



Today's Webinar – 1:00 pm ET

Livestock 101: What Every Conservation Professional Needs to Know about Livestock Production

Presenter:

Amy Powell, PhD, Iowa State University Extension and Outreach

Moderators:

Brian Hillers, Resource Conservationist, NRCS Illinois
 Tammy Swihart, Grazing Specialist, East National Technology Support Center

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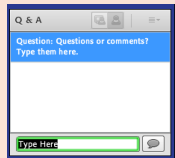
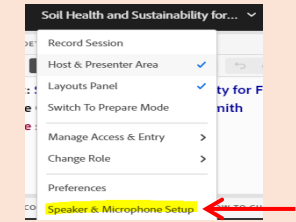
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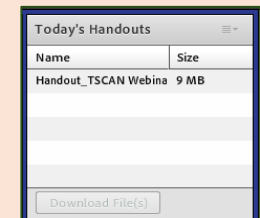
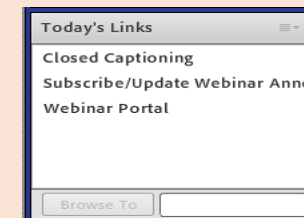


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Livestock 101: What Every Conservation Professional Needs to Know about Livestock Production



April 3, 2025

Tammy Swihart
Grazing Lands Specialist
East National Technology Support Center

Natural
Resources
Conservation
Service

nrcs.usda.gov

Purpose of the Series

- Respond to expressed need
- Share knowledge on livestock production to enable better support of conservation on the ground
- Help you leverage resources, allow you to better assist clients in the field, and expand your network of experts in livestock production



Livestock 101, Mark These Dates!

Thursday, April 3, 2025

Session 1. What Every
Conservation Professional
Needs to Know About Livestock
Production

Wednesday, May 7, 2025

Session 2. Beef Cattle

Tuesday, June 10, 2025

Session 3. Dairy Cattle

Monday, July 14, 2025

Session 4. Sheep and Goats

Thursday, August 14, 2025

Session 5. Swine

Wednesday, Sept 17, 2025

Session 6. Poultry

Tuesday, October 14, 2025

Session 7. Equines

Monday, Nov 10, 2025

Session 8. Livestock Economics
and Markets



Moderator for Today's Session

Brian Hillers

Resource Conservationist

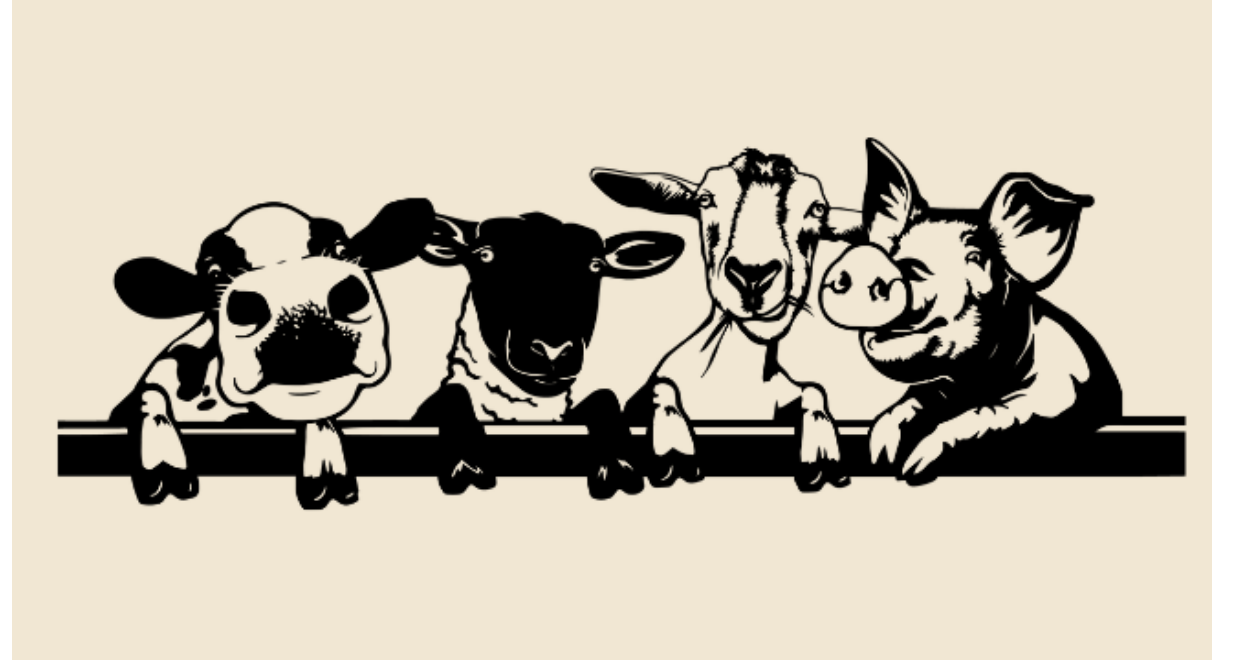
Ecological Sciences

Illinois State Office



Livestock 101

Amy Powell, PhD
Iowa State University Extension and Outreach



How the U.S. ranks globally in livestock production

Beef #1

Pork #3

Poultry #1 eggs, chicken and turkey

Dairy cattle #2

Sheep #52

Meat Goat- no data

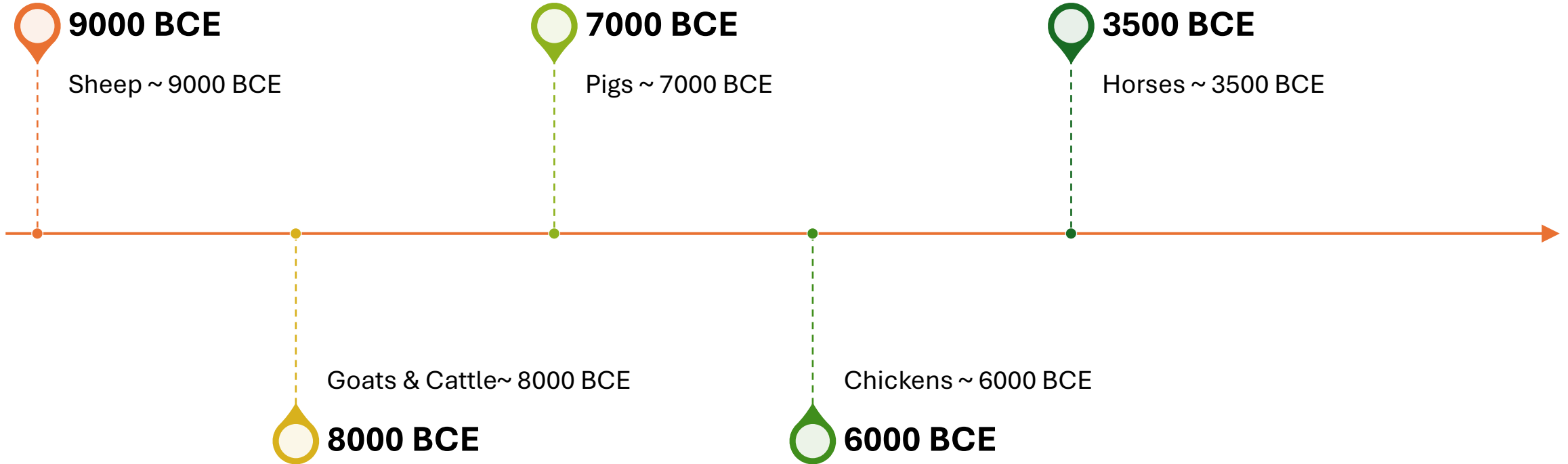
Equine - #4

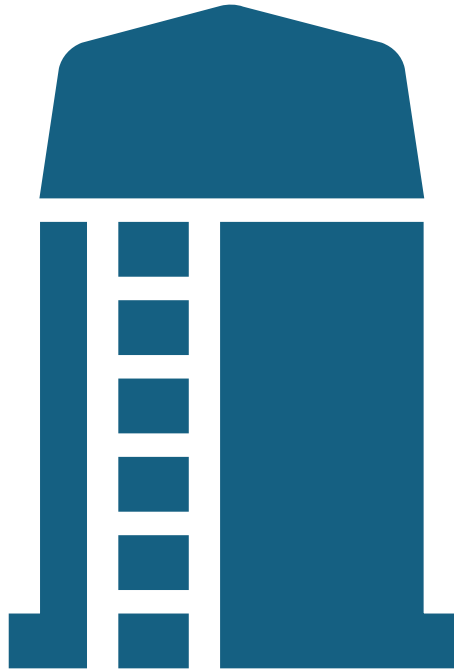
Importance of Livestock Production

- Livestock production contributes significantly to the **economy**, generating over \$100 billion in revenue.
- Livestock and poultry products make up about 50% of total agricultural sales.



When did it start?





Livestock Lingo

Livestock – Domesticated animals raised for food, fiber, or labor.

Ruminant – Animals with a four-chambered stomach (e.g., cattle, sheep, goats) that digest fibrous plant material.

Monogastric – Animals with a single-chambered stomach (e.g., pigs, horses).

Feedstuff – Any ingredient used in animal feed, such as hay, grain, or silage.

Forage – Plant material (e.g., grass, hay) that livestock graze on or consume as feed.

Silage – Fermented, high-moisture stored feed made from grass, corn, or other crops.

