APPENDIX A

CAGED ANIMALS

The following information will not be part of the State of Michigan pesticide applicator certification examination.

The **Michigan Department of Agriculture Animal Industry Division** is responsible for licensing and regulating animal shelters, dog pounds, pet shops, riding stables and research facilities. The humane treatment of animals is one of the division's priorities. The MDA Animal Industry Division inspects animal facilities to assure they are clean and not overcrowded and that wholesome food is provided to the animals. If problems are found, inspectors work with company personnel to bring the conditions up to high standards for the welfare of the animals. Provided below are some guidelines for establishing these standards for caged animals. Persons in this industry should obtain a copy of the **Animal Welfare Act of 1976** and learn the standards for the care of animals outlined in it. For more information contact the MDA Animal Industry Division at (517) 373-8782.

Information on ferrets is not included because it is illegal to have ferrets as pets in Michigan, according to Act 277 of 1927, Ferrets and Fitchews.

With permission, the information in this appendix has been adapted from the Pet Industry Joint Advisory Council (PIJAC) training materials.

Receiving Animals

If you work in a pet store-type business, the following guidelines provide an overview of the minimum standards that you should adhere to and be familiar with when acquiring and caring for small animals.

The method of animal shipping and receiving varies with species and means of transportation. Those sent by commercial airlines usually arrive in wood or cardboard containers that provide temporary housing. The animals should be removed from shipping containers immediately after arrival at your establishment and provided fresh water.

Visual inspection of the container should verify that the number of animals agrees with the number stated on the bill of lading. If an animal is discovered to be dead on arrival or the count does not agree with the number stated on the bill of lading, note this information on the bill of lading before signing for the shipment. The carrier and your supplier should be notified of the incident and copies of the necessary airline report forms should be filed.

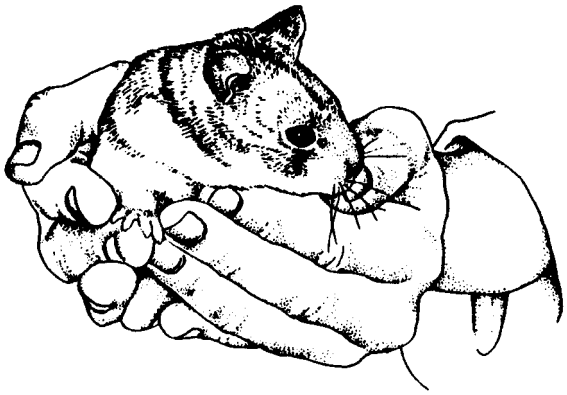
Handling Animals

Persons who handle animals should be trained on correct handling and restraining techniques to avoid injury to the handler and the animal. Animals are often fearful when in unfamiliar surroundings and should be handled with extreme caution. Correct use of holds may benefit both the animal and the handler. Inspecting an animal may be accomplished effectively with two persons, one acting as handler and the other as examiner.

Not all animals will require firm restraining. The amount of restraint needed will depend on the environment and the animal's behavior. Animal behavior will vary greatly, and handlers must learn to "read" the animals' body language. Speak to the animal initially in a soothing voice to prevent startling it. Obtain animal handling training to protect yourself and the animal. The following information may be used as general guidelines for picking-up and holding some small animals commonly found in pet stores. Always seek assistance if you are uncertain about a particular animal, how it may react and how it should be handled.

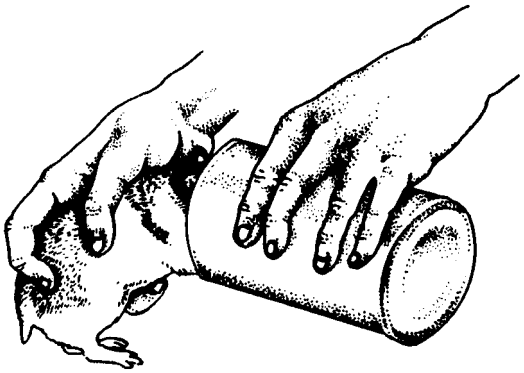
How to Pick Up a Hamster

The hamster should be fully awake before you attempt to pick it up. Grasp the hamster with both hands, as shown in the illustration, to lift it out of the cage. To prevent the hamster from escaping, a small animal box or new container should be close by to facilitate the transfer.

