Livestock

1. Apiculture
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3. Egg Production
4. Rabbit Production
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TECHNOLOGY PACKS

RABBIT PRODUCTION

November 2015

Background

Production decisions concerning how much effort and resources to invest and which farming practices to follow, have consequences and create opportunities for the farm affecting production levels, input costs, time constraints, and the potentially size of the operation. They also may have implications for resource use and environmental quality.

Numerous information exist on the various aspects of production and handling/ marketing of crops and livestock, the majority of which are outdated, not easily understood and lacking the where with all for addressing present day challenges such as good agricultural practices (GAPs) and food safety and climate change that impact on the environment and rural livelihoods. These issues are also closely related to the importance of the role of primary producers in increasing the earnings of all actors along the value chain in supporting the development of a commercially viable and sustainable agricultural industry.

The production of high quality and easily understood information packages is critical as this forms a basis for farmers to obtain financing from lending institutions and to efficiently increase their production through the availability of modern technology. This will also result in a reduction of rural unemployment and will greatly help in alleviating poverty and other associated social ills.

TECHNOLOGY PACKS

RABBIT PRODUCTION

November 2015

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Introduction

This Technological Package (Tech Pack) deals with the production of rabbits. Also included in the Tech Pack are appendices:

- Doe Record Card
- Buck Record Card
- Breeding and Kindling Chart.

The mention of any commercial products in the Tech Pack is for the purpose of citing examples and is not meant to either endorse or discredit any particular product. Use of chemical products should strictly comply with local regulations and all instructions provided by the manufacturer.

Rabbits (*Oryctolagus cuniculus*) are monogastric herbivores and belong to the family Leporidae of the order Lagomorpha. Males are called bucks while the females are called does. Newborn rabbits are called kits. Separation of doe from young is called weaning.

Under tropical conditions, the average doe should produce more than 150 lb (70 kg) of live rabbits per year. To achieve this she should kindle at least six times per year and give birth to an average of six kits on each occasion. Ideally, she should rear all her young to weaning and if reared as fatteners, they should be marketed at an average weight of 4.5 lb (2 kg). This should normally be achieved when the fatteners are 13 weeks old.

This performance level should not be too difficult to achieve provided good management practices are applied.

Appropriate Breeds and Selection of Breeding Stock

The most common breeds exploited in St. Lucia are:

- New Zealand White (medium breed): white in colour. A buck weighs between 9 - 11 lb (4 – 5 kg) and does 10 - 12 lb (4.5 – 5.5 kg) (Plate 1).
- Californian (medium breed): white body with black nose, ears, feet and tail. Adults weigh 8 - 10 lb (3.5 – 4.5 kg) at maturity (Plate 2).
- Flemish Giant (large breed): different colours exist including grey, fawn and sandy. Adults weigh 11 - 14 lb (5 – 6.5 kg) at maturity (Plate 3).
- There are also several local strains resulting from different crosses. Most of them are small in size, but have adapted well to local conditions.

Plate 1 New Zealand White rabbit
Source: http://rabbittalk.com/blogs/24car-rot/category/rabbits/page/2/

Plate 2 Californian rabbit
Source: http://www.whitemountainsranch.org/californian-rabbits.html

Plate 3 Light Gray Flemish Giant
Source: http://www.nffgrb.net/Varieties.htm

A replacement rate of 45 - 50% per year covers culling and mortality. Save at least one replacement doe per month for every 24 active does on your farm. The same applies to bucks.

When selecting breeding stock, consider fertility, milk yield, growth rate, prolificacy and fecundity. This can be determined based on analysis of pedigree and progeny records and past performance.

Select does and bucks from larger healthy litters with high live weights at 3 weeks old and uniform

in size at 9 - 11 weeks of age. This is an indication of the milk producing capacity of its mother. The mother must also have good mothering ability. A good doe will accept and nurse her young readily after birth. Cull any doe that does not accept her offspring. Does should also be able to make a good nest as this will reduce mortality rates. Also, do not consider offspring for replacement stock from does producing less than 5 litters a year. Bucks must have good meat qualities and be muscular looking.

Does and bucks should be strong and have an appearance of good health with no deformities. If mature stock is being acquired, reproductive organs should be well developed. Purchase stock from reputable breeders. Place any new rabbit entering the herd in a quarantine area for at least 30 days and observe for signs of diseases. Only after being declared healthy after this period should it be allowed to enter into the herd.

