Fighting the Spread of Invasive Species:

Tests of Decontamination Techniques

Bart De Stasio
Biology Department
Lawrence University
Appleton, WI

Wisconsin Aquatic Invasive Species (February 2016)

- Great Lakes has many invasive species
- Heavy boating and other recreational uses
- Many potential dispersal modes
- Current AIS Status:
  - 15 invertebrates
  - 6 fish
  - 16 plants

New Zealand Mudsnail

(*Potamopyrgus antipodarum*)

- Small freshwater snail (3-4 mm)
- High densities in streams
- Operculum covers opening
  - Seals perfectly with opening of shell
  - Allows for long term survival out of water
- Currently in 3 WI locations

Spiny Water Flea

(Bythotrephes longimanus)

(www.michigan.gov/deq/0,1607,7-135-3313_3677_8314-83004--,00.html)

(www.mychamplain.net/petitions)

- Small predacious crustacean
- Introduced to Great Lakes in ballast water in 1984
- Fouls fishing gear, competes with fish for food
- Currently in 23 WI locations

Mudsnail Collection

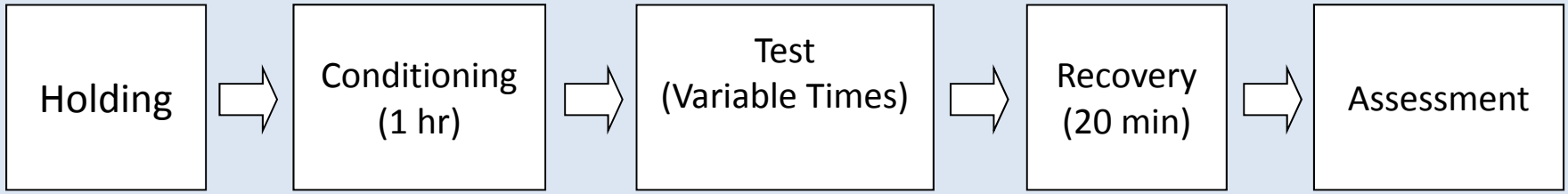
Black Earth Creek
(west of Madison)

