Animal Reproduction Management

MANY PEOPLE feel that raising animals is an easy task with few managerial responsibilities. What do you think? Are these people correct? Moreover, when looking at the agriculture industry, many people are often surprised to realize the extent to which planning and preventive measures are involved in animal production. Throughout this unit, you will discover the common breeding systems utilized in today's animal production industry. In addition, this unit details the various reproductive management practices used by livestock producers.

Objectives:

1. Explain common breeding systems and reproductive management practices used in animal production.
2. Identify common reproductive diseases that affect common agricultural animals.

Key Terms:

breeding readiness
closebreeding
crossbreeding
grade animal
grading up
heterosis
hybrid vigor
inbreeding
infectious disease
linebreeding
outcrossing
purebred
reproductive health management
straightbreeding
venereal disease

Common Reproductive Diseases

Disease can be a deterring factor in the success of reproduction in animals. It is important that producers take proper precautions to prevent and, if necessary, treat the disease. Without taking precautionary steps or understanding how to treat reproductive diseases, animals will not be successful at producing offspring, limiting the number of animals for market and, if severe enough, leading to the extinction of a species.

Reproductive diseases can be either venereal or infectious diseases. A **venereal disease** is transmitted sexually during the mating of animals. The outbreak of venereal diseases can be quite large if they are spread by one male animal naturally mating with several female animals. In addition, these diseases can also be spread by not properly cleaning equipment when utilizing artificial insemination. Some venereal diseases can be treated, while others have no cure. A common venereal disease in cattle, sheep, and pigs is vibriosis. Vibriosis can cause infertility, abortion, and other physiological problems.

An **infectious disease** is caused by pathogens, such as viruses, bacteria, and parasites. Unlike venereal diseases, infectious diseases can spread without sexual contact and can infect all animals in a herd at the same time. The results of infectious diseases include infertility, abortion, disrupted reproductive cycles, and other abrasive effects. Many infectious reproductive diseases can be found in domesticated and wild animals. They include brucellosis, tuberculosis, and leptospirosis. These diseases can be passed from animal to animal simply by exposure to each other. Infectious reproductive diseases can be passed from wild to domesticated animals and to other species and can spread out of control if not properly treated or prevented.

To have successful animal production, it is important for producers to take proper preventive measures against reproductive diseases and to properly treat them when they occur. Management practices that prevent reproductive diseases include proper sanitation of breeding equipment, preventive vaccinations, limited exposure to outside animals, and utilization of artificial insemination. Infectious diseases can be prevented by limiting exposure of outside animals and giving proper vaccinations to animals. Reproductive disease vaccinations can be highly effective if given at the appropriate time. They should always be given prior to the breeding season and to any new animal in the herd. Not all diseases can be fully cured through vaccination, but such diseases can be controlled.

Other treatment options may include isolating an animal for a period of time, removing an animal from the breeding program, or culling an animal from the herd. Animals suffering from a reproductive disease should be treated at the first signs of the disease, treated regularly under veterinarian care, and eliminated from the herd if the disease persists.

FIGURE 1. Preventive vaccinations help to keep the herd healthy. (Courtesy, Agricultural Research Service, USDA)

Reproductive Management Practices

For producers to have successful reproductive performance from their animals, they must implement management practices. These practices are designed to enhance the reproductive process and allow animals to produce at their highest capability. By utilizing reproductive management practices, more animals will be born healthy and raised successfully, and breeding animals will become pregnant again in a timely manner. Examples of reproductive management include proper male-to-female ratios, proper reproductive health, and evaluating animals for breeding readiness.

Animals breeding naturally in a herd or flock should have proper male-to-female ratios. When the females are ready to breed, enough males must be available to assure every female is bred. Males may become injured or ill if they are forced to breed too many females in a short period of time.

Age of the animals should be considered when determining the proper male-to-female ratio. Older, more mature males can breed more females than a younger, developing male. A typical management practice is to utilize both young and older males in a breeding system. This allows for the younger animal to develop and increases the efficiency of the breeding system. It also supplies a backup plan if one of the males becomes ill or is injured.

Reproductive health management is the evaluation of all factors prior to breeding. It is a practice that should be considered well in advance of the breeding season. It includes being sure that all animals are ready to breed; all vaccinations have been given before, during, and after pregnancy; and proper techniques are being utilized.

Animals should be the proper age and weight at breeding and have the capacity to carry a pregnancy to term. Both male and female breeding animals should be properly vaccinated. By administering vaccinations, producers are implementing preventive measures for disease and other illnesses. A veterinarian should be consulted to develop a reproductive health vaccination program for each herd.

