

Path to the Plate - Sheep and Goat Industry



History of Texas Sheep

- ▶ **Spanish Explorers and Missionaries**
- ▶ **mid-1800s Fine wool Sheep**
- ▶ **10 Million Sheep in the 1940s**



History of Texas Goats

- ▶ **Spanish Explorers and Missionaries**
- ▶ **mid-1800s Angora**
- ▶ **5 Million Goats by 1965**



***Sheep and
Goat In
Texas***





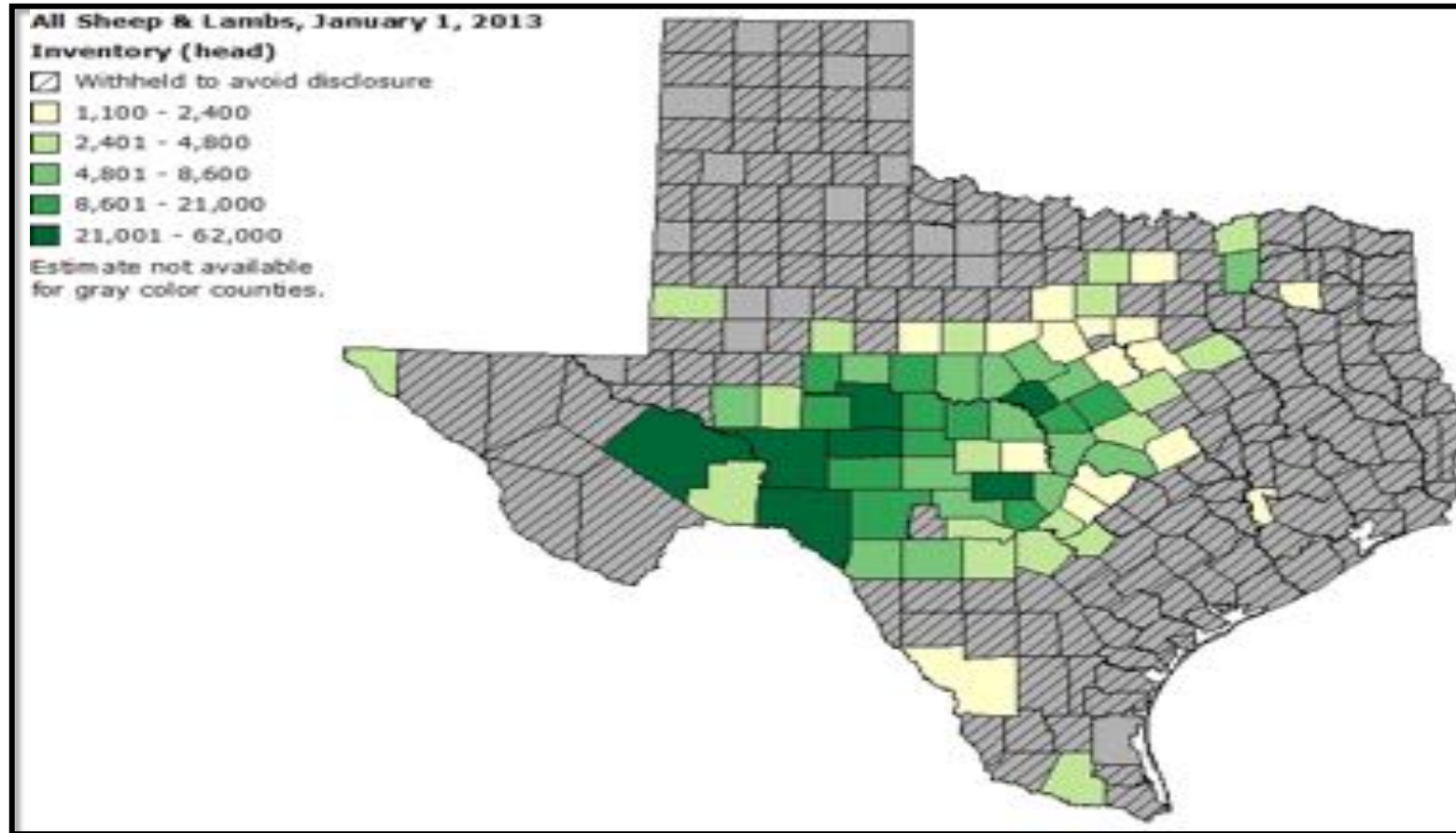
**Texas is #1
in the Nation in:**



HOW MANY AND WHERE ARE SHEEP AND GOATS IN TEXAS?

