

INTRODUCTION

TO PART III

PHYSIOLOGY AND METABOLISM OF WILD RUMINANTS

Physiology is an often-overlooked aspect of the ecology of an individual or a species. Yet, no behavioral act, no maintenance activity, or no productive process can occur without basic physiological processes.

The first two PARTS of this book have included descriptions of physical and chemical characteristics (PART I) and behavior (PART II). Both contained factual information based on observations on many different species. PART III is directed more toward the functional characteristics of various systems, emphasizing the processes rather than the products of life functions.

Understanding of the functions and metabolic processes described in the next five CHAPTERS is very important for an understanding of productivity. Energy metabolism, possible only with a supply of digestible nutrients, is a fundamental characteristic of life itself, as gastrointestinal functions convert range forage energy into chemical forms that can be metabolized for maintenance and production.

Various systems of the body perform specific functions; these are discussed in CHAPTER 6: SYSTEMS PHYSIOLOGY. Metabolic processes, including ENERGY METABOLISM (CHAPTER 7), PROTEIN METABOLISM (CHAPTER 8), and MINERAL, WATER, AND VITAMIN METABOLISM (CHAPTER 9) support the functions of the systems, providing the nutrients and enzymes necessary for tissue maintenance and production. Deviations from normal metabolic functions are discussed in CHAPTER 10: FACTORS AFFECTING THE PHYSIOLOGY AND METABOLISM OF WILD RUMINANTS.

Some of the topics in these CHAPTERS are discussed in only a general way because there are no specific data available for any species of wild ruminants. In some cases, domestic ruminants have been studied intensively and the basic principles applied to wild ruminants.

There is an emphasis, whenever possible, on mathematical expressions of basic measurements in order to relate these physiological characteristics to other ecological functions. The use of mathematics to evaluate inter-relationships increases as more functions of ecological importance are evaluated together. Ecological accounting is very important, and physiological processes, especially metabolism, are very well suited for mathematical expressions and ecological accounting.

The necessary reference information, including a glossary of symbols used, glossary of code names for the serials, and list of publishers is given at the end of each chapter. A Julian Day Calender is provided at the ends of those chapters which include time-related calculations.

The lists of REFERENCES, PART III, that follow provide essential bibliographic information for books and articles containing general information on several biological characteristics. These general references will be helpful in many of the UNITS that follow, but they are not listed again after each UNIT as the UNIT lists are limited to more specific articles of direct application to the material discussed in each UNIT.

REFERENCES, PART III

PHYSIOLOGY AND METABOLISM OF WILD RUMINANTS

BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS-----	AUTHORS/EDITORS---	YEAR
aubo	repu	nyny	1023		bioenergetics and growth	brody,s	1945
aubo	mhbc	nyny	895		a text of general physiol	mitchell,ph	1956
aubo	saco	phpa	1180		textbook of mediocl physio	guyton,ac	1961
aubo	moco	slmo	547		textbook of physiology	tuttle,ww; schotte	1961
aubo	jwis	nyny	468		textbook of comparat endoc	gorbman,a	1962
aubo	saco	phpa	535		body cell mass, suppor env	moore,fd; oleson,/	1963
edbo	mhbc	nyny	1427		hawk's physiological chemi	oser,bl,ed	1965
edbo	saco	phpa	1308		clinical diagn, lab method	davidsohn,i; henry	1969
edbo	orpr	nute	522		energy metabol, farm anima	blaxter,kl; kielan	1969
edbo	lefe	phpa	402		animal growth and nutritio	hafez,ese;dyer,ia	1969
edbo	acpr	nyny	439		clinical biochem, dom anim	kaenko,jj; corneli	1970
edbo	coup	itny	1463		duke's physiol of dom anim	swenson,mj,ed	1970
edbo	acpr	nyny	352		clin bioch of dom anim,	v2 kaenko,jj; corneli	1971
edbo	lefe	phpa	573		textbook of veterin physio	breazile,je,ed	1971
aubo	lmepl	llca	648		review of physiolog chemis	harper,ha	1977
aubo	rokp	loen	597	cerv	deer of g. britain, irelan	whitehead,gk	1964
aubo	huho	nyny	426	od--	deer, antelope of america	caton,jd	1877
edbo	stac	hapa	668	od--	deer of north america	taylor,wp	1956
aubo	stac	hapa	128	od--	if deer are to survive	dasmann,w	1971
aubo	vipr	nyny	194	od--	deer of the world	whitehead,gk	1972
aubo	omcc	eail	107	odvi	the white-tailed deer	madson,j	1961
edbo	nhfg	conh	256	odvi	the white-tai deer, new ha	siegler,hr	1968
aubo	ucap	beca	567	odhe	a herd of mule deer	linsdale,jm; tomic	1953
aubo	oxup	loen	215	ceel	herd of red deer, behavior	darling,ff	1937
aubo	stac	hapa	386	ceel	elk of north america	murie,oj	1959
aubo	wiwe	eail	125	ceel	the elk	madson,j	1966
aubo	ucap	beca	209	ceel	tule elk	mccullough,dr	1971
aubo	utop	toon	280	alal	north american moose	peterson,rl	1955

