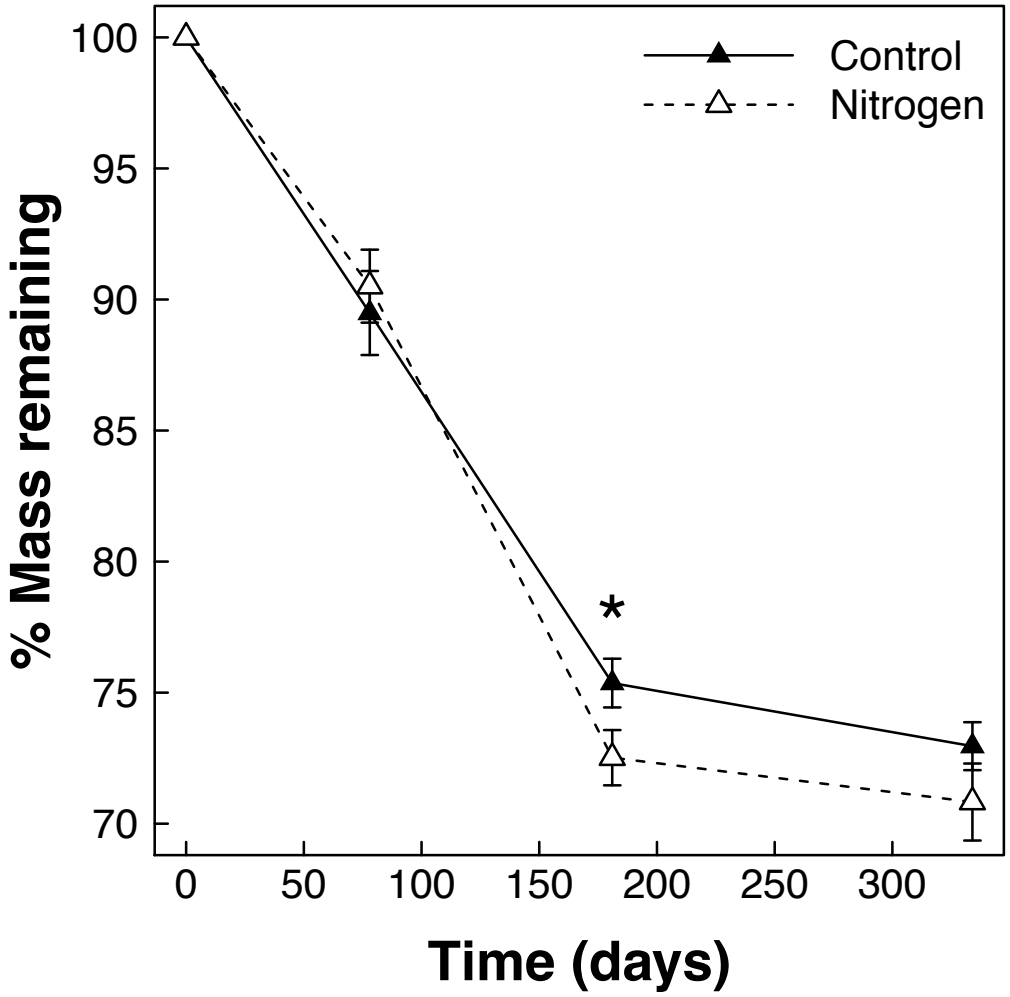
Substrate uptake by fungi

Nicole Hynson & Kathleen Treseder

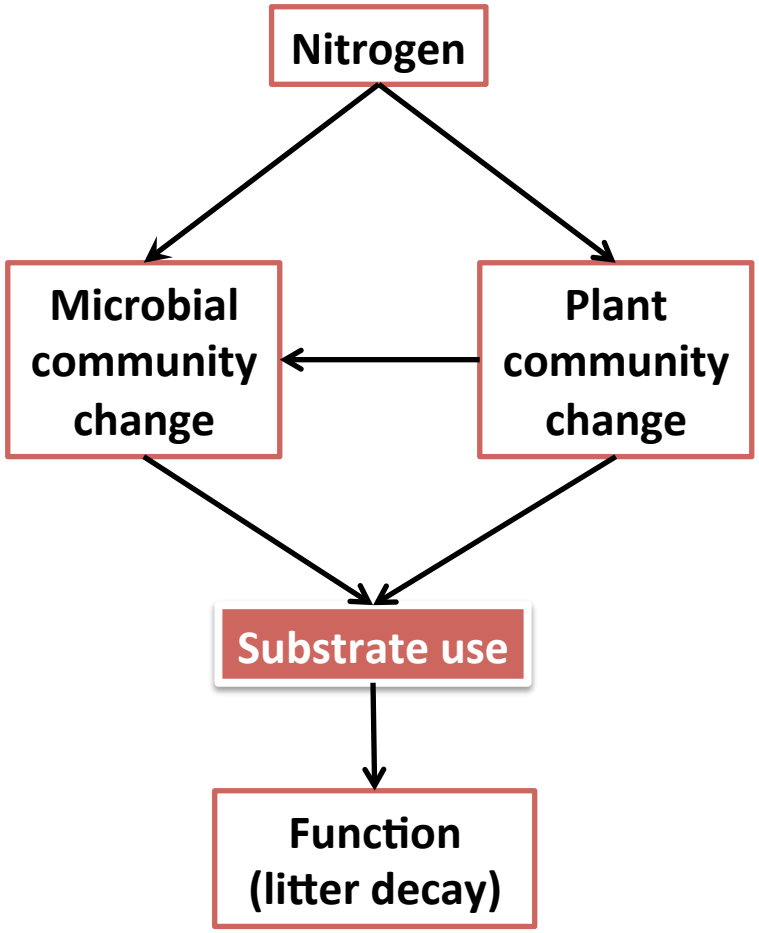
DOE Meeting

May 2012

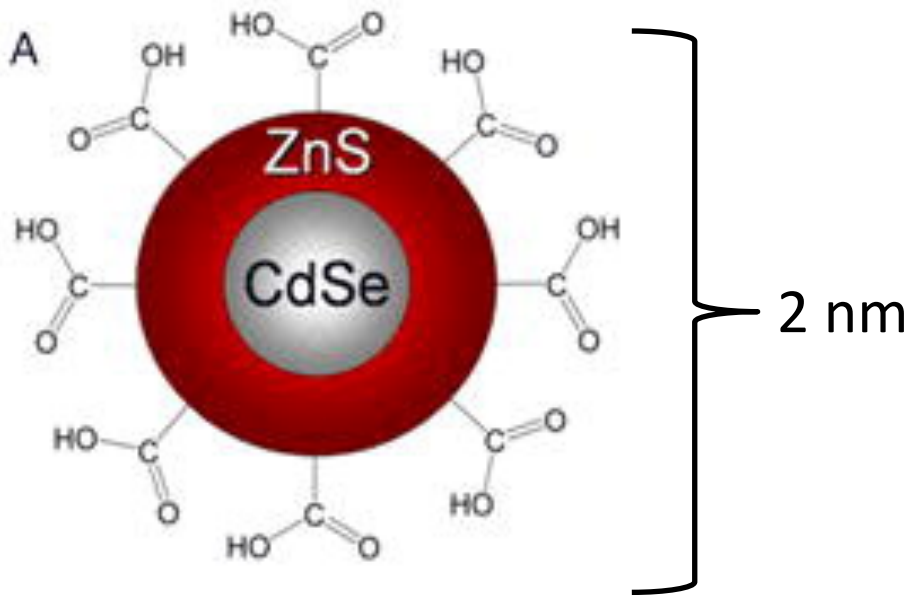
What mechanisms underlie the increase in decomposition rate under N fertilization?



Isolate effects of microbial community versus plant shifts



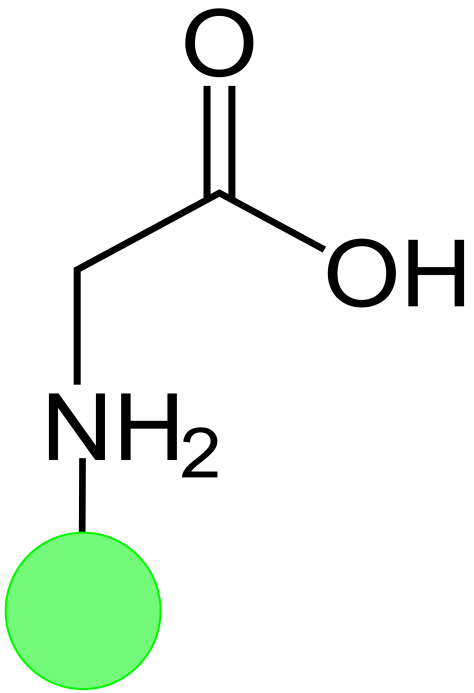
Quantum Dots (QDs) are versatile tracers



