

LETTERS

Wolves' avoidance of flag barriers and management implications

Sir,

Leg-hold traps are the devices most commonly used by researchers to capture wolves. These traps can cause injury, as they cannot usually be monitored closely enough to prevent captured animals from struggling in them. In areas where guard dogs are not used, typical methods for controlling wolf predation on livestock are culling and building substantial or electric fences to exclude wolves. These methods have two major drawbacks – culling can threaten the population, and conventional fences are expensive and difficult to maintain.

Ironically, an ancient wolf-hunting technique may offer a cost-effective, reliable solution both for capturing wolves and to the problem of livestock predation. This technique, known as *fladry* and used to hunt wolves in Eastern Europe and Russia, consists of driving them into a bottleneck formed by 50x10 cm red flags hanging from ropes stretched above the ground. Okarma and Jedrzejewski (1997) employed an adaptation of this technique to livetrapping wild wolves. One of us (MM) has worked with Okarma and Jedrzejewski, and has witnessed that the application of *fladry* allows for a sudden intervention and sedation of captured wolves, which were never injured (Jedrzejewski *et al* in press).

In 1997-1998, we conducted a pilot study to assess: i) whether captive wolves living in the Rome Zoo responded to *fladry*; and ii) which characteristics made such flag barriers effective. We found that avoidance was maximal when the flags (regardless of their colour) were 50cm apart with the bottom edge at ground level. When positioned across wolf pacing trails, *fladry* barriers were never crossed. No crossings occurred even when the daily food ration was placed on the opposite side of such barriers. In short, our results suggest that

fladry is effective on captive wolves, at least for the time frame we tested (our tests lasted up to one hour).

Sutherland (1998) stressed the importance of adopting non-lethal means to reduce predation. He also mentioned creating habitat barriers that predators avoid crossing. Our experiments demonstrate *fladry*'s effectiveness at excluding wolves from food and confining wolves in limited spaces, at least temporarily. Therefore, we believe that the *fladry* technique has potential for wolf management. Further research may be needed to evaluate the use of *fladry* to protect livestock in areas where conflicts between wolves and shepherds exist (eg the Alps, the northwestern United States). In this respect, experimentation with semi-captive wolves may play an important role for the better understanding of the characteristics that make *fladry* effective.

M Musiani and E Visalberghi
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References

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Sir,

I have read Prof Broom's article in *Animal Welfare* 1999, 8: 205-228 in which he reviews the welfare of farmed mink.

I am somewhat surprised at his conclusion in which he writes 'xii) As summarized in conclusions..., there is considerable evidence of poor welfare in