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS-----	AUTHORS/EDITORS---	YEAR
aubo	macm	nyny	300	rata	bar-gr car of north canada pike,w		1892
aubo	ukap	laka		rata	bar-ground carib, keewatin harper,f		1955
aubo	qupr	oton	339	rata	migratory, barren-ground c kelsall,jp		1968
aubo	stac	hapa	238	anam	the pronghorn antelope	einarsen,as	1948
aubo	utop	toon	957	bibi	the north american buffalo roe,fg		1951
aubo	thcr	nyny	242	bibi	the buffalo	haines,f	1970
aubo	aakn	nyny	339	bibi	time of the buffalo	mchugh,t	1972
aubo	swap	atoh	374	bibi	the buffalo book, saga ani dary.d		1974
aubo	uchp	chil	383	ov--	mt sheep, behavior, evolut geist,v		1971
aubo	coup	itny	248	ov--	mt sheep, man, norther wil	geist,v	1975
aubo	usgp	wadc	242	ovca	the bighorn of death valley	welles,re; welles	1961
aubo	qupr	oton	166	obmo	muskoxen in canada	tener,js	1965
aubo	dalt	laen	271	dada	fal de: histor, distr, bio	chapman,d; chapman	1975
aubo	doup	nyny	318	many	americ anim; popular guide	stone,w; cram,we	1902
aubo	cscs	nyny	347	many	our big game	huntington,d	1904
aubo	cscs	nyny	1267	many	life hist northern animals	seton,et	1909
aubo	ropr	nyny	129	many	wildlife in alaska, ecolog	leopold,as; darlin	1953
edbo	holt	nyny	264	many	records of n a big game	boone & crockett c	1958
aubo	ropr	nyny	547	many	mammals of north america	hall,er; kelson,kr	1959
aubo	ucap	beca	586	many	wildlife of mexico	leopold,as	1959
aubo	vipr	nyny	304	many	wildlife in america	matthiessen,p	1959
aubo	repn	nyny	335	many	principals of mammalogy	davis,de; golley,f	1963
aubo	blsp	loen	308	many	guide, study of productivi	golley,fb; buechne	1968
aubo	jhpr	bamd	769	many	mammals of the world	walker,ep; paradis	1968
aubo	whfr	sfca	458	many	wildlife ecology	moen,an	1973
aubo	utop	toon	438	many	the mammals of canada	banfield, awf	1974
aubo	repn	nyny	1023	dome	bioenergetics and growth	brody,s	1945
edbo	coup	itny	1463	dome	duke's physiol domest anim	swenson,mj	1970

SERIALS

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
MDCBA	5---- 1 64 odvi w-tailed deer of minnesota erickson,ab; gunv	1961	
MDCRA	14--- 1 80 odvi michigan white-tailed deer jenkins,dh; bartl	1959	
WCDBA	14--- 1 282 odvi white-tailed deer, wiscons dahlberg,bl; guet	1956	

