

Unit A: Introduction to Cattle Management

Lesson 2: Exploring the Dairy Industry

Student Learning Objectives:

Instruction in this lesson should result in students achieving the following objectives:

1. Discuss selection of dairy cattle to encourage herd improvement.
2. Explain dairy marketing options.
3. Explore seven major breeds of dairy cattle used for milking.

Recommended Teaching Time: 1 hour

Recommended Resources: The following resources may be useful in teaching this lesson:

Ensminger, M.E., *The Stockman's Handbook*. Danville, Illinois: Interstate Publishers, Inc., 1992.

Lee, Jasper S., *Introduction to Livestock and Companion Animals 2nd Edition*. Danville, Illinois: Interstate Publishers, Inc., 2000.

Internet keywords: dairy, Holstein, dairy judging, milk production, dairy farm, and Dairy Herd Improvement.

List of Equipment, Tools, Supplies, and Facilities:

- Writing surface
- PowerPoint Projector
- PowerPoint Slides
- Transparency Masters
- Copies of student worksheets

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide 2):

- Artificial insemination (AI)
- Beef
- Butterfat
- Cattle by-products
- Crossbreeding
- Culling
- Dairy Herd Improvement (DHI)
- Outcrossing
- Purebreeding
- Veal

Interest Approach:

Begin a discussion with students about herd improvement. What do they know about beef herd improvement? How do dairy producers improve their herd? Transition to Objective 1.

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Objective 1: Discuss selection of cattle to encourage herd improvement.

Anticipated Problem: How do I select cattle to improve my herd?

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- I. Being able to recognize desirable and undesirable traits is important in herd improvement. You must use breeding techniques to continually improve your herd while **culling** or removing animals from your herd based on set criteria or other situations that may arise. There are many options to consider when trying to encourage herd improvement.

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- A. Keeping accurate records on the breeding program, feed consumption and milk production can help you with herd improvement. Comparing records with other herds can also help the dairy producer make herd improvements..

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- B. Permanently removing or culling animals from your herd is a way of opening up space in your business for more profitable animals. Some of the main things to consider before culling are milk production, reproduction history, age of animal, chronic health problems, and cows that may be a threat to workers because they are jumpy and dangerous.

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- C. Using a bull for natural breeding or using artificial insemination is another option to consider. **Artificial insemination (AI)** is a method, other than natural mating, used to bring sperm in contact with eggs. When using AI, you can select sperm from hundreds of different donors. You can look at daughters of the sire and determine if they have the traits you are trying to improve in your own herd. The disadvantage of AI is catching your cows in heat and taking the time to breed them. Keeping a bull on your farm limits your genetic pool, but saves time by letting the bull do heat detection for you.

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- D. Purebreeding is another means of herd improvement. **Purebreeding** is the mating of a purebred animal to another purebred animal. With purebreeding, you can improve your herd by keeping registration papers of the ancestry of both the sire and the dam. If you use this system, you may want to become familiar with genetics so you can pick the best sire for improvement of offspring.

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- E. Outcrossing is another useful system of breeding. **Outcrossing** is the mating of an unrelated male and female of the same breed. This method will simply help produce hybrid vigor within the breed you are outcrossing.

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- F. **Crossbreeding** is mating one breed of cattle to a recognized, but different breed. For example: you would be crossbreeding if you mated a Holstein with a Jersey animal. There are many advantages to crossbreeding including higher production and more resistance to diseases. Disadvantages include not being able to register the animals because they are not purebred and difficulty predicting what the offspring will look like.

Use TM: 2-1 to discuss herd improvement options.

Objective 2: Explain dairy marketing options.

Anticipated Problem: What are some of the marketing options with dairy cattle?

- II. Even though the dairy industry is probably best known for its milk production, there are several items in addition to milk products that are used to generate an income from a dairy farm.

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- A. Milk production is important to the economy because milk is used in so many different products. If you compare nutrition, milk is one of the least expensive products on the food and beverage market. Milk is produced by a cow after its first calf. Cows will continue to produce milk if they are milked frequently and fed a nutritious ration for a long time. When milk production starts to drop, the cow must be bred again and have another calf to produce more milk. Some producers also use bovine growth hormone (BGH) to increase milk production for extended periods of time.

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- B. **Veal** is the meat of young calves that are not used for replacement animals in the dairy herd. Veal calves must be fed a specific diet to keep the color of the lean meat in the carcass light pink. Veal animals are usually under three months of age and have been fed a diet of milk only.

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- C. **Beef** is the meat from cattle. When cows are no longer profitable because of age, production, or reproductive problems, they are shipped to slaughter and used to make beef. Male offspring are also used for beef, if they are not kept for a breeding program. They are fed for period of time and then slaughtered for their meat and other products that are made from their hide, hoofs, and organs.

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- D. **Cattle by-products** are products made from various parts of cattle. Cattle by-products come from carcass, fat, bones, glands, intestines, brains, heart, and many other places. Some by-products are used to make cat and dog

food. Others are used for medicines, marshmallows, cosmetics, furniture, and clothing.

Use TM: 2-2 to discuss money making options on a dairy farm. Use WS: 2-1 to research cattle by-products.

Objective 3: Explore the seven major breeds of dairy cattle used for milking.

Anticipated Problem: What dairy breeds are used for milking?

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III. There are seven major breeds of dairy cattle that are used for milking. Each breed has advantages and disadvantages.

