



NOVA SCOTIA DEPARTMENT OF AGRICULTURE

Rabbit Production Manual

A Guide for 4-H Leaders
and Beginning Farmers

Rabbit Production Manual

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Disclaimer

This manual is intended to be a resource that provides educational information for 4-H leaders and people who are interested in raising livestock. It covers topics such as breeds, husbandry, nutrition, health, safety, and business.

This manual's appendix includes a section that outlines topics and activities for 4-H meetings. The content included in this guide is meant for reference only.

Readers who require additional information, specific regulations, or more details are asked to contact the Nova Scotia Department of Agriculture Regional offices for assistance:

<https://novascotia.ca/agri/programs-and-services/regional-services/>

While steps have been taken to ensure the content in this booklet is accurate, recommendations, guidelines, and regulations may change at any time. Authority rests with the relevant regulatory body.

Thank You

Thank you to Dr. Deannie Parks, DVM for her help creating this manual.

Introduction

Rabbits can be raised as pets, for show/breeding, or for commercial/meat purposes. Rabbits are a very social, intelligent, and curious animal. When well cared for, they can live 10 years or more.

Before deciding to take on the care of a rabbit ask yourself these questions:

- Can I make a long-term commitment?
- Can I provide a suitable living environment?
- Do I have the time and resources to properly care for rabbits?

A Brief History of the Rabbit

According to fossilized remains, rabbits have been around for about 30 million to 40 million years and have changed little over that time. Spain is considered to be the original home of the rabbit, and rabbit relics have been found on the Spanish peninsula dating back over 600,000 years.

The Romans were the first to build enclosures, called *Leporarii*, to raise rabbits in captivity. At first, they ran into problems. The enclosures were good enough to control hares, as they were surface dwellers, but rabbits are burrowing animals and they easily tunneled out under the walls. The Romans solved the problem by laying a foundation deep underground and were then able to house both the hares and rabbits.

The Romans consumed a lot of rabbit meat as they thought it aided in the beauty of Roman women. Although they did not know it, they were consuming a highly nutritious meat. Even court doctors prescribed rabbit meat for stomach problems. As the Roman Empire grew, rabbits were spread throughout Europe and were used for hunting and food.

In the wild, rabbits that have mutations for different coat colours are at a disadvantage. Their uniquely coloured coats are easy to spot by predators, which makes them more likely to be eaten. However, rabbits with desirable mutations are selectively bred in captivity. French monks are given credit for domesticating the rabbit. The first domestic breed of rabbit produced by the Cistercian monks of Champagne France was silver in colour. Loosely translated, these rabbits were known as the “silvers of Champagne” or, as we know them today, Champagne d’argente.

Rabbit keeping was brought to England by the Normans. In 1792, Thomas Berwick produced a book called *Berwick Quadrupeds* that showed four kinds of rabbits: Angoras, piebalds, and large and small tame. Around this time, it became necessary to start naming the breeds being produced. The fancier the name, the higher the selling price for the rabbit. Interestingly, the name of the breed typically had nothing to do with where the breed originated.

Section 1: Selecting an Animal

Purchasing and Selecting Stock

Always place the health of the rabbit(s) over everything else. Nova Scotia follows the American Rabbit Breeders Association's Standard of Perfection in defining breeds.

In this program, rabbits are divided up into two main classes: Showroom 4 and Showroom 6. These are then further divided into the following age classes: junior and senior doe, junior and senior buck. Rabbits that do not fit into those categories can then be classified as pet rabbits.

When choosing a purebred **Showroom 4** (previously referred to as **fancy rabbit**), look for:

- A healthy rabbit
- The right type and conformation for the breed
- A rabbit whose eyes are bright and sharp
- A rabbit that is alert and active
- A rabbit that has no disqualifications for their breed

When choosing a **Showroom 6** (previously referred to as **utility/meat rabbit**), look for:

- A healthy rabbit
- The right type and conformation for the breed
- A rabbit whose eyes are bright and sharp
- A rabbit that is alert and active
- A rabbit in the medium-size breeds that has good meat qualities (meaty shoulders, wide and deep loin and hind quarters)
- A rabbit that is the right size for its age class

When choosing a **pet rabbit**, look for:

- A rabbit that is healthy
- A rabbit that is clean
- A rabbit whose eyes are bright and sharp
- A rabbit with good conformation with a smooth transition from one part of the body to the other

Tips for purchasing a show rabbit:

- Aim to purchase a show-quality animal. These animals can be purchased from reputable breeders and will come with a pedigree. Pet stores often falsely identify the breed of their stock and/or sell lower-quality animals. Purchasing directly from a breeder will ensure that you have the correct information about your animal.
- If you know the breed you wish to purchase, consider the specific breed standards.
- Handle the rabbit to ensure it is healthy.
- Make sure the rabbit's coat is in good condition.
- Consider the animal's personality and temperament. You will want to choose one that is easy to handle and care for.
- Consider bringing along someone who knows rabbits for a second opinion.

Common Rabbit Breeds

There are too many rabbit breeds to fully describe in this manual; however, a few common breeds are listed below. The described breeds are divided into three categories:

- Showroom 6 Rabbits - should have excellent meat-producing qualities with an emphasis placed on body and muscling.
- Showroom 4 Rabbits - should be a good representative of their breed, with an emphasis placed on breed features.
- Fibre (can be showroom 4 or 6) - should have coat quality as the main priority.

It is important to note that many breeds of rabbit are multi-purpose and can fit into more than one of the listed categories. For example, the Jersey wooly could be considered a fibre rabbit but would be placed in the Showroom 4 class.

Common Rabbit Breeds

Showroom 6 Breeds

Californian

Adult size: Bucks 8–10 lbs
(3.6–4.5 kg)
Does 8.5–10.5 lbs
(3.9–4.8 kg)

Description: The Californian was first bred in the 1920s with the intent of creating a better commercial meat rabbit. It resulted from crosses between the Himalayan, the standard chinchilla, and the white New Zealand.

Californians have a white body and pink eyes as well as a coloured nose, tail, ears, and feet. The colour should be as near black as possible. Eye stains or coloured spots confined to the dewlap are permissible.

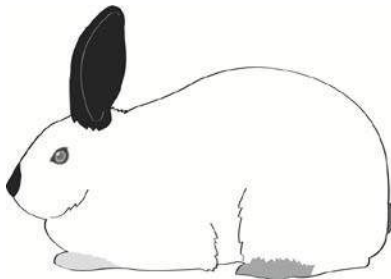


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New Zealand

Adult size: Bucks 9–11 lbs
(4.1–5.0 kg)
Does 10–12 lbs
(3.6–5.4 kg)

Description: The New Zealand is a very popular commercial rabbit. New Zealands should have deep, wide bodies and smooth flesh covering. This multi-purpose breed can be raised for meat, pelts, show, and laboratory purposes.

Colour varieties include white, red, broken, and black.

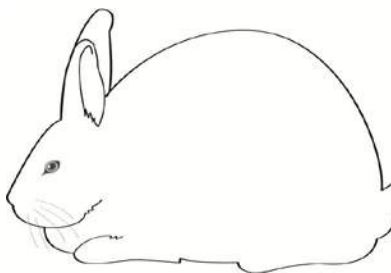


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Satin

Bucks 8.5–10.5 lbs
(3.9–4.8 kg)
Does 9–11 lbs
(4.1–5.0 kg).

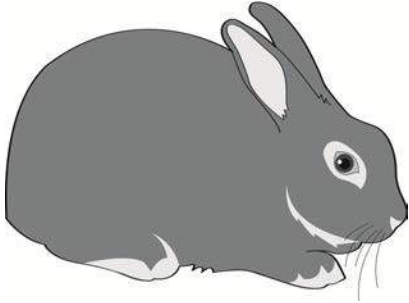


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Description: The satin resulted from a genetic mutation first identified in a litter of Havanas. Satin fur appears more brilliant in colour compared to normal-furred rabbits because their hair shaft is smaller in diameter and the hair is more transparent. They have one of the best meat-to-bone ratios.

Colour varieties include black, blue, broken, Californian, chinchilla, chocolate, copper, otter, red, Siamese, and white.

French Lop

Adult size: Bucks 11 lbs (4.5 kg)
and over
Does 11.5 lbs (5.0 kg)
and over



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Description: The largest of the lops, the French lop is believed to have resulted from crosses between English lops and Flemish giant rabbits. The animal's body should be broad, deep, and heavily muscled.

Colour varieties include agouti, broken, self, shaded, ticked, and wide band.

English Lop

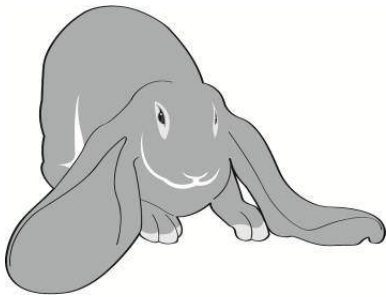


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Bucks 9.5 lbs
(4.1 kg) and over

Does 10.5 lbs
(4.5 kg) and over.

Description: The English Lop is believed to be one of the oldest known breeds. This rabbit is easily recognizable by its extraordinary ears, which should be a minimum of 21 inches (53 cm) in length from tip to tip. The English Lop is less massive and thick set than the rest of the lops. It should have a smooth mandolin-shaped body.

Colour varieties include agouti, broken, self, shaded, ticked, and wide band.

Showroom 4 Breeds

Dutch

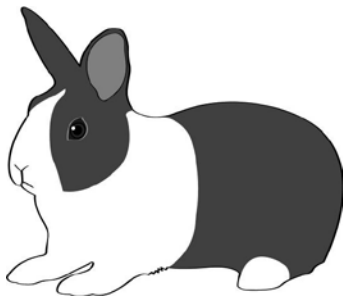


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Adult size: Bucks and Does
3.5–5.5 lbs (1.6–2.5 kg)

Description: The Dutch is a very popular breed that is easily distinguished by its markings.

They have a white blaze, a white stripe around the front torso (including front legs), and white on the ends of the hind feet. The rest of the body should be black, blue, chinchilla, chocolate, grey, steel, or tortoise.

Because the markings are a pure genetic trait, Dutch patterns can also appear in other breeds of rabbit.

English Spot

Adult size: Bucks and Does
5–8 lbs (2.3–3.6 kg)

Description: This breed is mostly white with colouring on the nose and ears, around the eyes, and chains of coloured spots along its sides and a stripe down its spine.

When breeding English Spots, about 50 per cent of the young will exhibit the characteristic breed markings. The other 50 per cent will be a combination of solid-coloured rabbits called “selves” and lightly marked rabbits called “charlies.” The English Spot has a full arch type so it should carry its body well up off the ground.

Colour varieties include black, blue, chocolate, gold, grey, lilac, and tortoise.



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Belgian Hare

Adult size: Bucks and Does
6–9.5 lbs (2.7–4.3 kg)

Description: Though it is a breed of domestic rabbit and not a true hare, the Belgian's lean, arched body; large ears; and energetic temperament led to its misleading breed name.

The fur colour should be a rich, red tan or chestnut shade. Rich black lacing on the ears is also desirable.

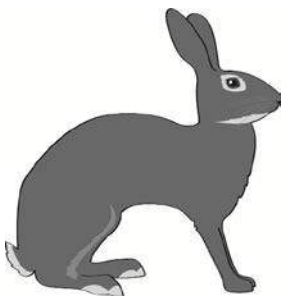


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Netherland Dwarf

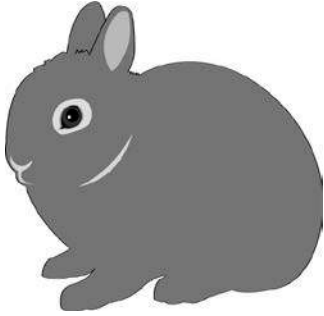


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Adult size: Bucks and Does
not exceeding
2.5 lbs (1.1 kg)

Description: The Netherland Dwarf is one of the smallest breeds. It is a short, compact animal with a round head and a short neck. Ideally, the ears are only 2 inches (5 cm) in length. It is bred in a wide range of colours and patterns.

Colour varieties include self, shaded, agouti, tan pattern, and other colours.

Rex and Mini Rex

Adult size: Bucks 7.5–9.5 lbs
(3.4–4.3 kg)
Does 8–10.5 lbs
(3.6–4.8 kg)

Mini Rex: Bucks 3–4.25 lbs
(1.4–2.0 kg)
Does 3.25–4.5 lbs
(1.6–2.0 kg)

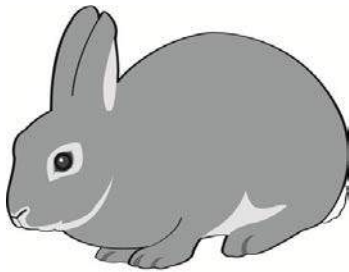


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Description: The Rex and Mini Rex are differentiated from normal-furred breeds by their unique fur coat. Rex fur is very dense. The guard hairs are nearly the same length as the undercoat giving a plush, velvet-like feeling. Rex fur is very short, and should have a springy resistance to the touch.

Colour varieties include amber, black, blue, broken group, Californian, castor, chinchilla, chocolate, lilac, lynx, opal, otter, red, sable, seal, and white.

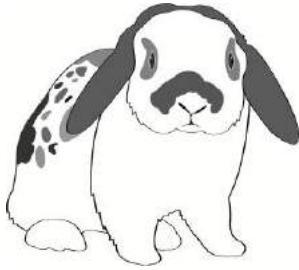


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Holland Lop

Adult size: Bucks and Does
not exceeding
4.0 lbs (1.8 kg)

Description: The smallest of the Lops, the Holland should have a compact muscular body and a blocky head with a full crown. The Holland Lop was developed as a result of crosses between French Lops, English Lops and Dwarfs.

Colour varieties include agouti, broken, pointed white, self, shaded, tan pattern, ticked, and wide band.



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Mini Lop

Adult size: Bucks and Does
4.5–6.5 lbs (2.0–2.9 kg)

Description: Although it is larger than the Holland lop, the mini lop is considerably smaller than the French and English Lops. The Mini Lop should have a thick-set body that is slightly wider through the hindquarters.