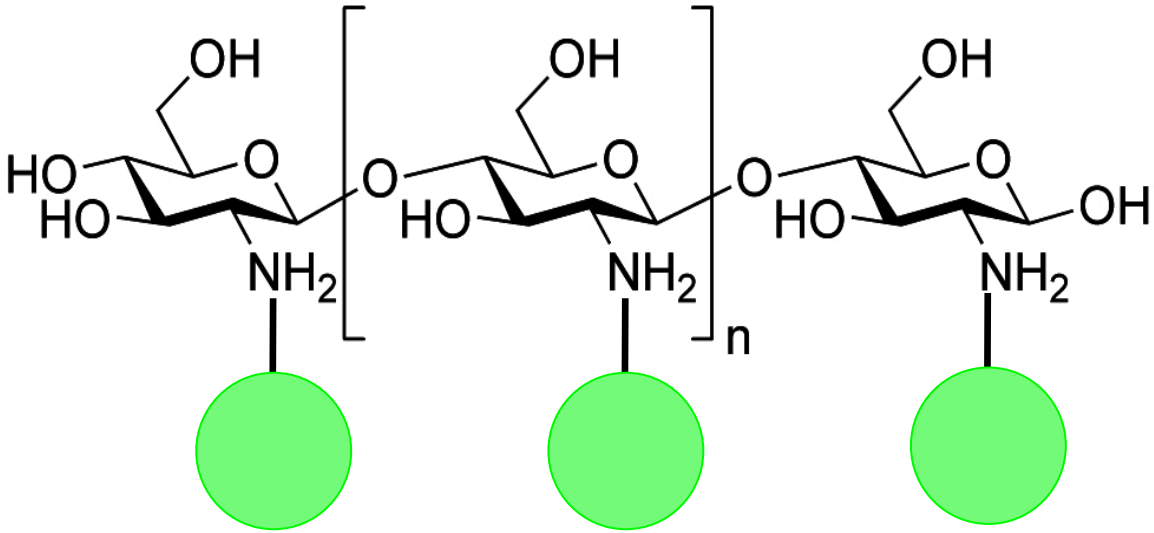
Carboxyl terminals to form amide bonds

Two organic N sources

Glycine

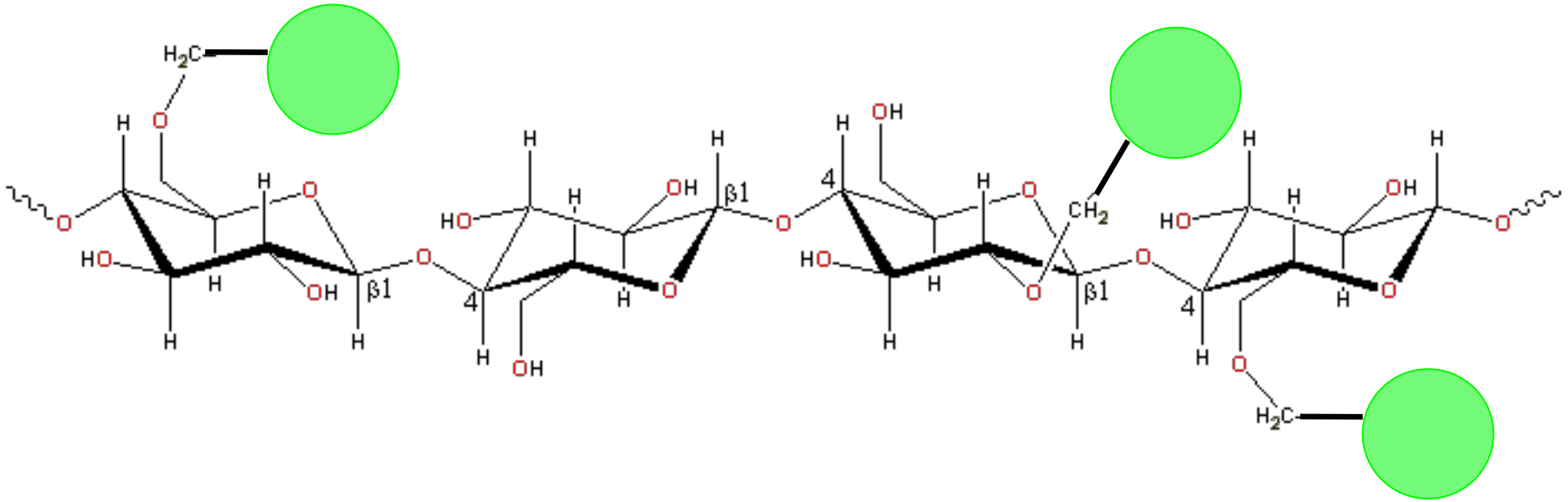


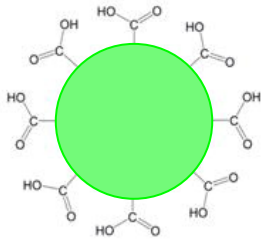
Chitosan



Two C sources

Carboxymethyl cellulose



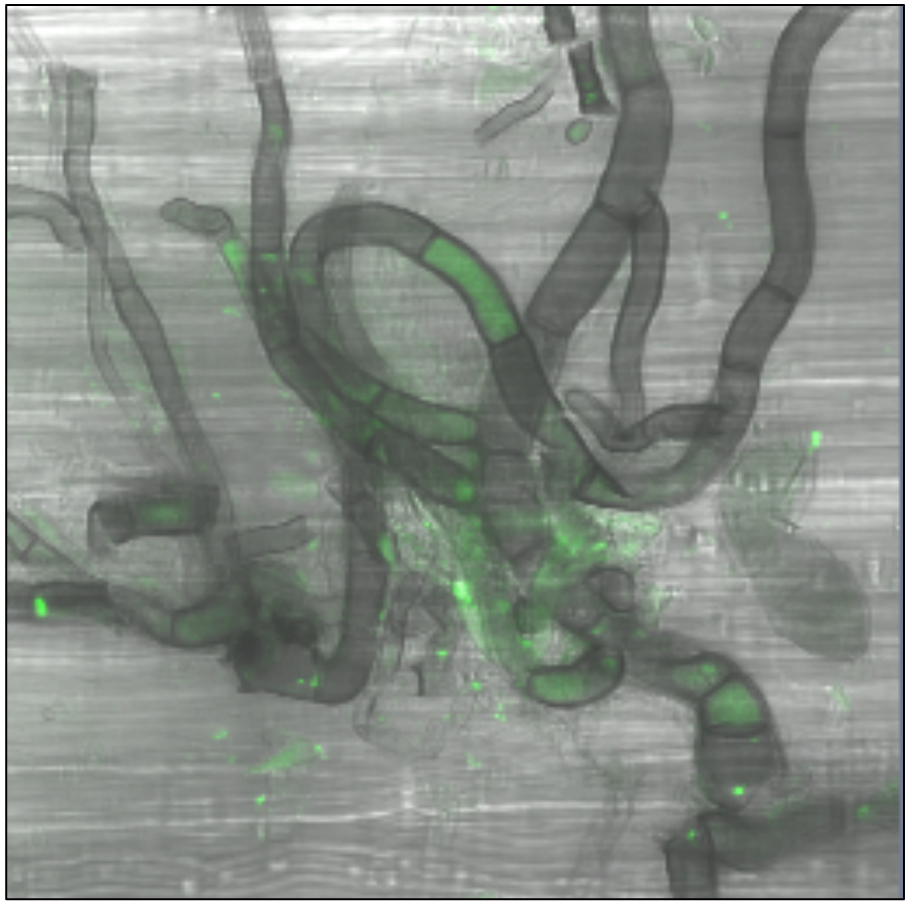


