RESILIENCE TO FLOW RATE VARIABILITY IN A GREEN WALL FOR GREYWATER TREATMENT

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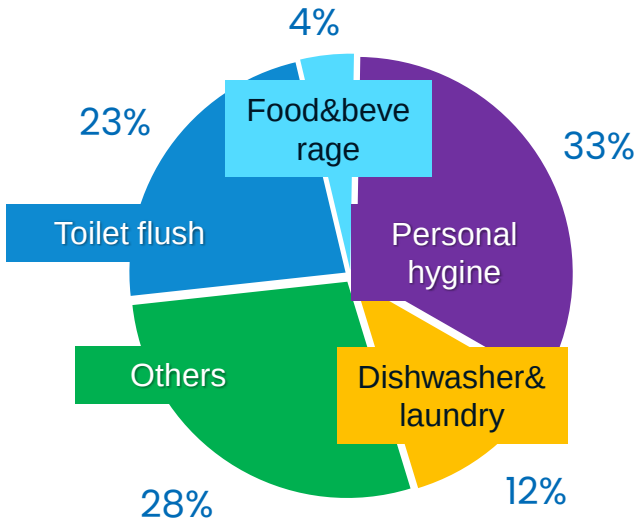
Green walls
not only aestethical purposes

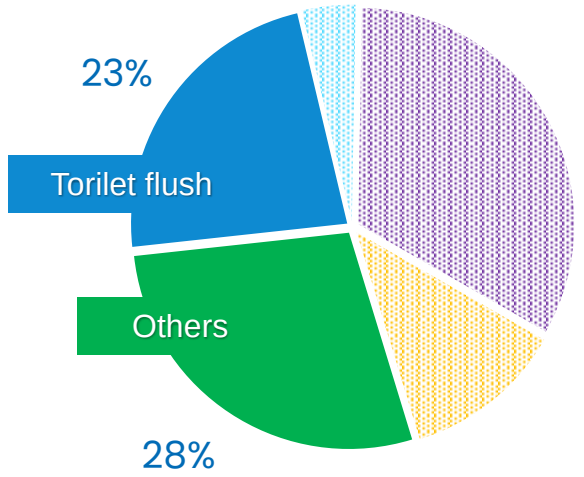

University of Plymouth linkedin page

Greywater
from waste to resource



Potable water consumption in Italy around **120 Ldie^{-1}PE^{-1}**

Greywater around **90 Ldie^{-1}PE^{-1}**

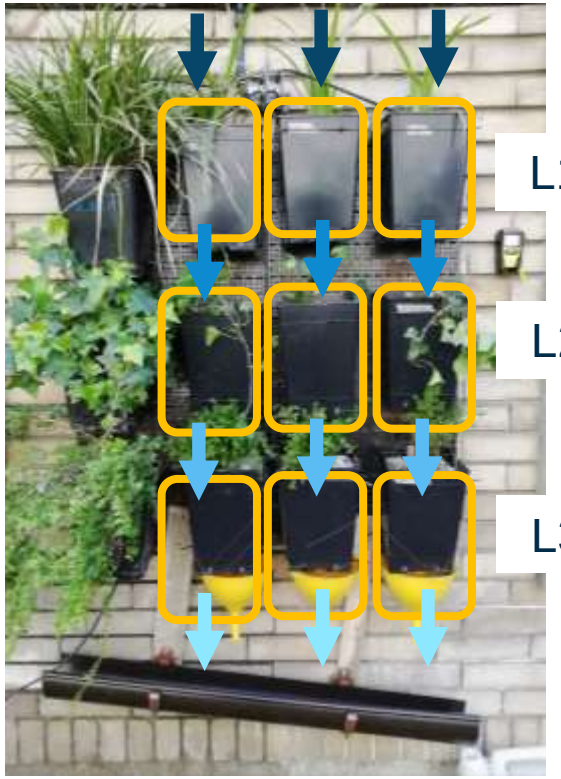


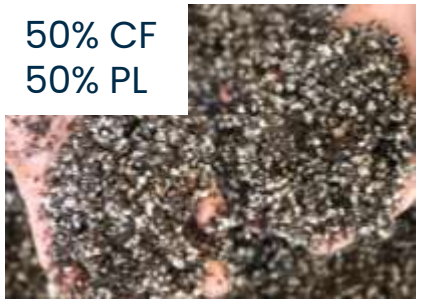
Water reuse
Allows reduction of water consumption **up to 50%**

