

FACT SHEET

Effect of ionized ammonia on phytoplankton productivity (13-08)	
Deliverables: Manuscript submitted for publication in a peer-reviewed scientific journal	
Status: Planned experiments yet to be started; development of experimental system being finalized	
Primary Investigator: Michael Johnson	Recipient Organization: Michael L Johnson LLC
Project Cost: \$564,000	SFCWA Funding: \$200,000
Partners: AQUA Science	

Introduction

Teh et al. (2011) reported on the toxicity of ammonium on the copepod *Pseudodiaptomus forbesi*, concluding that there was significant toxicity. The descriptions of methods and results in Teh et al. (2011) were incomplete, making it difficult to determine what was actually done in the experiments, how analyses were performed, or how conclusions were developed. There were fatal flaws in the experimental designs (improperly framed hypotheses, changing test conditions, inadequate controls, improperly fit dose-response curves) that could invalidate the results and conclusions. A subsequent publication by Parker et al. (2012) found that ammonium reduces primary production in diatoms specifically and is responsible for the lack of a spring phytoplankton bloom in Suisun Bay.

Taken together, the Teh et al. (2011) report and the Parker et al. (2011) publication suggest that *P. forbesi* may suffer from two different ammonium generated stresses; reduction of a food source due to suppression of primary production, and direct toxicity from the ammonium. Given these two potential stressors on *P. forbesi*, this project tests each stressor (reduced food and direct toxicity) in a way that allows the independent effects of each to be determined as well as any potential interaction between the two.

Objective

The purpose of the proposed experiment is to determine: 1) the effects of ammonium on growth and survival of all life stages of *P. forbesi*; 2) the effects of reduced food supply on growth and survival of all life stages of *P. forbesi*; and 3) any interaction between the two factors such that the combined effect of toxicity and reduction in food supply impairs the growth and survival of *P. forbesi* in more than an additive manner.

Results

Unavailable as yet.

Conclusions

Awaiting results.

Relevance

One of the current hypotheses for the decline of pelagic fish in the Bay-Delta system is low primary productivity, which limits the abundance of higher trophic levels. Researchers at the SFSU Romberg Tiburon Center hypothesize that the discharge of ammonium from waste water treatment plants is responsible for the reduced primary productivity. Evaluation of this hypothesis in a laboratory setting will test the hypothesis.

Next Steps

1. Initiate experiments with flow-through system
2. Preparation of manuscript for publication in a peer-reviewed scientific journal.