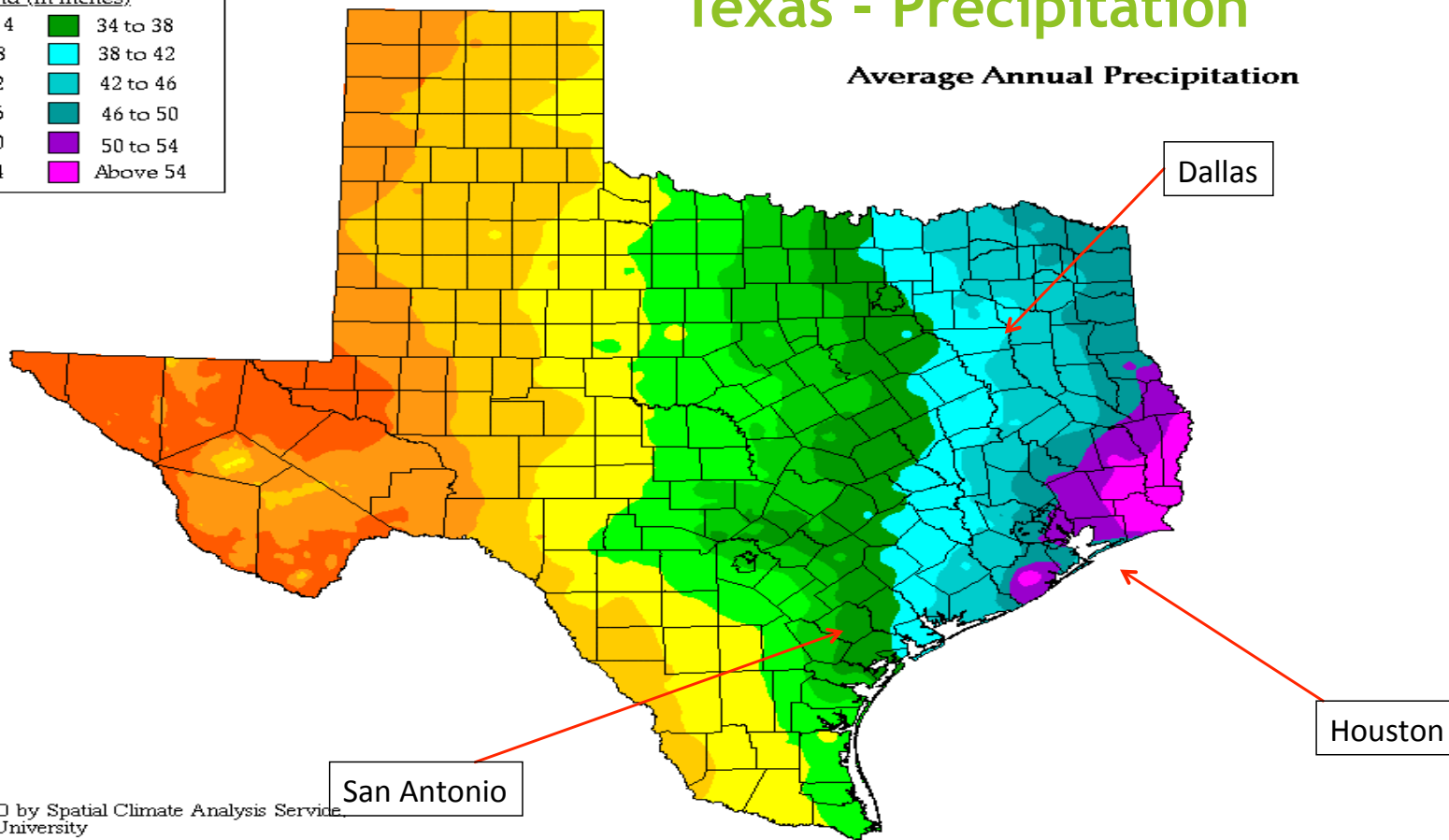
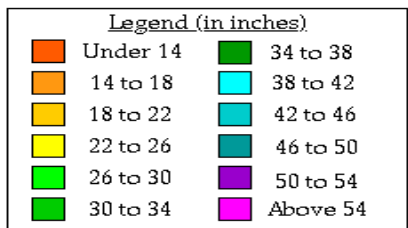


