fields bare** for extended periods, leaving **soil vulnerable to soil erosion and nutrient loss**
- The **perennial groundcover (PGC)** approach proposes the use of continuous soil cover through **perennial plant species growing in conjunction with** the annual row crop
- PGC **may increase soil quality and reduce nutrient runoff** at a **lower cost and reduced management burden** than traditional cover cropping systems
- Goal:** evaluate the **effect of PGC on nitrogen export** through field trials at the long-established water quality sites at the Northeast Iowa Research Farm in Nashua, IA and compare to conventional corn and other cover cropping techniques

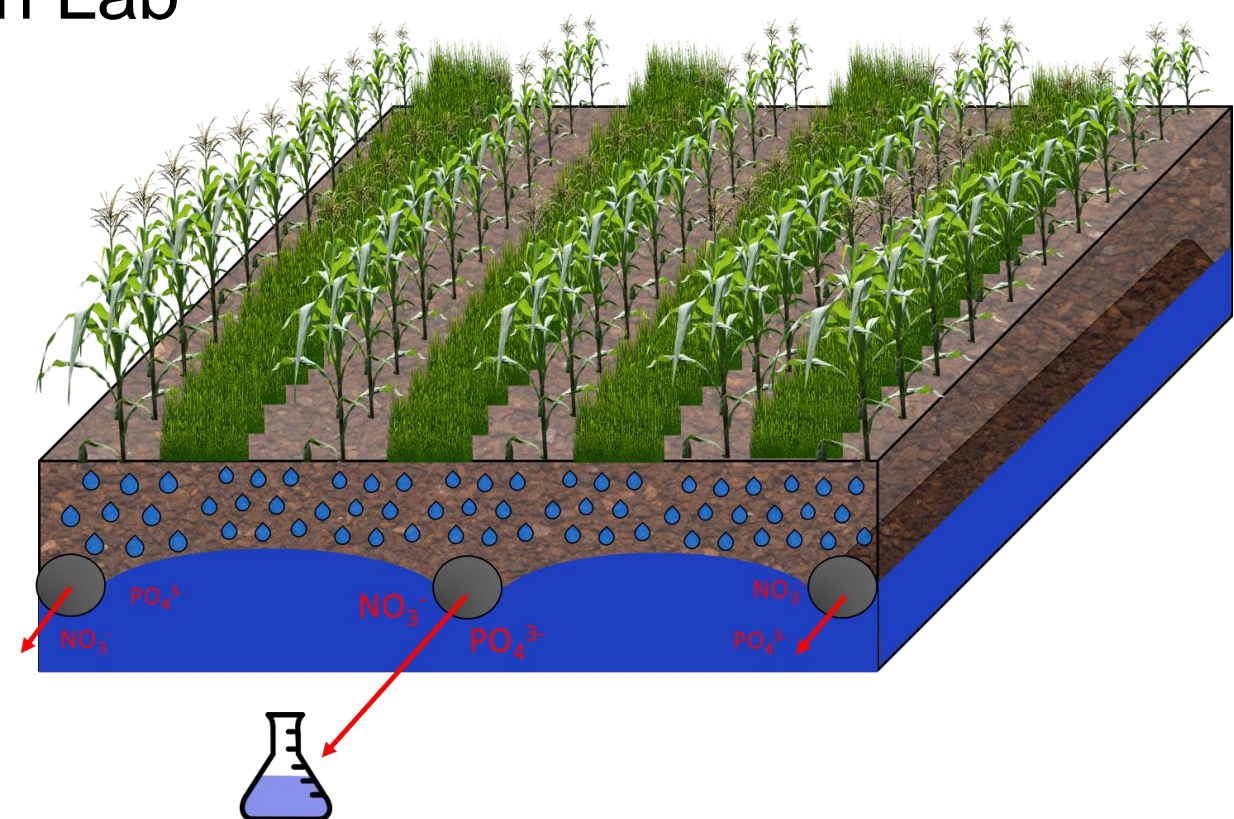
### Methods

- Management:**
  - Continuous corn
  - 0.4 ha (1 acre) plots
  - Treatments in triplicate
  - ~225 kg N per ha (200 lbs/ac) through fall injected swine manure
  - Fall strip-till
- Kentucky bluegrass** was established as the PCC in October 2020
  - The bluegrass was **suppressed with glufosinate (Liberty)** herbicide in May 2022 to minimize the shade avoidance response of corn