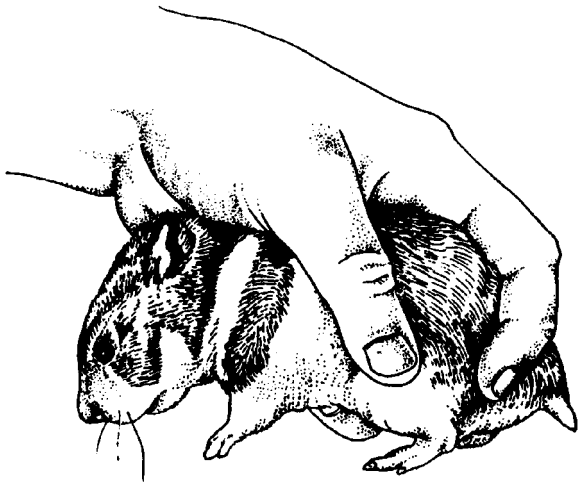


The hamster has very loose skin in the neck area. When picking up a hamster, use the method shown in the following illustration. A good deal of fur and skin should be grasped to prevent the hamster from wiggling loose or turning around and biting.

You can also use a receptacle to scoop up a hamster. This facilitates the transfer from the cage without the possibility of being bitten.

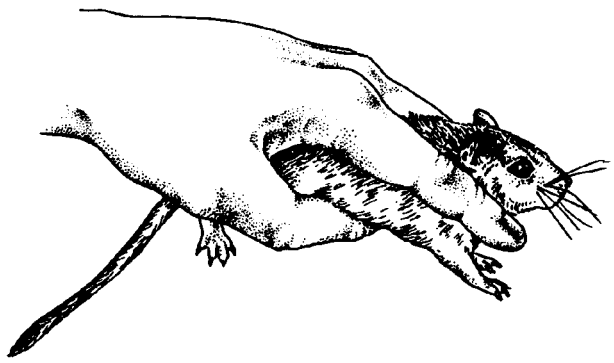


The one-hand method of grasping a hamster, as shown in the illustration below, should be used **only with very tame hamsters**. This type of grip prevents the hamster from falling.

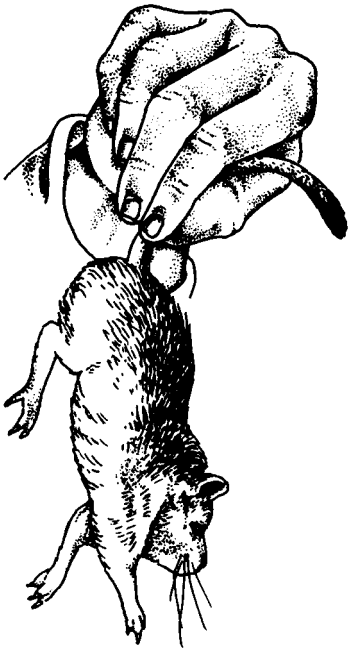


How to Handle a Gerbil

To grasp a gerbil, the over-the-back grip is recommended.

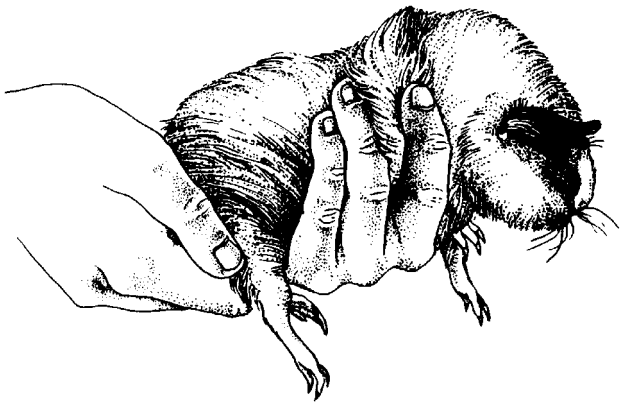


To pick up a gerbil, grip the base of the tail. NEVER attempt to pick up a gerbil by the end of the tail because the tuft and tail skin may pull off.