Concentrates – High-energy feedstuffs like corn, barley, or soybean meal.

Gestation – The period of pregnancy in livestock animals.

Parturition – The process of giving birth in livestock.

Weaning – The process of transitioning young animals from milk to solid feed.

Cattle Terms

Bull – A mature, intact male bovine.

Steer – A castrated male bovine.

Cow – A mature female bovine that has given birth.

Heifer – A young female bovine that has not yet calved.

Calf – A young bovine of either sex.

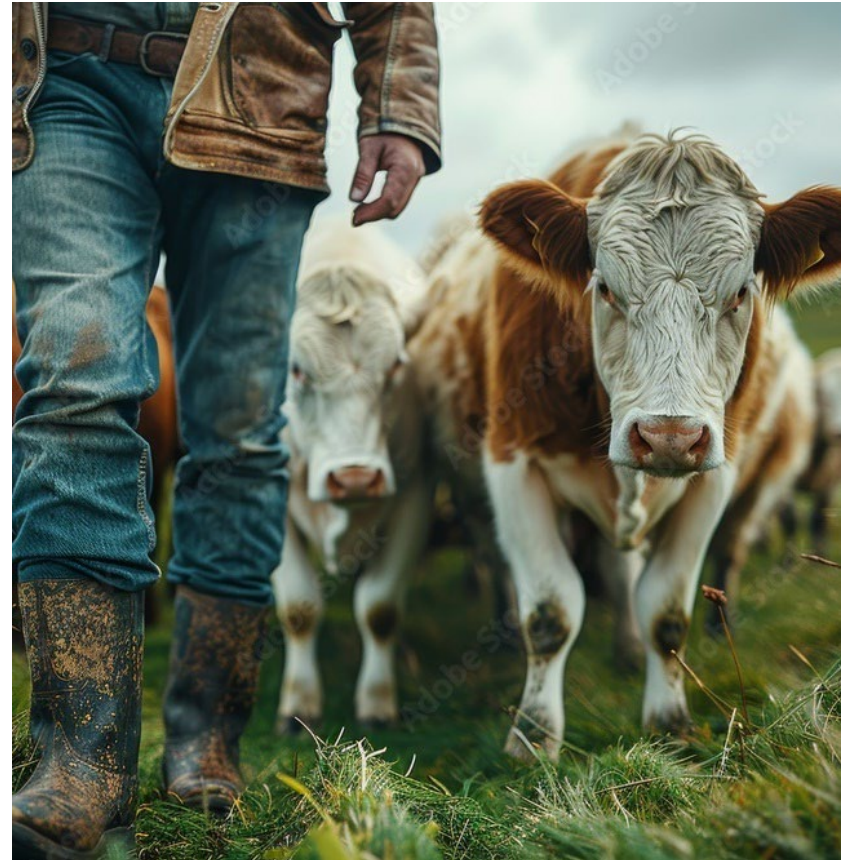
Colostrum – The first milk produced after birth, rich in antibodies.

Beef Cattle – Cattle raised for meat production.

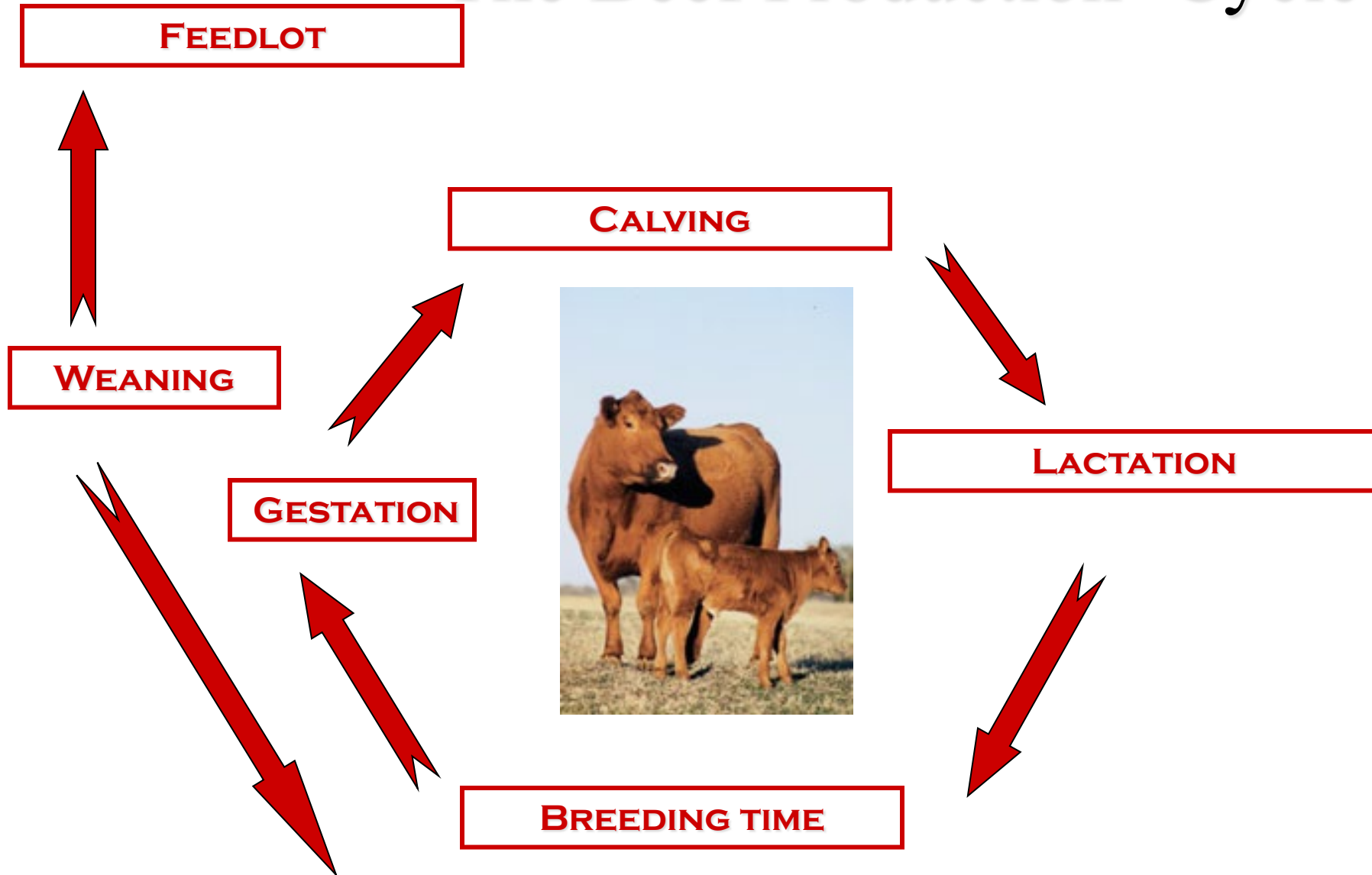
Dairy Cattle – Cattle raised for milk production.

Calving- Act of parturition

Herd- group of cattle



The Beef Production "Cycle"



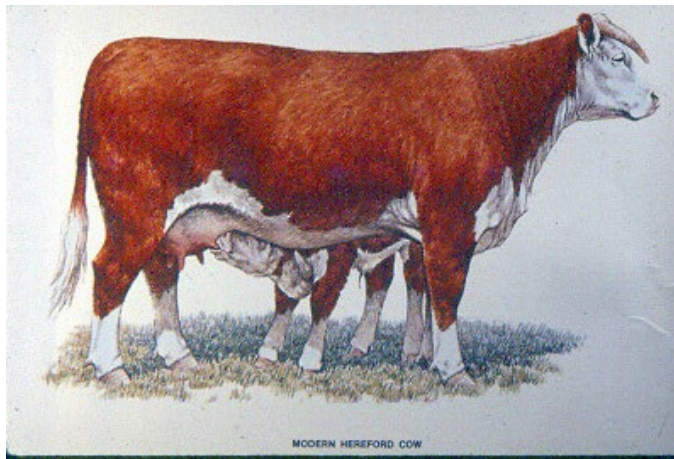


Types of Cattle Operations

- Seedstock production
- Cow-calf Operations
- Stocker/Backgrounding
- Feedlot/Finishing

Cattle Breeds

- Maternal Breeds
 - Basis of the cow herd
 - Cost effective, forage efficient
 - Sensibly sized, low input, easy fleshing
 - Important traits for survival and reproductive fitness.
 - Milking ability matches the environment



Cattle Breeds

- Paternal Breeds
 - Larger, later maturing, faster growing,
 - Heave muscled carcasses.



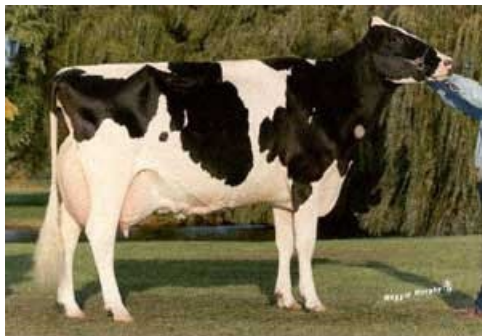
provided by Dr. Robert Kropp

Cattle Breeds

- Dual Purpose, Zebu (“eared”), Composites. .



