

Testing the Efficacy of Various Treatments for Removing Quagga Mussel Veligers from Transport Tanks at Willow Beach National Fish Hatchery



First Objective



To determine the efficacy of the standard treatment of potassium chloride and formalin

for removal of motile life stages of quagga mussel from transport tanks at Willow Beach National Fish Hatchery



Results

First tests (June 2009):

750 ppm KCl / 25 ppm formalin = no mortalities

1500 ppm KCl / 25 ppm formalin = no mortalities

1500 ppm KCl / 50 ppm formalin = no mortalities

2000 ppm KCl / 25 ppm formalin = 1 mortality

2000 ppm KCl / 50 ppm formalin = 1 mortality

Second round of tests (Sept. 2009):

2250 ppm KCl / 25 ppm formalin → 27% mortality

2250 ppm KCl / 50 ppm formalin → 25% mortality

2250 ppm KCl / 100 ppm formalin → 100% mortality

3500 ppm KCl / 25 ppm formalin → 20% mortality

3500 ppm KCl / 50 ppm formalin → 13% mortality

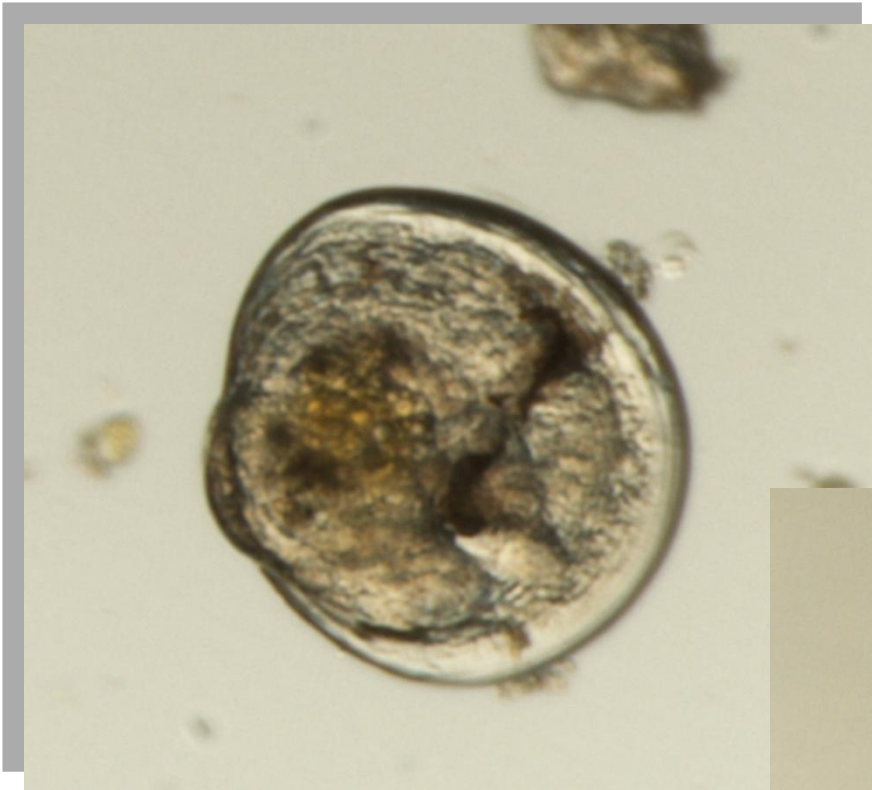
3500 ppm KCl / 100 ppm formalin → 60% mortality

4250 ppm KCl / 25 ppm formalin → 39% mortality

4250 ppm KCl / 50 ppm formalin → 93% mortality

4250 ppm KCl / 100 ppm formalin → 50% mortality

Differences
observed between
dead veligers



Are they REALLY
dead?

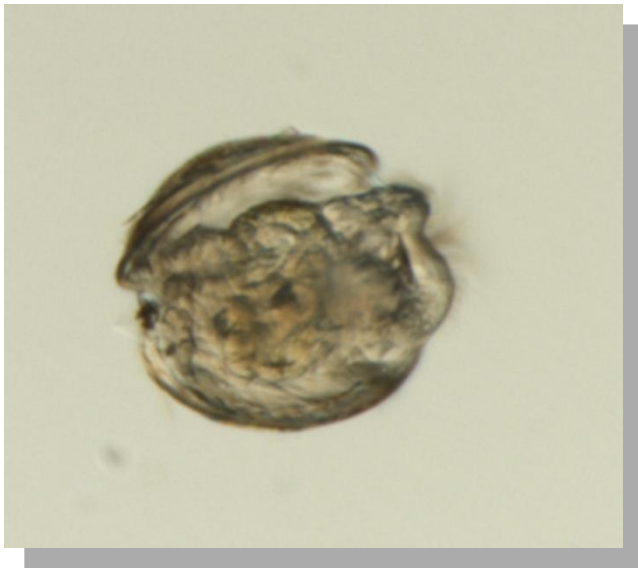


A recovery period was added to last round of tests:

4250 ppm KCl / 25 ppm formalin = 100% recovered

4250 ppm KCl / 50 ppm formalin = 100% recovered

4250 ppm KCl / 100 ppm formalin = 100% recovered



Additional Bioassay

Tested role of water hardness in efficacy of KCl/Formalin treatment by diluting WBNFH water with RO water:

Did not make a difference

Conclusion

The accepted treatment method of KCl and formalin does not kill quagga mussel veligers under the water conditions found at Willow Beach NFH - even at concentrations shown to be toxic to native fish species

Second Objective

Test three additional chemicals as alternative treatments

- Cutrine-Ultra (copper)
- Peraclean 15 (peracetic acid)
- Spectrus CT1300 (quaternary ammonium compound)



Lethality tests were designed with a 6-7 hour time frame to reflect an average fish hauling trip

Observations on condition of veligers were recorded hourly

Results

Chemical	Concentration (mg/L)	% Mortality	Time (hour)
Copper	6.25	50	6
	15	80	6
	20	84	6
Peracetic acid	1.25	11	7
	2.5	23	7
	5	50	7
	10	70	7
QUAT	35	100	4
	50	100	2
	10	0	6
	25	80	6
	30	90	6
	37.5	91	6

Good News

Peracetic Acid produced 100% mortality
and the Quaternary Ammonium
Compound produced 91%

Bad News

Required concentrations of those
chemicals were lethal to native fish in
less than 30 minutes

Third Round of Research

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