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GUINEA PIGS



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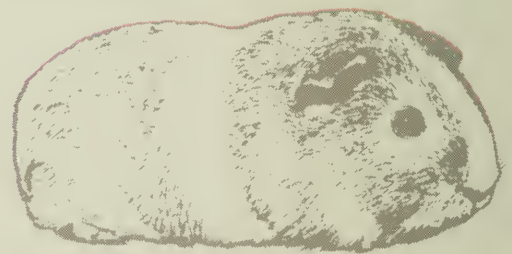
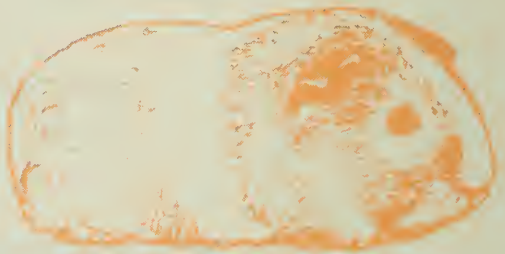
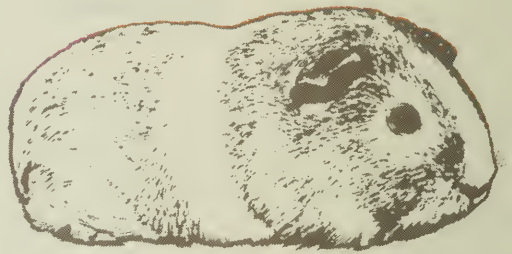
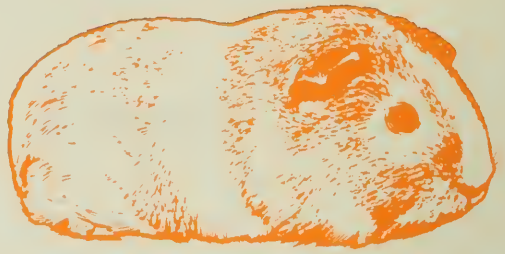
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guinea pigs

The guinea pig as a pet has always enjoyed great popularity the world over and is also highly regarded by our youngsters. It is a clean, odorless animal, not overly susceptible to disease, easy to feed and requires little care and attention. Guinea pigs, or cavies as they are also known, were introduced into Europe as pets during the 16th century by Spanish sailors returning from their South American colonies. After this introduction they soon found their way to North America. The wild ancestors (*Cavia cutleri*) of our common cavies (*Cavia porcellus*) can still be found in many parts of South America, particularly in Peru, where natives use them as food and consider them a delicacy. The cavy family consists of several genera of small animals and the much larger Patagonian cavy (mara) and its relatives. The smaller relatives are usually like solid-colored members of our domesticated form and are rarely found in captivity. The much smaller, salt-desert cavy of north-central Argentina has been exhibited and bred in some European zoos.

There are several theories as to why the cavy became known as a guinea pig. In many languages the cavy is referred to as a "pig" and we may assume that this term was carried over from one language to another. Their faint squeaking, squealing and grunting may remind one of pigs. Another suggestion is that the name Guinea should have read Guyana, or it may have merely meant foreign, or perhaps cavies were sold in Britain for a guinea (approximately 1 pound sterling). Still another suggestion is that they were introduced into Britain on slave ships via Guinea. Nevertheless, adding to this confusion, it should be noted that male cavies are referred to as boars, females are called sows. Oddly enough, there are no piglets; the sow can surprise you with little 'pups.'

Being rodents, cavies are vegetarians in diet and diurnal (active during daytime) in habit. The cavy's role for the past 300 years in our society has been that of a pet. Records show that cavies were used for scientific purposes from 1870 on, mainly by Koch, Roux and Pasteur, and are now extensively used for a wide range of experimental purposes. Early in the 20th century, English fanciers founded specialty clubs and soon a considerable interest developed. In the United States the past 25 years have brought the cavy fancy from its infancy to a level of national prominence. By selective breeding, three hair-types have been established with 22 differently colored varieties. These three hair-types or breeds are designated as short-haired American, Abyssinian and Peruvian cavy. The origin of these geographical terms cannot be traced and may remain as obscure as the name guinea pig.

management

housing

Proper housing is essential for successfully raising cavies and must be constructed according to local climatic conditions. Cavies usually do better indoors but can be kept outdoors if conditions permit. Outdoor operations are rare in Canada and can only be carried on intermittently during the summer months. Cavies must have dry quarters, well ventilated, with no drafts. Favorable temperatures are 65-75°F (18-24°C) with a relative humidity of 50-60%. For young animals the temperature can be raised to 80°F (27°C). They grow poorly if the temperature is below 55°F (13°C). Indoor heating may be unnecessary for adult cavies provided with sufficient dry bedding. When kept outdoors, cavies must be protected against predators, rain and drafts. By placing enclosed hutches some distance away from walls, ventilation is made possible and vermin are discouraged.

