





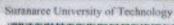




KEVIN POND AND WILSON POND











Introduction to ANIMAL SCIENCE

CONTENTS

Preface

SECTION ONE

CHAPTER I FOOD PRODUCTION	
Historical Perspective	1
Human Population Growth	2
Role of Research and of Land, Water, Soil, and	
Energy Resources	4
Food Consumption	9
Who Produces the Food?	16
Summary	18
CHAPTER 2 DOMESTIC ANIMALS	**************************************
An Overview of the Contributions of Domestic Animals	20
Food from Animals	22
Animal Byproducts	23
Pharmaceuticals and Therapeutic Agents	25 25
Companionship and Pleasure	
Faithful Stewards	27
Draft Power and Transportation	28
Manure, Crop Residues, and Food Processing Wastes	28
Biomedical Research	31
Summary	31

CHAPTER 3 ANIMAL AGRICULTURE IN THE U STATES AND THE WORLD		NITED 33	
Historical Pers		33	
Animal and Crop Production Profiles in the World Animal and Crop Production Profiles in the United States			
Agriculture		49	
Summary		50	
SECTION TW	0		
CHAPTER 4	REPRODUCTION	52	
-	lormones and Their Functions	53	
_	Reproduction and Their Functions	54	
-	of Reproduction and Their Functions	59	
The Estrous Cy	cle	63	
Pregnancy		65	
Parturition Artificial Insem	instian	67 69	
Estrus Detectio		72	
Estrus Synchro		72	
Fertilization		7 3	
Embryo Transf	er	74	
Summary		76	
CHAPTER 5	LACTATION	81	
The Mammary	Gland	81	
Milk Synthesis	and Secretion	84	
Colostrum		86	
Milk Compositi		87	
Milk Production		90	
Metabolic Cost	of Lactation	95	
Summary		96	
CHAPTER 6	GENETICS	99	
Introduction		99	
Genes and Chr	omosomes of the Cell	100	

-	ay'eu		-	in		(in
CO	N	т	Ē	N	т	5

Mitosis	•	106
Meiosis		106
Fertilization an	- · 	107
Dominant and F	Recessive Alleles for a Single Trait: Six	
Possible Outcom		109
Types of Gene A		110
Quantitatively I	nherited Traits	112
Selection		113
Mating Systems		116
Molecular Gener	tics	119
Summary	·	122
CHAPTER 7	GROWTH	127
Methods of Exp	ressing Growth	128
	a Measure of Growth	129
	pertrophy, and Differentiation	131
Growth of Brain	, Skeleton, Muscle, and Adipose Tissue	134
Strategies for R	egulating Growth	140
Growth of Place	nta, Fetus, and Mammary Tissues in	
Mammals and E	mbryo in Birds	140
Summary		144
CHAPTER 8	NUTRITION AND FEEDING	146
Nutrients		147
The Gastrointes	tinal Tract: Structure, Digestion,	
and Absorption		176
	g Feed Consumption	182
Feeds and Feedi	ng	183
Summary		196
SECTION THE	REE	
CHAPTER 9	THE RESERVE TO SELECTION OF THE PROPERTY OF TH	Kramanaria dalah Malahili Malahili Assa Assa
	ANIMAL NEEDS	212
Space and Place		213
Thermal Enviror	ıment	214

Light Environment

Environmental Effects on Animal Health

vii

219

222

Air Pollution in Animal Houses	224
Effects of High Altitude	224
Animal-Human Interactions	225
Animal Accommodations	226
Assessing Environmental Quality	229
Summary	230
CHAPTER 10 ANIMAL STATES-OF-BEING	232
Domestication and Adaptability	232
Multifaceted Internal and External Environments	232
Environmental Adaptability	236
Animal Needs	238
Inevitable Compromises	242
A Public Issue: Farm-Animal Welfare	243
Summary	247
CHAPTER 11 NEW AND EMERGING ISSUES	251
Plant-Animal Ecosystems	252
Ecological Balance and Environmental Quality	253
Animal Well-Being	257
Biological Diversity	259
Biotechnology	262
Food Safety	265
Economic Support for Agriculture	268
Challenges and Opportunities for Animal Science	
Graduates in the Twenty-first Century Summary	270
Jummary	271
SECTION FOUR	
CHAPTER 12 LIVE ANIMAL EVALUATION: BEEF CATTLE, SHEEP, AND SWINE	275
· · · · · · · · · · · · · · · · · · ·	
Live Animal Evaluation: Past and Present Beef Cattle Evaluation	276
Sheep Evaluation	277
Suech Faciliation	286

Swine Evaluation	292
Swine Evaluation Summary CHAPTER 13 DAIRY CATTLE Changes and Trends in the Dairy Industry Dairy Cattle Breeds Milk Marketing Genetic Improvement Housing Systems Herd Health Nutrition and Feeding Reproductive Management Dairy Replacements Economics Summary CHAPTER 14 BEEF CATTLE Historical Aspects Cattle Statistics Production Systems Breeding and Genetic Considerations Reproductive Management Nutritional Management Herd Health Concerns General Management Considerations and Issues Summary CHAPTER 15 POULTRY AND EGG PRODUCTION Integrated Production Systems Reproduction Breeding Incubation Brooding and Rearing Feeding and Nutrition Housing	292 299
	301
Changes and Trends in the Dairy Industry	302
Dairy Cattle Breeds	306
	306
	308
	310
	316
	316
Reproductive Management	324
	326
	329
Summary	332
CHAPTER 14 BEEF CATTLE	335
	336
··· = ··· = ···	336
	338
Breeding and Genetic Considerations	342
Reproductive Management	349
	353
Herd Health Concerns	360
General Management Considerations and Issues	363
Summary	369
CHAPTER 15 POULTRY AND ECC PRODUCTION	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
TOUR AND END PRODUCTION	373
Population Systems	374
	375
	377
	379
rovuing and Kearing	380
	382
ivasing	383

