

R a b b i t Production

“Tastes like chicken!”

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USDA once proclaimed rabbit meat to be...
“the most nutritious meat known to man.”

Nutrition Facts	
Serving Size 1 oz	
Amount Per Serving	
Calories 39	Calories from Fat 14
% Daily Values*	
Total Fat 1.57g	2%
Saturated Fat 0.471g	2%
Polyunsaturated Fat 0.306g	
Monounsaturated Fat 0.425g	
Cholesterol 16mg	5%
Sodium 12mg	0%
Potassium 94mg	
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars -	
Protein 5.68g	
Vitamin A 0%	● Vitamin C 0%
Calcium 0%	● Iron 2%

* Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Nutrition Values are based on USDA Nutrient Database SR18



Domestic rabbits

Oryctolagus cuniculus

- Order *Lagomorpha*
 - Are not rats!
 - Are different from hares
- Descend from European wild rabbits
 - Some behavior similarities
 - Some behavior differences
- Selective breeding of rabbits began in the Middle Ages (before 16th century).



Domestic and wild rabbits cannot interbreed.

Rabbits are a multi-purpose animal.

- Meat
- Wool
- Fur (pelts)
- Laboratory
- Hobby
- Pets
- Show
- Manure

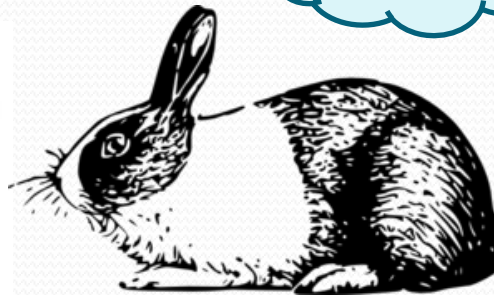
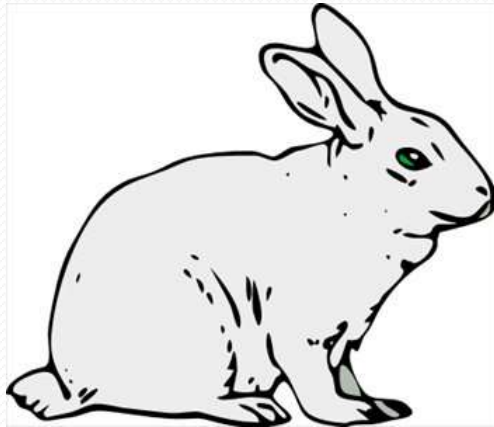


Californian doe at Garrett College

How many rabbits in the U.S.?

We don't know. In 2000, USDA estimated there to be 9 million.

- 5 million pet rabbits
- 2 million rabbits harvested for meat
- 1 million rabbits raised as 4-H/FFA projects
- 930,000 rabbits raised by hobby breeders
- 250,000 rabbits used in research



Compared to 8 billion chickens!



Rabbits in the world

- China
21% of production
- European Union
54% of production
 - France
 - Italy
 - Spain
- Developing countries
 - Subsistence agriculture
 - Economic development
- Considered “pests” in Australia and New Zealand.



Trinidad and Tobago

Rabbits vs. poultry: similarities

- Small livestock that do require a lot of land or investment.
- Not difficult to handle.
- USDA does not require inspection of small-scale poultry slaughter or rabbits.
- Slaughter regulations in Maryland are the same for small-scale poultry and rabbits.
- Produce healthful, low-fat white meat.



Proper way to hold and carry a mature rabbit.

Rabbits vs. poultry: differences



- Different biology
 - Anatomy
 - Digestion
 - Reproduction
 - Behavior
- Very small industry
 - Mostly pets and hobby
 - Few approved drugs.
 - Rabbit is not a widely consumed meat.
 - “Easter bunny syndrome”

Talk like a rabbit producer

- Doe - female rabbit
- Buck - male rabbit
- Kit (kitten) - baby rabbit
- Kindling - giving birth
- Fryer - market rabbit that is 8 to 10 weeks old and weighs 4-5 lbs.
- Cuniculture - raising of rabbits.
- Hole - production unit



Breeds

The Californian and New Zealand (White) are by far the most popular breeds for meat production.



Californian

(Himalayan x Chinchilla x New Zealand)
medium size, 9-11 lbs.



image from rabbitbreeders.us

New Zealand

(white, red, black, and broken varieties)
medium size, 10-12 lbs.