Pens may be constructed quite simply but should be easy to clean and disinfect. When fed greens, cavies produce much urine and frequent cleaning becomes necessary. Where large



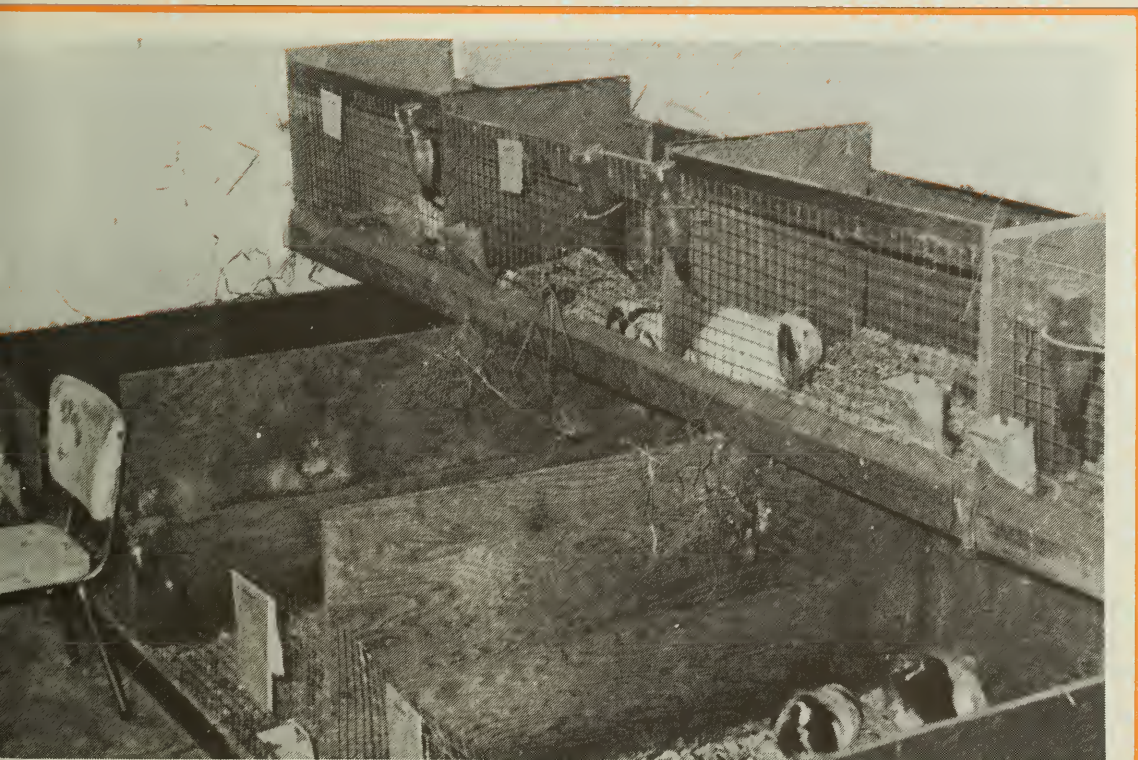
Four-tier cage arrangement in a noncommercial operation

colonies of caviae are to be used, it is advisable to divide colonies into subunits, possibly in separate rooms. This simplifies all control measures in disease outbreaks. Solid floors are the easiest to clean.

A few caviae kept as pets do well in a cage 3' x 3' x 3' (90 x 90 x 90 cm), constructed like a duplex apartment with a stairway connecting the two levels. A nest box with one or more openings goes in the bottom part, along with the feeding area, and the upper part serves as a playroom. For breeding on a small scale, a cage 3' x 2' x 12" high (90 x 60 x 30 cm) provides enough space for a boar and six sows.