- And Dairy too?



provided by Hoard's Dairyman



Marketing Beef

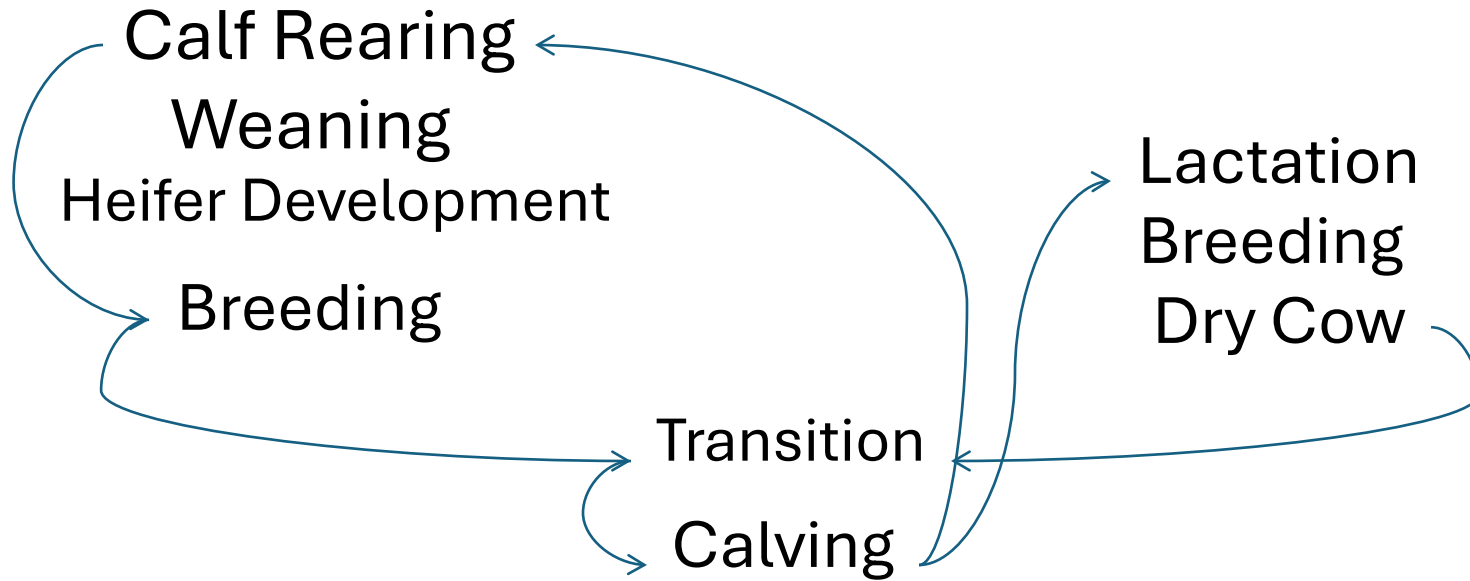
- 1300 pound steer
- 63% dress
- 750 pound carcass
- 70% retail yield
- 525 pounds retail product
- 60 pounds annual per capita consumption
- ~ 9 US citizens fed





Dairy Cattle

Stages of the Production Cycle



Breeding Lactating Cows

- Typical goal:
 - Calve every 12-13 months
- Most all programs AI in USA
- Sexed Semen



Lactation

- 305 days
- Peak lactation occurs 30-90 days after calving
- Average production 53lbs/day (6 gallons)



Calf Management

- Calving

- Separate from dam
- Colostrum
- Navel dip
- Weigh
- Milk replacer
- Calf starter
- Free choice water



Weaning

- Different than from dam!
- Weaning
 - Weaning calf from milk and changing calf diet
- When to wean
 - Based on starter consumption (intake-based)

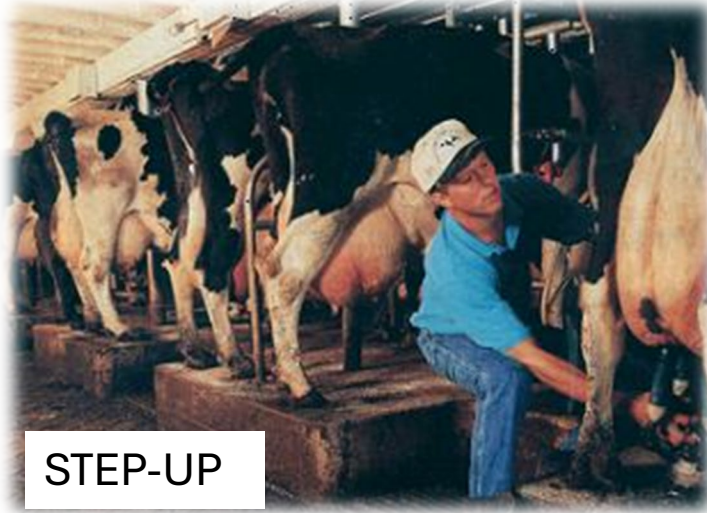


Dry Cows

- Give cows a 6-8 week rest period or dry period
- Have separate ration from milk cows
- Opportunity to prepare cow for next lactation



Types of Milking Parlors



STEP-UP



PARALLEL



HERRINGBONE



CAROUSEL

Housing

- Free Stall
 - Cows free to lounge around
 - Free Stall barn
 - Bedded pack
- Tie Stall/Stanchion
 - individual care
 - more labor





Dairy Breeds





Goat Terms

Buck – A mature, intact male goat.

Wether – A castrated male goat.

Doe (or Nanny) – A mature female goat.

Kid – A young goat.

Disbudding – The removal of horn buds in young goats.

Herd- Group

Kidding- act of parturition

Production Cycle

- Reproduction/Breeding
- Gestation
- Kidding
- Weaning
- Feedlot
- Harvest (Meat, Dairy, Fiber)





Why goats?

- Meat
- Milk
- Fiber
- Exhibition
- Land /Brush Management
- Pets



Dairy Goats

- 10 mo. lactation period
- peak at 4 weeks
- average ~ 6 - 8 lb./da = 2000 to 2200 lbs. per period
- ~ 3 to 4% milkfat , 3.5% protein
- > digestibility due to smaller fat molecules
- capric, caprylic, caproic fatty acids give distinctive flavor
- “chevre”





Harvest: 6 to 12 pounds
grease fleece/year.



(microns, staple length,
logged marketed)

Mohair

- luster (larger, incomplete scales, won't felt)
- fire retardant
- elastic, tensile strength = versatile, durable
- dye-able
- 23 to 40 microns . . . very fine



- 70% clean yield

Sheep Terms

Ram – A mature, intact male sheep.

Wether – A castrated male sheep.

Ewe – A mature female sheep.

Lamb – A young sheep.

Lambing- Act of parturition

Docking – The removal of a lamb's tail for health and hygiene purposes.

Flock – group of sheep





U.S. Sheep Production

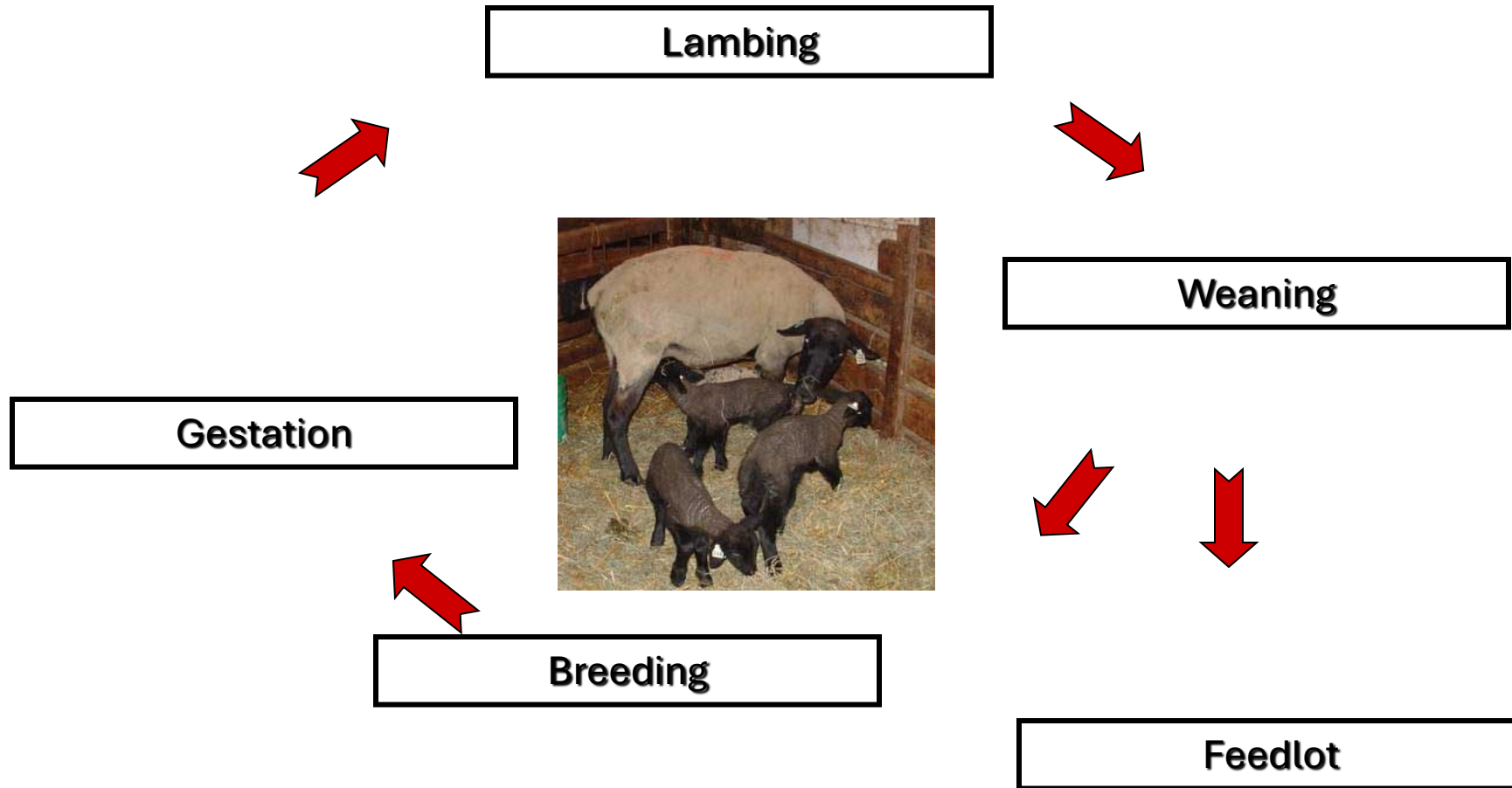
- Sheep raised in all 50 states (larger flocks in the West)
- About 80,000 sheep operations in the United States
- Leading lamb production states:
 - California
 - Texas
 - Colorado
 - Wyoming
 - South Dakota

What kind of sheep enterprises?