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
AZWBA	3---- 1 109 odhe in arizona chaparral	swank,wg	1958
CFGGA	8---- 1 163 odhe life hist, managmnt, calif taber,rd; dasmann	1958	

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
UCPZA	88--- 1 209 ceel tule elk: hist, behav, eco mccullough,dr	1969	
WLMOA	16--- 1 49 ceel status, ecol, roosevel elk harper,ja; harn/	1967	
WLMOA	24--- 1 66 ceel the sun river elk herd knight,rr	1970	

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
NCANA	101-- 1 436 alal ecol, proc inter sym, pt 1 bedard,j	1974	
NCANA	101-- 437 735 alal ecol, proc inter sym, pt 2 bedard,j	1974	

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
BPURD	2---- 1 215 rata ecol, caribou, prudhoe bay white,rg; thomso/	1975	
CWRSB	38--- 1 71 rata biology, kaminuriak popula dauphine,tc,jr	1976	
UABPA	8---- 1 82 rata ecology, managment, sweden skunke,f	1969	

CODEN	VO-NU BEPA ENPA GENS SPEC KEWO-----	AUTHORS-----	YEAR
WMBAA	10A-- 1 79 rata prelim investigation, pt 1 banfield,awf	1954	
WMBAA	10B-- 1 112 rata prelim investigation, pt 2 banfield,awf	1954	
WMBAA	12--- 1 148 rata caribou, continued studies kelsall,jp	1957	
WMBAA	15--- 1 145 rata barrn gr carib, coop study kelsall,jp	1960	

CODEN VO-NU BEPA ENPA GENS SPEC KEWO-----				AUTHORS-----	YEAR
AMNAA 43--2	257	354	anam life hist, ecology, texas	buechner,hk	1950
JOMAA 3----	82	105	anam the prong-horn	skinner,mp	1922

CODEN VO-NU BEPA ENPA GENS SPEC KEWO-----				AUTHORS-----	YEAR
AMNAA 24--3	505	580	ov-- distribut, variat, no amer	cowan,imct	1940
AZWBA 1----	1	153	ov-- desert bighorn	russo,jp	1956
WLMOA 4----	1	174	ov-- united sta, past to future	buechner,hk	1960

CODEN VO-NU BEPA ENPA GENS SPEC KEWO-----				AUTHORS-----	YEAR
AMNAA 56--2	297	324	ovca ecology of mountain sheep	mccann,lj	1956
WGFBA 1----	1	127	ovca wyoming bighorn study	honess,rf; frost,	1942
XNFSA 6----	1	242	ovca th bighorn of death valley	welles,re; welles	1961

CODEN VO-NU BEPA ENPA GENS SPEC KEWO-----				AUTHORS-----	YEAR
CAFNA 81--1	1	22	oram observat, brit col, canada	holroyd,jc	1967
CGFPA 8----	1	23	oram liter review on ecology of	hibbs,ld	1966

CODEN VO-NU BEPA ENPA GENS SPEC KEWO-----				AUTHORS-----	YEAR
NATUA 221--	59	60	dada geographi var, fallow deer	chapman,di; chapm	1969

OTHER PUBLICATIONS

Proceedings of the White-tailed Deer in the Southern Forest Habitat Symposium

Transactions of the Annual Meeting of the Northeast Deer Study Group (Annual meeting beginning 1964)

Proceedings of the North American Moose Conference (Vol. 5, 1968)

Proceedings of the International Reindeer/Caribou Symposium (First meeting in 1977, second in 1980)

Proceedings of the Biennial Antelope States Workshop

Transactions of the Interstate Antelope Conference

Transactions of the North American Wild Sheep Conference- (Second meeting in 1976)

Transactions of the Desert Bighorn Council (Annual meeting beginning 1957)

