



Human urine boosts bamboo biomass yield (*Phyllostachys viridiglaucescens*)

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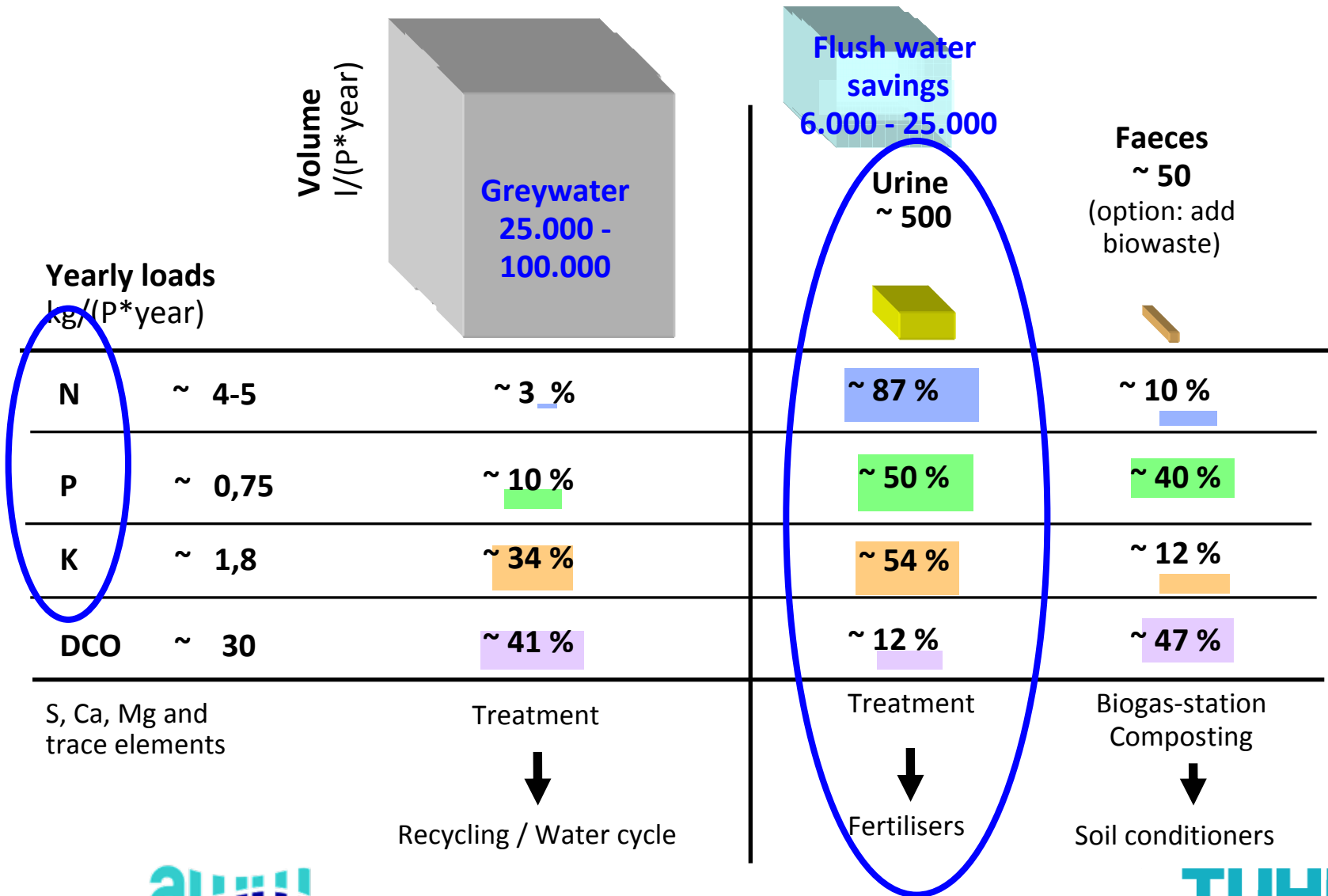
Hamburg University of Technology