- 80% of U.S. lambs are raised for meat (wool is a byproduct)
- Purebred
- Commercial
 - Range flocks
 - Farm flocks
- Feedlot
- Club lambs
- Dairy
- Wool



Stages of the Production Cycle





- Purebred
 - Breeding stock
 - Genetic change
 - Substantial marketing costs.
 - Showring vs. commercial goals are much different.
 - “Frame” sheep

Commercial Operations

Range (Band) Flocks

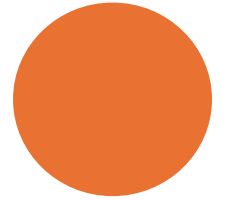
- Low input
- Large flock size
- White face (wool breed) breed base
- Western environments
- 80% or more of US sheep



Commercial Operations

Farm Flocks

- Higher input
- Smaller flock size
- Midwest and east focus
- Meat breed base



Feedlot

- ~3 million lambs processed per year
- Market lamb
 - Weighs 130 pounds
 - Gains 0.5 to 0.7 per day
 - These animals will consume a high concentrate diet to speed time to market



Dairy

- The [East Friesian](#), Lacaune, [Aveyron](#), [France](#). and [Awassi](#) are the most common.
- Average production: 900 to 1,100 lbs. per lactation of 220 to 240 days.
- Price: \$ 54 to \$60 per cwt. (<https://www.iamcountryside.com/sheep/raising-sheep-for-milking-sheep-offer-a-small-farm-alternative/>)



Species	Thousand million liters	As a percentage
Cow	494.6	84.6
Buffalo	69.1	11.8
Goat	12.5	2.1
Sheep	7.8	1.3
Other	1.3	0.2
TOTAL	585.3	100

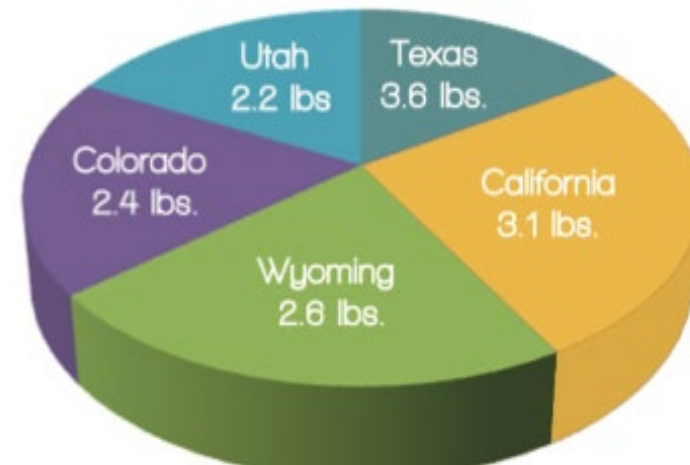
Wool Enterprises

- ✓ **< 10% of industry**
- ✓ **mainly range band flocks**
- ✓ **US = ~ 30 mil. lbs. greasy wool**
 - **Ave. fleece = 7.3 lbs.**
 - **Varies by environments**
 - **Iowa ~5 lbs.**
 - **Texas ~ 10 lbs.**
- ✓ **50% shorn in April-June.**

Top 5 Wool-Producing Countries²

- 1 Australia
- 2 China
- 3 New Zealand
- 4 Russia
- 5 Argentina

Top Wool-Producing States in 2010¹ (clean pounds in millions*)



Gestation and Lambing

- 144-151 days (about 5 months)

Lambing

- Lambing Jugs
 - bonding, individual care
- Lamb Care
 - Dehydration
 - Hypothermia
 - Processing: docking, tagging



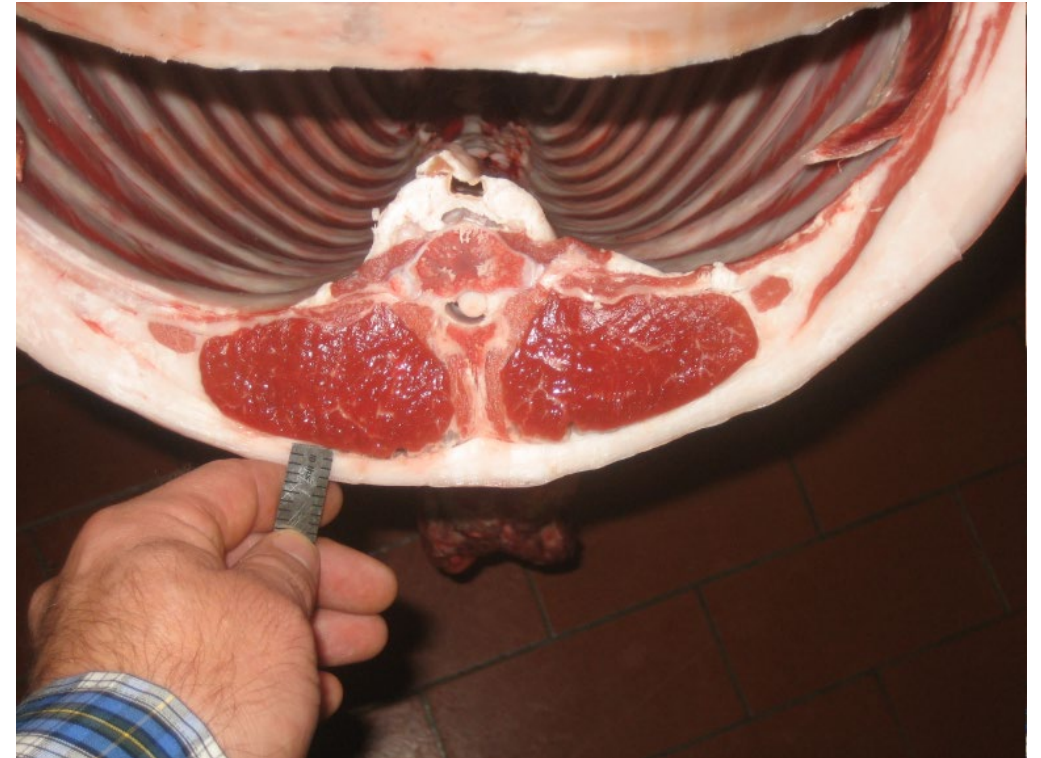
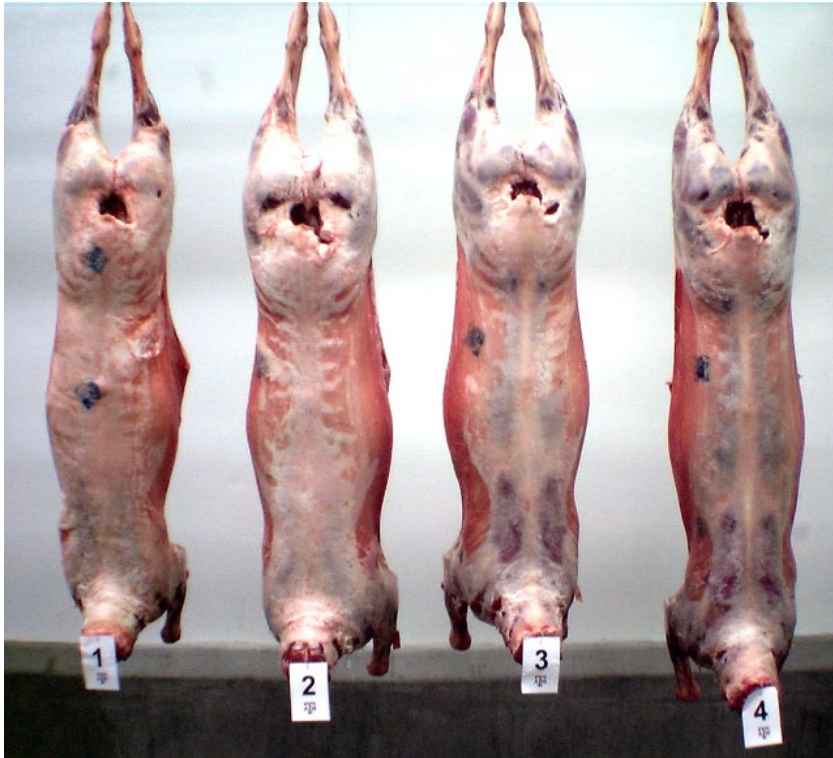
Weaning

~60-90 days or
40-45 lbs.

creep feeding
common

Marketing

Lambs are marketed at ~130 pounds



Sheep Grazing

- Improve the ecology and quality of the land they graze by supporting soil health, sequestering carbon, encouraging plant and insect biodiversity and consuming vegetation that is unsuitable for other livestock.
- Provide natural weed control around vineyards, orchards and solar farms – replacing mowers, fertilizers and herbicides.
- Thin vegetation to prevent fires.