Colour varieties include agouti, broken, pointed white, self, shaded, ticked, and wide band.

English Angora

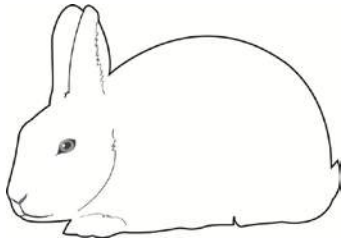


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Adult size: Bucks 5–7 lbs (2.3–3.2 kg)
Does 5–7.5 lbs (2.3–3.4 kg)

Description: The English angora has a compact body and can be easily differentiated by its heavy bangs, side trimmings, and heavily tasseled ears. The hair is very silky in nature, and the legs, feet, and tail are all covered to the very tips with hair.

Colour varieties include agouti, pointed white, self, shaded, ticked, and wide band.

Fiber Breeds - Showroom 4 or 6

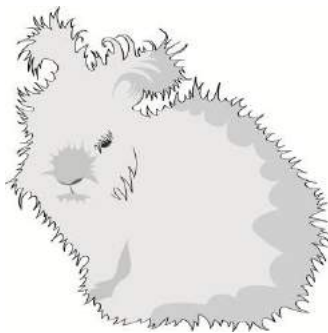


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Florida White

Adult size: Bucks and Does
4–6 lbs (1.8–2.7kg).

Description: The Florida white is believed to have resulted from crosses between Dutch, Polish, and New Zealand White rabbits.

Although it is smaller than many of the other commercial breeds, the Florida white is ideal for the small fryer market.

Florida Whites should be white with pink eyes.

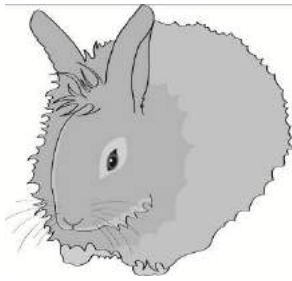


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French Angora

Adult size: Bucks and Does
7.5–10.5 lbs (3.4–4.8 kg).

Description: The French angora has a longer, narrower body than the English angora. Also, the head and feet (past the first joint) are not covered with hair. Their hair is coarse and ideally 2.5 – 3.5 inches (6.4–8.9 cm) in length.

Colour varieties include agouti, broken, pointed white, self, shaded, ticked, and wide band.

Jersey Wooly

Adult size: Bucks and Does
not exceeding 3.5 lbs (1.6 kg)

Description: The Jersey wooly has a short, compact body covered in dense hair. The ideal hair length is 2-3 inches (5-7.6 cm). The head should be bold and round with side trimmings and a fibre cap (short, dense hair just in front of the ears). A special characteristic of this breed is extreme gentleness.

Colour varieties include agouti, pointed white (black or blue), broken, self, shaded, and tan pattern.

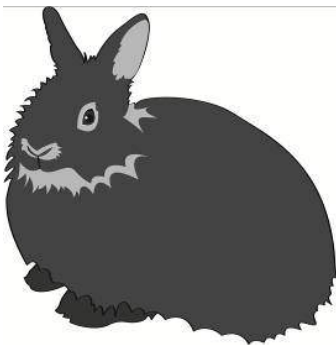


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Giant Angora

Adult size: Bucks 9.5 lbs (3.9 kg) and over
Does 10 lbs (4.1 kg) and over

Description: The giant angora was developed with the goal of maximum fibre production. It is a very versatile animal and has a commercial-type body with outstanding hair density. The giant angora has head trimmings including forehead tufts, cheek tufts, and ear tufts. The hair should extend to the tips of the feet. Only one variety is available: The Ruby-Eyed White.

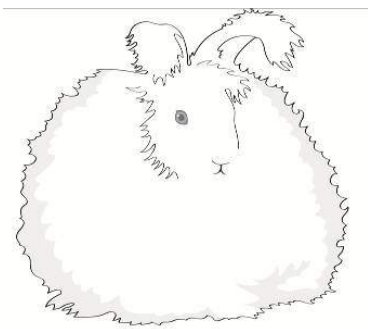


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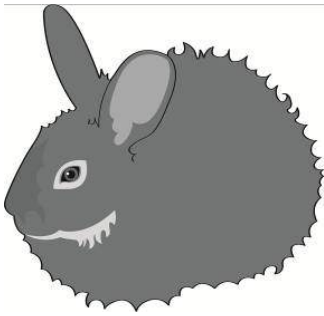


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Satin Angora

Adult size: Bucks and Does
6.5–9.5 lbs (2.9–4.3 kg)

Description: The satin angora resulted from a cross between a satin and a French angora. The result was a fibre-producing animal with a satinized coat. The satin Angora does not have extensive head furnishings, nor does it have hair on its feet. Its hair is finer than normal angora hair and is soft, silky, and very shiny.

Colour varieties include agouti, pointed white, self, shaded, ticked, and wide band.

American Fuzzy Lop

Adult size: Bucks and Does
not exceeding 4 lbs (1.8 kg)

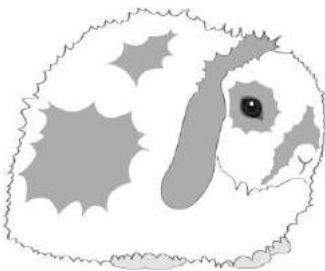


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Description: American fuzzy lops were developed by crossing Holland lops and angoras. Their body should be short and deep. The head should be wide, set close to the shoulders, and have lopped ears. Slightly coarse hair of at least 2 in (5 cm) should cover the body. The ears and feet should be covered in normal fur.

Colours varieties include agouti, broken, pointed white, self, shaded, and side band.

Body Type

Another way to classify rabbits is by body type. There are five body types that can be determined by the shape of the rabbit when viewed from the side.



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Commercial

Based on the ideal type for meat-producing breeds. Commercial rabbits are usually larger, with body depth equaling width, showing a smooth round curve through the back and hindquarters.

Breed examples include Californian, New Zealand, Palomino, French Lop, Silver Marten, Rex, and French Angora.



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Semi-Arch

This rabbit type sits with its legs flat on the table. The arch begins at the back of the shoulders, similar to the shape of a mandolin (another name for this body type).

Breed examples include American, Beveren, English Lop, Flemish Giant, and Giant Chinchilla.



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Cylindrical

This type is easy to distinguish because of their long, thin, tube-shaped body with fine bones and a slender head. It is posed in a stretched-out position.

Breed examples include Himalayan.



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Compact

Most compact rabbits are fairly small, light, and short in length, not intended for commercial rabbit raising. The majority of the fancy breeds belong in this category.

Breed examples include Netherland Dwarf, Polish, Mini Rex, Holland Lop, Jersey Wooly, American Fuzzy Lop, Mini Lop, Dutch, and English Angora.



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Full Arch

Rabbits of this type pose naturally up to their toes, showing a smooth arch from the nape of the neck, through the shoulders, loin and hips, down to the tail. These rabbits show more depth than width.

Breed examples include English Spot, Belgian Hare, Britannia Petite, Checkered Giant, Rhinelander, and Tan.

Standard of Perfection for Purebred Rabbits

In North America, there are approximately 50 recognized breeds of domestic rabbit. The American Rabbit Breeders Association (ARBA) sets official breed standards for recognized rabbit breeds. These breed standards are published in a guide called the *Standard of Perfection*. For detailed information on rabbit breed standards, consult the ARBA website and publications.

The purpose of the written standard is so everyone raising a particular breed will work toward producing the same-typed rabbit. In order for a breed to become recognized, it must go through a lengthy process that can take years to complete. Rabbit breeders must demonstrate that a new breed, or colour variety of an existing breed, is unique and will breed true. The rabbits should be thrifty and robust and must be able to pass these qualities down to their offspring generation after generation. If all has gone well, the breed will become recognized and its standard is then placed in the *Standard of Perfection* by ARBA. Visit the ARBA or specialty club websites for more information.

Associations and Rabbit Resources

The Maritime Rabbit Breeders Association (MRBA) puts on shows throughout the Maritimes. The MRBA website lists members, members' contact information, and what breeds of rabbits they have. Nova Scotia currently follows the *Standard of Perfection* from the American Rabbit Breeders Association.

If you are looking to purchase a rabbit, you have a few options. You can contact purebred rabbit breeders (MRBA/ARBA). Also, you can look for rabbits that need to be rehomed from your local SPCA. In Nova Scotia, you can also adopt from 10,000 Carrots Rabbit Rescue.

Commercial rabbit producers can view the Ontario Rabbit website listed in the additional resources section at the end of this manual. This website has information to assist current and future rabbit growers with rabbit production, as well as information for consumers who would like to research rabbit meat as a healthy protein alternative.

Section 2: Care and Management

Housing and Cages

Rabbits are very flexible when it comes to housing. Rabbits can be housed in anything from simple wire cages, to outside hutches, to large-scale rabbitry buildings. Elaborate, expensive housing and equipment is not necessary.

All types of rabbit housing should

- Provide the correct amount of space for the type of rabbits it will house
- Be easy to clean and maintain
- Provide a safe place for rabbits to live, breed, and raise young
- Be both economical and of good quality
- Be sturdy and durable
- Have adequate ventilation

Cages are one of the most important parts of any rabbitry, and they should be user friendly whether they are outside or inside. Do not build a cage that is difficult to clean or is hard to get the rabbits in and out of.

Much thought should be given to the construction and arrangement of cages in the rabbitry.

- Outside cages need a shady roof and protection from rain, wind, drafts, dampness, and direct sun during the hot summer months.
- If the weather is very hot, cool your rabbit by putting a bottle of frozen water in the cage or add a fan to increase airflow.
- Rabbits suffer more from hot weather than cold. Never place a cage uncovered in direct sunlight.
- In the winter, cages can be placed on the leeward side of a building to protect them from the elements.

Recommended Cage Sizes

The cage, or hutch, is the rabbits' home and it is important that they are provided with enough space to be comfortable. Mature rabbits are typically housed individually. Rabbits should be able to rest comfortably, have enough room to groom themselves, and be able to adjust their posture and turn around without obstruction. Below is a list of minimum cage sizes.

Individual Rabbit			
Size of Rabbit		Space Requirement	
lbs	kg	Sq. inch	Sq. cm
3 - 5	1.4 - 2.3	180	1,161
6 - 8	2.7 - 3.6	360	2,323
9 - 11	4.1 - 5.0	540	3,484
12 +	5.4+	720 (24 x 30)	4,636 (61 x 76)

Nursing Does			
Size of Rabbit		Space Requirement	
lbs	kg	Sq. inch	Sq. cm
3 - 5	1.4 - 2.3	576	3,716
6 - 8	2.7 - 3.6	720	4,645
9 - 11	4.1 - 5.0	864	5,574
12+	5.4+	1,080 (30 x 36)	6,916 (76 x 91)

The height of the cage should be 15 - 35 inches (38 - 90 cm) but will vary depending on the height of the rabbit. If cages have raised platforms, they will need to be on the higher end of the range for cage height.

If the rabbits' ears touch the top of the cage while it is sitting upright or hopping back and forth, then the top of the cage must be raised. Also, cages should not be so deep that you cannot reach the rabbit if it goes to the back.

Flooring and Bedding

Materials used for the cage floor can greatly impact rabbit foot health. The chosen material, mesh size or spacing between slats or holes, width and design of the mesh or slats as well quality, are all important when designing a housing system.

Wire mesh or perforated flooring is much easier to sanitize and keep clean. Plastic coated wire or plastic slatted flooring has been shown to reduce foot and leg injuries and maximize rabbit comfort. A slatted plastic resting mat is recommended for rabbit comfort. Litter or straw is appropriate to use but should be frequently replaced or topped up to maintain a clean and dry environment.

Types of Housing

Small Outdoor Hutch – Top Access

This is a small wooden hutch built about 24 inches (60 cm) off the ground. The hutch is constructed of wood and has a hinged roof that can be tilted back to give top access to the hutch for cleaning. The front and floor of the hutch is made from welded wire mesh. It is recommended that people build the shelter area in the middle with runs on either side because rabbits most often defecate and urinate inside the house when it's at one end. The alternative is to put a wire floor in the house for easier cleaning.

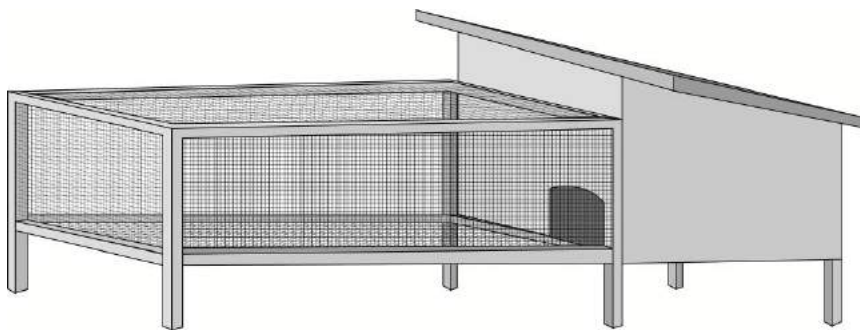


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Outdoor Hutches – Front Access

This group of outside hutches has a single roof and a large overhang to shelter cage fronts from rain or snow. The cages could be 24 - 48 inches (60 - 120 cm) above the ground. The floors, sidewalls, front, and door can all be made of welded wire. The back wall could be wood, metal, or plastic to provide a windbreak.

The roof should be sloped so rain runs toward the back and can be made out of wood and asphalt shingles, sheet tin, or corrugated fiberglass. An alternative to this design is to build the hutch against the leeward side (the side sheltered from the wind) of a building. The roof of the building should extend well out over the top of the hutch and have eaves troughs so the run-off does not drip on top of the hutch.