- Annual interseeded treatments** were planted in June of each year
  - Interseeded cover crop treatments are being investigated because they also offer a system with different management timing than traditional annual cover cropping
  - Mix: sunn hemp, cowpeas, yellow blossom sweet clover, buckwheat, annual ryegrass, phacelia, brown mustard, rapeseed, and hairy vetch

- Samples of tile drainage water** were collected weekly when possible and analyzed by Iowa State's Water Quality Research Lab



## Can perennial groundcover (PGC) decrease nutrient export through subsurface drainage without negatively impacting corn yields?



Study Location



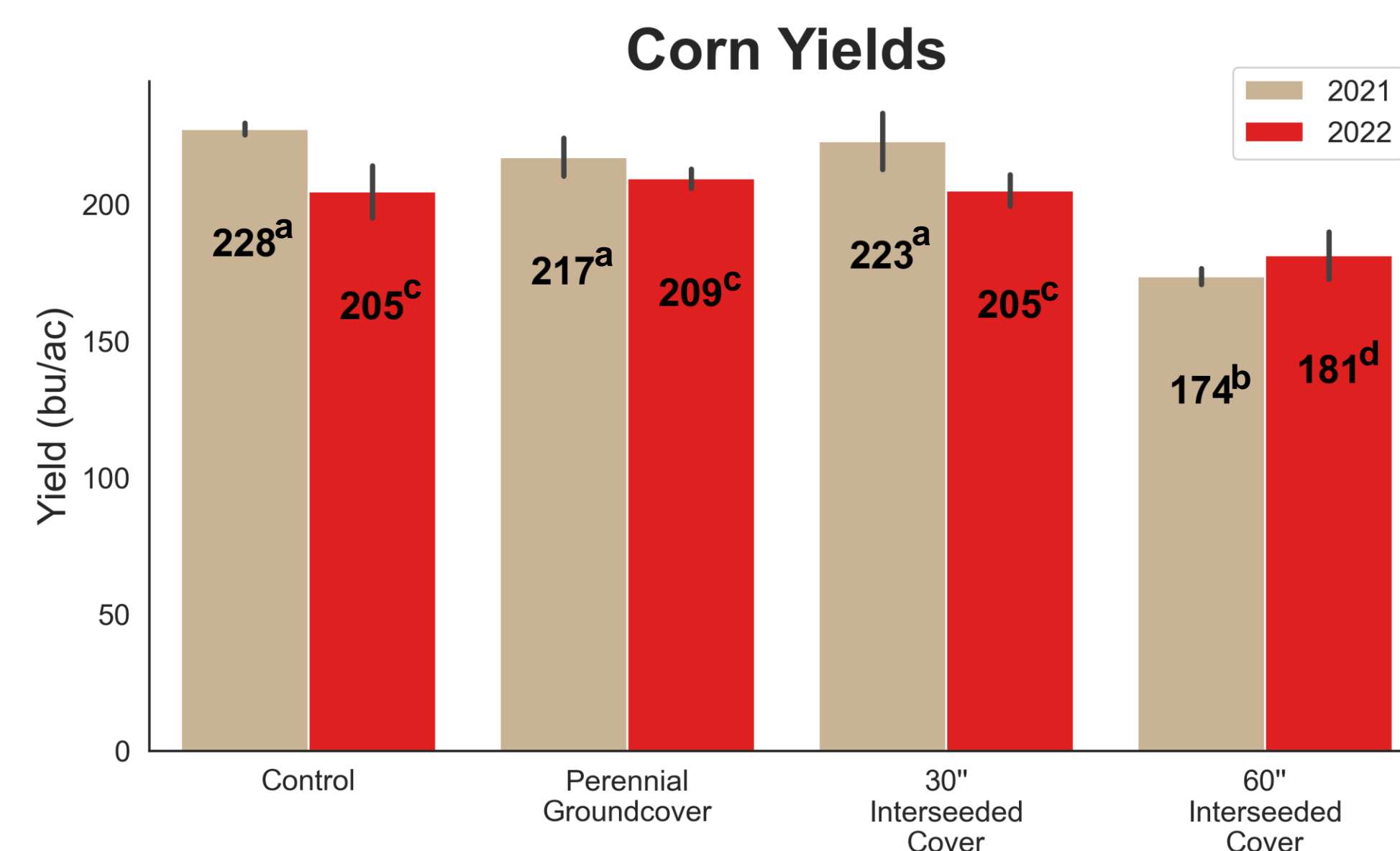
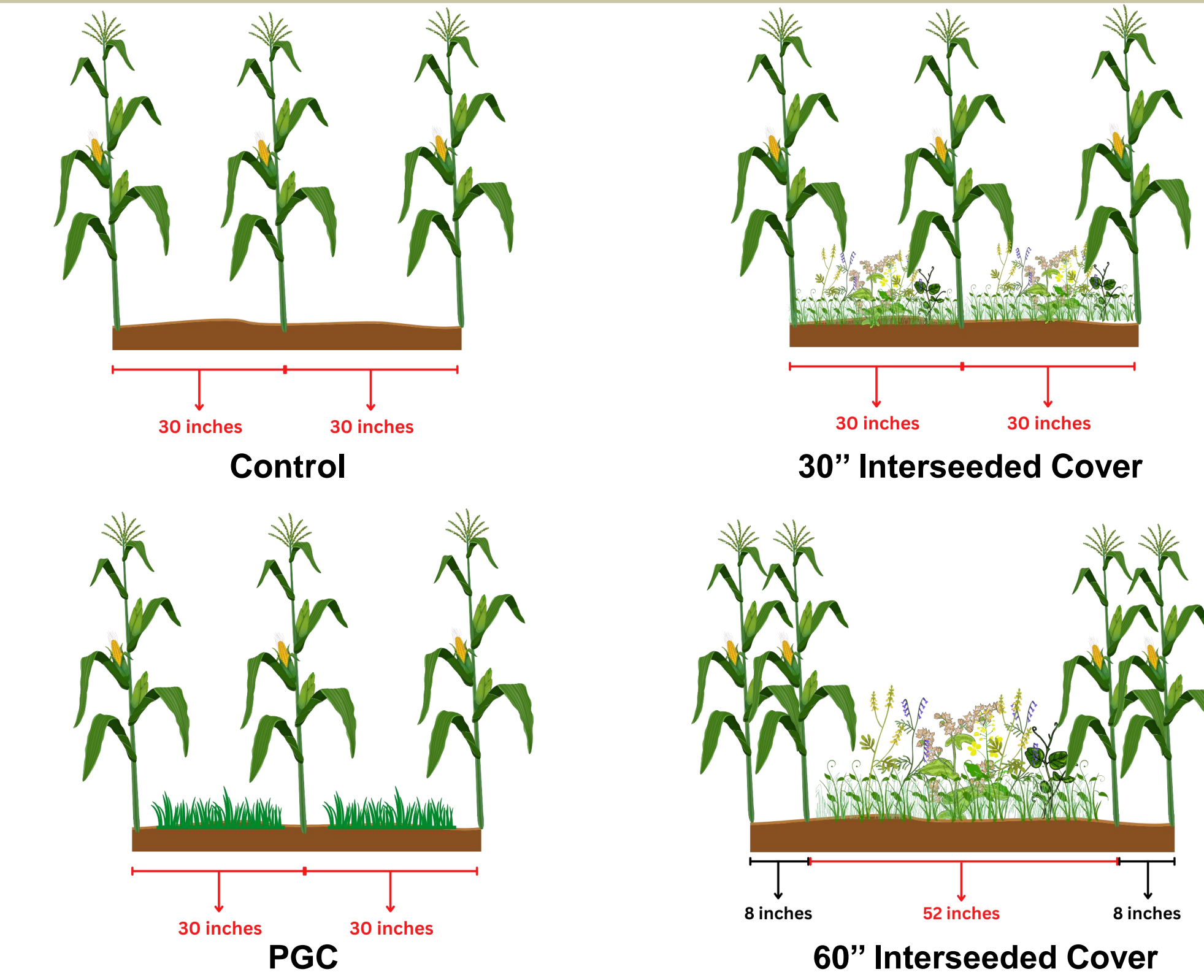
PGC Treatment