- Why urine for bamboo plants? Nutrient
- Resource-oriented Sanitation: a sustainable alternative
- Bamboo Research Overview at TUHH
- The biomass aspect: results and discussion
- Summary

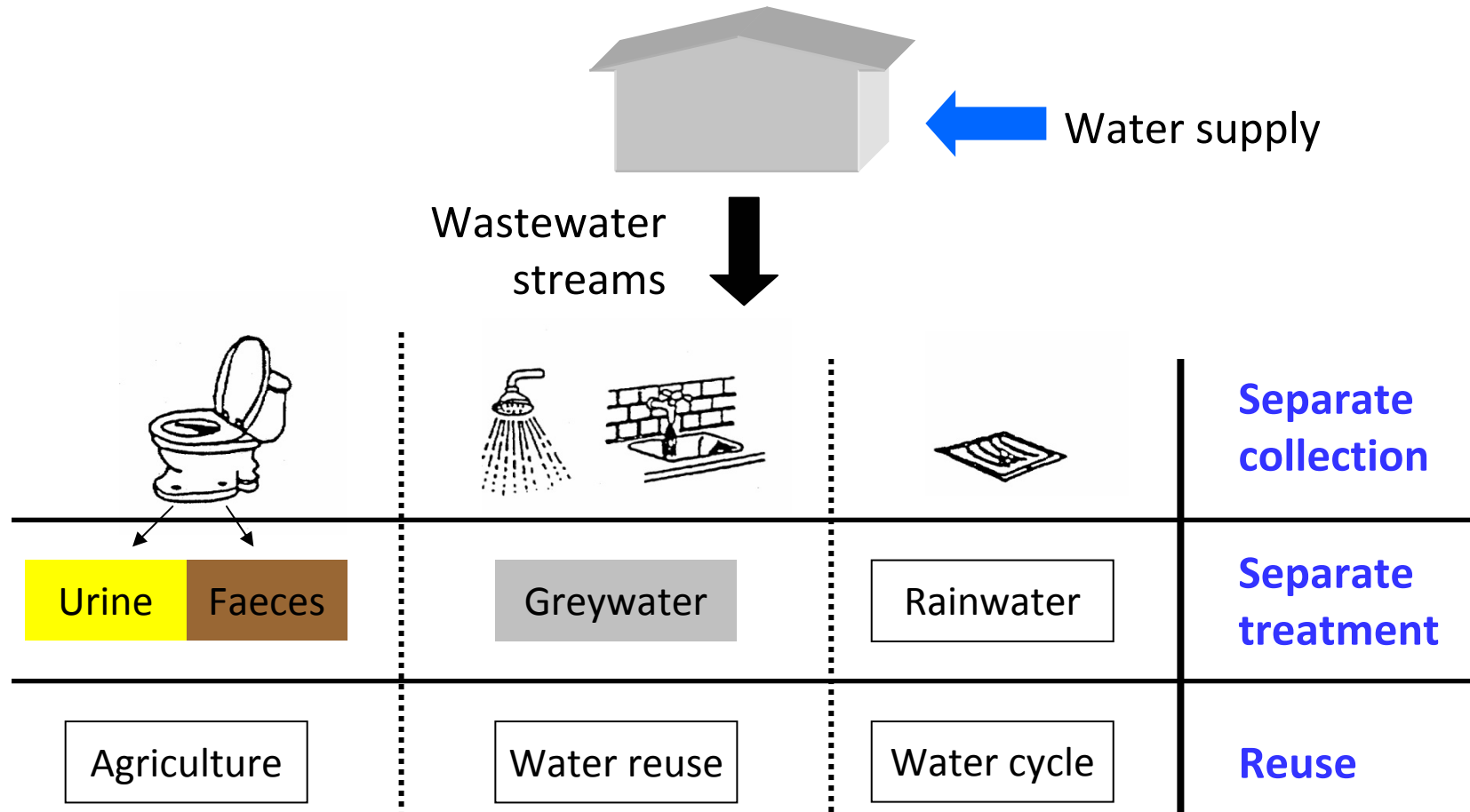


2- Human urine and nutrient