Proceedings of the International Mountain Goat Symposium

Proceedings of the Annual Conference of Western Association of State Game & Fish Commissioners (Annual conference beginning 1921)

LIST OF PUBLISHERS - PART III

aakn	Alfred A. Knopf	New York	ny
acpr	Academic Press	New York	ny
blsp	Blackwell Scientific Publications	London	lo
coup	Cornell University Press	Ithaca, NY	tny
cscs	Charles Scribner's Sons	New York	ny
dalt	Dalton	Lavenheim, England	lae
dipr	Dial Press, The	New York	ny
dohr	Dowden, Hutchinson & Ross	Stroudsburg, PA	stpa
doup	Doubleday, Pace, & Co.	New York	ny
hocl	Hollis & Carter Ltd.	London	lo
huho	Hurd Houghton	New York	ny
holt	Holt	New York	ny

Publishers continued on the next page

jhpr	John Hopkins Press	Baltimore, MD	bamd
jwis	John Wiley and Sons, Inc.	New York	nyny
lefe	Lea and Febiger	Philadelphia, PA	phpa
lmepl	Lange Medical Publishers	Los Altos, CA	llca
macm	MacMillan Co.	New York	nyny
mhbc	McGraw-Hill Book Co., Inc.	New York	nyny
moco	C. V. Mosley Company	St. Louis, MO	salo
nhfg	New Hampshire Fish & Game Dept.	Concord, NH	conh
omcc	Olin Mathieson Chem. Corp.	E. Alton, IL	eail
orpr	Oriel Press	Newcastle Upon Tyne, Eng.	nute
oxup	Oxford University Press	London	loen
qupr	Queen's Printer	Ottawa, Canada	oton
ropr	Ronald Press	New York	nyny
repul	Reinhold Publishing	New York	nyny
rokp	Routledge & K. Paul	London	loen
saco	Saunders Publishing Company	Philadelphia, PA	phpa
stac	The Stackpole Company	Harrisburg, PA	hapa
swap	Swallow Press	Athens, OH	atoh
thcr	Thomas Crowell Co.	New York	nyny
ucap	University of California Press	Berkely, CA	beca
uchp	University of Chicago Press	Chicago, IL	chil
ukap	University of Kansas Press	Lawrence, KA	laka
utop	University of Toronto Press	Toronto, Ontario	toon
usgp	U. S. Government Printing Office	Washington D. C.	wadc
vipr	Viking Press	New York	nyny
wbsc	W. B. Saunders Co.	Philadelphia	phpa
whfr	W. H. Freeman Co.	San Francisco, CA	sfca
wiwe	Winchester-Western Press	East Alton, IL	eail

GLOSSARY OF CODE NAMES, PART III

Code names (CODEN) of Serials are defined in a GLOSSARY OF CODENS at the end of each CHAPTER. The GLOSSARY below includes the CODENS listed as Serials in this PART I. It is a miniature version of the lists given at the ends of CHAPTERS.

- AMNAA American Midland Naturalist
AZWBA Arizona Game and Fish Department Wildlife Bulletin

BPURD Biol. Pap. Univ. Alaska Spec. Rep.

CAFNA Canadian Field Naturalist
CFGGA California Department of Fish and Game, Game Bulletin
CGFPA Colorado Division of Game, Fish, and Parks Special Report
CWRSB Canadian Wildlife Service Report and Management Bull. Series

JOMAA Journal of Mammalogy

MDCBA Minnesota Department of Conservation Technical Bulletin
MDCRA Michigan Department of Conservation Game Division Report

NATUA Nature
NCANA Naturaliste Canadien, Le

UABPA Proceedings of the Utah Academy of Sciences, Arts and Letters
UCPZA University of California Publications in Zoology

WCDBA Wisconsin Department of Natural Resources Technical Bulletin
WGFBA Wyoming Game and Fish Commission Bulletin
WLMOA Wildlife Monographs
WMBAA Wildlife Management Bulletin

XNFSA U S National Park Service Fauna of the National Parks of the
United States, Fauna Series