

# **Cattle Embryo Transfer Procedure An Instructional Manual For The Rancher Dairyman Artificial Insemination Technician Animal Scientist And Veterinarian**

Physiological basis of the ovarian response to PMSG in sheep and cattle; Factors influencing the follicular response of animals to PMSG; Endocrine response and factors which limit the response of follicles to PMSG and FSHL; Repeated superovulation and embryo collection in cattle; Surgical collection of embryos; Non-surgical collection of embryos; Some aspects of embryo transfer in the cow with particular reference to the non-surgical technique; Embryo transfer procedure in the goat: physiological and procedural differences in superovulation and transfer between sheep and goats; Fertilization and culture of embryos: factors which have a major influence on embryo survival in vitro; Embryo freezing; A geneticist's view of embryo transfer; The case for the exportation of Australian livestock and embryos; Transmission of disease by embryo transfer; Regulation of embryo transfer personnel and facilities.

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Methods in Mammalian Reproduction presents some of the techniques for manipulating, analyzing, observing, testing, and generally experimenting with mammalian mothers and their gametes and embryos. Mammalian reproduction involves an intimate relationship between mother and embryo. The first 18 chapters are arranged in an order that follows a developmental sequence from oocyte to fetal

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organs and the remaining seven chapters deal with the maternal side of the relationship. With strong focus on laboratory rodents and lagomorphs, the book starts with an introduction to in vitro oocyte maturation and experimental production of mammalian parthenogenetic. It goes on to describe the microtechniques in pre-implantation of embryos, production of chimeras, techniques for early embryonic tissue separation, mammalian embryo preservation by freezing, and in vitro development of whole mouse embryos beyond the implantation stage. Chapters 11-15 discuss the in vitro implantation of mouse blastocysts, advances in rabbit embryo and in large mammal embryo cultures, embryo transfer in large domestic mammals, and manipulation of marsupial embryos and pouch young. The following chapters cover reproduction experiments using marsupials, domestic farm species, and primates including humans. Finally, the concluding chapters tackle the use of amniocentesis in prenatal diagnosis, collection and analysis of female genital tract secretions, analysis of antifertility action of intrauterine devices, and surgical induction of endometriosis. This book will be helpful to students, teachers, researchers, and clinical researchers who demand for more and better procedures for analysis of mammalian reproduction.

Reproductive wastage is a major inefficiency in all livestock production with embryonic mortality accounting for a major portion of this loss. Accordingly the Commission of the European Communities encouraged the organisation of a seminar on embryonic mortality in farm animals which was held in Brussels on the 11th and 12th of December 1984. This book contains the text of the papers, discussions and final summary presented at that Seminar. As a background to the Seminar, the extent and timing of embryonic loss was described for farm animals. Particular consideration was then given to the various mechanisms and signals, both embryonic

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and uterine in origin, that are so far known to be involved in the establishment of pregnancy. Possible causes of embryonic death including physiological, endocrinological, genetic and immunological components were outlined and discussed. The final summary contains general conclusions from the Seminar and recommendations for future research work on this topic. J.M. Sreenan M.G. Diskin July 1985.

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EMBRYONIC MORTALITY IN THE COW J. M. Sreenan & M.  
G. Diskin, The Agricultural Institute, Belclare, Tuam, Galway,  
Ireland ABSTRACT The extent and timing of embryonic  
mortality in heifers, normal cows and repeat breeder cows  
has been reviewed.

In the past half century great progress has been made in the reproductive management of farm animals, both mammals and birds. This book aims to review developments and indicate which reproductive technologies can be used commercially or in research. It begins by discussing artificial insemination and how this has recently been refined in semen sexing technology. Embryo transfer, in vitro embryo production technology and the control of oestrus and ovulation are then reviewed.

Subsequent chapters consider the control of postpartum ovarian activity, seasonal breeding, multiple births and litter size, pregnancy testing, parturition, and the onset of puberty. The author then describes more recent developments in cloning and the production of transgenic animals, before a final chapter on suppressing reproductive activity.