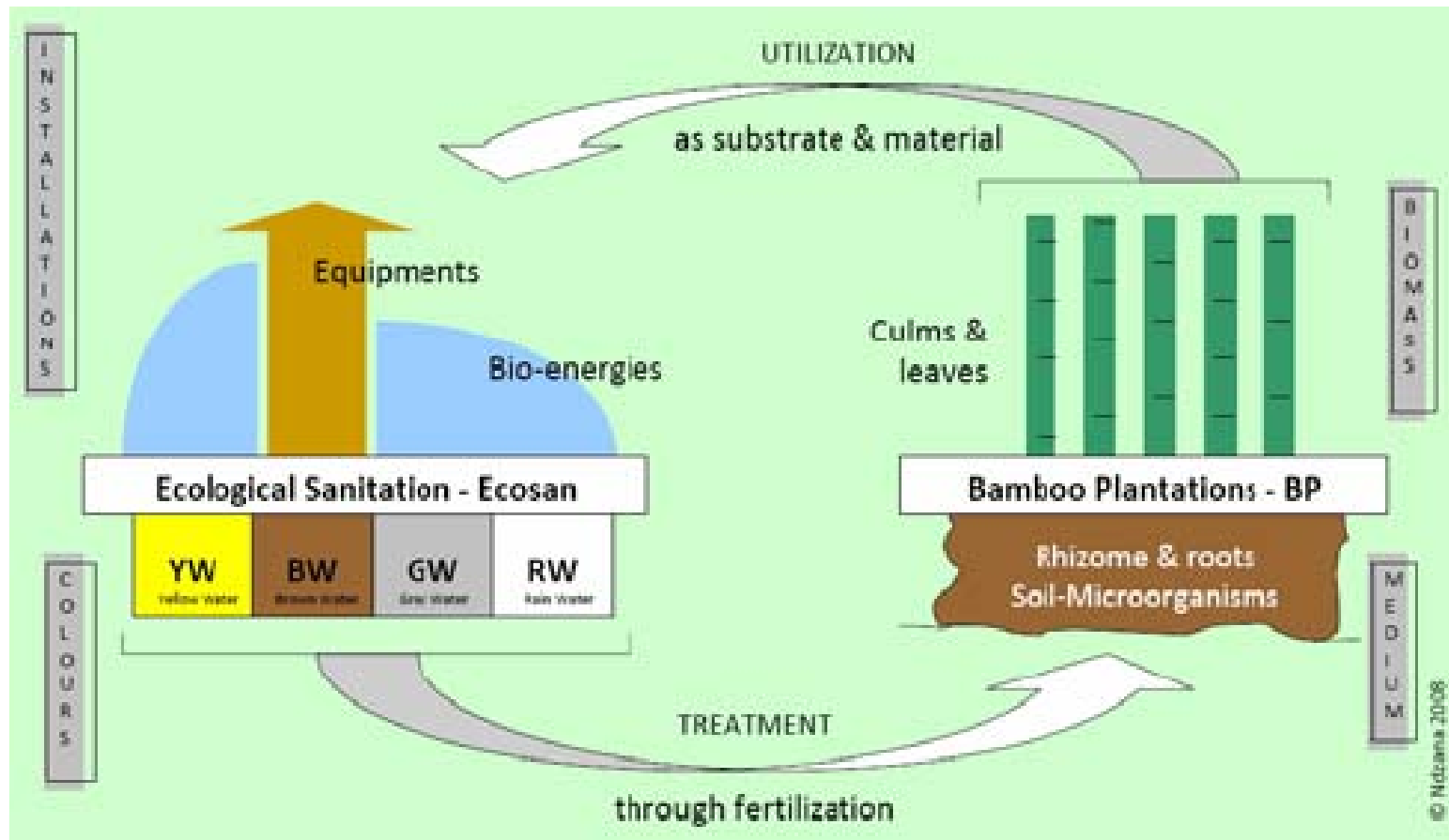


1- Resource-oriented sanitation





3- Bamboo Research Overview at TUHH



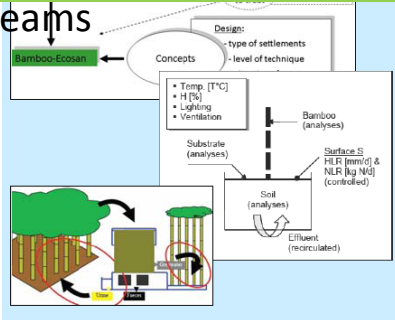


3- Bamboo Research Overview at TUHH



1

Concepts – Processes:
management of waste
