

**European College of Animal Reproduction**  
**- ECAR –**



Secretary ECAR  
Marijke Beltman  
UCD Veterinary Hospital  
School of Veterinary Medicine  
University College Dublin, Belfield, Dublin 4, Ireland  
marijke.beltman@ucd.ie  
<http://www.ecarcollege.org/>

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**May 2017**

**Invitation to the Examination for the  
European Diplomat in Animal Reproduction  
(European Veterinary Specialist in Animal Reproduction)**

The European College of Animal Reproduction (ECAR) is an organisation for veterinary specialist training in Animal Reproduction and a member of the European Board of Veterinary Specialisation. ECAR cooperates closely with its American counterpart, the American College of Theriogenologists (ACT).

The next certifying examination of ECAR will be held on the

**16-17th of November in Vienna, Austria**

Candidates, who have successfully passed the exam will be conferred the title of Diplomat of the European College of Animal Reproduction.

Applications must be submitted to the College before the 15<sup>th</sup> of June 2017, they will be reviewed by the ECAR Credentials Committee. After provisional admittance to the examination, the examination fee of 350 Euro will be charged and must be paid before 31 August 2017. If a candidate does not take the exam, the fee will not be refunded and a new full fee is charged for the exam in the following year. The exam fee includes participation in the exam, lunches and dinners.

In addition, all candidates have to provide **5 multiple choice questions and 5 essay questions either general or in their subspecialty** (including answers and backed by references by 31<sup>st</sup> August 2017 and hence before they are admitted to the examination. At least three questions need to be accompanied by one or more pictures (.jpeg) and can be either short-slide-based questions or clinical cases on animal reproduction. The questions provided by the candidates, together with questions provided by ECAR Diplomates and Members of the Examination Committee may be used in the examination in future years.

Request for Disability Services and Accommodations Form

ECAR is committed to ensuring that candidates with any kind of disabilities have equal access to the ECAR examination. Policies and procedures have been developed to allow candidates to be as independent as possible, to preserve confidentiality, and to provide candidates who have disabilities with the same opportunities. If you have any disability or medical condition that may require special accommodations during the examination, please contact the ECAR Secretary, Marijke Beltman. Your request, documentation and evaluation will remain strictly confidential.

## **Structure of the 2017 Exam**

The exam will consist of multiple choice, short slide-based and essay questions, as well as clinical cases based on visual material (e.g. projected powerpoint slides of morphological specimens, biopsy sections, microscopic smears, semen samples). The exam will be divided into two parts. The first part (General Part) will be identical for all candidates. The second part (Subspecialty Part) will consist of questions in the subspecialty or species-group chosen by the candidate. The second part of the exam can be taken in the following subfields:

- *Ruminant Reproduction and Herd Health*
- *Pig Reproduction and Herd Health*
- *Equine Reproduction*
- *Small Animal Reproduction*
- *Reproductive Biotechnology*

The subfield must be chosen by the candidate before the beginning of the exam and is determined by the subspecialty in which they trained. Only one can be taken per exam, in subsequent years it is possible to add another without having to repeat the general part.

### **General part:**

This part of the exam consists of 100 multiple choice questions, 10 essay questions and 15 short slide-based questions. The distribution of the 100 multiple choice questions (MCQ) are approximately 10% each for ruminants, equine, small animal, porcine, and biotechnology, 5% exotics/laboratory animals, and 45% general knowledge and/or multi-species questions (percentages are approximate and not rigid). The 10 essay questions and 15 short slide-based questions are distributed evenly across species and subfields. Questions are designed to verify both factual and comprehensive knowledge.

### **Subspecialty part:**

This part of the exam consists of 20 MCQs, 5 essay questions, five clinical case questions. In this part of the exam you will be tested more on comprehensive, contextual and clinical knowledge and experience and your ability to solve clinical problems. Especially in this part you must demonstrate clinical insights.

### **Provisional time schedule**

#### Day 1: General part

4 sessions (2 hours each): Multiple choice, essays and short slide-based questions; the number of questions of each type per session will be decided by the Examination Committee

#### Day 2: Subspecialty part

2 sessions (2 hours each): Multiple choice, essays, and clinical case questions.