Equipment	388
Lighting Poultry	389
Production Systems	39)
Health Maintenance	396 396
Summary	
	398
CHAPTER 16 HORSES AND THE HORSE INDUSTRY	400
History of the Horse and the Horse Industry in the	
United States	401
Horse Care and Health Programs	414
Nutrition	419
Housing and Containment	425
Raising Horses	426
Breeding Horses	427
Training Horses	435
Buying and/or Selling a Horse	436
Summary	438
CHAPTER 17 SWINE	441
Description and Characteristics of Swine Production	442
Issues Facing the Pork Industry	447
Pork as Human Food	450
Life Cycle	452
Breeds	456
Applied Genetics	457
Nutrition and Feeding	462
Health	469
Types of Production	470
Husbandry and Management	473
Marketing	479
Emerging Technologies	483
Summary	483
CHAPTER 18 SHEEP AND GOATS	486
Number of Sheep and Goats	487

Production Systems	
Breeding Management	490
Feeding and Nutrition	493
Gestational Concerns	494
Lambing and Kidding Management	499
Growing and Finishing	502
Diseases and Parasites	505
Marketing	505
Summary	50 <i>7</i> 50 <i>7</i>
CHAPTER 19 AQUATIC ANIMALS	
Evolution of Aquaculture	
Benefits of Aquaculture	511
Comparison of Feeding Fish versus Livestock	511
Feeding and Nutrition	512
Aquaculture and the Environment	513
Commercial Aquaculture	515
Summary	516 524
CHAPTER 20 DOGS AND CATS	526
Dogs and Cats in American Society	527
Careers in the Pet Industry	52 <i>7</i> 529
Nutritional Requirements of Dogs and Cats	530
Basic Health Care	538
Reproduction in the Kennel or Cattery	545
Development and Socialization of Puppies	J 15
and Kittens	548
Summary	549
CHAPTER 21 OTHER ANIMALS, OTHER USES,	ijit v damo ir tildami ir kilosoma a artino kalenta
OTHER OPPORTUNITIES	553
Animals for Food, Hides, and Fiber	554
Animals Raised for Fur	574
Animals in Research	575
Animals as Tissue and Organ Donors	576
Animals as Pets and Companions	578

Animals in Zoos and Aquariums Summary	579
,	580
SECTION FIVE	
CHAPTER 22 MEAT AND MEAT PRODUCTS	584
Modern Methods of Processing Carcasses	585
Distribution of Meat and Meat products	586
Packaging of Retail Meat Cuts	587
The Diet/Health "Scare" for Red Meats and the Response	
by the Livestock Industry	588
Low Fat Meats	589
The Other White Meat	589
Slaughter Plant Size	591
Food Safety	592
U.S. Meat Production	593
Meat Inspection	593
Hazard Analysis Critical Control Points	595
Carcass Composition	595
Composition of Muscle	597
Age, Sex, Weight, Fatness, Grade and Breed Effects on Meat Quality and Value	599
Effects of Fatness on Meat Palatability	605
Effects of Cooking	607
Why Meat Retail Cuts Differ in Price	608
Summary	610
CHAPTER 23 MILK AND MILK PRODUCTS	······································
	612
Composition of Milk and Dairy Foods	614
Milk Microbiology	616
Milk Processing	621
Processing of Cultured Byproducts	627
Other Products	629
Defects Classics 1.2 is at a 2.2 is at a 2	631
Cleaning and Sanitation of Dairy Plant Systems	633
Operating Efficiencies	635
In-Plant Quality Audits	635
Summary	635

CHAPTER 24	POULTRY AND EGG PROCESSING AND PRODUCTS	637
	AND PRODUCTS	
Poultry Meat		637
Eggs		646
Liquid Eggs Summary		650 653
Jummary		652
CHAPTER 25	AQUACULTURE PRODUCTS	654
Importance of Aq	ıuaculture Products	654
Nutritional Value	of Fish	655
Processing and N	Marketing and Aquaculture Products	657
Quality		658
Future of Aquacu	ilture Products	660
Summary		660
CHAPTER 26	WOOL, MOHAIR AND OTHER	Priving and the Control of the Contr
	ANIMAL FIBERS	663
Wool		663
Mohair		674
Other Animal Fib	ers	675
Pelts skins and H	lides	676
Summary		678
CHAPTER 27	THE FUTURE: ANIMALS AND SOCIETY IN THE 21ST CENTURY	682
Demand for Anin	nal Products	683
Food Resources	in i i dances	684
	ctations on the Nature of U.S. Animal	
Agriculture		684
Opportunities in	Animal Agriculture	686
Summary		687
Appendices		A -1
Index		1-1