Another aspect to consider is that the proper environment for animals exists in order to ensure proper reproductive practices. This includes proper pen space, with a solid natural surface. If the pen is full of manure or mud, animals cannot safely reproduce. All these reproductive health management practices will enhance the success of a breeding program.

Producers should also review the **breeding readiness** of animals, which is the physiological evaluation of animals to determine if they are ready to enter a breeding program. This

FIGURE 2. Reproductive health management increases the chances of healthy offspring. (Courtesy, Agricultural Research Service, USDA)

evaluation includes age, weight, development, and the environment in which the animals will enter.

Animals must be at a certain age in order to breed. Proper age varies among species but typically occurs around or shortly after one year of age. Animals must also be a proper weight prior to being ready to breed. If they are not carrying enough muscle and fat, they will not breed easily. Their bodies will not be able to dedicate energy to reproduction because they are under the proper weight.

Another consideration is the environment in which the animals will enter. Animals being raised in a closed environment, such as a confinement, have different needs than animals entering a pasture breeding program. They must be able to endure the stress they will encounter in order to be successful.

Common Breeding Systems

Producers utilize a variety of breeding systems to ensure highly effective reproductive animals. The system of breeding selected by a producer depends on the kind of livestock operation. There are two basic systems of breeding used in livestock production: straightbreeding and crossbreeding. Within these two basic systems, there are several variations of each system available for producers to utilize.

Straightbreeding is mating animals of the same breed. There are several variations of this system. Some of the most common are purebred breeding and inbreeding. A **purebred** animal is an animal of a breed. Both parents of the animal must have been purebred. The production of purebred animals is a specialized business. These animals provide the foundation stock for crossbreeding to produce market animals.

Inbreeding is the mating of related animals. This increases the genetic purity of the stock produced. The pairing of the same genes is increased, and offspring become more genetically homozygous. There are two types of inbreeding: closebreeding and linebreeding.
Closebreeding is the most intensive form of inbreeding, in which the animals being mated are very closely related and can be traced back to more than one common ancestor.
Linebreeding refers to mating animals that are more distantly related and can be traced back to just one common ancestor.

Other examples of straightbreeding are outcrossing and grading up. **Outcrossing** is the mating of animals of different families within the same breed. The purpose of outcrossing is to bring into the breeding program traits that are desirable but not present in the original animals. **Grading up** is the mating of purebred sires to grade females. A **grade animal** is any animal not eligible for registry as a purebred. This is done as a less-expensive way to improve the quality of animals on a farm or ranch.

The other common breeding system is known as **crossbreeding**. This type of breeding involves the mating of two animals from different breeds. The resulting offspring is a hybrid. This generally results in improved traits in the offspring. Superior traits that result from crossbreeding are called **hybrid vigor** or **heterosis**.

Summary:

For producers to have successful reproductive performance from their animals, they must implement management practices. These practices are designed to enhance the reproductive process and allow animals to produce at their highest capability. By utilizing reproductive management practices, more animals will be born healthy and raised successfully, and breeding animals will become pregnant again in a timely manner. In addition, producers must be cautious of reproductive diseases that can be a deterring factor in the success of reproduction in animals.

Checking Your Knowledge:

1. What are the differences between venereal and infectious reproductive diseases?
2. What does breeding readiness mean?
3. What is purebred breeding?
4. What is a grade animal?
5. What is hybrid vigor?

Expanding Your Knowledge:

Visit the World Wide Web and travel to this Web site: http://www.livestock.novartis.com/diseases_repro_beef.html. Use the reproductive disease selector at the top of the page to explore reproductive diseases of a variety of animal species. In addition, research the variety of treatment methods and preventive practices described for each disease. After exploration, write a one-page summary of a reproductive disease for three different species. In this summary, be sure to detail the treatment and preventive measures advised on this site.

Web Links:

This site details the reproductive management concept of bio-security and how it affects the interaction between the host, agent, and environment.

http://vetsci.sdstate.edu/vetext/Women%20in%20Ag%20Conference/04_Control%20of%20Infectious%20Reproductive%20Disease.htm

This site explains an overview of reproductive management of an overall vaccination program in dairy herds.

http://www.moomilk.com/archive/nutrition-13.htm

This site underlines the reproductive steps for treatment and prevention of a variety of venereal reproductive diseases.

http://www.livestock.novartis.com/diseases_repro_beef.html