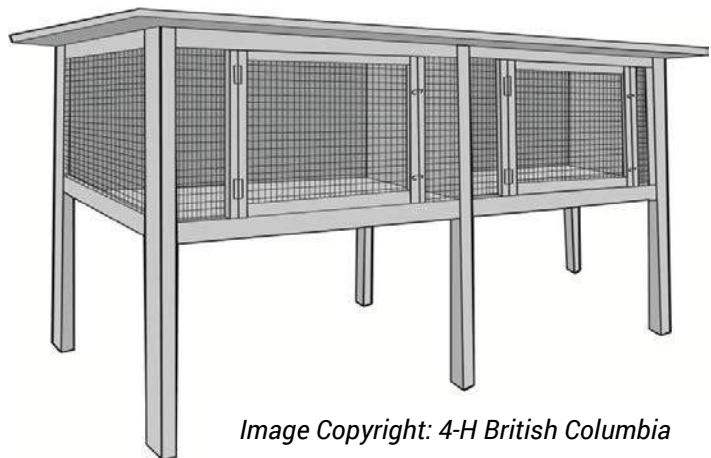


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Indoor Wire Cage

Wire cages can be put together with J clips or purchased preassembled. The cage can be set up on sawhorses with a sheet of wide plywood laid on top for the roof. You can also build a roof on four posts and hang the cage(s) from the rafters or ceiling joists.

Legs could also be attached to the outside of the cage using fencing staples. An all-wire cage is easy to keep clean. However, you need to do a little more planning as to where you will place the cage since it does not have solid protective walls.

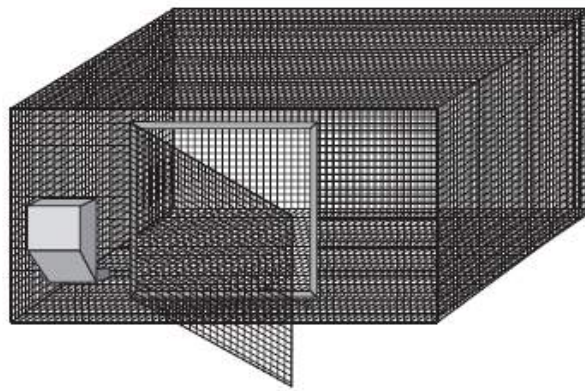


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Materials:

Wire

Wire used in cages should be galvanized, welded wire. One side of the wire is usually smoother than the other so make sure the smooth side faces up on the floor to protect your rabbit's feet. Wire floors can be hard on rabbit's feet. If your cage has an all-wire floor, consider providing something for your rabbit to sit on, such as wood, cardboard, carpet, or straw.

Never use poultry wire (fencing/netting) because it is too weak. While it is cheaper, its construction and gauge (thickness and strength) allows predators to easily break in and harm your rabbits.

Location used	Wire Gauge	Mesh Spacing
Floor	14	.5 x 1 inch (12.5 mm x 25 mm)
Sides and Top	16	1 inch x 1 inch (25 mm x 25 mm) to 1 inch x 2 inch (25 mm x 50 mm)
Kindling Cages – Bottom and first 4 inches (10 cm) on sides	14	.5 inch x .5 inch (12.5 mm x 12.5 mm) (prevents babies from getting stuck/falling out)

Wire mesh is a good choice for rabbit cages because

- Rabbits cannot damage it by chewing
- It is easy to clean and disinfect
- Wire cages are fairly light weight
- Cages allow good visibility of rabbits inside
- Welded wire mesh cages are easy to build

Wood

Wood is very commonly used in rabbit cages, but it is not ideal for several reasons:

- Rabbits love to chew on wood and will work hard at chewing through their cage.
- Pressure-treated wood is toxic to rabbits and should never be used.
- Wood absorbs urine and other liquid waste and causes the wood to rot and smell.
- Wood is difficult to disinfect, which allows bacteria to grow.

Wood should only be used for the top or the sides of the cage, never for the floor. Try to limit the amount of exposed wood in the cage. If there is exposed wood, consider covering it with a layer of wire so the rabbit cannot chew it.

Environmental Refinements

It is important to consider adding environmental refinements to rabbit housing when designing/purchasing housing. Environmental refinements encourage normal species-specific behaviours.

Refinements can be social, structural, physical, and food based. Refinements increase the number and range of normal behaviours, minimize abnormal behaviours, increase use of space, and increase a rabbit's ability to deal with challenges (behavioural and physiological).

Examples of refinements include

- Hardwood gnawing blocks/sticks
- Hay, straw, litter
- Grass or hay
- Raised platforms
- Multi-level cages/pens
- Tubes/tunnels
- Plastic resting mats

Recommended Practices:

- Provide two or more types of refinements.
- Monitor rabbits to ensure the refinements are not causing health problems.
- Avoid unbalancing the rabbit's diet.
- Ensure platforms are made from a material that is easily sanitized.

Other Equipment

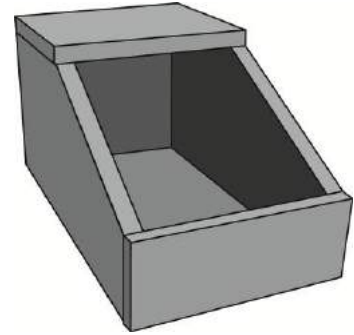
Nest Box

A nest box keeps the kits dry, protects them from extreme weather, and hides them from predators. Does should be provided nest boxes before they give birth.

The size of the nest box is important: if it is too large it can lead to kit death. When a box is too big, the doe may stay longer than needed to nurse her young. The doe may soil the bedding with her droppings, which will make the bedding damp and leave a strong ammonia odour that can cause respiratory illness in rabbits.

It's important to note that it is normal for a doe to deposit a few droppings in the nest after feeding. The purpose of this is to provide a source of microflora for the kits. Urinating in the box is NOT normal.

No matter the design of the nest box, it should provide privacy for the doe during kindling (giving birth) as well as comfort and protection for the young. It should be simple to clean and maintain, well drained, ventilated, and accessible for the young when they are large enough to leave and return to the nest.



A nest box it should be 12 inches deep, 12 inches high, and 20 inches wide (30 cm x 30 cm x 50 cm). Leave an entry hole at least 6 x 6 inches (15 cm x 15 cm) in the upper corner. Construct the box so you can remove the top and bottom during cleaning. Make two or three holes for ventilation and to prevent condensation.

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During cold weather, young rabbits will need more protection than a standard nest box can provide. You can make a simple winter nest by lining the inside of a standard box with an insulating board. Be sure to line the top and bottom as well as the sides. Fill the box with clean straw or wood shavings so the doe can burrow a cavity for a nest.

Feed Dishes

You can purchase specially designed crocks for rabbit feeding, or feeders can be as simple as a heavy glass or metal container that cannot be turned over.

Most rabbitries use metal feeders that are mounted on the outside of the cage with only the trough extending into the cage. These feeders are constructed so they can be filled from the outside of the cage.

The feeders should be mounted 4 inches (10 cm) from the cage bottom for giant breeds, 3 - 4 inches (7.5 cm -10 cm) from the bottom for medium breeds, and 2 inches (5 cm) from the bottom for small breeds. To mount the feeder, a hole must be cut in the cage to push the trough through. Carefully consider where you will locate the feeder before cutting a hole in your cage to mount it.

Water Systems

Rabbits, like all other livestock, must always have an ample supply of clean, fresh water. There are several different types of rabbit water systems. You should select the type that best suits your needs.

Type	Advantages	Disadvantages
Plastic bowl	Inexpensive and durable.	Rabbits will chew it, rabbits can easily tip it over and contaminate the water.
Ceramic crock	Durable, rabbits will not chew it.	May crack, rabbits may tip it, water may easily become contaminated.
Plastic bottle with ball bearing nozzle (mounts on the outside of the cage)	Water cannot be easily spilled or contaminated and does not take up floor space.	Lower-quality bottles may crack when they freeze or fall off the cage.
Automatic watering system (Water is supplied through rigid pipes or flexible hose with nipples on the end, must be under pressure or gravity fed)	Water cannot be easily contaminated/spilled and does not take up floor space.	Expensive, cannot be used in below-freezing temperatures.
Semi-automatic watering system (Water is supplied through a flexible hose with nipples, water is gravity fed from a reservoir mounted above the cage)	Water cannot be easily contaminated/spilled and does not take up floor space.	Cannot be used in below-freezing temperatures.

Sanitation

Sanitation is very important in the rabbitry. Rabbits are susceptible to health problems caused by ammonia vapours and excess humidity from a buildup of manure and urine. For these reasons, it is important to keep your rabbitry clean and dry.

Cleaning Checklist:

- Clean the feeding and watering equipment daily.
- Clean the hutches and cages at least once a week.
- Cages should be brushed with a wire brush and disinfectant.
- Use a vacuum or a stiff bristle brush to remove loose fur on cages and other equipment.
- A mixture of vinegar and water may be used to remove calcium carbonate deposits (from urine), which build up on cage wire as a white coating.
- Soiled bedding should be removed daily and replaced with fresh bedding.
- Sweep the barn floor and dispose of any accumulated droppings and urine several times per week. If your hutch is outdoors, you may only need to do this every few months.
- Concrete floors should be scrubbed with a disinfectant as often as possible.
- Sanitize the equipment with chlorine bleach whenever your rabbit has had health problems or if you obtain second-hand equipment.
- Clean and check the ventilation system on a regular basis to be sure airflow is not reduced by dirt and debris buildup.

Uses for Rabbit Manure

Rabbit manure can be used in several ways including:

- **Raising worms** - Rabbit manure is excellent for raising worms. Worms will turn the manure into rich growing soil, which you can sell or use in your garden. A worm pit can be constructed directly under the cage. You can purchase composting worms, called red wigglers, from a worm supplier.
- **Composting** - Add rabbit manure to your compost pile. It can be used as mulch or composted in layers with other composting materials (leaves, grass, clippings, shredded paper, etc.). Roses love it and it is good to add to clay-type soils to help keep the soil loose.
- **Fertilizing** - Add directly to the garden straight from the rabbit. Rabbit manure will not burn your plants.

Ventilation and Temperature

One of the most important features in raising healthy rabbits is proper ventilation. This is necessary to provide fresh air, reduce humidity, dilute or kill airborne disease-causing organisms, and help control temperature. If the animals are in an area with a breeze, you may be able to rely on natural ventilation.

In enclosed buildings where temperature and humidity are controlled, the desirable combination is 15 - 24°C (59 - 75°F) and 30 - 40 per cent humidity. Ideally, ammonia levels should be less than 5 ppm. At a level of 20 ppm, a rabbit's respiratory health could be compromised.

Hot Weather

Rabbits can withstand cold weather better than hot weather and may die if they are exposed to extreme heat. The temperature in the hutch should not be higher than 25°C (77°F). In hot weather, provide the rabbits with shade and any possible breezes. On extremely hot days, place plastic bottles of frozen water in the cage. The rabbits may be beside the bottle to keep themselves cool. An electric fan can also help to circulate the air. Situate the fan so it does not blow directly on the rabbits.

Heat Stress

Heat stress will occur in rabbits when the environmental temperature rises above 25°C (77°F). Pregnant and nursing does, crowded or stressed rabbits (such as those travelling and in shows), lop-eared rabbits, obese rabbits, sick rabbits, and older rabbits will become heat stressed at temperatures higher than 25°C (77°F). The signs of heat stress are warm ears, rapid breathing, laying out flat, and not eating or drinking.

Heat stroke occurs when the rabbit cannot cool itself. Environmental temperatures over 35°C (95°F) will produce heat stroke. Heat stroke can occur at lower temperatures in susceptible animals. Heat stroke results in cell damage of all body organs and leads to organ failure and shock. Signs are similar to heat stress but proceed to staring blankly (a sign brain cell death has started), rapid breathing, diarrhea (intestinal cells are dying), and seizures. Once brain cell death is significant, coma and death occur.

Thankfully, this problem is completely preventable. You need to act before cell death occurs. With a little help, your rabbit can reverse the effects of heat stress. The best prevention is to control the environmental temperature. Make sure the area where the rabbits are housed doesn't get above 25°C (77°F) and measures are taken to decrease the temperature if it does rise higher.

Four ways rabbits lose heat:

1. **Conduction** - The rabbit can lay against a cool surface such as a cool ceramic tile or a frozen water bottle. This allows heat to transfer from the rabbit's skin to the cool surface. The frozen bottle will also form condensation on its surface providing some cool water for the rabbit to lick.
2. **Convection** - A fan can be used to circulate the air around the rabbit to help it lose heat. This will not work well if the air being circulated is too warm.
3. **Radiation** - This is the main mechanism of heat loss in rabbits. The blood vessels of the ear dilate and release heat. This can be efficient if cool water is placed on the ear. Cold water, ice, or alcohol will cause the ear blood vessels to constrict therefore not allowing the overheated rabbit to lose heat from its core. Lop-eared rabbits are less heat tolerant because their ears lay flat against the body and the surface available for heat loss is reduced.
4. **Evaporation** - Rabbits do not utilize evaporation effectively because they do not sweat or pant to lose heat. Breathing rapidly allows some heat to be lost from the lungs. It is recommended to make sure there is always fresh, clean water available.

Heat stress is worse when temperatures vary widely (spring and fall) and the rabbit hasn't had time to acclimate. The rabbit's body will make changes by becoming more efficient at conserving water and the heart will increase blood flow to the surface of the body. This process takes some time to work properly.

If a rabbit recovers from heat stroke, it will have further problems with temperature regulation. This will make it much less heat tolerant if exposed to hot temperatures in the future.

Wet Weather

In cold weather, protect your rabbits from wind, rain, sleet, and snow. Rabbits can tolerate low temperatures and excessive cold, but wet and drafty conditions weaken their resistance to disease. Place the hutches where rain will not enter the cages and get the rabbits wet. Rabbits require increased feed in cold weather; rabbit owners should monitor rabbit body condition during long periods of cold weather.

Code of Practice for the Care and Handling of Rabbits

Canada's National Farm Animal Care Council released the first ever *Code of Practice for the Care and Handling of Rabbits* in 2018. A link to the code of practice can be found at the end of this manual.

