DAIRY MODULE 1: BREEDS AND SELECTION,
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Objectives

In this module you will learn about the six major dairy breeds, their physical characteristics, origin, production capabilities, and other facts that make them unique or different from the other breeds. In addition, you will gain insight into why some producers may choose one breed over another and the strengths and weaknesses of each breed.

You will also learn about pedigrees and common dairy terms
Learning Objectives:

- **Cloverbud (Ages 5-8) should:**
  - Be able to identify the six major dairy breeds and one interesting fact about one of the breeds.
  - Know the difference between of a cow, a heifer, and a bull.

- **Juniors (Ages 9-13) should:**
  - Be able to identify the six major dairy breeds, the largest and smallest breed, the highest producing breed in pounds of milk, the highest producing breed in butterfat percent
  - Know key terms on the first slide of dairy terms

- **Seniors (Ages 14-18) should:**
  - Be able to identify the six major dairy breeds and their physical characteristics (color, size, and production rank)
  - Know the meaning of the highlighted terms throughout the module
  - Understand the difference between recessive and dominate genes and be able to give an example
  - Be able to read a basic pedigree
Overview of Breeds, Selection, and Terms

- Beef vs Dairy
- Focus on 6 major Dairy Breeds
- Breeds and Selection
- Pedigrees
- Dairy Terms
Cattle Breeds

Cows come in all shapes and sizes
And are raised for human use
Consumption and Work

Those with common size, color, abilities, and other characteristics are classified as breeds

Cattle are broken down into 3 Categories
Dairy
Beef
Dual purpose
Cattle Breeds

Dual Purpose
used for both meat and milk

Dairy Breeds
Utilized for milk production
Do well in converting feed and forages into milk

Characteristics
Lean
Angular
Well developed mammary system

Beef Breeds
Utilized for meat production
Do well in converting feed and forage into meat

Characteristics
Heavy muscle
Rapid growth
Dairy Breeds

There are over 800 different breeds of cattle in the world.

Only 8 of these breeds are characterized Dairy:

- Holstein
- Red and White Holstein
- Jersey
- Guernsey
- Brown Swiss
- Ayrshire
- Milking Shorthorn
- Milking Devon

All of the major dairy breeds originated in Europe.
Holstein

Color Pattern:
Black & White or Red & White
Can be mostly black, mostly red, mostly white or anywhere in between

Origin:
the Netherlands
Came to the US in 1852

Size:
Largest of the Dairy Breeds
Average mature cow weighs 1,500# and stands 58 inches tall at the shoulders

Production:
Average U.S. Production 25,000# of milk/lactation
Produce more milk than any other dairy breed
Average Fat content in milk: 3.65%
Average protein content in milk: 3.2%
Holstein calves weigh an average of 90# at birth.

The most popular dairy breed and make up 90% of the US dairy population.

The World Record holder for milk production is a Holstein; Selz-Pralle Aftershock 3918 produced 78,170 of milk in one lactation in 2017.

The Holstein breed is known for high milk production, but has less butterfat and protein based on percentage in the milk, compared other breeds.
The Red and White coloring in some Holsteins is caused by a recessive gene and appears when the dam (mother) and sire (father) are both carriers.

Just like in humans, every animal inherits two genes for each trait from their parents. Some genes are more dominant than others. For example, brown eyes are dominant over blue eyes. If someone has a brown eyed gene and a blue eye gene, they will have brown eyes. They will only have blue eyes if both genes are blue.

The brown eyed gene is called the dominant gene and the blue eyed gene is the recessive gene, just like the black hair coat gene is dominant and the red hair coat is recessive.
Jersey

Color Pattern:
Vary from a very light gray or mouse color to a very dark fawn or a shade that is almost black. White markings are also acceptable.

Origin:
The Isle of Jersey in the English Channel
Came to the US in early 1850’s

Size:
Smallest dairy breed
1,000# mature weight

Production:
Produce milk with highest fat and protein
Average U.S production: 18,020#s
Average Fat: 4.8%
Average Protein: 3.7%
Jersey

Jerseys are the most efficient of the dairy breeds. They produce more milk per pound of body weight than any other breed.

They are also known for high fertility rate and low dystocia rate (calving difficulty) but have a high rate of hypocalcemia (milk fever).

Milk Fever is a disorder that occurs following the cow giving birth when milk production exceeds the cow's ability to mobilize calcium.
Guernsey

Color Pattern:
Fawn (light reddish brown) to red and white
Hooves, udder, tail, and muzzle do not have pigment so in a purebred these will always be white or cream colored.

Origin:
The Isle of Guernsey in the English Channel
Came to the US in 1840

Size:
Moderate in size
1,200# mature weight

Production:
Average U.S production: 17,000#s
Average Fat: 4.7%
Average Protein: 3.4%
Guernsey milk is “golden” in color due to the high protein and fat components and also because of a high concentration of beta-carotene.