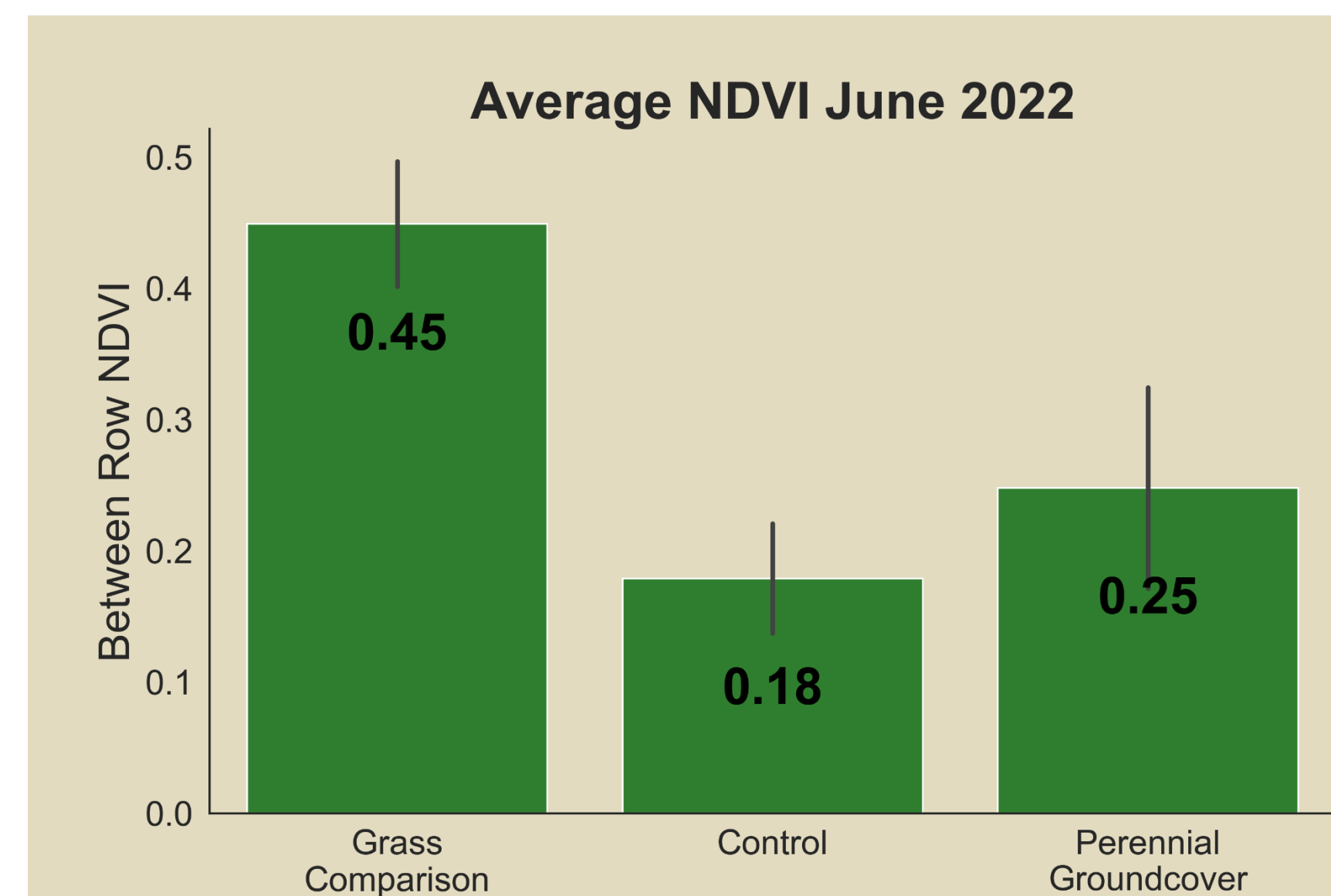
30" Interseeded Cover Treatment  
(Standard row width)



