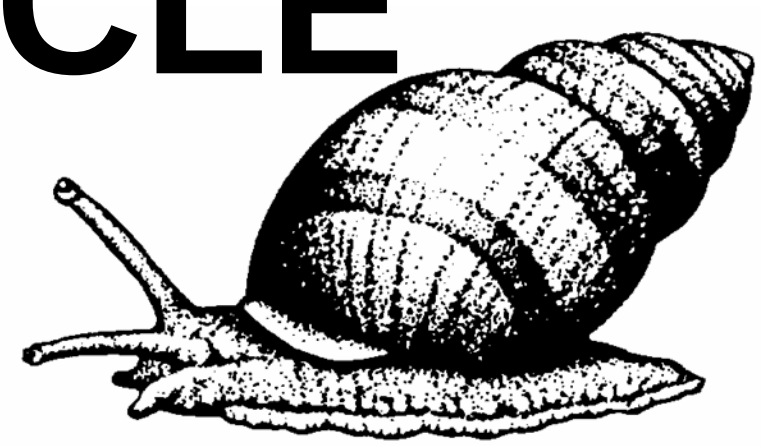
The Newsletter of the IUCN/SSC Mollusc Specialist Group
Species Survival Commission ● IUCN - The World Conservation Union

TENTACLE

UNITAS MALACOLOGICA



Editorial

This issue marks additional changes in *Tentacle*. Although the printed version of *Tentacle* is still distributed to those people with no web access, the great majority of the *Tentacle* readership now accesses the newsletter on the web: www.hawaii.edu/cowielab/Tentacle.htm. I have decided, therefore, that it is no longer necessary to impose the constraints on illustrations demanded by the need to produce *Tentacle* as a black and white photocopy. This, then, is the first issue of *Tentacle* to include color illustrations. While the printed version will still be produced as a black and white photocopy, the web accessible color version will, I feel, dramatically enhance the appeal of the newsletter. By promoting the visual splendor of many of the animals discussed within its pages, I hope that *Tentacle* will attract greater interest in and concern for these animals that we are all working to conserve – which of course is one the major purposes of this newsletter. And I hope you enjoy it. Also, all web and e-mail addresses in the text are now hot links.

All issues of *Tentacle* are available on the web at the above web site. Hard copies are sent only to those people on the distribution list for whom I do not have e-mail addresses – but you will receive only the black and white photocopy. If you receive a hard copy but can access *Tentacle* on the web and do not need the hard copy, please let me know – it helps to save costs. Also, since I announce the publication of each new issue to all who are on the e-mail distribution list, so please keep me updated with your current e-mail addresses so that you do not drop off the list. I also announce the availability of each issue on the MOLLUSCA listserver (for details, see page 42).

As always, I reiterate that the content of *Tentacle* depends largely on what is submitted to me. *Tentacle* is one means to publicise the threats molluscs face—and the conservation successes. But it is also a free, easy way to advertise your own projects! Sometimes you may notice that I have included articles not directly dealing with threatened molluscs (alien species, for instance). But many issues are linked to the threats faced by molluscs and there is no good reason to exclude them from a newsletter such as this. So I encourage anyone with anything relevant to mollusc conservation, even in a broad

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time of year and the fact that we were not searching deeper in the lagoons. Yet it seems that the micromelaniids, if still present, are scarce and their survival depends absolutely on re-establishing the direct connection between the lagoons and the sea, the Razelm Lagoon being the most deserving of conservation efforts.

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COULD DEER OVERABUNDANCE IMPACT TERRESTRIAL MOLLUSKS?

By Aydin Örstan

Terrestrial mollusk surveys of the U.S. forests, especially in the east and mideast, have consistently recorded a rich diversity of native species (e.g., Coney *et al*., 1982; Strayer *et al*., 1986; Örstan, 1999; Nekola, 2004). Comparisons with records from the 1800s suggest that the terrestrial mollusk species compositions of the present second-growth forests may not be too different from those of the old-growth forests. The same second-growth forests are also inhabited by growing populations of the native white-tailed deer, *Odocoileus virginianus*. From these two lines of information, one may conclude that the deer have not had a negative impact on forest snails and slugs. Two recent studies, however, have raised the possibility that overabundance of deer may reduce the numbers of at least some species of terrestrial mollusks.

