INTRODUCTION

We would like to take this opportunity to welcome you to our Equine Reproduction Short Course. As breeders ourselves, we appreciate the difficulties that can be faced when trying to run a successful breeding operation. Just understanding the basics of reproduction can be a daunting proposition, let alone trying to stay abreast of the latest technology and advancements in the field.

If you are a veterinarian, we recognize that you have the unenviable task of being expected to know what is available not only in equine reproduction, but all other aspects of equine health and whatever other species of animals they treat. As a result of recognizing the difficulties involved with locating current, correct and practical information, we realized that there was a need for short courses, for not only veterinarians and reproduction specialists, but for horse breeders.

If you are a breeder, we would like to encourage you to develop and cultivate a good working relationship with your veterinarian, which will be vital for your ongoing success. Much of the information contained in our short courses will enhance your equine reproduction knowledge, but it cannot replace your veterinarian.

As we spend the spring and summers practicing what is taught in the courses we have the practical experience that we believe is important to teach you successfully. We also research ideas that we believe may be beneficial to the industry, as well as field test new products, and will only endorse those products which we have used and found to work well. We know the pitfalls, expenses and problems that are part of breeding horses and strive to present information that is current and cost affective. We are both published authors in multiple national magazines and firmly believe that the sharing of information with others can only be beneficial.

State Regulations defining the “practice of veterinary medicine” vary considerably from State to State. Most, but not all, States permit the performing of procedures on one’s own horses, including artificial insemination. Many States have controls over procedures – including AI – being performed on other people’s animals. Some States may require a licensing of persons performing AI. As the regulations vary considerably from State to State, we recommend you obtain and closely review a copy of your own State’s regulations in order that you may ensure full compliance.

We wish to continue to offer these courses across the country and as you will appreciate, the organizational costs are significant. With that in mind, we would like to say that these course notes are copyrighted, but additional copies are available for sale to those who attend the short courses. If you wish to give them to a friend or an associate, we would ask that you purchase an extra set and not duplicate them.

We are extremely grateful to the many persons that have provided us with graphics for use in the presentation, and are pleased to offer recognition to those people at the end of the presentations. Regrettably, as we do not own the copyright to these photos, we are unable to include them in the course notes.

Our website at www.equine-reproduction.com is the largest of its kind on the Internet and we are always happy to see you visit. We would also like to invite you to join the Yahoo email list on equine reproduction. It is moderated by us and is the largest email list of its kind in the world. It gives breeders, veterinarians and repro specialists the unique opportunity to share information in the field of equine reproduction. To subscribe to this list, just visit the subscription page on our website.

While on tour, we also offer semen freezing, stallion (semen collection and handling) training, and breeding management consulting services. If you are interested in having us come to your farm, please feel free to contact us.
We hope you enjoy the short course and if you find it beneficial and informative, please tell everyone that you know who may wish to attend a future course. If, however upon completion, you are not pleased with the information and material presented, please let us know how we can improve what we offer.

To make the course run a little more smoothly, we would like to request that you review and attend to the following items. We will mention this in the introduction, but in the unfortunate event that you have missed it, there are a few points that we would like to ensure that you are aware of. Your compliance with these matters is appreciated.

1. Please either turn your cell phone to “mute” or turn it off. In the event someone is using a cell phone during the presentation, the presentation will be halted to assist you in completing your call. Other attendees however may not be so happy with that!

2. We will be covering a huge amount of information during the course. In order to achieve as much coverage as possible, there will be areas that are not covered in detail. Those areas will tend to be areas not in “daily use” in the field – a good example is that we cover mare hormones in detail, but stallion hormones very briefly. These notes do however carry more detailed review of all areas, so we hope that this will be sufficient for you.

3. You will probably have questions! In fact, we consider that if you do not have questions, we may be doing something wrong! As a result of the time constraints however, answering questions during the lecture portion can put us seriously behind schedule. We ask therefore that questions be kept at a minimum and be asked during the breaks or during the wet lab portion, when we will be available to answer questions.

4. We are not veterinarians; consequently, we are not legally permitted to answer specific questions about individual animals or cases, as that could be considered by some to be “practicing veterinary medicine without a license”. We are happy to answer questions with generalities, but please respect this precarious situation in which we find ourselves – we want to assist you, but also want to remain available to assist others!

Thank you for attending and we look forward to hearing of your breeding successes in the future!

Jos Mottershead
Kathy St.Martin
# TABLE OF CONTENTS

INTRODUCTION ................................................................................................................... 2

COPYRIGHT, CONTACT AND EDITION INFORMATION......................................................... 8

MARES ................................................................................................................................... 9

TERMINOLOGY .......................................................................................................................... 9

REPRODUCTIVE STRUCTURE ............................................................................................... 9
  Internal Reproductive Tract .................................................................................................. 9

ENDOCRINOLOGY ..................................................................................................................... 12
  Gonadotropin Releasing Hormone (GnRH) ....................................................................... 13
  Follicle stimulating hormone (FSH) and Luteinizing hormone (LH) ................................. 13
  Estrogens ............................................................................................................................ 14
  Progesterone ....................................................................................................................... 14
  Prostaglandin ..................................................................................................................... 14
  Inhibin ............................................................................................................................... 14
  A Brief Sequential Overview of the Regular Estrous Cycle ............................................. 15