Cattle play a fundamental role in animal agriculture

throughout the world. They not only provide us with a vital food source, but they also provide us with fertilizer and fuel. Keeping reproduction levels at an optimum level is therefore essential, but this is often a complicated process, especially with modern, high yielding cows. Written in a practical and user-friendly style, this book aims to help the reader understand cattle reproduction by explaining the underlying physiology of the reproductive process and the role and importance of pharmacology and technology, and showing how management techniques can improve reproductive efficiency. This edition includes: Recent research findings on the physiology of the oestrous cycle and its control; New techniques for monitoring and manipulating reproduction, including pregnancy diagnosis and embryo transfer; Advice on identifying common infertility problems and how to prevent and treat them. *Reproduction Cattle 3e* is essential reading for veterinary and agricultural students, as well as veterinarians and farmers involved in cattle reproduction.

This comprehensive, step-by-step laboratory training manual brings all the elements for a successful embryo transfer program together in a simple, organized, illustrated format. For the last several decades, artificial insemination has allowed genetic progress to be achieved relatively quickly through the widespread and efficient use of frozen semen. As a result of the advancement of embryo transfer

(ET) techniques, cows can produce many offspring.

A more rapid genetic gain is achieved which complements an artificial insemination program. Bovine Reproduction is a comprehensive, current reference providing information on all aspects of reproduction in the bull and cow. Offering fundamental knowledge on evaluating and restoring fertility in the bovine patient, the book also places information in the context of herd health where appropriate for a truly global view of bovine theriogenology. Printed in full color throughout, the book includes 83 chapters and more than 550 images, making it the most exhaustive reference available on this topic. Each section covers anatomy and physiology, breeding management, and reproductive surgery, as well as obstetrics and pregnancy wastage in the cow. Bovine Reproduction is a welcome resource for bovine practitioners, theriogenologists, and animal scientists, as well as veterinary students and residents with an interest in the cow.

Material is organized into 5 parts for easy and ready use, broadening the usefulness of the book, making it the most comprehensive, hands-on AI manual available. This manual prepares users for the "real world" by exposing them to the latest technology and techniques used in the reproduction and the practice of artificial insemination (AI) in livestock. Part One provides information on the advantages and considerations of

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artificial insemination, basic livestock genetics, the anatomy and reproductive processes of the cow and bull, and semen collection methods. It relates statistics on AI usage and general information about NAAB and CSS.

Part Two deals with semen characteristics, including evaluation, processing, and extension; freezing and cryogenic storage; and care of the refrigerator unit. The various tests for semen quality are discussed in detail as is custom selection of semen. Part Three explains insemination techniques for dairy and beef cattle, inseminator training, pregnancy determination in cattle, conception rates, and breeding problems. The exercise on "Embryo Transfer and Related Practices" explains the advances and techniques involved in the field. Part Four includes an overview of sire selection, sire health, sire management, AI organization, and career opportunities. Part Five explains the use and techniques for artificial insemination in dairy goats and other farm animals. For herd operators and persons involved in genetic development—of particular use to people interested in livestock improvement. For those who are anticipating careers in some phase of the AI industry.

Over the past decades, dairy cattle reproduction has presented to farmers with several challenges as a consequence of genetic selection for improved milk production traits. These challenges include suboptimal postovulatory responses for timed artificial insemination synchronization protocols. Another example is the metabolic adjustments the preimplantation embryo may undergo in a high producing cow resulting in a high likelihood of early embryo loss. Nevertheless, this is an

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opportunity to study alternative options to improve pregnancy rates. Assisted Reproduction Technologies (ART) have the potential to solve several issues the modern dairy cow is facing. The progress in the practice of ART has been satisfactory over the last two decades and our understanding about gametes and embryo biology has substantially improved. Embryo transfers using in vitro produced embryos (IVP) might certainly have an advantage over conventional breeding methods since ovulation, fertilization and early embryonic stages would be bypassed thereby enhancing the likelihood of embryo implantation and hence improved conception rates. However, there are several challenges to producing good quality embryos in vitro due to difficulties in emulating the natural oviduct microenvironments that the preimplantation embryo is experiencing several physiological changes en route to the uterus. The objectives of this work were to review current literature in regard to mammalian preimplantation embryo production in vitro with emphasis in bovine species and to study the effect of metabolic regulators (MR) on embryo development as well as using new methods to recover better quality sperm especially when using sex-sorted semen. Chapter Two is an extensive review of the IVP process in mammalian species with emphasis on the bovine embryo. Metabolic processes during oocyte in vitro maturation, sperm interactions during fertilization and in vitro cultures of different preimplantation embryo stages are reviewed. Special attention was devoted to the metabolic switch from low to high glucose uptake and metabolism occurring at the morula stage. Chapter

