

Trematodes influence macroalgae consumption

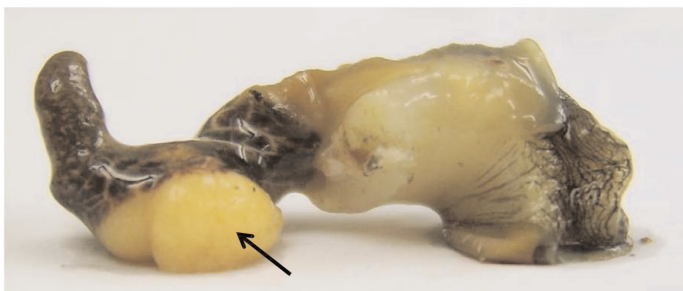


The common periwinkle, *Littorina littorea*, (Figure 1) is one of the most abundant grazers in coastal habitats of the north Atlantic. The snail was introduced, presumably by shipping, to the north-west Atlantic coast in the mid-19th Century from northern Europe and is currently widespread on both sides of the North Atlantic. Periwinkles are mainly found on rocky shores but inhabit also soft-bottom habitats such as sheltered beaches and tidal mudflats. Throughout its distributional range, the snail plays an important role for the structure and organization of coastal macroalgae communities as it prefers the competitively dominant ephemeral green algae over more slow-growing mechanically and chemically defended brown and red algae.

Interestingly, periwinkles commonly serves as first intermediate host to a range of trematode parasites that infect also other species of benthic invertebrates as well as fish and shorebirds in the attempt to complete their often astonishing complex lifecycle. In the snails gonad-digestive gland complex where the infections are located (Figure 2), immense amounts of trematode larvae (cercariae, see Figure 3) are continuously produced asexually. This eventually results in partial or total castration and possibly also reduced digestive capacity of the host. Both these processes can be envisaged to affect the consumption rate of the host negatively. The pool of energy normally allocated snail reproduction may be used for other purposes thereby reducing the infected snails overall energetic demand and, in turn, decrease consumption rates. Additionally, a compromised digestive capacity may force infected snails to consume less green algae.

Indeed, by the use of outdoor microcosm experiments we found that uninfected periwinkles consumed up to 65%

FIGURE 2. Soft parts of a common periwinkle (*Littorina littorea*) infected by the trematode *Renicola roscovita* (yellow-orange tissue; arrow).



more green macroalgal biomass than snails infected by the trematodes *Renicola roscovita* and *Himasthla elongata*. Both these species of trematodes commonly infects European periwinkles, locally reaching prevalence of infection exceeding 70%. Trematode infections typically persist for the entire lifetime of the periwinkle (usually 4-10 years in the field), and hence, trematodes may indirectly exert long-term regulatory effects on the macroalgae community through their influence on snail consumption.

Wood et al. (2007) found a similar effect of the trematode *Cryptocotyle lingua* on periwinkles from the north-west Atlantic shore, and in fact managed to demonstrate that this could ultimately affect the structure of macroalgae assemblages *in situ*. Hence, it seems that trematode infections in general depress the periwinkles consumption of green algae quite substantially, and these parasites may therefore play an important role in structuring communities of coastal macroalgae on both sides of the North Atlantic.

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Further reading:

Wood, C.L., Byers, J.E., Cottingham, K.L., Altman, I., Donahue, M.J. & Blakeslee, A.M.H., 2007. Parasites alter community structure. *Proceedings of the National Academy of Sciences of the United States of America*, **104**, 9335–9339

FIGURE 3. Free-swimming larval stages (cercariae) of three different trematode species (not to scale). (a) *Himasthla elongata* 670-1920 mm (b) *Renicola roscovita* 170-570 mm (c) *Cryptocotyle lingua* 600-700 mm. The cercariae are produced in the gonad-digestive gland complex of the snail host. When mature, the cercariae leave the snail in order to seek out the next host in the life cycle.