There is a good deal of variation in size and arrangement of pens used by commercial operators and breeders of show animals. Large pens are divided by removable partitions made of wood, aluminum alloy, galvanized sheet iron or 1/2-inch-mesh (12 mm) wire netting on frames. Large numbers of caviae can be kept in pens 3.5' x 8' (105 x 240 cm). Cage operations often have four sows and one boar in a space 30" x 30" x 10" high (75 x 75 x 25 cm).

For bedding, dry clean wood shavings, hay, straw or shredded newspaper 4-5 inches (10-13 cm) deep are recommended. Cages and pens should be cleaned and disinfected weekly.



Females grouped in the floor cage; males in separate top cages

feed and water

Cavies are vegetarians and they like to eat greens and roots, such as clover, grass, dandelion, celery, spinach and lettuce, and apples. Some breeders even feed raw potatoes. Greens are necessary to provide vitamin C (ascorbic acid), which is not produced by the animal. The daily requirement of vitamin C is 1 mg/100 g of body weight. Many fanciers feed cabbage but this gives the urine a strong odor.

All cavies require a certain amount of roughage, such as straw and hay, which is utilized in the large cecum. If clean fresh hay is available, the animals will consume lots of it. It is particularly useful during winter, when greens are less plentiful. However, in many commercial operations and laboratories, cavies do well and reproduce without hay.

Feed should be available at all times. Commercial pellets for cavies contain vitamin C and 18% protein and can be fed as the sole ration (without straw or hay). Rabbit pellets contain less protein and no vitamin C and can only be fed to cavies by supplementing the diet with ascorbic acid (in the drinking water) or greens. Give young animals and breeding stock cavy pellets daily or, if they receive a 'green diet,' two or three times a week. Never supply medicated feed routinely.



For winter feeding, carrots and apples besides pellets appear to be adequate for fulfilling vitamin requirements even though the vitamin content is relatively low. Vitamin C can be provided by ascorbic acid in the drinking water. Place feed such as oats or pellets in rabbit crocks or self-feeders and provide hay in a manger, away from the bedding.

Like other mammals, caviae require water. To help keep the animals in top condition, give them a daily supply of fresh, clean water. Although stoneware waterers are used, water bottles with stainless steel sipping tubes are preferable and do not get soiled as frequently (do not use glass or aluminum tubes as these can be broken or bent). As an alternate to the water bottle, a jar of water placed in an empty can reduces the amount of water that may be spilled and the feed cannot be easily dropped into it. Also, the bottom of the cage will not get wet.

Make sure that feed crocks and water containers are thoroughly cleaned daily.

◀ Duplex cage arrangement
(front screen removed)

A laboratory cage
unit for caviae ▶



handling

Cavies are one of the easiest pets to handle, as they rarely bite or scratch. To pick up animals, approach them quietly, put one hand gently across the shoulders with the thumb behind the front leg and the fingers on the opposite side. Tight squeezing of the abdomen may injure the animal, especially pregnant females. To lift a cavy, work the fingers under the body and use the other hand to aid in confining it. Frequent handling will lead to your pet becoming tame. When put on a table, cavies tend to stay motionless. Even though cavies are excitable and restless by nature, they do not try to jump over a 6-inch (15 cm) partition.

Cavies get to know their master and can learn to recognize his step. If a number of cavies are kept together, they can be fairly noisy due to squealing and whistling. These sounds are made when the animals are hungry, thirsty, frightened, or just playing. To avoid such noises, keep the feeder filled with pellets at all times and always have fresh hay in the cage.