Example questions are available on the ECAR web site at [www.ecarcollege.org](http://www.ecarcollege.org), see "For residents".

**For any problems or questions, please contact the following address:**

ECAR Secretary  
Dr Marijke Beltman  
marijke.beltman@ucd.ie

## **EUROPEAN COLLEGE OF ANIMAL REPRODUCTION**

### **PREPARING FOR THE EXAMINATION**

The examination will consist of a general examination and a subspecialty examination.

#### **General examination**

The general part of the examination consists of a combination of 100 multiple choice questions (each with one correct answer from 5 options), 10 long-essay and 15 short-slide questions. There is no negative marking.

This part of the examination is designed to determine whether the candidate has an acceptable level of knowledge (a minimal score of 55% is required) covering the following areas: physiology of reproduction including endocrinology and gamete biology, anatomy as far as it concerns reproduction, pathophysiology, gross pathology and histopathology of the reproductive organs, treatment and prophylaxis of reproductive diseases, diagnostic evaluation of reproductive function including clinical examination, ultrasonography and radiology as far as it concerns reproductive function, laboratory techniques in reproductive endocrinology, semen and embryo analysis, reproductive surgery including knowledge of standard anaesthetic techniques, genetics and hereditary diseases, legal aspects of artificial insemination, embryo transfer and animal breeding.

The general examination emphasises on general and comparative aspects of animal reproduction but will also cover basic aspects of farm animal reproduction and herd health, equine reproduction and small animal reproduction as well as questions on exotic animal, wildlife, laboratory animal and avian reproduction. The examination is taken in the English language. A working knowledge of English and veterinary medical and specialist terminology in English is assumed.

#### **Subspecialty examination**

The second (subspecialty) part of the examination will be held after the general examination in the same week and at the same place as the general examination.

This second part of the examination is designed to test the ability of the candidate to: examine clinical cases with reproductive problems, come to a diagnosis based on a thorough examination, suggest and perform treatments, and to carry out techniques in reproductive biotechnology. Questions based upon technical, practical and background aspects of animal reproduction may be asked.

This part of the examination will focus on either (a) small animal reproduction, (b) ruminant reproduction and herd health, (c) porcine reproduction and herd health, (d) equine reproduction, (e) reproductive biotechnology. The examination will be devoted to the respective subspecialty, although comparative aspects may be involved as well. Clinical cases presented to the institution where the examination is performed and animals provided by that institution for an examination on techniques in reproductive biotechnology may be presented to the candidates as well. A minimal score of 55 is required for this part.

Candidate can choose to take the exam in more than one subfield but can only apply to do a second subfield after sitting and passing the exam (general part and subfield part) of the subfield

in which they trained in. In order to sit a second subfield the candidate will have to supply the appropriate case log information.

The candidate's grade will be derived from the general multiple choice questions (30%), general long-essay and short-slide questions (30%) and the subspecialty examination (40%). An overall score of 70% is needed to pass the examination (in addition of the individual score of at least 55% needed for both the general and the subspecialty part of the examination).

## SUGGESTED READING

The list of books and journals are intended as suggestions to help you to prepare for the certifying examination. The main study books provide a useful guide to the topics which will form the major part of the examination. The list is not intended to be exhaustive. Candidates may have their own preferred texts (sometimes in the national language). Candidates are expected to be familiar with the current literature in animal reproduction journals.

## BOOKS

### GENERAL

- **Senger, P.L.** (2012). Pathways to Pregnancy and Parturition, 3<sup>rd</sup> edition. Current Conceptions Inc, Redmond USA.
- **Noakes, DE, Parkinson, TJ and England, GCW** (2009) Veterinary Reproduction and Obstetrics, 9<sup>th</sup> Edition, Saunders, London.
- **Youngquist, RS.** (2007) Current Therapy in Large Animal Theriogenology 2<sup>nd</sup> edition. W.B. Saunders Co., Philadelphia.
- **Hafez, ESE.** (2006) Reproduction in Farm Animals, 7th Edition, Lea and Febiger, Philadelphia.
- **Grant Maxie, M.** (2007) Pathology of Domestic Animals, Volume 3 - 5<sup>th</sup> edition. Saunders, London.

