TOPIC 6. SKELETAL SYSTEM FUNCTIONS

The skeleton of vertebrates provides support for the entire body, more or less rigid places for the attachment of muscles, and protection for some of the vital organs. Joints or articulations are present in two main kinds: immovable joints, as in the skull, and movable ones, as in the limbs. The skeleton plus the musculature provides the basic form of the animal's body which results in animals of grace and beauty, attractive to nearly all persons.

The skeleton has important seasonal functions as it is a storage reservoir for animals for mobilization during periods of rapid antler growth. Skeletal remains are also useful for determining mortality of sex and age groups.

UNIT 6.1: THE SKELETON AS SUPPORT

One of the main functions of the skeleton is body support, which is attained as a result of the rigidity of the bones and the muscle tone and contractions that result in various postures. Skeletal support charcteristics are of importance when evaluating details of locomotion, and the anatomical characteristics that affect relationships between animal and range, such as the effects of snow and forage distributions and availability. Support functions themselves are not analyzed further in this UNIT; anatomical measurements were discussed in CHAPTER 1, and the effects of range conditions on animals in CHAPTER 17.

REFERENCES, UNIT 6.1

THE SKELETON AS SUPPORT

SERIALS

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

CATRB 12--4 323 330 cerv cyclic bone remodeling dee hillman,jr; davi/ 1973

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

JOMAA 50--2 302 310 odvi alal, stuctur adapta, snow kelsall,jp 1969

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
CJZOA	41--4	629	636	odhe	age determ, ossif, long bo	lewall,ef; cowan,	1963
CAFGA	41--4	327	346	odhe	dosh, dogo, skeletal diffe	hildebrand,m	1955
CAFGA	42--1	15	21	odhe	odvi, pelv girdl, rel, sex	taber,rd	1956
JOMAA	45--2	226	235	odhe	rang-rel gro dif, sk ratio	klein,dr	1964

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JOMAA	37--1	129	129	ceel	healing, fractured leg bon	gilbert,pf; hill,	1956
JWMAA	30--2	369	374	ceel	bone char assoc with aging	gilbert,pf; hill,	1956

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JOMAA	50--2	302	310	alal	odvi,structur adapta, snow	kelsall,jp	1969

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
ATICA	19--2	111	113	rata	functio brow tine, caribou	pruitt,wo	1967
UABPA	18---	1	41	rata	mechanics, energy, crateri	thing,h	1977

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				anam			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				bibi			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				ovca			

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

ovda

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

obmo

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

oram

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

AMNTA 113-- 103 122 mamm scal. skel mass, body mass prange,hd; ander/ 1979

UNIT 6.2: THE SKELETON AS A STORAGE RESERVOIR

The skeleton serves as an important storage reservoir of nutrients that can be mobilized when nutrient intake is not sufficient to meet current metabolic demands. Two particularly good examples of this situation are at the time of antler growth and when energy demands are higher than metabolizable energy intake in the diet.

Minerals. The accumulation of minerals in the skeletal system for mobilization during antler growth is probably necessary for such rapid rates to be possible. Phosphorous and calcium are mobilized from the ribs and long bones for deposition in the antlers of white-tailed deer and this basic physiological process is very likely characteristic of all of the ruminants that shed their antlers each year.

Marrow. Bone tissue is very much alive and active, though the calcified tissue is rigid and often encloses more active, spongy tissue. The marrow inside of the shafts of the long bones contains blood at all times, and a rather high fat content when range conditioNs are good enough to result in a positive energy balance by the animal. The fat contents of the femur is often used as an indicator of the physical condition of an animal, and its stability permits one to estimate the season of death when dead animals are found in the spring. Animals not found during the hunt can be distinguished from those that died as a result of poor nutrition in the winter.

REFERENCES, UNIT 6.2

THE SKELETON AS A STORAGE RESERVOIR

SERIALS

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JOMAA	31--2	5	17	odvi	weight relations, georg re	hamerstrom,fm,jr/	1950
JWMAA	9---4	319	322	odvi	symptoms of malnutrition	harris,d	1945
JWMAA	29--2	397	398	odvi	kidney, marrow fat, condit	ransom,ab	1965
NFGJA	21--1	67	72	odvi	physical condition of whit	monson,ra; stone/	1974
NYCOA	3---5	19	22	odvi	bone marrw index of malnut	cheatum,el	1949
PCGFA	26---	57	68	odvi	var fat levl, mandib cavit	nichols,rg; pelt	1972
PSEBA	129--	733	737	odvi	calcium strontium age antl	cowan,rl; hartso/	1968

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JOMAA	45--2	252	259	odhe	density studies, body fat	whicker,fw	1964
JOMAA	52--3	628	630	odhe	tiss, organ, tota body mas	hakonson,te; whic	1971
JWMAA	36--2	579	594	odhe	indice, carc fat, colo pop	anderson,ae; med/	1972
JWMAA	41--1	81	86	odhe	exp starva, recovery, does	decalesta,ds; na/	1977
WAEBA	589--	1	6	odhe	the mule deer carcass	field,ra; smith,/	1973
WLMOA	39---	1	122	odhe	carcas, bone, organ, gland	anderson,ae; med/	1974

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JSFAA	22--1	29	33	ceel	fatty-acid compos, adipose	garton,ga; duncan	1971
JWMAA	30--1	135	140	ceel	measurements, weight relat	blood,da; lovaas,	1966
JWMAA	32--4	747	751	ceel	fat content, femur marrow	greer,kr	1968
MAMLA	35--3	369	383	ceel	demog, fat res, bod sz, nz	caughley,g	1971
WAEBA	594--	1	8	ceel	the elk carcass	field,ra; smith,/	1973

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
AZOFA	12--2	148	155	alal	fatty-acid compos, org fat	tanhuanpaa,e; pul	1975
JWMAA	40--2	336	339	alal	marrow fat, mortali, alask	franzmann,aw; arn	1976

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
CBCPA	30--1	187	191	rata	fatty acid comp bone marow	meng,ms; west,gc/	1969
CBPAB	56--3	337	341	rata	liver, bone, bone marrow	bjarghov,rs; jac/	1977
FUNAA	23...	106	107	rata	fat deposits, svalbard dee	oritsland,na	1971
JWMAA	34--4	904	907	rata	wt, dried marrow femur fat	neilans,ka	1970
NJZOA	24--4	407	417	rata	morph, fat stor, org weigh	krog,j; wika,m; /	1976
PASCC	22---	14	14	rata	water flux, climate, nutri	cameron,rd; luic/	1971
TNWSD	28---	91	108	rata	phys var, condit, b g cari	dauphine,tc,jr	1971

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JANSA	33--1	309	309	anam	carbonyl analysis of fat	booren,a; field,/	1971
JDSCA	38---	1344	1344	anam	major chemi compos, bovine	reid,jt; wellin/	1955
JOMAA	56--3	583	589	anam	seas tren in fat lev, colo	bear,gd	1971
WAEBA	575--	1	6	anam	pronghorn antelope carcass	field,ra; smith,/	1972

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
JOMAA	26--2	305	308	bibi	the lipids in bison bison	wilbur,dg; gorski	1955

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				ovca			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
CBCPA	50b-4	599	601	ovda	fatty acid comp bone marrw	west,gc; shaw,dl	1975

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				obmo			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
				oram			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
CJZOA	49--8	1159	1162	many	comp, adipose tiss triglyc	garton,ga; dunca/	1971

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
ATRLA	18-11	209	222	caca	drssng %, body comp, calor	weiner,j	1973