Equine Terms

Stallion – A mature, intact male horse.

Gelding – A castrated male horse.

Mare – A mature female horse.

Foal – A young horse of either sex.

Colt – A young male horse under four years old.

Filly – A young female horse under four years old.

Jack – A male donkey

Jenny – A female donkey

Burro- A small donkey

Herd- group of equine

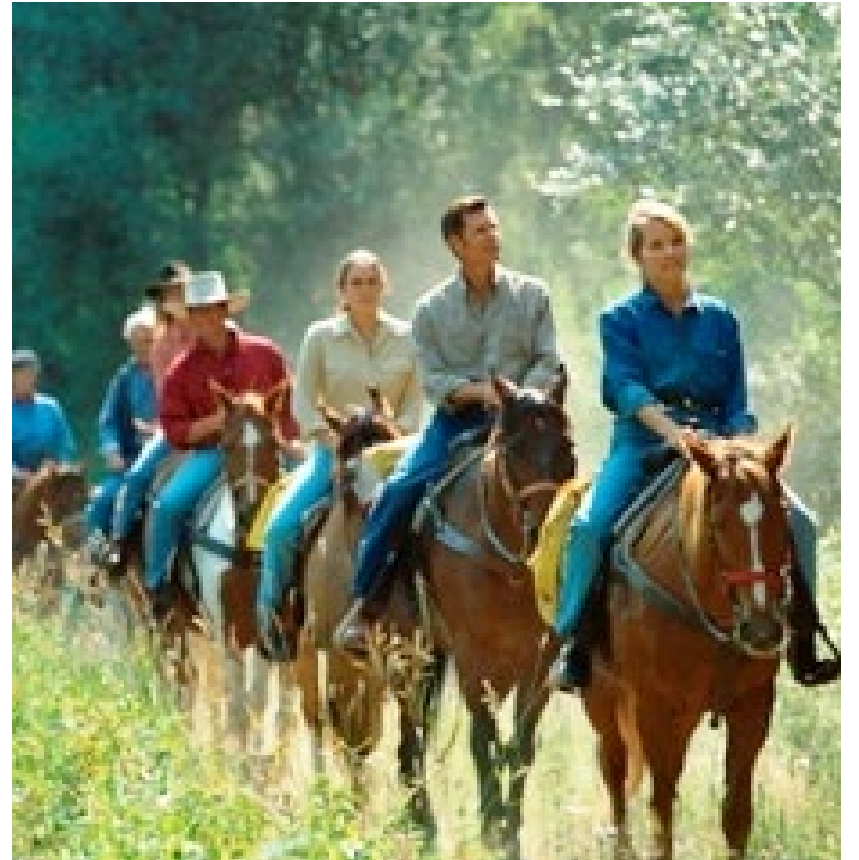
Foaling- Act of parturition

Hand – 4 inches



U.S. Horse Production

- **~ 9.5 mil. horses in USA**
 - *845,000 racing,*
 - *2.8 mil. for show*
 - *3.9 mil. for recreation*
 - *1.7 mil. for other purposes.*

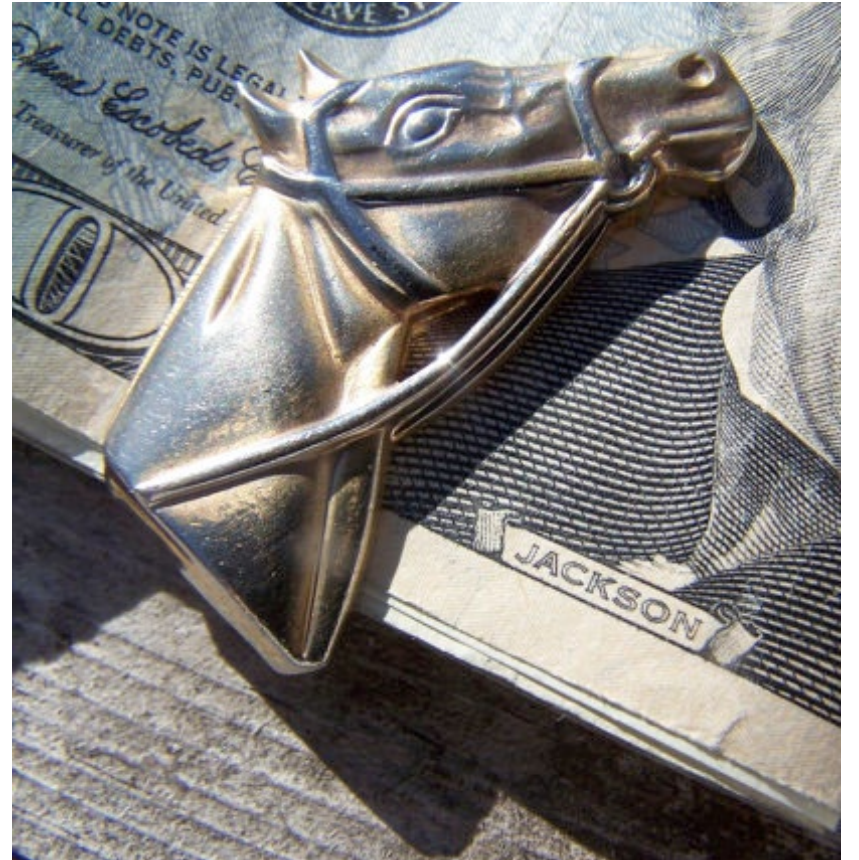


Impact on Economy: US

- \$122.1 bil. Impact on GDP; \$2 bil. in taxes.
- >2 mil. own horses.
 - 62% of owners have household income < \$50000
 - Mostly women, mostly 38 to 45 yrs. old.
- 0.5 mil. direct and 1.4 mil. indirect jobs

(American Horse Council Report

<http://www.horsecouncil.org/national-economic-impact-us-horse-industry>)



Types of Horses:

- **Pony:**
 - under 14.2 hands
 - show, children, therapy
- **Light (“hot” bloods):**
 - at least 14.2 hands
 - riding and work
- **Draft (cool bloods):**
 - at least 16 hands, largest breeds
 - heavy work
 - carriages, plowing



Pony Breeds:

- **Pony of the Americas**
- **Shetland Pony**
- **Welsh Pony**



Light Horse Breeds

- Quarter Horse
- Arabian
- Thoroughbred
- Paint Horse (breed & color)
- Standardbred
- Appaloosa (breed & color)



Draft Breeds:

- **Draft Breeds:**
 - **Belgian**
 - **Clydesdale**
 - **Percheron**



In addition . . .

- **Warm Bloods**

- **Dutch Warmblood, Hanoverian, Selle Francaise, Trakehner, Holsteiner.**
- **Predominately dressage, jumping, harness and equestrian Olympic sports.**

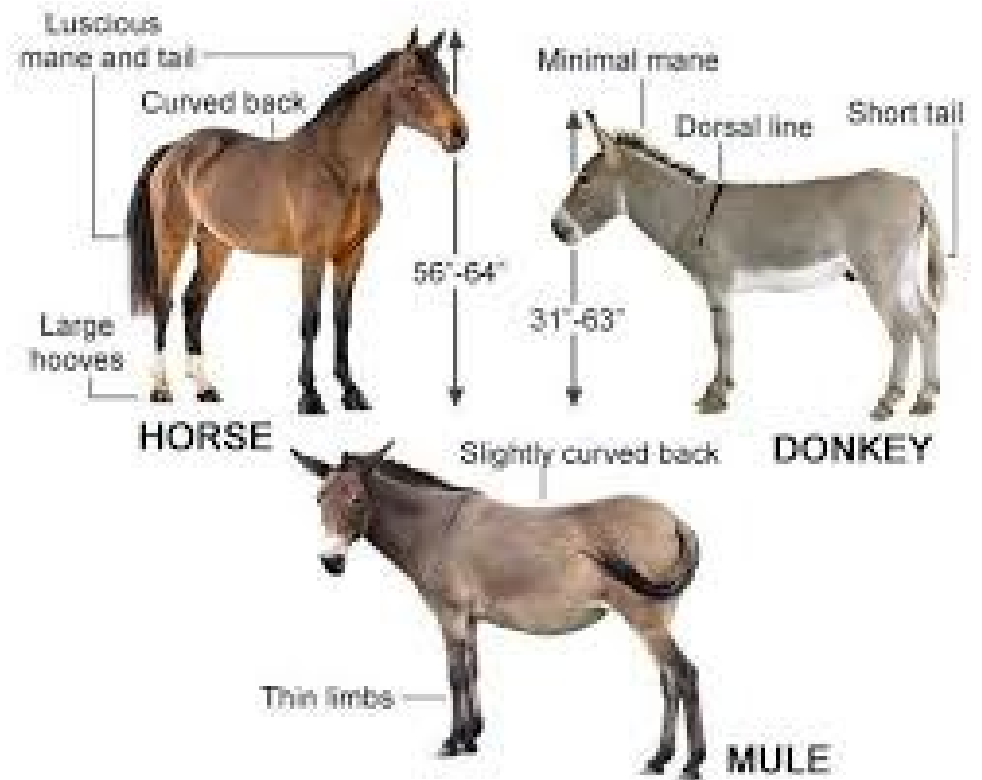
- **Gaited Horses (* gene called *DMRT3*)**