Design and operational infos

Resilience testing panel (variable flow rate)

Control panel (constant flow rate)



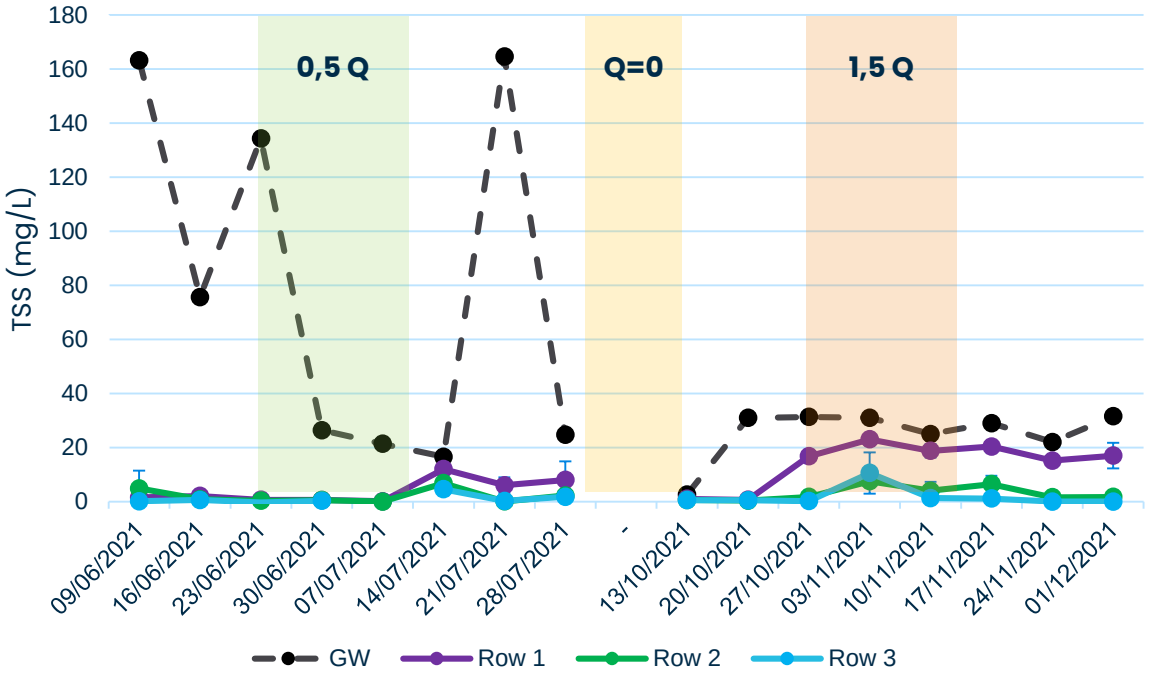


- Synthetic GW
- One column behaves as a **vertical flow system**, three columns are independent **replicates**

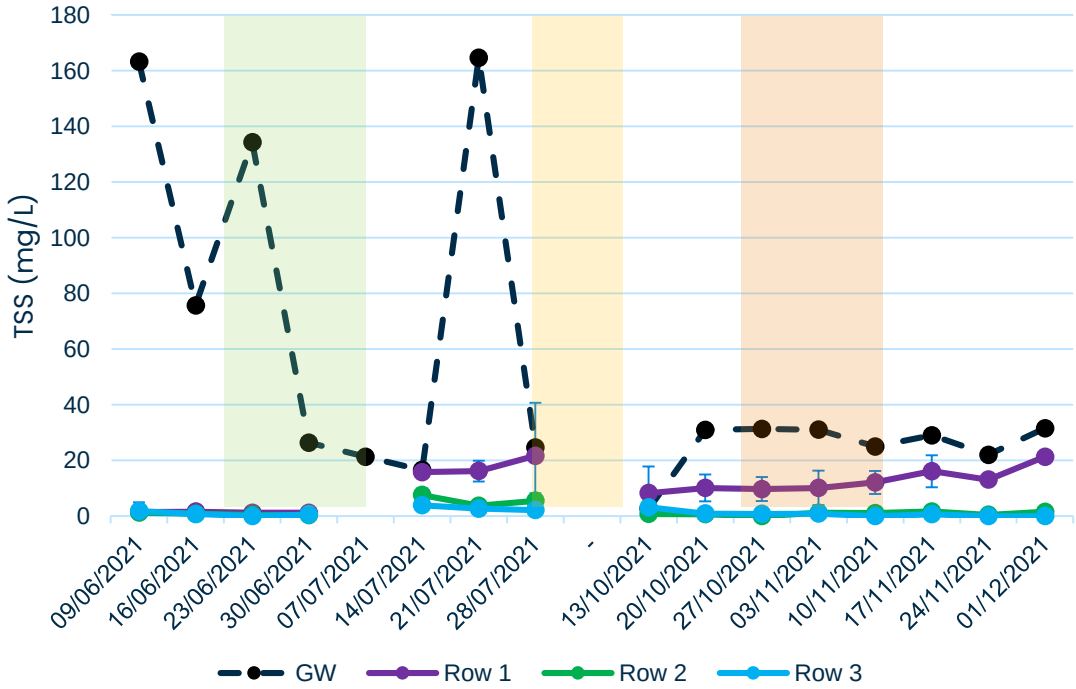
Flow rate	Flow rate ($L_{col}^{-1}die^{-1}$)	HLR ($L_m^{-2}die^{-1}$)	Weeks	Nr. of samplings
Standard	24	740	5	2
Underflow (-50%)	12.8	56	3	3
Standard*	24	740	3	3
Manteinance	0.5	15	9	-
Standard	24	740	2	2
Overflow (+50%)	36.8	1136	3	3
Standard	24	740	3	3
Manteinance	0.5	15	3	-