streams

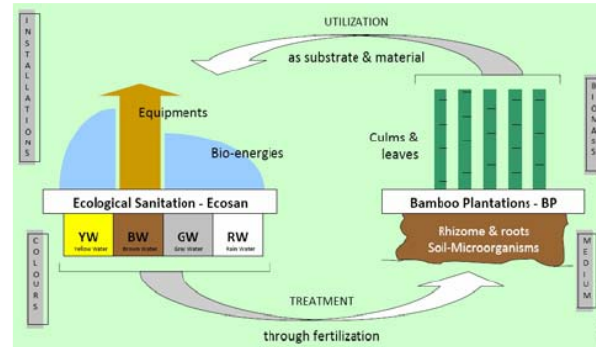


2

Experimental work:
treatment of urine

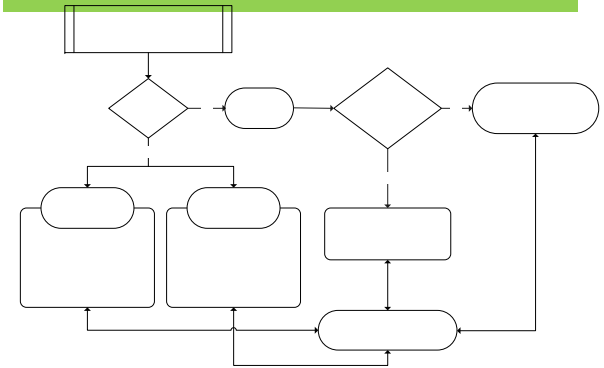


- Urine degradation
- Biomass production**
- Soil response to nutrient loads
- Bamboo nutrient uptake
- Effect of weeds



