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***Karlodinium veneficum* feeding responses and effects on larvae of the eastern oyster *Crassostrea virginica* under variable nitrogen:phosphorus stoichiometry**

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ABSTRACT: Mixotrophic feeding can be promoted by nutrient-enriched prey, a nutritional strategy which can provide benefits to some toxic microalgae under nutrient-imbalanced conditions. However, it is unclear how the nutritional condition of the predator or the prey affects the mixotrophy and toxicity of toxin-producing mixotrophs. Laboratory experiments were conducted to measure growth and feeding rates of *Karlodinium veneficum* with addition of *Rhodomonas salina* as prey under varied nitrogen (N):phosphorus (P) stoichiometry (molar N:P of 4, 16 and 32) of both predator and prey and with *K. veneficum* initially in different growth phases (exponential and stationary). Growth rates of initially exponential- and stationary-phase *K. veneficum* were enhanced in the presence of prey with reciprocal nutrient conditions. Feeding rates (measured as prey death rates) were highest for low-NP *K. veneficum* initially growing exponentially and mixed with N-rich prey. Maximum feeding rates of low-NP *K. veneficum* on N-rich prey during exponential growth were ~4-fold higher than the rates of high-NP *K. veneficum* on N-rich prey. The nutritionally different *K. veneficum* were tested with larvae of the eastern oyster *Crassostrea virginica* to compare putative toxicity. Larval mortality was significantly increased in 2 d exposures to high-NP *K. veneficum* monocultures in both growth phases. When mixed with N-rich prey, the presence of *K. veneficum* resulted in significantly enhanced larval mortality, but this was not the case for low-NP *K. veneficum* in exponential phase. Enhanced growth of *K. veneficum* and increased negative effects of *K. veneficum* on larval survival appeared to be highest when fed prey with higher N:P content.

KEY WORDS: Mixotrophy · Harmful algae · *Karlodinium veneficum* · N:P stoichiometry · Larval oyster mortality

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