Mudsnail Collection

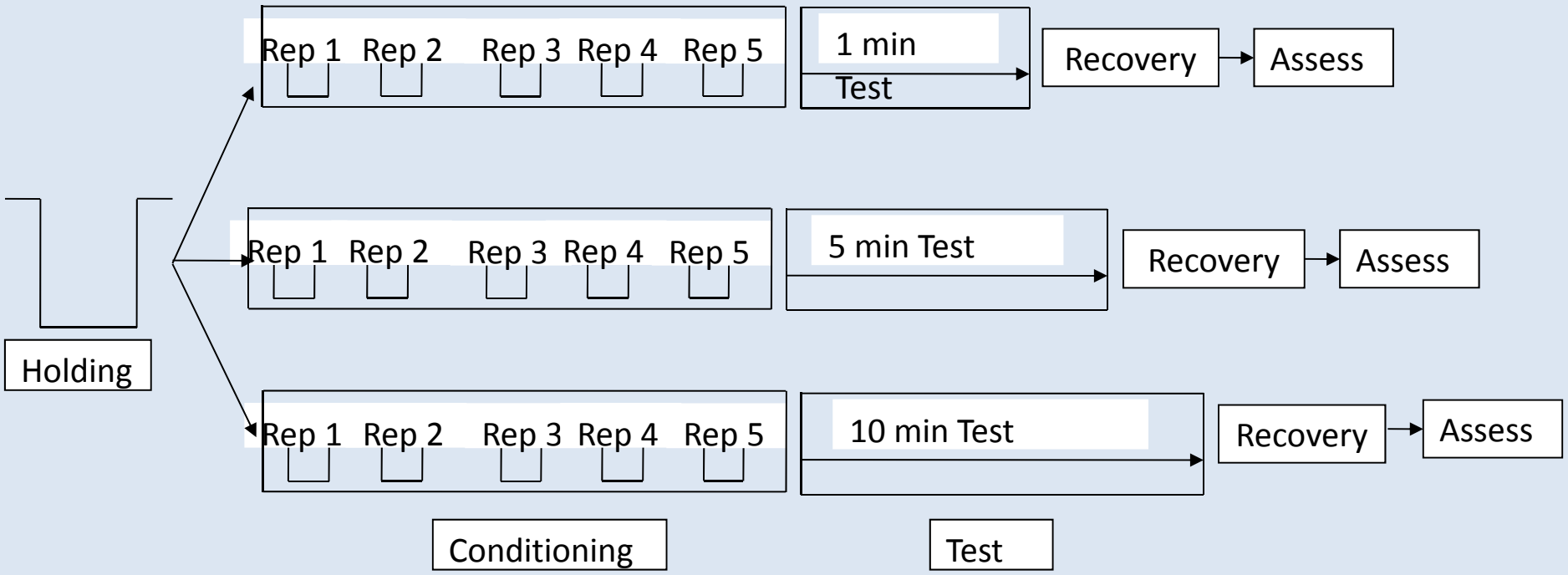
Spiny Water Flea Collection

Lower Green Bay

Lab Test Procedure



Lab Test Example



Each Replicate included 15 animals:

- Control without material (5 reps)
- Control with material (5 reps)
- Disinfectant with material (5 reps)

Lab Tests

Mudsnail Lab Tests

(I = Immersion, S = Spray)

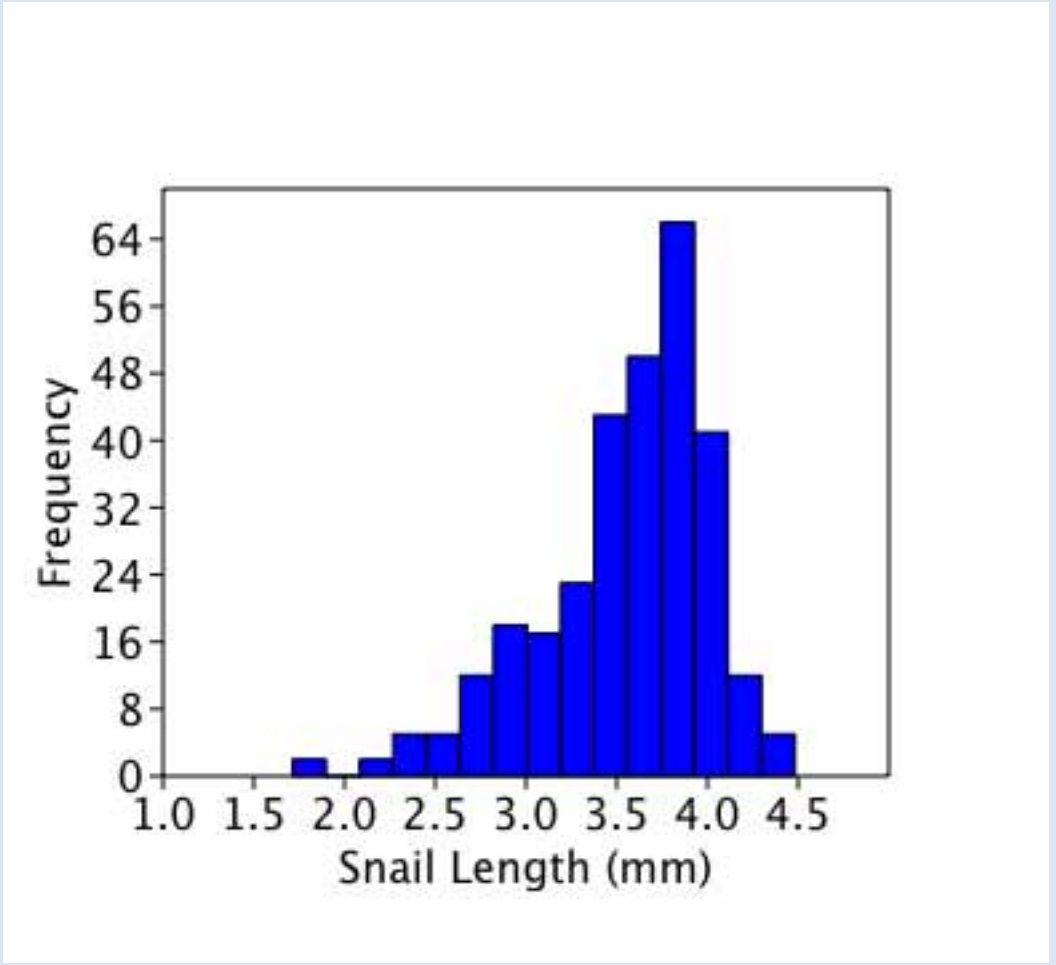
Material	Virkon (2%)	Bleach (400 ppm)	Formula 409
Polyester line (anchors)		I & S	
Nylon Nets (Dip/plankton nets)		I & S	
Neoprene (wetsuit/wader)		I & S	
Canvas	I & S	I & S	I & S
Rubber (wader/boots)	I & S	I & S	I & S
Felt (wader sole)	I & S		I & S

