NATIONAL FARM ANIMAL CARE COUNCIL
CONSEIL NATIONAL POUR LES SOINS AUX ANIMAUX D'ÉLEVAGE

CODE OF PRACTICE

FOR THE CARE AND HANDLING OF

Rabbits

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Introduction

As a nationally developed standard for farmed rabbit, this Code of Practice is the first of its kind in Canada and is unique internationally. The Code aims to provide feasible and scientifically informed approaches to meeting rabbit health and welfare needs contributing to a sustainable and internationally competitive Canadian rabbit industry.

The care and management provided by the person(s) responsible for the daily care of rabbits has a significant influence on their welfare. Those responsible for rabbits should consider the following key aspects of responsible rabbit care:

- shelter and comfort
- feed and water to maintain health and vigor
- social needs of rabbits
- humane handling
- disease prevention and control
- veterinary care, diagnosis and treatment
- timely euthanasia of any rabbit that is not responding to treatment or that is experiencing unrelieved pain
- emergency preparedness.

Requirements in this Code are often outcome- or animal-based, as these are most directly linked to animal welfare, and can be applied in a wide range of production systems. Since Requirements often state the necessary outcomes, the producer has flexibility to determine how the outcomes can be achieved using individual management and husbandry practices. Recommended Practices encourage continuous improvement in animal care. However, failure to implement Recommended Practices does not imply that acceptable standards of animal care are not being met.

The scope of this Code is on-farm with a focus on rabbits raised for meat. Consideration has also been given to rabbits kept for show, breeding and fibre. The rabbit Code includes important pre-transport considerations but does not address animal care during transport. Consult the Code of Practice – Transportation for information on animal care during transport. This Code excludes rabbits kept as companion animals which may be covered by other guidance documents.

The rabbit Code is not intended to describe all production and management practices relevant to each stage of production. Anyone building or modifying a facility or assuming management of an existing rabbitry will need to be familiar with local, provincial/territorial, and federal requirements for construction, land use, environmental management, and other areas outside the scope of this document. Individuals requiring further details than what can appropriately be included in this Code should refer to universities, agricultural ministries, and other resources (see *Appendix H – Resources for Further Information*).

Glossary

Ad libitum feeding: allowing rabbits to eat as much as they want when they want (free choice).

All-in, all-out: a production strategy whereby all rabbits are moved into and out of facilities or production phases at the same time.

Ambient temperature: the environmental temperature in the rabbit's immediate surroundings. (Contrast with "Effective environmental temperature.")

Ammonia: a noxious gas common in animal production that forms during the breakdown of nitrogenous wastes in animal excrement.

Analgesic: a drug that relieves pain.

Artificial insemination: mechanical means of inserting previously collected semen into sexually mature does.

Balanced diet: a diet or ration of feed that has all the known required nutrients in the proper amount.

Biofilm: a thin, impenetrable film of bacteria and mucous-like material that may adhere to a surface unless properly cleaned.

Breed-back schedule: the interval of time after kindling when the doe is re-bred.

Cages: housing systems typically made of wire mesh or plastic coated wire and that are raised off the ground.

Cecotrophs: a soft type of feces produced and consumed by rabbits and thought to be an important source of protein, micronutrients, and B vitamins. Cecotrophy in rabbits does not occur as a response to a nutritional imbalance; it represents a normal but specialized digestive strategy.

Clean: the process of removing visible debris, dirt and dust. (Contrast with "Sanitize" and "Disinfect.")

Competent: demonstrated skill or knowledge in a particular topic, practice or process that has been developed through training, experience or mentorship.

Compromised animal: in the context of transport, an animal with reduced capacity to withstand the stress of transportation but for which transportation with special provisions will not lead to undue suffering (1). (Contrast with "Unfit animal.")

Controlled feeding: a feeding strategy that involves managing when rabbits have access to feed in a day. (Contrast with "Restricted feeding.")

Controlled nursing: a management strategy that involves restricting the doe's access to the litter to manage when the doe nurses and how often she accesses the nest box.

Corrective action: action to eliminate the cause(s) of nonconformity or other undesirable situations and to prevent recurrence (2). Corrective actions relate to aspects of animal care or welfare that a producer can control; the action taken needs to be directed at effectively addressing a given issue. (Contrast with "Reasonable steps.")

Culling: the process of removing rabbits from production based on specific criteria.

Disinfect: the process of cleaning equipment and facilities in ways that completely and effectively destroy disease-carrying microorganisms. (Contrast with "Cleaning" and "Sanitize.")

Effective environmental temperature: the temperature that rabbits actually feel. The effective environmental temperature may differ by several degrees from that measured in the overall barn. (Contrast with "Ambient temperature.")

Enteritis: inflammation of the intestine, usually accompanied by diarrhea and reduced intake of feed and water.

Fit animal: in the context of animal transport, an animal that is able to withstand the stress of transportation without experiencing suffering and expected to arrive at its final destination in good condition.

Fryers: growing rabbits from weaning to finishing.

Herbivore: an animal that feeds on plants.

Incidence: the number of new cases of a disease or condition over a specific period of time. (Contrast with "Prevalence.")

Ketosis: a condition characterized by raised levels of ketone bodies in the body associated with abnormal fat metabolism. Affected rabbits may be depressed and reluctant to move. In does, ketosis usually occurs in the last week of gestation.

Kindling: the act or process of giving birth to kits. Also referred to as "parturition."

Kits: young rabbits from birth to weaning.

Lairage: holding animals for transport in containers.

Metritis: inflammation of the uterus.

Milk spot: a white spot visible through the side of a neonatal kit that correlates with milk in their stomach.

Multiparous does: does that have experienced one or more previous kindling(s).

Natural breeding: allowing a doe and buck to mate naturally while still controlling the timing of breeding and providing supervision to minimize the risk of injury.

Neonates: kits that are less than 10 days of age.

Olfactory: of or relating to the sense of smell.

Parity: the number of times a doe has kindled.

Pasteurellosis: a bacterial infection caused by Pasteurella that involves the respiratory and other body systems.

Pelleted feed: feed components that are processed and compressed into pellets of a standardized shape and size. A pelleted diet is a reliable way of providing a balanced and complete diet.

Pens: a type of rabbit enclosure that is generally on the floor and larger than cages.

Pododermatitis: a painful condition occurring on the footpads of the hind feet of rabbits. If untreated, pododermatitis may lead to deep-seated infection and compromise animal movement. (Also known as "sore hocks.")

Prevalence: the number of cases of a disease or condition (new and ongoing) at one point in time. (Contrast with "Incidence.")

Primiparous does: does that are kindling for the first time. (Also referred to as "first-parity does.")

Quick: live tissue in the centre of rabbits' nails that contain blood vessels and nerves.

Ration: the total amount of feed that is provided.

Reasonable steps: steps taken by a producer to try to mitigate an issue that is not fully under a producer's control (e.g. weather, transport time). (Contrast with "Corrective action.")

Replacement rabbits: rabbits that are kept on the farm to replace rabbits in the breeding herd. Bucks between 12-16 weeks of age are referred to as replacement bucks. Does between 5-18 weeks of age are referred to as replacement does.

Restricted feeding: feeding a quantity of feed that is less than full feeding/ad libitum quantity to prevent over conditioning and avoid digestive disorders. Certain conditions, such as obesity, may also warrant short-term restricted feeding in rabbits. (Contrast with "Controlled feeding.")

Salinity: the saltiness or dissolved salt content of water, for example.

Sanitize: the process of making a surface sanitary or free of visible dirt contaminants that could affect rabbits. Sanitizing is meant to reduce (not eliminate) the occurrence and growth of bacteria, viruses and fungi. (Contrast with "Clean" and "Disinfect.")

Stereotypies: abnormal behaviours that serve no apparent function and are performed by rabbits in a repetitive, invariant way (e.g. wire biting, pacing, weaving, excessive grooming).

Topical anesthetic: a substance that, applied directly on the rabbit's skin, will induce a temporary loss of feeling or pain sensation on the area to which it is applied.

Unconsciousness: the point at which a rabbit no longer has the ability to feel pain or perceive and respond to its environment (e.g. light, sound).

Unfit animal: in the context of transport, an animal with reduced capacity to withstand transportation and for which there is a high risk that transportation will lead to undue suffering (1). Unfit animals must not be transported except for diagnosis or treatment on the advice of a veterinarian. (Contrast with "Fit animal" and "Compromised animal.")

Section 1: Housing and Equipment

1.1 Housing Systems

1.1.1 Facility Design and Maintenance

Facility design and maintenance significantly impact rabbit health and welfare. Rabbits on most commercial farms are housed in cages that are raised off the ground and typically made of wire mesh or plastic coated wire. Alternative systems include pens, which are generally larger than cages. All housing types should promote good handling, monitoring, and care of rabbits.

Housing systems need to provide a comfortable environment for rabbits through appropriate space allowance, ventilation, and temperature. Routine maintenance of facilities and timely replacement of cages/pens before their condition deteriorates helps prevent rabbits from becoming injured.

REQUIREMENTS

Housing systems and their components must be designed, constructed, and maintained in a manner that reduces the potential for injury and permits observation of all rabbits.

RECOMMENDED PRACTICES

a. develop and follow a schedule for facility maintenance
b. consult an agricultural engineer or other qualified specialist when building a new facility or renovating an existing one.

1.1.2 Space Allowances

Rabbits' use of space depends on ambient temperature, group size, and various characteristics of the enclosure (e.g. platform) (3). Space allowance affects a rabbit's ability to perform behaviours important to the species (e.g. grooming, hopping, jumping), and to adopt normal resting postures (ventral and lateral) and sitting postures (sitting upright or with all 4 legs on the ground) (3, 4). Floor space impacts a rabbit's ability to thermoregulate in high ambient temperatures (rabbits can cool themselves by stretching out) (3,4).

Rabbits appear to prefer higher cage heights during their active period and will hop and stand fully upright when provided with sufficient cage height (4). Providing an area within the cage/pen with a minimum height of 40.6 cm (16 in) promotes the expression of natural behaviour and reduces the risk of ear lesions (4). Fryers, at any stocking density, appear to prefer enclosures with a top (rather than an open top) (4).

Increased floor space per rabbit results in improved bone quality by allowing more weight-bearing activity, such as walking and hopping (4). Overcrowding can result in reduced feed intake as well as increased aggression and

associated injuries (e.g. scratches, leg injuries, tail injuries) (4). A stocking density at or below 40 kg/m² has been recommended (5).

The Canadian rabbit industry and other stakeholders understand the need for further research and innovation into feasible housing systems designed to accommodate rabbit behaviour and movement in all stages of production.