Texas Sheep and Goat Ranches



Texas - Precipitation

Average Annual Precipitation



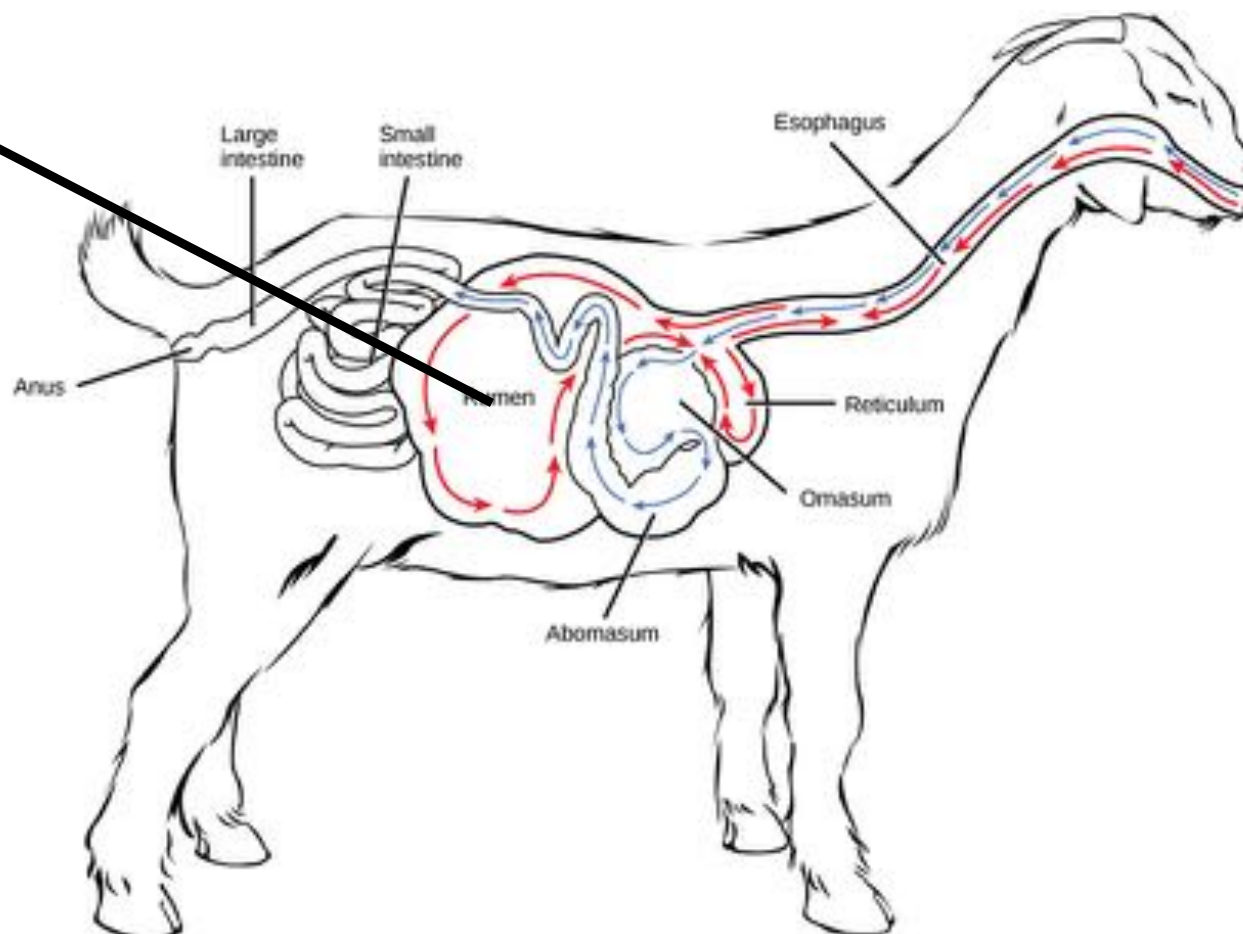
Copyright 2000 by Spatial Climate Analysis Service,
Oregon State University

What do sheep and goats eat?

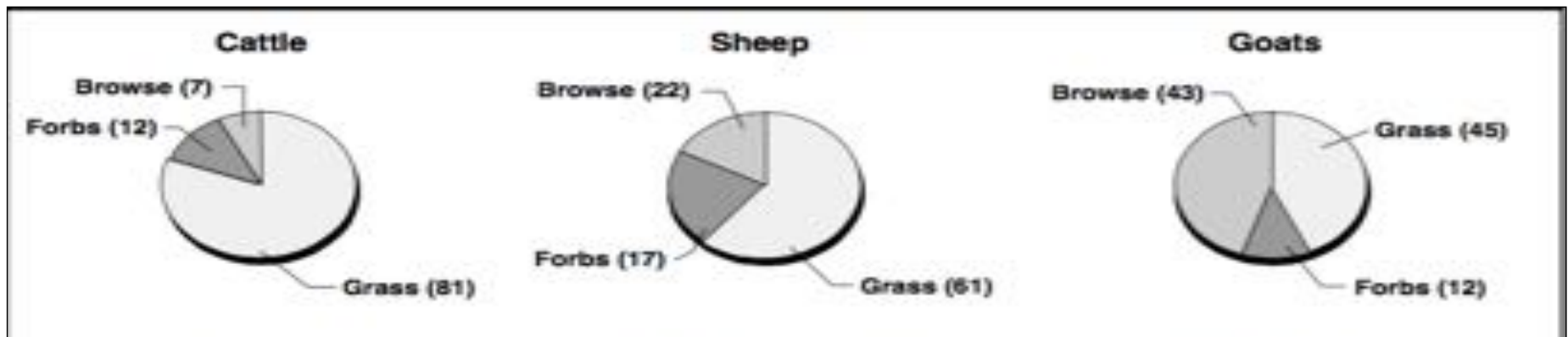


How Does a Ruminant 4-Compartment Stomach Work?