Carboxyl

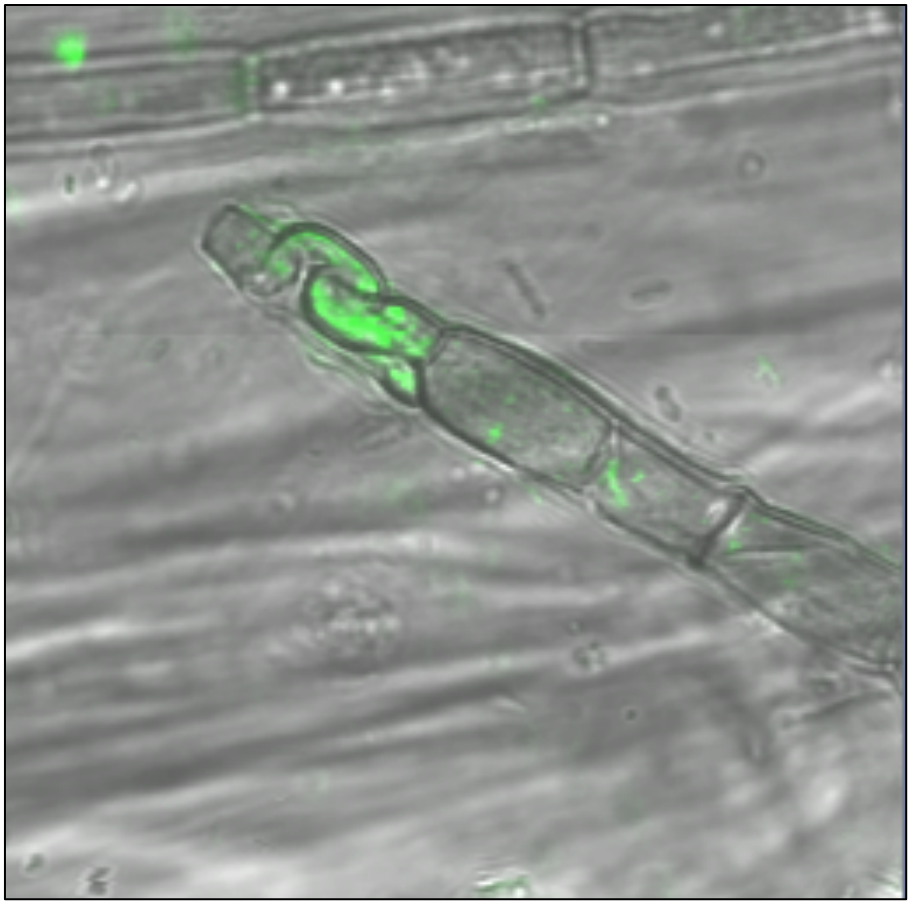
Methods

- Used litter that had decomposed in control plots for 3 months.
- Litter treatments were incubated with each labeled substrate for 24 hrs.
- Measured QD uptake for every substrate from 5 replicates.