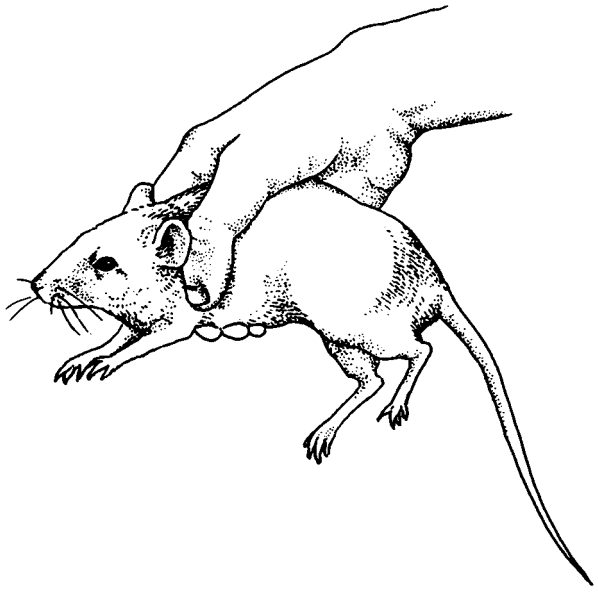
How to Hold a Guinea Pig

The chest area must be supported to prevent injury. The rump is supported to prevent back injury and to restrain the guinea pig from kicking.



How to Pick Up a Rat

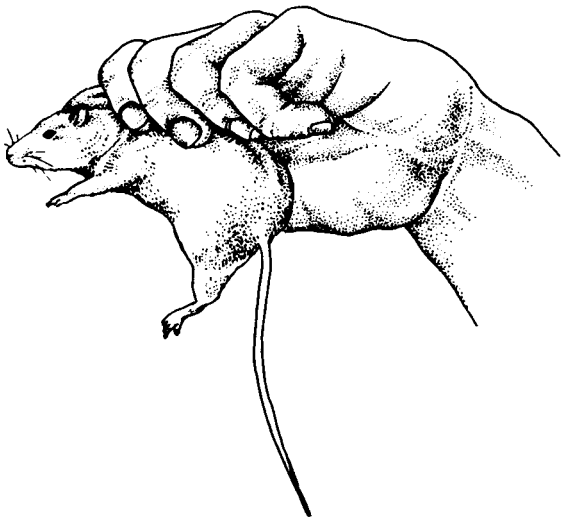
Pick up the rat by grasping it over the back and rib cage. Using this method you can place the pet in a small container to examine it. (Note: rats will struggle if turned belly up.)



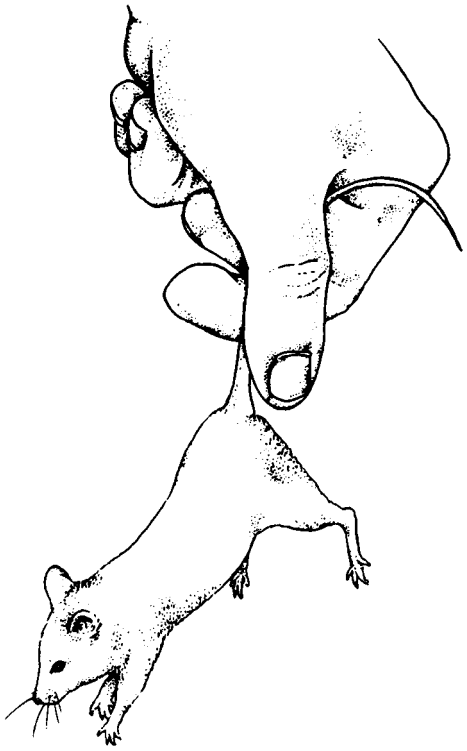
If the rat is in a wire mesh bottom cage, grasp as above and by the base of the tail, to aid in freeing the claws from their grip on the mesh.