**Bacteria
Protozoa
Fungi**



- ▶ Demand for Food and Fiber
- ▶ Well Suited for Texas Land Resources



What Range Herbivores Eat and Why - Lyons, Forbes, Machen

Brush and Weed Control

Biological Control Tool

- ▶ Texas A&M AgriLife Research
 - ▶ 20% average Juniper in Diet
 - ▶ Super Juniper Eating Goat



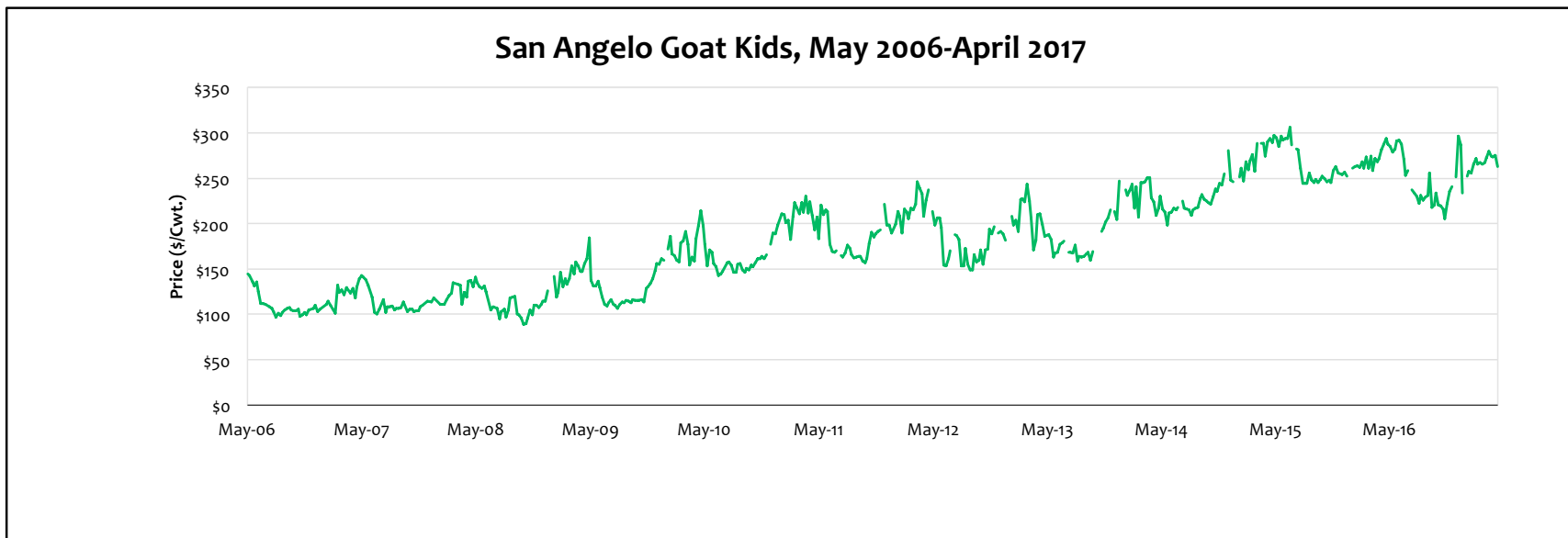
What do Cattle Eat? Cattle Great UP-cyclers



<http://www.feedipedia.org/>

Current Market Situation

- ▶ Strong Demand & Weak Supply
- ▶ Lamb and Goat Meat Imports are Greater than Production



Texas Sheep Breeds



Texas Goat Breeds



Weinheimer Ranch Photo courtesy of Chris Weinheimer







Predators

- ▶ 10-20% Losses
- ▶ Common to Texas
 - ▶ Coyote
 - ▶ Domestic Dog
 - ▶ Feral Pigs
 - ▶ Fox
 - ▶ Eagles
 - ▶ Buzzard