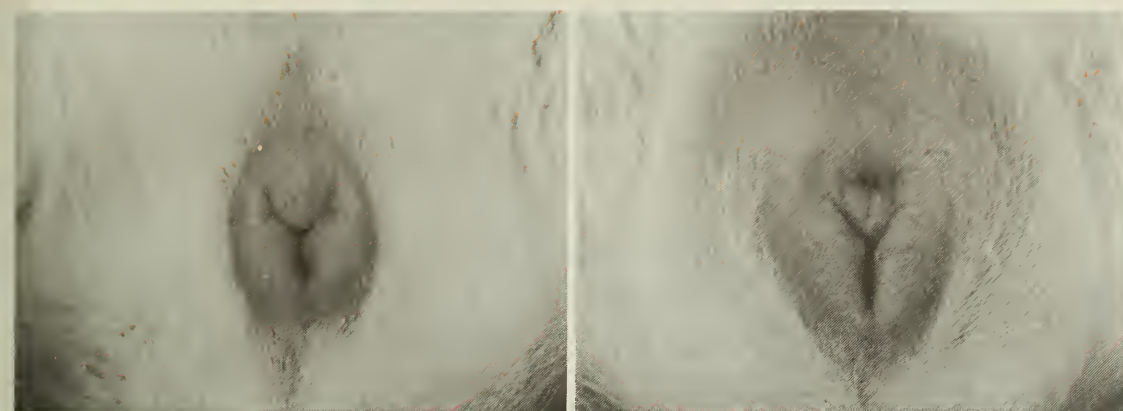
breeding

selection of breeding stock

To establish suitable breeding stock, obtain animals from existing herds with a satisfactory history of health and production. If possible, visit breeders who have a good grade of stock for sale. Note carefully whether the cavies are kept properly, are healthy and not run down in appearance. A cavy in good physical condition has a sleek, glossy coat in one or more distinctive colors. Select for vitality!

Regardless of the color or breed you intend to raise, type and size are important. Select your cavies before weaning and obtain them at weaning age, preferably from a breeder. If you are going to breed cavies on a commercial scale, costs are the main factor, as the aim is to produce healthy animals as economically as possible. If you plan to breed them for exhibition, then show points are of utmost importance.

Selection of the right variety for show purposes may be difficult. Experienced breeders recommend starting with two varieties, such as white and black Americans. White or black American short-haired cavies are easier to breed than, for instance, Dutch or tortoise shell with their distinctive color patterns.



Genitals of female cavy

Genitals of male cavy

breeds

There are three breeds¹ of cavies, known as American, Abyssinian and Peruvian. The breeds are divided into varieties according to their colors and patterns, as listed on page 11. The most common breed is the American cavy. Body type, standard weight and color are the same for all three breeds, except that colors tend to be lighter in long-haired breeds than in short-haired ones.

Breeders distinguish between surface color, under-color, top and belly color. Color is the most interesting aspect of cavy breeding and is the most prominent feature in the American cavy. Although color does not reach the same state of perfection in the Abyssinian and Peruvian cavies, it is none the less important. Colors can be improved by selection, crossing, and hybridizing; and they are influenced by a number of factors, some nongenetic, including age and condition of the animal. Cavies sold in pet stores are usually of intermixed breeds and colors are brindled (streaky or flecked gray or light brown).

American Cavy — This is the breed grown most extensively, especially by commercial producers. The white variety with pink eyes is preferred by laboratories for experimental purposes. It has broad shoulders, a blunt Roman nose, short and slightly drooping ears, large bold bright eyes, four toes on the front and three toes on the hind feet. Like all cavies, it is tailless. The flesh is firm. The crown (top of head + neck) in a well-shaped cavy is slightly higher than the hindquarters. The American cavy is short haired and is bred in all color varieties. It is most easily groomed by simply rubbing the hand over its

¹Show requirements and color descriptions may be found in *Standard of Perfection* by the American Cavy Breeders Association.

coat in the direction of hair growth. The guard hairs may be loosened by rubbing the coat the wrong way. If the animals are on clean bedding, they do not usually need to be washed.

All breeds appear in the following color varieties:

Selfs ²		Agoutis ³	Marked ⁴
Black	Blue	Cinnamon	Broken color (two or more colors)
White	Chocolate	Golden	Dutch
Beige	Roan	Silver	Himalayan
Cream	Cinnamon		Tortoise shell
Red-eyed orange	Brindle		Tortoise shell and white
Red	Golden		
Lilac	Silver		