### SMALL ANIMAL REPRODUCTION

- **England, Gary C.W.** (2013) Dog Breeding, Whelping and Puppy Care. Wiley Blackwell. More for breeders not really very relevant for the examine
- **Feldman, EC and Nelson, RW.** (2003) Canine and Feline Endocrinology and Reproduction, 3<sup>rd</sup> ed. WB Saunders Co., Philadelphia.
- **Johnston, SD. Root-Kustritz M.V, Olson, P.N** (2001) Canine and Feline Theriogenology W.B. Saunders Co., Philadelphia.
- **Lopate Cheryl (2013)** Management of Pregnant and Neonatal Dogs, Cats and Exotic Pets. Wiley Blackwell.
- **England, G. and von Heimendahl, A.** (2010) BSAVA Manual of Canine and Feline Reproduction and Neonatology, 2<sup>nd</sup> edition British Small Animal Veterinary Association.
- **Rijnberk, A and Kooistra** (2010). Clinical endocrinology of dogs and cats. Schlutersche Verlagsgesellschaft mbH & Co. KG, Hans-Bockler-Allee 7, 30173 Hannover.

## RUMINANT REPRODUCTION AND HERD HEALTH **UNDER REVISION May 2017**

- **Ginther, OJ.** (1998) Ultrasonic Imaging and Animal Reproduction: Cattle (Book 3), Equiservices, Publishing, Cross Plains, Wisconsin.
- **Gordon, I.** (1996) Controlled reproduction in Cattle and Buffaloes, CAB International, Wallingford, UK
- **Gordon, I.** (1997) Controlled reproduction in Sheep and goats, CAB International, Wallingford, UK
- **Hopper, R.M.** (2015) Bovine Reproduction, Wiley Blackwell
- **Tibary, A. and Anoussa, A. (1997)** Theriogenology in Camelidae. Anatomy, Physiology, Pathology and Artificial Breeding. Veterinary Research Center, P.O Box 44479, Abu Dhabi. (ISBN 9981-801-32-1)
- Veterinary Clinics of North America - Large Animal Practice, Bovine Theriogenology July 2005 W.B. Saunders Co., Philadelphia.

## PIG REPRODUCTION AND HERD HEALTH

- **Noakes, DE, Parkinson, TJ and England, GCW** (2009) Veterinary Reproduction and Obstetrics, Saunders, London, 9th Edition.
- **Youngquist, RS.** (2007) Current Therapy in Large Animal Theriogenology 2nd edition. W.B. Saunders Co., Philadelphia.
- **Gordon, I.** (1997) Controlled reproduction in Pigs, CAB International, Wallingford, UK
- Veterinary Clinics of North America - Large Animal Practice, W.B. Saunders Co., Philadelphia.
- **Farmer, C.** (ed) (2015) The Gestating and Lactating Sow. Wageningen Academic Publishers. ISBN: 978-90-8686-253-5
- Veterinary Clinics of North America - Large Animal Practice, Swine Reproduction July 1992 W.B. Saunders Co., Philadelphia.

## EQUINE REPRODUCTION

### BOOKS

- **McCue PM and Squires EL** (2015) Equine Embryo Transfer, Teton Newmedia, USA.
- **McKinnon, AO and Voss, JL.** (2011) Equine Reproduction, 2<sup>nd</sup> edition Blackwell Publishing Ltd.
- **Descanio JJ and McCue PM** (2014) Equine Reproductive Procedures, Wiley Blackwell, UK.
- **Madigan JE (2013)** The manual of Equine Neonatal Medicine. E-version on [www.ivis.org](http://www.ivis.org)
- **Blanchard, TL, Varner, DD and Schumacher, J.** (2011) Manual of Equine Reproduction, 3<sup>rd</sup> edition Mosby, St Louis, Missouri
- **Samper, JC, Pycock J and McKinnon AO.** (2007) Current Therapy in Equine Reproduction, Saunders Elsevier, St Louis, USA.
- **Youngquist RS and Threlfall W** (2006) Current Therapy in Large Animal Theriogenology; 2nd edition, Saunders.
- **Ginther, OJ.** (1995) Ultrasonic Imaging and Animal Reproduction: Horses (Book 2), Equiservices, Publishing, Cross Plains, Wisconsin.
- **Ginther, OJ.** (1992) Reproductive Biology of the Mare, Basic and Applied Aspects 2nd Edition, Equiservices, Publishing, Cross Plains, Wisconsin