▶ Common Control Practices

- ▶ Fencing
- ▶ Guardian Animals
- ▶ Lethal Removal

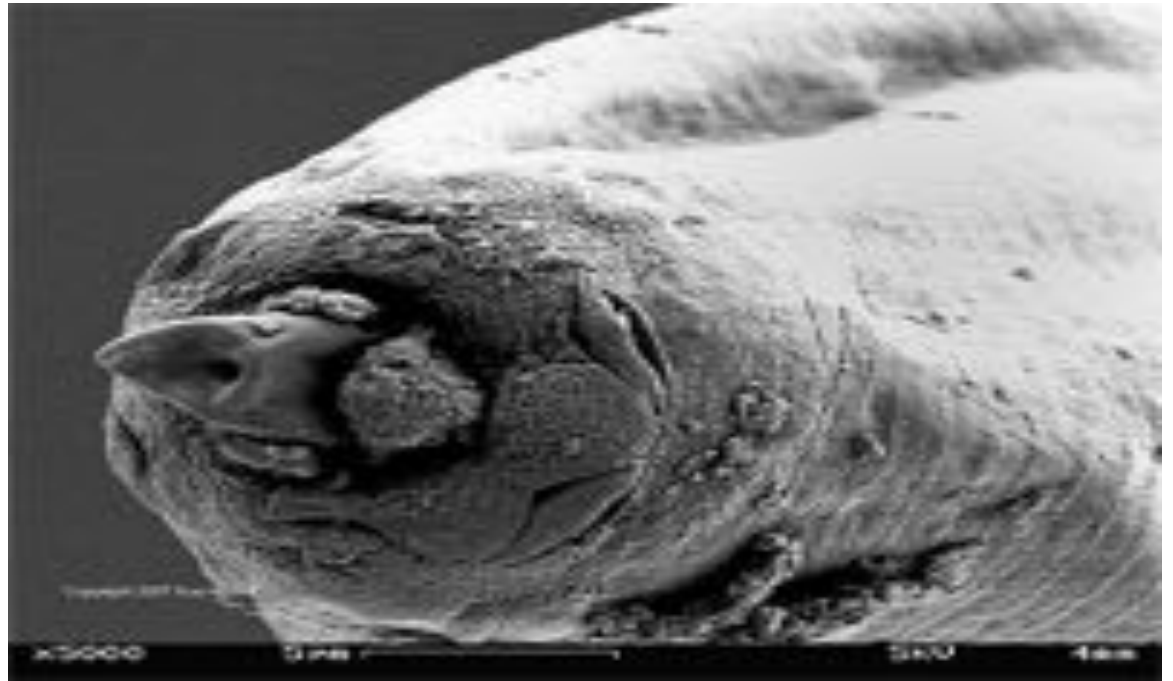


Dogs are used for herding and gathering sheep and goats



Parasites

- ▶ **Internal Parasites**
 - ▶ **Round Worms - H. Contortus**
 - ▶ Anemia
 - ▶ **Coccidiosis**
 - ▶ Bloody Diarrhea
- ▶ **Common Control Techniques**
 - ▶ Maintain Good BCS
 - ▶ Strategic Supplementation
 - ▶ Pasture Rotation
 - ▶ Genetic Selection
 - ▶ Strategic Deworming





Why do we eat lamb and goat in the first place?
Lamb and goat meat provides these nutrients



What is Meant By Lamb and Goat Being Nutrient Rich? 28 Grams of Protein

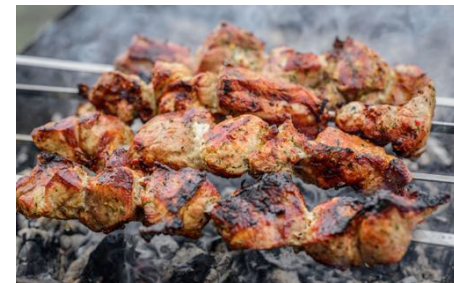
Peanut Butter
3.94 Tbsp.
752 Calories



Tofu
11 Ounces
364 Calories



Goat
3.5 Ounces
180 Calories



Lamb
3.63 Ounces
145 Calories



What is Lamb and Goat Meat role in the diet? Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year	Lamb Leg	Black Beans	Roasted	Goat
		Old	Roasted Lean	100 grams	Almonds	Cooked
Proximates		RDA	Only	100 grams	100 grams	100 grams
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year	Lamb Leg	Black Beans	Roasted	Goat
		Old	Roasted Lean	100 grams	Almonds	Cooked
Proximates		RDA	Only	100 grams	100 grams	100 grams
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Moderation and Balance



Nutrient	Unit	19 Year Old RDA	Lamb Leg Roasted Lean Only 100 grams	Black Beans 100 grams	Roasted Almonds 100 grams	Goat Cooked Roasted 100 grams
Proximates						
Water	g		64.92	65.74	2.41	68.21
Energy	kcal	2000	180	132	598	143
Protein	g	56	28.17	8.86	20.96	27.1
Total lipid (fat)	g	<65	6.67	0.54	52.54	3.03
Carbohydrate, by difference	g		0	23.71	21.01	0
Fiber, total dietary	g	>26	0	8.7	10.9	0
Sugars, total	g		0	0.32	4.86	0
Minerals						
Calcium, Ca	mg	1200	8	27	268	17
Iron, Fe	mg	18	2.06	2.1	3.73	3.73
Magnesium, Mg	mg	420	26	70	279	0
Phosphorus, P	mg	700	208	140	471	201
Potassium, K	mg	4700	342	355	713	405
Sodium, Na	mg	<2400	66	1	3	86
Zinc, Zn	mg	11	5.02	1.12	3.31	5.27
Copper, Cu	mg	0.9	0.121		1.1	0.303
Manganese, Mn	mg	2.3	0.028		2.2	0.042
Selenium, Se	µg	55	31.7		2	11.8
Vitamins						
Thiamin	mg	1.2	0.11	0.244	0.08	0.09
Riboflavin	mg	1.3	0.28	0.059	1.2	0.61
Niacin	mg	16	6.39	0.505	3.6	3.95
Pantothenic acid	mg	5	0.71		0.32	
Vitamin B-6	mg	1.7	0.17	0.069	0.14	0
Folate, DFE	µg	400	24	149	55	5
Choline, total	mg	550			52.1	106.4
Vitamin B-12	µg	2.4	2.71	0	0	1.19
Vitamin E (alpha-tocopherol)	mg	15	0.18	0.87	23.9	0.34
Vitamin K (phylloquinone)	µg	120	1.6	3.3	0	1.2
Fatty acids, total saturated	g	<20	2.38	0.139	4.092	0.93
Fatty acids, total monounsaturated	g		2.92	0.047	33.076	1.36
Fatty acids, total polyunsaturated	g		0.44	0.231	12.955	0.23
Cholesterol	mg	<300	87	0	0	75

Protein Quality and Meat



Wu said. “Sufficient intake of high-quality protein from animal products such as lean meat and milk, is essential for optimal growth, development and health of children, as well as for optimal maintenance, function and health of tissues including skeletal muscle, brain, heart, kidneys, liver and gut in adults.”