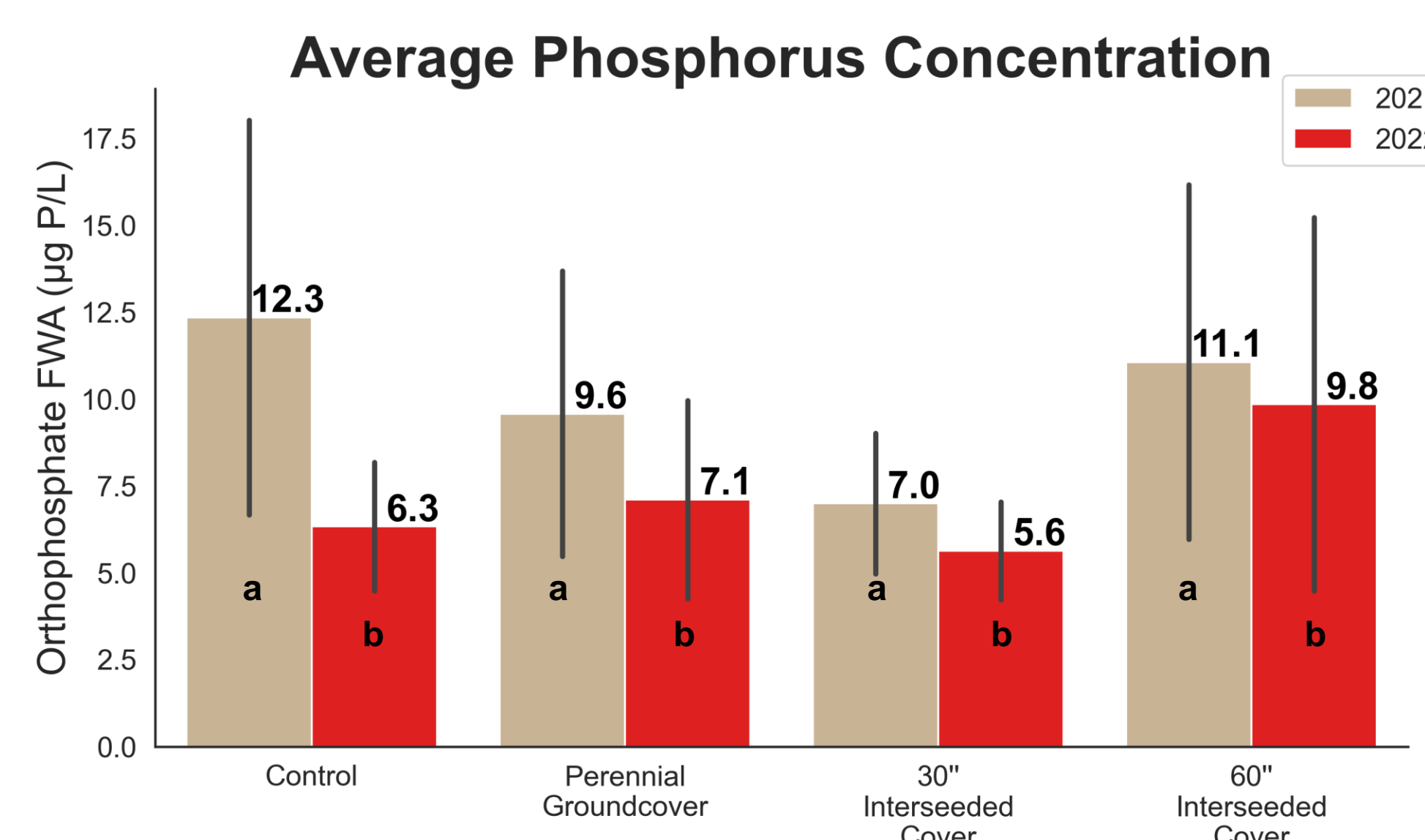
60" Interseeded Cover Treatment



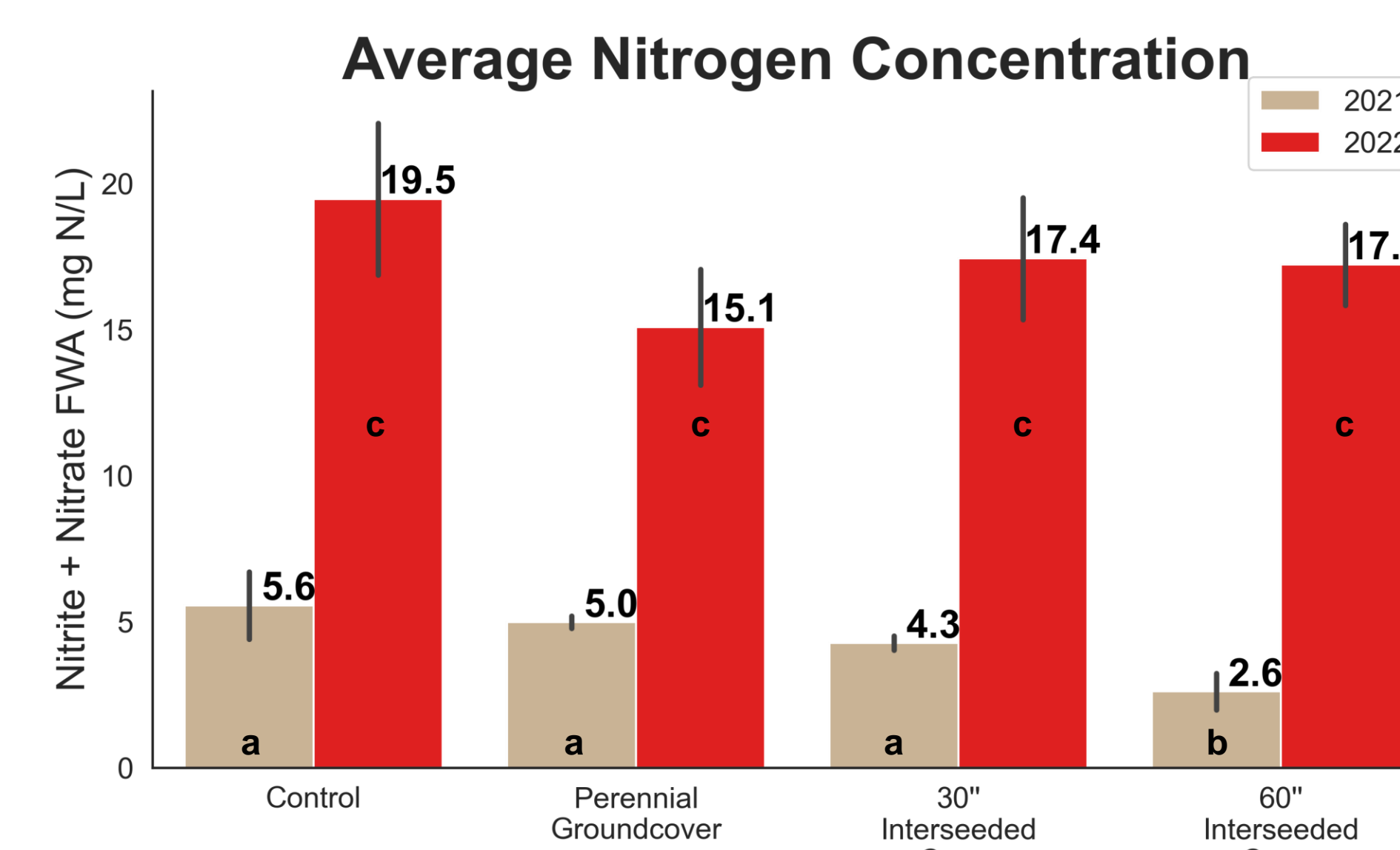
The use of a Kentucky Bluegrass PCC did not significantly affect yields in 2021 or 2022.



