Mesopredator Release and Prey Abundance: Reply to Litvaitis and Villafuerte

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Litvaitis and Villafuerte (this issue) disagree with interpretation of the results of our study investigating the effect of top-predator presence on small game populations (Palomares et al., 1995 Conservation Biology 9:295-305). We found that the presence of a top predator (Iberian lynx) benefited small game populations (rabbits) because the former limits populations of some other smaller predators (Egyptian mongooses) that also prey upon the game species. We estimated predation rates in two situations, with and without lynx. We based our estimates on field data of predator densities obtained in an area where lynx were restricted to certain habitats and mongooses as a rule used smaller and discontinuous patches of similar vegetation surrounding those areas used by lynx (Palomares et al. 1996; cited as in press in our Conservation Biology paper).

Litvaitis and Villafuerte support their criticism of our paper with three main arguments. First, they contend we did not provide evidence that lynx can limit mongoose numbers. They are right that we did not prove that mongoose populations are limited by lynx because we would have needed an experiment that included lynx removal. Such an experiment is not possible, because of the protected status of lynx. However, we provided evidence that lynx limit mongoose numbers, although not in the Conservation Biology paper, but in another paper cited in it (Palomares et al. 1996). This paper investigates the spatial relationships between lynx and smaller carnivores. The main results of the paper were that 1) lynx avoid the human-disturbed area outside the National Park; 2) mongooses avoid the less disturbed area inside the National Park, where there are lynx; 3) mongooses do not seem to gain any trophic or resting benefit by living outside the protected area; and 4) lynx kill mongooses. For more details, please refer to this paper. Litvaitis and Villafuerte are right to state that the effect of intraguild predation on the demography of terrestrial vertebrates has been the subject of limited experimental evaluation; however, plausible evidence of such effects has increased in the last few years (Bailey 1992, Hersteinsson & Macdonald 1992; Lindström et al. 1995, Ralls & White 1995).

Litvaitis and Villafuerte also believe that landscape differences, especially the large amount of human-altered habitats and other human influences, provide a more parsimonious explanation for the differences in lynx and mongoose densities than does intraguild predation/mesopredator release. We agree that lynx presence may be limited in areas used by humans (in fact this was one of the explanations offered in Palomares et al. 1996 to explain the pattern) and that smaller predators may be at an advantage in these areas as a result. Theoretical models of coexistence between species stress the last point (for example, Nee & May 1992; Palmer 1992). However, Litvaitis and Villafuerte forget a major point: their argument does not explain why mongooses did not use the patches used by lynx. Patches used by lynx were inside a National Park, but those mainly used by mongooses were outside the park. Both areas were contiguous and subjected to human-induced habitat changes. Therefore, the clearest difference between patches used by lynx and mongooses were that those used by the former were bigger and not subject to high, direct human disturbance. Furthermore, mongooses are habitat specialists and in the study area selected habitats with dense undergrowth vegetation and higher densities of warrens and rabbits (Palomares & Delibes 1993). Lynx habitat also has these characteristics. Hence, because lynx kill mongooses, the most reasonable argument to explain why mongooses were so rare in the area used by lynx may be behavioral avoidance of this area by mongooses because of the risk of intraguild predation by lynx.

Litvaitis and Villafuerte also supported their argument with Oehler's (1995) study that apparently provides evidence that generalist predators (foxes and raccoons) increased as forest-dominated landscapes were fragmented by agriculture and human settlements in an area of the United States. In this study top predator extinction (gray wolf) could not be the reason for the increase of foxes.
and raccoons because wolves were extirpated nearly two centuries ago. However, decline or extinction of other potential intraguild predators of foxes and raccoons should also have been considered before speculating on the subject. For example, foxes and raccoons could be killed by coyotes (Rails & White 1995).

Finally, Litvaitis and Villafuerte believe higher rates of predation may have been the proximate cause of rabbit decline in the areas without lynx, but they again argue that this was a result of landscape change and not lynx absence, which would favor mongooses in these areas. The point of this argument is basically the same as their previous one—differences in predator densities between areas are the ultimate cause of the observed results. Of course it is the cause. However, they overlook that the overall predation rate on rabbits in each area (lynx absence and presence in our case) is the sum of the predation from lynx and mongooses. Because mongooses were in extremely low densities in the areas used by lynx, overall predation rates in these areas were lower than in areas without lynx. Therefore, the question of why mongooses did not use the areas with lynx arises.

We agree with Litvaitis and Villafuerte that top predators will become increasingly scarce and that some smaller predators (but mainly those that are both habitat and feeding generalists) may show population increases solely as a consequence of landscape alterations. However, the overall abundance of other, smaller predators that are victims of intraguild predation by top predators will also or only increase as a consequence of rarification of the latter. This will be especially obvious in habitats used by the top predators and that also support the highest game populations. Fortunately, the effect of intraguild predation on the enhancement of game populations is shown not only by our study (e.g., see Sovada et al. 1995). Conservationists and managers should use this information as a sound argument to preserve and improve populations of endangered top predators on still well conserved natural areas.

Literature Cited