Beta-carotene is also the pigment that gives carrots their orange color. The body converts this substance to Vitamin A, which is important for healthy eyes, immune system, skin, and mucous membranes.
Brown Swiss

Color Pattern:
Range from a deep brown that is almost black, to a light greyish brown.
Will also have a dark tail switch, dark hooves, deep brown eyes and a black nose.

Origin:
Switzerland
Came to the US in 1869

Size:
Larger dairy breed (2nd in size to Holstein)
1,500# mature weight

Production:
Produce milk with highest fat and protein
Average U.S production: 22,040#s
Average Fat: 4.0%
Average Protein: 3.5%
Brown Swiss

Brown Swiss are known for having very good feet and legs. Sound feet and legs were a must for the beginnings of the breed in Switzerland grazing the mountain slopes.

Originally known as a dual purpose breed utilized for meat and milk.

Brown Swiss have the longest gestation period of the dairy breeds- 287 days. This is 7 days longer than the average gestation of 280 days.

Gestation period is the length of time the animal is pregnant.
Ayrshire

Color Pattern:
Red and white- Can range from a light shade of orange to dark brown.
Can be nearly all white or all red
Brindle and Roan color patterns are also possible

Origin:
The County of Ayr in Scotland
Came to the US in 1822

Size:
Moderate sized dairy breed
1,400# mature weight

Production:
Average U.S production: 14,500#s
Average Fat: 3.9%
Average Protein: 3.3%
Ayrshire

Ayrshire were once known for their horns. If properly trained, they would gracefully curve out and could grow up to 2 feet or more in span. Horns are not practical now and can unintentionally cause injury to other cattle and people, so cattle born with horns are dehorned at a young age.

Another distinct characteristic of Ayrshire cattle is the possibility of a brindle or a roan hair coat. Brindle is a coat coloring pattern in animals that is sometimes described as "tiger-striped". The streaks of color are irregular and darker than the base color of the coat, although very dark markings can be seen on a coat that is only slightly lighter.
Milking Shorthorn

Color Pattern:
Red, red with white markings, white, or roan

Origin:
Northeastern England, in the Valley of the Tees River
Came to the US in 1783

Size:
Moderate sized dairy breed
1250# mature weight

Production:
Produce milk with highest fat and protein
Average U.S production: 15,000#s
  Average Fat: 4.0%
  Average Protein: 3.5%
Milking Shorthorn

Like Ayrshires, Milking Shorthorn can also be Roan in color. In these breeds, white and red coat color genes are co-dominant, resulting in the roan (evenly mixed white and red) and unique color patterns.

Milking Shorthorn are another dual purpose breed. However, in many cases there is more of a distinction between those that are used for milk and meat. They are registered as Milking Shorthorn or just Shorthorn.

provided by Hoard's Dairyman
Dairy Breeds and Selection

Traits and Selection

Milk Production Facts

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<th>body wt.</th>
<th>fat</th>
<th>lbs. Fat</th>
<th>lbs. Milk</th>
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<td>3.65</td>
<td>912</td>
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<tr>
<td>Ayrshire</td>
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<td>Jersey</td>
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<td>864</td>
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<td>Brown Swiss</td>
<td>1,500</td>
<td>4.00</td>
<td>880</td>
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<tr>
<td>Guernsey</td>
<td>1,200</td>
<td>4.70</td>
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<td>17,000</td>
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</table>

Things to Remember

Each of these breeds have strengths and weaknesses that producers have to take into account when they are deciding which breed(s) will make up their herd.

- Holsteins produce the most milk, but have the lowest butterfat, are the largest of the breeds, and require more feed than most.
- Jerseys produce one of the least amounts of milk, but have the highest butterfat and require less feed.
- Brown Swiss are similar in size and feed requirements to a Holstein, but produce less milk. However, they are know for having very sound feet and legs and longevity (they stay in the herd a long time).
- Guernsey produce less milk, but are known for producing milk high in beta-carotene and A2/A2 milk.
Reading Pedigrees

Pedigree formats and most information contained in them is the same regardless of the breed.
Reading Pedigrees

The top portion of the pedigree has information about that particular animal and what she may be genetically capable of producing.

- **Animal’s Name**
- **Registration number**
- **Breed and what percentage registered**
- **Date of Birth**
- **Genetic averages or numbers**
- **Identification number**
- **Owner**
Reading Pedigrees

The remainder of the pedigree is the information on her parents (dam and sire).

Her sire and dam are listed on the left side of the page. The sire (father) is listed on top and the dam (mother) is listed on the bottom.

Information on her grandparents is listed on the right hand side as follows:
- Paternal grandsire
- Paternal grandam
- Maternal grandsire
- Maternal grandam

Information on their production and genetic averages is included under each
Cow Pedigrees

Breeders can have their cattle evaluated for type (conformation) through their breed association's linear classification programs. This linear classification is based on the functional soundness and appearance of the animal. Classification scores are a tool producers can use to breed, develop and market higher producing, more durable cows.