A dry fall and spring following perennial cover crop (PCC) planting resulted in **poor establishment.**

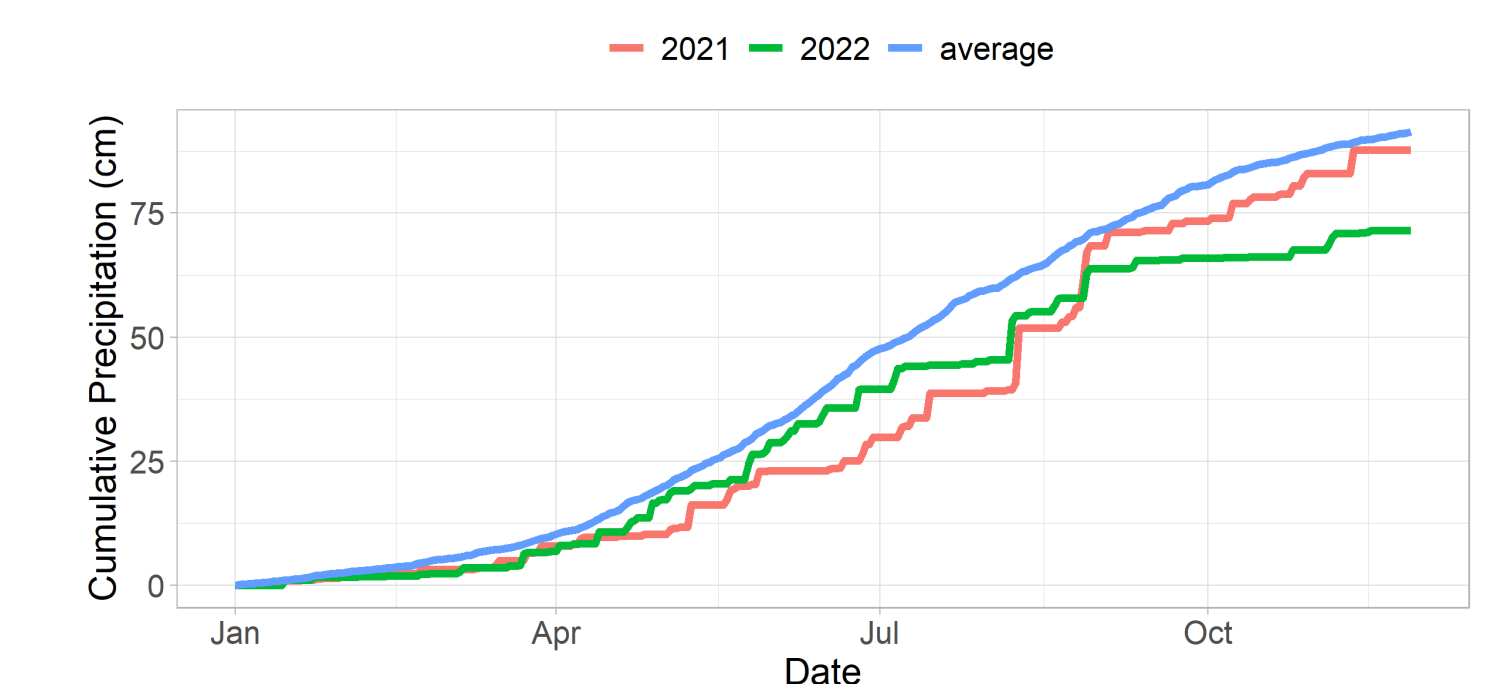


The PCC did not affect nitrogen or phosphorus concentrations.