Chitosan uptake



Plus N Litter and Fungi

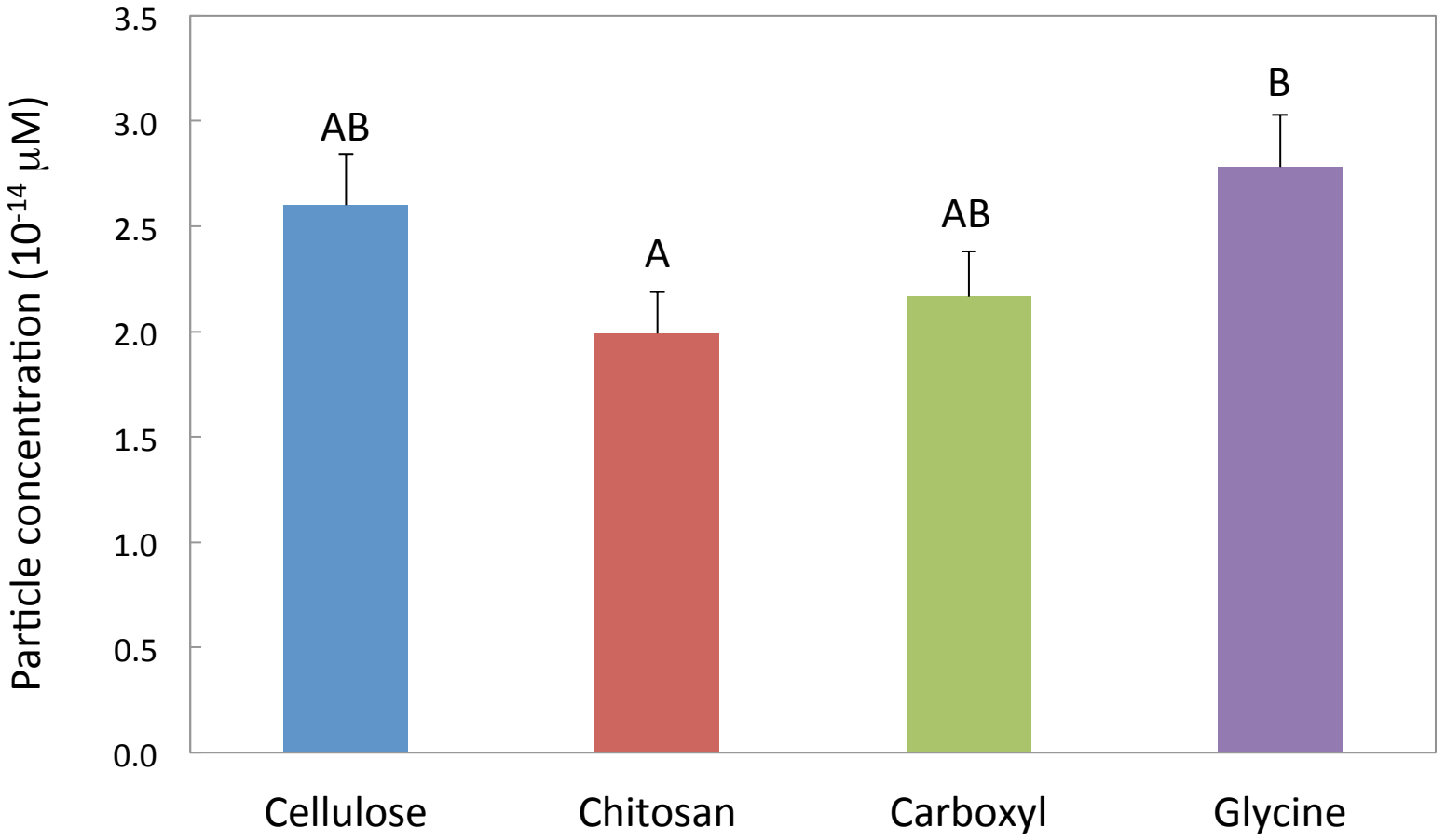


Ambient

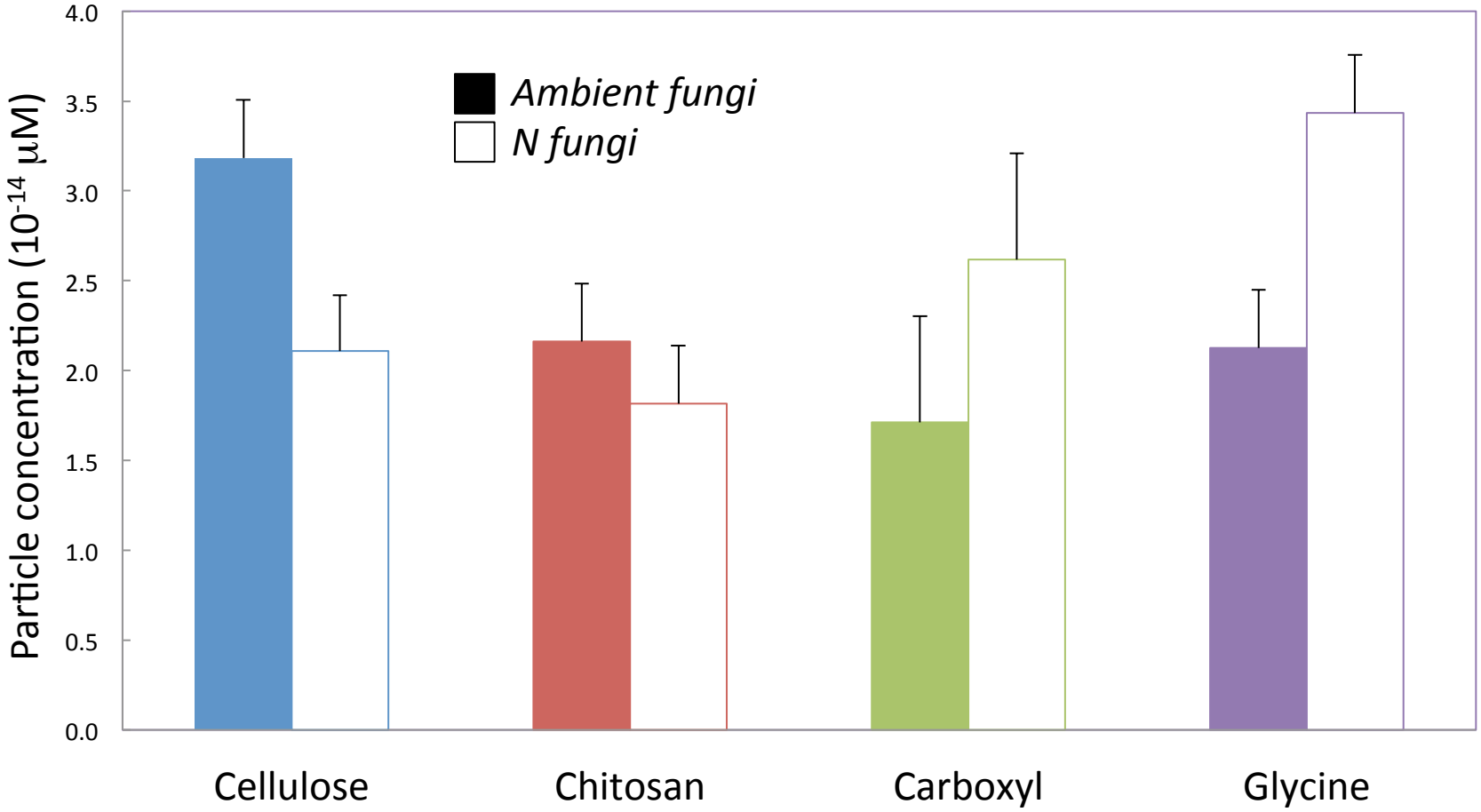
Significant effects

Compound	P = 0.036
Compound * fungal community	P = 0.001
Litter source * fungal community	P = 0.009
Compound * litter source * fungal community	P = 0.007