How to Pick Up a Mouse

Grasp loose skin along back to restrain a mouse.

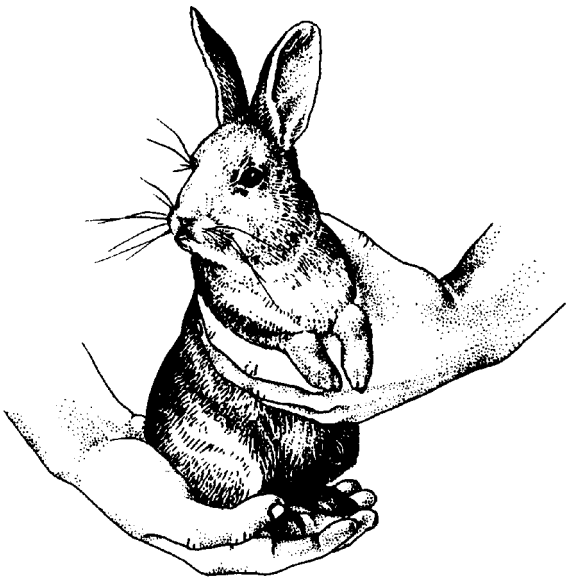


Mice, like gerbils, can be picked up at the base of the tail. NEVER pick up the animal at the tip of the tail because the skin may slough off.



How to Pick Up a Rabbit

It is important that rabbits be picked up properly. **NEVER** pick up the animal by the ears—it can harm the rabbit and cause it to be frightened whenever it is approached. Place one hand beneath the rabbit's hind legs and the other around its chest. Make sure that the rabbit doesn't kick out of your grasp.



Small Animal Housing

The environment that animals are maintained in significantly affects their well-being. Their housing should be adequate in size, clean and free from sharp edges. The following suggestions will help ensure animal comfort:

1. Use only cages fabricated of smooth, corrosion-resistant material impervious to moisture and easily sanitized. Select glass aquariums with tight fitting screen lids easy to maintain.
2. Metal cages should be constructed of galvanized metal, stainless steel, aluminum or similar metal alloys.
3. Metal cages may have bottoms of expanded metal or a galvanized wire mesh. Wire mesh floors should be smooth and free of sharp protrusions, and the grid should be small enough to prevent feet from falling through openings.
4. Small animals should be separated according to sex when possible to aid employees in making sales presentations.
5. Fresh water should be available at all times.
6. Cage lids, food and water containers, and cages should be cleaned and sanitized periodically, as needed.
7. Bedding material should be absorbent and of a type that can be eaten by the animals. It should not contain fine particles that might be inhaled.
8. Soiled bedding should be removed from the cages. Loose hair should also be removed to reduce likelihood of clogging vents.
9. Keep cages dry to avoid fly breeding, especially in corners, with resultant growth of maggots.
10. Where possible, use an ultraviolet light equipped with a Woods filter to detect evidence of ringworm. This is a common problem in guinea pigs.

Colonizing

When selecting housing and placing animals in cages, consider the following behaviors and precautions:

Hamsters – Do not overcrowd or mix strangers in with an established colony. Try not to mix sexes because of the potential for fighting or breeding. Keep cool to prevent wet tail.

Gerbils – Do not overcrowd or mix strangers in with an established colony. Strange adult males will fight.

Guinea pigs – Do not overcrowd. Long-haired guinea pigs should be housed separately from short hairs because the short-haired ones will eat the long hair.

Rats – Do not overcrowd.

Rabbits – Do not overcrowd or overheat.

Mice – Do not overcrowd.

Special Housing Considerations

Hamsters – Special housing requirements for hamsters include a temperature of approximately 68 degrees F and low (50 percent) humidity. High heat and/or humidity can contribute to a serious condition called wet tail. Twelve hamsters in a 10 gallon tank can raise the ambient temperature 6 to 8 degrees. Therefore, room temperature should ideally be kept at 62 degrees F. Because this is impractical (and hazardous to most other animals), it is recommended that hamsters be placed in wire cages rather than tanks. This allows good air circulation.

