

THE BIOLOGY AND MANAGEMENT OF WILD RUMINANTS

CHAPTER SEVENTEEN

RANGE APPRAISALS AND EVALUATIONS OF ANIMAL RESPONSES

by

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## CHAPTER 17. RANGE APPRAISALS AND EVALUATIONS OF ANIMAL RESPONSES

The range is a dynamic place through the year. Its physical characteristics are changing, and its biological characteristics are changing. The animals that live there are also changing, resulting in constantly-changing relationships between animal and range.

Changes in animal-range relationships are generally synchronous through the annual cycle, with times of greater range productivity coinciding with times of greater animal productivity. This must be the case; one would certainly not expect high energy demands by the animal, such as during lactation, during a time of reduced or zero range productivity, as in winter.

Range appraisals and animal responses evaluated in this chapter are focused primarily on energy. Organisms must have positive energy balances if they are to be productive and contribute to the population. Young animals must have positive energy balances to grow; more energy must be ingested and metabolized than is dissipated through activity or heat loss or growth is impossible. When reproductive maturity is reached, more energy must again be ingested than is dissipated through activity and heat loss, or the production of new individuals is impossible.

Organisms experience short-term fluctuations in energy balances due to transient food and weather conditions. Wild ruminants are apparently well-adapted to such changes as their positive nutrient energy balances in late summer and fall result in rapid growth of the young and accumulations of fat by the older animals. They are adapted to potentially negative energy balances in winter by employing a metabolic depression to reduce the daily needs, and use the fat reserves to supplement limited forage resources as a source of energy.

Pregnant females have increased nutrient requirements in the last 1/3 to 1/4 of the gestation period when fetal growth is rapid. The timing of this increase in requirements in relation to the timing of the arrival of spring is critical. Early-arriving springs alleviate the potential and late-arriving springs prolong the potential for negative energy balances. These relationships are quantified in Moen (1978) and the effects of different times of arrival of spring on intake necessary to maintain positive energy balances illustrated.

Range appraisals and animal responses may be quantified rather easily with present knowledge, comparatively speaking. No longer is it necessary to look at a range and merely describe it as "good, fair, or poor." Now, its quality may be evaluated in relation to animal requirements, with an understanding of changes in these requirements and in the behavioral responses of animals through the year. It is impossible, to be sure, to be able to predict what will happen to a particular animal, herd, or population at a given time, but the patterns are understood, and the effects of changing range conditions known well enough to predict population responses.

The TOPICS and UNITS in this CHAPTER 17 include discussion of range conditions and animal responses to these conditions. Seasonal conditions are discussed, with references that describe particular range situations for the species considered listed. The UNITS in these TOPICS are formatted to evaluate "profiles," or range conditions and animal responses at a point in time, permitting one to evaluate heat loss calculations and metabolic responses more easily. It is hoped that this format will promote thinking about productivity over the year, emphasizing again the importance of time in ecological relationships.

#### LITERATURE CITED

Moen, A. N. 1978. Seasonal changes in heart rates, activity, metabolism, and forage intake of white-tailed deer. J. Wildl. Manage. 42(4): 715-738.

#### REFERENCES, CHAPTER 17

##### RANGE APPRAISALS AND EVALUATIONS OF ANIMAL RESPONSES

##### BOOKS

TYPE	PUBL	CITY	PAGE	ANIM	KEY WORDS-----	AUTHORS/EDITORS--	YEAR
aubo	lefe	phpa	308	----	intro to environ physiolog	folk,ge,jr	1966
edbo	usup	lout	155	----	ecol energetics of homeoth	gessaman,ja	1973
edbo	acpr	nyny	278	----	v.3 sp aspects of thermorg	whittow,gc,ed.	1973
aubo	whfr	sfca	488	----	intro to biophys plant phy	nobel,ps	1974
edbo	uppr	bama	326	----	environmental physiology	robertshaw,d,ed.	1974
edbo	oxup	loen		----	physiological anthropology	damon,a,ed.	1975
edbo	spve	nyny	609	----	perspectives, biophys ecol	gates,dm; schmerl	1975
edbo	spve	nyny	339	----	primary prod of the biosph	lieth,h; whittake	1975
aubo	blsp	oxen	273	----	intro to physiol plant eco	bannister,p	1976
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