THE BIOLOGY AND MANAGEMENT OF WILD RUMINANTS

CHAPTER TWELVE

FORAGE CONSUMPTION BY WILD RUMINANTS

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CONTENTS OF CHAPTER TWELVE

FORAGE CONSUMPTION BY WILD RUMINANTS

TOPIC 1. FOOD HABITS AND PREFERENCES 3
UNIT 1.1: FOOD HABITS 5
UNIT 1.1: REFERENCES 5
UNIT 1.2: PREFERENCES 15
UNIT 1.2: REFERENCES 18

TOPIC 2. OBSERVED FORAGE CONSUMPTION AND PASSAGE RATES 25
UNIT 2.1: FORAGE CONSUMPTION 27
UNIT 2.1: REFERENCES 27
UNIT 2.2: PASSAGE AND TURNOVER RATES 31
UNIT 2.2: REFERENCES 31

TOPIC 3. CALCULATIONS OF FORAGE REQUIRED, ENERGY BASE 33
UNIT 3.1: EFFECTS OF VARIATIONS IN DIETARY ENERGY 35
UNIT 3.1: REFERENCES 35
UNIT 3.2: EFFECTS OF VARIATIONS IN ECOLOGICAL METABOLISM 37
UNIT 3.2: REFERENCES 39
UNIT 3.3: EFFECTS OF SEASONAL VARIATIONS IN ENERGY RESERVES . . . 41
UNIT 3.3: REFERENCES 42
UNIT 3.4: NOMOGRAPHIC PREDICTIONS OF FORAGE REQUIRED, ENERGY BASE 45
UNIT 3.4: REFERENCES 46

TOPIC 4. CALCULATIONS OF FORAGE REQUIRED, PROTEIN BASE 49
UNIT 4.1: EFFECTS OF VARIATIONS IN DIETARY PROTEIN 51
UNIT 4.1: REFERENCES 51
UNIT 4.2: EFFECTS OF VARIATIONS IN PROTEIN REQUIREMENTS 53
UNIT 4.2: REFERENCES 55
UNIT 4.3: EFFECTS OF SEASONAL VARIATIONS IN UREA RECYCLING 57
UNIT 4.3: REFERENCES 58
UNIT 4.4: NOMOGRAPHIC PREDICTIONS OF FORAGE REQUIRED, PROTEIN BASE 61
UNIT 4.4: REFERENCES 62

TOPIC 5. CALCULATIONS OF FORAGE REQUIRED, MINERAL BASE 65
UNIT 5.1: EFFECTS OF VARIATIONS IN DIETARY MINERALS 65
UNIT 5.1: REFERENCES 65
UNIT 5.2: EFFECTS OF VARIATIONS IN MINERAL REQUIREMENTS 67
UNIT 5.2: REFERENCES 67
UNIT 5.3: EFFECTS OF SEASONAL VARIATIONS IN MINERAL RESERVES . . . 69
UNIT 5.3: REFERENCES 69
UNIT 5.4: NOMOGRAPHIC PREDICTIONS OF FORAGE REQUIRED, MINERAL BASE 71
UNIT 5.4: REFERENCES 71

CLOSING COMMENTS 73

CONTENTS continued on the next page

GLOSSARY OF SYMBOLS USED 75

GLOSSARY OF CODENS 77

LIST OF PUBLISHERS 79

LIST OF WORKSHEETS 81

JULIAN CALENDAR 82

CHAPTER 12. FORAGE CONSUMPTION BY WILD RUMINANTS

Forage consumption by free-ranging ruminants must be in balance with their nutrient requirements if the animals are to fulfill their ecological roles as productive members of a population. Nutrient requirements are dependent on the metabolic requirements for maintenance, activity, and production. Since these requirements vary during the annual cycle, the nutrients required vary, and are dependent on several factors of ecological importance. Since forage characteristics--cell wall and cell soluble fractions and digestibilities--also vary through the annual cycle, variations in consumption are due to variability in both nutrients required for metabolism and in the quality of the nutrients themselves.

