

Feeding the house rabbit

Camilla Bergstrøm

Hay

Hay is an excellent source of fiber, and the most important part of any rabbit's diet. The rabbit's digestive system is dependent on large amounts of indigestible hay-fiber to obtain and maintain optimal digestion. Hay must therefore be available at *all times*.

Fiber has several important functions:

- Protects against gastro-intestinal stasis,
- Prevents constipation caused by accumulation of fur in the intestines,
- Adds moisture and volume to the feces,
- Prevents enterotoxaemia,
- Provides a healthy bacterial balance in the cecum.



C. Bergstrøm

Hay – for healthy tummies and teeth

The rabbit's digestive tract is made for quickly processing large amounts of high-fiber / low-calorie food. Too little fiber in the diet can cause serious problems. Many of these problems can be avoided by offering the rabbit unlimited amounts of grass hay every day.

The quality of the hay is very important. Good quality grass hay should be rough, green, dry, have a sweet and spicy aroma, and generally *look* appetizing. Some say that the smell of good hay

resembles the smell of tobacco. It's important that the hay does not contain too much dust. Small particles of dust may cause respiratory problems. The hay sold in pet stores is often of very bad quality, and many rabbits refuse to eat it. Often



it's better to buy from local farmers or stables. Hay that is moist or has a mouldy smell can make your rabbit sick, and must be removed immediately.

Hay should be stored in a dark, dry place. Direct sunlight may ruin important vitamins and minerals in the hay.

Offer you rabbit hay from a basket or a hayrack. Hay that ends up on the cage floor, and gets soaked in urine and droppings, must be removed as soon as possible.

Stuffing the hay into wicker baskets, empty paper rolls, and other fun containers, might encourage some rabbits to eat more hay.

Another method to increase hay consumption is to put the hay directly on the floor in the rabbit's living area, away from the toilet. This way the hay is always available, and the rabbit can graze peacefully from the ground like wild rabbits do.

Vegetables

Most rabbits love vegetables. They add variation to the diet and are entertaining to eat. Vegetables also contain many nutrients your rabbit need. The high water content helps hydrate the intestinal content, and further improve digestion.

Introducing vegetables

It is very important that vegetables and other types of fresh food are introduced *slowly* and *carefully*. It is often best to introduce just one kind at a time. Don't be tempted to give your rabbit large amounts in the beginning. This can cause soft stools, diarrhoea or stasis. Start with one vegetable (e.g. celery). Offer a small piece and wait for at least 24 hours. If there are no soft stools, a larger piece can be offered the next day. If the droppings get soft, discontinue the introduction, and try again some other time. Take your time, and allow 5-7 days to introduce each vegetable.

The digestive tract of young rabbits is not fully developed and they may suffer diarrhea if the diet is changed. Watery stools are, however, more often the result of an infestation of the digestive tract by coccidia, a major cause of death at this young age. Young rabbits will start to nibble on hay and fresh vegetables after leaving the nest, at age of 2 or 3 weeks. If the young does not suffer adverse effects, this natural behavior should be encouraged, so to help develop a healthy bacterial flora in the intestine. If a young rabbit does not handle fresh food well, it should be stopped during a few days, and then reintroduced slowly. Other causes like parasitic infestation or environmental conditions should be ruled out.









Hold the carrots, please!
 These delicious roots are sugary, and should only be offered as treats.

An adult rabbit should be offered at least 3-6 different types of vegetables every day. Be sure to vary once in a while to keep it interesting. A 6 lbs rabbit should have between 1 ½ and 2 ½ cups of fresh vegetables a day. It is an individual matter which, and how much vegetables a rabbit can tolerate. You might have to experiment a little to find the perfect balance for your









rabbit.

At least one of the daily vegetables should contain vitamin A (e.g. beet tops, broccoli, carrot tops, dandelion leaves, endive, cress, chicory).