Is Lamb and Goat Meat Protein Different then Plant Protein?



Amino Acids		Required 150 Lb, 19 years and older, FAO	Goat Meat Roasted	Lamb Leg Lean Only Roasted	Black Beans, 100 g	Almonds 100 g
Tryptophan	mg	280	403	329	105	209
Threonine	mg	1050	1290	1206	373	595
Isoleucine	mg	1400	1371	1359	391	745
Leucine	mg	2730	2258	2191	708	1461
Lysine	mg	2100	2016	2488	608	563
Methionine	mg	728	726	723	133	155
Cystine	mg	315	323	336	96	214
Phenylalanine	mg	1750	941	1147	479	1122
Tyrosine	mg		833	947	250	446
Valine	mg	1820	1452	1520	464	848
Arginine	mg		1989	1674	549	2444
Histidine	mg	700	565	892	247	534
Alanine	mg			1694	372	991
Aspartic acid	mg			2479	1072	2616
Glutamic acid	mg			4088	1351	6153
Glycine	mg			1376	346	1417
Proline	mg			1182	376	961
Serine	mg			1047	482	904

Animal Protein Child Growth and Learning



Meat Consumption is Associated with Less Stunting among Toddlers in Low-income settings


Krebs et al., Food and Nutrition Bulletin, 2011 Sep;32(3):185-91.



Meat Positively Impacts Test Scores in Kenyan Children

Mulert et al., Br J Nutr 2014 Mar 14;111(5):875-86, Epub 2013 Oct 30.

American Lamb Cuts & How To Cook Them



Leg

- Whole Leg (Roast)
- Shank Cut (Leg, Shank & Hip) (Roast)
- Shank Portion (Roast)
- Casserole Leg (Roast)
- Casserole Shank (Shank, Hip, Portion) (Roast)
- American Style Shank (Roast)
- French Style Leg Roast (Roast)
- Roast Leg Shank (Roast)
- Roast Shank (Roast)
- Tip Roast (Roast)

Rack

- Green Roast (Roast)
- Rib Roast (Roast, and Roast)
- Rib Chop (Shank, Hip, Portion) (Roast)
- French Rib Chop (Shank, Hip, Portion) (Roast)

Shoulder

- Shank Cut (Shoulder, Shank) (Roast)
- Shoulder Roast (Shank, Roast)
- Shoulder Shoulder (Shank, Roast)
- Shank Chop (Shank, Hip, Hip) (Roast)
- Arm Chop (Shank, Hip, Hip) (Roast)

Other Cuts

- Chops for Stew (Shank, Hip, Hip)
- Ground Lamb (Shank, Hip, Portion)
- Cubes for Stew (Shank, Hip, Hip)

Loin

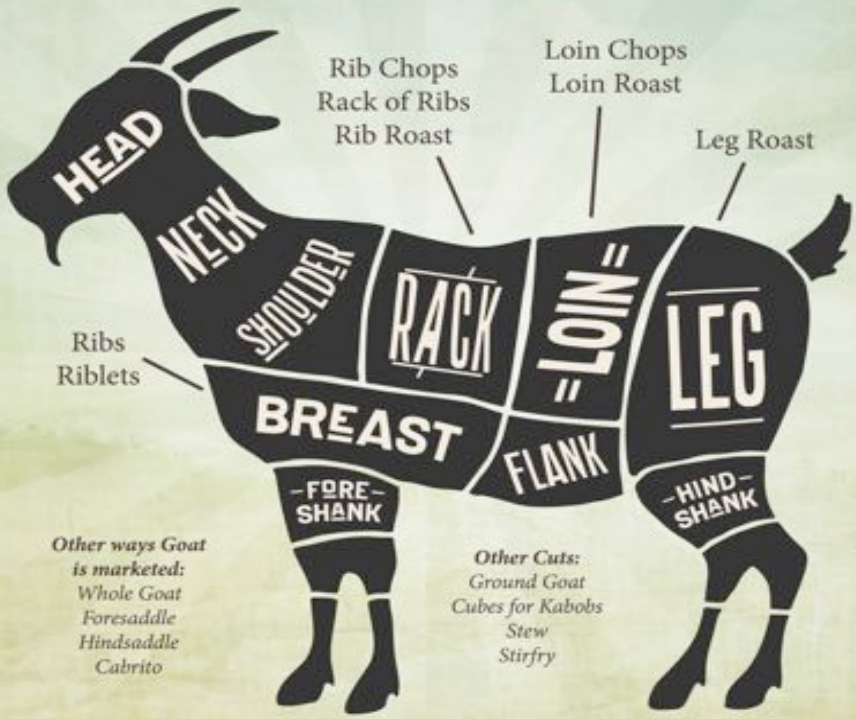
- Loin Roast (Roast)
- Roast Loin (Shank) (Roast)
- Loin Chop (Shank, Hip, Portion) (Roast)
- Shoulder Loin Chop (Shank, Hip, Portion) (Roast)
- Tenderloin (Roast)