Keep replacement stock in individual cages to prevent indiscriminate breeding. Before putting in replacements disinfect the breeding doe/buck cage and leave empty for 1 month.

Handling Rabbits

Rabbits should be handled as little as possible, yet it is a good practice to occasionally pet or touch young replacement breeders, which gets them accustomed to being handled. Rabbits should never be lifted by the ears or legs as this invariably leads to injuries (fractures to the lumbar spine). Always hold rabbits with two hands, with one hand grasping the loose skin at the back of the neck and the other under the rump supporting the weight and hind legs. This prevents struggling.

Production Practices

SITE SELECTION

- A cool well drained and fenced-in area.
- A small number of cages (6 - 8) could be placed under eaves or on the veranda.
- Fruit trees could be planted as wind breaks and can also be used as a source of shade and feed material for the rabbits.

HOUSING AND EQUIPMENT

Housing should be practical and functional, making tasks like feeding, watering and mating easy to carry out. It must protect stock from the cold, heat, sun and rain and excessive wind while still providing ventilation.

Housing for rabbits can be constructed from a wide variety of materials ranging from bamboo slats to galvanised or steel sheeting. However, due to the durability of galvanised wire and sheeting, these materials are preferred over wooden materials. Cost may also be a factor when determining the materials to use.

Traditionally, the unit housing rabbits is called a hutch. Rabbits are now housed in cages inside a building known as a rabbitry or under a shed in the backyard.

Galvanised sheets are commonly used for roofing. However, thatched roofs are much cooler and cheaper but require an experienced craftsman with a high level of expertise for installation. The roof must be at a suitable height and designed to allow for optimal airflow. A common design used is the raised split-gable type roof. Building sides could be made using "chain link" wire placed on the top of concrete blocks (two block height).

The buck's cage is normally situated between two does with two fattener cages on either side of the does' cages (Figure 1). Breeding does should be kept in individual cages to avoid sexual stimulation from does mounting each other. This can result in a pseudo-pregnancy (false pregnancy). Breeding bucks housed together may fight. Fatteners (4 weeks old to market at 13 weeks) can be housed in groups. The replacement cages are then sited next to the fatteners.

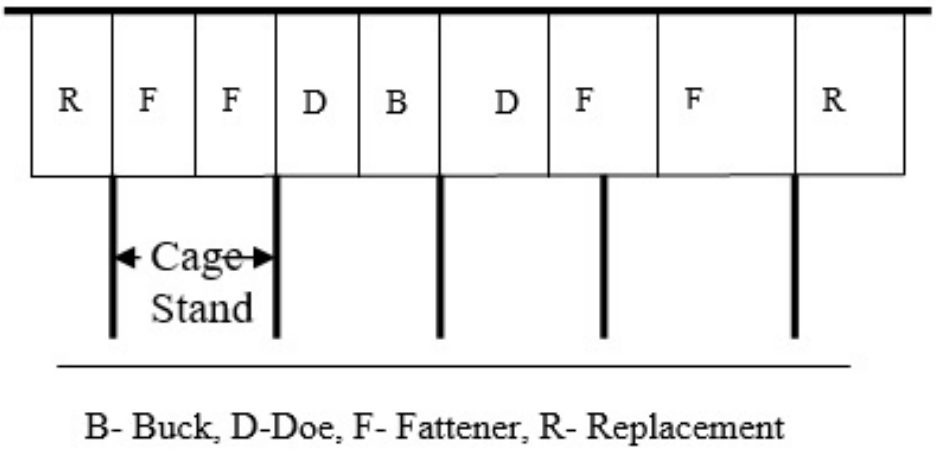


Figure 1 Diagram showing arrangement of rabbit cages on cage stand

In some modern rabbitries, cages can are suspended from the ceiling using wire.

All wire cages are the best as these are easy to clean and disinfect, but a wooden frame covered with wire mesh can be used. Wire floors are preferred as they may last longer than wood and they allow faces and urine to drop to the ground.

CAGE SIZE

From weaning to slaughter at 13 weeks old growing rabbits should have access to at least 0.5 square feet (0.05 m^2) of floor space. Provide the breeding rabbits with 2½ – 3¼ square feet (0.25 – 0.3 m^2) of floor space each. Cage size is dependent on the physiological state of the rabbit; Table 1 can be used as a guide.

Table 1. Floor space requirement for rabbits

Category	Floor Space (square feet)*
Breeding does	**3.25**
Breeding bucks	**2.50**
Replacements	**3.00**
Fatteners (i.e. from weaning to 13 weeks)	**0.50**

*** Divide by 10 to convert to m^2**

The rabbit must be able to stretch full length diagonally as well as along the width of the cage to cater for animal welfare concerns.

