3.5 Animal Breeding

Course Code : ANB 321

Course Title : Principles and Practices of Animal Breeding

Credit Hour : 3 (2+1) Full Mark: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of this course, the students will be able to understand basic principles and fundamentals of animal breeding, and application of animal breeding technique.

Syllabus

Animal breeding, importance and its scope in livestock improvement. Genetic resources of Nepal. Variations and causes of variation importance of heritability and repeatability. Concept of genetic resistance to diseases and parasites. Selection differential, methods and basis of selection; Mating system inbreeding and out breeding. Nuclear transplantation, transgenic animal production and its significance in genetic improvement of livestock Hormonal mechanism in reproduction, male and female reproductive system, estrus detection, estrus cycle and induction of synchronization of ovulation. Introduction advantages and limitation of A.I. method of semen collection, dilution, preservation, thawing, transportation and technique of A.I. importance of embryo transfer, super ovulation, synchronization, collection and transfer of embryo.

Outline

Theory

S.N.	Topic	No. of lecture
1	Introduction, history and importance of animal breeding	1
2	Animal genetic resources (AnGR) of Nepal	2
3	AnGR conservation and utilization: principles, methods and needs	1
4	Variation and its causes: heredity, environment and GXE interaction; importance of heredity and environment	2
5	Traits of economic importance in livestock and poultry	1
6	Phenotypic expression of genes (gene action): additive and non-additive (dominance, over-dominance, incomplete dominance, co-dominance, epistasis and transgressive variation)	2
7	Concept of heritability: definition, broad and narrow sense heritability, importance of narrow sense heritability in animal genetics, and uses of heritability estimates.	1

8	Concept of repeatability: definition, explanation and uses of repeatability (life time average and MPPA)	1
9	Selection: principles, basis and methods of selection	1
10	Selection for qualitative and quantitative traits	1
11	Livestock breeding/mating systems: random mating, assortative mating; and inbreeding (line breeding and close breeding)	1
12	Out breeding (pure breeding, crossbreeding, upgrading and hybridization), and close and open nucleus breeding systems	1
13	Current livestock improvement programs in Nepal	1
14	Current animal breeding researches in Nepal, their concepts, objectives and methods	1
15	Animal reproduction: male and female reproductive systems	2
16	Animal reproduction: estrus detection, induction of estrus synchronization, pregnancy diagnosis and parturition	2
17	Animal endocrinology: hormones, their functions and mechanism	2
18	Artificial insemination: principles and methods	1
19	Semen collection, processing (dilution, preservation and transport); and physical and chemical properties of quality semen	2
20	Animal biotechnology: recent advances in animal biotechnology	1
21	Introduction to bioinformatics and their uses in animal breeding	1
22	Multiple ovulation and embryo transfer (MOET) technology: collection and transfer of embryo, and importance of MOET.	2
	Total	**30**

Practical

S.N.	Topic	No. of practical
1.	Estimation of heritability	2
2.	Estimation of repeatability	1
3	Estimation of variance components, means, breeding value, PBA and MPPA	2
4.	Calculation of inbreeding relationship and coefficient	1
5.	Estimation of selection parameters, selection index etc	2
6.	Preparation of artificial vagina (A.V.) and collection of semen	2
7.	Evaluation of semen	2
8.	Heat detection indifferent farm animals	1
9.	Palpation of female reproductive organ	1
10.	Insemination technique	1
Total		**15**