Suominen (1999) looked at the effects of reindeer and moose grazing on land mollusks in 23 paired plots in Finland and Sweden. In each pair, one plot was fenced to keep large animals out. Suominen used pitfall traps to collect gastropods and concluded that "there were generally more snails and slugs active in those plots where cervid access was prevented than in reference plots where cervids had grazed or browsed."

One confounding factor in this study was that the fences had been placed at different dates, one dated from the 1940s, while others dated from the 1960s through the 1980s. Rooney & Waller (2003) noted another potential interpretational problem with the use of exclosures to keep out all grazing animals: "While exclosures clearly and graphically demonstrate how ungulates can affect vegetation structure and composition, they can also be misleading when the relationship between ungulate density and the dependent variable is non-linear." As they explain (their Fig. 4), some species of plants, and indirectly, animals may actually benefit from intermediate deer densities (see also Côté *et al*., 2004).

Moreover, as Suominen (1999) also noted, pitfall trapping is not effective for sampling terrestrial gastropods and is not even considered in studies testing the effectiveness of different survey methods (e.g., see Oggier *et al*., 1998). Pitfall traps do not adequately sample land mollusks, presumably because, unlike arthropods that do fall into the traps and die, snails and slugs, being always attached to a substrate, do not commonly fall into the traps and if they enter one, they may be able to crawl back out before they are killed.

More recently, Allombert *et al*., (2005) carried out invertebrate surveys on the Haida Gwaii archipelago (Queen Charlotte Islands), 80 km off British Columbia, Canada, where Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) were introduced in 1878. They determined the abundances of various arthropods and land mollusks on six islands, two of which did not have deer, and concluded that "gastropod species density (significantly) and abundance (markedly but not significantly) decreased with increasing [deer] browsing history".

This study also has methodological and interpretational problems. First, Allombert *et al*., (2005) also used pitfall traps and identified only nine snail species. Unfortunately, they did not give a list of species names. I would like to know if any of the mollusk species were introduced to any of the islands as a result of human activities, because if they were, then this would be a factor in determining their presence or absence on a particular island.

Second, the Sitka deer is not native to the study area. Consequently, the results may not be relevant to the North American forests where the white-tailed deer is native and is expected to have coevolved with all other forest taxa. Any impact the white-tailed deer, present at normal or near normal population densities, might have on the other native inhabitants would be a natural process. In this context, it is worth keeping in mind that, although deer populations in North America have been growing, Côté *et al*., (2004) noted that it is not known if the present deer populations are higher than those before European colonization.

Another problem common to both the studies of Suominen (1999) and Allombert *et al*. (2005) is that the recorded mollusk species diversities and abundances were low in comparison with those of lower latitude forests. Suominen (1999) found 13 species of gastropods, but six of them were represented by 13 or fewer specimens. The abundances of two of the remaining seven did not differ significantly between grazed and ungrazed plots, four species were more abundant on ungrazed plots and one species, *Zoogenetes harpa*, was significantly more abundant on grazed plots. Likewise, Allombert *et al*. (2005) collected 26,818 invertebrates, of which only 0.4 % were gastropods, including nine species and giving an average of less than 12 specimens per species distributed over six islands. At such low species and specimen numbers, I would suspect that in either study chance events are highly likely to have influenced distribution patterns and survey results.

The impact of deer density on diversity and abundance of other

forest taxa can be complex and in the presence of deer some species may decline in abundance, while others may increase (Rooney & Waller, 2003; Côté *et al*., 2004). Therefore, it may be difficult to come up with generalizations that would be applicable in all or most instances. What Suominen (1999) and Allombert *et al*., (2005) found may indeed be highly relevant as far as the interactions of large grazing mammals and the somewhat scanty snail faunas of high latitude forests are concerned. But, for all the above reasons, I am hesitant to extrapolate their conclusions to the interactions of terrestrial mollusks and deer in lower latitude forests.