Ensure cages are sturdy enough to prevent entry of dogs, cats, rats, mice and other rodents.

Use 16 gauge galvanised wire mesh for cage sides while 14 gauge is used for cage bottoms. This can be assembled with the use of "J-clip pliers" and strips of aluminium sheets. The initial extra expense in using the higher gauge wire mesh for cage bottoms will be offset by fewer repairs and replacements.

The wire mesh used for the bottom should be of a size ½ x 1 inch (1.25 x 2.5 cm); for the cage sides and top use larger size mesh ¾ x ¾ inch (2 x 2 cm).

Place forage racks on the outside of the cage.

Cage stands should not be shorter than 1½ feet (50 cm) to reduce the risk of back injury to workers. Do not rest cage stands directly on the floor. Place on a non-corrosive platform such as a concrete block.

Grade floor to prevent the settling of water and rabbit urine and thus maintain good sanitation. If cages are suspended, there is no need for cage stands and manure removal will be made easier.

NEST BOXES

Boxes should provide seclusion for doe and protection of the litter. They should be easy to clean and maintain, provide good drainage and ventilation and be easy for young to leave and return when they get older.

Place a nest box in the breeding doe cage on or before the 28th day of pregnancy so that the rabbit has sufficient time for the preparation of her nest for the newborn litter. Around this time, the doe may be seen pulling fur from her body.

An old oil keg can be used use as a nest box (Plate 4). Modify it by cutting out an entrance on a longitudinal side for the doe and perforating the bottom of the keg to facilitate draining and aeration. The larger the doe, the larger the entrance should be. The cut should start at least 3½ inches (9 cm) from the base to prevent curious kits from leaving the nest box too soon.

Plate 4 Recycled oil keg used as a nest box.

Nest boxes can also be made with materials such as ½ inch (1 cm) thick plywood. Baskets have also been used by some farmers as nest boxes. Make the nest box large enough to avoid overcrowding, but small enough for the body heat of the kits to keep them warm.

Suitable dimensions for nest boxes are 12 inches wide x 16 inches long x 10 inches height (30 x 40 x 25 cm). Larger breeds may require a nest box of dimensions 15 x 24 x 12 inches (38 x 60 x 30 cm).

Preferably nest boxes should be uncovered to reduce damp conditions that could increase mortality among kits. It may be necessary to provide a small amount of nesting material such as wood shaving or straw for the doe. The doe will also pull fur from her body to mix with the bedding provided.

WATERERS AND FEEDERS

Install feeders which can be filled without opening the cage door.

Feeders made of sturdy galvanize steel are recommended because they are long lasting and more sanitary than the other types commonly used.

Feeders should be hung 3 – 4 inches (7.5 – 10 cm) above the cage floor or attached to the outside of the cage with an opening to the inside of the cage for easy access by the rabbits.

Automatic waterers (nipple drinkers) are preferable and are easy to install using a system of PVC pipes and tanks (Plate 5).

