Background
Pathogens and excess nutrients flowing from industry, agriculture, and wastewater threaten Lake Champlain’s watershed health. Beaches frequently close after heavy rains due to E. coli levels > 235 colony forming units (CFUs)/100ml water. Fungi’s primary role of decomposition happens via their primary function of mineralizing nutrients and releasing water. Fungi’s primary role of decomposition happens via their mycelial mats which denature microbes that die and contribute to mycelial nets (Stamets 2005).

Methods
- Greenhouse-based methods grew mats in 36 66-quart bins of hardwood chips, half and full, myceliated and nonmyceliated: 10 lbs of mushroom spawn inoculated each yard of wood chips. The manure slurry was filtered at 3 concentrations: low E. coli = 125 bacteria/100 mL water, middle = 250 bacteria/100 mL, high = 500 bacteria/100 mL; influent was compared to effluent after 22 hr dwell time.
- Laboratory-based mesocosm experiments compared E. coli concentrations after passing through 100 g mycelial mats to those after mixing with mat eluent over five minutes.

Results
- Greenhouse experiments revealed patchy colonization. (Fig.1)
- Laboratory-based experiments:
  - Outflow plated, incubated, and counted using Coliscan Membrane Filtration kits indicated lower E. coli counts than inflow (Table 1).
- There was no difference between E. coli concentrations after passing slurry through mycelial mats or adding it to eluent. (Table 1).
- In a separate experiment, filter from mycelial mats was enriched in phosphorus and other bacteria. (Fig. 2).

Conclusions
- *Stropharia rugoso-annulata* may reduce E. coli in runoff.
- *Stropharia rugoso-annulata* mats may not effectively filter water due to patchy monomitic hyphal structure.
- Mycelial mats may provide substrate for bacterial growth and increased phosphorus cycling
- Mycelial mats may be reservoirs for microbes and sources of nutrients.
- Questions arise concerning trade-offs of *Stropharia rugoso-annulata* killing E.coli vs. mineralizing nutrients promoting E.coli growth.

References

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