



Pathogen removal by biofilter for greywater reuse

Its potential and future direction for fit-for-purpose water production

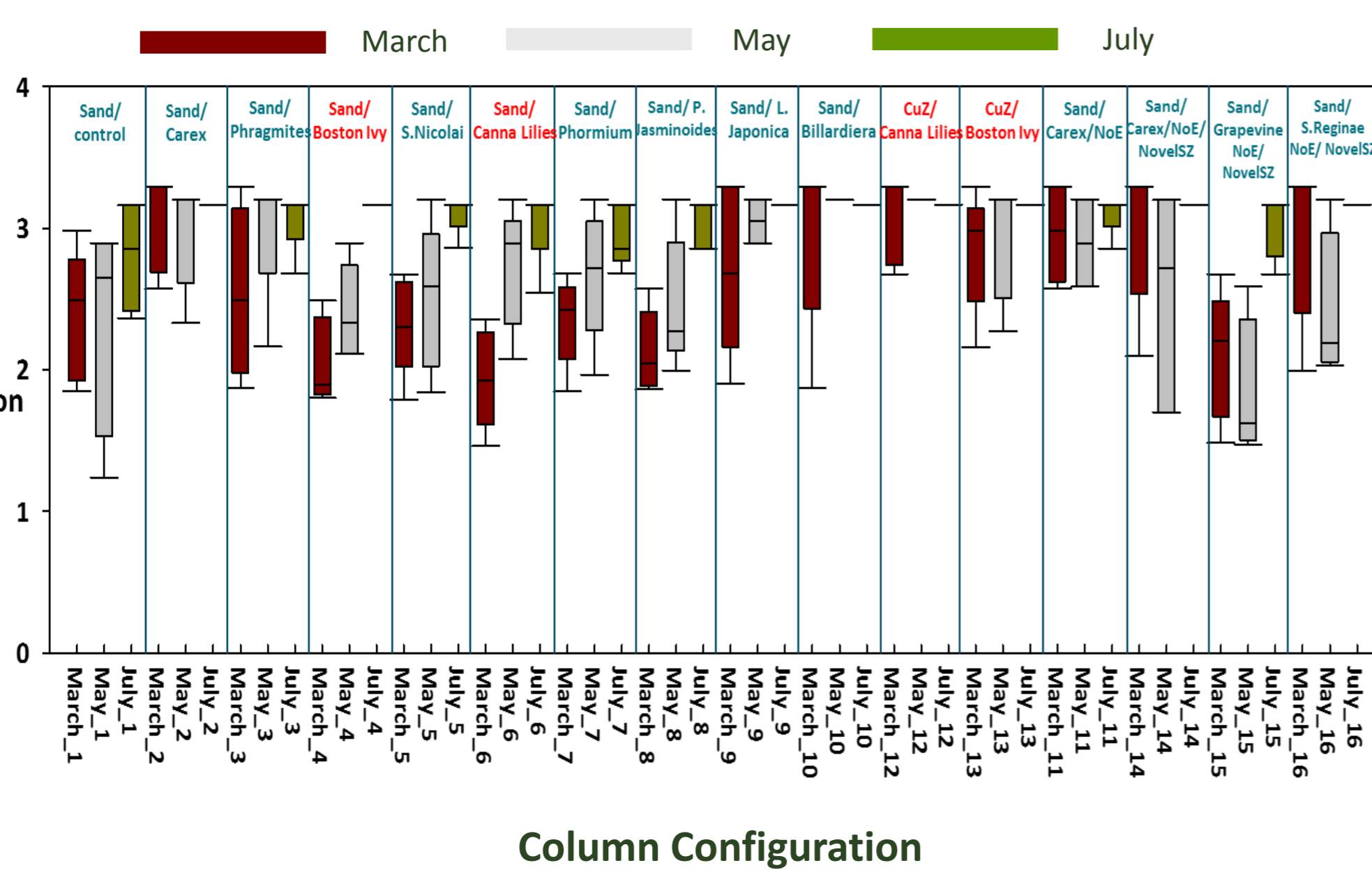
Research Problems & Gaps

- Greywater reuse
 - Reducing potable water demands
 - Less domestic wastewater generation
- Biofilter
 - Shown great performance
 - Water sensitive urban design
- Pathogens in the alternative water sources
 - Public health issue, no clear guidelines yet
 - Pathogen removal in the biofilter has not been understood completely

Methods

- Biofilters
 - Total 80 biofilters set – 16 configurations x 5 reps
 - Monitored over 10 months with synthetic greywater
 - Different weather condition & dosing volume
- Monitoring of
 - *E. Coli* concentration
 - Other pathogens – *Enterococci Faecalis*, *Pseudomonas aeruginosa*, *Campylobacter jejuni* (bacteria indicator), *FRNA coliphages* (virus indicator), *Clostridium perfringens* (protozoan indicator)

Fig1. *E. coli* removal by time
CuZ: copper coated zeolite, noE: no *E. coli* donor added



Result

- *E. coli* removal increased by time – due to system maturation
- In July, all configurations showed median 2.8 log removal
- Copper coated zeolite media equipped columns show stable high removal efficiency
- After dry weather period, novel saturated zone columns showed decreased *E. coli* inactivation

Discussion

- *E. coli* behaviour may or may not represent the other pathogens removal rate
- Future research to understand the biofilter for greywater reuse with
 - Microbial community changes inside the filters
 - Other pathogen behaviour will be reported
 - Pathogen inactivation mechanisms will be understood

Fig2. *E. coli* removal before and after dry period
S: Sand, CuZ: copper coated zeolite, noE: no *E. coli* donor added

