

## COMMENT

## Impact of *Steinhausia mytilovum* on its host: a comment on Rayyan & Chintiroglou (2003)

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*Steinhausia mytilovum* is a widely distributed microsporidian parasite that infects the oocytes of the mussels *Mytilus edulis* and *M. galloprovincialis*. Despite numerous observations, studies conducted to date have failed to assess the potential impact of *S. mytilovum* on its mussel host. Several papers have reported a strong hemocyte infiltration in the gonadal tissue (González et al. 1987, Bower & Figueras 1989, Figueras et al. 1991, Villalba et al. 1997, Sagristà et al. 1998), but no conclusive evidence has been reported regarding the effect on the whole organism.

In their recent paper, Rayyan & Chintiroglou (2003) were the first to report a physiological impact of *Steinhausia mytilovum* in *Mytilus galloprovincialis* from the Thermaikos Gulf (north Aegean Sea, Greece). Despite the interest of their results, their conclusion has to be considered with caution. This is mainly due to the fact that they used the condition index as a measurement of the mussel health. Such a parameter is indeed influenced by numerous factors, both intrinsic (e.g. gametogenic stage) and environmental (e.g. temperature, food availability). To show the effect of a parasite on the condition index would thus require all other factors that could possibly affect it to be equal. This is not the case in Rayyan & Chintiroglou (2003).

First, of the 3 populations they studied, the one with the highest prevalence of *Steinhausia mytilovum* (16 infected females of 45) is located at a polluted site (Halastra). This means that more than half of the 23 infected mussels were from the polluted site, whereas most of the 104 non-infected ones (i.e. 75) were from the 2 unpolluted sites. Thus, the significant difference observed between the condition index of infected and non-infected females might reflect pollution instead of infection.

Second, to show the impact of a given parasite would also require that this parasite is the only one to infect its host, or at least that other potential parasites are present with the same intensity and prevalence. Ray-

yan & Chintiroglou (2003) did not take into account all the parasites that could potentially affect the mussels' condition index. Indeed, they showed more recently from macroscopic examination that at least 4 metazoan parasite species could be found in *Mytilus galloprovincialis* from the same 3 populations (Rayyan et al. 2004). In particular, mussels sampled in May 2001 (same sampling date as for mussels analysed for the presence of *Steinhausia mytilovum*) were shown to harbour both the hydroid *Eugymnanthea inquilina* and the gill turbellarian *Urastoma cyprinae* at the 3 stations. Both species were reported to affect the condition index in the same range of values as for *S. mytilovum* (Rayyan et al. 2004). How then can it be concluded that the decrease in the condition index in *Steinhausia*-infected females is only due to *S. mytilovum*? Furthermore, other mussel parasites are known from this area, and it is not clear if their occurrence was checked by Rayyan & Chintiroglou (2003). This is particularly important for the paramyxean *Marteilia* sp. which has been recorded in *M. galloprovincialis* from the Thermaikos Gulf (Virvilis et al. 2003) and which is known to cause mortality in mussel populations.

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