- **Morgan, Saddlebred, Tennessee Walkers.**



Donkey (Ass)

- male = jack
- female: jenny or jennet
 - mule = jack X mare
 - hinny = stallion X jenny
- horses = 64 chromosomes, whereas donkeys (*equus asinus*) = 62, therefore foals (mules) are sterile.
- Burro- A small donkey



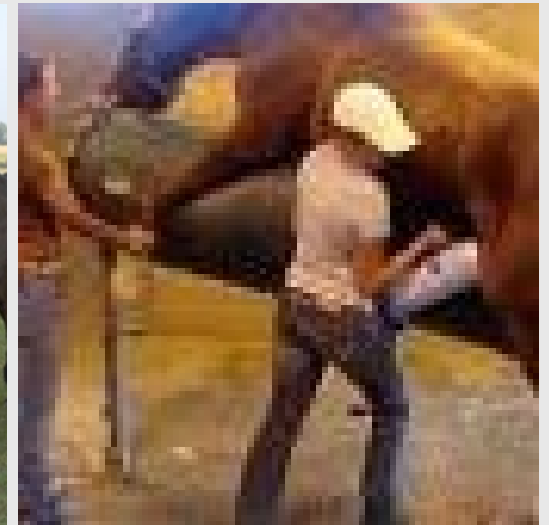
Management Stages/Practices:

- Breeding
- Weaning
- Training



Breeding:

- Horses are **seasonally polyestrous**
- Several Methods of Breeding:
 - AI: Commonly used in many breeds
 - Live Cover: Thoroughbred require live cover
 - Embryo Transfer: Newer technology, controversial
- ~ 3 years of age
- Gestation: 340 days (11 months)



Weaning:

- Born in the spring, weaned in the fall
- 6 to 7 months or as early as 4 to 5 months
- Producers desire foals born closer to Jan. 1st



Training:

- **halter breaking:**
Soon after birth
- **Basic handling:** at weaning
- **Saddle breaking:**
2 yrs. old
- **Heavy training:** after 3 yrs.





Poultry Terms

Rooster – A mature male chicken.

Hen – A mature female chicken.

Pullet – A young female chicken that has not yet laid eggs.

Cockerel – A young male chicken.

Broiler – A chicken raised for meat production.

Layer – A chicken raised for egg production.

Tom – A mature male turkey.

Poult – A young turkey.

Flock – group of turkeys or chickens

Capon- castrated male

Bantam- miniature breed

Terms

- Value Added – the extra labor or processing to increase the value or price of the item
- Vertically Integrated- a person or company that owns the whole life cycle of the industry (e.g. Tyson owns the birds that breed boiler, the boiler houses, and the harvest facilities)
- Molt- the process of losing feathers
- Incubation -21 days
- Broilers
- Layer

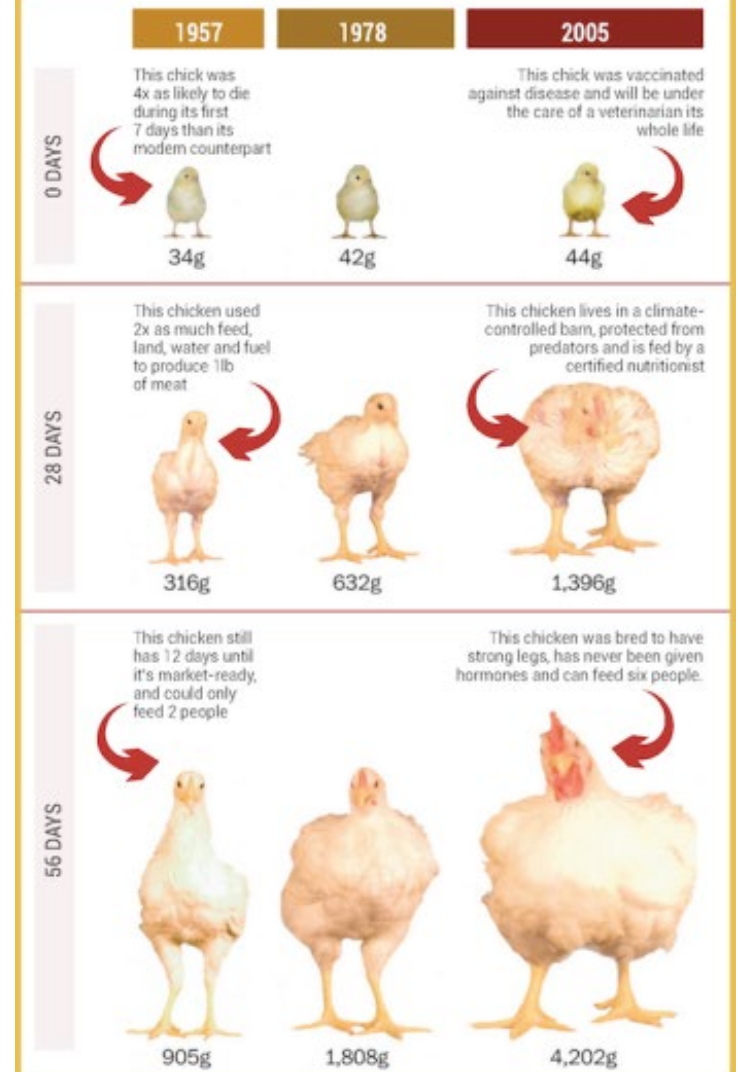
Production by Sector

Species	Number/year	Quantity
Broiler	9.1 billion	27 billion kg
Turkey	219 million	2.6 billion kg
Layers	308 million	92.6 billion eggs
Ducks	27 million	~ 64 million kg
<small>per USDA</small>		

Meat Type Birds - Broilers

- Production goal → Meat production
- Harvested at 35-47 days
- Market Weight = 5-8 pounds
- Efficiency is IMPORTANT
 - Feed Conversion Ratio (feed/gain)
 - 1.9 for broilers

YEP, CHICKENS ARE **BIGGER** TODAY



It's no secret that today's chickens are bigger than in years past. They're also the healthiest they've ever been. Find out how at chickencheck.in



Typical Broiler Housing

- Confinement for protection, disease control, efficiency of labor, land.
 - lit dimly: reduces cannibalism, encourages growth
 - Corn-soybean meal-based diet; crumble and pellets
 - 0.9 sqft/bird
- Floor systems (deep-litter)
 - Wood shavings, rice/peanut hulls, recycled paper, chopped straw
 - Bedding often recycled for following flocks before land application

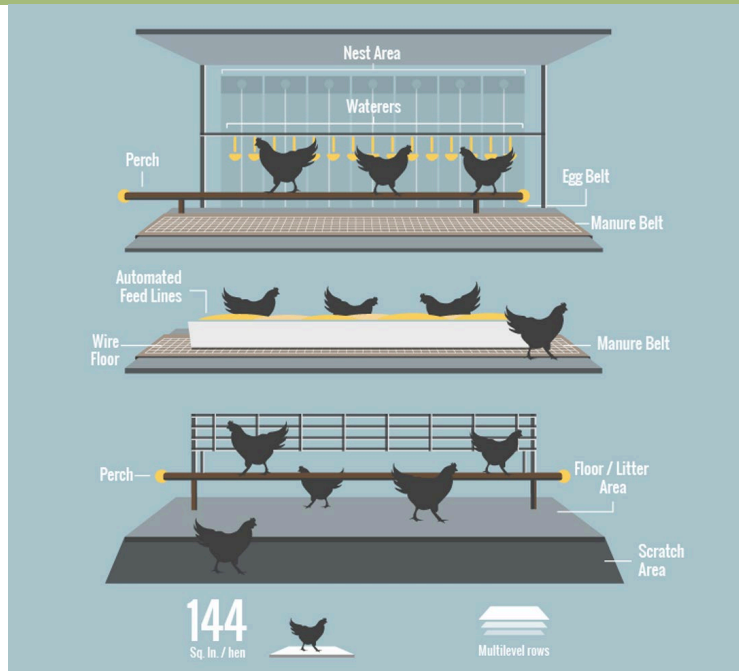
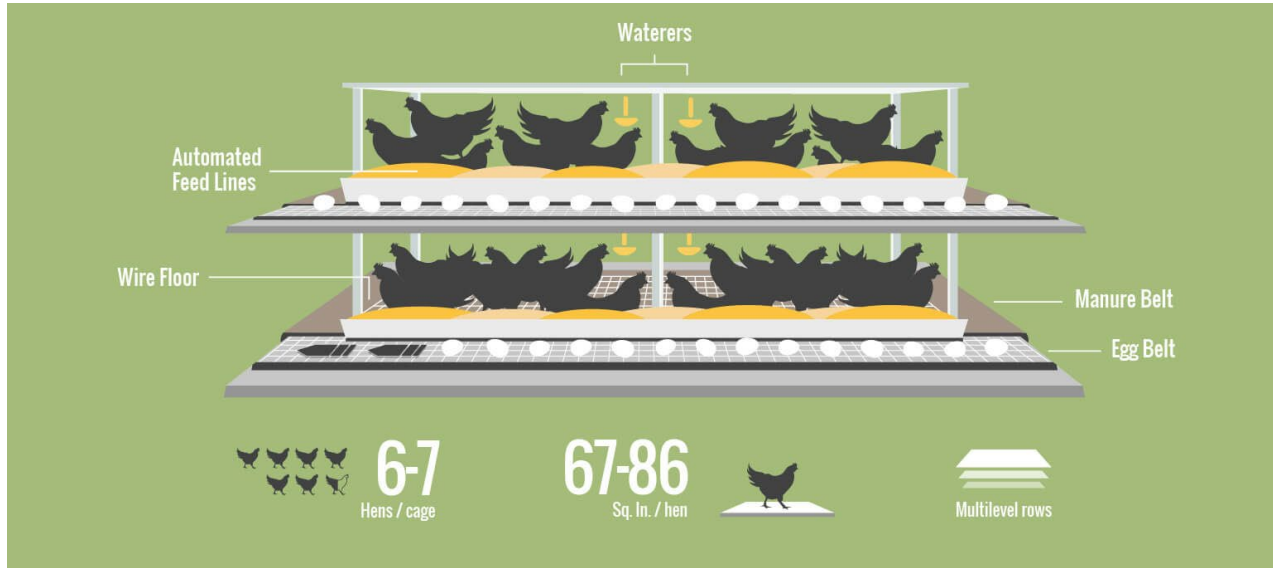


