



Horn Size and Nutrition in Mountain Sheep: Can Ewe Handle the Truth?

KEVIN L. MONTEITH, *Haub School of Environment and Natural Resources, Wyoming Cooperative Fish and Wildlife Research Unit, Department of Zoology and Physiology, University of Wyoming, 804 East Fremont St., Laramie, WY, USA 82072*

RYAN A. LONG, *Department of Fish and Wildlife Sciences, University of Idaho, 875 Perimeter Dr., MS 1142, Moscow, ID, USA 83844*

THOMAS R. STEPHENSON, *Sierra Nevada Bighorn Sheep Recovery Program, California Department of Fish and Wildlife, 787 North Main Street, Suite 220, Bishop, CA, USA 93514*

VERNON C. BLEICH, *Department of Natural Resources and Environmental Science, University of Nevada Reno, Mail Stop 186, 1664 North Virginia Street, Reno, NV, USA 89557*

R. TERRY BOWYER, *Institute of Arctic Biology, University of Alaska Fairbanks, 902 North Koyukuk Drive, Fairbanks, AK, USA 99775*

TAYLER N. LaSHARR, *Wyoming Cooperative Fish and Wildlife Research Unit, Department of Zoology and Physiology, University of Wyoming, Dept. 3166, 1000 E University Ave, Laramie, WY, USA 82071*

ABSTRACT: Horns, antlers, and other horn-like structures are products of sexual selection, confer reproductive advantages, and are heritable and honest indicators of individual quality. In addition, horns and antlers also garner substantial societal interest that, when combined with the powerful motivation to acquire trophy animals, likely has spawned a growing “hornographic” culture fixated on males with exceptional horn-like structures. Intensive harvest of large, fast-growing males, however, may have deleterious effects on the very trait being sought, which has led to considerable controversy in the popular and scientific literature. Mountain sheep, possibly the only large ungulate in North America managed almost exclusively as a trophy species, embody this controversy because of the emphasis on managing for large males. That controversy has led to polarizing views among scientists and stakeholders as to how mountain sheep should be managed. Our goal herein was to discuss the relative contributions of the key ecological and intrinsic factors that influence horn growth, how those factors might interact with harvest strategies, and identify what determinants of horn size are most amenable to management and most effective in achieving desired outcomes. Given the hyperbole surrounding trophy management and big horns, we suggest the importance of females in the management of bighorn sheep has been largely forgotten. Females play a critically important role, not just as the reproductive segment of the population responsible for producing young, but because maternal condition can produce life-long effects on size and growth of males (via maternal effects); and additionally, abundance of females, in turn, affects nutritional limitation within populations through density-dependent feedbacks. Ultimately, we call for greater recognition of the pervasive role of the ewe—and other female ungulates—in the production of trophy males and in contributions to population performance; and accordingly, that they be better integrated into harvest and management programs.



KEYWORDS Bighorn sheep; *Ovis canadensis*; horns; horn-like structures; nutrition; maternal condition; heritability; genetics.