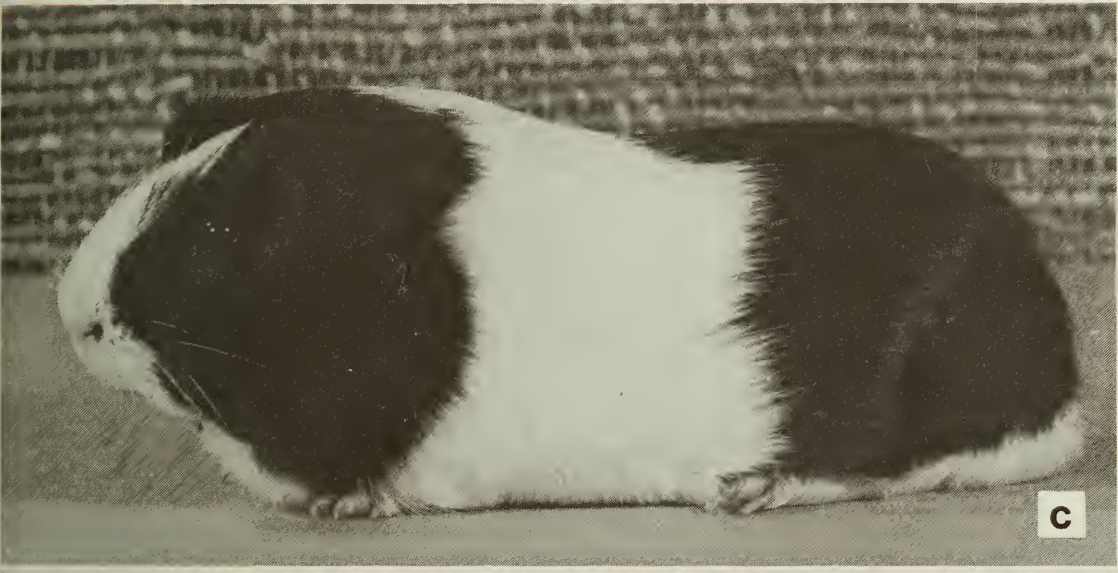
²Having one color only.

³Hair shaft possesses three or more bands of color. Ticked markings on individual hairs of head, ears and feet.

⁴Distinct patterns of different colors.

Smooth-haired American cavies: a) marked, broken color
b) marked, Dutch pattern, beige and white
c) marked, Dutch pattern, black and white
d) white laboratory strain





Abyssinian Cavy — The Abyssinian is a hardy cavy and its size can sometimes exceed that of the American. It has the same colors as the American cavy but in lighter shades. The distinguishing feature is the coat with its short, harsh, wiry texture. An erect mane reaches from shoulders to rump running down the back. The rough hair forms rosettes radiating from a distinct tiny center. Rosettes should be very distinct and should not run into one another. The more rosettes the better. When two centers are too close together, double rosettes develop and prevent full radiation. Soft coats produce unclear rosettes. The rosettes of the Abyssinian can be set by using a toothbrush. With clean bedding in the cage, washing is usually not necessary.



Abyssinian cavies: a) marked, broken color b) self, white

Peruvian Cavy — Here is the prima donna of the cavy breeds. Raising Peruvians involves considerable time in care and grooming. The coat is curly, very dense, and should be as long as possible. There are the same varieties (colors) as in the other breeds. There should be abundant forelock (frontal and shoulder hair) with very long side sweeps. The rear sweep should be uniform in length.⁵ A sweep 12 to 14 inches (30 to 40 cm) is not uncommon. Coarse coats, rosettes, or forelocks that sweep only to one side are undesirable.

⁵There is often no consensus among breeders regarding colors and hairstyles.



When breeding Peruvians, you may have to clip or wrap the rear sweep. At other times, keep the front, rear and side sweeps wrapped in paper, cloth wrappers or rollers. Do this daily and you will keep them free of tangles and mats. Clean and brush the hair at least once a week; experts advise to brush and comb down to the skin and massage it. Peruvians can be washed with baby shampoo. Rinse them thoroughly, hand-dry with a towel and then with a hair dryer. Put them on shavings in warm quarters until the show. It takes about an hour to properly prepare a Peruvian. There are no shortcuts.

breeding methods

Puberty in the female cavy may occur as early as 4 to 5 weeks. Males usually become fertile at 8 to 10 weeks of age. Some breeders believe that cavies are best mated first at 12 weeks of age. There is disunion of the pelvis during birth and, therefore, mating at 3 months prevents permanent fusion with resultant dystocia (complications at birth). However, early mating retards the growth of the female and may lead to small, weak litters. Other breeders prefer to breed their females at 5 to 6 months, with males over 6 months old. In commercial operations, sows are usually discarded at 2 years of age and boars after 12 months of age.

It is common practice to place one boar with six to ten sows. In a colony system of breeding, several boars are kept with a large number of sows. Strange males will fight and may kill each other unless they were raised and kept together. To control breeding where limited production is desired, sows are separated before the young are born. If several sows are kept together, they will nurse the young indiscriminately. If all sows are pregnant at the same time, the boar can be removed to another pen. He can be returned 2 weeks after the last sow has had her litter.