Spiny Water Flea Lab Tests

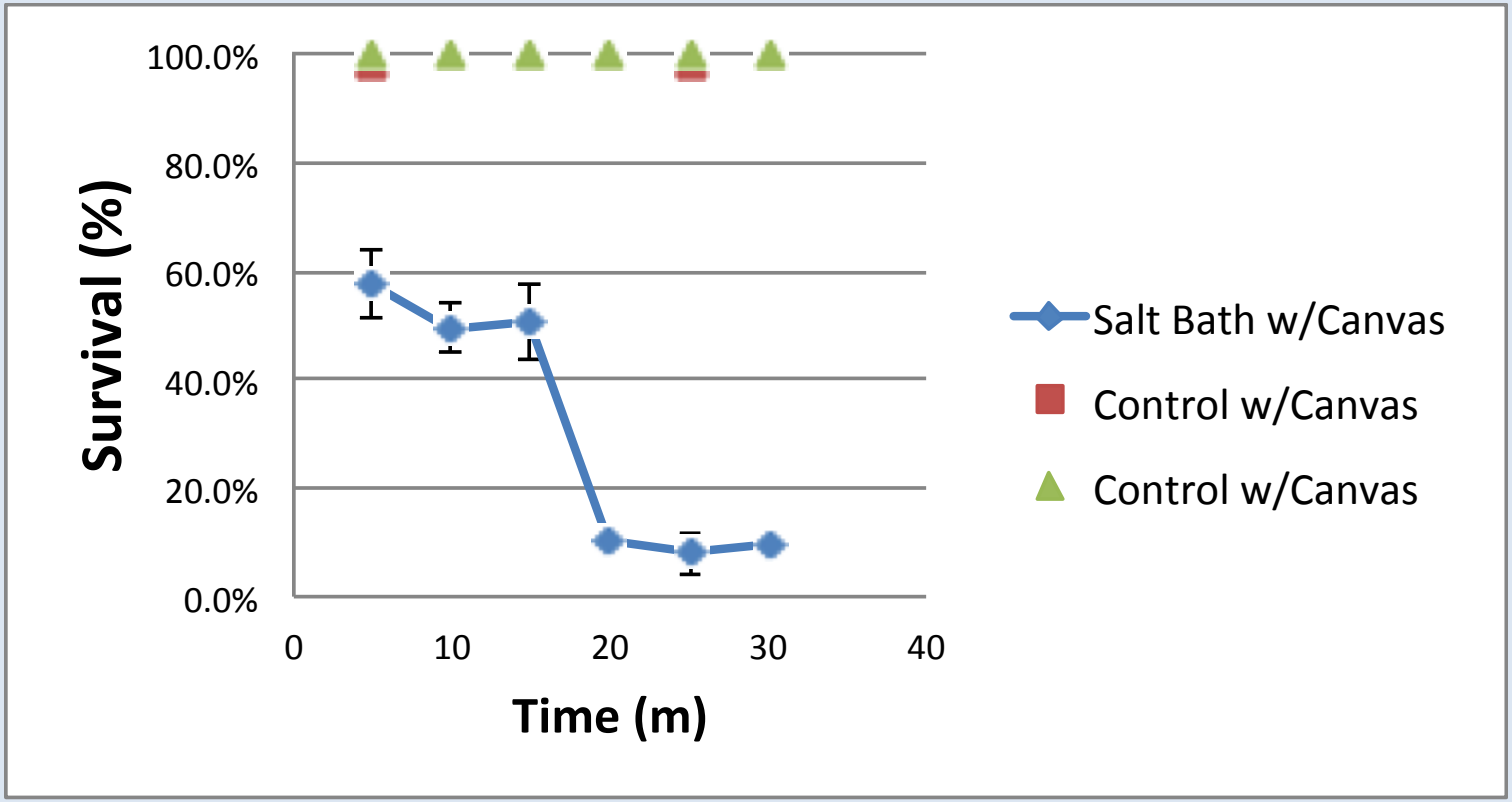
(I = Immersion, S = Spray)