The code of practice is nationally developed guidelines for the care and handling of rabbits. It serves as the foundation for ensuring rabbits are looked after by providing sound management and welfare practices that promote rabbit health and well-being. The code is used as an educational tool, reference material for regulations, and the foundation for industry animal care assessment programs. 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 management provided by the person(s) responsible for the daily care of rabbits has a significant influence on the rabbits' welfare. Those responsible for rabbits must consider the following key aspects of responsible rabbit care:

- Shelter and comfort
- Feed and water to maintain health and vigour
- Social needs of rabbits
- Humane handling
- Disease prevention and control
- Veterinary care, diagnosis, and treatment
- Timely euthanasia of any rabbit not responding to treatment or experiencing pain that is not relievable
- Emergency preparedness

The scope of the code is on-farm. It is focused on rabbits raised for meat and 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. Follow the link at the end of this manual for information on the code of practice for animal care during transport.

Handling a Rabbit

Frequently and properly handling a rabbit usually results in the animal becoming gentle, manageable, and unlikely to scratch when picked up. Rabbits should be handled to examine them for diseases and injuries, or to move them from one hutch to another. You will also need to handle your rabbit when it is entered in a rabbit show. Practice picking up and handling your rabbit regularly and both of you will be far more comfortable when it is show time.

Removing a Rabbit from its Cage

Rabbits tend to struggle when you try to remove them from their cages. You have more control over the rabbit if you remove them from the cage as if you were picking them up to carry them. Remove them feet first while supporting their hind end. Once you have them out of the cage, tuck them safely under your arm.

Be very careful when you are bringing them out that their toes do not get caught in the cage wire. A caught foot or toe could lead to serious injury.

DO NOT lift a rabbit using its ears or front legs. They are not strong enough to support the rabbit's weight.

Carrying a Rabbit

There are several different ways to carry rabbits. Select the best method based on the size and temperament of your rabbit, as well as your size and strength.

Make sure you always keep a firm hold on your rabbit in case it suddenly tries to get away. This can be done by grasping the loose skin over the rabbit's shoulders. If your rabbit does not have sufficient loose skin, or if it has a delicate hair coat, you can grasp the rabbit by its shoulders to avoid discomfort and/or coat damage.

The rabbit's ears should also be tucked into your hand (if they are long enough) to help you maintain control over the head. Be sure not to pull their ears, just lightly hold them in your hand.

Carrying Method 1

- Grasp the rabbit's ears and the skin over its shoulders in your right hand.
- Place the rabbit's feet down on your left arm.
- Support the rabbit's hindquarters with your left hand.
- Tuck the rabbit's head under your left elbow; this helps keep the rabbit calm.

Carrying Method 2

- Grasp the rabbit's ears and the skin over its shoulders in your right hand.
- Place the rabbit's hindquarters down on your left arm close to the elbow.
- The rabbit's feet should be sticking out under your left arm and its face should be buried in your armpit.
- Support the rabbit's back with your left hand.

Flipping a Rabbit Over

It is important to learn how to flip your rabbit over so you can trim its toenails and check its teeth. You will also be expected to turn your rabbit over if you show your rabbit to demonstrate your handling ability to the judge. Follow these steps to safely flip your rabbit over.

- Start with the rabbit facing left and sitting on the table.
- Grasp the rabbit's ears and the skin over its shoulders in your right hand.
- Reach your left arm in front of the rabbit's body and place your hand on its rump.
- Use your right hand to lift the rabbit's front end. At the same time use your left hand to slightly lift and roll the rabbit's hind end under. The rabbit should be sitting on its rump.
- Continue to lower the rabbit until it is lying on its back on, or beside your right arm.
- Continue to keep a firm grip on the shoulders and ears.

Grooming

Regular attention and grooming is an important part of keeping your rabbits healthy. The following information will give you the basics of proper grooming for rabbits.

Trimming Nails

Nail trimming is a necessary part of rabbit care and will be easier if you do it on a regular basis. Long nails can get caught in wire floors and can result in a torn nail or even a broken/dislocated toe. Sometimes the nail will not grow back if the damage is too severe.

How to Trim a Rabbit's Nails:

1. **Gather your supplies**—Trimmers, towel, cotton swabs, a small flashlight and something to treat the nails if you accidentally cut a nail too short.
2. **Find a helper**—If possible have them hold the rabbit gently but firmly. They can swaddle the rabbit in a towel to keep the rabbit calm and restrained.
3. **Trim the tip of the nail**—If you trim too much, you will hit the quick and the nail will bleed. A light can be used to show where the quick is in dark-coloured nails.
4. **Tend to any bleeding nails**—Wipe any blood away with a cotton swab and quickly place a pinch of a product such as blood stop, cornstarch, or flour on the end of the nail and gently pack it. When applying the clotting agent to a bleeding nail, apply light pressure until the bleeding stops. Applying pressure alone will also stop the bleeding but it will take longer. Cutting the nail too short is scary, but it is common, so do not feel bad if it happens and don't panic. Make sure the bleeding has stopped before leaving the rabbit unattended.
5. **Trim the remaining nails.**

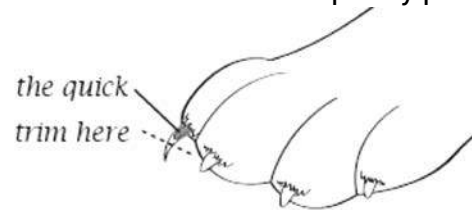


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If your rabbit is struggling when trimming the nails, take a break between feet so it does not panic and hurt itself. It is better to trim the nails regularly and a little bit each time than to try to trim off many occasionally. Always restrain the rabbit correctly, supporting and holding the hindquarters.

Shedding

On average, rabbits shed every three months, sometimes lightly and other times heavily. Rabbits are very clean animals and will lick themselves. Like cats, rabbits can get hairballs if they ingest too much hair. Rabbits are not able to vomit the hair, which can cause serious stomach issues. Therefore, the best prevention is to brush rabbits weekly. During heavy shedding, daily brushing may be necessary. Always brush in the direction of the fur, and do not brush too hard. Be careful not to hurt the rabbit! Use a pin brush for basic brushing, and a wide-toothed comb for rabbits with long fur. For longhaired rabbits, scissors can be used to trim the hair, so it is 1 inch (2.5 cm) or shorter in length.

A slicker brush is recommended to properly groom rabbits. Brush opposite to the rabbit's hair growth in an upward direction away from the skin. The slicker brush has wire pins that are bent so you won't scratch the skin. They are not designed to be used on the skin. Pay special attention to the chest, under the neck, around the tail, and back feet. These are the common areas where mats can form.

Spot Clean

Generally, baths are not recommended for rabbits as they can be extremely stressful. Remove stains by rubbing with a little white vinegar on a washcloth. For stubborn stains, try brushing in a whitening detergent or hydrogen peroxide followed by household cornstarch. Stains are especially common on the feet or the underside of the tail. Be sure to thoroughly rinse any soaps or chemical products out so your rabbit does not ingest them and become sick. Always make sure your rabbit is completely dry before you return it to the cage so it does not get chilled.

Stains occur most often because of dirty cages. If you notice your rabbit is developing stains, clean the cage more often or look at the cage's design to see if that is the problem.

Rabbits have scent glands on either side of the anus that sometimes build up a hard, dark-coloured material. You can carefully soften this with lukewarm water to soak the material loose. The skin is very delicate so do not try to pull the material out.

Traceability and Identification

In Nova Scotia, farmed rabbits fall under the Nova Scotia Premises Identification (PID) program.

Farmed-rabbit owners should apply for a PID number. This is a unique number, based on national standards, that is assigned to a premise. Each premise will be issued a single premises identification number, regardless of the number of animal types or premise types on that parcel of land. Either the owner or renter of a land location may apply for a PID for a location. Land ownership must be indicated on the application.

A premise is defined as a parcel of legal land where animals are grown, kept, assembled, or disposed of. Premises include farms, hobby farms, stables, feedlots, pastures, hatcheries, egg-grading stations, abattoirs, assembly yards, auctions, sale facilities, rendering plants, zoos, petting farms, fair grounds, race tracks, competition facilities, and veterinary facilities, etc.

Benefits of the PID program include the ability to

- Notify premise owners of disease outbreaks in their vicinity and recommend biosecurity precautions
- Determine which species are near a disease outbreak
- Respond in a rapid and informed manner when emergencies occur
- Address all phases of emergency management (preparedness, prevention, response, and recovery)
- Reduce the impact of marketing restrictions by enabling quicker resolution of emergency situations

You can find the application form to apply for a PID on the website listed under additional resources at the end of this manual, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

NOTE

For more information on traceability, see the information sheet in the appendix at the end of this manual.

Identification

Learning to tattoo a rabbit is an important and necessary management skill. Tattooing gives the rabbit its identity. It is the best way to keep accurate records, especially if you are breeding rabbits and completing pedigrees. The best age to tattoo a rabbit is when it is ready to be weaned, which is at six- to eight-weeks old.

How to Tattoo a Rabbit:

- Put numbers and/or letters in the tattoo pliers.
- First, tattoo a piece of cardboard or paper to make sure the tattoo is correct.
- Restrain the rabbit in a tattoo box or wrap it firmly in a towel. Rabbits can easily suffer back injuries if the pain of the tattoo pliers causes them to react.
- Expose the left ear and clean it with a cotton swab soaked in alcohol.
- Place a plastic baggy filled with ice on the ear to freeze the area.
- Carefully tattoo the smooth part of the left ear with the tattoo pliers. Be as gentle as possible.
- Press the tattoo ink into the holes. You can use a new pencil eraser to press the ink in.
- Rub a small amount of Vaseline over the tattoo and wipe off the excess with a clean tissue.
- Keep a record of the rabbit's sex, breed, and tattoo number.

Pay close attention to the tattooed ear for about 10 days, making sure it does not become infected. Some breeders are now using a new pen tattoo combined with Xylocaine gel. This method is much safer and the rabbit feels no pain.

Section 3: Nutrition

Feeding and Nutrition

Feed, whether grown at home or purchased, accounts for the most significant cost in raising any animal. It is necessary to learn the fundamentals of nutrition and to study the appetite and feeding habits of each animal to provide the proper type and amount of feed. A caged rabbit cannot forage and select its diet like a wild rabbit does. It is up to you to supply your rabbit with a proper diet.

Digestion

Rabbits have a unique digestive system that allows them to absorb important nutrients from materials that are indigestible to many other animals. After a rabbit ingests food, the food travels down to the rabbit's stomach and enters the small intestine, which absorbs many nutrients from the food. However, not all of the nutrients can be absorbed, and the food needs to be broken down further. The undigested fibrous material leaves the small intestine and is sorted into digestible and indigestible fibre.

The indigestible fibre has no nutritional value; it enters the colon and is excreted in a pellet form. In comparison, the digestible fibre enters the cecum where it is broken down further by bacteria. The bacteria of the cecum make it possible for the rabbit to get nutrients from fibrous material that it otherwise would not be able to break down.

The material from the cecum is passed by the rabbit as small, soft pellets called cecotropes. The rabbit re-ingests these nutrient-rich pellets and the small intestine further absorbs any nutrients. This practice is known as coprophagy.

Nutrients

The term "nutrient" refers to any chemical compound (natural or human-made), or a group of compounds of the same general chemical compositions, that help to support animal life. The primary nutrients from food that are required by all animals are carbohydrates, fats and proteins.

Minerals and vitamins are important for body functions and are classified as secondary food nutrients. Water and air are considered nutrients as well, but they are obtained primarily from sources other than feed.

Carbohydrates

These are complex substances that contain only carbon, hydrogen, and oxygen. The latter two are always in the same proportion as water: two hydrogen molecules for every oxygen molecule. Carbs are used to produce heat, energy, and fat in an animal's body. Common carbohydrates are starch and sugar. Good sources of carbohydrates are oats, barley, wheat, corn, roughage, and molasses.

Fats

These complex substances also only contain carbon, hydrogen, and water. However, the proportions of carbon and hydrogen are much greater in fats than in carbohydrates. Any excess amount of fat is stored in the rabbit's tissues. Fat is found in small quantities in common grains such as oats, barley, and wheat. Flax seed and soybean seed are high in fat while roughage has a very low-fat content.

Protein

Protein is composed of chains of amino acids. While rabbits do not require high amounts of it, protein is essential for growth and reproduction. Rabbits should be fed a plant-based protein, which can be found in commercial feed, alfalfa, or vegetable oil.

Minerals

The four minerals of the greatest importance in livestock feed are sodium, chlorine (combined in common salt), calcium, and phosphorus. Other commonly utilized minerals are iron, iodine, cobalt, sulphur, and copper.

Minerals have many uses and help body processes function properly. They aid in digestion, muscle action, and manufacturing of blood and bone. Minerals are stored in a rabbit's skeleton and soft tissues.

Plant materials and rabbit pellets both contain minerals. If you feed your rabbit a balanced diet, there likely will be no need for a mineral supplement. If you notice a deficiency in your rabbit, try to identify the lacking mineral and add it to their diet using fresh foods or a mineral block. Be alert to the fact that most mineral supplements do not contain all the essential minerals. Make sure you know what the supplement contains before you feed it to your rabbit.

Vitamins

Vitamins are known as accessory food substances. They are identified by letters and the vitamins A, B, and D are commonly required by rabbits.

Vitamins regulate growth processes, assist in digestion, and help disease prevention.

Vitamin A promotes health and growth. It is found in green grass, carrots, milk, well-cured legume hay, yellow corn, and cod liver oil.

Vitamin D is known as the sunshine vitamin. It is important for growing animals, more particularly during the winter months. A lack of vitamin D can cause a disease known as rickets. Milk, grasses, and well-cured hays are good sources of the vitamin D.

Water

All vital processes of the body demand water. It is used in digestive processes and in the removal of wastes from the body. Keep plenty of fresh water in front of your rabbits at all times. This is the cheapest and most essential feed required by all animals.

Classes of Feed

Feeds can be classified into three main groups - Concentrate Feeds; Dry Roughage Feeds and Succulent Feeds.

Concentrate Feeds

The concentrate feeds include farm grains, mill feeds, and manufactured supplements. They are low in fibre and high in digestible nutrients. Some of the common concentrates are oats, barley, wheat, wheat bran, corn, dried beet pulp, linseed meal, fish meal, and soybean meal.

