NIANP

National Institute of Animal Nutrition and Physiology

Bangalore

Courses

1. Assisted Reproductive Techniques to Augment Productive Functions
2. Recent Techniques for Feed Analysis and Evaluation

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The National Institute of Animal Nutrition and Physiology was established on 24th November 1995 by Indian Council of Agricultural Research (ICAR) to sort out some of the major impediments pertinent for the usage of feed resources and the physiological constraints limiting the production potential of farm animals. The institute is located in Bangalore which is nerve centre of scientific activities of the country and also populalry known as garden city and silicon valley of India.

The Institute has three research divisions namely, Animal Nutrition, Animal Physiology and Bioenergetics & Environmental Sciences and sections/units like the Economics, Statistics and Extension section, experimental livestock unit and fodder production unit with strong support of central facilities and computerized administrative set up. The institute has also very strong base of Agricultural Research Information System (ARIS) equipped with modern hardware and software. The laboratories in the institute have been conceptualized as central facilities for all divisions and sections. The main laboratories are Macronutrient laboratory, Micronutrient laboratory, Feed analysis laboratory, Rumen Microbiology laboratory, Animal Biotechnology laboratory, Radioisotope & Endocrinology laboratory, Reproductive physiology laboratory, Molecular Biology laboratory, Toxicology laboratory, Bioenergetics laboratory and Fermentation Technology laboratory.

1.
Assisted Reproductive Techniques to Augment Productive Functions

Embryo Resource Generation by in vitro technique

The productive capability of animals in many developing countries is low because of poor genetic make up. The improvement of the genetic quality of the milch breeds of cattle and buffalo has traditionally been met by the pedigree breeder in the post 40-50 years by Artificial insemination (AI), using progeny tested and performance tested bulls. The important emerging biotechnology in improvement of genetic make up of cattle and buffalo breeds is Embryo Transfer Technology (ETT) coupled with *in vitro* Fertilization (IVF) technology. IVF technology consists of harvesting of ooctytes, *in vitro* maturation (IVM), *in vitro* fertilization (IVF) and *in vitro* culture (IVC). During the reproductive life time of the animals less than 1% of the follicular population will be utilized for offspring production. The objectives of IVF Technology are to mass produce embryos for genetic manipulation and / or embryo transfer, for basic research in gamete biology and developmental physiology and commercial utilization of emerging biotechnologies including transgenic livestock production and cloning, transfer of in vitro produced embryos. Exploitation of female gametes which are otherwise lost can be utilized for production of a number of embryos. The immature oocytes derived from ovaries after maturing and fertilizing in vitro can be utilized for generation of embryo pool. The training will provide in depth knowledge and hands on experience to the persons to take up techniques for assisted animal reproduction.

Semen Evaluation

Artificial insemination has remained one of the improtant assisted reproductive techniques for the rapid dispersal of valuable genes and it has been the method of choice for dairy farmers around the world to improve the genetic quality of their stock. Reliable laboratory assays/ techniques to accurately predict the fertility potential of a bull is essential for obtaining consistently high conception rate for the semen used. The training porgram will provide exposure to various tests, evalultions and interpretations for predicting fertility status of bull semen.

Hormone Profile Monitoring

Any Aberrations/ deficiencies in hormonal make up of the animal affects reproduction. It is essential to map hormonal profiles of animals for a clear understanding of the involvement of hormones in productive and reproductive functions. Also, assisted reproductive techniques/reproductive interventions require hormonal investigations and monitoring. This programme imparts training in estimating various metabolic and reproductive hormones associated with productive and reproductive functions of the animals.

Training programme

Training programme will consist of in- house lecture on various aspects and practical demonstrations.

Faculty

Scientists of the institute will constitute the faculty.

Course Director	: Dr K T Sampath
Duration	: 5 weeks (2 November to 5 December 2009)
Course fee	: US $ 3,000 per trainee (exclusive of boarding & lodging)
No. of trainees per course	: 10
Eligibility	: Post graduate in Animal Physiology, Animal Reproduction and Animal Biotechnology/Degree in Veterinary and Animal Sciences with 2 years of experience in Reproduction Physiology or Animal Biotechnology

2.
Recent Techniques for Feed Analysis and Evaluation

Course Contents

Embryo resource generation by in vitro techniques
- Isolation of immature oocytes ovaries by various methods
- Ultrasound guided oocyte pickup by ovarian follicular fluid aspiration from live animals.
- Grading of oocytes
- *In vitro* maturation of oocytes
- *In vitro* capacitation of sperm
- *In vitro* fertilization of matured oocytes
- Grading of fertilized oocytes
- *In vitro* culture of embryos
- Grading of embryos to evaluate developmental stages
- Embryo freezing by different methods.
- Micro manipulation of embryos
- Isolation and *in vitro* culture of preantral follicles, harvesting and IVF of oocytes from *in vitro* cultured preantral follicles.

Semen Evaluation Methods
- Routine semen evalution techniques
- Functional based assay : Induction of capacitation and / or acrosome reaction, homologous oocyte penetration assay, plasmalemma functional integrity.
- Molecular/biophysical assessment of fertility: Seminal plasma & sperm membrane proteins, sperm nuclear morphology DNA integrity and mitochondrial membrane potential
- Frozen Semen Technology and Artificial Insemination

Hormone Estimation
- Principles & procedures of RIA technique for estimation of steroid & peptide hormones
- Protocols for estimation of peptide hormones like TSH, insulin, Prolactin, LH, FSH, growth hormone etc., including iodination of the hormones.
- Protocols for estimation of steroid hormones like estradiol, progesterone, cortisol, testosterone etc.
- Estimation of melatonin
- Estimation of T3, T4
- General principles of hormone isolation and purification and production of hormone antibodies.

The feed Analysis and evaluation is a major tool for Animal Nutrition Research. It includes analytical techniques, which are more accurate, less time consuming and enables handling of large sample size.

Feed Analysis

Moisture estimation by hot air oven drying method is time consuming. Moisture analysis based on infrared drying is rapid and more accurate.

- Estimation of nitrogen/protein by Kjeldahl method is more complex and involves both digestion and distillation processes.
- Estimation using nitrogen analyzer based on combustion method does not involve the process of digestion and distillation and is faster and brief.
- Estimation of crude fibre by Weendy method does not give the true fibre content of the feed. Determination of fibre fractions (NDF, ADF and lignin) by Vansoest method is more accurate.
- Estimation of fat in feeds and fodders by conventional ether extraction method is time consuming. The use of rapid ether extract analyzer is a faster method for fat estimation.
- Estimation of macro and micro minerals by colorimetric/Titrimetric method is time consuming and laborious. Use of atomic absorption spectro photometry provides accurate and rapid estimation of the entire range of minerals.
- Estimation of amino acid content of feeds by high pressure liquid chromatography is an accurate method in deciding the protein source which can provide limiting amino acids.