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Nekola, J.C. 2004. Terrestrial gastropod fauna of Northeastern Wisconsin and the Southern Upper Peninsula of Michigan. *American Malacological Bulletin* 18: 21-44.

Oggier, P., Zschokke, S. & Baur, B. 1998. A comparison of three different methods for assessing the gastropod community in dry grasslands. *Pedobiologia* 42: 348-357.

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COULD DEER OVERABUNDANCE IMPACT TERRESTRIAL MOLLUSKS?—A RESPONSE TO ÖRSTAN

By Jean-Louis Martin

Aydin Örstan, in this issue of *Tentacle*, questions the conclusions of two recently published papers that suggested possible negative effects of current deer populations on mollusks. One of theses papers is by Allombert *et al*. (2005a). Before addressing the specific points raised by Aydin Örstan I should mention that mollusks were only marginally touched upon in our paper. The study only suggested that some mollusks that depended on live understory vegetation might have been affected. What our study showed was that a dramatic reduction in the understory vegetation, the result of a long history of deer browsing, had led to a dramatic reduction of the overall abundance and species *density* (see Gotelli & Colwell, 2001) of the invertebrate fauna that relies directly or undirectly on that vegetation. It also showed that the effects on the litter fauna were more complex. Our conclusion was not one of plain extrapolation to continental forests but suggested closer attention to potential effects of current deer populations on other components of the forest ecosystems.

Örstan, on the basis of records from the 1800s, states that species composition in east and mid east U.S. forests has not changed. This may be true. But the question we address is: have species abundances and species *densities* remained the same? If there are no data available to judge variation in abundance or species *density*, past records are of little help. If we take our data on plants (Stockton *et al*., 2005), invertebrates (Allombert *et al*., 2005a) or songbirds (Allombert *et al*., 2005b) and look at variation in species lists from island to island, there is at best a weak effect of browsing history. If we take variation in abundance into account, than the effect becomes overwhelming and many species have to be considered ecologically and locally extinct.

Although many people still resist the idea, there is an increasing amount of evidence in the literature that shows that deer populations are currently changing forest ecology, particularly in eastern north America and western Europe. Two of the authors mentioned by Örstan, Don Waller and Steeve Côté, are, with their teams, among the scientists that take the potential for negative effects on many plant and animal populations very seriously. We also increasingly realize that density does not tell it all. It has to be matched with current carrying capacity, browsing history, landscape structure and the presence or not of fear from predators. We are currently only learning the complexities of these interactions and their link to land use changes by human activities. The studies on Haida Gwaii by our research group, the studies of Steeve Côté and colleagues on Anticosti Island, and the work of Don Waller's team in eastern forests, just to mention the authors listed by Örstan, are part of that effort to quantify the potential of dramatic ecosystem simplification by forest ungulates. This of course does not imply that there are necessarily dramatic effects on mollusks. It only means that the question deserves careful consideration.

Örstan also raised a number of specific points. Indeed, as recognized in the studies he comments on, there are methodological problems both with exclosure experiments and with pitfall traps. These have to be taken into account when analyzing the data and interpreting the results. This is especially true for pitfall traps and mollusks.

In the Haida Gwaii study all mollusk species recorded were native. The study was conducted on remote small islands in an uninhabited and road-less part of the archipelago. No introduced mollusk species were recorded. The only human visitations were those by the research team. The rate of drop offs was similar for all islands. The sampling by pitfall traps was done within one single field season. This should further reduce the likelihood of unwanted biases caused by species getting a ride from the scientists. The concern is a valid one though.

Örstan wonders if mainland mollusks could have "coevolved" and be better adapted to deer presence than island populations. The point made by Allombert *et al*. (2005a) is that deer eat