Like other species of rodents, cavies experience a postpartum estrus (an after-delivery heat) accompanied by ovulation. If mating occurs at this time (often 2 hours after the litter is born), the interval between litters is considerably reduced. Since the young are born 59 to 72 days (average 63 days) after mating, the maximum annual output is six litters. There are two basic methods of breeding: intensive or continuous breeding method (postpartum) and nonintensive or discontinuous method (remating after the young have been weaned). Breeding should be discontinued during the cold months unless the caviary is heated.

Usually a litter of three or four can be expected, though it can vary from one to six. Sows that produce less than three or more than five young per litter are undesirable. For breeding,

select the best one or two animals from litters of four and, in the long run, a strain that produces healthy stock, uniform in size and number per litter, will develop.

The young are born in an advanced stage of development — their eyes are open 2 weeks before birth. They will run with their mothers and will eat soft leafy greens a few hours after birth. Sows tend to spend their time in the nest box and leave their young elsewhere in the cage, often not even sleeping with them. Young animals may be weaned at 14 to 16 days of age. Do not leave them with their mother for more than 3 weeks or they may injure her nipples.

Weigh the pups at 3 weeks of age. Cull those weighing less than 8 ounces (227 g), as they are not healthy and, if bred, may spoil your entire herd. Healthy animals increase in body size until 15 months old. When the young are weaned in commercial operations, they must be weighed, identified, sexed and separated by sex into different pens.

diseases

general precautions

Poor husbandry leads to the occurrence of disease and loss of animals. Observe these precautions to minimize disease problems:

- ▶ Keep animal quarters warm, dry, well ventilated and free from drafts.
- ▶ Isolate newly acquired animals and those returning from shows for 2-3 weeks.
- ▶ Keep cages or pens free of vermin.
- ▶ Clean and disinfect cages and utensils weekly or as necessary.
- ▶ Provide fresh, clean water and food daily.

Laboratories with breeding colonies must take precautions when obtaining animals from outside sources to avoid introducing new disease conditions into the herd. Never introduce the imported animals directly into the breeding colony; keep them quarantined at least 2 weeks in a separate building. If animals have been shipped a considerable distance, give them 2 or 3 days to adjust to their new environment before handling them. Also, keep animals from several different breeders separately in quarantine for at least 2 weeks. Cull diseased animals immediately and continue quarantine for at least 1 week after the last death. Necropsy of culled or dead animals by a veterinary pathologist may be necessary to establish a diagnosis.

first aid

Cavies are generally easy to maintain. If health problems should arise, immediate attention by your local veterinarian is suggested. The following first aid notes on treatment of a sick pet cavy may come in handy:

- ▶ If your pet has a cold, keep it warm and dry with clean bedding and avoid any drafts. Provide plenty of hay and sufficient greens or apples.
- ▶ Let abscesses ripen and try to lance and drain them; do not let drain onto the bedding as this spreads the infectious material. Use phenol or sulfonamide ointments on the wounds.
- ▶ You can treat external parasites such as fleas or mites with an approved insecticide spray or dust. Protect the animal's eyes while applying this medication. Pyrethrum would be the safest insecticide to use. Malathion (0.5%) may be used as a dip.
- ▶ If diarrhea occurs, stop feeding greens. Isolate the sick pet and give it boiled milk with rice pablum (lukewarm or at room temperature) and lots of good hay. Keep the animal warm.
- ▶ For eye problems such as redness or discharge, treat with 4% boric acid or apply ophthalmic ointment containing neomycin or other antibiotics.

bacterial diseases⁶

Salmonellosis — Salmonellosis might be considered the most lethal of all cavy diseases. This infection usually starts with one or two deaths in the colony, followed soon after by an explosive outbreak. Some chronic cases may develop which often survive for another 2 to 3 weeks. Some animals may become carriers. If the diagnosis has been confirmed by isolation and identification of the organism, the disease can be controlled by destroying all in-contact animals with those in the surrounding units. The bedding has to be disposed of and the pens, feeding utensils, trays and other equipment have to be thoroughly cleaned with hot water containing 5% washing soda and then fumigated with formaldehyde and steam.

Pseudotuberculosis — The bacterium *Pasteurella pseudotuberculosis* causes this disease. Primary lesions are usually found in the mesenteric lymph nodes. Three types of the disease are known: acute septicemic type with rapid death; chronic type with progressive emaciation and death in 3-4

⁶The following dosage is generally recommended for the use of antibiotics in bacterial infections: procaine penicillin G (10,000 IU) and streptomycin (12.5 g) in combination for 3-14 days to the average 600-g cavy. Do not use penicillin alone.