Some vegetables to try:

<p>Carrots and tops (the toots should be limited because of the high sugar content)</p>	<p><i>Daucus carota</i></p>	
<p>Celery sticks (cut into 1 in. pieces)</p>	<p><i>Apium graveolens</i></p>	
<p>Celeriac (celery root)</p>	<p><i>Apium graveolens</i></p>	
<p>Radish and tops</p>	<p><i>Raphanus sativus</i></p>	



Peppers	<i>Capsicum annuum</i>	
Romaine lettuce	<i>Lactuca sativa</i>	
Lollo rosso lettuce		
Lollo lettuce		
Rucola	<i>Eruca sativa</i>	
Chicory	<i>Cichorium intybus</i>	
Artichoke	<i>Cynara scolymus</i>	
Pumpkin	<i>Cucurbita pepo</i>	



Squash, zucchini	<i>Cucurbita pepo</i>	
Beets and tops	<i>Beta vulgaris</i>	
Goutweed	<i>Aegodopium podograria</i>	
Fennel	<i>Foeniculum vulgare</i>	
Okra	<i>Abelmoschus esculentus</i>	
Alfalfa (fresh)	<i>Medicago sativa</i>	
Parsnip (should be limited because of the high sugar content)	<i>Pastinaca sativa</i>	



Parsley root	<i>Petroselinum crispum</i>	
Spinach	<i>Spinacea oleracea</i>	
Endive	<i>Cichorium endivia</i>	
Wheat grass	<i>Poa sp.</i>	
Asparagus	<i>Asparagus officinalis</i>	
Garden pea pods	<i>Pisum sativum</i>	
Tomato (should be limited because of the high sugar and oxalate content)	<i>Lycopersicon esculentum</i>	












Rabbits enjoy socializing at meal times

- Dark green and red lettuces are OK, but the light green varieties (iceberg) can cause diarrhoea in some rabbits.
- Cucumber and iceberg lettuce contain almost no nutrients and some rabbits can get digestive problems.
- Too much cabbage can cause enlargement of the thyroid and digestive problems.

The following vegetables are OK in limited amounts, but may cause gas in some rabbits:

<p>Broccoli</p>	<p><i>Brassica oleracea var. italica</i></p>	
<p>Cauliflower</p>	<p><i>Brassica oleracea var. botrytis</i></p>	



Brussels Sprouts	<i>Brassica oleracea var. gemmifera</i>	
Curly kale	<i>Brassica oleracea var. acephala laciniata</i>	
Fodder kale	<i>Brassica oleracea convar. acephala</i>	
Endive	<i>Cichorium endivia</i>	
Kohlrabi	<i>Brassica oleracea var. gongylodes</i>	
Turnip and tops	<i>Brassica rapa rapifera</i>	
Bok Choy	<i>Brassica campestris</i>	



Herbs

Rabbits have a taste for sweet food. While fruit contain sugars (mainly fructose), they are a good source of minerals and vitamins, especially for rabbits suffering from health disorders. Although anecdotic, banana is said to help rabbit who suffer light digestive disorders and soft fecal production. This fruit also help a rabbit keep on weight when suffering a major health problem. The rabbit seen at the end of this page, a black Flemish giant, ate one whole banana per day, aside hay, pelleted food, fresh vegetables and herbs.







Most rabbit digest fruit well from a young age, while a handful will suffer watery fecal or gas production. Since this is individual to every rabbit, it is the task of the owner to experiment with the amount the rabbit digest well, and keep to this. As a rule, all seeds and pits should be removed in advance. Some contain toxins that may be harmful.

Fresh pineapple and papaya contain enzymes (bromelain and papain) that help break down particles of food and mucus (proteins, fats and sugars) that bind together fur in the digestive tract ("hairballs" or trichobezoar). These enzymes can be used during molts to reduce the development of fur-related blockages. Only fresh papaya and pineapple contain these enzymes.