REQUIREMENTS

1 (a) As of the publishing of this Code, all cages/pens that are newly built, substantially renovated or brought into use for the first time must meet or exceed the Requirements in Table 1 and permit:

- ***All rabbits to adopt ventral and lateral resting postures, groom, adjust their posture, turn around without obstruction, and move about within the cage/pen.***
- ***All rabbits to sit upright with their ears fully erect without touching the top of the enclosure.***
- ***Rabbits in groups to rest on the enclosure floor at the same time (without piling), including fryers up to finishing.***

Table 1 †

	*Minimum height – no platform**	*Minimum height with platform**	*Minimum floor space***
Mature bucks (i.e. >16 weeks of age)	*45 cm (17.7 in)*	*60 cm (23.6 in)*	*0.46 m² (4.95 ft²)*
Replacement bucks (i.e. 12-16 weeks of age)	*40 cm (15.7 in)*	*60 cm (23.6 in)*	*0.125 m² (1.35 ft²)*
Doe with kits younger than 21 days of age	*40 cm (15.7 in)*	*60 cm (23.6 in)*	*0.36 m² (3.88 ft²)*
Doe with kits older than 21 days of age	*40 cm (15.7 in)*	*60 cm (23.6 in)*	*0.46 m² (4.95 ft²)*
Replacement does older than 12 weeks of age	*40 cm (15.7 in)*	*60 cm (23.6 in)*	*0.125 m² (1.35 ft²)/doe Must not exceed 5 kg/0.125 m²*
Fryers	*40 cm (15.7 in)*	*60 cm (23.6 in)*	*0.0625 m²/fryer (0.67 ft²/fryer) Must not exceed 40 kg/m² (8.2 lb/ft²)*

† *The minimum space allowances in Table 1 refer to medium-sized rabbits, e.g. New Zealand white. If raising larger or smaller rabbits, space allowances will need to be adjusted relative to body size while still ensuring compliance with all Requirements in 1(a).*

* *Cages with sloped tops must provide an area that meets the minimum heights outlined in Table 1.*

** *The area that can be used by rabbits, including a platform (if applicable) but excluding the nest box. Floor space in doe enclosures depends on kit age because the nest box occupies space until it is removed when kits are approximately 21 days of age.*

2(a) Existing cages/pens must meet or exceed the Requirements in Table 2 and permit:

- ***All rabbits to adopt normal resting postures, groom, adjust their posture, turn around without obstruction, and move about within the cage/pen.***
- ***Rabbits in groups to rest on the enclosure floor at the same time (without piling), including fryers up to finishing.***

2(b) Existing cages/pens must also meet the following Requirements: ‡

- ***Cages/pens must be replaced or modified in accordance with the Requirements in 1(a) if ear lesions exceed 5% in the herd.***

- ***Floor space per animal must be increased in accordance with the Requirements in 1(a) if:***
  - ***Fryers do not maintain normal body condition and weight gain throughout production.***
  - ***Injuries from aggression due to inadequate space exceed 8% in group-housed rabbits. Management of aggression due to method of grouping and incompatibility is addressed in Section 5.3.***

Table 2 [†]

	Minimum height – no platform*	***Minimum floor space*****
Mature bucks (i.e. >16 weeks of age)	***30.5 cm (12 in)***	***0.36 m² (3.88 ft²)***
Replacement bucks (i.e. 12-16 weeks of age)	***30.5 cm (12 in)***	***0.12 m² (1.29 ft²)***
Doe with kits younger than 21 days of age	***30.5 cm (12 in)***	***0.22 m² (2.37 ft²)***
Doe with kits older than 21 days of age	***30.5 cm (12 in)***	***0.32 m² (3.44 ft²)***
Replacement does older than 12 weeks of age	***30.5 cm (12 in)***	***0.12 m² (1.29 ft²)***
Fryers	***30.5 cm (12 in)***	***0.055 m²/fryer (0.59 ft²/fryer) Must not exceed 45 kg/m² (9.2 lb./ ft²)***

‡ *The thresholds in 2(b) are based on data in Rabbit Code of Practice Scientific Committee (2016) Review of Scientific Research on Priority Issues (see References)*

† *The minimum space allowances in Table 2 refer to medium-sized rabbits, e.g. New Zealand white. If raising larger or smaller rabbits, space allowances will need to be adjusted relative to body size while still ensuring compliance with all Requirements in 2(a) and (b).*

* *Cages with sloped tops must provide an area that meets the minimum heights outlined in Table 2.*

** *The area that can be used by rabbits, including a platform (if applicable) but excluding the nest box. Floor space in doe enclosures depends on kit age because the nest box occupies space until it is removed when kits are approximately 21 days of age.*

Effective March 1, 2018, cages/pens that do not meet or exceed the Requirements in 2(a) and (b) must be replaced or modified in accordance with the Requirements outlined in 1(a).

Effective January 1, 2037, all cages/pens must meet or exceed the Requirements outlined in 1(a).

RECOMMENDED PRACTICES

a. ensure a 10% reduction in stocking density in advance of periods of high ambient temperatures (5)
b. for open-top enclosures, provide refinements that offer rabbits overhead cover (refer to *Section 1.2 – Environmental Refinements*)
c. for enclosures with a platform, ensure the height of the platform enables rabbits to easily access the platform and retreat below the platform (e.g. 30 cm above the enclosure floor).

1.1.3 Bucks

Due to territorial aggression and associated injury and animal stress, group or pair housing of bucks is not appropriate. Larger breeds generally reach sexual maturity by 12 weeks of age and begin to demonstrate territoriality with related aggression to perceived intruding males.

REQUIREMENTS

Bucks must be housed individually after 12 weeks of age.

1.1.4 Reproductive Does and Nursing Kits

In commercial settings, managing territoriality and associated aggression in pair- or group-housed does is difficult. Rates of doe injuries and kit mortality are typically higher in pair and group systems (4).

Nest boxes and quality nesting material are important factors in kit survival and growth. Young kits, particularly those less than 2 weeks of age, have a very limited ability to thermoregulate. Properly sized and bedded nest boxes provide warmth and accommodate the litter while also allowing kits to stay in close contact with each other (to minimize chilling and mortality). Nest size should also be appropriate for the size of the doe, which varies by breed. Does tend to rest in over-sized nest boxes increasing the risk of crushing kits.

Nesting material should be dry and dust free. A variety of bedding materials may be used, including rabbit hair, hay, straw, shredded paper, and wood shavings.

Injuries inflicted to the kits by the doe can be minimized by enabling the doe to retreat from the kits once they begin leaving the nest box (e.g. increase the cage/pen size, provide a platform). Refer also to *Section 4.4 – Care of Kits*.

REQUIREMENTS

Does must have access to a nest box and nesting material at least 2 days before kindling to promote maternal and nesting behaviour.

The nest box must provide comfort, warmth, seclusion and promote kit survival.

Nest boxes must be made of sanitizable materials.

RECOMMENDED PRACTICES

a. use bedding material that promotes a "bowl" shaped nest to maintain a better nursing environment and assist with thermoregulation
b. replace wet/soiled nesting material promptly
c. in cold ambient temperatures, provide extra nesting material and consider closing or covering the nest box to conserve body heat.

1.1.5 Fryers

Young rabbits are gregarious animals (5) and must be raised in groups. Strategies for successful mixing are provided in *Section 5.3 – Grouping/Mixing Rabbits*.

REQUIREMENTS

Fryers must be housed in pairs or groups unless they need to be isolated for health reasons.

1.2 Environmental Refinements

Environmental refinements are used to enhance a rabbit's environment and encourage expression of normal species-specific behaviours. The broad types of refinements include social (e.g. direct, visual or olfactory contact with other rabbits), structural (e.g. devices that promote movements or exercise), physical (e.g. addition of objects or substrates to chew or manipulate) and food-based (e.g. novel food supplements or methods of feed delivery) (7).

Refinements should achieve the following goals (7):

- increase the number and range of normal behaviours;
- prevent or minimize the development of abnormal behaviours;
- increase positive use of the environment (e.g. use of space); and
- increase the animal's ability to cope with behavioural and physiological challenges.

Examples of refinements:

- hard wood gnawing blocks or sticks
- hay, straw or litter (for chewing or manipulation, i.e. in addition to nesting material)
- grass or hay in any form
- raised platforms
- two-tiered cages/pens
- tubes/tunnels
- mirrors.

Rabbits perform fewer abnormal behaviours (e.g. oral stereotypies, cage biting or manipulation) when provided with refinements such as wooden objects, straw, hay or grass or hay cubes (4). Fryers provided with wooden gnawing sticks have improved weight gains, are more active, groom more, and perform fewer aggressive behaviours (4). The prevalence of injuries, including ear lesions, is significantly lower in fryers housed with wooden gnawing sticks (4).

Platforms enable the expression of certain behaviours that rabbits are motivated to perform and can improve bone quality by enabling weight-bearing activity (e.g. jumping) (4). The area beneath the platform provides a sheltered area that rabbits may prefer for resting (4). In maternity cages or pens, platforms allow the doe to rest away from young kits, which may reduce kit injuries (4).

REQUIREMENTS

Rabbits must be provided with at least 1 type of refinement in all stages of production.

RECOMMENDED PRACTICES

a. consider safety of refinements prior to their use. For example, soft wood objects may splinter and contain noxious volatile oils, while some hard woods may contain toxicants, for example, unpeeled apple wood contains cyanide
b. monitor rabbits frequently to ensure that the refinements do not cause health problems (e.g. choking, poisoning, obstruction of the digestive tract, transmission of pathogens) (7)
c. replace or sanitize refinements that become heavily soiled
d. evaluate rabbit behaviour and use of refinements to ensure those chosen are meeting the intended goals and adjust or replace, as needed (7)
e. avoid unbalancing the ration when using food-based refinements (they should be a complement to a balanced diet not a supplement)
f. ensure platforms allow for easy passage of urine and manure and are made from sanitizable material
g. provide hay or straw in a rack rather than loose on the cage/pen floor to minimize soiling.

1.3 Flooring and Bedding

Enclosure flooring has a significant impact on foot health. The material, mesh size or spacing between slats, width and design of the mesh or slats (rounded or flat), and welding quality are all important components of flooring.

Wire mesh flooring allows easy passage of manure and urine, is easily cleaned and sanitized, and is associated with lower rates of gastrointestinal disease and better air quality in commercial production systems. Certain types of wire mesh flooring may increase the prevalence of pododermatitis in adult rabbits, particularly for heavy rabbits or does in late gestation (4). Pododermatitis is painful and, if untreated, can lead to deep-seated infection and compromise animal movement (4). Refer also to *Section 3.3.1 – Pododermatitis.*

Plastic coated wire or plastic slatted flooring greatly reduces the prevalence and severity of foot injuries in adult rabbits (4). The routine provision of a slatted plastic resting mat on wire flooring improves animal comfort and reduces the occurrence of pododermatitis in adult rabbits (4) and the risk of leg injuries in pre-weaned rabbits as they first start leaving the nest. Providing a slatted plastic resting mat for rabbits with early-stage pododermatitis may aid recovery (4).

Cleanliness of flooring is also important for managing pododermatitis and disease. The mesh size or spacing between the slats should allow for easy passage of urine and manure.

The use of wood or solid bottom flooring is discouraged because these flooring types are difficulty to sanitize, and this can result in increased mortality rates in some circumstances.

Litter or straw may be appropriate in cool environments and provided it is replaced or topped up frequently to ensure a clean and dry surface (4).

REQUIREMENTS

Cage/pen flooring must be designed and maintained to minimize the risk of injuries and build-up of manure and urine.

Bedding and litter, if provided, must be safe and managed to provide a clean and dry resting surface for rabbits.

Refer also to the Requirements in Section 3.3.1 - Pododermatitis

RECOMMENDED PRACTICES

a. ensure wire or plastic flooring is made of high quality material and designed specifically for rabbits
b. provide all rabbits, particularly breeding does and bucks, with a plastic resting mat
c. sanitize resting mats between uses and whenever they become soiled
d. replace soiled bedding and litter promptly.

1.4 Ventilation, Temperature and Relative Humidity

Air flow, temperature and relative humidity are 3 very closely linked environmental factors that, if well managed, can significantly promote good health and welfare in rabbits. An effective ventilation system removes excess heat, water vapour, noxious gases (e.g. ammonia, carbon dioxide), and dust from the rabbitry while at the same time introducing fresh air.

Ammonia

Ammonia is released from manure and urine. Excessive ammonia concentrations in the environment can pose a health threat to humans and animals. The concentration of ammonia at the rabbit level should ideally be less than 5 ppm (8). Ammonia concentrations of 20 ppm or higher impair rabbit respiratory immunity and are strongly correlated with respiratory disease (8). When a human observer can smell ammonia, it is likely to be at a concentration of 10 ppm or higher. There are several tools for measuring ammonia concentration, including ammonia test strips, detection tubes and electronic devices.

Temperature and Relative Humidity

The effective environmental temperature (i.e. the temperature that animals actually feel) depends on several factors such as air speed and temperature, relative humidity, flooring and cage/pen type, bedding, single or group housing, and the animal's stage of production and health status. The effective environmental temperature may differ by several degrees from that measured in the overall barn.

When ambient temperatures exceed 25°C (77°F) rabbits are at risk of heat stress, which may be indicated by decreased feed intake, increased water intake, open-mouthed panting with the head extended backwards, salivation, and ears fully upright and expanded with prominent blood vessels (8). When ambient temperatures exceed 35°C (95°F), rabbits can no longer regulate body temperature and are at significant risk of hyperthermia and heat stroke

(6). Heat stress negatively affects growth rates and several production traits (e.g. reduced daily milk production, increased pre- and post-weaning mortality) (6,9).

When ambient temperatures fall below 10°C (50°F), rabbits will increase their intake of feed and water and compact their bodies to limit heat loss (8). Rabbits are vulnerable to cold stress if the temperature is below 4°C (39°F) or they are wet or held in drafty conditions. Newborn kits are particularly vulnerable to cold stress as they are unable to regulate their body temperature (8).

Pregnant does at term (i.e. within 2-3 days of kindling) are less able to cope with temperature extremes (hot or cold) (9).

High relative humidity favours pathogen survival in the environment whereas very low relative humidity increases respiratory problems by drying mucous membranes (8).