TRANSITIONAL PHASE ........................................................................................................ 15
  Manipulation of Transitional Phase ................................................................................... 15

BREEDING PREPARATION ..................................................................................................... 17
  Mare History ...................................................................................................................... 17
  Nutritional Status and Housing ......................................................................................... 17
  External Reproductive Conformation ................................................................................. 18
  Endometrial Swab, Cytology, Culture and Sensitivity .................................................... 19
  Endometrial Biopsy ........................................................................................................... 20
  Breeding to the EAV Positive Stallion ............................................................................ 22
  Breeding Soundness Examination – other ....................................................................... 23

MODIFICATION OF THE ESTROUS CYCLE USING HORMONES ........................................ 24
  Induction of estrus ............................................................................................................. 24
  Induction of Ovulation ..................................................................................................... 26
  Ovarian Superstimulation (“Superovulation”) .................................................................. 27

INDICATION OF ESTROUS STAGE ..................................................................................... 27
  External signs .................................................................................................................. 27
  Internal signs of estrus .................................................................................................... 28
  Determination of estrus status ......................................................................................... 28
  Hormone assay ................................................................................................................ 29

BREEDING PROCESS ............................................................................................................ 29
  Live Cover ......................................................................................................................... 30
  Artificial Insemination ....................................................................................................... 30
  Multiple Pre-ovulatory Follicles Present – to breed or not? ............................................ 35
  “Foal heat” Breeding ....................................................................................................... 36
  Sex-selection Breeding ..................................................................................................... 37

BREEDING “PROBLEM” MARES ......................................................................................... 37
  Anestrus ............................................................................................................................ 38
  Chromosomal Abnormalities - “Intersex” Mares ............................................................ 40
  Persistent Estrus (Nymphomania) ..................................................................................... 41
  Delayed Uterine Clearance ............................................................................................... 41
  Endometritis ..................................................................................................................... 42
  Sexually Transmitted Organisms ................................................................................... 44
  Urovagina (“Urine Pooling”) ........................................................................................... 44
Advanced Evaluation ..................................................................................................................... 138
Calculation of On-Farm Insemination or Shipping Dose ............................................................... 139
Packaging Cooled Semen .............................................................................................................. 142
Frozen Semen ............................................................................................................................... 142
DEALING WITH THE PROBLEM STALLION .............................................................................. 147
Poor Quality Semen ...................................................................................................................... 147
Low Libido ................................................................................................................................... 149
“High” Libido ............................................................................................................................... 150
Ejaculatory Dysfunction ............................................................................................................... 151
Cryptorchidism ........................................................................................................................... 151
Testicular Degeneration ............................................................................................................... 152
DISEASES ................................................................................................................................. 152
Bacterial ........................................................................................................................................ 152
Viral ................................................................................................................................................ 153
Protozoa ........................................................................................................................................ 153
Squamous Cell Carcinoma ........................................................................................................... 154
Habronemiasis (summer sores) ................................................................................................... 154
INJURIES ....................................................................................................................................... 155
OTHER PHYSICAL CONDITIONS ............................................................................................... 155
Scrotal Hernias ............................................................................................................................. 155
Testicular Torsion ......................................................................................................................... 155
Effusions of the Vaginal Cavity ................................................................................................... 156
ADVANCED BREEDING TECHNIQUES ...................................................................................... 158
EMBRYO TRANSFER .................................................................................................................. 158
Function and Advantages ............................................................................................................. 158
Problems and Disadvantages ....................................................................................................... 158
Process ........................................................................................................................................... 158
EQUINE GENOMICS .................................................................................................................... 161
GENDER SELECTION .................................................................................................................. 162
LOW SPERM DOSE INSEMINATION ............................................................................................ 162
OOCYTE FREEZING ..................................................................................................................... 163
INTRA-FALLOPIAN OOCYTE TRANSFER ...................................................................................... 163
GAMETE INTRA-FALLOPIAN TUBE TRANSFER (GIFT) .............................................................. 163
INTRA-FOLLICULAR OOCYTE TRANSFER ................................................................................... 163
INTRA-FOLLICULAR INSEMINATION .......................................................................................... 163
IN VITRO FERTILIZATION ........................................................................................................... 163
INTRA-CYTOPLASMIC SPERM INJECTION (ICSI) ..................................................................... 164
FREEZING EPIDIDYMAL SPERM ................................................................................................... 164
FREEZE DRIED SPERM ................................................................................................................ 164
ANTIOXIDANTS IN SEMINAL PLASMA ....................................................................................... 164
NUCLEAR TRANSFER (NT) .......................................................................................................... 164
SOME FINAL OBSERVATIONS .................................................................................................... 165
APPENDICES .............................................................................................................................. 166
FOALING KIT ............................................................................................................................... 166
SEMEN COLLECTION AND ANALYSIS FORM .......................................................................... 167
KENNEY COOLED SEMEN EXTENDER ....................................................................................... 168
COOLED TRANSPORTED SEMEN SHIPMENT REPORT ............................................................ 169
TEMPERATURE CONVERSION CHART ...................................................................................... 170
ARTICLES CURRENTLY AVAILABLE ON THE WEB SITE ................................................... 171