Some safe herbs to try:

Basil	<i>Ocimum basilicum</i>	
Peppermint	<i>Mentha piperita</i>	
Parsley	<i>Petroselinum hortense</i>	










Garden cress	<i>Lepidium sativum</i>	
Sage	<i>Salvia officinalis</i>	
Caraway	<i>Carum carvi</i>	
Dill	<i>Anethum graveolens</i>	
Oregano	<i>Origanum vulgare</i>	
Lavender	<i>Lavandula sp.</i>	
Comfrey	<i>Symphytum officinale</i>	



Dandelion	<i>Taraxacum officinale</i>	
Rosemary	<i>Rosmarinus officinalis</i>	
Thyme	<i>Thymus vulgaris</i>	
Clover	<i>Trifolium pratense</i>	
Camomile	<i>Matricaria chamomilla</i>	
Coriander, cilantro	<i>Coriandrum sativum</i>	
Borage	<i>Borago officinalis</i>	



Salad burnet, small burnet	<i>Sanguisorba minor</i>	
Chervil	<i>Cherifolium cerefolium</i>	
Lovage	<i>Levisticum officinale</i>	
Mustard greens	<i>Sinapis</i>	
Tarragon	<i>Artemesia dracunculus</i>	
Lemon balm	<i>Melissa officinalis</i>	
Nettle	<i>Urtica dioica</i>	





Most rabbits love herbs.

Here, a pot of basil is suffering the ultimate sacrifice: death by hungry rabbits!

Fruits and berries

Rabbits have a taste for sweet food. While fruit contain sugars (mainly fructose), they are a good source of minerals and vitamins, especially for rabbits suffering from health disorders. Although anecdotic, banana is said to help rabbit who suffer light digestive disorders and soft fecal production. This fruit also help a rabbit keep on weight when suffering a major health problem. The rabbit seen at the end of this page, a black Flemish giant, ate one whole banana per day, aside hay, pelleted food, fresh vegetables and herbs.

Most rabbits digest well a variety of fruit from a young age on, while a handful will suffer the production of watery fecals and/or gas. Since this is individual to every rabbit, it is the task of the owner to experiment with the amount given, and to keep to this. As a rule, all seeds and pits should be removed in advance. Some contain toxins that may be harmful.

Fresh pineapple and papaya contain enzymes (bromelain and papain) that help break down particles of food and mucus (proteins, fats and sugars) that bind together fur in the digestive tract ("hairballs" or trichobezoar). These enzymes can be used during molts to reduce the development of fur-related blockages. Only fresh papaya and pineapple contain these enzymes.

Banana contains fructo-oligosacharides, which are sometimes referred to as prebiotic (not probiotic = enteric bacteria found in products such as e.g. Benebac, probios, Protexin). These prebiotics help the proliferation of the regular bacteria of the intestine, and inhibit growth of pathogen bacteria in human beings and in rabbits. This action helps stop watery feces or diarrhea. In other animals, fructo-oligosacharides contribute, moreover, to an increased absorption of nutrients in






the intestine, e.g., iron, calcium or magnesium. More information on fructo-oligosaccharide digestion in rabbits can be found in *The Nutrition of the Rabbit*, by de Blas and Wiseman, 1998, 2010).

Not all sugars are thus bad for rabbits; some help restore the bacterial balance in the digestive tract.

Some fruits and berries to try:

Raspberry (and leaves)	<i>Rubus idaeus</i>	
Blueberry (and bushes)	<i>Vaccinium myrtillus</i>	
Cowberry (and bushes)	<i>Vaccinium vitis-idaea</i>	
Strawberry (and leaves)	<i>Fragaria vesca</i>	
Blackberry (and leaves)	<i>Rubus fruticosus</i>	
Apple (remove seeds)	<i>Malus</i>	



Melon	<i>Cucumis trigonus</i>	
Papaya	<i>Papaya vulgaris</i>	
Pear (remove seeds)	<i>Pyrus sp.</i>	
Peach	<i>Amygdalus persica</i>	
Pineapple	<i>Ananas comosus</i>	
Grapes	<i>Vitis sp.</i>	
Banana	<i>Musa sapientum</i>	
Orange	<i>Citrus aurantium</i>	



Mango	<i>Mangifera indica</i>	
-------	-------------------------	---









Flowers

Flowers are pretty to look at, and some taste delicious as well. As with herbs, make sure the flowers you pick are safe.