REQUIREMENTS

Prompt corrective action must be taken if ammonia concentrations exceed 10 ppm at the rabbit level. Ammonia concentrations must not exceed 20 ppm.

Prompt corrective action must be taken when signs of thermal stress in rabbits are observed.

RECOMMENDED PRACTICES

a. avoid exposing rabbits, and especially kits and pregnant does at term, to direct drafts or significant fluctuations in temperature
b. install and regularly maintain equipment that measures temperature, relative humidity and ammonia
c. equip heating and ventilation systems with alarms to alert personnel of a power failure or conditions outside of acceptable ranges
d. design housing systems to limit emissions of ammonia in rabbits' immediate environment (e.g. a 76 cm [30 in] vertical gap between manure handling systems and the cage floor)
e. maintain environmental ammonia concentrations at the rabbit level below 5 ppm (8) through appropriate ventilation and frequent removal of manure and wet/soiled bedding
f. strive to maintain ambient temperatures between 10°C - 25°C (50°F - 77°F)
g. strive to maintain relative humidity between 30-70%
h. monitor rabbits frequently for signs of thermal discomfort during extreme temperatures (hot or cold)
i. ensure a 10% reduction in stocking density in advance of periods of high ambient temperatures (5)
j. avoid handling or causing any additional stress to rabbits during periods of high ambient temperatures
k. in mechanically ventilated barns, maintain adequate air flow during cold weather (i.e. ventilation systems should not shut off at a low temperature threshold).

1.5 Lighting

Lighting should provide uniform illumination and permit effective observation of rabbits. At the rabbit level, light intensity in the range of 5 - 10 lux (equivalent to a very dark day) is generally appropriate for young rabbits (8). As a general guide, light at which a newspaper can be read is considered sufficient during the grow-out period. A light intensity of 30 - 50 lux (equivalent to public areas with dark surroundings) at the rabbit level is necessary to enable mature rabbits to investigate their surroundings, have visual contact with other rabbits, and show active behaviours (5).

Continuous lighting (i.e. no dark period in a 24-hour cycle) negatively impacts welfare and health. Feed consumption is typically high during the night and declines at the beginning of the light period (10). Does tend to nurse during the dark period (10).

Sudden changes in light intensity may cause fear reactions in some rabbits.

REQUIREMENTS

In barns without natural light, supplemental artificial lighting must be provided daily.

Rabbits must receive a light and dark period every day. The light period must not exceed 16 hours when using supplemental artificial lighting.

RECOMMENDED PRACTICES

a. match the intensity/location of the lighting to the purpose for which the area is used
b. have artificial lighting set to a timer to offer rabbits a consistent lighting schedule
c. consider the use of a lighting program that transitions into light and dark periods gradually.

1.6 Emergency Planning

Emergencies (e.g. power failure, barn fire, flooding, disruption of supplies or services) can compromise rabbit welfare. Pre-planning will assist producers to respond in a timely and effective manner better providing for the welfare of rabbits in the event of an emergency. Resources to support emergency planning are provided in *Appendix A – Sample Emergency Contact List* and *Appendix H – Resources for Further Information.*

REQUIREMENTS

A contingency plan for emergencies must be developed and communicated to farm personnel.

RECOMMENDED PRACTICES

a. develop a written emergency action plan and ensure it includes emergency contacts, farm location, and evacuation procedures for the herd and personnel

b. consider emergency management protocols when designing or renovating facilities and get advice on housing design as it relates to emergencies (e.g. installation of smoke detectors)
c. consult a local fire department for specific advice on fire prevention
d. have a fire extinguisher (Class ABC) available at various points in the rabbitry and ensure that personnel know where they are located
e. ensure fire extinguishers are maintained according to manufacturer's instructions
f. have a back-up power supply or alternative plan for emergency power failures (e.g. on-site generator or rental)
g. test alarms and back-up systems regularly.

1.7 Additional Considerations for Outdoor Systems

Due to climate, most areas in Canada are unsuitable for year-round outdoor rabbit production. Outdoor enclosures (e.g. outdoor runs, mobile pasture pens) offer rabbits more freedom of movement and environmental enrichment. Challenges associated with raising rabbits in outdoor systems include pests, parasites, predators and the difficulty of sanitizing the environment.

Consult other sections of this Code, which provide important information applicable to outdoor systems.

REQUIREMENTS

Outdoor enclosures must protect rabbits from rain and snow and extremes of temperature, particularly wind in cold ambient temperatures and direct sun in hot ambient temperatures.

For rabbits in outdoor pens, the range must be sited and managed to avoid muddy or unsuitable conditions and provide rabbits with continuous access to a dry area; this includes the areas under feeders and waterers.

A protocol must be developed and implemented to protect rabbits from predators.

RECOMMENDED PRACTICES

a. choose outdoor sites carefully avoiding flood prone or poorly drained land
b. locate outdoor enclosures to take advantage of natural windbreaks or shaded areas
c. rotate the range areas to reduce the risk of infectious disease and parasites.

Section 2: Feed and Water

It is essential that rabbits receive high quality feed in correct quantities. Nutrient requirements may vary by breed (11). A pelleted diet is a reliable way of providing a balanced and complete diet. Producers are strongly encouraged to purchase feeds from a supplier who is knowledgeable about meat rabbits. If it is not possible to buy from a commercial supplier, a nutritionist knowledgeable in rabbit nutrition should be consulted.

2.1 Nutritional Needs of Rabbits and Feeding Behaviour

Rabbits are strict herbivores and require a diet high in fibre to maintain digestive health (4). Feeding practices that increase the time rabbits spend chewing (e.g. provision of hay or alfalfa/forage cubes) have been shown to reduce abnormal behaviour, including destructive chewing of cages and mats (4). Refer also to *Section 1.2 – Environmental Refinements*.

When fed ad libitum, growing and adult rabbits feed frequently with the majority of feed intake occurring in the dark period (4). The impacts of different feeding strategies (i.e. ad libitum, controlled feeding, restricted feeding) on rabbits are not fully understood. Conditions that may warrant short-term energy restriction include excessive weight gain in breeding rabbits, outbreaks of digestive disorders (4), and transportation of breeding rabbits. However, feeding strategies need to be carefully considered in the context of genetics, diet composition, and overall farm management.

Rabbits produce and consume cecotrophs, which are an important source of protein, micronutrients, and B vitamins (4). The pattern of cecotroph production is affected by rabbit age, lactation, length of the light period, and changes to the feed schedule (10, 12).

Changes to the diet should be accomplished gradually because rabbits may experience digestive upset or refuse to feed when the diet is changed abruptly.

REQUIREMENTS

Rabbits must have daily access to quality, nutritionally balanced feed in quantities that meet their physiologic needs at each stage of production.

RECOMMENDED PRACTICES

a. select a reputable feed supplier knowledgeable about meat rabbits and develop a balanced ration and appropriate feeding program for all stages of production
b. if mixing your own ration, consult a nutritionist knowledgeable in rabbit nutrition and have feeds, including forage, analyzed periodically to obtain accurate nutrient information
c. maintain a consistent daily feeding schedule
d. ensure any changes to the diet are accomplished gradually.

2.2 Feed Management

Proper feed storage helps prevent contamination which can negatively impact rabbit health and performance. The freshness of feed (time in storage) can affect the quality of feed including vitamin content.

Rabbits' access to feed is affected by several factors. Strategies to improve feed access include:

- reduce group size within each cage/pen
- increase the quantity of feed offered
- increase feeding frequency
- provide feed ad libitum
- increase feeder space.

Good feed management results in more uniform weight gain in group-housed rabbits.

REQUIREMENTS

Rabbits' access to feed must be managed in a manner that minimizes aggression between rabbits and excessive weight variation.

RECOMMENDED PRACTICES

a. purchase feed in quantities to maintain freshness
b. ensure feed is stored in a dry area
c. use dedicated and secure containers for feed storage (i.e. rodent and moisture proof)
d. check pellets and other feedstuffs regularly for mold and, if concerned about contamination, have feeds tested at an accredited laboratory
e. label containers used for medicated feed, including the expiry date, and store medicated feed separately from other feeds.

2.2.1 Does and Newborn Kits

The doe's feed requirements vary considerably over the reproductive cycle (e.g. from 150 g per day during early gestation to 450 g per day at peak lactation) (13).

Assessing body condition of does using a body condition scoring tool helps evaluate health and nutritional status and optimize production (see Appendix B). Lactating does are at risk of losing body condition due to the simultaneous energy requirements for lactation and pregnancy and, in young breeding does, the additional demands for growth (13). Young primiparous does are especially vulnerable to loss of body condition during lactation (4). Obese does are at increased risk of ketosis (pregnancy toxemia) in the last week of gestation (14). A metabolic form of ketosis can occur in obese bucks (14).

Survival and growth of newborn kits depends on the quality and quantity of the doe's milk. Therefore, the doe's nutritional status is important for the welfare of the doe and her kits. Kits gradually begin eating solid feed around 16-18 days of age, but the majority of their intake is in the form of milk until 25 days of age (4).

It is important to feed does relative to the size of their litter to ensure kits have enough milk. A good feeding program also takes into account the average litter size in the herd. Strategies for does that begin losing body condition or that are not producing sufficient milk for the litter include fostering kits to other does, increasing the quantity of feed offered, providing feed of higher nutrient density, or lengthening the breed-back schedule.

Visually assessing kits for a milk spot in the first 5 days is a practical and effective way of confirming milk intake. Kits that appear small relative to litter-mates should be fostered. Refer also to *Section 4.4 – Care of Kits.*

REQUIREMENTS

Does must receive a diet that is adequate for maintaining health, vigor, and body condition and that allows the doe to provide sufficient milk for the litter. Refer to Appendix B – Body Condition Scoring.

Kit health and vigor must be assessed at least daily and prompt action taken for kits showing signs of inadequate milk intake.

Refer also to the Requirements in Section 4.2 – Evaluating Fitness for Breeding.

RECOMMENDED PRACTICES

a. assess the body condition of individual does using the body condition scale in Appendix B
b. monitor doe body condition throughout the reproductive cycle, especially 5 days after kindling.

2.2.2 Growing Rabbits

The immediate post-weaning period is stressful to fryers and, without attentive management, there is an increased risk of digestive disorders and mortality in this period.

Competition for feed can be an issue when growing rabbits are not fed according to their needs. Strategies for ensuring feed access are provided in Section 2.2.

REQUIREMENTS

The feeding program must maintain the health and vigor of growing rabbits.

2.3 Water

Rabbits have high water requirements and consume approximately twice as much water as feed (2). Water intake increases due to:

- increased humidity
- increased ambient temperature
- lactation
- certain health conditions (e.g. diarrhea).

Water plays an important role in the digestive process. Rabbits with an insufficient supply of water will limit their feed intake (4).

Water treatment (medications and purification) can affect the palatability of water and therefore intake. Testing water quality can help ensure it is safe and palatable.

REQUIREMENTS

Rabbits must have continuous access to safe, clean drinking water.

Records must be kept when medications are used in water (date, product, mixing rate, duration, withdrawal time).

RECOMMENDED PRACTICES

a. test water quality at least annually and whenever problems such as reluctance to drink or reduced feed consumption are observed and during seasonal high risk periods (i.e. spring, fall)
b. arrange for chemical analysis of water in addition to bacterial analysis (rabbits can be sensitive to high salinity and chlorine, for example)
c. keep records of water purification that include date, product, mixing rate and duration.

2.4 Feeding and Watering Equipment

Feeders and waterers should be positioned so that rabbits can easily access them while ensuring the feed and water is not contaminated by manure or urine. Open water drinkers bring an increased risk of contamination (and therefore disease) and are not recommended. Feeding and watering equipment must be well maintained, free from sharp edges that might injure rabbits, and should be constructed from materials that can be readily sanitized.

The respiratory tract of rabbits is irritated by fine dust in the air (8). Feeds and feeder designs that limit airborne dust can reduce respiratory problems.

Water quality is affected by how often watering systems are cleaned and flushed.

REQUIREMENTS

Feed and water equipment must be maintained in good working order and defective systems must be attended to without delay.

Rabbits must be able to access feed and water.

RECOMMENDED PRACTICES

a. clean and flush watering equipment as needed to eliminate biofilms and scale
b. clean feeding equipment to minimize health risks associated with contamination
c. clean feeders after rabbits are removed from cages/pens
d. ensure feed containers are used only for feed
e. choose feeding equipment that minimizes fine dust in the feed
f. handle feeds in a way that minimizes pellet breakage and associated fine dust.