Many different brands of rabbit pellets are available on the market. There are two types of pelleted diets: an all-grain pellet to be fed with hay, and the complete pellet, which already contains hay. A complete pellet rabbit ration from a reputable feed company usually supplies the right amounts of protein, energy, fibre, minerals, and vitamins to meet your rabbit's needs.

Dry Roughage Feeds

Dry roughage feeds include hay and straw. These feeds are high in fibre but low in digestible nutrients. If a rabbit is only fed dry roughage, it will require large quantities of the feed to sustain life. Dry roughage includes alfalfa hay and clover hays (high in protein) as well as mixed hay and timothy hay (lower in protein). These hays differ considerably in their content of protein, carbohydrates, minerals, and fibre.

For your rabbits, choose hay that is fine stemmed, leafy, green, well-cured, and free from mildew or mold. Select the type of hay based on what else you are feeding. If you are feeding a high-protein pellet, you may choose to feed a lower-protein hay to keep the diet balanced. Fibre is essential in maintaining proper gut motility.

During moulting periods, increasing the fibre content helps pass hair through the intestinal tract and decreases hairball formation.

Succulent Feeds

Succulent feeds are feed in the green stage, such as green grass and vegetables. Fresh green feeds and root crops should only be used as supplements or treats as they are primarily composed of water. Succulent feeds should be added to the diet slowly because they can contribute to diarrhea. Some succulent feeds, such as cabbage and beans, may also cause gas. Succulent feeds are good sources of vitamins and minerals, but it is important to carefully monitor the type and amount you feed to your rabbit.

Feeding Program

When designing a feeding program for your rabbit ensure that:

- All feeds are high in quality for maximum digestibility
- A variety of feed is provided to supply adequate protein, carbohydrates, fats, minerals, and vitamins
- Your feeding program is economical
- You consider the individual needs of your rabbits

Some rabbits may have special nutritional requirements you will need to consider when designing a feeding program. For example, fibre breeds have higher protein requirements than most other breeds. You may need to include extra protein in their diet by using a high-protein pellet or by adding a high-protein hay, such as alfalfa.

Pellet Purchasing Tips

- **Buy feed designed for rabbits**—Rodent feed may not contain all the nutrients a rabbit requires.
- **Purchase feed in small quantities**—If you only have a couple of rabbits, purchasing feed in small quantities helps to ensure the feed will not go stale.
- **Purchase pellets that will fulfill the protein requirements of your rabbit**—Rabbit pellets are usually classified by protein content.
 - Maintenance: 12% protein
 - Growth (babies and market animals): 16 % protein
 - Pregnancy: 15 % protein
 - Lactation: 17 % protein

Avoid feeds with unnecessary additives, such as colour, dried fruit, and nuts.

How Much to Feed?

There are two common methods of feeding.

1. Full or Self-Feeding

To self-feed, place several days' worth of feed in the rabbit's dish and it will eat whenever it is hungry. Self-feeding is recommended for pregnant and lactating (nursing) does, young litters, and market animals. If feed is always available, the rabbits will increase their food consumption to keep up with their high-energy requirements. Dishes should be regularly checked to ensure there is a sufficient amount of feed available.

2. Managed Feeding (Limited feeding)

Place a measured amount of feed in the feed troughs each day. This method is recommended for feeding dry does, adult bucks, and breeding stock. The rabbit's daily intake is restricted so the rabbit is less likely to become overweight. Also, daily feeding is an excellent opportunity to inspect your rabbit and ensure it's in good condition.

Like humans, each rabbit will have unique nutritional requirements. Generally, rabbits require $\frac{1}{4}$ to $\frac{1}{2}$ cup (85 -170g) of pellets per 6 lbs (32.7kg) of body weight, as well as some hay and vegetables. If hay and vegetables are not provided, more pellets will be required. It is important to handle your rabbit regularly to determine if it is over- or underweight. Adjust the amount of feed as necessary to maintain correct conditioning.

Changing Feeds

From time to time, you may have to switch from one brand of feed to another because the current feed has become unsatisfactory (unavailable, poor quality, high price, etc.). An instant change in feed is likely to result in digestive upset in your rabbits. Feed should be changed slowly by mixing old feed with new over a period of at least one week. The first day, start out with a mix of 90 per cent old feed and 10 per cent new. Every following day reduce the percentage of old feed by approximately 20 per cent while increasing the percentage of new feed until it is 100 per cent new feed.

Body Condition Scoring

Body conditioning scoring (BCS) is a method of assessing the amount of fat and muscle cover on an animal. In order to do a proper BCS on any animal, hands-on palpation and visual assessment techniques should be used. The table below can be found in the *Code of Practice for the Care and Handling of Rabbits* (2018).

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 and not sharp; no abdominal bulge; rump area is flat
4. Overweight	Pressure is needed 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

Section 4: Health

Raising Healthy Rabbits

Your best medicine is prevention when raising rabbits. This means that you remove things that could cause your rabbit problems before any issues arise.

You alone are responsible for your rabbit's health. Poor feed, feeding practices, and management—such as filthy cages—will result in sick animals. Diseases in rabbits can almost always be attributed to faulty husbandry.

To protect a rabbit's health, keep all equipment sanitary. Remove manure, soiled bedding, and contaminated feed from the hutches daily. Wash watering and feeding equipment frequently in hot soapy water. Rinse in clean water, drain well, and dry.

If you manage your rabbits well and keep a clean rabbitry, you can substantially minimize any problems with disease. Nonetheless, it is useful to know the signs of common health problems so you can address the issue and treat the rabbit as quickly as possible.

Stress

While stress is not a disease, it is a contributing factor to many health problems among rabbits. The effects of stress leave rabbits susceptible to disease. Young animals seem to tolerate and recover from stress better than older ones. Stress is a pressure or strain caused by an adverse force. It may come from external sources or from inside the rabbitry. Early signs of stress can be difficult to detect and stress may have a number of causes.

1. **Environmental** - Transporting your rabbits, changing their pens, overcrowding or making other changes to their habitat, can cause stress. Climate changes, temperature, humidity, and drafts are also environmental factors.
2. **Physiological** - Anything that upsets the function of the rabbit's body, such as pregnancy, kindling, lactation, changes in diet, as well as clinical causes, like illness, injury or infection, can cause stress.
3. **Inherited** - Nervousness in reaction to noise, new handlers, and strangers may be an inherited trait.

Practice the following precautions for a trouble-free operation:

- Regularly clean cages and feeding utensils.
- Disinfect cages before restocking with healthy rabbits.
- Isolate all newly purchased rabbits and those returning from shows for about a month from the rest of the herd.
- Supply your rabbits with fresh food and drinking water.
- Keep the rabbitry adequately ventilated and the rabbit cages quiet and comfortable.
- Make sure the rabbit houses are free of vermin, and cannot be entered by other animals and predators.

If you suspect disease, take the following precautions immediately:

- Isolate affected rabbits.
- Clean and disinfect all infected cages.
- Consult a veterinarian.
- Prevent people from visiting your rabbits until the health issues resolve.
- Do not remove a sick rabbit from your property.
- If you have more than one rabbit, feed and handle the sick one last.
- Wash your hands and clothing after handling a sick rabbit.

Examining the Rabbit

Rabbits should be thoroughly examined from one end to the other when looking for any health problem. Do not stop at the first abnormal sign that you notice. Many diseases have similar signs and it is only after you know all of the signs that you can accurately identify the health issue. You may also find it helpful to record your observations on a note pad in case you need to call a veterinarian or other knowledgeable person.

1. **Observe the rabbit from far away** - Watch how the rabbit is resting. Is it in its normal position? Is it moving abnormally? Does it appear to be in any discomfort? Is it doing any kind of repetitive movement, such as scratching at some area on its body, tilting its head to one side, etc.?
2. **Move up closer and observe again** - Is its respiration rate normal? Listen carefully to the breathing. Does it sound normal? Do you hear fluid in the lungs or congested breathing like a sinus problem?
3. **Look around** - Examine the cage and the floor beneath it. Are the droppings normal? Are there any signs of diarrhea? Is there leftover feed in the feeder?

4. **Remove the rabbit from its cage** - Place the rabbit somewhere convenient to examine. Begin at the head and carefully check the animal all over.
5. **Look at the head** - Are the eyes bright and shiny or are they dull and lifeless looking? Is there a discharge from the eyes or nose? Does the mouth look normal? Do the rabbit's teeth meet correctly? Are the ears in their typical position? Feel the base of the ears. Does the rabbit flinch when you handle the ear? Look inside the ears for signs of ear mites (crusty brown discharge coating the inner surface of the ear).
6. **Look at the fur coat** - Are there areas of missing hair? Are there any rashes or areas of dry skin? Are there any sores or abscesses? Does the coat feel soft and supple or is the skin hard or tight feeling and the hair dry and lifeless?
7. **Look at the feet and legs** - Check for missing claws that might be infected, sores on the feet and legs, and bent or abnormal-shaped legs.
8. **Look at the underside** - Turn the rabbit over and examine its body. If it is a nursing doe, check the mammary system for any signs of mastitis or congestion (hardness, redness and swelling). Check the external sex organs to be sure there are no rashes, sores, scabs, or infections.
9. **Take the rectal temperature** - Normal temperature is between 38.6°C - 40.1°C (101.5°F - 104.2°F).

If you don't find any signs of disease and your rabbit still seems sick, call an experienced breeder or veterinarian to come and have a look.

If you do find some signs of sickness, check the disease and health problem charts you'll find in the next sections to see if you can match the symptoms to a disease. It is a good idea to consult a veterinarian or experienced breeder before you begin treating your rabbit. You may have misdiagnosed the disease and your rabbit wouldn't receive the proper treatment. The wrong medicine is the same as no medicine.

Signs of a Healthy Rabbit

It is important to learn how to recognize the appearance and behaviour of healthy rabbits. You should always be on alert for anything abnormal as this could be a sign of disease or stress. Early recognition of health problems will help you treat the rabbit in a timely manner. Also, you may be able to quickly isolate the sick animal before the disease has a chance to spread.

The following chart will help you recognize what is normal for a rabbit. However, you know your rabbit best and will know when it is happy and acting normally and when it appears sick.

	Healthy	Unhealthy
Eyes	Clear and bright	Dull, cloudy, runny
Nose	Clean (no-discharge)	Nasal discharge or mucous
Ears	Clean with smooth skin inside	Crusty or scabby
Head	Held straight and upright	Tilted to one side
Coat	Smooth, shiny	Dry, dull, patchy hair
Skin	Soft and supple	Dry, tight, hard
Feet	Well furred, straight toes, unbroken claws	Patchy fur on feet, sores or redness on pads, crooked or broken toes and claws
Temperature	38.6°C - 40.1°C (101.5°F - 104.2°F)(rectal)	Above or below the healthy range
Respiration	35 -60 breaths per minute	Noticeably slow/fast (except during exercise)
Droppings	Hard and round (except for cecotrophes)	Soft and runny
Appetite	Normal	Does not eat
Thirst	Normal (2 - 3.4 oz/lb/day) (50 - 100 ml/kg/day)	Does not drink at all or drinks excessively
Behaviour	Alert	Listless

Now that you know how to recognize if a rabbit is unwell, the next step is to try to identify the exact problem, treat it, and take steps to eliminate the cause.

It is not always possible to identify the problem by examining a live animal. Sometimes we don't find out an animal has a problem until it has died. If an animal is found dead without an apparent cause, you can have a post mortem performed to find out why it died. Post mortems can be performed at a veterinarian's office or one of the Department of Agriculture's Veterinary Services Laboratories. The cost of this service is expensive, but the lab can often report a diagnosis within two or three days. You can then use this information to decide what action must be taken to protect the rest of your rabbits.

The following is a list of the most common rabbit diseases and health problems, as well as their causes and treatments.

Parasites

Parasites are a common internal and external problem in rabbits. Rabbits can be plagued with a host of parasites, which may go unnoticed for extended periods of time.

Often, the only indication there may be a parasite problem is that the animal is not gaining weight, has runny stools, or has a dull fur coat.

The best course of action against parasites is always prevention through proper sanitation management practices.

Common Rabbit Parasites

Condition	Cause	Symptoms	Treatment
Ear mites	Infestation	Brownish scabs in the ear canal. Scratching ears and shaking head.	Treat with an oral or topical insecticide. Repeat treatments may be needed.
Fur mites	Fur mites are most likely found on the back and neck. They do not burrow into skin.	Reddened scaly skin, intense itching and scratching with some loss of hair.	Treat with an insecticide. Some cat flea products may work. Thoroughly clean the rabbitry.
Lice	Sucking louse	Flaky skin along the back, sides, and perineum; nits attached to hair.	Treat with an insecticide and remove nits. Thoroughly clean the rabbitry.
Intestinal worms	Various types of worms (pin worms, tape worms, etc.).	Rabbit has poor condition and slow growth rate. Occasionally may see worms in droppings.	Consult a vet on what type of dewormer to use.
Coccidiosis	Microscopic protozoan parasites that attack the liver and the intestinal lining.	Diarrhea, weight loss, pot-bellied, poor condition. Can lead to death.	Use a coccidiocide on a regular basis. Prevent through proper sanitation.
Warbles	Botfly	Swelling or isolated lump around the shoulders.	Parasite must be removed. Seek veterinary assistance.

Encephalitozoonosis	Encephalitozoon cuniculi – protozoan parasite that infects the kidneys, nervous system and eyes.	Increased drinking/urinating, wry neck, paralysis, seizures, cataracts, hutch burn, and weight loss.	No cure. Antiparasitic drugs to control. Prevention is best as spores are passed in urine.
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General Conditions

Rabbits are susceptible to a great variety of conditions brought on by an equally great variety of causes. The lists of causes, symptoms, and treatments below should not be viewed as complete. If you suspect your rabbit is experiencing health problems, do further research or consult a professional before beginning treatment.