Egg Type Birds - Layers

- Production goal → Egg production
- Production cycle 80-100 + weeks
 - Pullet farm from hatch to 16 weeks
 - Layer farm from 16 to end of production
 - Produce ~289 eggs/hen
 - Corn-soybean meal diet; mash
- Market Weight = 3-4 pounds
- Egg is IMPORTANT



Layer Housing Types



Turkey Stages of Production

Incubation → 28 days

```
graph TD; A[Incubation → 28 days] --> B[Young are called Poults - Brooder]; B --> C[Sexually mature males are Toms - Growout facility]; C --> D[Sexually mature females are Hens - Growout facility];
```

Young are called Poults - Brooder

Sexually mature males are Toms – Growout facility

Sexually mature females are Hens - Growout facility

Meat Type Birds

- Production goal → Meat production
- Harvested at 14-20 weeks
- Market Weight = 12-50 pounds
- Efficiency is IMPORTANT
 - Feed Conversion Ratio (feed/gain)



Different Markets







- Hen Market
 - Exclusively females
 - Reared for 14 weeks
 - “Thanksgiving” turkeys
- Tom Market
 - Exclusively males
 - Reared for 18 weeks
 - Further Processed turkeys



Typical Turkey Housing

- Confinement for protection, disease control, efficiency of labor, land.
 - lit dimly: reduces cannibalism, encourages growth
 - Corn-soybean meal based diet; crumble and pellet
 - 0.9 sqft/brooder and 4 sqft/tom
- Floor systems (deep-litter)
 - Wood shavings, rice/peanut hulls, recycled paper, chopped straw
 - Bedding often land application

Types of litter

Type of litter	Advantage(s)	Disadvantage(s)
 Straw	Available depending on region	Health & safety, abrasive
 Wood shavings	Health - Comfort Biodegradable - Good absorption	Availability/shortages, cost, dust
 Pellets – straw or wood shavings	Good absorption	Stability of movements
 Hemp/silvergrass	Absorbent	Health & safety, cost
 Cereal husk (e.g. rice)	No caking	Health, confusion with food
 Corn cob	No dust	Cost, availability

Poultry “Classes”

- **American**
 - 13 Breeds that originated in USA/Canada
- **Asiatic**
 - 3 Breeds originated in China
- **English**
 - 6 Breeds originating in UK & Australia
- **Mediterranean**
 - 7 Breeds from Mediterranean region
- **Continental**
 - 10 Breeds from continental Europe
- **Other**
 - List of breeds that do not fit into classes listed above

Swine Terms

Boar – A mature, intact male pig.

Barrow – A castrated male pig.

Sow – A mature female pig that has given birth.

Gilt – A young female pig that has not yet farrowed.

Farrowing – Act of parturition

Piglet – baby pig

Herd – group of pigs



Stages of Production Cycle

- Farrowing
- Weaning
- Nursery
- Feeder/market hog
- Packer
- Replacement
- Breeding
- Gestation



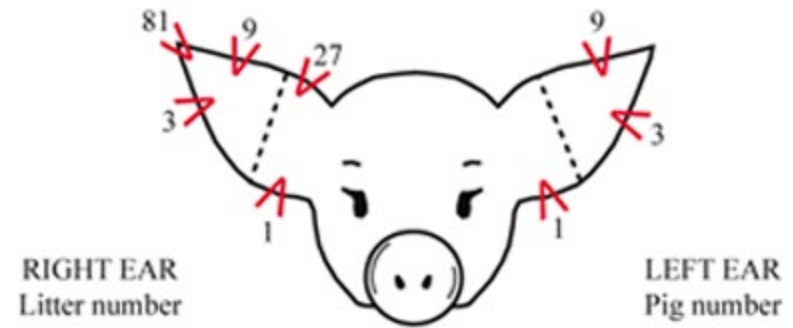
Farrowing

- Birth weights: 3-5 pounds
- Litter size: ~ 9 - 12 piglets
- Colostrum – antibodies and disease protection
- Issues
 - Pig safety, crates, sanitation
 - Cross-fostering
 - Comfort of sow and piglets



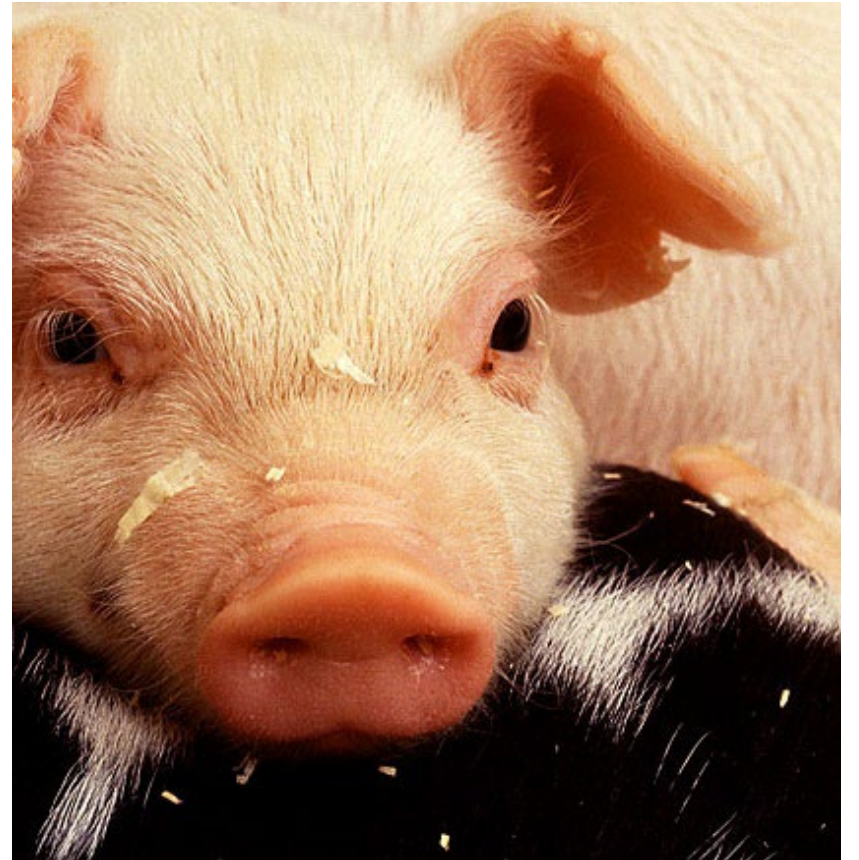
Processing

- Identification
 - Ear notch, tattoo, ear tag
- Clip needle teeth
- Dock tails
- Iron shots
- Castrate



Weaning

- ~ 3-4 weeks of age
- Weaned pig ~ 10 to 15 pounds, 21 days
- SEW: Segregated Early Weaning
 - 8-20 days
- To Nursery or direct to finishing
- Synchronization facilitated
 - “all-in/all-out”
- Concerns
 - Adaptation, socialization



The Nursery

- Purpose: transition from 10 to ~50 pounds
 - Socialization
 - Feeder, waterer discovery
 - Temperature change: 89 to 65
- Issues:
 - Sanitation
 - Diet (weaning to self feeder)