3

Investigations for sustainable
value chains with the biomass
produced





Experimental set-up

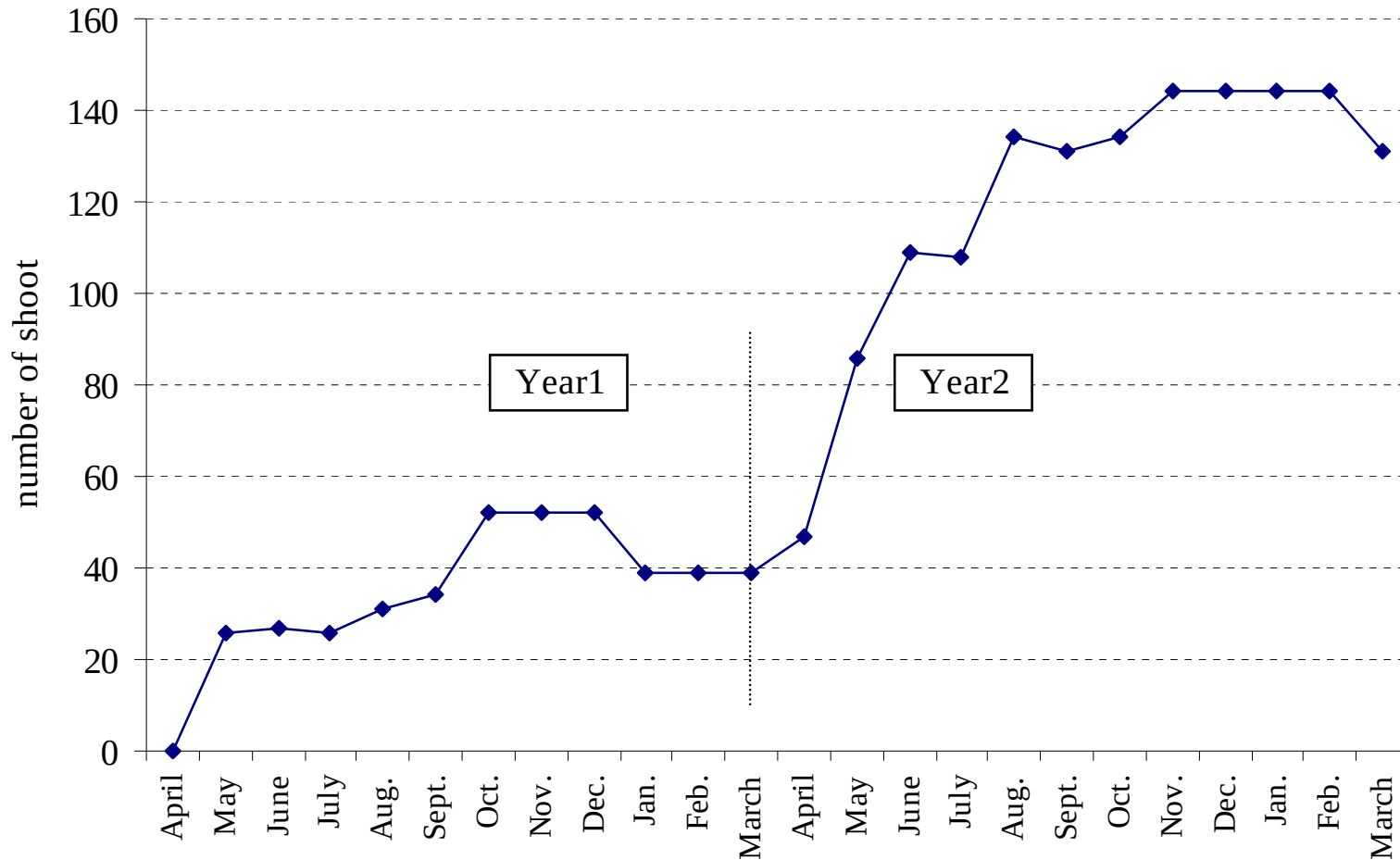
- Open air experiments in Hamburg
- 10 huge containers planted with bamboo (*P. viridiglaucescens*)
- Initial conditions: soil and bamboo tissue analyses
- 2 years continuous urine-based substrate feeding
- High fertilization rates from 0 to 1050 kgN/ha/a
- Periodic soil and leachate collection and analyses

Raw urine

	TOC (mg/l)	TN (mg/l)	TP (mg/l)	pH (-)	EC (mS/cm)
Min.	1080	2860	204	6.72	12.10
Mean	2807	5060	424	8.69	20,12
Max.	6960	7390	1050	9.19	28.90