Material	Virkon (2%)	Bleach (400 ppm)	Freezing
Polyester line (anchors)	I & S	I & S	S
Nylon Nets (Dip/plankton nets)	I & S	I & S	S
Neoprene (wetsuit/wader)	I & S	I & S	S
Canvas	I & S	I & S	

Mudsnail Sizes 2015

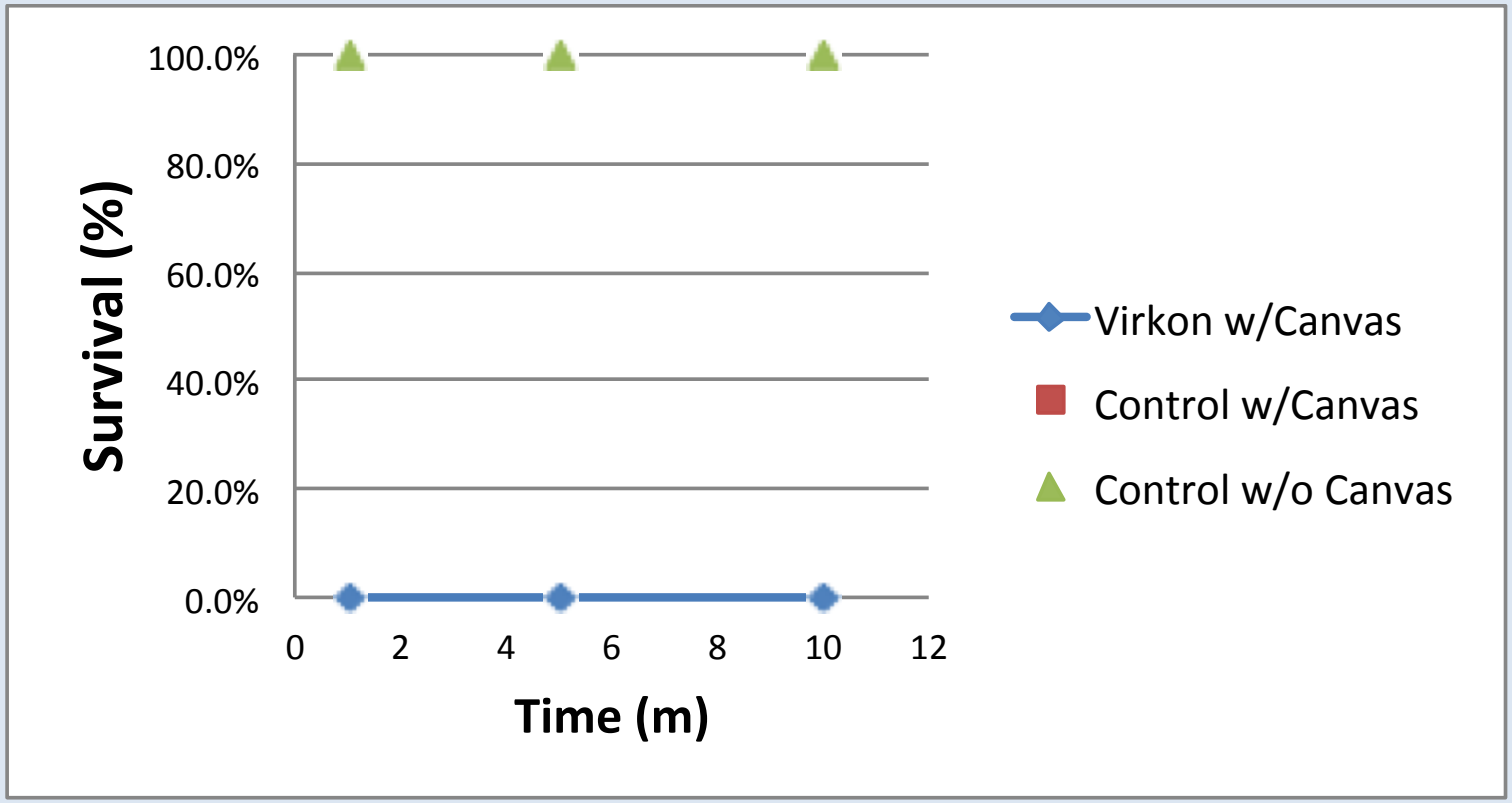


Mudsnail Survival: Saltwater



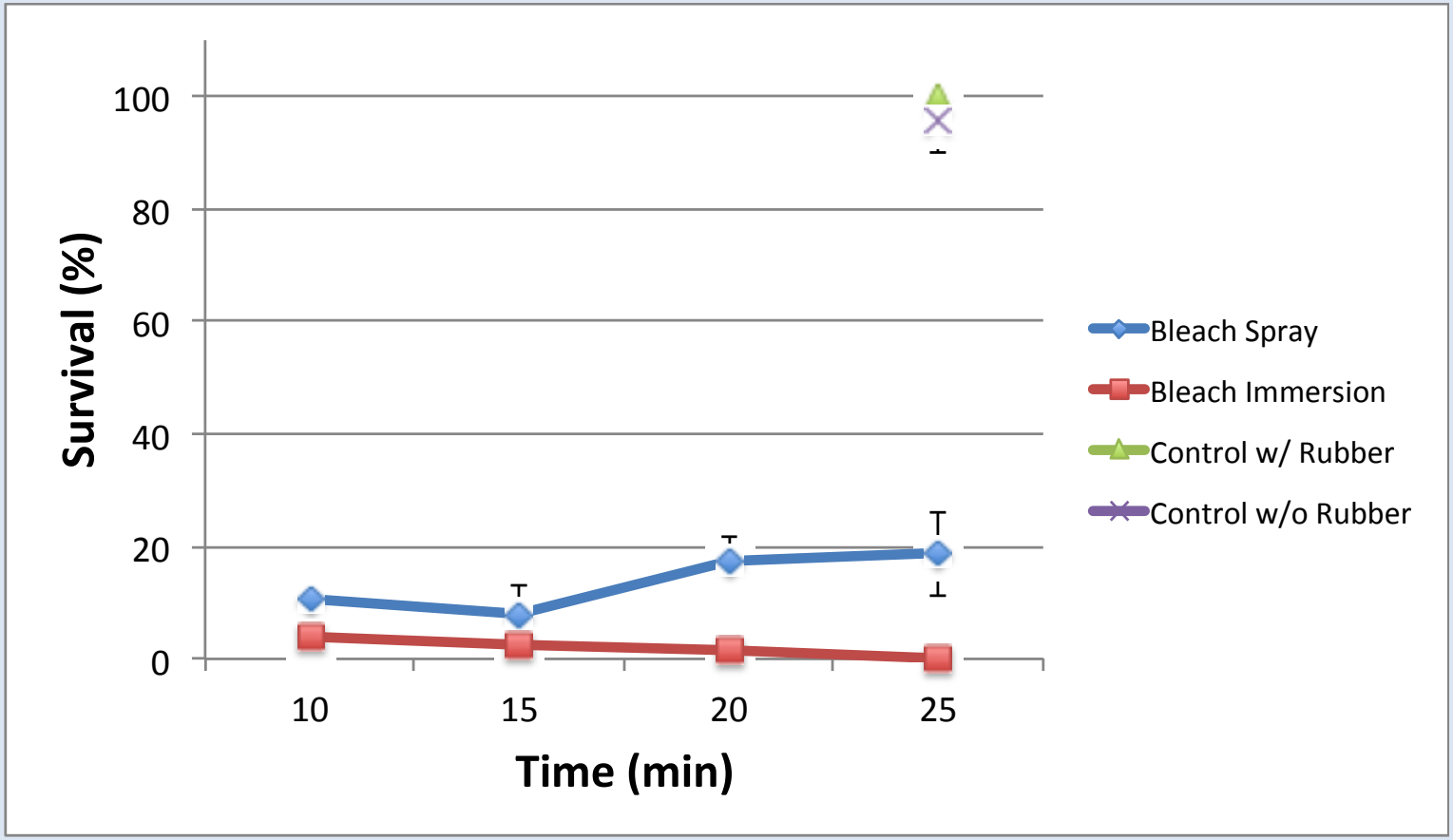
(mean +/- 1 SEM)