Other breeds used for meat production

Breed	Size
Altex (composite, sire)	> 13 lbs.
American Chinchilla	9-12
Champagne d'Argent	9-12
Flemish Giant	13-14
Florida White	4-6
French Angora	7 ½ - 10 ½
Palomino	8-11
Rex	8 - 10 ½
Satin	8.5-11
Silver Fox	9-12



Raising rabbits for wool: Angoras

Four kinds of Angoras

1. English: 5 to 7 ½ lbs.
2. French: 7 ½ to 10 ½ lbs.
3. Satin: 6 ½ - 9 ½ lbs.
4. Giant: 10 lbs. and up

Harvesting the fiber

- Pluck during molt or every 10-11 weeks or shear (with scissors) every 10-11 weeks (Giant Angora).
- Average of 15 ounces per year

Image from inotternews.com



Image from travelblog.org

Any breed is suitable for show, hobby, or pet.



Dominican Republic



- The American Rabbit Breeders Association (ARBA) currently recognizes 47 unique rabbit breeds.
- Some breeds have several or numerous varieties, e.g. Netherland Dwarf has 25 varieties.
- The breeds have many fur, body, and ear types and range in weight from 2 (Netherland Dwarf) to over 13 lbs. (Flemish Giant).

Housing options

Outdoor hutches vs. indoor cages



INRA rabbit research farm in Toulouse, France

Housing options

Colonies vs. individual cages



INRA rabbit research farm in Toulouse, France



Housing options

Pasture vs. cages



Pastured rabbit in Frederick County

INRA rabbit research farm in Toulouse, France



Housing options (fryers)

Feed lot vs. cages



Rabbit "feedlot" in Trinidad



Fryers at Garrett College

General cage recommendations

Size

- $\frac{3}{4}$ square feet per pound of mature body weight
 - e.g. 30" x 30" (or 36") for commercial doe
- 18 inches high

Wire

- $\frac{1}{2}$ x 2 in. wire on sides
 - Options: "baby saver" wire or urine guards
- $\frac{1}{2}$ x 1 in. wire on floors
- ~~Solid floors~~



Does in Garrett County

Additional cage needs

- Grow-out (or bigger cages for does and litters)
- Junior does and bucks (replacements)
- Breeding bucks

Grow-out cages in France



Accessories

- Feeders
- Watering
- Nest boxes
- Resting mats
- Animal identification
- Record keeping
- Carrying cages



Automatic waterer with flexible tube

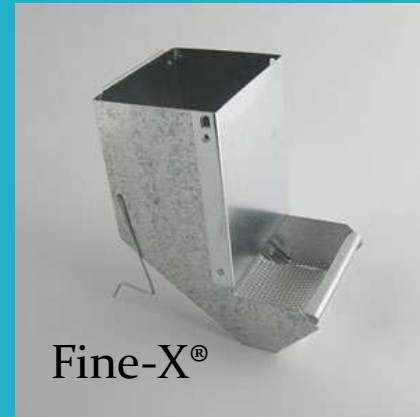
Feeders

Pelleted feed

- Crocks
- Dishes
- Cups
- Pans
- ➔ Hoppers (e.g. Fine-X[®])
- Creep feeders

Hay

- V-shaped
- Hopper
- Between or on top of cages.



Feeders from Bass Equipment Company

Watering

- Manual - receptacles
 - Dishes, pans, crocks, bottles
 - Purchased vs. home-made
- Automatic
 - Gravity-fed
 - Rigid or flexible tubes
 - Re-circulating water
 - Heated cables

Silver Fox doe with water bottle



Automatic waterer with rigid tube

Nest boxes

- Size depends upon size of rabbit, e.g. 16 x 10 x 8 in.
- Made from wood, metal, plastic, or wire.
- Purchased or homemade
- With or without lid.
- Inside or outside cage.
- On cage floor or below.
- Bed with hay or straw.
- Insulate in winter.



INRA rabbit research farm in France

Manure

Production 10-lb. doe

- 0.31 lbs/day (feces + urine)
- 0.056 ton per year

Composition

- 2.4 - 1.4 - 0.6 (N-P-K)
- 51.6% total solids
 - 24.5 lb. N/ton
 - 25.2 lb. P/ton
 - 11.1 lb. K/ton



Rabbit manure makes excellent fertilizer.

Manure handling

Collection

1. Manually remove manure from under cages
2. Collect manure on trays underneath cages and remove manually.
3. Install an automatic manure removal system (flush).