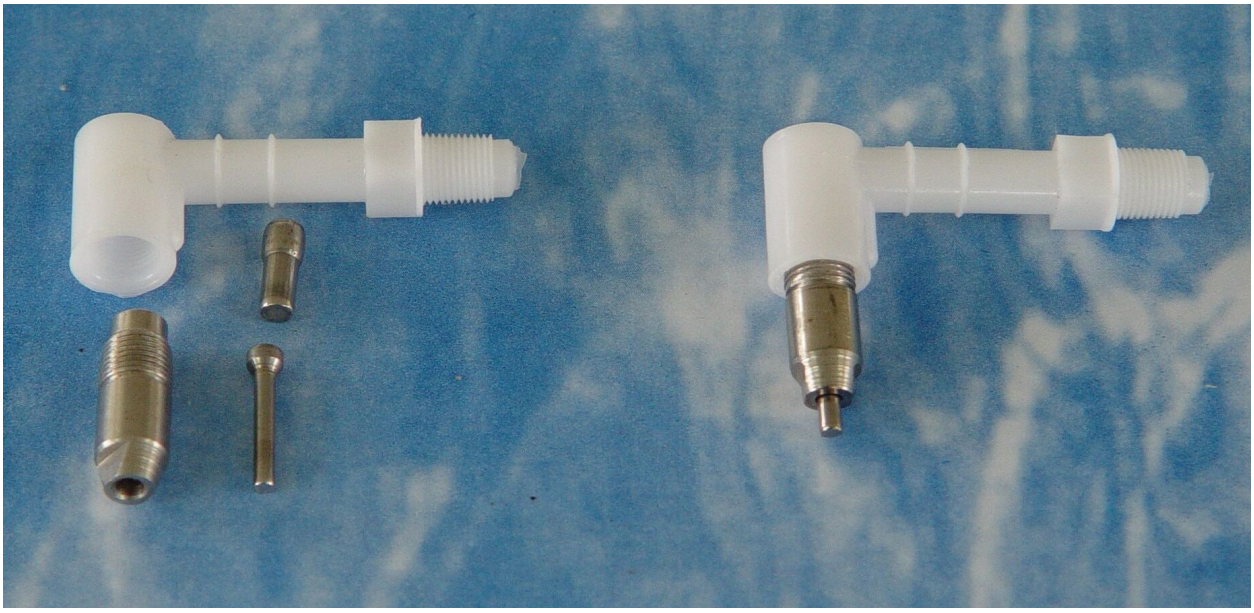


Plate 5 Nipple and elbow components of an automatic watering device

If feed and water bowls are used in cages, they must be made of a material that is easily cleaned, not easily eaten by rabbits and must be properly secured to prevent overturning. Some farmers use heavy porcelain. Waterers and feeders must always be kept clean.

BREEDING RABBITS

There are two main systems of breeding:

1. Outcrossing: the most common system of breeding is outcrossing, or the combining of two unrelated animals. It is a relatively safe system, for it is unlikely that two unrelated animals would carry the same undesirable gene and pass them on to their offspring.

2. Inbreeding: involves the crossing of closely related animals and should be avoided by the amateur farmer.

The buck to doe ratio should between 1 – 10 and 1 – 15. Ensure that the buck is used frequently. Ideally, the buck can be used once per day. Twice every other day mating is possible with a rest period of 3 - 4 hours between matings; when using this breeding regime the buck must be allowed to rest for a full 24 hour period before being used for service again.

Medium-sized breeds such as the New Zealand White and Californian mature at about 6 months while larger breeds such as the Flemish Giant mature at about 9 - 12 months. Males mature about 1 month later than females. Medium-sized breeds should have a minimum of 5½ lb (2.5 kg) body weight when first bred. Weight rather than age should be the criterion used when starting a breeding programme.

Does can be kept in the breeding herd for 12 - 18 months. Bucks can be kept up to 14 - 20 months of age. The oldest doe in the rabbitry should normally be no older than 2 years. However, if her performance drops before this time she should be culled. Conversely, if the doe still maintains a high performance, she can be kept in the breeding herd beyond this period.

Breed rabbits during the cooler parts of the day. No sudden noises should be heard during this time. Carry the doe to the buck's cage for mating as the doe is territorial and may not accept the buck in her cage. Some does even attack and injure bucks that enter their cage.

Signs of heat in the doe include a moist vulva which appears red and shiny. The doe may run around the cage when placed with the buck. If, upon inspection of the vulva she is sexually receptive the doe may have to be held down for the buck to mate with her. Sometimes, all that may be necessary is to hold your hand in front of her face to prevent her from running. Observe the buck to ensure proper service of doe. The mating is usually successful when the buck makes a grunting noise and rolls over on his side. Mate the doe twice if possible, within a 6 hour period, to ensure adequate stimulation for egg release.

PREGNANCY TESTING

Test breeding: The doe is taken to the buck's cage 18 days after mating. If the doe refuses service from the buck by fighting and growling and avoids the attention of the buck, then you can assume that she is pregnant.

Palpation: This method is reliable only in the hands of experts who have been trained. Palpate the doe 14 - 21 days after mating to confirm that conception has taken place. The abdominal area close to the rear underside of the doe is carefully felt and manipulated in an effort to feel the presence of young in the does' womb. At 2 weeks they are about the size of marbles.

KINDLING AND CARE OF LITTER

Does gestate for a period of as short as 29 to as long as 35 days with an average of 30 - 32 days.

Most litters are kindled at night. Avoid noises or sudden disturbances during kindling as this may discourage the doe from accepting her litter.

Inspect the litter 10 - 15 minutes after kindling and remove the afterbirth, bloody bedding or any dead kits that may be present. Carefully cover back the kits with fur and avoid any unnecessary handling of kits as this may result in the doe abandoning them.