Condition	Cause	Symptoms	Treatment
Sore hocks	Thin fur covering on feet, long toenails, or rough cage floor. Wire floors.	Loss of fur on bottom of feet. Red, dry, ulcerated foot pads. Rabbit may be reluctant to walk.	Provide a solid and clean surface in the cage for rabbits to rest on. Use antibiotic ointment.
Ring worm	Fungal infection that can be transmitted to other animals and to humans.	Crusty, circular patches on the rabbit's face or feet. Hair loss.	Treat rabbits with fungicidal cream or lotion. Disinfect the rabbitry.
Hutch burn	Poor sanitation and wet cages. Splash of urine from incorrectly placed urine guards.	Chapping and inflammation of the genitals.	Apply antibiotic cream. Ensure proper sanitation.
Pneumonia	Bacterial infection of the lungs. Can be a symptom of high ammonia exposure.	Quick, laboured breathing with nose held high. Blush colour to lips and ears. Lungs congested.	Antibiotics effective if administered early. Rabbits often relapse with pneumonia.

Abscesses and boils	Various bacterial infections.	Lumps occurring under the skin.	May break and drain naturally. Consult veterinarian.
Malocclusion	Inherited condition. May be due to tooth breakage.	Elongated upper/lower teeth. Can prevent the animal from eating.	Clipping teeth is a temporary solution. Affected animals should be culled.
Enteritis (Several forms)	Caused by various types of bacteria. May also be related to diet.	Severe diarrhea, dehydration, and death.	Minimize stress and feed a high-fibre diet. Some success treating with tetracycline.
Weepy eye	Inflammation of the conjunctiva. Usually due to a blocked tear duct.	Discharge from the eye. Matted fur around the eye.	Eye drops, consult veterinarian for type. Help may be needed to open eye duct.
Pasteurellosis 1. Snuffles 2. Hemorrhagic septicaemia 3. Abscesses	Seems to be further induced by stress.	1. Sneezing, nasal discharge, poor condition, difficulty breathing. 2. Commonly seen in fryers. Pot-bellied, diarrhea, respiratory distress. 3. Lumps around the head/neck. 4. Wry Neck (torticollis) is a symptom of Pasteurella infection in the middle ear.	1. Reduce stress, improve ventilation, administer antibiotic to prevent secondary infection. Cull infected rabbits. 2. Same as above. 3. Drain abscesses, treat with antibiotics. Cull from herd. 4. Treat with long-term antibiotics. Cull from herd.

Breeding and Pregnancy-Related Conditions

Condition	Cause	Description	Treatment
Metritis	Bacterial infection of the uterus.	Low conception rate. Failure to produce milk.	Treat with antibiotics and hormones. Seek veterinary assistance.
Vent disease	Spirochete organism spread through mating.	Scabby inflammation of the genitals. Refusal to mate. Can cause lesions around nose/lips. Abortion.	Penicillin. Always check animals for infection before mating.
Caked breast	Milk not drawn from mammary glands as fast as it is formed. Often leads to mastitis.	Breasts become swollen, hard, and painful.	Monitor feed consumption. Withhold concentrates, especially if the litter dies. Strip milk from glands.
Mastitis	Bacterial infection of the mammary system. Normally occurs just after kindling or weaning.	Mammary system is swollen, red, hard, hot, and painful. If untreated, milk production will stop and litter will die.	Treat doe with antibiotics. Strip the glands free of milk. Apply a hot pack several times a day.
Ketosis (Pregnancy toxemia)	Sudden breakdown of fat in overweight or malnourished does just after kindling.	Sudden death.	Seek professional assistance. Maintain condition of breeding stock. Provide a nutritionally complete diet during pregnancy.

Administering Medications

Keep in mind it takes a lot of time and experience to be able to recognize and correctly diagnose diseases. Do not hesitate to seek the help of an expert if you suspect your rabbits are ill. It is especially important to consult your veterinarian when purchasing and administering medications. The wrong type or dosage of medication can do a lot of harm, so always be sure to double check.

Orally (liquid form)

Method 1

- Gently grasp the rabbit by its ears and the skin of its shoulders.
- Tip the rabbit back and slide your other hand under its haunches at the same time. Let the animal lean against you as if you were checking the sex.
- Tip the rabbit's nose up. Gently press the jaws apart with your thumb and forefinger.
- Place the medicine well back on the tongue.
- Allow the rabbit to close its mouth and then gently stroke the chin until it swallows. Liquid medication can be given using a plastic eyedropper.

Method 2

- Sit down and place the rabbit on your lap.
- Have the rabbit's hind end against your body and hold the head with your fingers under the chin and your thumb between the eyes and ears on top of the head. Be careful that your fingers are not around the neck.
- Insert syringe or dropper behind front teeth and give medicine in small increments.

Orally (pill form)

For medication in pill form, split a raisin and hide the pill in the middle.

Injection

There are three types of injections:

1. Intramuscular (IM) – Given in the muscle

IM injections should be given in the quadriceps, thigh, or lumbar muscles. The needle should be inserted into the muscle. Care should be taken to make sure the needle is actually inserted in the muscle and not just under the skin. You should pull back on the plunger to make sure the needle has not been inserted into a blood vessel; blood will appear in the syringe if you have. The medication should be slowly injected into the muscle. A 1 inch needle (2.5 cm) is recommended for IM injections.

2. Intravenous (IV) – Given in the vein

Sometimes IV injections are necessary to get medicine directly into the bloodstream for a quick response. These are given in the jugular vein. Most people rely on veterinarians for this type of injection.

3. Subcutaneous (SQ, Sub Q) – Given under the skin

SQ injections should be given over the shoulder area. An SQ injection is given by making a “tent” with the skin and injecting the solution under the fold of the skin parallel with the muscle. The medicine should be slowly injected. A $\frac{3}{4}$ or 1 inch needle (1.9 or 2.5 cm) should be used.

For thin solutions, such as vaccines, a 21 - 23-gauge needle should be used. For thick solutions, such as penicillin, an 18 - 21-gauge needle may be used. Use the smallest possible gauge needle when giving injections. A clean needle should be used each time when drawing medications or vaccines from a bottle. No more than 5cc should be injected at any one site. Each time you administer any form of medication, you should keep a record of it. Withdrawal times should be strictly adhered to.

Biosecurity

It is important to practice good biosecurity as the potential for disease outbreak can pose serious threats to your rabbits' overall health and longevity. Biosecurity is a system of best management practices that are put in place to reduce the introduction of disease. Biosecurity implementation could include screening measures for new or returning visitors/animals/equipment and/or creating an area of isolation for new/sick rabbits.

There are three main sources for health threats to a rabbitry:

1. Physical transfer from visitors
2. Biological transfer from new, sick, or contaminated rabbits
3. Transfer from equipment, supplies, or machinery

A good rabbitry operator will take several steps to prevent the transmission of contagious diseases. These steps include the following:

Isolation - Prevent close contact between sick rabbits, newly purchased rabbits, and rabbits that have been away at a show.

- Sick rabbits should be housed in a separate section of the rabbitry, away from all other rabbits. If a rabbit dies, immediately remove the dead rabbit for disposal and thoroughly disinfect its cage. If possible, leave the cage unoccupied for three to four weeks. Feed and handle sick animals last.
- Newly purchased animals should be kept separate for three to four weeks and watched carefully for signs of disease.
- If you compete in a lot of shows, you might want to keep a small rabbitry separate to house frequently shown animals. Look after the rabbits that stay at home first before you tend to any rabbits that leave your property.

Handling practices - Always handle sick animals last to prevent the spread of disease. Also handle younger rabbits before handling older animals. Adult rabbits are more likely to have developed immunities/tolerances to diseases.

Traffic control - Keep your rabbitry secure from unauthorized visitors. Any visitors should wear clean clothes, sanitize their footwear, or wear foot covers. Limit traffic near your rabbitry and consider sanitizing vehicle tires that have been to farms/rabbitries.

Sanitation Maintenance

Sanitize new equipment and cages that may have been in contact with other rabbits. Clean off organic matter such as feces and hair. Allow for proper drainage of urine and excessive water that may harbour disease. Remove manure and other debris that builds up under the cages. As a post-clean up measure, spread hydrated lime under the cages to reduce odour. Hydrated lime also allows the manure/hay to decompose quicker.

1. **Hygiene** - Wash your hands, clothing, and footwear after visiting another rabbitry. Use latex or rubber gloves when handling sick rabbits.
2. **Control Pests** - Barn flies, rodents, and parasites can all be methods for spreading disease.
3. **Observation** - It's a good practice to observe rabbits when they are healthy so you notice any changes that may indicate when a rabbit is ill. Become familiar with disease symptoms to insure a quick response to isolate and and deliver treatment if rabbits become sick.

Note: For more information on biosecurity and tips for keeping your animals safe and healthy view the *Biosecurity for Small Scale Livestock Production* factsheet in the appendix of this manual.

Section 5: Breeding

Rabbit breeding can be an interesting and rewarding hobby and even a profitable business. Before you breed rabbits, make sure you have a thorough understanding of proper breeding and husbandry techniques. You should never breed rabbits unless you have an arrangement in place for the babies. There are only so many homes for the rabbits you do not need. Do not breed more babies than you can take care of.

The actual age to start breeding rabbits depends on their breed. Smaller breeds sexually mature more quickly and can mate at an earlier age than larger rabbits. On average, smaller breeds can be bred when the bucks and does are five to six months old. Medium-weight breeds, such as New Zealands, can be mated at six to eight months, and giant breeds at eight to twelve months.

Selecting Rabbits to Breed

The most important thing to consider when you are selecting rabbits to breed is that they are healthy. Be sure to thoroughly inspect both the buck and the doe for signs of poor health and disease. Do not breed rabbits that are sick or have heritable conditions. Rabbits to be used for breeding should be in prime physical condition. Over- or under-weight does may have considerable problems with conception and pregnancy.

The key to successful rabbit production is to use a good breeding program that chooses bucks and does based on their pedigree and performance records.

There are four types of breeding programs:

1. Outcrossing
2. Crossbreeding
3. Line breeding
4. Inbreeding

No matter which breeding program you choose, select breeding rabbits whose ancestry has evidence of good productivity and good genetics. Both members of a breeding pair should have desirable conformation and characteristics that will complement each other. For example, if the doe has weak shoulders, breed her to a buck with very strong shoulders.

Differences Between Four Types of Rabbit Breeding Programs

Note that linebreeding and inbreeding are not recommended programs for novice breeders.

Program	Description	Advantages	Disadvantages	Recommended for...
Outcrossing	Mating unrelated rabbits of the same breed.	Genetic diversity, large size, and increased vigour.	None	Breeding show stock. Animals to be shown in ARBA shows must be purebred.
Crossbreeding	Mating unrelated rabbits from different breeds.	Genetic diversity, large litter size, and increased vigour.	None	Breeding market animals.
Line breeding	Mating rabbits that are descended from the same animal, but several generations back (cousins, uncles to nieces, or aunts to nephews).	Good traits are intensified.	Bad traits are intensified.	Improves traits found in one family line. This program is not recommended for novice breeders.
Inbreeding	Mating closely related rabbits such as brothers to sisters.	Creates lines or strains of animals that are uniform in type.	Small litter size and genetic abnormalities.	Creating new breeds or varieties. Not recommended for novice breeders.

Principles of Breeding

Once you have selected which rabbits to breed, you can place them together to mate. Consider the following information to ensure a successful mating.

Ovulation - Unlike many other mammals, rabbits do not have a regular heat cycle. Rabbits are reflex ovulators and release eggs 9 - 13 hours after they are mated.

Some signs that a doe may be willing to breed are: Restlessness; rubbing her chin on the cage or equipment or a slightly swollen and purplish coloured vulva.

If a doe is not showing signs of being receptive to breeding, the breeder should investigate. Check for presence of disease, and assess nutrition and lighting. Uterine and ovary problems could also be the cause. If you breed a doe that is not ready, a false pregnancy could occur. False pregnancies can lead to ovarian/uterine problems and render future breedings unsuccessful.

Light - Decreased light will result in reduced conception rates in rabbits. You may want to supplement your rabbits with artificial lights (14–16 hours a day) especially if you are planning to breed in the dark winter months.

Temperature - Extreme temperatures decrease the chance of conception. When it is too hot (33°C (92°F) and above), bucks may not produce viable sperm and become temporarily sterile. When it is cold a doe is not as likely to conceive because her body is concerned with taking care of itself rather than nurturing young. If your rabbits are not housed in a temperature-controlled area, consider the weather when you are planning to breed.

Location - When it's time to breed the doe, take it to the buck's cage. **Never bring the buck to the doe's cage.** The buck is less likely to breed in the doe's cage because the doe is likely to fight him and not accept service. Also, the buck may spend his time sniffing around and trying to mark the doe's cage with his scent.

Duration - Place the doe in the buck's cage, watch it, and once the mating is complete, remove the doe right away. Since the doe ovulates following the mating, you may increase the conception rate by rebreeding the doe 4 to 12 hours after the initial breeding. Do not rebreed the doe more than 36 hours or more after the initial breeding. This may disrupt the hormone cycle and result in a miscarriage.

Pregnancy - The gestation period pregnancy of a rabbit is approximately 31 days. This period can range by up to two days either way.

Pregnancy Determination

Since baby rabbits are extremely small, it can be very difficult to tell if a rabbit is pregnant. Rabbit breeders can determine if a doe is pregnant through palpation.

Palpating the Pregnant Doe

If the doe is pregnant, you may be able to feel the embryos by palpating her abdomen 9–14 days after breeding. It is not recommended that you palpate the doe after 14 days as the developing fetuses could be injured.

To palpate the doe:

- Grasp the ears and skin over her shoulders in your right hand
- Place your left hand between the hind legs, slightly in front of the pelvis, with the thumb on the right side and your fingers on the left side of the abdomen
- Exert light pressure and move the fingers and thumb gently backwards and forwards; the embryos will feel marble-shaped as they slip between thumb and finger

Handle the doe gently and use only light pressure on the abdominal cavity. Accurate determination of pregnancy by palpation takes practice. You can practice palpating a buck or a non-bred doe first to get the feel of it. This way the difference should be more obvious.

If palpation is negative, the doe should be examined for receptivity and rebred at this time. If she is not showing signs of wanting to be bred, she may be pregnant and the palpate missed the pregnancy or there may be another cause.