It is obvious that forage consumption is affected by a number of variables. Seasonal variations in weights--an individual may vary as much as 30 percent or more--were discussed in CHAPTER 1, UNIT 1.4. Topography affects the cost of activity; very hilly land demands larger expenditures of energy for movement (CHAPTER 7, UNIT 4.3). The amounts of body reserves present (CHAPTER 2, UNIT 2.1) affect the amounts of forage that are necessary: metabolized fat reduces the need for ingested energy. Weather factors and subsequent heat losses modify behavior and metabolism, altering the amounts of forage that are necessary to meet metabolic needs. Thermal energy balances are discussed in CHAPTER 16.

Forage consumption necessary to meet nutrient requirements may be calculated with a formula in which the nutrients required is the numerator and the nutrients supplied by the forage, depending on the gross composition and digestibility of the forages, is the denominator. The basic formula for calculating forage consumption (FGCP) is:

FGCP = nutrients required by the herbivore/nutrients in the forage

The intake of pen-fed domestic ruminants is subject to direct control by the farmer. Indeed, least-cost analyses, balanced feeding, and other recently-developed feeding programs for domestic animals are based on nutrients required and supplied by different feeds, with cost factors considered in formulating rations. The intake of free-ranging animals is not subject to direct control by a farmer, rancher, or wildlife manager but is related to seasonal variations in nutrients required by the animals, and to seasonal variations in nutrients supplied by the plants. The free-ranging situation is much more complex than the pen-fed one, and the calculations of forage requirements are more challenging.

At this point some very pertinent questions may be asked. How much do we know about the chemical interaction between wild ruminants and their environments? What does the environment contain chemically, and of what values are the different components to the animals? Do greater chemical differences exist between plant species than between populations of the same species on different soils? How much selectivity do different species of wild ruminants exhibit while foraging, or is foraging a random event that results in different species being ingested just because they are dispersed throughout the habitat?

The answers to the above questions are neither simple nor straight forward. As is true of most, if not all, biological situations, there is no single and absolute conclusion that is true in every situation. Species differences per se between plants may be greater than differences due to soil effects. Such answers may be available as a result of research in soils and agronomy. Wild ruminants do select some species, but a random element is very likely present also. The mechanisms for this are not well known since very little is known about chemical interactions between animals and their environments. This is particularly true for game species since the emphasis has been on applied problems of immediate concern. The descriptive approaches usually used may be adequate for identifying the existence of a given relationship, but they do not necessarily yield an understanding of the functioning organism in its very complex environment.

We can conclude that very little is known about chemical interactions between wild ruminants and their environments. We are beginning to understand the requirements of the animals, and how well the environment supplies them, at least in a general way. We know that there are chemical differences between plant species, and we know that there are differences in the chemical characteristics of the soil. We know that wild ruminants have preferences for certain forage species, but that preference lists are not constant between different geographical areas. More information is needed before the functioning organism in its very complex environment is understood, and our information needs will be more clearly identified as we analyze the animal-environment relationship more comprehensively.

The basic relationships between nutrients required and nutrients supplied may be applied to a particular nutrient by using units of energy, mass, and time. The factors affecting these basic relationships are discussed in the TOPICS that follow, beginning with TOPIC 1: FOOD HABITS AND PREFERENCES, and then considering TOPIC 2: OBSERVED CONSUMPTION, followed by CALCULATIONS OF DAILY CONSUMPTION, ENERGY BASE (TOPIC 3); PROTEIN BASE (TOPIC 4); and MINERAL BASE (TOPIC 5).

REFERENCES CHAPTER 12

FORAGE CONSUMPTION BY WILD RUMINANTS

BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS----------	AUTHORS/EDITORS--	YEAR
aubo	hocl	loen	556	cerv	deer stalking ground, brit	whitehead,gk	1960
edbo	nhfg	conh	256	odvi	whte-taild deer of nw hamp	siegler,hr,ed	1968
edbo	blsp	oxen	477	anim	anim pops reln food resour	watson,a,ed	1970
aubo	whfr	sfca	458	wldl	wildlife ecology	moen,an	1973
edbo	iucn	mosw	759	ungu	behav reltn to mgt, 2 vols	geist,v,ed; walth	1974
edbo	crcp	cloh			handbk series, nutr & food	rechcigl,m,jr,ed	1977