

ABC's of Dog Breeding

Study Guide

Lesson 2, Breeding Systems

1. KNOW THE BREEDING SYSTEMS AVAILABLE TO BREEDERS

- Inbreeding/linebreeding; outcrossing; like-to-like and unlike-to-unlike.

2. DEFINE INBREEDING AND LINEBREEDING

- To be inbred or linebred a dog must have an ancestor common to the sire and dam in the first 3 or 4 generations of a pedigree in a numerically large breed, and preferably in the first 3 generations. **Inbreeding** are matings involving parents and siblings. **Linebreeding** are matings involving relatives other than parents and siblings.

3. UNDERSTAND IDENTICAL BY DESCENT (IBD) AND IDENTICAL BY STATE (IBS) GENES

- **Identical by Descent (IBD)** genes are genes an offspring inherits from a common ancestor behind the sire and dam.
- **Identical by State (IBS)** genes are genes that are present in a homozygous gene pair but which did not come from a common ancestor behind the sire and dam.

4. KNOW THE MEANING OF COEFFICIENT OF INBREEDING (CI)

- Measures degree of inbreeding or average percent of Identical by Descent genes.
- Define current and non-current inbreeding.

5. EXPLAIN BLOOD PERCENT AND HOW TO OBTAIN THE BLOOD OF A FAVORED ANCESTOR

- Know positive and negative effects of typical matings: grandfather/granddaughter; half-brother/half-sister; full brother/sister; father/daughter, etc.
- Having more than one common ancestor in the same generation is not as effective as having just one common ancestor.

6. KNOW THE RISKS OF EXCESSIVE INBREEDING/LINEBREEDING

- Can increase incidence of genetic disease, although the system itself does not create harmful genes.
- Know the symptoms of inbreeding depression, which can lead to an increase in health problems. Understand how heterosis counters the effects.

7. DEFINE OUTCROSSING AND KNOW WHEN IT SHOULD BE USED

- With outcrossing there are no common ancestors in the first 6 generations. Works best if the sire/dam are each individually inbred or linebred. Breeders should outcross for a specific reason and to introduce heterosis.

8. DEFINE LIKE-TO-LIKE AND UNLIKE-TO-UNLIKE MATINGS

- **Like-to-Like:** Sire and dam resemble one another but do not share a common ancestor. Their offspring therefore do not carry IBD genes.
- **Unlike-to-Unlike:** Mates extremes to produce an intermediate phenotype; also to compensate for a fault in the sire and/or dam.

9. DEFINE PREPOTENCY, BREEDING VALUE, BREEDING TRUE AND GENETIC VARIATION.