Section 3: Health Management

There is a critical relationship between animal health and welfare. Health issues can cause pain and discomfort, which negatively impact an animal's well-being. Good animal welfare, therefore, requires good animal health, and prevention of disease is always preferred to treatment.

3.1 Rabbitry Health Planning

Good herd health management incorporates practices that are designed to optimize the health and welfare of rabbits through nutrition, housing, and management. Many issues can effectively be addressed through preventive strategies such as biosecurity and sanitation.

Producers can continuously improve herd health outcomes by taking the following steps in response to any illness, particularly a disease outbreak (adapted from 15):

- obtain a veterinary diagnosis and provide specific, timely treatment, where possible
- analyze the health and treatment records and investigate the risk factors (e.g. hygiene, biosecurity, nutrition, management, environment)
- develop a manageable, effective action plan to reduce the risk of disease recurrence
- communicate the action plan to relevant personnel
- evaluate the effectiveness of the action plan and refine if needed.

Veterinarians and other experts play a key role in helping producers attain herd health objectives. While veterinarians are often called after animals are sick or injured, they can play a valuable role on a proactive basis by helping with the development of herd health plans and prevention practices. Having an ongoing working relationship with a veterinarian helps ensure that the veterinarian will be familiar with the herd and farm management practices to assist proactively and in the event that a problem occurs. Maintaining a working relationship with a veterinarian also facilitates collaborative decision-making between the producer and veterinarian.

Record keeping is an important aspect of herd health planning. Without records, producers tend to under estimate the incidence of disease on their farm (16). Research has also shown that producers who keep accurate and detailed health records achieve a lower incidence of disease (17).

The risk of antimicrobial resistance increases if antimicrobials are used inappropriately (18). Use of antimicrobials should be limited to situations in which they are deemed necessary by a veterinarian (18). In these cases, antimicrobial should be used as targeted treatment and according to best practices. The ultimate objective is to reduce the need for antimicrobials by preventing disease (18).

REQUIREMENTS

A working relationship with a veterinarian must be established.

RECOMMENDED PRACTICES

a. strive to prevent disease by maintaining optimal environmental conditions in the rabbitry at all times (refer to *Section 1.4 – Ventilation, Temperature and Relative Humidity*)
b. track rabbit health and consult a veterinarian when disease is suspected
c. keep accurate and detailed animal health records
d. use and store antimicrobials as directed by the prescribing veterinarian
e. consider, where appropriate, alternatives to antimicrobials (e.g. management or housing changes, alternative dietary supplements with accepted efficacy).

3.1.1 Biosecurity

Biosecurity refers to measures used to protect against the introduction and spread of diseases. Biosecurity is based on 2 main concepts: keeping disease out of the herd (exclusion) and preventing disease from spreading within the herd or to other herds (containment).

Elements of a comprehensive biosecurity protocol include:

- strict hygiene and sanitation procedures for all individuals who are in contact with rabbits
- wearing clean gloves or washing hands before handling rabbits
- changing, covering or disinfecting footwear upon entering any facility housing rabbits
- allowing only necessary personnel in buildings housing rabbits
- work flow and handling from the youngest to the oldest rabbits, and from the healthiest to the least healthy rabbits
- changing clothing when moving between sick and healthy animals
- minimizing movement of equipment between buildings
- avoiding contact with rabbits and personnel on other farms
- proper manure handling and storage
- excluding pets and pests from the barn
- separating rabbits from other farm animals on the farm
- sourcing rabbits from suppliers with herds of known health status
- separating newly arrived or returning rabbits from the herd (to confirm the health of new arrivals prior to their introduction).

Purchasing breeding rabbits from another farm brings a risk of introducing disease into the home herd.

REQUIREMENTS

Rabbits must not be introduced to the breeding herd unless they are free of obvious signs of illness.

RECOMMENDED PRACTICES

a. develop and follow a biosecurity protocol in consultation with a veterinarian or other biosecurity expert

When acquiring replacement rabbits from another farm:

a. source from a limited number of reputable farms
b. source from farms that adhere to strict biosecurity and sanitation protocols and that have a similar health status as your farm (discuss health records, diseases present on the farm, and overall health management)
c. separate newly acquired rabbits from the herd for at least 14 days.

3.1.2 Sanitation

Effective sanitation measures help to minimize disease. Research in several farm animal species shows that sanitation measures account for much of the variation in disease burden observed between farms. Clean cages/pens are particularly important during gestation, lactation, and weaning; after the removal of sick animals; and preceding the introduction of new animals (14).

Disinfectants are only effective when used on clean surfaces free of hair, manure, bedding/litter, and other organic debris. Wet washing, while important, can increase relative humidity in the rabbits' environment, which can exacerbate respiratory disease.

REQUIREMENTS

Cages/pens must be sanitized before they are populated with rabbits.

Nest boxes must be sanitized between uses.

RECOMMENDED PRACTICES

a. develop and follow a sanitation plan in consultation with a veterinarian
b. manage fryers in an "all-in, all-out" system to permit effective sanitation
c. use disinfectants in accordance with the manufacturer's directions to ensure efficacy
d. sanitize equipment, cages/pens and all areas of the rabbitry at least annually or whenever manure, urine, hair or other organic debris begin to accumulate
e. sanitize and disinfect equipment and cages/pens after a disease outbreak
f. allow recently washed cages/pens to dry before they are populated with rabbits.

3.1.3 Pest Control

Rodents and insects are recognized as carriers of many diseases. Given the difficulty of eliminating rodents, prevention should be the primary objective. *Appendix H – Resources for Further Information* provides resources on pest control.

REQUIREMENTS

Measures must be taken to control pests including rodents, small animals, wild birds, insects, and predators in the rabbit facility and feed storage areas.

RECOMMENDED PRACTICES

a. eliminate or reduce the number of places rodents can use for shelter
b. store feed in rodent-proof facilities and containers
c. locate and eliminate insect breeding areas (e.g. standing water, manure and other refuse)
d. when building or redesigning a rabbitry, incorporate design features that will prevent the entry of pests.

3.2 Monitoring Rabbit Health and Welfare

Regular monitoring of rabbits facilitates early identification of health and welfare problems. Daily assessment is an important management tool to enhance overall rabbit health and welfare by minimizing disease transmission and making early treatment or care decisions for rabbits with conditions known to cause pain or discomfort (19).

When assessing rabbits, look for:

- signs of illness (e.g. diarrhea, sneezing, coughing, discharge)
- injured rabbits (e.g. ear lesions, pododermatitis)
- signs of thermal discomfort (described in Section 1.4)
- lameness or inability to rise or move
- abnormal posture
- changes in behaviour
- poor body condition or weight loss
- poor hair condition
- signs of dental problems (described in Section 3.3.4)
- reduced feed and/or water intake.

Body Condition Scoring (Appendix B) and the Rabbit Grimace Scale (Appendix C) are among the tools that can be used when assessing rabbit health and well-being.

Producers may find value in benchmarking health outcomes as a percentage of the total herd to establish targets and monitor progress. For example, mortality is an important indicator of herd health to monitor on farm (4, 20, 21). In fryers and breeding rabbits, mortality is often due to infectious causes (4). A reduction in mortality rate in fryers and adult rabbits represents an improvement in animal health (21). Consistent time intervals should be used to track mortality so that it can be compared over time. Mortality records should also be interpreted in conjunction with culling records.

Common causes of mortality in pre-weaned kits include chilling, inadequate nest, poor maternal care, insufficient milk, and cannibalism (4).

Infectious diseases are a significant cause of morbidity and mortality on rabbit farms (4). Animal density, hygiene, and biosecurity practices all play a role in spreading disease-inducing agents within a herd (22). When infectious diseases occur, it is essential to take prompt steps to limit transmission within the herd, which may include euthanizing or culling affected rabbits to limit the environmental burden of disease (4).

REQUIREMENTS

Rabbits must be assessed at least daily for overall health and well-being.

Dead rabbits must be removed from the cage/pen and separated from production areas daily.

RECOMMENDED PRACTICES

a. increase the frequency of monitoring for animals identified with an injury or possible health issue
b. increase the frequency of monitoring during high risk conditions (e.g. poor ventilation, high ambient temperature, high relative humidity, recent transport or relocation)
c. keep accurate and detailed records of mortality (i.e. found dead) and culling, including age and cause of death (if known) and reason for culling
d. strive to continuously reduce mortality
e. consult a veterinarian if unexplained mortality significantly increases in a 24-hour period and if mortalities exceed the following thresholds (based on data in 4):
    - average pre-weaning kit mortality exceeds 25%
    - mortality exceeds 15% in fryers
    - monthly mortality in breeding does and bucks due to adverse health issues and injury exceeds 5%.

3.3 Managing Sick or Injured Rabbits

For all conditions affecting rabbit health and welfare, early recognition and prompt treatment or euthanasia are essential to minimize animal pain and distress (4). As prey animals, rabbits have evolved to mask signs of sickness, weakness, and pain (4). This can make assessment of their well-being difficult, and illness may not be apparent until disease is in its final stages (4).

Rabbits affected with conditions from which they are likely to recover may benefit from being segregated in an area where they can recuperate with easy access to feed and water and a comfortable resting area.

Technical advisors may be available through the provincial government to provide important supports to producers dealing with a disease outbreak. Consulting these advisors can facilitate timely access to laboratories (for testing or diagnostics).

REQUIREMENTS

Farm personnel must be familiar with normal rabbit behaviour and able to identify signs of illness, injury, and adverse stress.

Sick or injured rabbits and rabbits that exhibit obvious signs of pain must be promptly treated or euthanized by competent personnel.

The condition of sick or injured rabbits must be monitored and, if they fail to respond to treatment(s), the treatment(s) must be reassessed or the rabbits must be euthanized.

RECOMMENDED PRACTICES

a. consult a veterinarian on appropriate treatments for sick or injured rabbits
b. ensure recovery cages/pens for injured rabbits provide enhanced comfort conducive to recovery (e.g. bedding, rubber mat, draft-free environment, easy access to feed and water).

3.3.1 Pododermatitis

Pododermatitis is a painful condition and major risk factor for culling (4). The condition begins with localized hair loss and callous formation on the footpad(s) and the hind feet. It progresses to cracked and open calluses, and is most severe when open wounds or ulcers have formed (4).

Strategies to reduce the incidence of pododermatitis include:

- provide slatted plastic resting mats preventatively
- review sanitation protocols
- modify the cage/pen floor.

Refer also to *Section 1.3 – Flooring and Bedding.*

REQUIREMENTS

The feet of breeding rabbits must be assessed for pododermatitis at least monthly.

A resting mat must be provided for rabbits upon the earliest signs of pododermatitis. If the condition does not improve, the rabbit must be treated or culled.

Rabbits with severe pododermatitis must be euthanized.

RECOMMENDED PRACTICES

a. provide all rabbits, particularly breeding does and bucks, with a plastic resting mat
b. sanitize resting mats between uses and whenever they become soiled.

3.3.2 Pasteurellosis

Pasteurellosis ("snuffles") is the most common respiratory disease in farmed rabbits and a significant cause of illness and culling (4). Producers who are vigilant in their management of pasteurellosis can reduce its occurrence on their farm.

Signs of pasteurellosis can include discharge (from the eyes and nose), matted forepaws, sneezing, and head tilt (4). However, infected rabbits may show no signs and may act as carriers of the disease (14). Pasteurellosis is associated with other adverse health issues, including conjunctivitis, pneumonia, abscesses, and metritis (4).

Pasteurellosis is transmitted by direct contact between group-housed rabbits, an infected doe and her litter, or between breeding pairs (14). Transmission may also occur by respiratory aerosol between neighboring cages/pens and contaminated equipment or materials (14).

Risk factors for pasteurellosis: (4)

- inappropriate ventilation
- high stocking density
- lack of biosecurity protocols
- poor sanitation measures
- lack of routine disinfection or the inability to disinfect due to cage/pen material.

REQUIREMENTS

Strategies to reduce the occurrence of pasteurellosis must be developed and implemented.

RECOMMENDED PRACTICES

a. implement strict biosecurity and sanitation protocols to reduce the occurrence and spread of pasteurellosis (see Sections 3.1.1 and 3.1.2)
b. strive to maintain good indoor air quality in the rabbitry at all times (Refer to *Section 1.4 – Ventilation, Temperature and Relative Humidity*)
c. avoid exposing rabbits to stressors that can trigger a latent infection (e.g. heat and cold stress, overcrowding, poor nutrition, sub-optimal handling)
d. cull breeding rabbits that are showing obvious signs of pasteurellosis.