## PROCEEDINGS

- Veterinary Clinics: Equine Practice - Advances in Diagnostic and Therapeutic Techniques in Equine Reproduction by Marco A. Coutinho da Silva, Editor (2016 – Volume 32)
- Proceedings of the American Association of Equine Practitioners (recent years) also available on [www.ivis.org](http://www.ivis.org)
- Proceedings of the International Symposium on Equine Reproduction (New Zealand, 2014) Journal of Equine Veterinary Science Supplement
- Proceedings of the International Symposium on Equine Embryo Transfer (Gent, 2016) Journal of Equine Veterinary Science Supplement
- Proceedings of the International Symposium on Stallion Reproduction (Champaign, 2016) Journal of Equine Veterinary Science Supplement

## REPRODUCTIVE BIOTECHNOLOGY

- **Gordon, I.** (2003) Laboratory production of cattle embryos. CAB International, Wallingford, UK
- **Hopper, R. (2015)** Bovine Reproduction, Section III: Assisted and advanced reproductive technologies (different authors)
- **McKinnon, A. (2011)** Equine Reproduction, Part IV Assisted Reproductive Technologies (different authors)
- Current reviews in Journals (mentioned below) about IVM, IVF, IVC (bovine, equine, ovine, porcine, canine, feline, murine), cryopreservation (semen, embryos, oocytes), cloning, transgenic animals, OPU, ET, staining methods, semen evaluation methods

## JOURNALS (including supplements; )

Animal Reproduction Science

International Journal of Andrology

Biology of Reproduction

Domestic Animal Endocrinology

Journal of Andrology

Reproduction (see also Journal of Reproduction and Fertility; Reviews of Reproduction (by JRF))

Reproduction in Domestic Animals

Theriogenology

## MANUALS

Manual of the International Embryo Transfer Society (IETS, 1998)

## WEBSITES

IVIS (<http://www.ivis.org>)

The Drost Project (<http://www.drostproject.org/>)

Comparative Theriogenology, Louisiana State University

<http://www.vetmed.lsu.edu/eiltslotus/theriogenology-5361/>)

Communications in Theriogenology (<http://diglib.lsu.edu/CTJournal.nsf/Web/Home>)

**Appendix I of the college profile. It gives an extensive overview of the topics to be covered.**

## **European College of Animal Reproduction (ECAR)**

### **Requirements for Residents (October 1999)**

#### **List of Topics to be Covered in a Residency or Individual Training Programme**

(Practical training should include work on patients presented to the training institution but can be replaced to a certain degree by practical demonstrations. Candidates wanting to qualify via the alternate route must demonstrate to the Board of the College that their professional activities are equivalent to the clinical training requirements for residencies and individual training programmes)

#### **1. General topics**

- Anatomy and histology of the reproductive organs
- Physiology of the oestrous cycle and pregnancy in domestic animals
- Reproductive anatomy and physiology of exotic, avian, wildlife and laboratory animal species
- Physiology of reproduction in male animals
- Physiology of parturition and the puerperal period
- Principles of hormone therapy pertaining to reproduction
- Principles of antibiotic therapy pertaining to reproduction
- Gamete development and physiology
- Techniques for the evaluation of gamete function
- Principles of gamete preservation
- Hereditary diseases, defects and dispositions
- Principles of population genetics
- Principles of epidemiology
- Analgesia and anaesthesia in large and small animals
- Ethical aspects of animal reproduction
- European animal breeding legislation
- European animal disease control legislation pertaining to reproductive diseases