A false pregnancy occurs between 17 and 18 days; rebreeding at this time can lead to further missed breedings. If a doe has a false pregnancy, it's best to let her go through it, then you can reassess what happened and adjust breeding practices.

Feeding a Pregnant Doe

Pregnant rabbits have higher nutritional requirements than rabbits of the same age and size that are not pregnant. If a doe is pregnant, you should begin to increase her feed two weeks after the initial breeding to keep up with her nutritional needs. Pregnant does may also benefit from a protein feed to support the growing babies. Do not significantly alter the type of food, such as changing from pelleted feed to whole grains. Also, do not add treats to your rabbit's diet, like fruits and vegetables, if she is not accustomed to them. You may want to free feed pregnant animals but be careful that the does do not become overly fat.

Nest Box

A nest box should be placed in the doe's cage about 25 days after she was mated. This gives the doe time to prepare a nest and assures there is a proper place for the birth. Caution should be taken to not put the nest box in too soon or the doe will defecate in it.

When you put a nesting box in the cage, the doe will use her mouth to place the nesting material in the box. Straw, hay, shredded paper, and non-toxic wood shaving can be provided as nesting materials. Watch carefully to make sure she is putting it in the nest box and not spreading it on the floor of the hutch. Spreading the material on the floor is a sign that she intends to have the litter on the floor. You should move the nest box on top of where she is spreading the nesting material to encourage her to build her nest in the box.

At kindling time, the doe's fur is loose and it can be plucked gently. The doe will pull her fur from her dewlap, chest, belly, and along her sides just before she gives birth. Make sure there is enough fur pulled to keep the newborns warm. You may want to keep a box of fur on hand from earlier litters just in case a doe does not pull her fur.

Kindling

At the end of the gestation period, the doe will kindle, which means to give birth. The doe can give birth any time of day or night and it takes about 10 minutes for the doe to deliver all her young. Litter size can range from one all the way up to fourteen. An average litter will have four to six kits. When it is time for the doe to kindle, try to keep the area around her as quiet as possible. If the doe is nervous or becomes frightened she may kill and eat the babies. If the doe kindles on the hutch floor, quickly gather up the babies and put them in the nest box so they do not die from exposure.

Once all the kits are born, the doe will cover them with fur and get out of the nest box. Do not be alarmed if the doe is not spending a lot of time in the nest box. She may only feed the babies once or twice a day. Check the kits soon after birth to count them and remove any blood or dead kits. Babies are born with their eyes closed and are nearly hairless. They must be protected from exposure and confined with their litter mates. If they crawl or fall out of the nest before their eyes open, they have slim chances for survival.

A day or so after birth, check to make sure the kits have been fed. Kits that have nursed will have a large, warm, rounded belly. Kits that have not nursed will have a sunken-in belly and may be making some small sounds. Remove the doe from the cage to examine the kits. Check the nest to make sure it is left as you found it before placing the doe back inside.

Sometimes a doe will give birth prematurely. If the babies are more than two days early, they will usually die. Other times a doe will prepare the nest with fur but never give birth. This is called a false pregnancy and you can rebreed the doe four days after she was due.

Orphan Kits

Occasionally a doe will refuse to care for her litter or will fail to produce milk. In such cases, the young will starve within two or three days unless they are transferred to a foster mother or are fed by hand. Fostering the babies with a mother who has a litter of the same age is the best alternative, since hand-raised babies are prone to health problems.

If you do attempt to hand feed baby rabbits, go to a pet store and buy a milk supplement for kittens. Wrap a face cloth around the kit and place it on its back in your hand when feeding. Fill a clean syringe and gently squirt the supplement into their mouth. When the feeding is finished, wet the cloth and gently wipe their genital area several times.

You must feed the kits twice a day for three weeks. In the fourth and fifth week they start to nibble solid food, so you can cut the feedings to once a day. After the fifth week you should be able to stop feeding them the supplement.

Lactation

When the mother is nursing her young, she will have even higher nutritional requirements than when she was pregnant. The doe's feed should be gradually increased over a five-to-seven-day period. This full feed should be maintained until three to four weeks after kindling, and then it should be reduced back to normal to coincide with weaning.

Young rabbits grow and develop quickly. The chart below outlines some key stages in their growth during the lactation period.

Date	Stage
Birth to 10 days	Kits get more and more fur.
Days 10 to 11	Eyes open. If they do not open, the kits should be treated for an eye infection. Ears start to come up (except lops). Kits may come out of the nest box.
Days 12 to 18	Remove the nest box.
Weeks 4 to 8	Kits will start eating solid food and can be weaned.

Weaning

Weaning means taking the kits away from their mother once they no longer require milk. Kits can be weaned as early as four weeks old if they are eating solids. Usually, it is best to keep the kits with their mother until they are six weeks old. Some breeders even allow them to go eight weeks before weaning to maximize their nutrition and growth. Remove the doe from the cage to reduce weaning stress on the kits. Then after a few more days, separate the kits by sex.

Before they are three months old, you should separate each rabbit into its own pen. This gives them a chance to develop without the stress of fighting, competing for food, or fur chewing. Make sure growing young rabbits have access to a sufficient amount of high-protein feed to support their rapid growth. Monitor them carefully as young rabbits are prone to digestive upset.

Determining Sex

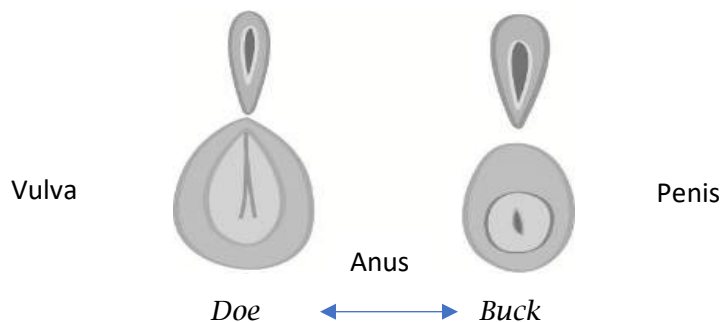
You can identify a buck from a doe once they are three weeks or older.

To determine the sex of a rabbit, use your forefinger and middle finger to press down on the vent area just in front of the anus. This area will protrude in both does and bucks.

The doe will display a slit or central line running up and down. Each side of the slit will be banded in pink.

The buck will display, if less than five weeks old, a blunt white tube without a central line. It will not have pink covering either side of the centre line. Older bucks will present a pink tube with a pointed end that resembles a bullet. Normally the testicles are not visible until at least two months of age.

An older buck is easy to identify as its head and body is generally blockier than a doe's. Does of the medium and large breeds often develop a fold of skin under their chin called a dewlap. Older does are usually larger than bucks of the same breed.



Section 6: Business and Production

Marketing

Rabbit business opportunities include selling breeding stock, rabbit meat, tanned pelts, fibre from angoras, pets, and rabbit byproducts such as manure and earthworms.

If you want to start a rabbit business, you will need to identify what products you will sell and to whom you will sell them.

The table below describes some popular rabbit products and possible markets for them.

Product	Preparation	Possible Markets
Meat	Animals must be processed, slaughtered, cleaned, and dressed according to provincial laws.	Delis, restaurants, meat shops, private sale, ethnic markets, and pet food processors.
Pelts	Pelt must be stretched, cleaned, and tanned.	Garment manufacturers, crafters, and toy makers.
Angora fibre	Hair can be sheared, combed, or hand plucked. Combed and hand-plucked hair is more desirable as it has a consistent length and does not have blunt ends like sheared hair. Angora fibre can be dyed and is often blended with sheep wool.	Spinners, weavers, and knitters.
Live rabbits (pets, show rabbits or breeding stock)	Live rabbits are ready for sale as soon as they are weaned. Many people who purchase rabbits for show or breeding will want to buy rabbits around six months, when it is easier to judge their conformation. If possible, prepare a pedigree for each rabbit you plan to sell.	Pet stores, fellow rabbit breeders, and 4-H members.
Manure and earthworms	These products can be used directly from under the hutch. Air-dried rabbit manure will not burn plants and can be used as top dressing. Worms can also be cultivated beneath rabbit cages.	Gardeners, fishermen, zoos, fish hatcheries, poultry producers, and biology classrooms.

Meat Slaughtering and Processing

Any meat sold in retail stores in Nova Scotia must be slaughtered at a provincially or federally inspected abattoir. Meat slaughter in a provincially inspected abattoir can only be sold within Nova Scotia. In order for Nova Scotia-produced meat to be sold outside of the province, it has to be slaughtered at a federally inspected facility. More than 20 abattoirs are licensed to operate in Nova Scotia and inspection services are provided by the government.

To ensure meat is safe for consumers, all animals, slaughter processes, and carcasses at provincially permitted abattoirs are inspected by trained primary product inspectors appointed under Nova Scotia's Meat Inspection Act and Regulations.

Further processing of meat or meat products is inspected and enforced by Nova Scotia Environment public health inspectors under the Health Protection Act and Food Safety Regulations. Provincial inspection contributes to the general surveillance of key food safety, animal health, and animal welfare issues in provincial livestock and poultry populations.

If you are interested in operating a meat-processing establishment (abattoir, slaughterhouse, meat shop, or retail outlets, including mobile retail truck), you will require a permit from the Nova Scotia Department of Environment.

Note: On-farm slaughter and farm-gate sales are only allowed where consumers do not sell or intend to sell the meat or meat product or use the meat or meat product for other commercial purposes. Any farm gate willing to sell processed meat or meat products through a retail shop on their farm requires a permit from the department and can only sell inspected meat. It is illegal to operate farm gate for commercial purposes without inspection in Nova Scotia. Failure to comply with provincial regulations could result in enforcement action.

For more information or questions about the provincial meat inspection program, contact your local district Nova Scotia Environment office.

<https://novascotia.ca/sns/paal/agric/paal011.asp>

NOTE

For more information on the Meat Inspection Act, or to learn more about obtaining a Meat Slaughtering and Processing Licence, view the links listed under Additional Resources.

Industry Challenges and Opportunities

The rabbit industry is very small in Nova Scotia. There is a lack of consumer data, marketing programs, and few processors.

Data from the 2016 Canada Agricultural Census indicated there were 67 active rabbit producers in the province with a total of 1,587 rabbits. This is a decline from the 2011 census, which listed 78 producers.

However, the number of rabbits has increased from 848 in 2011. This number reflects the total number of rabbits reported but does not indicate if the rabbits were for meat, fur, or show/breeding purposes. Ontario and Quebec have significantly more rabbit production than any other province in Canada, with 950 and 539 registered farms respectively. In 2016, Ontario listed that they produced over 95,000 rabbits while Quebec listed just over 61,000 rabbits.

Rabbit meat consumption has remained stable since 2006. There was a small increase from .48lbs (22.1 grams) per capita consumption in 2015 to (.49lbs) 22.5 g in 2016, an increase of 1.9 per cent. More information can be found from Statistics Canada.

Record Keeping

Record keeping is an important part of breeding rabbits. Whether you have one rabbit or one hundred, you cannot make progress in your breeding program without accurate records. Records are a diary of your rabbitry and should include information on the daily management, breeding, and ancestry of your stock. See the appendix at the end of this manual for examples of record keeping templates.

Types of Records

Herd Records - This lists the sex, sire, dam, date of birth, colour, and date the animal leaves your farm for each individual animal. Comments such as buyers' names or show winnings can be added and help keep track of each animal.

Breeding Record - Each breeding is recorded on this record. It will help you keep track of birthing dates and help you decide which animals are productive and worth breeding.

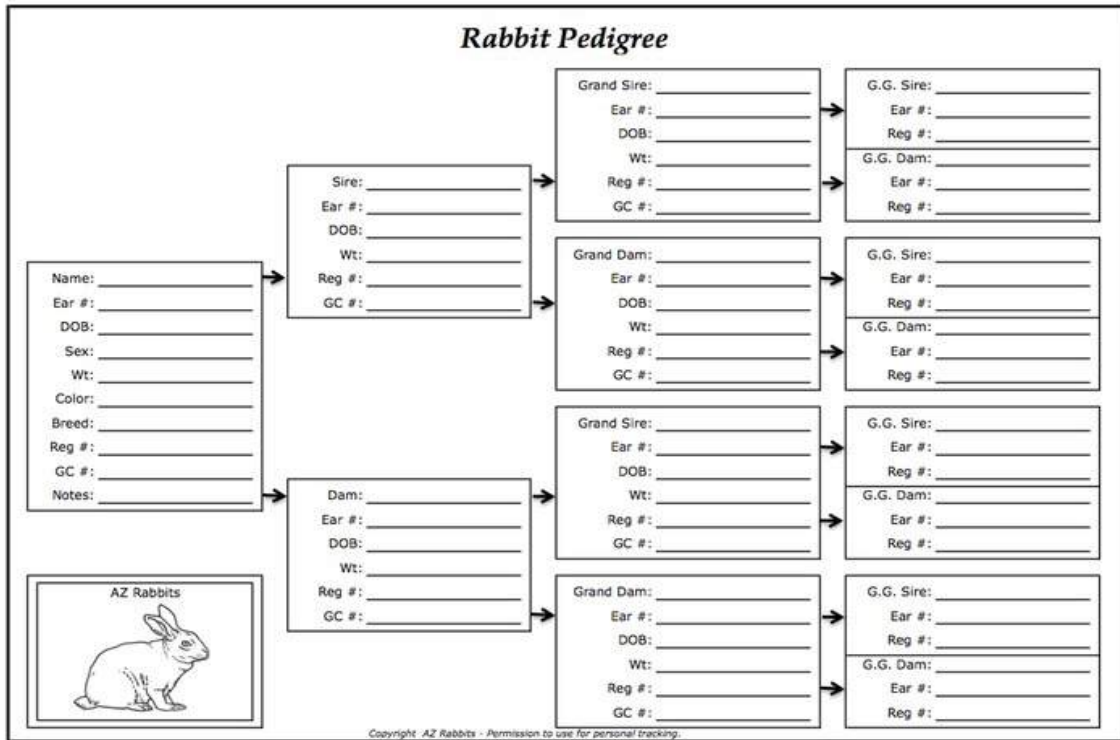
Show Record - A show record includes the dates and places of shows entered plus information on classes and awards received.

