

Stoichiometry of *Daphnia lumholtzi* and their invasion success: Are they linked?

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With 3 figures and 2 tables

Abstract: *Daphnia lumholtzi*, a cladoceran native to Australia, South Africa and Asia, has been spreading through the rivers and reservoirs of the Southern and Midwestern US since its first detection in 1989 in Lake Texoma. Although several studies have documented *D. lumholtzi* dispersal in the US, there is little data linking its life history characteristics with its colonization success. In this study we investigated *D. lumholtzi*'s body stoichiometry, growth and fecundity responses on natural seston vs. uni-algal cultures of *Scenedesmus acutus* (high and low quality and quantity). We also assessed resting egg production via a series of growth and population experiments to see if these life history parameters are linked with its invasion success. The first experiment examined the effect of diet quality and quantity on growth rates and fecundity of *D. lumholtzi*. The second experiment examined the growth performance of *D. lumholtzi* on ambient and lower concentrations of natural seston vs. uni-algae (*S. acutus*) treatments. In the third experiment, the relationship of *D. lumholtzi* population density and resting egg production was compared with two other widely distributed (Northern Hemisphere) species (*D. pulicaria* and *D. magna*). Growth rate, fecundity and body % P (dry mass) data from the quality-quantity experiment showed that *D. lumholtzi* performed best under P-rich, high food conditions and worst under P-deficient, low food conditions, exhibiting effects of both food quality and quantity. None of the life history characteristics we examined were significantly different from those of the tested native species of *Daphnia*. However, %RNA (dry mass) of *D. lumholtzi* was significantly higher than the tested native species (*D. lumholtzi* ≈10%; *D. pulicaria*, *D. magna* <8%). The algae-seston experiment also showed that *D. lumholtzi* growth performance did not differ from that of the tested native species, but the population and resting egg production experiment showed that at similar food and environmental conditions *D. lumholtzi* produced significantly more resting eggs than either *D. magna* and

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