This information can also be found on the pedigree

On a cow that has been classified, it will show her classification score and at what age she was classified

This cow scored Good Plus 82 when she was 5 years and 10 months old.

The letters and symbols that follow are score for specific traits. Capacity, Dairy Strength, Rump, Feet and Legs, and Udder
Cow Pedigrees

A cow will also have her production records included in her pedigree for each lactation.

Those records will include:
- **AGE** - Her age when the lactation started
- **X** - How many times a day she was milked during that lactation
- **Days** - Number of days she milked in that lactation
- **Milk** - Pounds of milk she produced in that lactation
- **DCRM** - Data Collection Rating for Milk
- **%** - Average Percent Fat
- **Fat** - Total pounds of fat she produced during that lactation
- **%** - Average Percent Protein
- **PRT** - Total pounds of Protein
PTPI (Pedigree Total Performance Index) is an index based on a combination of traits. It helps sort out animals based on their genetic potential to be the productive in a herd. It takes into account production, type, animal health traits like somatic cell count, and pregnancy rates.

PTAs (Predicted Transmitting Ability) express the level of genetic superiority or inferiority an animal is expected to transmit to their offspring and helps producers rank animals based on their genetic merit.

PTAs are listed for M(milk), F(fat), P(protein), PL(Productive Life), SCS(Somatic Cell Count), DPR(Daughter Pregnancy Rate), DCE(Daughter Calving Ease), T(Type), UDC (Udder Composite), and FLC(Feet and Leg Composite)
Dairy Terms

- Bull - Mature male dairy animal
- Cow - Mature female dairy animal that has produced one or more calves
- Heifer - Female dairy animal that has not borne a calf
- Calf - Male of female dairy animal under one year of age
- Steer - A castrated male used for beef production
- Freemartin - Infertile heifer that is born twin to a bull calf
- Polled - Condition of naturally hornless
Dairy Terms

• Springer - cow or heifer showing signs of being close to calving

• Calving/Parturition - giving birth

• Dairy Character - characteristics indicating the animal will be a high milk producer

• Butterfat - percent of fat in the milk

• Milk Production - amount in pounds of milk that a cow produces during a lactation period

• **Lactation** - span of time that a cow is giving milk
  • Usually around 300 days/year

• **Estrus** - Animal is in heat and can be bred
  • Releases egg at this time
  • Occurs on average every 21 days
  • Average length of estrus is 12-24 hours
Major Breeds of Dairy Cattle

Quiz

1

2

3

4
Major Breeds of Dairy Cattle

Quiz

1. Which breed produces the largest volume of milk?
2. Which breed is known for having exceptional feet and legs?
3. Which breed(s) can have roan haircoat coloring?
4. Which breed is the most efficient?
5. Which breed has milk that is high in beta carotene?
6. Which 2 breeds do you think are know as the Channel Island Breeds?
Major Breeds of Dairy Cattle

Quiz

Brown Swiss

Holstein

Jersey

Guernsey
Major Breeds of Dairy Cattle Quiz

1. Which breed produces the largest volume of milk? **Holstein**
2. Which breed is known for having exceptional feet and legs? **Brown Swiss**
3. Which breed(s) can have roan haircoat coloring? **Ayrshire and Milking Shorthorn**
4. Which breed is the most efficient? **Jersey**
5. Which breed has milk that is high in beta carotene? **Guernsey**
6. Which 2 breeds do you think are know as the Channel Island Breeds? **Jersey and Guernsey**
Dairy Breeds and Selection

Can you remember what you’ve studied?

1. What is a bull?
2. What is a heifer?
3. What is the average weight of a Holstein calf?
4. What is dystocia? Which breed is known for having very little dystocia?
5. What is a cow?
6. What is the term for the span of time that a cow is giving milk?
7. What causes the Red and White color pattern in a Holstein? Give another example of this.
8. What is the term for the length of time a cow is pregnant?
9. PTA is an acronym for what?
10. What gives Guernsey milk its golden color?
Answers

1. What is a bull? **Mature male dairy animal**
2. What is a heifer? **female dairy animal that has not borne a calf**
3. What is the average weight of a Holstein calf? **90 pounds**
4. What is dystocia? **calving difficulty** Which breed is known for having very little dystocia? **Jersey**
5. What is a cow? **Mature female dairy animal that has produced one or more calves**
6. What is the term for the span of time that a cow is giving milk? **Lactation**
7. What causes the Red and White color pattern in a Holstein? **A recessive gene** Give another example of this. **Blue eyes**
8. What is the term for the length of time a cow is pregnant? **Gestation**
9. PTA is an acronym for what? **Predicted Transmitting Ability**
10. What gives Guernsey milk its golden color? **Beta Carotene**