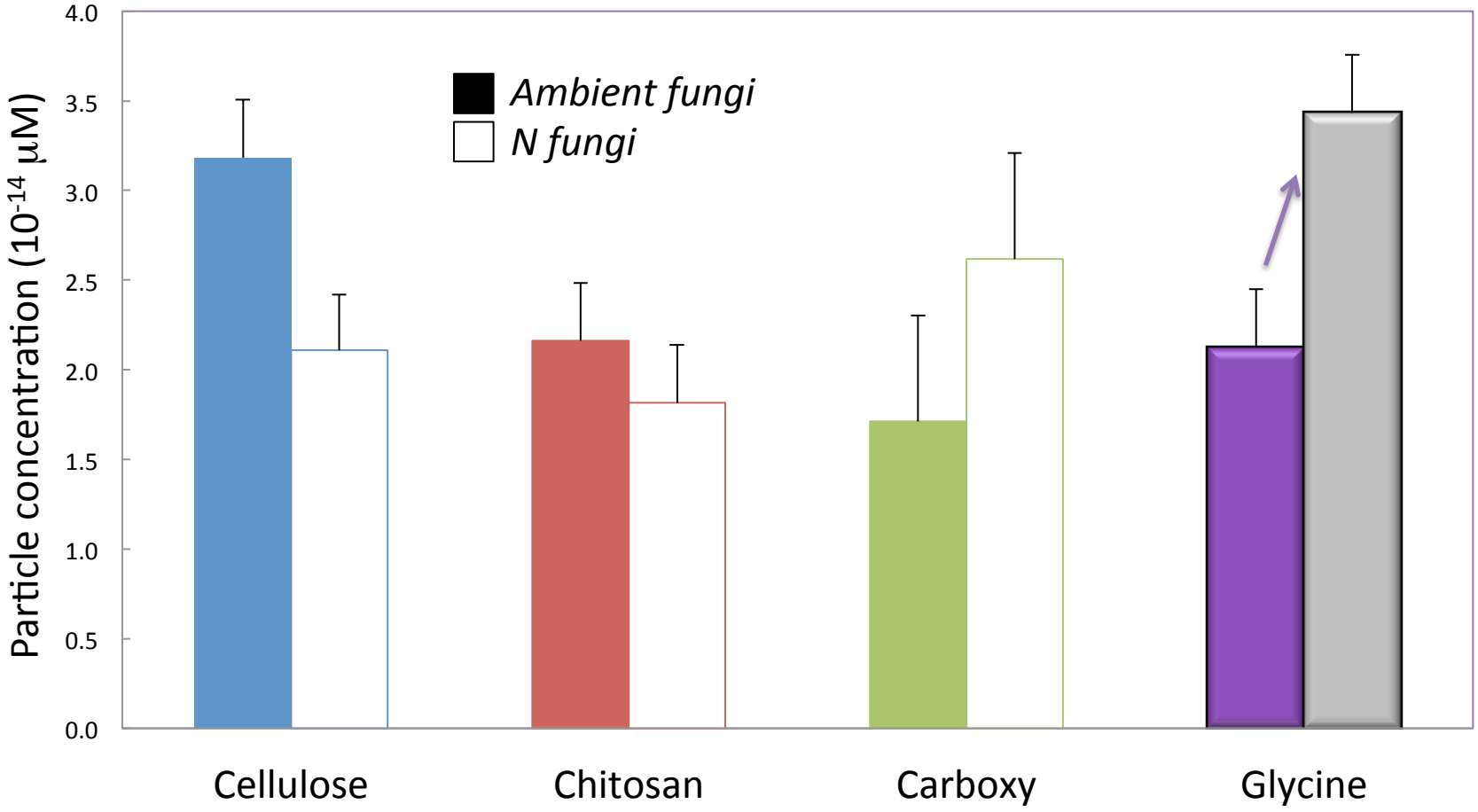
Overall, glycine was preferred by fungi



N fertilization shifted substrate users

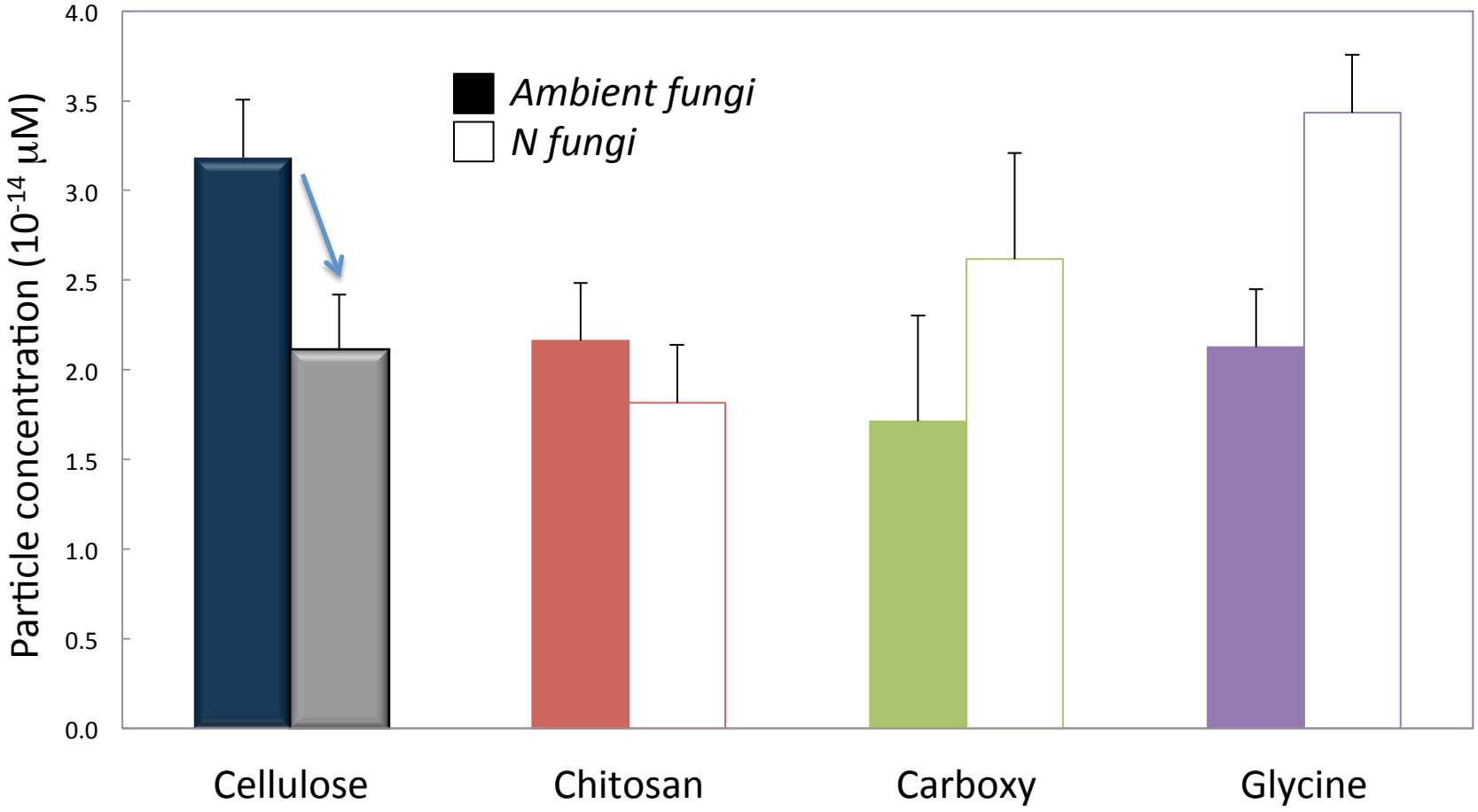