Results- TSS

Testing panel

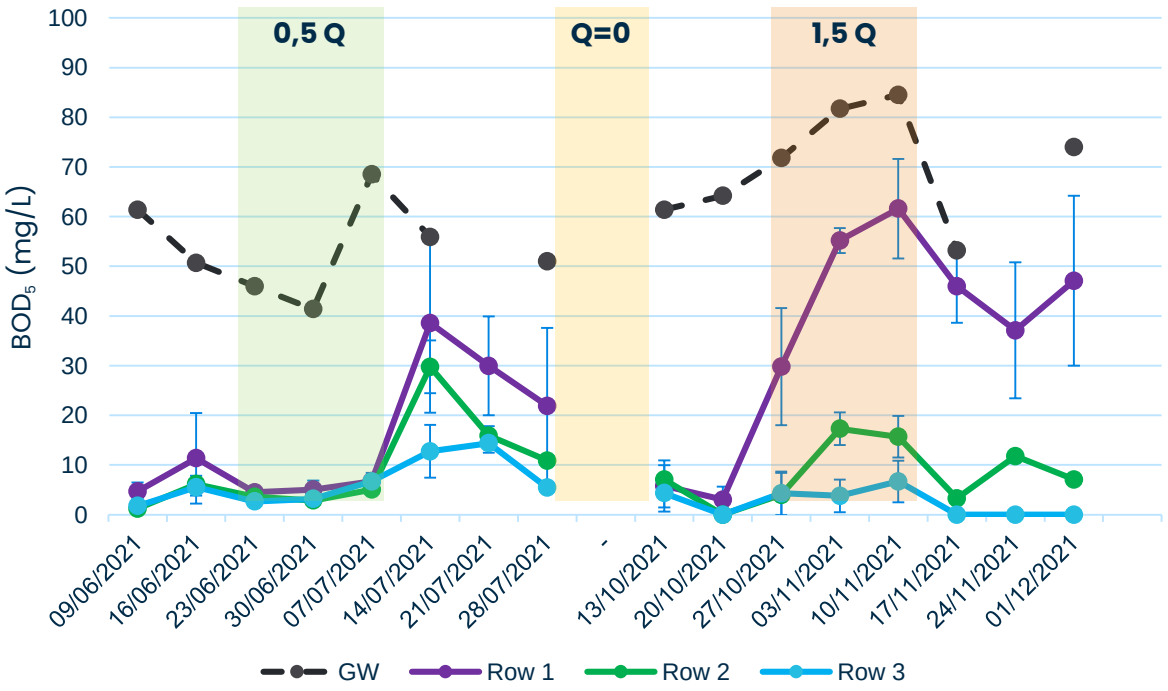


Control panel

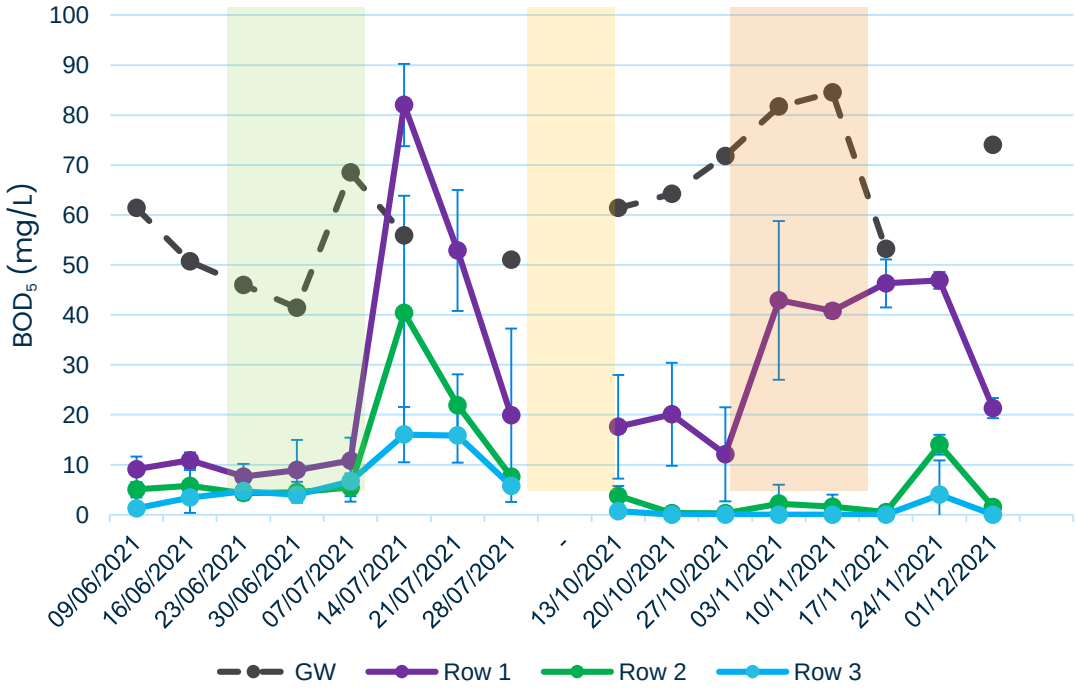


Results-BOD_5

Testing panel

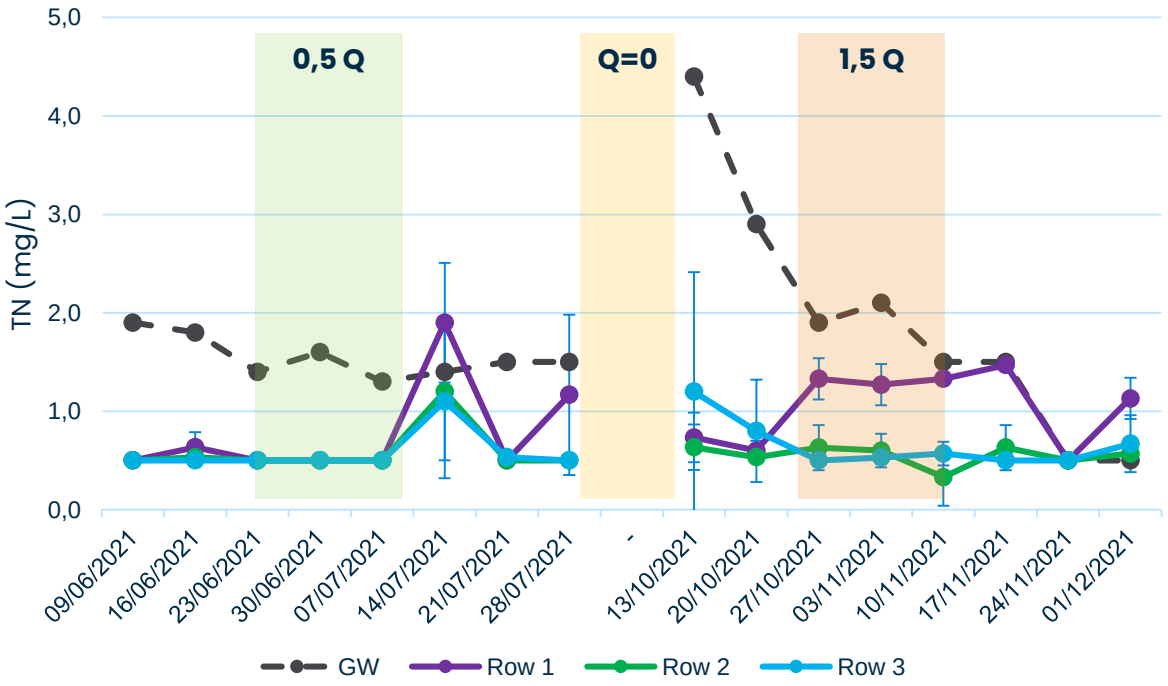


Control panel

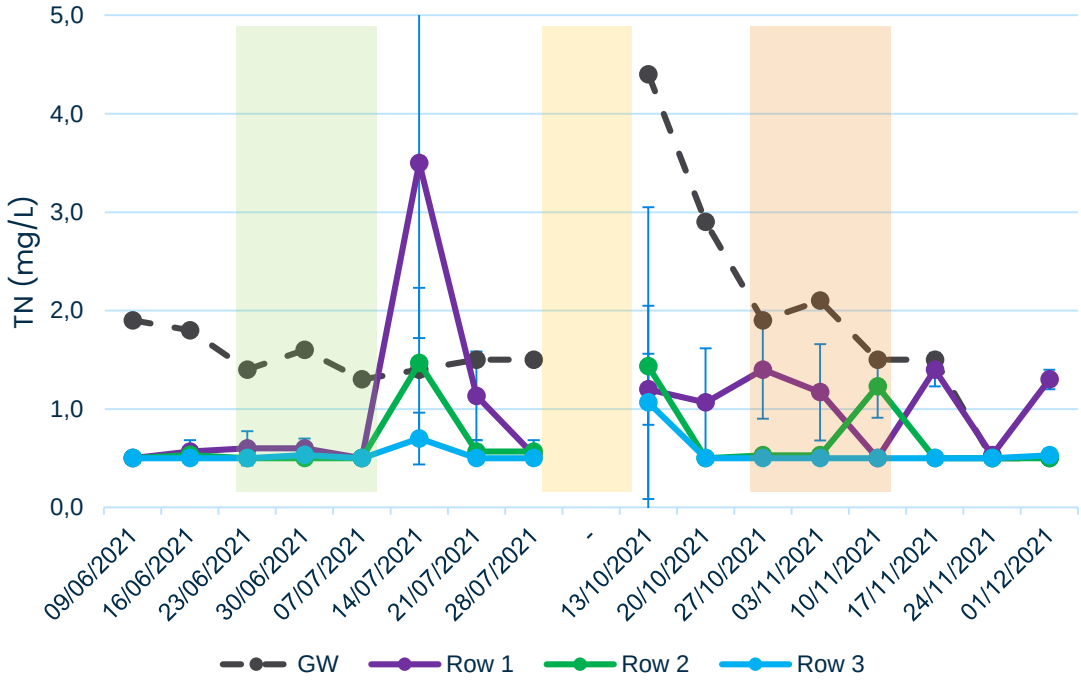


Results- TN

Testing panel



Control panel



Preliminary conclusions

- System maintains **high performances** also with flow rate variation
- The two panels show **similar** behaviour
- Performances **decreasing during overflow**
- The most of the removal happened with **two levels**
- Two weeks of **overflow affect plants** well being

Previous studies

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Review

A review of nature-based solutions for greywater treatment: Applications, hydraulic design, and environmental benefits

Fulvio Boano [a,*], Alice Caruso [a], Elisa Costamagna [a], Luca Ridolfi [a], Silvia Fiore [a], Francesca Demichelis [a], Ana Galvão [b], Joana Pisoeiro [b], Anacleto Rizzo [c], Fabio Masi [c]

ACS ES&T Water

pubs.acs.org/estwater

Article

Assessment of the Treatment Performance of an Open-Air Green Wall Fed with Graywater under Winter Conditions

Fulvio Boano,* Alice Caruso, Elisa Costamagna, Silvia Fiore, Francesca Demichelis, Ana Galvão, Joana Pisoeiro, Anacleto Rizzo, and Fabio Masi

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Evaluation of the influence of filter medium composition on treatment performances in an open-air green wall fed with greywater

Fulvio Boano [a,b,*], Elisa Costamagna [a], Alice Caruso [a], Silvia Fiore [a,b], Marco Chiappero [a], Ana Galvão [c], Joana Pisoeiro [c], Anacleto Rizzo [d], Fabio Masi [d]

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