 doi:10.1111/j.1365-2427.2006.01548.x

Corrigendum

There is an error in eqn 3, Fig. 3 and associated text in Cross *et al.* (2005). The corrected equation, figure and text are printed below. The corrected text begins with the last paragraph of page 1905 in Cross *et al.* (2005).

Correction (corrected text in italics):

The utility of beginning with this simplified case is that it helps identify several characteristics of stream ecosystems that can cause $U_N : U_P$ (and $S_{W\text{–}N} : S_{W\text{–}P}$) to vary from the value predicted by $B_N : B_P$. For example, the supply of N and P is rarely, if ever, fully provided by dissolved inorganic elements extracted from the water column, although uptake length calculations are almost exclusively determined from these forms. Alternate avenues of nutrient delivery to benthic organisms include local mineralisation of organic matter, perfusion of ground water through stream sediments, and direct use of nutrients in organic matter (Sheibley *et al*., 2003; Brookshire *et al*., 2005). *Regardless of the mechanism, differential subsidies of N and P will cause $U_N : U_P$ to vary from $B_N : B_P$ (Fig. 3). Variable fractions of N and P demand met by flowing water*

***Ambient conditions**:* C_{DIN} = 6 µM; C_{SRP} = 0.5 µM; Biomass N : P ratio = 15

***Assumptions**:* No net change in biomass; N and P have equal residence times within cells; Uptake compartments are homeostatic (i.e. N : P ratio is constant)

Parameter or compartment	Scenario I	Scenario II	Scenario III	Scenario IV
	- Inorganic nutrients from water column is sole nutrient source - No nutrient recycling	- Inorganic nutrients from water column supply 90% of N and 60% of P - No nutrient recycling	- Inorganic nutrients from water column is sole nutrient source - N recycling is 4*x* more efficient than P recycling	- Inorganic nutrient from water column is sole nutrient source - Denitrification adds 20% to observed N uptake rate
$U_N : U_P$	15.0	22.5	3.8	18.0
$S_{W\text{–}N} : S_{W\text{–}P}$	0.8	0.5	3.2	0.7
Predicted limitation	Weak N-limitation	Strong N-limitation	Strong P-limitation	Moderate N-limitation

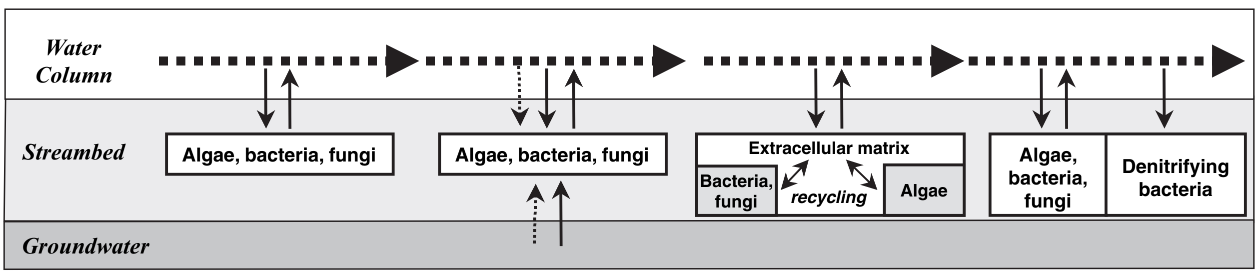

Fig. 3 Hypothetical relationship between stream water column N and P concentrations, uptake rates and uptake lengths (as determined by solute addition experiments) for various scenarios. In scenario I, the water column is the sole source of nutrients for benthic biomass production, assimilation by benthic organisms represents the only nutrient demand, and nutrients are not differentially recycled in the benthic compartment. In scenarios II–IV, these assumptions are altered to assess how each affects nutrient spiralling ratios as determined by solute addition techniques. Solid vertical arrows represent flows of dissolved inorganic N and P. Dotted vertical arrows represent flows of dissolved and/or particulate organic N and P.

supplies (F_N and F_P, respectively) will change relative uptake rates such that:

$$U_N : U_P = B_N : B_P\left(\frac{F_N}{F_P}\right) \tag{3}$$

For example, if 10% of N demand and 40% of P demand is supplied by non-water column sources (F_N and F_P equal 0.9 and 0.6, respectively), $U_N : U_P$ and $S_{W-N} : S_{W-P}$ would increase to about 22.5 and 0.5, respectively (Fig. 3, scenario II). In this scenario, gross $U_N : U_P$ (assimilation of N and P by organisms) has not changed and remains equivalent to $B_N : B_P$ (= 15). However, differential use of N and P from non-water column sources has exaggerated the degree of N limitation. Discrepancies between observed $U_N : U_P$ and $B_N : B_P$ could also arise from differential internal recycling of N and P (Fig. 3, scenario III) and non-assimilatory removal of nutrients from the water column (Fig. 3, scenario IV). Denitrification, nitrification, and sorption are a few processes that result in the loss of particular forms of nutrients from solution and are included in tracer-derived estimates of nutrient uptake in streams.

Reference

Cross W.F., Benstead J.P., Frost P.C. & Thomas S.A. (2005) Ecological stoichiometry in freshwater benthic systems: recent progress and perspectives. *Freshwater Biology*, **50**, 1895–1912.