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Three is a systematic study of the effects of conjugated linoleic acid (CLA) isomers on embryos produced in vitro. Inclusion of 100 [ $\mu$ ]M CLA- cis 9, trans 11 during embryo culture 36 hrs before cryopreservation resulted in embryos with higher survival and better developmental rates post-thaw when compared to other groups.

Chapter Four presents a study about the effect of phenazine ethosulfate (PES) and 2, 4-dinitrophenol (DNP) on embryo development at the morula stage to enhance glucose uptake and metabolism to improve embryo developmental rates. Combination of 0.3 [ $\mu$ ]M PES and 10 [ $\mu$ ]M DNP resulted not only in higher embryo development and better quality but also embryos more resistant to cryopreservation procedures. Chapter Five describes a study of the effect of four colloidal-based sperm washes (Percoll, Old Bovipure, New Bovipure and Androcoll-B) on embryo development and quality. The International Embryo Transfer Society regulations strictly indicate that bovine embryos produced in vitro should be originated from sperm that has been recovered by silane-coated silica particles colloids when fractionation methods are used due to the debatable toxic effects of Percoll. Results from these experiments showed that embryos derived from sperm recovered by New Bovipure and Androcoll-B achieved higher blastocyst rates than Percoll and Old Bovipure groups. In addition, as a followup the effects of MR were evaluated on embryos originated from X-sorted semen. Interestingly, PES and DNP supplementation resulted in delayed development and poorer morphology in this embryos compared with untreated counterparts. Glucose

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uptake threshold may be lower in female embryos and/or they may have a different substrate preference as compared to male embryos. Our contribution to science may provide information for a better understanding of IVP and help shape the direction of future research. More importantly, it may provide the basis for production of better quality embryos originated from genderselected semen with more chance of survival to term, thereby improving conception rates in dairy cattle.

The Encyclopedia of Biotechnology in Agriculture and Food provides users with unprecedented access to nearly 200 entries that cover the entire food system, describing the concepts and processes that are used in the production of raw agricultural materials and food product manufacturing. So that users can locate the information they need quickly without having to flip through pages and pages of content, the encyclopedia avoids unnecessary complication by presenting information in short, accessible overviews. Addresses Environmental Issues & Sustainability in the Context of 21st Century Challenges Edited by a respected team of biotechnology experts, this unrivaled resource includes descriptions and interpretations of molecular biology research, including topics on the science associated with the cloning of animals, the genetic modification of plants, and the enhanced quality of foods. It discusses current and future applications of molecular biology, with contributions on disease resistance in animals, drought-resistant plants, and improved health of consumers via nutritionally enhanced foods. Uses Illustrations to Communicate Essential Concepts & Visually Enhance

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the Text This one-of-a-kind periodical examines regulation associated with biotechnology applications—with specific attention to genetically modified organisms—regulation differences in various countries, and biotechnology’s impact on the evolution of new applications. The encyclopedia also looks at how biotechnology is covered in the media, as well as the biotechnology/environment interface and consumer acceptance of the products of biotechnology. Rounding out its solid coverage, the encyclopedia discusses the benefits and concerns about biotechnology in the context of risk assessment, food security, and genetic diversity.

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Dennis R. Heldman speaks about his work on the CRC Press YouTube Channel.

Cattle Embryo Transfer ProcedureAn Instructional Manual for the Rancher, Dairyman, Artificial Insemination Technician, Animal Scientist, and Veterinarian

This two-volume textbook provides a comprehensive overview on the broad field of Animal Biotechnology with

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a special focus on livestock reproduction and breeding. The reader will be introduced to a variety of state-of-the-art technologies and emerging genetic tools and their applications in animal production. Also, ethics and legal aspects of animal biotechnology will be discussed and new trends and developments in the field will be critically assessed. The two-volume work is a must-have for graduate students, advanced undergraduates and researchers in the field of veterinary medicine, genetics and animal biotechnology. This first volume mainly focuses on artificial insemination, embryo transfer technologies in diverse animal species and cryopreservation of oocytes and embryos.