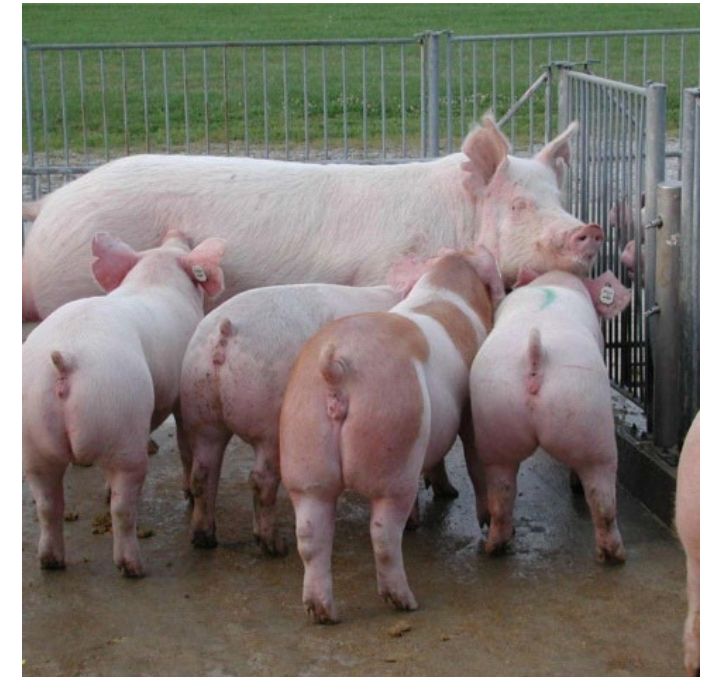
Feeder/Market hog

- In: Feeder pig ~50 pounds
- Out: Market (finished hog)
 - ~ 260-290 pounds
 - 5-6 months of age
- Concerns
 - Feed efficiency, carcass merit
 - Sold “on the grid”



Breeding

- Heat detection
- Natural vs. Artificial insemination (AI)
- Estrous synchronization



Artificial Insemination

More than 90% of
sows are bred AI

Much different
than cattle

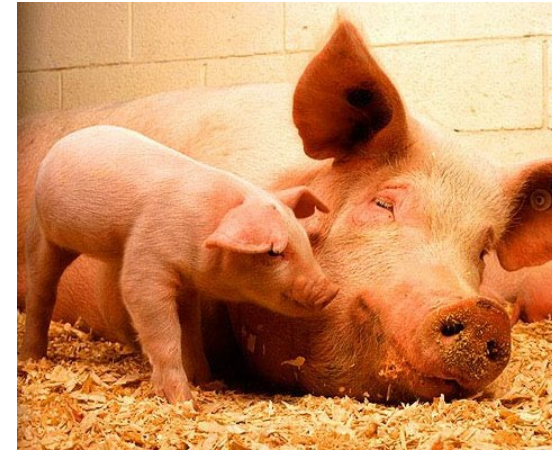
Semen handling

Proper
insemination
time

Used virtually
exclusively in
show pig industry

Gestation

- ~114 days
- Maintenance diet
- Concerns: health, housing



Outdoor Production Systems

Advantages

- Low input costs
- No significant manure handling
- More “anthropomorphically pleasing”



Disadvantages

- Less control over environment. Affects animal performance and health.
- Higher labor requirements for farrowing.
- Less profitable because less efficient

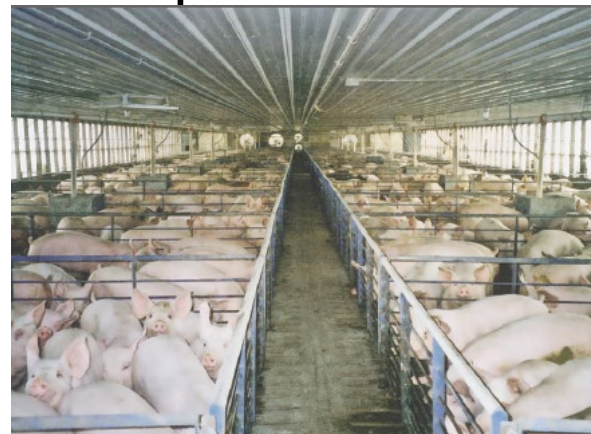
Indoor Confinement Systems

Advantages

- Constant, controlled environment
 - Heat/Cool
 - Humidity
 - Fresh Air
- Less Labor per pig, More specialized labor
- Constant flow of pigs and cash

Disadvantages

- Very expensive initial cost
- Hard to change size of production
- High energy requirements
- Requires large amount of land to dispose of manure



Breeds of Hogs

Sire (terminal)

- Hampshire
- Duroc
- Pietrain
- Poland China
- Spots
- Tamworth
- Berkshire

Maternal

- Yorkshire
- Landrace
- Chester White
- Meishan

Terminal Breeds

Berkshire

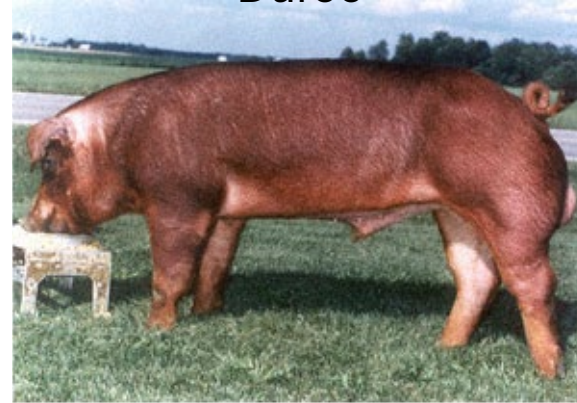


Hampshire



provided by National Swine Registry

Duroc



provided by National Swine Registry

Pietrain

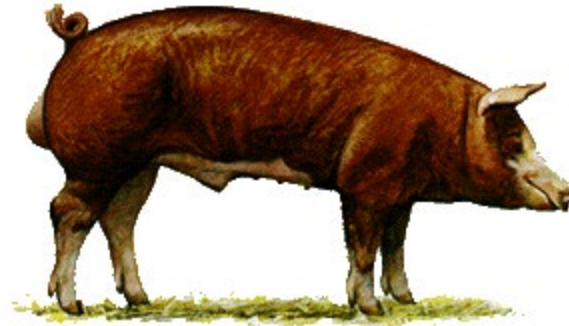


Terminal Breeds *con't*

Poland China



Hereford



Tamworth



Spots

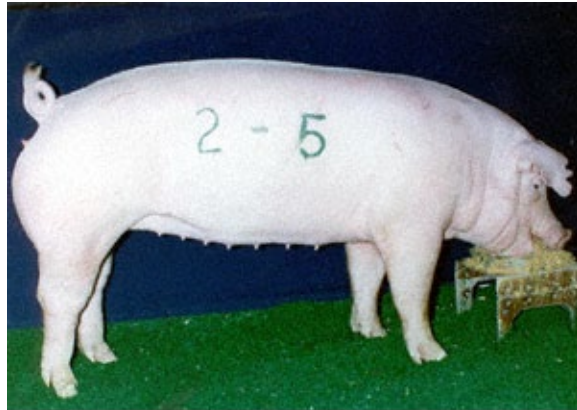


provided by National Swine Registry

Provided by Michael von Luttwitz

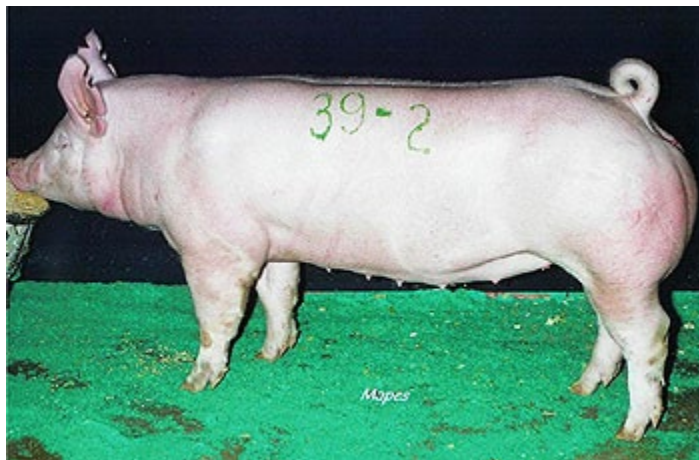
Maternal Breeds

Chester White

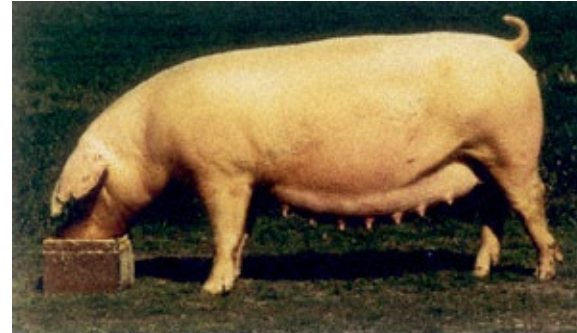


provided by National Swine Registry

Yorkshire



Landrace



provided by National Swine Registry

Meishan



Myths and Misconceptions

Myth: Livestock are raised in inhumane conditions.

Fact: Modern farming emphasizes animal welfare, with regulations and audits ensuring humane treatment.

Myth: Farmers overuse antibiotics.

Fact: Antibiotics are used carefully under veterinary supervision, with withdrawal times enforced to keep food safe.

Myth: Factory farms dominate livestock production.

Fact: **Over 97% of U.S. farms are family-owned**, including many large-scale operations.

Grass-Fed vs. Grain-Fed Beef – Grass-fed cattle eat only forage, while grain-fed cattle receive grain for faster growth. Both are safe and nutritious.

Organic vs. Conventional – Organic livestock must be raised without synthetic pesticides, antibiotics, or hormones, but conventional meat is equally safe.

Cage-Free vs. Free-Range vs. Pasture-Raised Eggs – Differ based on how much outdoor access hens have.

Questions?