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LETTER TO THE EDITOR . . .

On the use of Xylazine for field immobilization of Bighorn Sheep

I have read with interest the paper by Jorgenson et al. (1990, Journal of Wildlife Diseases 26: 522–527) on the use of xylazine for field immobilization of bighorn sheep (*Ovis canadensis*). I believe there are several statements in the article that need to be challenged.

First, the authors' comparisons with the study by Kock et al. (1987) are invalid. That study compared four different capture methods used on bighorn sheep. Three of the methods involved the use of a helicopter either to herd or chase sheep, and it would be impossible to evaluate the contribution of the helicopter to the degree of stress experienced. Most importantly, evaluation of these capture methods involved not only basic mortality data, but in companion papers, animals were classified in stress categories and various stress parameters were measured. This study concluded that darting from a helicopter (all of the immobilized sheep were darted from a helicopter) was more likely to stress bighorn and had a higher risk of mortality. No comparisons were made with the use of chemical immobilization methods on the ground. The sheep data collected in the 1987 study were from truly wild bighorn. I cannot think of many populations of bighorn sheep in California (and, for that matter, other wild ungulate species in Africa, for example) that would allow an individual to approach within 10 to 30 m unless they were habituated and "tame." The 1987 bighorn study concluded that the netgun was the least stressful method with the lowest mortality rate; this method requires helicopter pursuit. Pursuit by a helicopter elicits a flight response in wildlife species, probably very similar to that induced by a predator, but if it is done efficiently and rapidly (as with the case of netgunning) I do not believe that it compromises the animal to the extent that might be believed. I would suggest that the darting situation with the Jorgenson et al. (1990) study is very unusual, the exception rather than the rule.

Secondly, their article's most important message was that there is a reversal agent for xylazine. The advent of α-2 antagonists has made xylazine a much more useful drug for wildlife work but only, in my opinion, for the sedation of captive or confined wildlife species. The exception would be, as outlined by Jorgenson et al., with habituated and tame free-ranging species, but I have reservations about this application. Using very high doses of xylazine from a helicopter to immobilize wild bighorn would in my opinion be unethical and would invariably result in the death of the animal. I do not regard xylazine as a true immobilizing drug; very high doses (as demonstrated by Jorgenson et al.) are required to achieve a significant depth of anesthesia, and the adverse side effects are compounded at higher doses. Xylazine is most often used as an adjunct to other, powerful, immobilizing agents. These combinations are often synergistic and adverse side effects are reduced, compared to if these drugs were used alone.

Apart from the special circumstances where xylazine alone can be used, with a reversal agent, I do not believe, based on many years of experience, that xylazine can be recommended as a sole immobilizing agent. Besides there are several other drugs, such as the opioids, that can be used as the primary immobilizing agent, with the addition of xylazine. These combinations are far safer and more effective, with rapid induction (<5 min), and therefore less stress, to the animal. I temper this

statement with the knowledge that opioids are not always easy to obtain, especially if a wildlife worker is a non-veterinarian, and this emphasizes the need for reports such as Jorgenson et al.

Finally, I would be interested in data from the Jorgenson et al. study on the long-term survival (24 hr to 1 wk post immobilization) of bighorn immobilized with xylazine, prior to the development of α-2 antagonists.

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