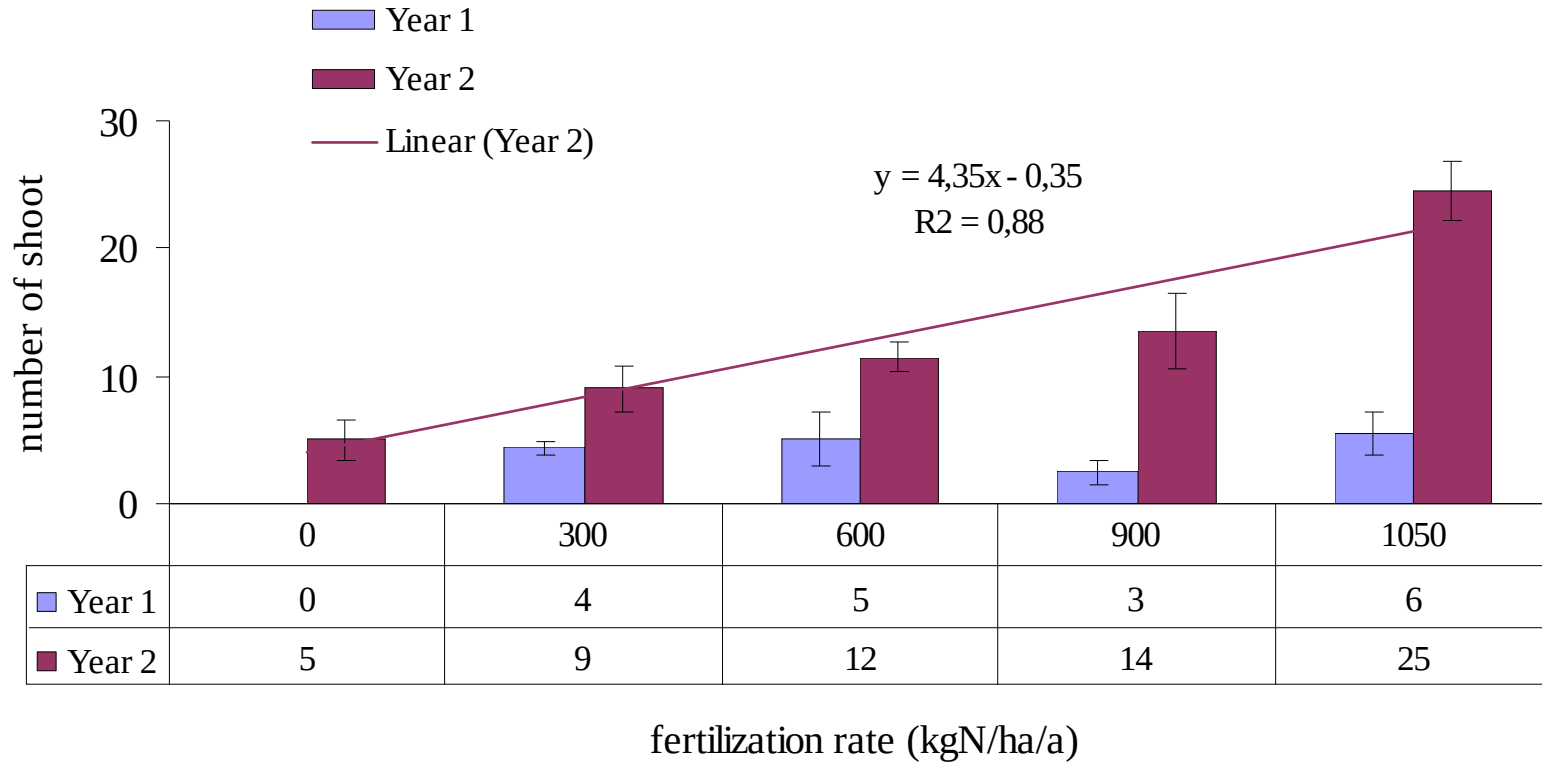


4- Cumulative monthly number of shoots



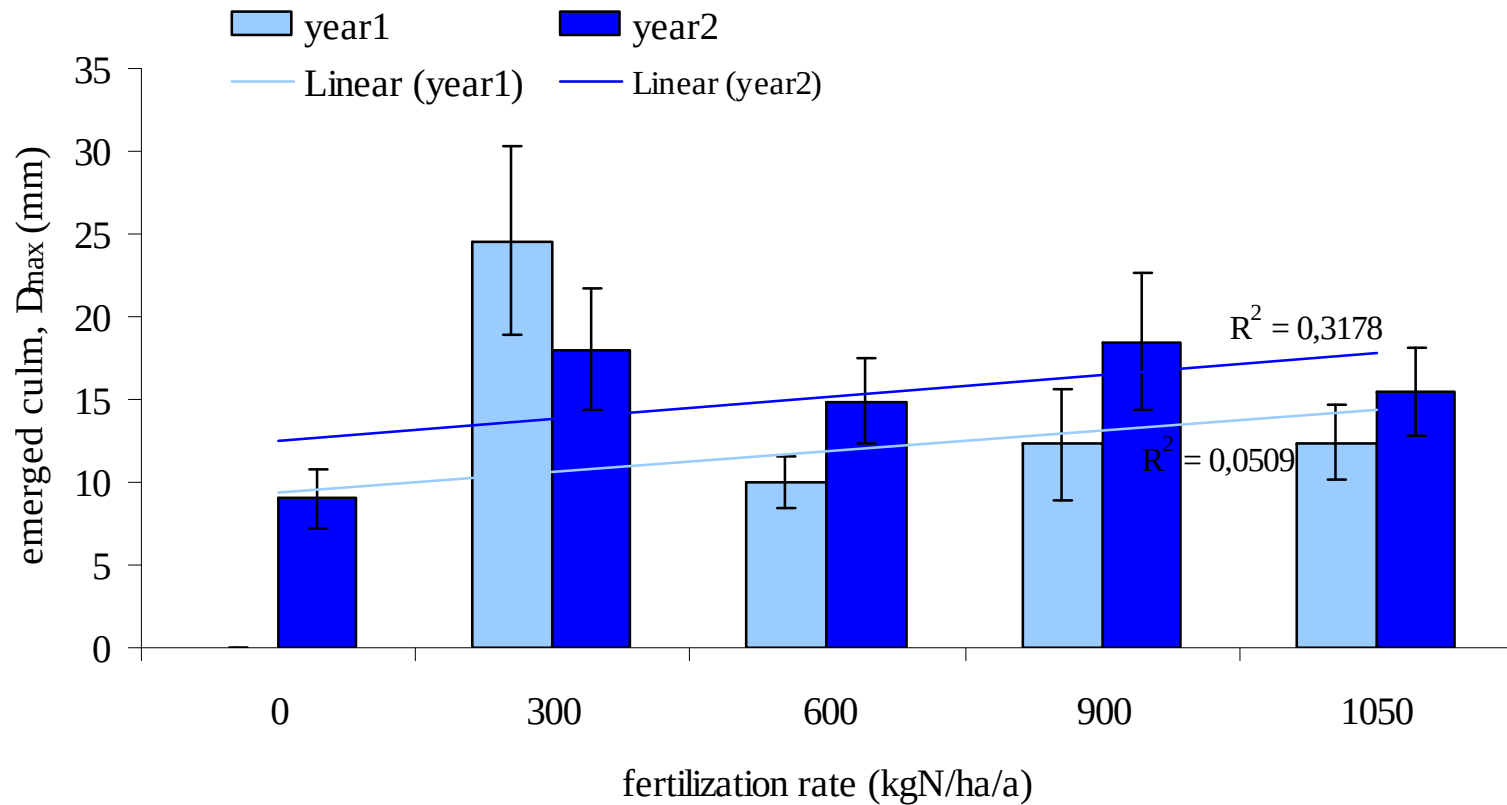


4- Mean yearly shoots per group



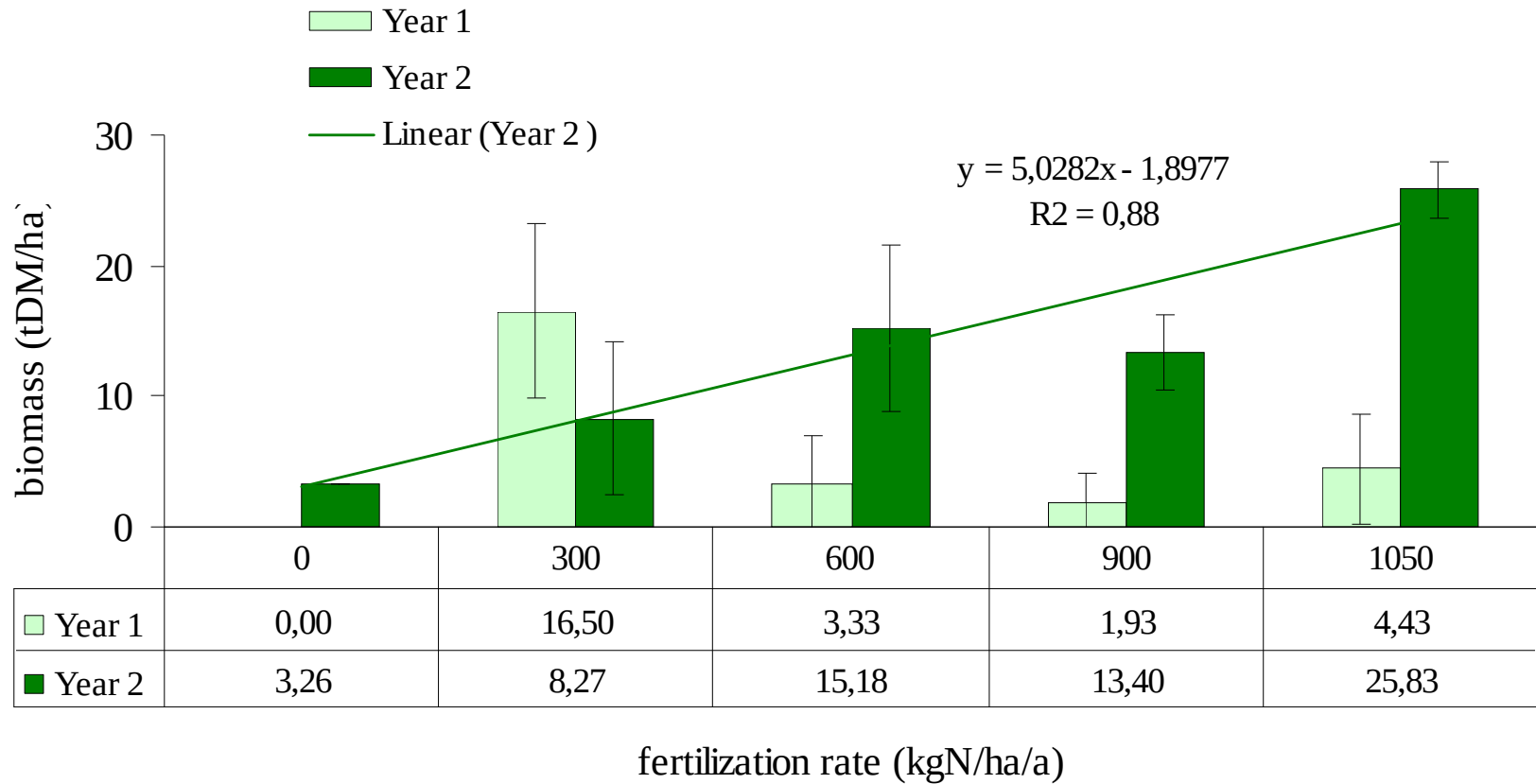


4- Emerged culm diameter: D_{max}





4- Biomass yield





Human urine: the major portion nutrient-rich of wastewater

↳ so, separate and use it as fertilizer

Bamboo and human urine: the results of this research aspect (biomass) show that:

- ↳ without urine, the growth is weak and yield is less
- ↳ human urine increases the production
- ↳ urine does not influence the growing and resting seasons
- ↳ The title of this paper is therefore justified:

HUMAN URINE BOOSTS BAMBOO BIOMASS YIELD



Thank you!



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