#### **2. Cattle, small ruminants and pigs (incl herd health)**

- Breeding soundness examination (male and female). A minimum number of examinations performed by the resident is required.
- Determination of the reproductive stage. A minimum number of examinations performed by the resident is required.
- Endocrine causes of subfertility/ovarian dysfunction (pathogenesis, diagnosis, treatment and prophylaxis)
- Infectious causes of subfertility and venereal diseases (pathogenesis, diagnosis, treatment and prophylaxis)
- Effects of nutrition and environmental factors on reproductive function and fertility
- Approaches to fertility and udder problems as a herd health problem. Active involvement of the resident in herd health programmes is required.
- Induction and synchronization of oestrus and ovulation
- Superovulation and embryo transfer. A minimum number of embryo transfers performed by the resident is required.
- Management of reproductive seasonality in sheep and goats



- Infectious and non-infectious diseases of the mammary gland (pathogenesis, classification, diagnosis, treatment and prophylaxis).
- Management of mammary gland diseases. A minimum number of cases treated by the resident is required.
- Computer recording and analysis of herd records.
- Pregnancy diagnosis. A minimum number of examinations performed by the resident is required.
- Infectious and non-infectious causes of abortion and stillbirth (pathogenesis, diagnosis, treatment and prophylaxis).
- Abnormalities of pregnancy.
- Induction of parturition.
- Management of dystocia including obstetrical surgery (Caesarean section, fetotomy). A minimum number of cases treated by the resident is required.
- Management of birth-related lacerations of the genital tract. A minimum number of cases treated by the resident is required.
- Uterine disorders in the puerperal period. A minimum number of cases treated by the resident is required.
- Metabolic diseases in the peripartum period.
- Congenital and hereditary defects, resuscitation and intensive care of the neonate, pathogenesis, diagnosis and treatment of neonatal asphyxia, pathogenesis, diagnosis and treatment of prematurity and respiratory distress syndrome, diseases in the neonatal period. A minimum number of pediatric cases diagnosed and treated by the resident is required.
- Endocrine causes of subfertility/testicular dysfunction (pathogenesis, diagnosis, treatment and prophylaxis). A minimum number of cases seen by the resident is required.
- Semen collection, analysis, processing and preservation, artificial insemination (AI). A minimum number of procedures performed by the resident is required.
- Management of AI and ET stations.
- Disease control in male animals used for AI.
- Reproductive surgery in the male (castration, preparation of teaser bulls and rams).
- Control of semen production in boar farms.
- Control of stillbirths number in pig reproduction.
- Control of neonatal infections in piglets.
- Reproductive management of pig hyperprolific breeds in pig reproduction.
- Pathologies linked to yard conditions during the last stages of gestation in sows.
- Free management vs. confined management during parturition of sows.

### 3. Equine Reproduction

- Breeding soundness examination (male and female), determination of reproductive stage. A minimum number of examinations performed by the resident is required.
- Endocrine causes of subfertility/ovarian dysfunction (pathogenesis, diagnosis, treatment and prophylaxis). A minimum number of cases diagnosed and treated by the resident is required.
- Ovarian tumors (pathogenesis, diagnosis and treatment). A minimum number of cases diagnosed by the resident is required.
- Infectious causes of subfertility (pathogenesis, diagnosis, treatment and prophylaxis) and venereal diseases.
- Induction and synchronisation of oestrus and ovulation.
- Artificial insemination. A minimum number of AI procedures performed by the resident is required.
- Superovulation and embryo transfer.

- Physiology and management of reproductive seasonality (male and female).
- Diseases of the mammary gland.
- Evaluation of uterine biopsies. Active involvement of the resident in histopathologic evaluation of uterine biopsies is required (in cooperation with a histopathology unit).
- Endocrine diagnostic function techniques.
  