3.3.3 Enteritis

Although enteritis can affect rabbits in all stages of production, it is most common in young post-weaned fryers as they change from a milk-based diet to solid-feed, and their gut acquires new flora (4). Inappropriate diets may exacerbate enteric conditions (4). Multiple bacterial, viral, and parasitic agents (e.g. rotavirus, coccidiosis) contribute to enteritis (4). Use of antimicrobials can further upset rabbits' delicate balance of gastrointestinal flora leading to further cycles of disease (4).

Strategies that reduce adverse stress in rabbits are likely to reduce the occurrence of enteritis (e.g. provide an appropriate diet, implement strict sanitation protocols, avoid overcrowding). Some research has shown an association between later weaning (≥ 35 days) and increased risk of enteritis, possibly because of increased stress (4).

Signs of enteritis include (4):

- diarrhea or soiling of the hocks with fecal material
- distended or bloated abdomen
- reduced feed and water intake
- reduced growth rate
- signs of discomfort (see Appendix C).

REQUIREMENTS

Strategies to reduce the occurrence of enteritis must be developed and implemented.

RECOMMENDED PRACTICES

a. provide rabbits a high quality diet with a sufficient level and correct types of fibre to maintain rabbits' gastrointestinal health (4) (see *Section 2 – Feed and Water*)
b. avoid sudden changes in diet composition
c. ensure kits are weaned before 35 days of age
d. implement strict biosecurity and sanitation protocols to reduce the occurrence of enteritis (see Sections 3.1.1 and 3.1.2).

3.3.4 Dental Conditions

In rabbits, dental conditions may develop as a result of genetic abnormalities; insufficient tooth wear (caused by misaligned teeth or a diet with insufficient fibre); injury to the mouth or teeth; or infection (which can lead to abnormal tooth growth). Most dental conditions are painful and lead to other adverse welfare issues, such as loss of body condition, infection, and even death. Because many dental conditions are highly heritable, rabbits with known dental problems should not be used for breeding.

Replacement rabbits should be inspected at a young age for incisor (front teeth) problems. The top incisors should overlap slightly outside the bottom incisors. Problems with cheek teeth can be more difficult to identify. A jaw that appears pushed forward may indicate a discrepancy in jaw length that will prevent normal teeth alignment.

Signs of dental problems in rabbits include:

- reduced feed intake
- reduced fecal output
- dropping feed while chewing
- loss of body condition
- asymmetrical swelling of the face or jaw
- runny eyes
- drooling or moisture around the mouth, chin or dewlap
- foul odour from the mouth
- pawing at the mouth and/or seeking isolation.

The use of nail trimmers, side-cutters or other types of clippers is not appropriate as they may crack or split the teeth leading to pulp exposure, pain, and the development of an abscess.

REQUIREMENTS

Rabbits with dental problems must be promptly culled or euthanized when health and welfare are at risk (i.e. rabbit shows signs of pain or is unable to feed).

Teeth trimming is not an acceptable on-farm practice.

RECOMMENDED PRACTICES

a. provide rabbits with gnawing material (e.g. hardwood objects, hay) to help reduce dental problems associated with bar biting or insufficient tooth wear
b. ensure rabbits with dental problems are not used for breeding
c. inspect rabbits at a young age for incisor problems.

Section 4: Reproductive Management

4.1 Breeding Methods

Natural breeding and artificial insemination are used for reproductive management of does. All methods of breeding must be overseen by competent personnel to minimize the risk of animal injury and reproductive disorders.

Artificial insemination is a highly skilled procedure. Improper technique and use of contaminated semen may result in abdominal pregnancies and metritis (4).

Natural breeding brings a risk of injury to the doe and buck. The doe must be brought to the buck's cage to avoid triggering territoriality and associated aggression in the doe. Injuries can be prevented by observing the pair at breeding and promptly removing the doe if physical aggression is noted or if breeding does not occur within 3 minutes.

Rabbits may be unwilling to breed when stressed (e.g. new handler, high ambient temperatures). Does that are unwilling to breed or that appear stressed at breeding should be returned to their home cage/pen promptly to settle before breeding is attempted again.

Appendix H – Resources for Further Information provides references on breeding methods.

REQUIREMENTS

Personnel overseeing breeding activities must be competent in the proper techniques and hygiene.

For natural breeding, the doe must be brought to the buck and removed after breeding.

Breeding pairs must never be left unattended.

If physical aggression occurs, the doe must be removed promptly.

RECOMMENDED PRACTICES

a. with natural breeding, promptly return a doe that is unwilling to breed or that appears stressed to the home cage/pen to settle before breeding is attempted again.

4.2 Evaluating Fitness for Breeding

Does require attentive management to ensure they are maintained in optimal health and body condition over successive reproductive cycles.

Young female rabbits are still developing when they reach puberty, and the first 4 breeding cycles are a critical period for the development of energy and protein reserves (4). These rabbits are at the highest risk for loss of body condition, early culling, and mortality (4). It is generally appropriate to begin breeding does when they reach 16 weeks of age or 75-80% of their expected mature weight. However, multiple variables affect doe development during rearing, including birth weight, the feeding strategy used, and weaning weight (4).

Bucks can generally start breeding at approximately 5 months of age.

With good management, multiparous does that are re-bred 11 or more days after kindling are able to maintain body condition (4). Shorter breed-back schedules require careful selection of breeding rabbits and attentive feed and health management to ensure does are fit for re-breeding.

When selecting breeding rabbits from another farm, ensure the rabbits are healthy and have good body and leg conformation. Other considerations for purchasing breeding rabbits are outlined in *Section 3.1.1 – Biosecurity*.

REQUIREMENTS

Does must not be bred or re-bred unless they are at an appropriate body condition and in good health. Refer to Appendix B – Body Condition Scoring.

RECOMMENDED PRACTICES

a. keep accurate and detailed records of individual breeding does (e.g. parity of doe, number of live and stillborn kits, number of kits fostered, weaning date, number of kits weaned) and use these records as the basis for management decisions for individual does
b. if selecting breeding stock from another farm, purchase direct (not from a market) from a reputable source
c. ensure does are older than 16 weeks of age and reach at least 75-80% of their expected mature body weight prior to their first breeding.

4.3 Kindling

Gestation lasts 30-33 days, and kindling is a relatively rapid process (15-30 minutes, depending on litter size) (4). If kindling is prolonged, the doe may be experiencing difficulty requiring immediate attention, which may include treatment or euthanasia to reduce doe suffering and promote kit survival. Signs of kindling difficulty include excessive panting, abnormal posture, and more frequent movements (e.g. circular pacing).

The nest box should be removed approximately 3 weeks after kindling to promote good hygiene in the cage/pen . Refer to *Section 1.1.4 – Reproductive Does and Nursing Kits* for further details on nest box design and management.

REQUIREMENTS

Does that are expected to kindle must be monitored first as part of daily assessments of rabbit health and well-being.

Does experiencing prolonged kindling must be treated promptly or euthanized.

RECOMMENDED PRACTICES

a. palpate does that experienced a difficult kindling to check for unborn kits; treat these does, as needed, and do not re-breed.

4.4 Care of Kits

Does generally nurse their kits at least once a day (4). Controlled nursing can reduce kit mortality due to crushing and helps confirm that nursing is occurring. Refer to *Section 1.1.4 – Reproductive Does and Nursing Kits* for details on nest box design and management.

Survival of neonates depends greatly on the nourishment and warmth they attain in the nest box. As does will not retrieve neonates outside the nest box, it is imperative that personnel promptly return these neonates to the nest. Refer to *Section 2.2.1 – Does and Newborn Kits* for details on confirming milk intake in neonates.

Cross fostering (based on litter size, kit size, and doe milk production) may be used to enhance kit survivability and doe and kit health. Cross fostering is generally more successful when done within 72 hours of kindling.

REQUIREMENTS

Neonates found outside the nest box must be promptly returned to the litter to promote survival.

RECOMMENDED PRACTICES

a. increase the depth of the nest box if neonates are frequently found outside the nest box
b. evaluate the condition of nest boxes and remove or close them if they are becoming soiled and kits are at a suitable maturity (i.e. 18-28 days).

4.4.1 Weaning

Kits are generally weaned at 4-6 weeks of age. After the third week of lactation, the doe's milk becomes markedly richer in proteins and fats (8). While milk production varies between does, daily milk production typically peaks towards the end of the third week of lactation and then drops rapidly (8) coinciding with the period in which kits' intake of solid feed increases.

Weaning is a stressful time for kits due to separation from the doe and possible mixing with kits from other litters. During weaning, the kits' gut flora changes and they have enhanced susceptibility to disease (refer also to *Section 3.3.3 – Enteritis*).

REQUIREMENTS

Kits at weaning must be able to feed and drink independently and maintain normal growth.

RECOMMENDED PRACTICES

a. evaluate kits' suitability for weaning based on their age, health, physical development, and intake of solid feed as well as the condition of the doe
b. minimize kit stress at weaning (e.g. remove the doe so kits remain in the home cage/pen)
c. manage breeding and weaning according to an "all-in, all-out" system.

Section 5: Husbandry Practices

5.1 Stockmanship Skills Related to Animal Welfare

Management practices have a significant impact on animal health, welfare, and productivity (23). Training and knowledge development about rabbit welfare and care should be an ongoing process.

REQUIREMENTS

Personnel must be competent in rabbit care through training, experience and/or mentorship.

Personnel must be monitored and receive additional training as necessary.

RECOMMENDED PRACTICES

a. supervise inexperienced personnel until the necessary competencies are assured and periodically re-assess skills
b. establish relationships with knowledgeable and experienced producers or other experts for ongoing advice on rabbit care.

5.2 Handling and On-Farm Movement of Rabbits

Positive human contact is an important factor in animal well-being and productivity. With proper handling, rabbits experience less stress and fear, and the risk of injury to the animals and handlers is greatly reduced. Improper handling of rabbits increases the risk of injury to the animal, such as fractured backs and legs. Gentle handling of rabbits at a young age may habituate them to human contact (making later handling less stressful) provided that rabbits are always handled in a calm and gentle manner (5).

Low-stress handling of rabbits in pens is an important consideration.

Refer to *Appendix D – Humane Handling and Restraint of Commercial Meat Rabbits*.

REQUIREMENTS

Rabbits must be handled in a way that minimizes stress and the risk of injury.

Rabbits must not be lifted or carried by the ears or legs.

RECOMMENDED PRACTICES

a. work quietly and calmly in the rabbitry
b. avoid loud noises or sudden actions that may startle rabbits
c. use low-stress handling aids when catching rabbits in pens (e.g. temporary partitions that prevent rabbits from escaping from catchers)

d. minimize the distance rabbits are carried by hand
e. use a carrying crate or container if moving multiple rabbits or moving rabbits over a long distance on the farm
f. place rabbits into cages/pens by setting them down on their feet first.

5.2.1 Methods of Restraint

Equipment used for restraint should be designed for maximum safety of the rabbit and handler. The method selected should be the most mild and effective method available and should be applied for the minimum amount of time necessary to carry out the task. For some procedures, it may be ideal to have 2 handlers working together (i.e. one to restrain the rabbit and the other to perform the procedure).

Refer to *Appendix D – Humane Handling and Restraint of Commercial Meat Rabbits*.

REQUIREMENTS

Corrective action must be taken if the equipment or method of restraint causes pain or injury.

Rabbits outside the cage/pen must never be left loose and unattended.

Rabbits must not be restrained on their backs other than for very brief specific procedures such as artificial insemination.

RECOMMENDED PRACTICES

a. minimize the time that rabbits are restrained (e.g. have sufficient personnel to perform procedures in a timely manner and any necessary tools ready before the rabbit is restrained).

5.3 Grouping/Mixing Rabbits

Rabbits to be group housed should be mixed at weaning with litter mates ideally grouped together (24). It can be difficult to successfully mix rabbits previously housed individually or sexually mature rabbits (24). Aggressive or subordinate animals may ultimately need to be removed from the group. Singly housed rabbits may show incompatibility with near-by rabbits and may need to be relocated or visual barriers added between cages/pens.