For large litters of more than eight kits, foster mothers with small litters may be used such that no doe has to provide milk for more than eight kits. This is a good reason for synchronizing breeding and kindling whenever possible. Rub some of the nesting material of the foster doe onto kits for increased acceptability. Some does are more sensitive than others and it may be necessary to place a small amount of the popular decongestant preparation, "Vicks", around the nose of the foster doe to mask the foreign odour of the kits.

Does that have small litters, poor mothering ability, destroy or desert their young should be culled.

For identification and record keeping, tattoo kits 10 days after birth.

A skilled person can determine the sex of the rabbit in a few days after birth. However, it is not necessary to determine the sex until weaning.

At 3 weeks after kindling, remove the nest box to give the kits more room for their increasing activity. Wilted forage, supplemental feed and water should be made available. Avoid overfeeding of does and kits. Fresh water must always be readily available.

Weaning takes place when kits are approximately 4 weeks old, at which time, milk production is on the decline. At 35 days, milk production by the doe has completely ceased. Weigh rabbits at weaning to determine the performance of the doe.

The most common intervals for re-breeding does are 35, 42, and 56 days. The shorter the interval, the higher level of management is required to prevent the doe from losing body condition. A reasonable interval is 42 days or 6 weeks after kindling. With this schedule each doe can produce 5 litters a year.

POST WEANING MANAGEMENT

Meat producers generally practice group weaning. The entire litter is placed as a group into one cage. Separation by sex is not necessary because rabbits will be slaughtered at 13 weeks, i.e. well before attaining sexual maturity. However, rabbits to be used as future replacement stock should be placed in separate cages.

To determine the sex of the rabbit, place the rabbit on its back with your right hand holding its head and ears. Place the index and middle finger of the left hand over the tail, and gently pull open the genital area and move it towards the upper body.

The buck's opening will appear round while the female's opening will form a slit and have a slight depression at the end next to the rectum.

FEEDS AND FEEDING

Rabbits must have an ample supply of clean fresh water available at all times.
With regard to feeds, the two objectives to consider are:

a. Securing a balanced ration that has adequate nutrients necessary for maintenance, growth, reproduction and lactation.
b. Minimizing feed costs.

Rabbits can be fed a wide variety of plants, crop residues, kitchen scraps and agricultural by-products. Grass and legume mixtures should also be offered. Indigenous plants harvested from roadside fields can provide variation and a cheap source of fibre for the back-yard farmer. Select forages that are young and tender. Always allow forage to wilt for 24 hours before feeding.

Many different grass species are suitable for the rabbit such as, *Panicum maximum* (guinea grass) *Digitaria decumbens* (pangola grass), *Cynodon dactylon* (devils grass), *Commelina elegans* (pond grass), *Pennisetum purpureum* (elephant grass) and *Dichanthium aristatum* (Antigua hay grass).

Farmers may also feed their rabbits leaves and vines of the sweet potato (*Ipomea batatus*) plant, which may contain more than 20% crude protein. Legumes commonly used are *Teramnus labialis* (rabbit vine), *Clitoria ternatea* (blue pea) and *Cajanus cajan* (pigeon pea).

Leucaena (river tamarind, wild tamarind) is a high-protein, multi-purpose plant that can be fed to rabbits. However the levels must not exceed 10% of the total dry matter of the diet, as this may cause toxicity problems. Leucaena and Cabbage are examples of two common plants that have toxins, which can be detrimental to the health of rabbits. Be very careful when feeding these materials to rabbits.

In some countries, commercially prepared pellets are also available. A combination of the two (concentrate pellets and forage) provides a good feeding system.

Salt is a very important nutrient. It is closely related to water use in the rabbit's body and a lack of salt may cause a loss of water from the animal's body, low growth rate, poor health and body condition. It is a good idea to keep a salt or mineral block in each cage so that the rabbit may satisfy its own needs.

Avoid overfeeding since overweight rabbits will be prone to health problems. Growing rabbits require about 16% crude protein (CP) in their diet, which is somewhat less than the 19% required by gestating or lactating rabbits. In the absence of commercial feeds formulated for the different physiological states of the rabbit, a general rabbit feed with a CP content between 17 - 18% may be used.

