

Testing the applicability of the Redfield ratios across taxa and water bodies.

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Redfield et al (1963) proposed that healthy marine phytoplankton contain a molecular C:N:P ratio of 106:16: 1. Departure from this ratio implies nutrient deficiency, and not only sub-optimal growth for phytoplankton, but also sub-standard food resources for primary consumers of the phytoplankton. A number of studies (Morris and Lewis, 1988; Hecky et al. 1993) have tested the applicability of the Redfield ratio for freshwater phytoplankton, suggesting that seston ratios can be indicative of the relative importance of N and P limitation. Nutrient ratios in the bodies of both pelagic herbivores and benthic invertebrates may also help explain community structure and, through retention of limiting nutrients, provide a feedback to phytoplankton dynamics (Sterner and Hessen, 1994; Walve and Larsson 1999; Elser et al., 2000; McCarthy et al., 2007). We report here on preliminary analysis of a large dataset, from both published and unpublished work, to a) test if C:N:P ratios within taxa across a range of habitats and trophic positions are consistent with stoichiometric theory; b) evaluate if there are some general relationships between compliance or departure from the Redfield ratio across taxa; and c) to discuss the implications of this work for assessing or predicting the relevant limitation of N and P in surface waters.

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