Tetracycline in the drinking water can be used at 10 mg per 500 g of body weight. This is done by adding 250 mg of tetracycline and two saccharin tablets to 3 litres of water.

weeks; and nonfatal type with lesions confined to the lymph nodes of head and neck. As a routine measure, all animals should be palpated (examined by touch) monthly and all pups should be checked for lumps around the neck and abdomen at weaning. Infected and enlarged lymph nodes can be felt through the abdominal wall. Pregnant sows should be palpated after parturition and only remated if found negative.

Streptococcal Infection — This infection, caused by *Streptococcus pneumoniae*, occurs endemically in many colonies. Inflammation is found in the peritoneum, pleura and pericardium with abundant yellowish discharge. The condition is frequently seen in females after parturition and other stresses. Pneumonia is often responsible for the death of the animals. Except for reduced appetite and less activity, the affected animals show no signs before they succumb to the disease. Treatment is generally unrewarding. Well-ventilated, dry and temperature-controlled houses are helpful in the prevention.

Pneumonia — Pneumonia and other respiratory infections may be due to *Bordetella bronchiseptica*, *Streptococcus pneumoniae*, *Pasteurella spp.* and probably other bacteria. Coughing, sneezing, and discharge from eyes and nose usually indicate respiratory problems. Mortality, however, is only high when environmental conditions are poor. Comfortable surroundings should keep respiratory infections at a minimum level.

Cervical Lymphadenitis or 'Lumps' — Abscesses in the neck region or in other parts of the body may be caused by *Streptococcus zooepidemicus*. These abscesses do not seem to be painful and are not fatal to the animal unless they rupture and spread infected material all over the body and to other animals.

protozoan diseases

Coccidiosis — The most common parasite found in the intestinal tract is *Eimeria caviae*. It is host-specific and causes diarrhea, loss of appetite and listlessness. Diagnosis is made by microscopic examination of a fecal sample. Since developmental stages of the parasite reach the infective stage at about 6 days, regular cleaning is an effective way of controlling the disease. There is usually no problem if sanitation is adequate. Sulfamethazine (12%) for 5 days in the drinking water has also been used to arrest the infection.

other ailments

Acute Typhlitis — This infection of the cecum occurs very suddenly and the animals die quickly. Inbreeding of caviae

tends to accentuate the problem. Postmortem examination reveals a congested cecum with more or less severe hemorrhages in the wall. The cause is unknown as yet. Clostridial or coliform species may be involved. There is no effective treatment at present.

Dermatomycosis — *Trichophyton* and *Microsporum* species cause this fungal disease, which appears as multiple small dark spots around the eyes and other parts of the body. Cavies are subjected to mycotic skin infections more than other domestic animals. The infection may be transmissible to man. Treatment with griseofulvin orally (30 mg per 500 g of body weight) has been successful.

Scurvy — The condition is due to a vitamin C deficiency and is often encountered in pet cavies that do not receive proper commercial pellets. The efficiency of vitamin C in commercial feeds becomes questionable after about 60 days storage. Regular feeding of greens will prevent scurvy. Hemorrhages around the knee joint are considered to be typical in scurvy.

Metastatic Soft Tissue Calcification — An imbalance of magnesium-calcium-phosphorus is responsible for this problem in adult cavies. There are no typical signs other than listlessness in severely affected animals. The magnesium level is usually found to be too low. On postmortem, small calcified spots are visible in almost any organ of the body, but mainly in the wall of colon, stomach, and base of aorta. No treatment is known.

Molar Malocclusion — This overgrowth of the lower premolar teeth is often seen in cavies. The inability to chew properly finally leads to emaciation and death.

Pregnancy Toxemia — The onset of this condition is rapid and death is sudden, often within 24 hours. Obesity is the most important predisposing factor among females in a late stage of pregnancy, usually between 60 to 68 days. At necropsy the liver is yellow or bronze in color and infiltrated with fat. The disease is seldom found in cavies of normal weight. When obese pregnant females are subjected to a simple stress such as withholding a supplemental food many of them may die. An identical syndrome has been observed in males where obesity and stress are the inducing factors. Losses from this disease condition may occur when heavy males are shipped.