Disposal

1. Use as organic fertilizer
2. Compost and sell as organic fertilizer
3. Grow worms
4. Make methane (energy)



Meat rabbits in Western Maryland



Basics of reproduction

- Puberty (sexual maturity) varies by breed
 - 4-5 months (small)
 - 5-6 months (medium)
 - 9-12 months (large)
- Does mature sooner than bucks
- Does get bigger (heavier) than bucks
- No estrus cycle
Induced (spontaneous) ovulators
- ~30 day gestation period
- 1-14 young per litter (avg. 8)
- 4-8 litters per year
 - Can rebreed as early as 14 days after kindling
 - Wild rabbits breed within days of kindling



Reproductive Management

- Should take doe to buck's cage for breeding.
- Can palpate to determine pregnancy at 14 days.
- Put nest box in 28 days after breeding.
 - Doe will line nest with fur.
- Inspect litter after kindling
 - Can cross-foster litters (1-3 days of age)
- Wean at 4 to 8 weeks (or later).

Californian doe at Garrett College



Kits (bunnies)

- Born blind, furless, and helpless
 - Fur begins to grow at about 4 days of age
 - Eyes open about 10 days after birth.
- Does usually only nurse kits once per day.
- Take nest box out when kits are 15- 21 days old.
- Can wean as early as 28 days for commercial production.
 - More efficient to feed kits than doe
 - Decline in milk production
 - Kits are eating solid feed
 - Lactation is stressful to doe.
- ➔ Wean later (e.g. 8 weeks) for pets, show, and hobby.



Environmental considerations

Ideal environment for a rabbit is 50-60°F.

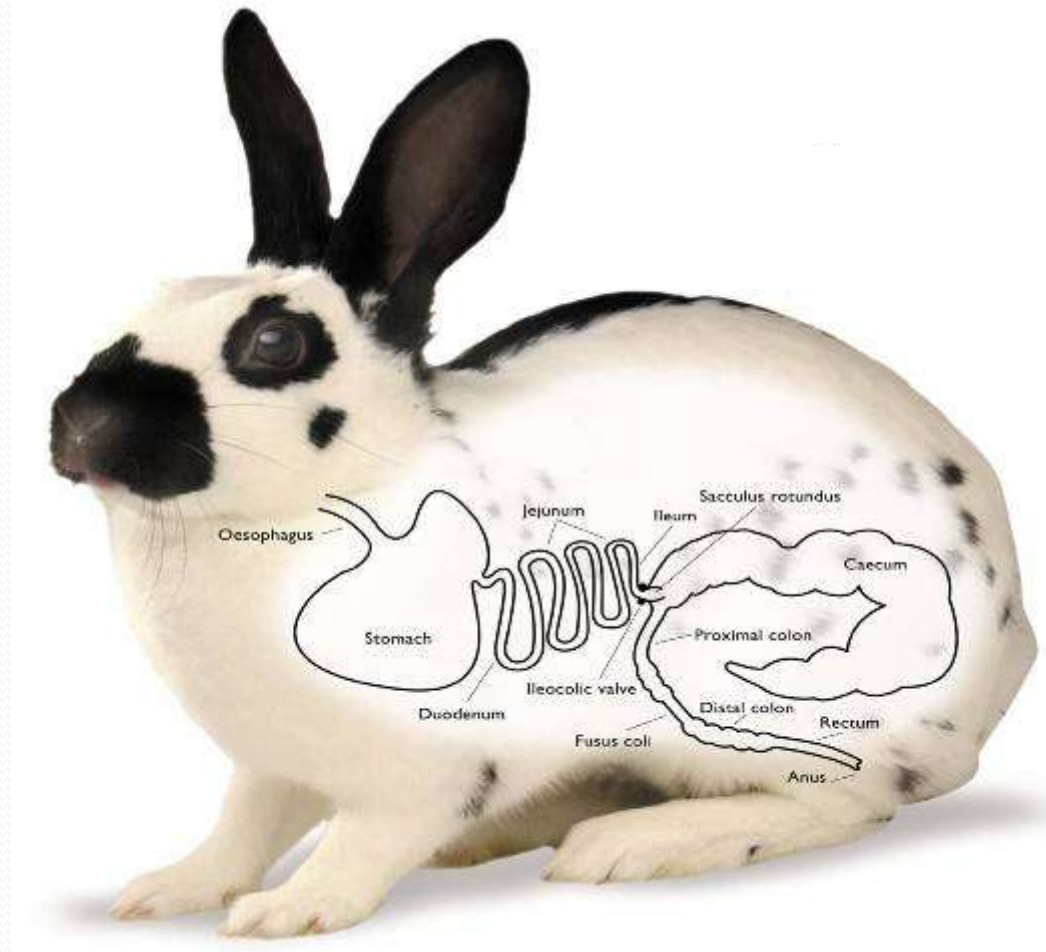
- Rabbits are very susceptible to heat stress.
- High temperatures and humidity can lower reproduction.
- Winter decline in fertility may be due to decreasing day length.
 - Can use lights to maintain 14-16 hrs. of light.