Some flowers to try:

Apple	<i>Malus sp.</i>	
Mustard	<i>Sinapis</i>	










Basil	<i>Ocimum basilicum</i>	
Borage	<i>Borago officinalis</i>	
Salad burnet, small burnet	<i>Sanguisorba minor</i>	
Calendula (pot marigold)	<i>Calendula officinalis</i>	
Camomile	<i>Matricaria chamomilla</i>	
Clover	<i>Trifolium pratense</i>	




Coriander (Cilantro)	<i>Coriandrum sativum</i>	
Dandelion	<i>Taraxacum Officinale</i>	
Day lily	<i>Hemerocallis sp.</i>	
Dill	<i>Anethum graveolens</i>	
Daisy	<i>Bellis perennis</i>	
Fennel	<i>Foeniculum vulgaris</i>	
Gladiolus	<i>Gladiolus sp.</i>	



Hyssop	<i>Hyssopus officinalis</i>	
Jasmine	<i>Jasminum sambac</i>	
Wild pansy	<i>Viola tricolor</i>	
Lavender	<i>Lavendula sp.</i>	
Rose	<i>Rosa sp.</i>	
Rosemary	<i>Rosmarinus officinalis</i>	
Sage	<i>Salvia sp.</i>	



Sun flower	<i>Helianthus annuus</i>	
Thyme	<i>Thymus sp.</i>	
Great plantain	<i>Plantago major</i>	



Twigs and branches

Rabbit teeth grow constantly throughout their lives (approx. 2 mm per week). Even though a diet consisting of hay, vegetables and pellets normally is enough to keep the teeth nice and short, it is wise to give the rabbit a twig to chew on once in a while. Twigs not only help wear the teeth down – they are nutritious and fun as well. Before you give your rabbit a twig to chew, you must make sure that it's picked from a tree that is not toxic to rabbits. Furthermore, the tree must not have been exposed to chemicals or pollution from busy roads.

Trees carrying drupes – single-seeded fruits (including plum, cherry, apricot and peach) are toxic to rabbits.



Safe trees: Willow, spruce, ash, birch, maple, juniper, poplar, apple, pear, hazel and hawthorn.

Pellets

Pellets are a concentrated source of energy and nutrients. They contain a number of vitamins and minerals, and makes sure your rabbit is getting all the nutrients it needs to grow and stay healthy. Even though fresh foods also contain vitamins and minerals, they lack certain nutrients such as essential fatty acids. The low concentrations of these nutrients do not necessarily harm the rabbit on short term, but over time it will have a negative effect on its general health.

In some parts of the world, good pellets are really hard to find. A good brand should contain minimum 18 % fiber, 12-14 % protein, maximum 3 % fat and between 0,5 and 0,8 % calcium. A rule of thumb is that the fiber content always should exceed the protein content.

The recommended amount of pellets for an adult rabbit is 1/4 to 1/2 cup pellets per 6 lbs. body weight. Again, it's important to consider the individual need of each rabbit. Some have a fast metabolism, and will need more than the recommended amount. Some rabbits easily Gain weigh and need less. Growing rabbits (under 6 months) need more pellets. The same goes for breeding does, rabbits suffering from disease, or is recovering from surgery. Spayed and neutered rabbits might need fewer pellets because the energy that used to power the reproductive system is no longer used.



Pellets are an important part of a healthy diet, and a balanced source of vitamins and minerals. But pellets contain many calories and your rabbit can get overweight if they are fed too much. Restriction and knowing your rabbit is important.



HAY is still the most important thing you can feed your rabbit. It is hay that ensures that the digestion functions optimally.

Good digestion is the key to a happy and healthy rabbit!



ENJOY!

Acknowledgement

Thanks to my rabbits/teachers Babs, Robin, Pia, Todi and Lille, and to Esther van Praag for adding this article to MediRabbit.

The information and pictures on these pages may not be reproduced, or republished on another webpage, website, or elsewhere.

JULY 2005
updated 2011

