Key Words

1. **Purebred Producers**: Also known as seedstock breeders

2. **Seedstock**: Livestock that historically came from the pure breeds for which ancestry is recorded on a pedigree by a breed association.

3. **Inbreeding**: Mating of animals more closely related than the average of the breed or population.

4. **Outbreeding**: Mating of animals not as closely related as the average of the population.

5. **Relationship**: Knowing which genes two animals have in common and whether the genes in an animal or animals exist primarily in a heterozygous or homozygous condition.

6. **Intensive Inbreeding**: Mating of closely related animals whose ancestors have been inbred for several generations.

7. **Linebreeding**: Mild form of inbreeding where inbreeding is kept relatively low while maintaining a high genetic relationship to an ancestor or line of ancestors.

8. **Species Cross**: Crossing of animals of different species (e.g. horse to donkey or cattle to bison).

9. **Crossbreeding**: Mating of animals of different established breeds.

10. **Outcrossing**: Mating of unrelated animals within the same breed.

11. **Grading Up**: Mating of purebred sires to commercial-grade females and their female offspring for several generations. Grading up can involve some crossbreeding or it can be a type of outcrossing system.

12. **Mule**: Result from crossing the jack of the ass species and the mare of the horse species (Equus asinus X Equus caballus).

13. **Hinny**: Reciprocal cross of the mule (Equus caballus stallion X Equus asinus jennet).

14. **Cattalo (Beefalo)**: Result from crossing American bison and cattle. Intended to be more adaptable to harsh environments; fertility problems have existed in some of these crosses.

15. **Heterosis**: Increase in productivity in the crossbred progeny above the average of breeds or lines that are crossed.

16. **Synthetic Breed**: New breed formed by crossing several breeds. In beef cattle, the Brangus, Barzona, Beefmaster, and Santa Gertrudis breeds are synthetic breeds formed several years ago.
17. **Composite Breed**: New Breed formed by crossing several breeds. In beef cattle (MARCI – crosses of Charolais, Brown Swiss, Limousin, Hereford, and Angus breeds) and (RX3 – crosses of Red Angus, Hereford & Red Holstein breeds) are composite breeds more recently developed.

**Review Questions**

1. *Animals derived from matings within a single breed are called _______________?*
   Animals derived from matings within a single breed are called Purebreds.

2. *What is inbreeding?*
   Inbreeding is the mating of animals more closely related than the average of the breed or population. The resulting inbred offspring have an increased homozygosity of gene pairs compared to non-inbred animals in the same population.

3. *How does inbreeding affect homozygosity of traits?*
   Inbreeding increases the homozygosity of traits.

4. *What is a major disadvantage of inbreeding?*
   Inbreeding is detrimental to reproductive performance and preweaning and postweaning growth. They are also most susceptible to environmental stresses. Quickly identifies serious recessive genes.

5. *What is a major advantage of inbreeding?*
   Inbreeding increases Heterosis. It also identifies some desirable genes. Inbred animals with superior performance are most likely to have superior breeding values; resulting in more uniform progeny.

6. *What is line breeding?*
   Linebreeding is a low risk form of inbreeding used to maintain a high genetic relationship to an outstanding ancestor. A high performing sire is usually found in a linebred animal’s pedigree in more than one location; thus increasing the genes / alleles of the progeny – almost as if the high performing animal was the progeny’s sire.
7. **What is crossbreeding?**

Crossbreeding occurs when animals of different breeds are mated.

8. **What are the two primary reasons for crossbreeding?**

The two reasons for crossbreeding are to:

a. **Take advantage of breed complementation**
   i. This involves crossing breeds so their strengths and weaknesses complement one another; this can significantly increase herd productivity.

b. **Heterosis (hybrid vigor)**
   i. Heterosis is the increase in productivity in the crossbred progeny above the average of breeds or lines that are crossed.

   ii. Heterosis is highest for low-heritability traits and lowest for high-heritability traits

9. **What is outcrossing?**

Outcrossing is the most widely used breeding system for most species. Outcrossing occurs when unrelated animals within the same breed are mated. Primarily dependent on the effectiveness of selection.

10. **What is the term for newly developed breeds created by crossing several established breeds?**

Newly developed breeds created by crossing several established breeds are called Synthetic Breeds or Composite Breeds.

   - Beef Ex: Brangus, Barzona, Beefmaster, Santa Gertrudis, Leachman Stabilizer, MARC I, RX3
   - Sheep Examples: Columbia, Targhee, Polypay
   - Swine: Hybrid Boars, Blue-butt

11. **What is grading up?**

Grading Up involves continuously using purebred sires of the same breed in the same herd. This increases the percentage of inheritance of the desired purebred during each generation. Useful in breeding cattle and horses – happened in the beef industry when European cattle breeds were introduced to the US – as most of the breed introduction happened using bulls & / or semen.