Feed fatteners 1 ounce (30 g) feed pellets per day during the first week after weaning, then feed an additional 0.4 ounce (10 g) for each subsequent week until the sixth week after weaning. At this point, feed fatteners 2.8 ounces (80 g) of feed pellets per day until slaughter at 13 weeks. Adult rabbits should be offered the following quantities of commercial feed pellets (17 - 18% CP):

- BREEDING BUCK: 2.8 OUNCES (80 G)/DAY
- DRY (ADULT) FEMALE: 2.8 OUNCES (80 G)/DAY
- PREGNANT DOE: 3.5 OUNCES (100 G)/DAY
- LACTATING FEMALE: 3.5 OUNCES (100 G)/DAY plus an additional 0.4 ounces (10g) for each kit in the litter.

Feed rabbits feed pellets and forage (ad libitum) once daily, preferably during the evening period as they are usually more active at this time. Clean, fresh, cool water must be available to all animals at all times.

Indigestible fibre is necessary for maintenance of the lining of the small intestine in rabbits. Two sources are wheat bran and dried coconut. Dried coconut husks also serve as a mechanism to relieve boredom that may be experienced by the animals. Fresh vegetables and fruits can also form part of the rabbit's diet, providing an avenue for making liberal use of kitchen vegetable scraps and waste fruits. A good selection of vegetables includes: green peppers, parsley, spinach, watercress, celery, broccoli (leaves and stem), carrots and carrot tops.

All feed adjustment or changes should be done gradually.

HEALTH AND DISEASE MANAGEMENT

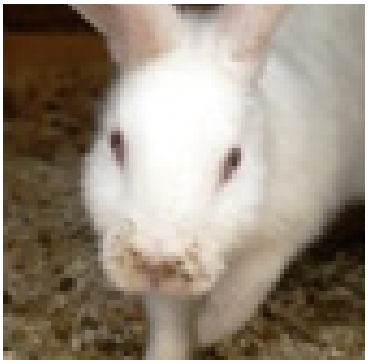
The most effective way of preventing disease is by practicing good sanitation. It is always better to prevent an outbreak of a disease than to try to get rid of it after it has occurred. The most common circumstances contributing to disease incidence in any rabbitry are dirty feeders, dirty drinking containers, dirty cages and overcrowding. All of these point to faulty management.

Good management practices which will reduce disease occurrence include the following:

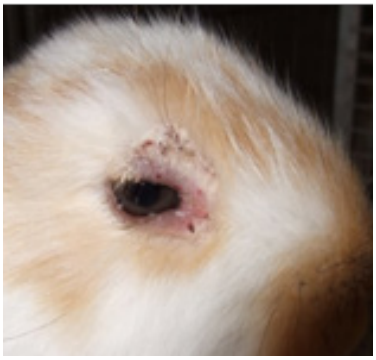
- Removal of manure, soiled bedding and stale or contaminated feed daily.
- Daily inspection of water and feed pans. Change water in bowls. It is a good practice to wash the feed pans every week with hot soapy water, rinsing them with water to which a bit of Clorox has been added, then place in the sun for a couple of hours to dry before use.
- Washing and disinfecting each cage after the litter has been weaned. Allow to dry before introducing rabbits to the hutch.
- Nest boxes should be cleaned and disinfected and set out in the sun or burned out with a gas blow torch before using them a second time.
- In some rabbitries, loose fur may accumulate on cage floor and walls. A gas blow torch can be used to burn off this fur which presents a harbour for disease organisms and also may limit ventilation.
- Place newly acquired rabbits and those returning from another rabbitry in the quarantine area for at least 30 days. Cages must be thoroughly cleaned before introducing rabbits.
- Daily observation for any signs of illness. Ensure rabbits are alert, eyes are bright, eating and drinking habits are normal, stools are firm, no unusual lumps, no excessive sneezing or nasal discharge. Signs of disease include a rattling noise when breathing, inflammation and crusting in the external ear canal causing rabbits to scratch their ears and shake their heads, hair loss, matted and discoloured hair.
- Isolate animals suspected of having diseases, and consult the Livestock Services Division at Union or Beausejour. If death occurs, burn or bury all dead rabbits after the cause of death has been determined by the veterinarian. Do not leave dead animals lying around.
- Table 2 presents some common diseases occurring in the rabbitry and the appropriate treatment.

Table 2 Common diseases, symptoms and treatment

Condition	Symptoms	Control/Management
Plate 6 Ear Canker  **Source: http://riseandsinerabbitry.com/2012/**	Shaking head, effort to scratch ears, brown scaly crusts and sores at base of inner ear, loss of balance.	Swab affected area with ear mite medication such as ivermectin. Repeat in several days as needed. Add a few drops of mineral oil into the affected area. The oil can also be applied using a cotton swab. The oil will suffocate the mites. Do not remove the brown scaly crust as this may leave open cuts which can become infected. The crust will drop off on its own when the rabbit shakes its head.