Strategies for successful mixing include (24):

- group rabbits of the same litter together
- keep groups stable from weaning
- group rabbits of similar age and weight together
- avoid overcrowding
- provide environmental refinements (see Section 1.2).

REQUIREMENTS

Personnel must be able to recognize signs of incompatibility between rabbits.

Promptly separate incompatible rabbits.

Bucks must be housed individually after 12 weeks of age.

RECOMMENDED PRACTICES

a. seek advice from an experienced breeder/producer on how to establish groups
b. monitor newly established groups frequently until their compatibility is confirmed.

5.4 Identification

Doe and buck cards (typically fixed to the cage/pen) are a common and suitable method of record keeping. Leg bands and ear tagging are also used to identify rabbits. Ear tattoos are used on show rabbits and may be used to identify individual bucks and does. Ear tattooing is an acutely painful procedure for rabbits (25). Topical anesthesia has been shown to mitigate the pain caused by ear tattooing (25).

REQUIREMENTS

Analgesia must be used when tattooing and tagging rabbits' ears.

Identification bands and tags must be safe, light weight, and suitable for rabbits.

RECOMMENDED PRACTICES

a. keep records of individual breeders and use the records to monitor reproductive difficulties and health (see Sections *3 – Health Management* and *4 – Reproductive Management*)
b. discuss pain control options and correct use of pain control with a veterinarian
c. ensure that tags and tattoos are applied correctly, taking care to avoid the main blood vessels and ridges of cartilage.

5.5 Nail Clipping

Nail clipping is necessary when nails become overgrown. Torn nails, inter-animal injuries, and infection may result from overgrown nails. Care should be taken not to cut the quick, which causes pain and bleeding. If the quick is cut, ensure bleeding is stopped before leaving the animal. Proper restraint is also important to prevent the rabbit from struggling and becoming injured (see *Section 5.2.1 – Methods of Restraint*).

REQUIREMENTS

Nails must not be allowed to grow to excessive lengths causing injury or discomfort to rabbits.

RECOMMENDED PRACTICES

a. ensure that nail clipping occurs in a well-lit area.

5.6 Grooming of Long-Hair Breeds

Long-hair breeds of rabbits (typically raised for show and/or fibre) require regular grooming to promote health and welfare. The frequency of grooming depends on the breed.

Regular grooming prevents hair from becoming matted and soiled (26). Matted hair causes discomfort, and the skin underneath can become infected (26). Severe matting can impede a rabbit's ability to move about and feed (26). In the Angora rabbit, matting can occur rapidly without regular grooming (27).

Grooming can be stressful to rabbits due, in part, to the associated handling and restraint. It should therefore be done in advance of periods of high ambient temperatures in order to avoid exposing rabbits to the stresses of heat and handling concurrently. Refer also to *Sections 5.2 – Handling and On-Farm Movement of Rabbits* and *5.2.1 – Methods of Restraint*.

REQUIREMENTS

Long-hair breeds of rabbits must be groomed at a frequency sufficient to mitigate heat stress and to prevent matting and soiling of the hair and associated skin infections.

RECOMMENDED PRACTICES

If raising a long-hair breed:

a. avoid grooming pregnant does that are expected to kindle
b. groom rabbits in advance of periods of high ambient temperatures
c. increase the frequency of brushing when rabbits are shedding or molting
d. inspect the condition of individual rabbits during grooming for problems such as poor body condition, pododermatitis and other injuries
e. remove loose tufts of hair from rabbits and/or the enclosures daily to prevent rabbits from consuming excessive hair
f. sanitize and disinfect grooming tools after use.

Section 6: Preparation for Transport

Each person responsible for transporting animals in Canada, or arranging their transport, must ensure that the entire process (i.e. loading, lairage, transport, and unloading) does not cause injury or suffering to the animals.

The federal regulations for animal transport are covered under the *Health of Animals Regulations (Part XII)*.[1] Some provinces have additional regulations related to animal transport.

The scope of the rabbit Code of Practice ends at the farm gate but includes Requirements and Recommended Practices for pre-transport and on-farm lairage. Refer to the Code of Practice – Transportation for the actual transportation process.

6.1 Evaluating Fitness for Transport

Rabbit producers often manage large numbers of rabbits, which can make assessment of individual rabbits difficult. However, every effort should be made to ensure that only fit rabbits are loaded, and the welfare of the rabbits must be the first consideration.

Fit rabbits are those that are in good health and physical condition prior to transport. A rabbit's fitness for transport may be affected by illness, injury, fatigue or any other condition likely to cause suffering during handling, loading/unloading, lairage, or transport. Rabbits that are unfit must not be transported. Compromised rabbits can only be transported locally and directly to their final destination (not through an auction, depot or assembly point). Special provisions (e.g. reduced loading density, load last and unload first) are also required if transporting compromised rabbits.

REQUIREMENTS

Prior to loading, rabbits must be assessed as being fit for transport.

Unfit rabbits must not be transported except for diagnosis or treatment on the advice of a veterinarian (refer to Appendix E for a list of conditions).

Rabbits deemed unfit for transport must receive appropriate and timely care or be euthanized.

Compromised rabbits, if transported, may only be transported with special provisions and directly to their final destination (not through an auction, depot or assembly point) (refer to Appendix E for a list of conditions).

6.2 Arranging Transport

Producers are responsible for ensuring that personnel involved in animal handling and transport are trained and knowledgeable. Those responsible for arranging transportation services need to be aware of how long the rabbits

[1] The *Health of Animals Regulations* are accessible through the link below or by doing an Internet search for "Health of animals regulations" www.laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._296/page-37.html#h-70

may be in transit (including intermediate stops such as auction markets, depots or lairage) and whether the transporter needs to provide additional services (e.g. feed, water, rest) during transit. When in doubt, assume the longest possible trip.

Trip planning should also include consideration of expected weather conditions and emergency procedures (e.g. contingency plans) should problems be encountered.

Time in transit is calculated from the time rabbits are last provided feed and water until they are provided with subsequent feed and water or slaughtered.

REQUIREMENTS

Personnel responsible for rabbit transport must be knowledgeable of and comply with federal and provincial animal transport regulations.

All reasonable steps must be taken, in consultation with relevant parties (e.g. transporter, assembly point, processor) to ensure that rabbits are not in containers for more than 24 hours.

RECOMMENDED PRACTICES

a. ensure loading facilities are compatible with the type of vehicle used
b. schedule loading and transport to avoid delays in transit (due, for example, to intense traffic congestion, road closures and construction)
c. ensure all documentation is completed to avoid unnecessary delays at inspections stations or other checkpoints. This is especially important for rabbits leaving the province or country
d. in hot or humid weather, avoid transport during the hottest part of the day

If arranging for transport by a company or other carrier, in addition to the above Recommended Practices:

a. select reputable transporters; follow these guidelines when selecting a carrier:
    - if you have never used a particular transporter before, ask for references from other shippers and receivers that have used that carrier for transporting rabbits
    - ensure the carrier has appropriate experience relative to your transport needs (e.g. short vs. long distance hauls)
    - strive to use drivers that are professionally trained in animal handling and transport
b. ensure the following information is discussed and agreed upon between the transporter and shipper:
    - number of animals to be shipped
    - estimated weight (to properly determine loading density)
    - time and point of loading (especially during very hot and/or humid conditions to avoid loading during the hottest hours of the day)
    - destination
    - special requirements, if any, of the animals being transported (e.g. when the rabbits were last fed)
    - special protection from temperature extremes (cold or hot).

6.3 Feed and Water Pre-Loading

In rabbits, for human food safety reasons, withdrawal of feed at the farm generally occurs 4-6 hours prior to loading.

REQUIREMENTS

Rabbits must have access to water until loading into transport containers begins.

6.4 Loading for Transport

Proper handling and calm, careful loading reduces the risk of stress and injury to rabbits. Injuries incurred at the time of loading can compromise the rabbit's ability to handle the stress of transportation potentially making the rabbit unfit for transport or requiring transport with special provisions. Refer also to *Section 5.2 – Handling and On-Farm Movement of Rabbits* and *Appendix D – Humane Handling and Restraint of Commercial Meat Rabbits*.

Transport containers should meet the following characteristics:

- designed to ensure good airflow
- suitable height (i.e. allow the rabbit to lay sternally without the ears touching the top of the container)
- allow for drainage, collection or absorption of wastes
- constructed of readily sanitizable material
- provide non-slip flooring
- permit inspection of rabbits
- fitted with openings that are large enough for safe loading and unloading of rabbits
- fitted with a locking device to prevent rabbits from escaping
- well-constructed to prevent injury.

Provision of bedding or litter can help ensure that rabbits in solid-bottom containers have proper footing and do not come in direct contact with accumulated wastes, water, or snow.

REQUIREMENTS

Container design, material, and state of repair must minimize the risk of injury.

Containers must have sides, a bottom, and top of sufficient strength to protect rabbits during loading and transport. The use of burlap or any type of bag is unacceptable.

The time that rabbits are held in containers on farm must be minimized.

All reasonable steps must be taken to ensure rabbits do not become wet during loading. Wet rabbits must not be transported in cold temperatures.

Containers loaded with rabbits must be checked to ensure no part of the rabbit is protruding, and containers must be kept level and never thrown or dropped.

Rabbits being transported must not be in direct contact with accumulated wastes, water or snow.

RECOMMENDED PRACTICES

a. minimize the time rabbits are carried by hand by using a carrying crate to move rabbits from the cages/pens to the loading area
b. clean and disinfect containers after each use.

6.4.1 Loading Density

The appropriate number of rabbits per container depends on the available floor space, size of the rabbits, and the environmental conditions at the time of transport.

In hot or humid weather, the loading density in the containers should be reduced to minimize environmental heat and relative humidity (28) and allow rabbits to adopt postures that help them dissipate heat (29). Excessive loading densities in the winter can lead to cold stress because animals are less able to reposition themselves within the container to periodically avoid direct exposure to colder areas (28).

REQUIREMENTS

The number of rabbits per container must be determined prior to loading taking into consideration the available floor space, body size/weight, environmental conditions, and time of transport.

Rabbits must be loaded in containers in such a way that permits each of them to rest on the container floor at the same time when evenly distributed, while preventing excessive movement within the container.

RECOMMENDED PRACTICES

a. reduce the loading density in each container during hot or humid weather (see *Appendix E – Should this Rabbit be Loaded?*).

6.5 On-Farm Lairage

This section applies to lairage on the farm of origin or depots where rabbits are in lairage for later pick-up. Lairage time should be minimized. Both weight loss and mortality rates increase with increasing lairage and transport times (4). On-farm management must account for the fact that feed and water is rarely provided in lairage.

Refer also to *Section 6.4 – Loading for Transport.*

REQUIREMENTS

Rabbits in lairage must be protected from rain and extremes of temperature particularly wind in cold ambient temperatures and direct sun in hot ambient temperatures.

Containers must be arranged to ensure appropriate air flow relative to environmental conditions.

Section 7: Euthanasia

Euthanasia is defined as the "ending of the life of an individual animal in a way that minimizes or eliminates pain and distress" (30). It is characterized by rapid, irreversible unconsciousness (insensibility), followed by prompt death (31).

7.1 Decision-Making around Euthanasia

Euthanasia in an important aspect of animal welfare. Allowing a sick or injured rabbit to linger unnecessarily (sometimes informally referred to as "letting nature take its course") is unacceptable.

It is important to euthanize rabbits without delay that:

- are unlikely to recover, or
- fail to respond to treatment and recovery protocols, or
- show signs of chronic, severe or debilitating pain and distress, or
- are unable to access feed and water, or
- are unable to stand or walk, or
- show marked weight loss/loss of body condition.

Training, attitude, and behaviour of personnel responsible for euthanasia can greatly influence the timeliness, effectiveness, and humaneness of the procedure. Personnel who have received training on all aspects of euthanasia have greater confidence in making timely euthanasia decisions and have the skills necessary to perform the procedure competently.

Having an on-farm euthanasia plan can improve confidence when making decisions about euthanasia and help ensure the procedure is carried out in a timely and consistent manner. Euthanasia plans should be developed in consultation with a veterinarian and include procedures to recognize sick animals, criteria for euthanasia, and appropriate euthanasia techniques (31).

REQUIREMENTS

Rabbits must be euthanized without delay if they are experiencing unrelieved pain or distress and do not have a reasonable prospect of improvement or fail to respond to treatment or convalescence.

RECOMMENDED PRACTICES

a. develop a written on-farm euthanasia plan in consultation with a veterinarian
b. establish and follow clear criteria for euthanasia of individual rabbits (see *Appendix F – Sample Euthanasia Decision Tree*).