Health Records - Health records should include any symptoms or possible signs of disease and the date they were observed in each animal. If the animal receives any medication, the amount and the date must be recorded. Health records can help keep track of the withdrawal period for medication that must be adhered to before an animal can go to market.

Feeding Records - These records should include the type and amount of feed given to each animal. The record can also track the overall feed costs of your operation. Feeding records can also help you to design and implement feeding programs according to the life stage of your animals.

Pedigrees -This record shows the family tree of each individual animal. It lists the sires, dams, grand sires, grand dams, and great-grand sires and dams. It also includes the colour and senior weight of each animal.

Rabbit Pedigree



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Pedigrees are important because they can establish that your animal is purebred and show ancestry, so you can avoid accidentally inbreeding.

NOTE

For examples of record templates, see the appendix at the end of this manual.

Additional Resources

- American Rabbit Breeders Association: <https://www.arba.net/>
- Guide for Beginning Farmers in Nova Scotia: <https://novascotia.ca/thinkfarm/documents/beginning-farmers-guide.pdf>
- Maritime Rabbit Breeders Association: <https://www.maritimerba.com/>
- Meat Inspection Act: <http://laws-lois.justice.gc.ca/eng/acts/M-3.2/page-1.html#h-1>
- Meat Slaughtering and Processing License: <https://novascotia.ca/sns/paal/agric/paal011.asp>
- National Farm Animal Care Council Code of Practice for the Care and Handling of Rabbits: www.nfacc.ca/codes-of-practice/rabbits.
- National Farm Animal Care Council Transportation: <http://www.nfacc.ca/codes-of-practice/transportation>
- Nova Scotia Premises Identification Program (PID): <https://novascotia.ca/agri/programs-and-services/industry-protection/>
- Ontario Rabbit: <http://ontariorabbit.ca/>
- Rabbit industry at a glance in Canada: <http://www.agr.gc.ca/eng/industry-markets-and-trade/market-information-by-sector/red-meat-and-livestock/red-meat-and-livestock-market-information/supply-sheets-by-species/rabbit-industry-at-a-glance/?id=1415860000120>
- 10,000 Carrots Rabbit Rescue: <https://www.10000carrots.com/>

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- 4-H Nova Scotia. *Rabbit*. Nova Scotia Department of Agriculture, 1998. Leader Resource Guide.

Appendix A: Biosecurity



Biosecurity for Small Scale Livestock Production

Biosecurity is the protection of people, animals, and the environment from infectious disease, pests, and other biological threats. It refers to the proactive measures taken to exclude threats from farms that are disease free, and preventing spread of pathogens to other herds or flocks if/when a disease does occur. The ultimate goal of a good biosecurity plan is to implement easily attainable protocols that reduce problems to inexpensive and manageable occasions. The following are the key components of any biosecurity plan.

1. **Fences:** Good fences keep livestock in and wildlife out. Inspect boundary fences regularly and repair as needed. Stray stock may spread disease and feral animals introduce new pathogens to your farm.

2. **Housing, Equipment, and Yard Maintenance:**
 - Pens should be completely emptied, cleaned, and disinfected at least annually.
 - All equipment that comes into direct contact with livestock or poultry should be cleaned and disinfected periodically, including feeders and waterers.
 - If sharing equipment with other farms, be sure to disinfect the equipment before using on your farm. Use your best judgement and weigh the risks carefully.
 - Prevent pests and rodents by:
 - Keeping area around pens free of debris
 - Cutting the grass short around pens and enclosures
 - Keeping feed in tightly closed containers and cleaning up spilled feed
 - Using traps and bait as necessary
 - Standing water should be drained.

For organic production, a robust biosecurity program can prevent the need for antibiotics and parasiticides, and can reduce the potential of GMO contamination or loss of certification.

3. **Introducing New Stock:**

- Don't bring new stock to your property if they appear unhealthy.
- Avoid purchasing stock from markets and auctions.
- Obtain a health certificate if possible.
- Birds, eggs, and livestock should be sourced from farms with a solid herd or flock health program.

4. **Quarantine:**

- Have a quarantine area available for animals new to the farm and for sick or injured animals.
- This should be a separate area or building to prevent bird-to-bird or animal-to-animal contact.
- Three weeks will allow time for a proper assessment of health, condition, and recuperation from transport or illness.
- Observe animals or birds for any abnormal behaviour and signs/symptoms of disease. Presence of unusual behaviour or symptoms calls for veterinary inspection or tests.

5. **Water and Feed:**

- Water should be tested at source to ensure its suitability for livestock production at least annually.
- Design and position water bowls, troughs, and waterers to prevent fecal contamination.
- Feed or ingredients should be purchased from sources that verify its safe origin.
- Keep feed pest-free and dry, cover feed bins and feed systems to reduce the chance of contamination.

6. **Work Flow:**

- Farm owners and workers should have separate clothing and footwear for working around various animal species. These should be kept at the barn entrance.
- Use hand sanitizer or wash hands with soap and warm water before entering and after leaving livestock areas.
- Work with the youngest and most susceptible animals first.

7. **Manure:**

- Manure should be removed from the production area regularly.
- Farms, even hobby farms and small stables, should have a manure management plan that includes collection, storage, moving, and disposing of manure to minimize chance of spreading disease.
- Tools and equipment used for manure handling should not be used for feed or bedding.

8. **Herd or Flock Health:**

- Contact your herd health veterinarian when livestock appear sick, mortalities are high, or production drops off without apparent reason. Low numbers of mortality should be examined by a vet if the cause of death is unknown.
- Mortality should be disposed of in a timely manner to prevent contamination of the farm environment, reduce risk of spreading disease to other livestock and humans, and prevent attraction of pests.
- When animals are stressed from parasites, weather extremes, etc., natural treatments may be less effective. Monitor carefully and resort to other options as necessary. As well, remember that sick animals benefit from remedial care.
- Vaccinate as required (keeping the necessary records).
- Pay attention to parasites. Fecal egg counts are useful in determining if treatment is necessary.
- Keep records of treatments and veterinary care.

9. **Visitors/WWOOFers/Contractors:**

- Discourage unannounced visitors.
- All visitors must follow biosecurity protocol.
- Designate a parking area for visitors.
- Visitors should be accompanied by farm staff.
- A visitor log is recommended.
- Post “Biosecurity” and “No Entry without Permission” signs on entrance doors.
- Keep extra footwear and outerwear (coveralls, smocks, etc.) for visitors.

Biosecurity is not limited to large-scale farms. Regardless of size or production philosophy, all farms, even hobby farms, have a responsibility to prevent an outbreak or spread of animal (or plant) disease or pests. Stay on top of industry association news. Be aware of local conditions or issues as they arise. **If there is a serious disease outbreak don't be the last to know!**

There are national biosecurity standards for most livestock commodities.

These guidelines are a good place to start when developing a biosecurity plan for your farm.

<http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/eng/1299868055616/1320534707863>

**For more information, contact:
Heather McLean,
Non-Ruminant Livestock Specialist,
Perennia**

(902) 678-7722

www.perennia.ca

Appendix B: Record Keeping

Herd Record							
Name	Tattoo	Sex	Sire: Dam:	DOB	Colour	Date Sold	Comments

Inventory Record							
Animal ID (Name/#)	Registration #/Tattoo	Description Breed, colour, marking, etc.	DOB	Sex	Ownership Information	Purchase Price	Value
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased _____Date if purchased		

Breeding Record						
Dam	Sire	Date Bred	Date Birthed	No. Born Alive	# Dead at Birth	Comments

Show Record						
Name of Show	Location	Date Entered	Identification Number	Classes Entered	Number in Class	Comments

Health Record								
Name/#	Breed	Sex	Age	Illness/ Symptoms	Treatment	Date Treated	Cost of Treatment	Recovered from illness/ successful treatment

Death Record					
Name/#	Breed	Sex	Age	Date of Death	Cause

Feed Record		
Situation Description	Method of Feeding	Amount of Feed

Nutritional Value of Feed						
Name of Feed	Type of Feed	Cost of Feed	Amount fed per day	Protein %	Fat %	Fiber %

Appendix C: Activities for a 4-H meeting

Each chapter in this manual can serve as information and act as a guide to help you plan a 4-H meeting. This manual is meant to act as a starting point for providing you with knowledge to teach your members. As a leader, you are encouraged to tailor your meetings to your groups' interests and abilities.

The table below outlines a typical 4-H meeting and gives suggestions for the length of time.

Welcome, call to order, and pledge		10 min
Roll call		5 min
Parliamentary procedure	Minutes and business	10 min
Topic information discussion	Use the manual as a guide to present information on the meeting's topic.	20 min
Activity	Time to apply the newly learned information. See the list of suggested activities below.	30 min
Handle the animals	If possible, members may use this time to practice handling their animals.	20 min
Wrap up and adjournment		10 min

The following tables have different topic suggestions, information to discuss, as well as some possible activities based on each section of this manual.

Ideally, one or two topics should be selected to discuss during each meeting. Try to select topics from different sections for each meeting so members are exposed to a wide variety of knowledge.

As a leader, feel free to be creative and use a variety of activities to help your members learn. There are many worksheets available on various websites for members to fill out. You can also invite experts and guest speakers to come in to talk to your members, or you can arrange day trips to visit new locations.

Section 1: Selecting an Animal

Topic	Information	Activity
Parts of the animal	Show members a labeled diagram of the animal. For younger or newer members, begin with basic parts of the body. For older or more experienced members, you can discuss more advanced topics such as skeletal or muscular structure.	Have members label the parts of the animal. This can be done by using a worksheet or by having members take turns placing labels on an actual animal.
Animal breeds	Teach your members about different breeds. Possible information to include is <ul style="list-style-type: none"> • Distinct breed characteristics • Differences among the breeds • History of a breed 	Some suggested activities: <ul style="list-style-type: none"> • Have members match a picture of the animal to its breed. • Have members research and present the ideal characteristics of their chosen breed.
Choosing an animal	Discuss particular features a member might want to look for in an animal. Make sure to include information on correct conformation and conformation faults.	Have members practice judging. The members should place the animals and give reasons for their placings using the correct judging format.
Purchasing stock	Outline your members' options for where they might purchase an animal. Discuss the pros and cons of purchasing from a private sale, a large breeding operation, an auction or breeding their own.	Organize a trip for the members to visit a breeding operation or an auction.

Section 2: Care and Management

Topic	Information	Activity
Housing	Discuss with your members the different options for housing their animals. Make sure to include information on the National Farm Animal Care Council Code of Practice.	Have members design their own farm using whatever materials they like, such as modeling clay, popsicle sticks, paper etc. Have members present their farms and discuss their farms with the group.
Handling	Inform members about proper animal handling and demonstrate how to properly handle the animal. This activity meeting can include information on animal behaviour, proper handling techniques, and safety tips.	Have members practice handling an animal while you observe.
Grooming	Teach members how to properly groom their animals. You can discuss basic grooming techniques as well as how to groom an animal for show.	Have members assemble a grooming kit and take turns grooming an animal. They could bathe, clip/shear, trim nails/hooves etc.
Identification	Discuss the importance of proper identification and tagging/tattooing animals.	Have members observe an animal being tagged/tattooed.

Section 3: Nutrition

Topic	Information	Activity
Digestive system	Teach your members about their animal's digestive system.	Have members label an image of the animal's digestive system and include brief descriptions on the functions of each part.
Essential nutrients	Inform your members about what the essential nutrients are and why they are important to their animal's diet.	Have members complete a worksheet where they match essential nutrients to their function.
Classes of feed	Discuss the different types of feed available for the members to feed their animals. Describe each feed and its pros/cons.	Have an animal nutritionist, feed salesperson, veterinarian etc. come in and give a talk on animal nutrition.
Feeding programs	Teach your members about their animal's nutritional requirements for their different developmental and life stages.	Instruct members to design a feed program for the different stages of their animal's life. Compare and contrast how a newborn is fed compared to the diet of a mature animal.
Body condition scoring	Inform members how to score an animal's body condition, when to score, how often, and why. Include some basic information on how a member could adjust the animal's diet to raise or lower a body condition score.	Have members practice palpating and scoring the body condition of an animal. Provide images of animals in different conditions so members have a visual.

Section 4: Health

Topic	Information	Activity
Recognizing a healthy animal	Teach members how to recognize a healthy animal and what normal vital signs are.	Have members practice taking an animal's vitals.
Biosecurity	Inform members on the importance of biosecurity.	Have members discuss proper biosecurity practices and ways they can implement them into their own program.
Common diseases	Discuss some common diseases, their cause, prevention, and treatment.	Have a veterinarian in, or visit a vet clinic, to talk about common diseases and what members can do about them.
Parasites/vaccinations	Inform your members about the importance of routine vaccinations as well as deworming.	Have your members design a deworming and vaccination schedule. If members are older and more experienced, they may want to learn how to properly administer vaccines.

Section 5: Breeding

Topic	Information	Activity
Reproductive cycle	Teach members about the animal's reproductive cycle.	Have members label diagrams of the animal's reproductive system.
Signs of heat and breeding	Inform your members about the signs of an animal in heat. Proper breeding practices, as well as natural vs artificial insemination, may also be discussed.	Have members record some signs of an animal in heat. Then, have members discuss the advantages/disadvantages of natural service or artificial insemination. Also, you could arrange to have the members observe animals being checked for pregnancy.
Giving birth	Discuss the stages of labour and some signs of issues with the birthing process.	Have members fill out a timeline on the stages of labour with a description of each stage.
After-birth care	Teach your members about what to do following the birth of an animal. Care for the newborn as well as the mother should be discussed.	Have members create an after-birth care kit complete with towels, disposable gloves, buckets etc.

Section 6: Business and Production

Topic	Information	Activity
Marketing	Discuss with members the importance of marketing and some marketing ideas/tips.	Have members research potential markets for products from their animals. Alternatively, you could organize a trip to a dairy farm, specialty meat market, farmers market etc.
Record keeping	Talk to members about why records are kept, how to keep them, and what members should keep track of.	Have members fill out a record booklet throughout the year. You may use the record templates provided in this manual or use your own.