- Pregnancy diagnosis. A minimum number of examinations performed by the resident is required.
- Diagnosis and management of twin pregnancies.
- Infectious and non-infectious causes of abortion and stillbirth (pathogenesis, diagnosis, treatment and prophylaxis).
- Abnormalities of pregnancy.
- Induction of parturition.
- Management of dystocia, obstetrical surgery (Caesarean section, fetotomy). A minimum number of cases treated by the resident is required.
- Management of birth-related lacerations of the genital tract. A minimum number of cases treated by the resident is required.
- Uterine disorders in the puerperal period.
- Metabolic diseases in the peripartum period.
- Congenital and hereditary defects.
- Resuscitation and intensive care of the neonate, pathogenesis, diagnosis and treatment of neonatal asphyxia, pathogenesis, diagnosis and treatment of prematurity and respiratory distress syndrome, diseases in the neonatal period, management of neonatal septicaemia, management of the orphan foal. A minimum number of pediatric cases diagnosed and treated by the resident is required.
- Endocrine causes of subfertility/testicular dysfunction (pathogenesis, diagnosis, treatment and prophylaxis). A minimum number of cases seen by the resident is required.
- Endocrine diagnostic function testing in the male horse
- Semen collection, analysis, processing and preservation, artificial insemination (AI). A minimum number of procedures performed by the resident is required.
- Management of the breeding stallion.
- Management of AI and ET stations.
- Disease control in stallions used for AI.
- Reproductive surgery in the male (castration of the normal and cryptorchid stallion).

#### 4. Small Animal Reproduction

- Breeding soundness examination (male and female), determination of the reproductive stage. A minimum number of examinations performed by the resident is required.
- Hormonal, pharmacological and immunological methods of contraception
- Surgical techniques for contraception. A minimum number of surgical procedures performed by the resident is required.
- Endocrine causes of subfertility/ovarian dysfunction (pathogenesis, diagnosis, treatment and prophylaxis)
- Infectious causes of subfertility and venereally transmitted diseases (pathogenesis, diagnosis, treatment and prophylaxis)
- Toxicological, therapeutic and other causes on infertility
- Induction and synchronisation of oestrus and ovulation
- Artificial insemination. A minimum number of surgical procedures performed by the resident is required.

- Infectious and non-infectious diseases of the mammary gland (lactation with and without pregnancy, mammary tumors, mammitis)
- Surgery of the mammary gland
- Diseases of the uterus, ovaries, vagina and vulva
- Endometritis and pyometra (pathogenesis, diagnosis, treatment and prophylaxis). A minimum number of cases diagnosed and treated by the resident is required.
- Endocrine diagnostic function techniques
  
- Pregnancy diagnosis. A minimum number of examinations (including ultrasonography and radiography) performed by the resident is required.
- Infectious and non-infectious causes of abortion and stillbirth (pathogenesis, diagnosis, treatment and prophylaxis)
- Abnormalities of pregnancy and parturition
- Induction of abortion
- Induction of parturition
- Management of dystocia. A minimum number of cases treated by the resident is required
- Obstetrical surgery. A minimum number of cases treated by the resident is required.
- Uterine and vaginal disorders in the puerperal period
- Metabolic diseases in the peripartum period
- Congenital and hereditary defects
- Resuscitation and intensive care of the neonate
- Pathogenesis, diagnosis and treatment of neonatal asphyxia and respiratory distress
- Diseases in the neonatal period. A minimum number of pediatric cases diagnosed and treated by the resident is required.
- Management of the orphan puppy
  
- Endocrine causes of subfertility/testicular dysfunction (pathogenesis, diagnosis, treatment and prophylaxis). A minimum number of cases seen by the resident is required.
- Semen collection, analysis, processing and preservation. A minimum number of semen collections, evaluations and artificial inseminations is required.
- Management of AI
- Reproductive surgery in the male. A minimum number of surgical procedures performed by the resident is required.
- Diseases and surgery of the accessory sex glands
  
- Ultrasonography and medical imaging of the reproductive tracts and systems

## 5. Reproductive Biotechnology

- Superovulation and synchronization of ovulation
- Embryo transfer (transcervical and transabdominal collection and transfer of embryos). A minimum number of embryo transfers performed by the resident is required.
- Classification of embryos
- Collection and preparation of follicles and oocytes
- In vitro maturation, fertilization and culture of oocytes/embryos. A minimum number of IVF procedures performed by the resident is required.
- Micromanipulation of oocytes and embryos
- Culture of follicles/oocytes/embryos
- Conservation of gametes and embryos. A minimum number of gamete and embryo conservation procedures performed by the resident is required.

- Semen evaluation and processing for embryo transfer and associated biotechniques (including semen sorting)
- Intracytoplasmic sperm injection (ICSI)
- Genomic analysis of embryos (including testing for genetic defects and sex determination)
- Manipulation of the genome
- Ethical aspects of reproductive biotechnology