N fertilization selected *for* glycine users



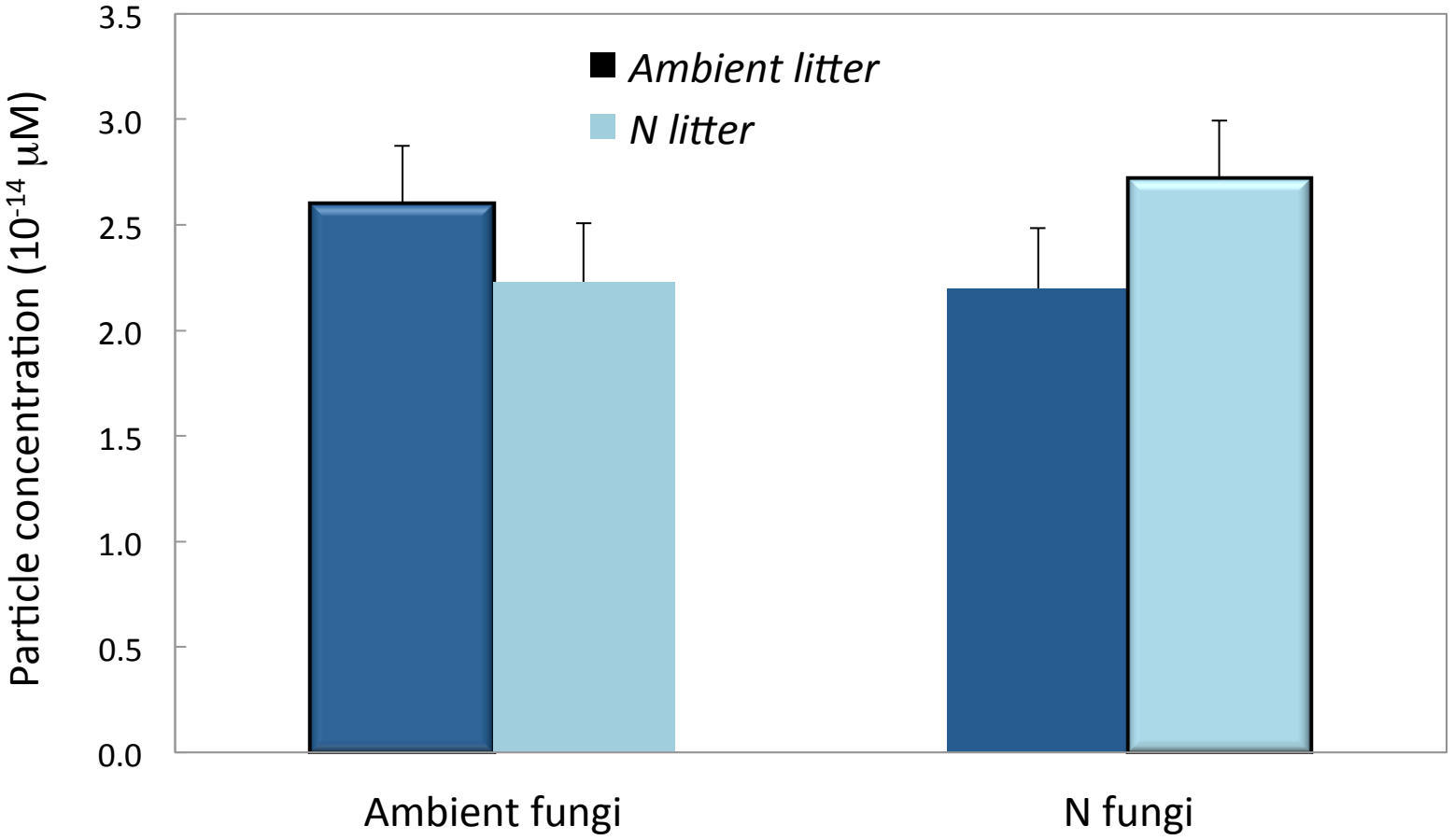
Litter N and litter protein are lower when decomposed with N fungi

