

TEMPORAL GEOGRAPHIC VARIATION IN THE
LAMBING SEASON OF BIGHORN SHEEP

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Abstract

Temporal geographic variation in lambing seasons was statistically assessed for 22 populations, including 5 ecological races, of North American bighorn sheep (Ovis canadensis ssp.) from the Canadian National Parks (52°N) to western Texas (30°N). Throughout their distribution, bighorn lambing seasons occur coincident with the growing season when the environmental regime ameliorates neonate survival. Analyses generally demonstrate later and shorter lambing seasons in higher latitudinal populations. The inception of lambing occurs later with colder temperatures, increased snowfall, at higher latitudes and elevations, and with later and shorter growing seasons. Additionally, these trends evince a significant divergence ($P < 0.001$) in the mean onset and duration of lambing occurring between bighorn herds of the Sierra Nevada Mountains, California (37°N) and Desert National Wildlife Range, Nevada (36°N) as a result of two distinct, but adjacent environmental regimes. The greater importance of environmental variables to northern populations indicate that a brief, temporally recurrent growing season is the environmental constraint restricting the lambing season by selecting against offseason lambs. Southern bighorn protract their lambing seasons such that births occur, with certainty, in an interval subsequent to scant, erratic winter precipitation favoring lamb survival. Consequently, northern bighorn populations are less resilient to severe density independent perturbations and are, therefore, more likely to lose a major portion of a neonate cohort to environmental catastrophe during the lambing season.

QUESTIONS - RESPONSES

Shawn Stewart: I'm a little confused. What are you using as a definition for growing season?

Rick Thompson: Growing season is the number of days between dates where temperatures are above 32 degrees.

Jim Bailey: Just a comment about how this works in desert sheep. Sheep are also evolved to be highly social as part of their predator evasion strategy, it's part of their mechanism for transmitting home range when you look at an environment where home ranges consist of scattered suitable areas. Your social animals spreading your rutting season out; the best way of course is to spread your lambing season out, brings rutting rams, estrous ewes and lactating ewes together at the same time. There is some evidence that the harassment that results from that results in high lamb mortality. So you've got a selective force in the desert there that doesn't fit some of the biology of bighorns.

Rick Thompson: If I may make a comment on that subject. The kind of neat thing that Jack Turner has shown out there, as far as the physiology goes, in southern populations as in northern population you have segregation of rams and ewes at different time of the year. After the rutting season rams usually go off into more remote parts of the range. In southern populations the ram lambs, the lambs that were produced that year have an increase in serum testosterone level which more or less corresponds reproductive condition which lags behind that of adult males. These ram lambs remain with the ewe bands until they are 2 or 3 years of age; late estrous, older females and young females which have a more variable estrous season are therefore with these ram lambs, and that basically is how you get the protracted lambing. These ram lambs are breeding off-seasons ewes and extending the lambing season.

Jim Bailey: You're saying that the older rams have a more synchronized occurrence with the females; that the ram lambs are doing the breeding?

Rick Thompson: No. I'm saying the ram lambs are doing the off-season breeding after the rut occurs.