Foreshank & Breast

- Foreshank (Roast)
- Shoulder (Shank, Hip) (Roast)
- Shank Chop (Shank, Hip, Hip) (Roast)
- Roast Shank (Roast)

AMERICAN LAMB BOARD
www.americanlamb.com

CUTS OF GOAT



Other ways Goat is marketed:

- Whole Goat
- Foresaddle
- Hindsaddle
- Cabrillo

Other Cuts:

- Ground Goat
- Cubes for Kabobs
- Stew
- Stirfry

PATH TO THE PLATE **TEXAS A&M AGRILIFE EXTENSION**



CO-PRODUCTS OF L A M B

Tennis Balls Wool Shoes Paint Roller



Active Wear Lanolin Violin Strings

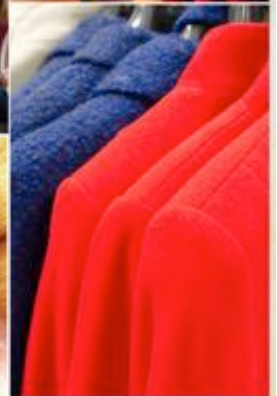


TEXAS A&M
AGRILIFE
EXTENSION



CO-PRODUCTS OF G O A T

Cheese Goat Milk Crayons



Pelt Clothing Mohair Clothing Cashmere Clothing



TEXAS A&M
AGRILIFE
EXTENSION

Wool Harvest

- ▶ Shorn Annually
- ▶ 5 - 15 Pounds
- ▶ Quality
 - ▶ Fiber Diameter
 - ▶ Length
 - ▶ Color
 - ▶ Purity



Mohair Harvest

- ▶ **Shorn Twice a Year**
- ▶ **2 - 5 Pounds**
- ▶ **Quality**
 - ▶ **Fiber Diameter**
 - ▶ **Length**
 - ▶ **Purity**



Bales of wool and mohair are consigned to warehouses and sold via auction or private treaty. The buyer sends the product to a scouring facility to remove the dirt, grease and other contaminants.



Lanolin is extracted at the scouring plant. The fiber is then combed into top and spun into yarn.



Hair from Angora goats is called 'Mohair'



Labeling

**What is locally raised?
400 miles
Within the State
State plus adjoining state**



While the definition of local varies by region of the country, it generally means one day's drive away or less, and it's usually much less.

Organic



- ▶ Defined by USDA standards
- ▶ Last 1/3 gestation to harvest
- ▶ Certifiably 100% organic diet
 - ▶ No synthetic fertilizers
 - ▶ No pesticides, herbicides
 - ▶ 3 year abstinence period (forages, crops)
 - ▶ Certifiably organic seeds
 - ▶ Use of GMO crops is prohibited
- ▶ Access to outdoors
 - ▶ \geq 30% of daily intake from 'standing' crops

from Organic Production and Handling Standards, National Organic Program, USDA AMS

Organic *(continued)*

- ▶ Animals with health concerns should be treated and marketed as traditional product
- ▶ Animals must be harvested, processed and product handled under USDA certification
- ▶ *In Texas*, Organic certification is overseen by TDA Organic Certification Program



Organic *(continued)*



Organic production requires USDA certification of the entire production chain, involves audits and inspections, and requires more time, effort and process documentation than other sheep and goat production systems.

Grass Fed - There is no standard definition



Are Cereal Grain Crops Grass **Yes**



Growth Stages



Zadoks Growth Stage	GS 00 - 09	GS 10 - 19	GS 20 - 29	GS 30 - 39	GS 40 - 49
Development phase	Germination	Seedling growth	Tillering	Stem elongation	Booting



Zadoks Growth Stage	GS 50 - 59	GS 60 - 69	GS 70 - 79	GS 80 - 89	GS 90 - 99
Development phase	Ear emergence	Flowering	Milk Development (grain fill period)	Dough Development (grain fill period)	Ripening

Pre-Dough Stage OK to Feed American Grass-Fed Beef Association

R3 – Milk

Kernels now begin to show a yellowish color on the outside. Also, the inner fluid now has a milky texture, which is caused by accumulating starch. The cob also gained a considerable amount of size and volume considered to it at R2.

Dry matter accumulation is occurring at a very high rate now. Any stress that occurs during this stage can limit kernel size and weight.

[Return to Table](#)



R4 – Dough

The ear now begins to display a brighter yellow in color. Also, the accumulated starch in the kernel begins to thicken from its earlier milky consistency. The cob also begins to develop a reddish color.

[Return to Table](#)

Picture from Kansas State University Extension


Grass and forage, must be the feed source consumed for the lifetime of the ruminant, except for milk consumed prior to weaning. The diet must be derived solely from forage appropriate to the species:

d) Cereal grain crops harvested in the pre-dough stage



Why do you use antibiotics?

What are the different types of antibiotics/antimicrobials used in the industry and how are they used?