N fertilization selected *against* cellulose users



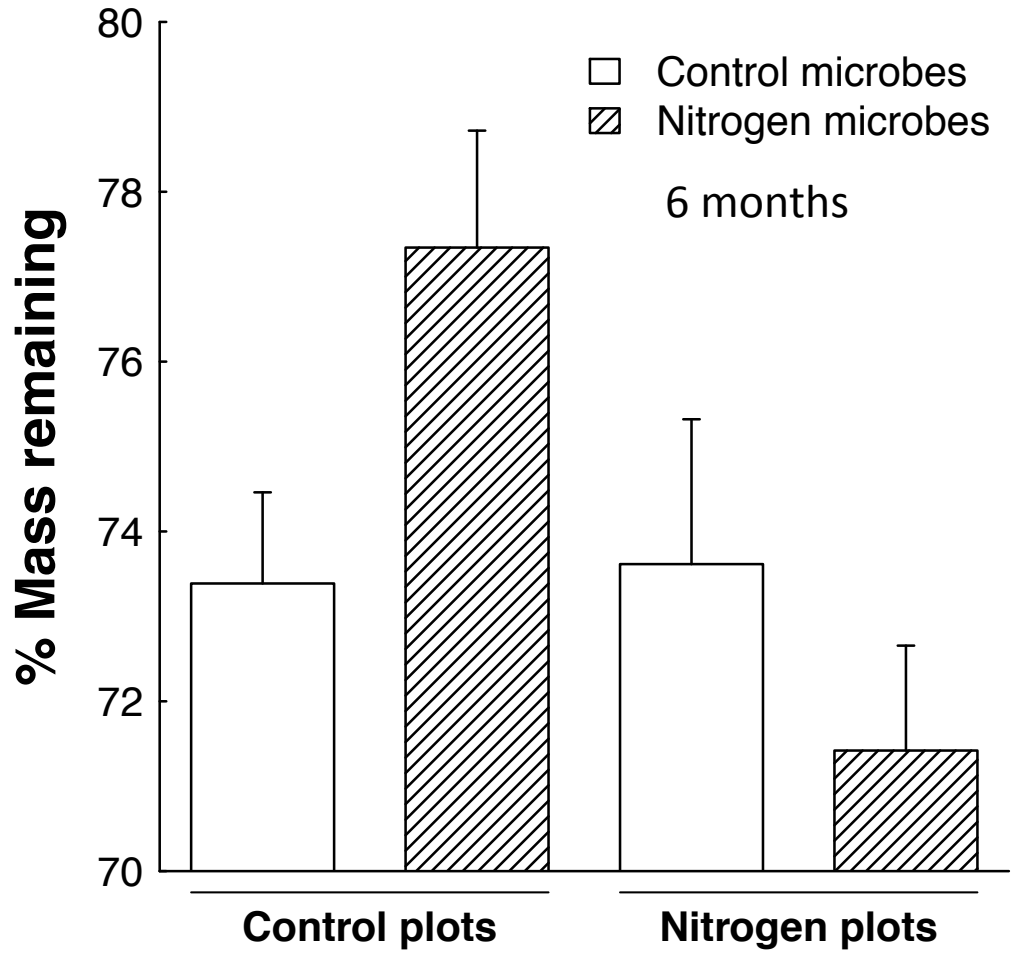
Litter hemicellulose is greater when decomposed with N fungi

Faster overall uptake on “home” litter

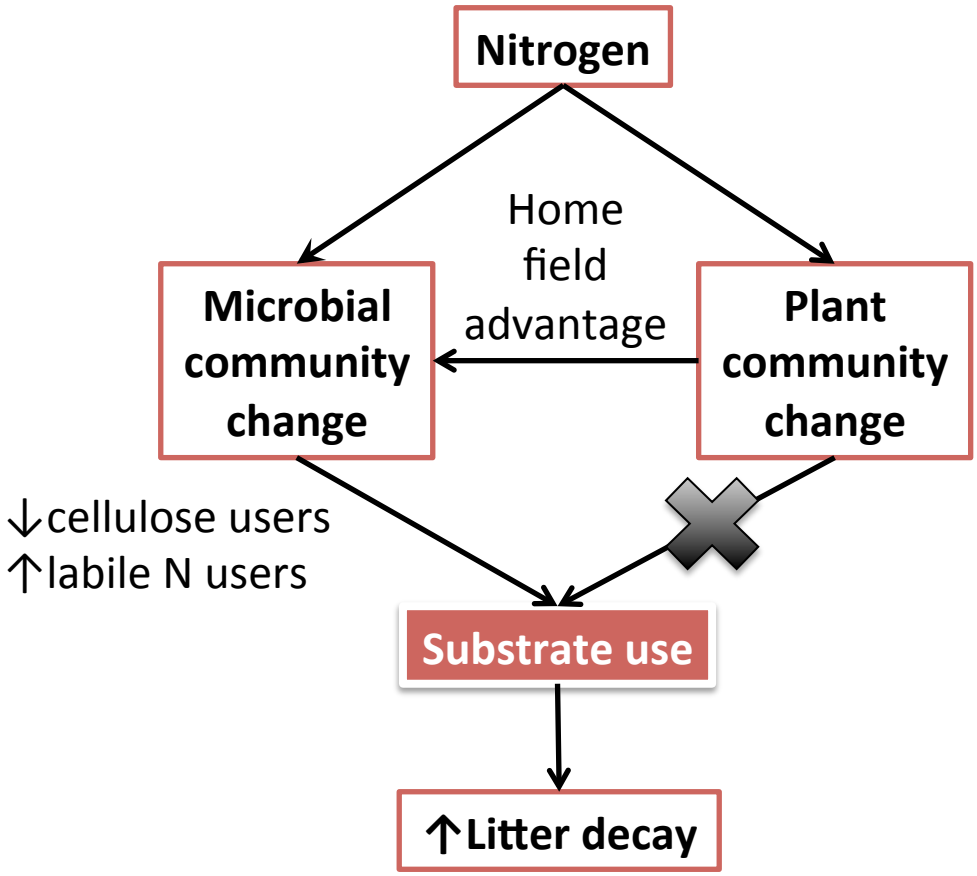


N fertilization alters litter C, N, cellulose, and lignin

Microbes decompose litter faster in their native N plots (home-field advantage)



Isolate effects of microbial community versus plant shifts



Do you want to see all the data together? There's a three-way interaction.