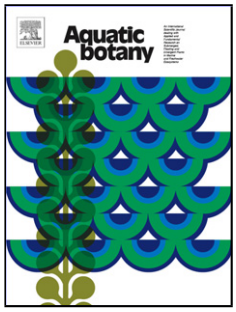

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Influence of biomass and water velocity on light attenuation of *Cladophora glomerata* L. (Kuetzing) in rivers

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Highlights:

- Light attenuation through riverine *Cladophora glomerata* filaments was measured
- Experiments were completed with a fiber-optic sensor in a flume and *in situ*
- Correlations between light attenuation and algal mat thickness were established
- Volumetric biomass provides suitable explanation of downward light attenuation
- Areal biomass density was a poor predictor of the light extinction coefficient
- Drag from water velocity compresses the algal mat reducing downwelling irradiance

Abstract

The attenuation of photosynthetically active radiation (PAR) through the filamentous alga *Cladophora glomerata* was investigated both *in situ* and in an experimental flow tank under both natural and artificial lighting using a fiber-optic sensor. Over 35 separate experiments were completed to characterize downward light attenuation and water velocity effects. Measured extinction coefficients ranged from 4.3–150.7 m^{-1} for biomass samples ranging from 40–253 mg chlorophyll-a m^{-2} (41–381 g ash free dry weight m^{-2}) at shear velocities from 0–51.8 cm s^{-1}. An exponential relationship between light attenuation coefficient (K_{alg}) and algal biomass thickness (δ) was found ($\ln K_{alg} = -1.1831 \ln \delta + 8.3789$; r^2=0.41, p<0.001). Unexpectedly, chlorophyll-*a* (Chl*a*) and ash free dry weight (AFDW) areal density were poor

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