Pastured rabbit in Frederick County

Rabbit Digestive System

- Herbivore with a simple stomach
- Hind-gut fermenter
 - Microbial digestion occurs in the large intestine and cecum.
 - Sensitive to diet changes (specially overload of carbs)
- Coprophagy – rabbits re-ingest their soft night time feces.



Feeding

- Biggest expense
 - >75 percent (up to > 90%)
- Rabbits are efficient converters of feed
 - 1 lb. of meat from 4 lbs. of feed
- Feed by weight (ounces) not volume (cups).
 - Amount depends on size of rabbit and stage of production.
- Control feed wastage!



Traditional diets



- **Commercial rabbit feed**
 - 100% balanced
 - 16-18% CP
 - Pellet
 - Dehydrated alfalfa meal is usually the main ingredient.
 - 25 and 50-lb. bags
 - Expensive!
\$15-\$20/50 lb. bag
- All feeds are not created equal!
 - Ingredients
 - Pellet quality
 - Cost of gain

Alternative feeds

Can reduce feed costs, but be careful!

- Hay
 - Fresh greens
 - Crop residues
 - Agricultural by-products
 - Pasture
-
- May reduce performance.
 - High moisture feeds can cause diarrhea.
 - Wilted or spoiled feed may cause digestive upsets.
 - Always introduce new feeds slowly.

Raising rabbits on pasture



Rabbit health

- No vaccinations or deworming.
- Require excellent sanitation and healthy diet.
- Biosecurity very important.
- Veterinary expertise and approved drugs lacking.



Image by Shannon Uzelac

Common diseases

Ear canker (ear mites)

- Can cause inner ear infection, “wry neck”
- Treatment
 - Ear mite drops
 - Mineral oil
 - Ivermectin (Rx)

Sore hocks

- Treat with antiseptics and antibiotics.
- Prevention
 - Good hygiene
 - Provide board or mat for rabbit to rest on.
 - Favor rabbits with thick feet pads.

Image from Ontario Rabbit



Image from bananasforbunnies.org

Respiratory Disease

Snuffles

- Upper respiratory disease
- Treat with antibiotics
- Prevention
 - Good sanitation
 - Good management
 - Biosecurity
 - Antibiotics in feed

Image from Arizona Exotic Animal Hospital



Common diarrheal diseases

Coccidiosis (*Eimeria spp.*)

- Intestinal and hepatic (liver)
- Treat with antibiotics (Rx)
- Prevent with good hygiene and anti-coccidial medications.



Image from rabbitsandguineapigs.blogspot.com

Enteritis (complex)

- Inflammation of the intestinal tract
- Various causes: *e. coli*, *clostridium perfringens*, and *salmonella*.
- Diarrhea is common symptom.
- Treat with antibiotics and supportive care.
- Prevent with good hygiene, gradual changes in diet, and adequate fiber in diet.

Rabbit slaughter

- USDA does not recognize rabbits as an agricultural animal.
- Rabbits are a non-amendable species:

Congress has not mandated inspection of rabbits under either the Federal Meat Inspection Act (FMIA) or the Poultry Processing Inspection Act (PPIA); therefore, inspection of rabbit is voluntary (and costly).

- However, some states, permit the sale of rabbit only if it is inspected under their laws.



Rabbit meat (conejo) for sale in Spain

Rabbit slaughter in Maryland

- The Maryland Department of Health and Mental Hygiene (DHMH) does not consider rabbits slaughtered under federal exemption to be an approved source of meat (for resale) in Maryland.
- However, producers can participate in Maryland's new voluntary program and receive certification as an approved source by DHMH and sell rabbit meat (whole carcass or parts) anywhere intrastate.



Mobile slaughter unit (for poultry)



Suggested resources

- **American Rabbit Breeders Association**
www.arba.net
- **Rabbit links on the Maryland Small Ruminant Page**
<http://www.sheepandgoat.com/rabbits.html>
- **Rabbit Production: “tastes like chicken” (today’s presentation)**
<http://www.slideshare.net/schoenian/rabbit-production>
- **Rabbit Production by Cheeke, Patton, Lukefahr, and McNitt**
- **Maryland Poultry On-farm slaughter/processing Program**
http://www.mda.state.md.us/feed-food_safety-grading/food_qual_assur/poultry_rabbit/index.php
- **National 4-H Rabbit Curriculum**
<http://www.4-h.org/resource-library/curriculum/4-h-rabbit/>

Questions?

**Thank you for
your attention.**



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