Condition	Symptoms	Control/Management
Plate 7 Sore Hocks  **Source: http://cartercutiesbarnes.weebly.com/medical-terms-treatment.html**	Pads of feet (usually rear feet) have sores and scabs, raising or lowering of the affected feet, rapid weight loss. Pads and toes on the front feet may become infected.	In mild cases provide clean soft bedding such as straw or hay, or a resting board. Also wash hock with germicidal soap and apply tincture of iodine. If abscessed, lance, irrigate with antiseptic (tincture of iodine) and apply antibiotics
Plate 8 Pasteurellosis "Snuffles"  **Source: http://www.rabway.com/_wiki/index.php?title=File:Snuffles-2.jpg**	Sneezing, nasal discharge, watery eyes, head shaking, rattling noise in breathing, matted, soiled and discoloured fur. Some rabbits may become sterile. Snuffles is contagious and can cause death.	Isolate sick animals. Tetracycline in feed may be effective in an uncomplicated case. Cull rabbits that show continuous chronic symptoms. Elimination is difficult. Keep cages clean, dry and sanitary.
Plate 9 Coccidiosis - liver -intestinal  **Source: http://vetsonline,com/publications/vn-times/archives/n-08-10/internal-parasites-of-rabbits.html**	Diarrhoea, pot belly, loss of appetite leading to loss of condition, rough fur coat, may cause death in young rabbits.	Sulfaquinoxaline in food or drinking water continuously for 2 weeks, good sanitation. Prevent faecal contamination of feed and water.

Condition	Symptoms	Control/Management
Plate 10 Enteritis (scours, bloat)  **Source: http://rabbitsandguineapigs.blog-spot.com/2012/07/enteritis.html**	Young rabbits are primarily affected, diarrhoea, sometimes bloat, excessive drinking, poor condition, some mortality	Wilt forages for 24 hrs before feeding. Encourage consumption of a vitamin fortified feed may help in recovery. No effective treatment.
Plate 11 Malocclusion (buck teeth)  **Source: http://www.petsforlife.com.sg/news/uploads/2013/05/cottontailsrescue1.jpg**	Upper incisor teeth grow excessively long, sometimes inwardly and affect the eating habits of the rabbit. The lower teeth sometimes protrude.	No effective treatment. Do not include affected animals in breeding programmes. Teeth may be trimmed to allow eating and permit young to reach market weight.
Plate 12 Wet Dew Lap (Moist Dermatitis)  **Source: http://www.mypetsdentist.com/rabbit-slobbers-dropling.nml**	Matted and discoloured hair, hair loss or irritated skin which can lead to infections and maggot infestations, inflammation.	Elevate the water bowl to prevent wetting, clip affected hair, and apply powder or starch for drying. Apply antiseptic dusting powder if skin is irritated. Use automatic watering systems.

Condition	Symptoms	Control/Management
Plate 13 Ring Worm  **Source: http://wildpro.twycrosszoo.org/5/00dis/FungalAlgal/lmg Ringworm/RSrabbit ringworm face0**	Yellowish, scabby skin on face, around mouth, nose, eyes and feet, skin gets red, scaly and fur drops out in circular patches, vigorous scratching.	Isolation. Wear gloves when handling animal. Clip fur from around and ½ inch (1 cm) beyond affected area. Apply antifungal ointment (griseofulvin). Equipment should be cleaned and disinfected thoroughly. Seriously affected animals should be culled.
Plate 14 Hutch Burn/Vent Disease  **Source: http://www.rabbitsonline.net/showthread.php**	Small blisters around the vent which then rupture forming yellow to brown scabs, pus tinged with blood may be present.	Don't breed affected animals. Clean infected area with warm soapy water and rub with tincture of iodine. Recovery in 10 - 14 days.

WASTE MANAGEMENT

Rabbit manure contains high proportions of nitrogen, phosphorus and potash. It will not burn plants even when applied fresh. However, to prevent possible contamination it should first be composted. It is great for growing almost anything.

A simple waste management system involves collecting, composting, packaging and selling the composted manure to vegetable farmers. Depending on the system used, manure could be accumulated daily or weekly and composted monthly. Vegetable farmers are usually keen to use rabbit manure as it is almost odourless.