Mudsnail Survival: Virkon



(mean +/- 1 SEM)

Mudsnail Survival: Bleach



(mean +/- 1 SEM)

Mudsnail Test Results

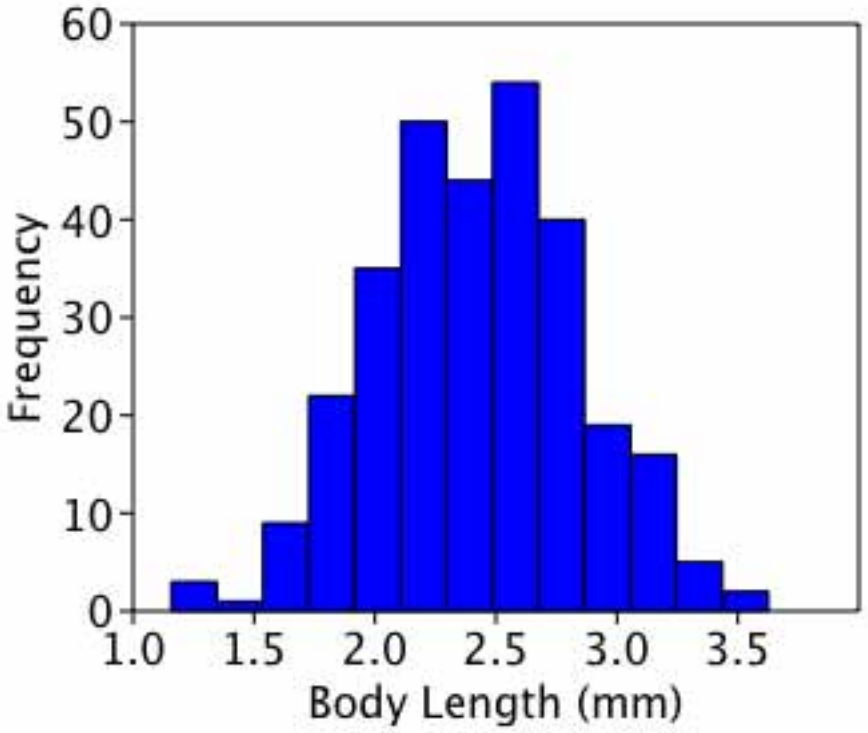
Mean Percent Survival
(Immersion / Spray)

Material	Virkon (2%)	Bleach (400 ppm)	Formula 409
Polyester line (anchors)		3.6 / 8.9	
Nylon Nets (Dip/plankton nets)		10.7 / 26.6	
Neoprene (wetsuit/wader)		1.3 / 21	
Canvas	0	18.7 / 9.3	0 / 1.3
Rubber (wader/boots)	0	0 / 18.7	0 / 1.3
Felt (wader sole)	0		0 / 0

New Zealand Mudsnail Results

- Virkon & Formula 409 very effective
- Bleach & salt not effective (>30 min)
- Spraying less effective
- Material makes a difference with Bleach
- Mud significantly decreases effectiveness

Spiny Water Flea Sizes 2015



Spiny Water Flea Test Results

Mean Percent Survival
(Immersion / Spray)

Material	Virkon (2%)	Bleach (400 ppm)	Freezing
Polyester line (anchors)	0 / 0	0 / 0	0
Nylon Nets (Dip/plankton nets)	0 / 0	0 / 0	0
Neoprene (wetsuit/wader)	0 / 0	0 / 0	0
Canvas	0 / 0	0 / 1.3	

Some eggs in brood chambers survive

Spiny Water Flea Results

- Virkon, Bleach & Freezing effective
- Immersion and Spraying equally effective
- Eggs in brood chambers can survive
- No differences based on materials

Acknowledgments

- Wisconsin Dept of Natural Resources
- Excellence in Science Fund, Lawrence University
- Student Assistants:

  Chris Acy

  Katie Frankel

  Casey Merkel

  Sarah Lawhun

  Zoe Psarouthakis