The objectives of this study were to evaluate the effects of flunixin meglumine (FM), an inhibitor of PGF<sub>2</sub>a synthesis, administered at the time of embryo transfer (ET) and insertion of an intravaginal progesterone-releasing device (CIDR) at the time of ET on pregnancy rates (PR) and the resynchronization of estrus. Beef cows (n = 796) and heifers (n = 108) at three locations were assigned randomly within age to one of four groups in a 2 x 2 factorial arrangement of treatments with injection of FM (500 mg i.m.; Phoenix Scientific, St. Joseph, MO) 2 to 12 min prior to ET and insertion of a CIDR (1.38 g progesterone; Pfizer, New York, NY) for 13 d immediately following ET as main effects. Fresh or frozen embryos (Stage = 4 or 5; Grade = 1 or 2) were randomly assigned to be transferred to recipients on d 6 to 9 of the estrous cycle. At Location 2 a subset of fresh embryos were split and transferred as fresh half embryos (n = 192). Recipients at Location 2 only (n = 493) were

observed for signs of return to estrus beginning 9 d after ET. Recipients that returned to estrus at Location 2 were either bred by AI 12 h after estrus or received an embryo 7 d after estrus. Pregnancy was diagnosed by ultrasonography. Pregnancy rates were analyzed using the LOGISTIC procedure of SAS. Pregnancy rates of split embryo recipients were analyzed separately using the same statistical procedure. Variation in the timing of the return to estrus was determined by an F-test for heterogeneity of variances.

updated throughout with new information on sexing embryos, sexing semen, marketing, cloning as well as the basics and economics of this technology. Glossary. Human reproductive cloning is an assisted reproductive technology that would be carried out with the goal of creating a newborn genetically identical to another human being. It is currently the subject of much debate around the world, involving a variety of ethical, religious, societal, scientific, and medical issues. Scientific and Medical Aspects of Human Reproductive Cloning considers the scientific and medical sides of this issue, plus ethical issues that pertain to human-subjects research. Based on experience with reproductive cloning in animals, the report concludes that human reproductive cloning would be dangerous for the woman, fetus, and newborn, and is likely to fail. The study panel did not address the issue of whether human reproductive cloning, even if it were found to be medically safe, would be "or would not be" acceptable to individuals or society.

3000 new references added since the first edition Gives

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information necessary to produce embryos totally through in vitro techniques Shows commercial applications of embryo and oocyte research Cattle remain at the forefront of many new developments in reproductive technology and what can be done for the cow today will later be applicable to other farm livestock and perhaps humans. This new edition reviews the considerable advances and issues in embryo production technology, based on reports since the first edition in 1994. This is a must have volume for those who own the first edition, and in itself an incredibly informative text. In today's world, we are witnessing simultaneous breakthroughs in reproductive technologies, genomics, and molecular biology. Advances in molecular genetic technology and understanding of the bovine genome have led to the development of tools that can be used to enhance profitability on cow-calf enterprises. Factors Affecting Calf Crop: Biotechnology of Reproduction provides a detailed compilation of current and forthcoming technology for managing reproduction in cattle. The book discusses topics such as: approved techniques for controlling the estrous cycle in cattle; managing follicular growth with progesterone, estrogens, and prostaglandins; freezing, thawing, and transfer of cattle embryos; application of embryo transfer to the beef cattle industry; embryo transfer in topically adapted cattle; new factors affecting bull fertility; embryo collection and utilization technology, in vitro fertilization, somatic cell cloning, and genetic technologies; uses of real-time ultrasound; and sexed semen. Over 25 leading animal scientists have combined their expertise to

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produce the first single-source reference that covers successful reproductive techniques that will, most likely, be the wave of the future. Expansive in scope, the book addresses current biotechnologies as they impact the production of beef cattle. Written at a level to appeal to the researcher, commercial producer, or student, *Factors Affecting Calf Crop: Biotechnology of Reproduction* presents you with a wealth of technologies applicable to animal agriculture.

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