External Parasites — Cavies may become infested with lice and cavy-specific mites. Both types of parasites feed on skin debris. Persistent or frequent scratching by the animals indicates their presence. The common fur mite is *Chirodiscoides caviae* and the biting lice are *Glirocola porcelli* and

Gyropus ovalis. Sanitary maintenance of pens and utensils is the best approach to prevention of parasitic problems. Approved commercial insecticides are effective in the treatment of mite, lice, flea and tick infestations.

sanitation

cleaning

A thorough cleanup must precede all disinfecting methods. Use hot water containing 5% washing soda to clean feeding utensils and trays. Remove dust and debris from all areas. Use plenty of water. Detergents greatly assist in cleaning.

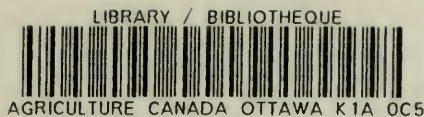
disinfection⁷

Fumigation using formalin (formaldehyde) is an effective way for prophylactic disinfection and for disinfecting contaminated cages and material. To obtain maximal germicidal activity, some requirements are essential: a room temperature of 75-100°F (24-38°C); 36-48 hours to achieve proper results; and correct concentration of the gas.

Formaldehyde gas can be generated by dropping potassium permanganate into 40% solution of formalin. The amount suggested is 1 pound of potassium permanganate to 1 pint of formalin for each 1000 cubic feet of space (400 g/560 ml/27 m³). Make sure that doors and windows are sealed, and avoid inhaling vapors. Leave the pens unoccupied for at least 2 weeks and then test the place with only a few animals. If disease has not recurred within 28 days increase the stock to the desired level.

Small cages used for pet animals or by show breeders can be thoroughly cleaned and then 'flamed' with a blow torch.

⁷Other disinfecting methods and the use of a variety of disinfectants that may be helpful in raising cavy are discussed in the bulletin *Hatchery Sanitation* available from Information Division, Agriculture Canada, Ottawa, K1A 0C7.



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METRIC EQUIVALENTS

LENGTH

inch = 2.54 cm	millimetre = 0.039 in.
foot = 0.3048 m	centimetre = 0.394 in.
yard = 0.914 m	decimetre = 3.937 in.
mile = 1.609 km	metre = 3.28 ft
	kilometre = 0.621 mile

AREA

square inch = 6.452 cm ²	cm ² = 0.155 sq in.
square foot = 0.093 m ²	m ² = 1.196 sq yd
square yard = 0.836 m ²	km ² = 0.386 sq mile
square mile = 2.59 km ²	ha = 2.471 ac
acre = 0.405 ha	

VOLUME (DRY)

cubic inch = 16.387 cm ³	cm ³ = 0.061 cu in.
cubic foot = 0.028 m ³	m ³ = 31.338 cu ft
cubic yard = 0.765 m ³	hectolitre = 2.8 bu
bushel = 36.368 litres	m ³ = 1.308 cu yd
board foot = 0.0024 m ³	

VOLUME (LIQUID)

fluid ounce (Imp) = 28.412 ml	litre = 35.2 fluid oz
pint = 0.568 litre	hectolitre = 22 gal
gallon = 4.546 litres	

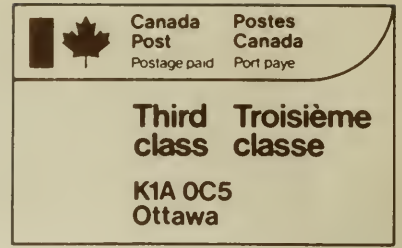
WEIGHT

ounce = 28.349 g	gram = 0.035 oz avdp
pound = 453.592 g	kilogram = 2.205 lb avdp
hundredweight (Imp) = 45.359 kg	tonne = 1.102 short ton
ton = 0.907 tonne	

PROPORTION

1 gal/acre = 11.232 litres/ha	1 litre/ha = 14.24 fluid oz/acre
1 lb/acre = 1.120 kg/ha	1 kg/ha = 14.5 oz avdp/acre
1 lb/sq in. = 0.0702 kg/cm ²	1 kg/cm ² = 14.227 lb/sq in.
1 bu/acre = 0.898 hl/ha	1 hl/ha = 1.112 bu/acre

INFORMATION
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930 Carling Avenue
Ottawa, Ontario
K1A 0C7



IF UNDELIVERED, RETURN TO SENDER

EN CAS DE NON-LIVRAISON, RETOURNER À L'EXPÉDITEUR