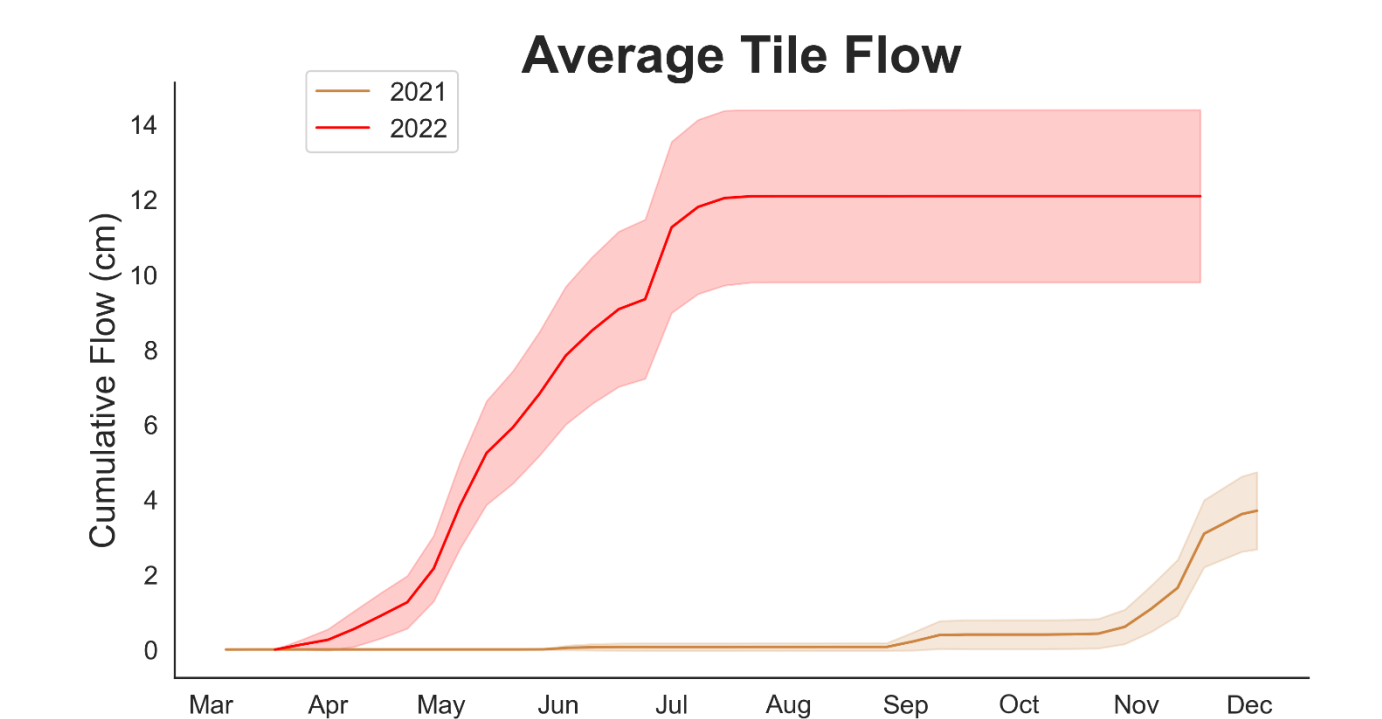


### Precipitation and Tile Flow

- Both years were drier than the 30-yr average
- 2021 had a drier spring, while 2022 had a drier late summer and fall



- 2022 had greater cumulative subsurface drainage flows



### Conclusions and Future Directions

- The PGC and 30" interseeded cover treatments did not affect yield in either year studied. However, **cover crop density was low in both treatments.**
- The 60" interseeded cover treatment had **substantial cover crop growth** and **significantly reduced yields** in each year.
- The sparse PCC establishment was **not sufficient for nutrient concentration reductions**
- PCC will be **replanted in spring 2023** to establish a better stand.

### Acknowledgements

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