7.2 Methods of Euthanasia

Any euthanasia method must result in rapid loss of consciousness followed by death without the animal regaining consciousness (31). Different methods are required depending on rabbit age and weight (see Appendix G).

When choosing a euthanasia method, consider (32, 33):

- ability to restrain the rabbit for proper application of the procedure
- size and weight of the rabbit
- emotional comfort of the personnel performing the procedure and any bystanders
- skill of the personnel performing the procedure
- biosecurity and potential spread of disease
- carcass use and disposal.

Every effort should be made to minimize animal distress prior to euthanasia. Humane handling and restraint are important factors for euthanasia to be carried out with minimal pain and distress.

The successful application of any euthanasia method depends on many factors, including the competence and commitment of the personnel carrying out the procedure (30). Personnel who are tasked with euthanizing rabbits need to be trained and monitored periodically to ensure continued competence.

Not all personnel are suited to perform euthanasia, nor do all personnel have the required physical strength and abilities to perform certain euthanasia methods. These factors may impact the efficacy of the euthanasia method. Operator fatigue may also impact animal welfare (30). Attitudes towards euthanasia should be monitored to ensure that personnel are comfortable with the methods being used.

REQUIREMENTS

An acceptable method of euthanasia must be used. Refer to Appendix G – Methods of On-Farm Euthanasia.

The method of euthanasia must be quick, cause minimal stress and pain, and result in rapid loss of consciousness followed by death without the rabbit regaining consciousness.

Personnel performing euthanasia must be competent in the euthanasia methods used on the farm.

Equipment used for euthanasia must be cleaned between uses and used and maintained according to the manufacturer's instructions to ensure proper function.

RECOMMENDED PRACTICES

a. when restraint is necessary, choose the safest least stressful method sufficient to facilitate effective euthanasia and ensure euthanasia is performed with minimal delay following restraint (31)
b. have a backup euthanasia method readily available.

7.3 Confirmation of Insensibility and Death

It is essential that rabbits be swiftly rendered insensible and remain so until death. For this reason, euthanasia methods that affect the brain first are preferred (31).

Signs of sensibility include (4):

- rabbit blinks when the surface of the eye is touched (corneal reflex)
- rabbit attempts to raise its head or body (righting reflex)
- rhythmic breathing is observed (nostrils moving in and out regularly)
- rabbit responds to painful stimuli (pinch the ear or folds of skin between the toes).

Absence of these signs indicates that the rabbit is insensible. Convulsions (e.g. uncoordinated kicking of the legs, body rigidity) following the application of the euthanasia method are not a sign of sensibility.

Regardless of the euthanasia method, death must be confirmed prior to disposal (30). Lack of heartbeat is the most important indicator of death; however, because this can be difficult to confirm, lack of movement and breathing should also be used to confirm death (30).

REQUIREMENTS

Rabbits must be evaluated for signs of sensibility immediately after the euthanasia method has been applied.

If signs of sensibility are observed after the application of the euthanasia method, a second application of the euthanasia method (or an alternate method) must be immediately administered.

Death must be confirmed before moving or leaving the rabbit.

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Appendix A: Sample Emergency Contact List

EMERGENCY CONTACT LIST

Use 911 for any emergencies

Your farm address: _____

Farm staff emergency contacts:

Contact 1: _____
Office phone: _____
Home phone: _____
Cell phone: _____

Contact 2: _____
Office phone: _____
Home phone: _____
Cell phone: _____

Local police contact (for non-911 emergencies): _____

Provincial Ministry of Agriculture: _____

Canadian Food Inspection Agency: _____

Veterinarian: _____

After-hours veterinary contact: _____

Internet service provider: _____

Insurance company: _____

Hospital: _____

Hospital address: _____

Appendix B: Body Condition Scoring

Body condition scoring (BCS) is a hands-on method of assessing the amount of fat and muscle cover on an animal. Proper scoring involves both physical palpation and visual assessment of specific anatomical sites.

Body condition score	Description
1 Very thin	- Hip bones, ribs and spine project prominently - Loss of muscle and no fat cover - Rump area curves in
2 Thin	- Hip bones, ribs and spine are easily felt - Loss of muscle and very little fat cover - Rump area is flat
3 Ideal	- Hip bones, ribs and spine are easily felt but are rounded, not sharp - No abdominal bulge - Rump area is flat
4 Overweight	- Pressure is need to feel the ribs, spine and hip bones - Some fat layers - The rump is rounded
5 Obese	- Very hard to feel the spine and hip bones; ribs cannot be felt - Abdomen sags with obvious fat padding - Rump bulges out

Appendix C: On-Farm Euthanasia Decision-Making for Commercial Meat Rabbits

Euthanasia is the act of ending the life of an animal in a way that minimizes or eliminates pain and distress. It is characterized by rapid, irreversible insensibility followed by prompt death.

A good death is critical to the humane termination of an animal's life.

It is essential that everyone who works with rabbits be trained and competent to recognize normal behaviour as well as signs of pain, injury, illness or distress that indicate that euthanasia may be necessary. Each producer should develop a plan to promptly separate and observe, treat, ship or, in the case of an animal that is not responding to or cannot be treated, euthanize a rabbit.

Rabbit Grimace Scale

It is difficult to observe signs of pain in rabbits since rabbits have evolved to hide pain and injuries from predators. Recent research has shown that rabbit facial expressions can be useful for assessing pain and discomfort.

The Rabbit Grimace Scale is a tool that can be used to assess whether a rabbit is in pain and needs to be closely observed, treated or euthanized. The action units (see table) should only be used in animals that are awake. Each animal should be observed for a short period of time to avoid scoring brief changes in facial expression that are unrelated to the animal's welfare. Rabbits with a higher total score (demonstrating more 'obviously present' facial action units) are more likely to be experiencing pain and distress.

	Facial Action Units*		
	Not present "0"	Moderately present "1"	Obviously present "2"
Orbital tightening • Closing of the eyelid (narrowing of the orbital area) • A wrinkle may be visible around the eye			
Cheek flattening • Flattening of the cheeks. When 'obviously present', cheeks have a sunken look. • The face becomes more angular and less rounded			
Nostril shape • Nostrils are drawn vertically forming a 'V' rather than a 'U' shape • Nose tip is moved downwards towards the chin			
Ear shape and position • Ears become more tightly folded/curled (more cylindrical) in shape • Ears move from facing towards the source of sound, towards the hindquarters • Ears may be held closer to the back or sides of the body			

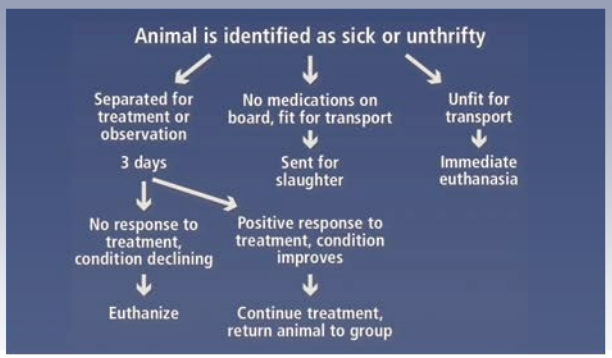
*Whisker position can also be used to assist with pain assessment. Whiskers stiffen, move downward away from the face, and will be pushed out in a painful animal.

It is important to euthanize rabbits without delay if they:

- are unlikely to recover from a condition or illness
- fail to respond to treatment and recovery protocols
- have signs of chronic, severe or debilitating pain and distress
- are unable to access feed and water
- are unable to stand or walk
- show marked weight loss or loss of body condition

Developing an on-farm euthanasia decision plan can provide guidance for personnel in making consistent decisions on when rabbits need to be euthanized.

See the following example of a decision-making plan.



Acknowledgments: Rabbit Grimace Scale images were kindly provided by Dr. Matt Leach (Newcastle University) and Dr. Patricia Hedenqvist (Swedish University of Agricultural Sciences). Rabbit Grimace Scale research funding was provided by the Pain and Animal Welfare Science Group, Newcastle University and the UK National Centre for the 3Rs.

Appendix D: Humane Handling and Restraint of Commercial Meat Rabbits

Proper handling is important to ensure safety of both the handler and the rabbit. A rabbit's hind end is very powerful and if not supported properly a rabbit can kick out and permanently injure its back. Always support a rabbit's hind end and hold the rabbit close to one's body when carrying. Never lift a rabbit by its ears.

LIFTING

1. Move the rabbit to an area of the cage where it is easiest to pick up. Use your hands to coax the rabbit or gently slide it.
2. With one hand, gently grasp the loose skin at the back the neck or shoulder blades or support animal with a hand under the chest.
3. Use the other hand to support the rabbit's weight and hind end before lifting.
4. Hold the rabbit close to your body.





Alternatively, young rabbits, can be picked up with one hand by grasping the rabbit firmly over the loin area. This technique should not be used for carrying the rabbit over long distances.


Holding and Carrying
Rabbits feel most secure when held close to the handler's body, decreasing their tendency to scratch or struggle. There are many different ways to hold a rabbit correctly. Fearful rabbits can be calmed by placing their head under an arm, covering their eyes. Alternatively, place the rabbit in a tall box or tote made of rigid materials to carry.

Placing in cage
Rabbits may get excited when approaching their cage. Use caution when lowering a rabbit back into the cage to reduce the chance of injury.

Damage from improper handling
Improper handling can lead to injury and pain. Handling a large, mature rabbit by the scruff of the neck alone can cause pain and distress to the rabbit and lead to carcass downgrading at processing.

Shipping containers
Transportation containers should be in good repair.


Containers should not have sharp edges that may injure rabbits.




Large holes in the container may allow rabbits to stick their limbs and head outside of the crate, creating a risk for injury.


Appendix E: Should this Rabbit be Loaded?

SHOULD THIS RABBIT BE LOADED?
Guidelines for Transporting Rabbits

LOAD & TRANSPORT HEALTHY RABBITS

DO NOT LOAD DO NOT TRANSPORT IF

- Depressed or dull
- Difficulty breathing or significant discharge from eyes or nostrils
- Emaciated or weak
- Dislocated, broken or exposed bones
- Unable to rise or walk due to physical abnormality or injury

CAUTION
Conditions requiring further assessment before rabbit can be loaded

ENVIRONMENTAL
- Wet rabbits in cold weather
- Very hot and humid environmental conditions
- Severe cold temperatures, particularly with a wind chill
- Prolonged road closures that will significantly delay rabbit transportation

INDIVIDUAL RABBIT
- Minor trauma, wounds or bleeding (including injury due to handling)

HERD
- Diarrhea
- Respiratory disease
- If a herd is diagnosed with a disease by a veterinarian, special provisions for loading may be required

Assessment decisions should be made by the producer, loading crew, transporter and processing plant when faced with CAUTION conditions.

HEALTH OF ANIMALS REGULATIONS, PART XII

No person shall load or cause to be loaded, an animal that by reason of infirmity, illness, injury, fatigue or any other cause cannot be transported without undue suffering during the expected journey.

DO NOT
- Transport a sick or injured rabbit
- Load or unload a rabbit in a way likely to cause injury or suffering
- Crowd rabbits to such an extent as to cause injury or undue suffering

www.inspection.gc.ca

VIOLATORS OF THE HEALTH OF ANIMALS ACT
- Fines up to $10,000
- Increased fines for repeat offenders
- Repeat offenders posted on Canadian Food Inspection Agency (CFIA) website

Identification of Sick or Injured Rabbits


Wry (twisted) neck


Severe diarrhea


Exposed bone


Open wound


Bleeding

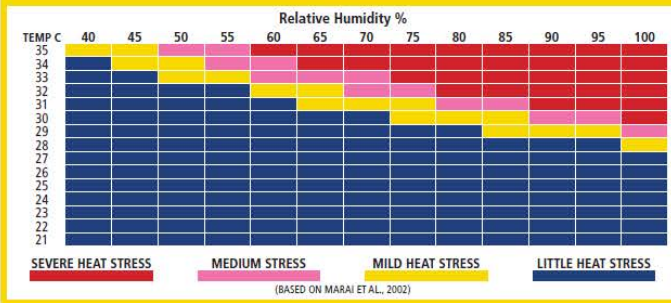

Weak


Severe respiratory disease

GUIDELINES FOR DEALING WITH RABBITS

Rabbits must be protected from extremes in ambient temperatures during loading and transportation. Rabbits are particularly sensitive to heat stress since they have few means of cooling themselves. Similarly, wet rabbits may chill quickly in very cold temperatures and should not be loaded.