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A. Holstein cattle are the most popular breed of dairy cattle. Holstein is shortened from Holstein-Friesian and originated in the Netherlands. They are black and white and very large. The cows can weigh upwards of 675 kilograms and the bulls are known to get as large as 1,000 kilograms. The biggest advantage of the Holstein is that they produce the largest average amount of milk per cow in comparison to other breeds. The disadvantage of the breed is even though they produce more milk, it is lower in butterfat and protein. **Butterfat** is simply the fat content in the milk.

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B. The red and white Holstein breed evolved from the black and white Holstein. Other than the color difference, all other characteristics are very similar to the Holstein. They are large animals that have high milk production but lower butterfat and protein than other breeds.

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C. Ayrshire cattle originated in Scotland. The colors are light to dark cherry red, browns, and white in any combination. There is a polled strain of Ayrshire and they are most widely known for having strong feet and legs, grazing ability, and strong well-attached udders.

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D. Brown Swiss dairy cattle originated in the Alps of Switzerland. In comparison to the Holstein, Brown Swiss have a higher fat and protein ratio and a calmer disposition. Brown Swiss are solid brown in color. The browns vary greatly from very light to dark. Both the nose and tongue are black and the muzzle has a light-colored band around it.

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E. Guernsey dairy cattle originated on the island of Guernsey. Their color is mostly fawn with clearly defined white markings. Guernsey cattle usually have smaller calves compared to the other breeds. They are most commonly known for their milk color because it is more golden than the other breeds of dairy cattle. The popularity of this animal has declined, even though they are small, quiet cattle that are very easy to work with.

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F. Jersey cattle originated on the island of Jersey. They vary greatly in colors and color patterns but can be fawn, near white, grayish, with or sometimes without, white markings. The breed is especially known for their udder qualities: well-shaped with strong attachments. Even though the amount of milk is lower in Jersey cattle compared to other breeds, the butterfat and protein content is the highest. The popularity of this small breed has increased in the last few years.

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G. The Milking Shorthorn originated in England and can be any combination of red and white, just red, or just white. The breed is very adaptable to a variety of situations and is commonly used for beef production, as well as dairy.

Use TM: 2-3 to discuss the various milking breeds.

Review/Summary: Focus the review and summary of the lesson around the student learning objectives **(PowerPoint Slide 22)**. Call on students to explain the content associated with the objectives.

Application: Application can involve the following student lab sheet:

WS: 2-1 Cattle By-Products Research

Evaluation: Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activity. A sample written test is included.

Answers to Sample Test:

Matching

1. C
2. D
3. B
4. A

Fill-in-the-blank

1. Artificial insemination
2. Butterfat
3. Cattle by-products
4. Crossbreeding
5. Beef

Short Answer

The biggest advantage of the Holstein is they produce the largest average amount of milk per cow in comparison to other breeds. The disadvantage of the breed is while they produce more milk, it is lower in butterfat and protein. Brown Swiss have a higher fat and protein ratio and a calmer disposition. Guernsey cattle usually have smaller calves compared to the other breeds. They are most commonly known for their milk color; it is more golden than the milk of other breeds.

Exploring the Dairy Industry

Name: _____

Matching: Match each word with the correct definition.

- | | |
|-----------------|------------------------|
| a. Purebreeding | c. Outcrossing |
| b. Veal | d. Reproductive system |

- _____ 1. When you mate a male and female of the same breed that are not related.
- _____ 2. The system used to reproduce cattle by natural, in vitro, and various artificial means of insemination.
- _____ 3. The meat of young calves that are not used for replacement animals in the dairy herd.
- _____ 4. When you mate a purebred animal to another purebred animal.

Fill-in-the-blank: Complete the following statements.

1. Using a method other than natural mating to bring sperm in contact with eggs is called _____.
2. Fat content in the milk is referred to as _____.
3. _____ are products that are made from various parts of cattle and used to make many common items.
4. _____ is mating one breed of cattle to a recognized, but different, breed.
5. The meat from cattle is called _____.

Short Answer: Answer the following question.

Compare and contrast Holstein, Brown Swiss, and Guernsey cattle.

SELECTION OF CATTLE TO ENCOURAGE HERD IMPROVEMENT

- DHI is a dairy testing and record keeping program through which you test your herd and compare it with other herds.
- Permanently removing or culling animals from your herd is a way of opening up space in your business for more profitable animals.
- Using a bull for natural breeding or using artificial insemination is another option.
- Purebreeding is the mating of a purebred animal to another purebred animal.
- Outcrossing is the mating of an unrelated male and female of the same breed.
- Crossbreeding is mating one breed of cattle to a recognized, but different, breed.

TM: 2-2

EXAMPLES OF MARKETABLE PRODUCTS THAT COME FROM DAIRY ANIMALS

- Cat and dog food
- Medicines
- Marshmallows
- Cosmetics
- Furniture
- Clothing
- Beef
- Milk
- Milk products
- Veal

BREEDS OF DAIRY CATTLE

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

CATTLE BY-PRODUCTS RESEARCH

Instructions:

List 25 cattle by-products and the part of the animal from which they are taken.

Cattle By-products	Animal Part
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____
10.	_____
11.	_____
12.	_____
13.	_____
14.	_____
15.	_____
16.	_____
17.	_____
18.	_____
19.	_____
20.	_____
21.	_____
22.	_____
23.	_____
24.	_____
25.	_____