



Australian Government

ACMATE505 Carry out advanced breeding procedures

Release: 2

ACMATE505 Carry out advanced breeding procedures

Modification History

Release	Comments
Release 2	This version released with ACM Animal Care and Management Training Package Version 3.0.
Release 1	This version released with ACM Animal Care and Management Training Package Version 1.0.

Application

This unit of competency describes the skills and knowledge required to establish breeding programs for multiple generation production lines, select and prepare animals for breeding, and implement breeding and post-mating procedures.

The unit applies to individuals who work as animal technicians in research and teaching facilities that are required to breed animals for scientific purposes. Work is performed according to the organisation's breeding program and standard operating procedures and requires a sound, effective working knowledge of genetics.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Unit Sector

Animal Technology (ATE)

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Establish breeding programs for production lines	1.1 Comply with organisational policies, procedures and protocols set by the Animal Ethics Committee (AEC) and relevant legislation, including health and safety, at all times

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.2 Relate genetic principles to breeding program requirements 1.3 Design and establish breeding programs for animal production lines 1.4 Confirm design, and develop or evaluate established data collection record systems for relevant breeding program 1.5 Review and modify organisational standard operating procedures for breeding programs
2. Select animals and prepare for breeding	2.1 Identify and confirm breeding program for specific production line requirements and production schedules 2.2 Review and monitor animals for mating to determine the current stage of their reproductive cycle 2.3 Monitor females for stages of oestrus cycle and identify those that are ready for mating 2.4 Identify and allocate animals selected for mating or cohort production in an appropriate environment
3. Implement breeding procedures	3.1 Select and review appropriate mating systems and methods according to the breeding program 3.2 Monitor animals during and after the mating period to determine whether mating has been successful
4. Perform post-mating procedures	4.1 Monitor animals for signs of parturition and/or eggs for signs of hatching 4.2 Prepare a plan for fostering arrangements or caesarean re-derivations 4.3 Assess quality of offspring according to the required quality parameters of the breeding program and experimental needs 4.4 Identify, sex and wean offspring according to the breeding program 4.5 Carry out post-weaning management according to the breeding program 4.6 Maintain breeding records according to the breeding program and organisational policies and procedures 4.7 Review and suggest modifications to breeding program outcomes for future production runs
5. Name and record	5.1 Identify and record strains or breeds of animals

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
animals	5.2 Record and interpret breeding records, including details of number of litters born, stillbirths or neonatal deaths, weaning sex ratios and reasons for poor test performance

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
Reading	- Analyse documentation to review breeding program outcomes - Analyse information to assist in the identification of animals
Get the work done	- Plan and organise complex tasks, identifying possible risks and accessing assistance where required - Identify problems, apply animal breeding research problem-solving approaches, and review outcomes

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
ACMATE505 Carry out advanced breeding procedures Release 2	ACMATE505 Carry out advanced breeding procedures Release 1	Minor changes to performance criteria and knowledge evidence for clarity Revised performance evidence to reduce duplication with performance criteria	Equivalent unit

Links

Companion Volumes, including Implementation Guides, are available at VETNet: - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b75f4b23-54c9-4cc9-a5db-d3502d154103>

Assessment Requirements for ACMATE505 Carry out advanced breeding procedures

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Performance Evidence

An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit.

There must be evidence that the individual has:

- planned, prepared and carried out advanced breeding procedures on at least two occasions
- reviewed, revised, maintained and updated records according to regulatory and project documentation requirements.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:

- key principles of genetics:
 - Mendelian genetics, including punnet squares
 - differences between inbred/outbred; backcross/intercross; knock-in, knock-out; transgenic
 - genetic drift
 - maintenance of integrity of genetic lines
 - common pedigrees
 - differences between background strains
 - basics of Cre-lox recombination
- mediated genome editing – mosaicism in Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)
- hemizygote, sex (x) linked breeding
- principles and practices of advanced breeding procedures, including:

- anatomical and physiological structures and functions related to reproductive health and wellbeing of commonly held animals
- artificial insemination procedures relevant to different scenarios, including cryopreservation and in vitro fertilisation (IVF) techniques
- types of genetic modifications
- functions and requirements of a breeding colony
- oestrus cycles of a range of species, including representative poly-oestrus, mono-oestrus and induced ovulation species
- range of mating systems, behaviour and methods appropriate to the species
- reproductive cycles
- emergency techniques for birthing difficulties, including caesareans
- post-weaning management
- terminology and nomenclature related to animal reproductive anatomy and physiology, and genetics
- animal welfare and ethics related to breeding, covering:
 - 3Rs – replacement, reduction and refinement
- organisational policies and operating procedures, including:
 - emergency procedures for birthing difficulties
 - safe animal handling techniques during mating and in breeding programs
 - record keeping requirements, including types of information that need to be kept on birthing and fostering processes
 - workplace hygiene methods, disinfection, sterilisation and aseptic techniques
- key requirements of the Australian Code for the Care and Use of Animals for Scientific Purposes relating to breeding
- relevant state or territory legislation and regulations relating to the practice of veterinary science, workplace health and safety and animal welfare and research, including:
 - Office of the Gene Technology Regulator
 - National Health and Medical Research Council (NHMRC)
 - Department of Agriculture.

Assessment Conditions

Assessment of skills must take place under the following conditions:

- physical conditions:
 - an animal technology laboratory or an environment which accurately represents workplace conditions.
- resources, equipment and materials:
 - breeding animals
 - animal breeding records.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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