1. Therapeutic and preventative
 1. Most common
 2. Short duration use
 3. Animal well-being
 2. Coccidostats and Ionophores
 3. Residues and residue avoidance measures in the industry
- 

Are Antibiotic Residues Found in the Meat? Almost never found in the meat

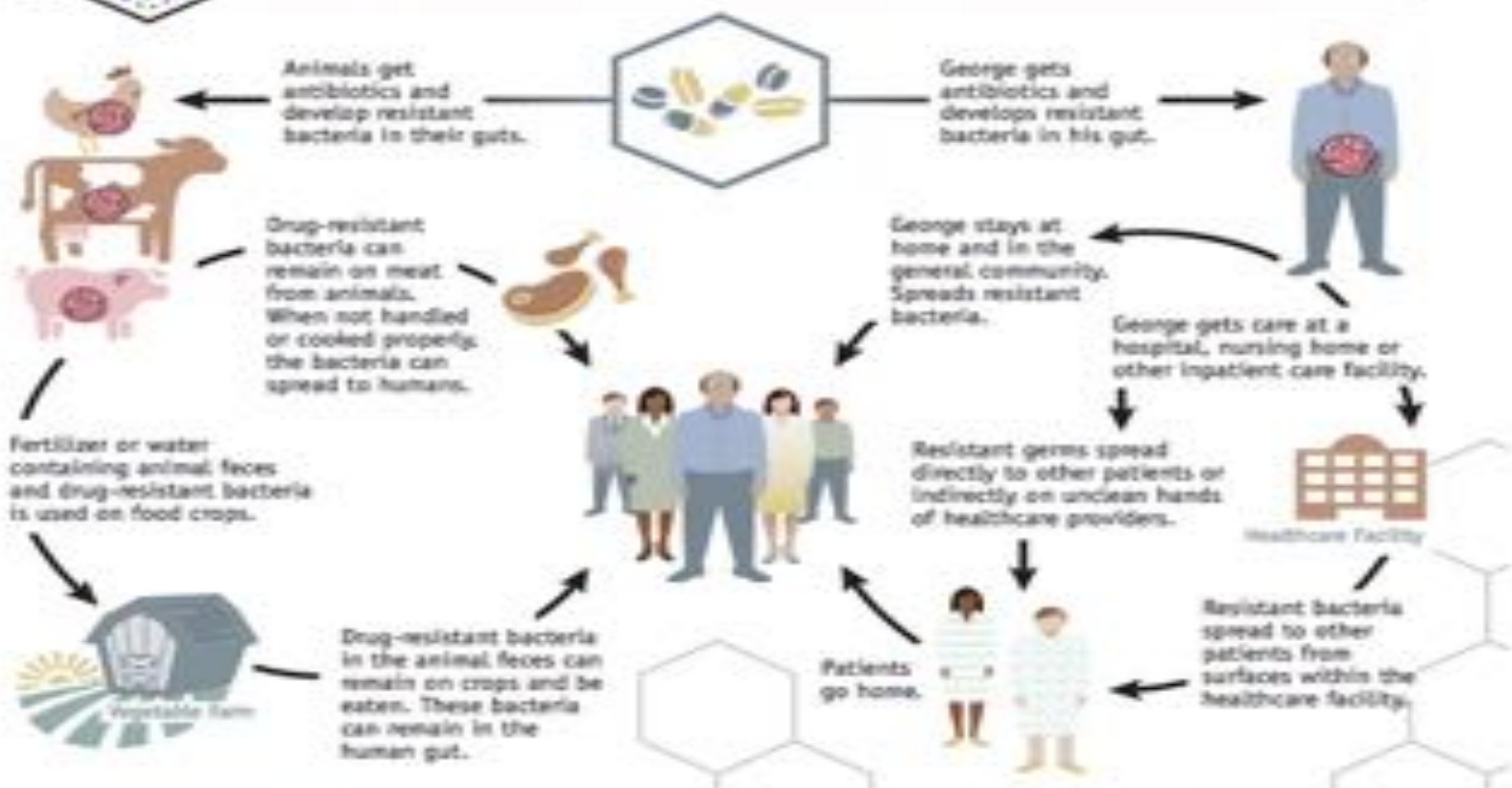


USDA National Residue Monitoring Program and FDA Total Diet Study show residues from antibiotics is rare.

How Much Antibiotic is in meat

- ▶ It is illegal to sell meat or dairy products with residues from antibiotics.
- ▶ Products are constantly being monitored for antibiotic residues

Examples of How Antibiotic Resistance Spreads



Simply using antibiotics creates resistance. These drugs should only be used to treat infections.

Current Resistance Issues are Human to

1. *Clostridium difficile*

- a. 250,000 hospitalizations; 14,000 deaths
- b. Opportunistic after normal gut flora killed by antibiotics
- c. Often hospital acquired – not food related

2. *Neisseria gonorrhoea*

- a. Multidrug resistant
- b. Venereal disease
- c. Not hospital acquired – not food related

3. Carbapenem Resistant *Enterobacteraceae*

- a. 50% mortality rate
- b. Hospital acquired – not food related

Adapted from Dr. Richard Raymond as reported by Chuck Jolley in Drovers Network

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacteria that is resistant to many antibiotics. Staph and MRSA can cause a variety of problems ranging from skin infections and sepsis to pneumonia to bloodstream infections. Mostly Human to Human.

Questions



PATH
TO THE PLATE

TEXAS A&M AGRILIFE EXTENSION