Slaughtering and Post Slaughtering Management

Always ensure slaughter facilities are kept clean, walls smooth and sinks and floors have adequate drainage. Ensure that utensils used during slaughtering and dressing are well sanitized. If utensils used for slaughtering are also to be used in the dressing of the carcass, these should be sanitized before use in the dressing process. Sanitizing agents include detergents (which can be used to wash off dirt and blood) and chlorinated water which can be used to sanitize utensils (e.g. knives) after washing and between different carcasses or processes.

Refrigeration is also critical and for long term storage, rabbit meat should be stored at 65°F (18°C) to reduce proliferation of contaminants.

All equipment must be made of stainless steel, galvanized steel, aluminium or approved plastic.

Hands and clothing must be cleaned, hair must be secured and absolutely no jewellery, badges or buttons allowed. All footwear must be enclosed.

Deliberate efforts must be made to reduce stress on the animal. Withdraw solid food from the animal 24 hours before slaughter. Water should still be provided.

Steps when slaughtering a rabbit

- Regardless of the chosen method for slaughtering, it should either cause immediate death or render the animals unconscious, immediately followed by immediate bleeding of the animal. A captive bolt is commonly used on farms.
- An alternative system some farmers use is to subject the rabbit to a step-up transformer that, in effect, “steps up” 220 volts to approximately 500 volts and stuns the animal.
- The rabbit is then hung by its hind legs, just above the hock joint, on two pointed hooks. A second option is to use a piece of rope or twine. Be sure that the rope or twine is strong enough to bear the strain when pulling off skin. This is followed by cutting of the jugular vein and the carotid artery. Allow the blood to drain into a bucket. The head is then severed.
- Make an incision in the skin around both hocks followed by a cut from one incision point down towards the tail and up the opposite leg to the hock joint. Cut off the tail and peel the skin off the body. Cut off at the point of the distal part of the fore leg. Avoid the external surface of the hide/skin from coming into contact with the carcass meat during cutting and exposure of the carcass.

- Make an incision into the belly and cut downwards toward the chest. Empty the chest and abdominal cavity. Avoid accidentally opening or cutting organs during the dressing procedure and evisceration.
- Some consumers also request the kidney, liver and heart along with the carcass. Wash carcass and other edible parts with clean water.
- The chilling process is very important. Carcasses can be stored for a short term at a temperature 35 - 40°F (1.5 - 4°C). Chilling could also be achieved by using potable water and ice made from potable water. However, do not hold the bare carcass for any length of time in water as it absorbs moisture and may contaminate the carcass.
- Dressed carcasses may be sold whole or in parts. Plastic cartons and trays are available to ensure proper packaging of the product.

Record Keeping

It's absolutely essential to keep clean, accurate and neat records in the rabbitry. The only index for determining if rabbits are producing profitably is by analysing these records. By doing this the farmer can better care and manage rabbits, improve performance and increase profits. Doe and buck cards are primarily used. Keep records of the breeding dates and expected dates of kindling, litter size, mortality, weight at weaning and number of kits weaned. Weaner cards can also be developed.

With the exception of those saved for breeding (replacement bucks and does), slaughter rabbits when 13 weeks old, as it is uneconomical to grow them any longer. At this time, a dressed carcass should weigh around 2.5 lb (1.1 kg).

An example of Buck and Doe record cards are shown in the Appendices 1 and 2.

APPENDICES

APPENDIX 1: DOE RECORD CARD (Rabbits)

Farm no. Hutch no. Date of birth

Breed Sire Dam

Doe no. Age/wt at Ist mating

Litter no.	Date served	Buck no.	Date to kindle	Date kindled	No. born		Date weaned	No.		Indiv. nos	Average weaning wt	Remarks
					Alive	Dead		M	F			

APPENDIX 2: BUCK RECORD CARD (Rabbits)

Farm no. Hutch no. Date of birth

Buck no. Sire Dam

Age/wt at Ist mating

Date mated	Doe no.	Conception	Births		Total litter weaning wt (28 days)	Total litter weight (12 weeks)	Remarks
			No alive	No dead			

APPENDIX 3: BREEDING AND KINDLING CHART

Determining time of kindling

Instructions: If the doe is bred on a specific date her kindling date will be immediately below the breeding date.

January	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
February	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3
February	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
March	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
March	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
April	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1
April	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
May	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
May	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
June	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1
June	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
July	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
July	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

August	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
August	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
September	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1
September	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
October	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
November	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1
November	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
December	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
December	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31