Heat stress index for rabbits



Loading densities should be decreased under conditions of high ambient temperature and/or relative humidity.

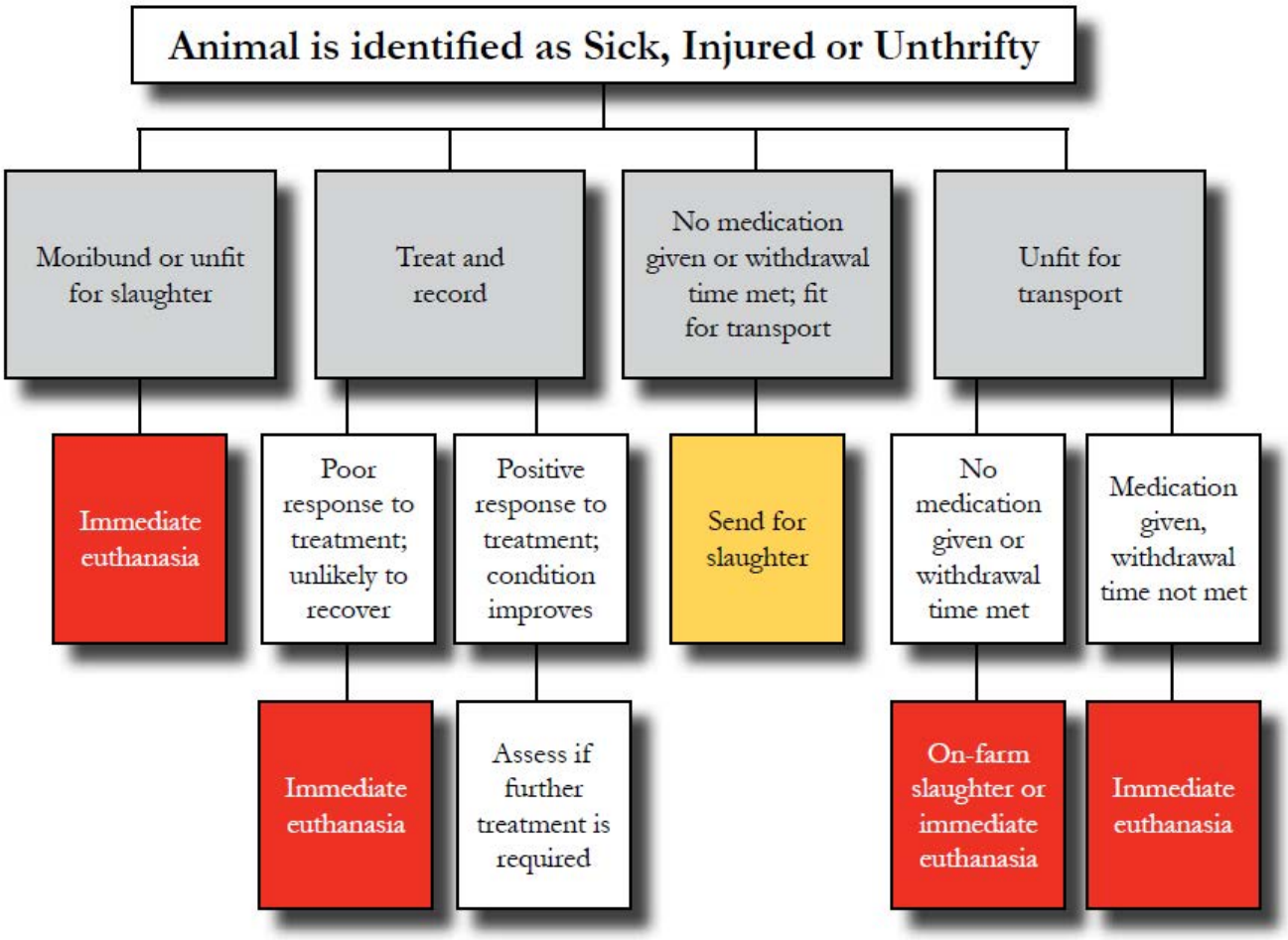
LOAD & TRANSPORT HEALTHY RABBITS

1.IDENTIFY
Identify compromised rabbits during routine herd monitoring.

2.EUTHANIZE
Daily removal of unfit animals improves loadout efficiency and eliminates the need to euthanize large numbers of rabbits on farm just prior to loading.

3.DISPOSE
Refer to provincial legislation for deadstock regulations and methods for proper disposal.

Appendix F: Sample Euthanasia Decision Tree



Appendix G: Methods of On-Farm Euthanasia

The following is a list of methods of euthanasia that are considered acceptable with the noted conditions as well as methods that are unacceptable. The chart is based on peer-reviewed research available at the time of publishing of this Code of Practice.[a,b] Further peer-reviewed research may result in new, acceptable equipment and/or euthanasia methods, or the elimination of some currently accepted practices. For a method to be considered acceptable, it must rapidly render the rabbit insensible and the rabbit must not return to sensibility prior to death.

	Pre-weaned kits <150 g (<0.3 lb)	Pre-weaned kits 150 g - 1 kg (0.3 - 2.2 lb)	Weaned and growing rabbits 1 - 1.5 kg (2.2 - 3.3 lb)	Adult rabbits >1.5 kg (>3.3lb)
Anesthetic overdose[1]	Acceptable	Acceptable	Acceptable	Acceptable
Blunt force trauma	Stunning only - a secondary step to cause death is required[2]	Unacceptable	Unacceptable	Unacceptable
Decapitation	Acceptable[3]	Unacceptable	Unacceptable	Unacceptable
Assisted manual cervical dislocation	Unacceptable	Conditional[4]	Conditional[4]	Conditional[4]
Manual cervical dislocation	Conditional[5]	Unacceptable	Unacceptable	Unacceptable
Non-penetrating captive bolt	Unacceptable	Conditional[6]	Conditional[6]	Conditional[6]
Gas inhalation: Carbon dioxide (CO_2)	Unacceptable	Conditional[7]	Conditional[7]	Conditional[7]

[a] American Veterinary Medical Association (2013) AVMA Guidelines for the Euthanasia of Animals: 2013 Edition. Schaumburg, IL: American Veterinary Medical Association.

[b] Rabbit Code of Practice Scientific Committee (2017) Code of Practice for the Care and Handling of Rabbits: Review of Scientific Research on Priority Issues. Lacombe AB: National Farm Animal Care Council.

[1] IV barbiturate (for example) administered under the direction of a licensed veterinarian only. Carcasses may be dangerous to scavengers. Safe disposal of the carcass is necessary.

[2] Blunt force trauma refers to a quick firm blow to the back of the head, leading to immediate loss of consciousness. To be effective, appropriate physical force must be used and the object must be brought to the rabbit's head, once the rabbit has been restrained. Blunt force trauma must be immediately followed by a suitable secondary step (decapitation or manual cervical dislocation) to cause death.

[3] Decapitation (i.e. complete separation of the head from the body) can be accomplished with the use of appropriate equipment such as heavy scissors or garden shears.

[4] Assisted manual cervical dislocation is acceptable when using a purpose-designed device that results in separation (never crushing) of the cervical vertebrae.

[5] Manual cervical dislocation is acceptable when it results in separation (never crushing) of the cervical vertebrae.

[6] In order to be effective, proper restraint of the rabbit and correct placement and aim of the device is critical. Devices must also be cleaned and maintained according to manufacturer's instructions to ensure proper function.

[7] Requires specialized equipment (pressure-reducing regulator, flow meter, CO_2 cylinder or tank) and a closed chamber to contain gas. Gradual fill chambers must be used, and the gas must be supplied in a precisely regulated and purified form without contaminants or adulterants. Rabbits must be placed in the chamber in a single layer and never overcrowded. Use in a well ventilated area for operator safety.

Appendix H: Resources for Further Information

HOUSING AND EQUIPMENT

Ventilation

Turnbull J.E., Huffman H.E. (n.d.) Fan ventilation principles and rates. Plan M-9700. Canada Plan Service. Available http://www.cps.gov.on.ca/english/plans/E9000/9700/M-9700L.pdf

Estellés F., Bustamante E., Torres A.G. & Calvet S. Evaluation of climate control strategies in rabbit houses. World Rabbit Science Association, Proceedings of the 10th World Rabbit Congress, September 3-6, 2012. Available: https://world-rabbit-science.com/WRSA-Proceedings/Congress-2012-Egypt/Papers/04-Management/M-Estelles.pdf

Mousa-Balabel, T.M. (2004) Effect of heat stress on New Zealand white rabbits' behaviour and performance. Minufiya Veterinary Journal, 3(1): 125-134. Available: http://publicationslist.org.s3.amazonaws.com/data/tarek.mousa-balabel/ref-6/paper_5%20heat%20stress%20on%20rabbit.pdf

Facility design and construction

Canada Plan Service (n.d.) Series 8000 – Special structures, Plan 8248 – 240 Doe rabbitry. Available http://www.cps.gov.on.ca/english/ss8000/ss8248.htm.

Canada Plan Service (n.d.) Series 9000 – Building Engineering, Plan 9700 Fan ventilation principles and rates. Available http://www.cps.gov.on.ca/english/frameindex.htm.

Lang, B. (last reviewed 2012) Rodent Control in Livestock and Poultry Facilities. Agdex 400/680. Ontario Ministry of Food, Agriculture and Rural Affairs. Available http://www.omafra.gov.on.ca/english/livestock/dairy/facts/10-077.htm

Emergency planning and safety

Ontario Ministry of Agriculture, Food and Rural Affairs (2011) Reducing the risk of fire on your farm. Publication 837. Available http://www.omafra.gov.on.ca/english/engineer/barnfire/toc.htm.

The Alberta Environmental Farm Plan Company (2008) *Rural Emergency Plan.* Online: http://www.ruralemergencyplan.com/

NUTRITION

Cheeke P.R. (1987) Rabbit Feeding and Nutrition. Academic Press, Inc., Orlando, Fl.

de Blas C. & Wiseman J., eds. (2010) The Nutrition of the Rabbit, 2nd edition. CAB International, Cambridge, MA.

Government of Alberta (2006) Know your feed terms. Agri-Facts AgDex 400/60-2. Available www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex4521/$file/400_60-2.pdf?OpenElement

National Research Council. 1977. Nutrient Requirements of Rabbits. Second Revised Edition. National Academy of Sciences. Washington, D.C.

HEALTH

Pest Control

Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs (2013) *Rodent Control in Livestock and Poultry Facilities*. Publication number 1198-712X. www.omafra.gov.on.ca/english/ livestock/dairy/facts/13-057.htm

REPRODUCTIVE MANAGEMENT

Ontario Rabbit. Rabbit Artificial Insemination Resource Guide.
http://ontariorabbit.ca/?page_id=74

EUTHANASIA

Farm and Food Care Ontario (2016) Rabbit Handling and Euthanasia [Video]
www.farmimpact.ca/index.php/2-uncategorised/62-rabbit-resources-main-page

GENERAL

Lebas F., Coudert P., de Rochambeau H. & Thébault R.G. (1997) The Rabbit – Husbandry, health and production. Food and Agriculture Organization of the United Nations. Available
http://www.fao.org/docrep/t1690e/t1690e00.htm#Contents

McNitt J.I, Lukefahr S.D., Cheeke P.R. & Patton N.M. (2013) Rabbit Production, 9th Edition. CABI, Boston, MA.

RESOURCES AVAILABLE IN FRENCH

Centre de référence en agriculture et agroalimentaire du Québec. Fiches techniques : L'élevage du lapin, 2013. ISBN : 978-2-7649-0245-5.
https://www.craaq.qc.ca/Publications-du-CRAAQ/fiches-techniques-l_elevage-du-lapin/p/PCUN0101

Centre de référence en agriculture et agroalimentaire du Québec. L'élevage commercial du lapin, 2009. ISBN : 978-2-7649-0215-8
https://www.craaq.qc.ca/Publications-du-CRAAQ/l_elevage-commercial-du-lapin/p/PCUN0002

Boucher S. & Nouaille L. Maladies des lapins. 3e édition, Éditions France Agricole, 2013. ISBN : 9782855572468.
https://www.craaq.qc.ca/Publications-du-CRAAQ/maladies-des-lapins-3e-edition/p/PAUT0141