Hamsters should not be housed in fish or grooming rooms because of the high humidity. If a tank must be used, observe the following guidelines:

1. Don't overcrowd—12 animals per 10-gallon tank is maximum.
2. Use a screen cover and locate the tank in a well ventilated area.
3. Clean tank (or cage) regularly to prevent urine buildup. Add ground corncob to wood shavings (1:3 ratio) for super absorption of urine and humidity.

Gerbils may be housed in an aquarium or tank equipped with screen covers, sipper-type water bottles and ground corncob bedding. Aquarium size should be determined by the number of animals in inventory. Corncob bedding is important—its granular shape simulates the natural sand substrate. When animals burrow, the bedding removes excess hormone buildup from around the muzzle area, thus preventing the hair loss syndrome common in gerbils.

Rats, mice and guinea pigs. An aquarium with screen cover, sipper-type water bottles, and cedar or pine shavings constitutes an adequate housing unit. Aquarium size should be determined by the number of animals in inventory.

Rabbits may be housed on a wire grid in a pen-type structure. A medium mesh base is recommended for rabbits because of their high urine output. Consider a combination floor for animal comfort.

General Small Animal Maintenance Program

DAILY:

1. Visually inspect animals for signs of distress or illness. Report illness to manager and/or consult a veterinarian.
2. Medicate as approved by cooperating veterinarian.
3. Determine whether odor problem exists. Correct immediately, if necessary.
4. Separate sick or injured animals.
5. Remove open water containers, wash, disinfect, rinse and refill. Examine sipper-type water bottles and clean, if needed.
6. Remove food containers, wash, disinfect, rinse, dry and refill.
7. Wipe clean aquarium glass inside and out.
8. Wipe off and check screen covers for secure fit.
9. Remove fecal material and other debris.
10. Vacuum or mop floor.

3 to 5-day Intervals:

1. Change bedding.
2. Clean each cage, wash thoroughly with cleaning solution of warm water and detergent. Make sure all fecal material is removed. Wipe down with hypochlorite (bleach) and water solution. Mix solution: 1 part hypochlorite to 28 parts water. Recommend using 32-ounce bottle with 1-ounce markings on side.

   CAUTION: Do not mix ammonia and hypochlorite. Mixing ammonia disinfectants with any hypochlorite solution causes intense heat and highly toxic fumes dangerous to humans and animals.
3. Wash, disinfect and rinse all sipper-type water bottles or drinking devices.
4. Replace all cracked aquariums, damaged cages, and/or damaged screen covers.
5. Check drug, food, cleaning supplies inventory. Prepare list of needed supplies for manager.

Potential Caged Animal Disorders

The environmental conditions of an animal greatly influence its health and well-being. Good sanitation, a fresh water supply and adequate space will help ensure animal comfort. From time to time, problems may arise. Observe animals daily and note any abnormal conditions or behaviors. Consult with a veterinarian when you discover animal health problems.

APPENDIX B

BIRDS

The following information will not be part of the State of Michigan pesticide applicator certification examination. This information is provided for persons who care for and work with birds.

The **Michigan Department of Agriculture Animal Industry Division** is responsible for licensing and regulating pet shops, animal shelters, dog pounds, riding stables and research facilities. The humane treatment of animals is one of the division's priorities. The MDA Animal Industry Division inspects animal and bird facilities to assure they are clean and not overcrowded, and that proper, wholesome food is provided to the animals and birds. If problems are found, inspectors work with company personnel to bring the conditions up to high standards for the welfare of the animals. Provided below are some guidelines for establishing these standards for caged animals. Persons in this industry should obtain a copy of the **Animal Welfare Act of 1976** and learn the standards for the care of animals outlined in it. For more information, contact the MDA Animal Industry Division at (517) 373-8782.

With permission, the information in this appendix has been adapted from the Pet Industry Joint Advisory Council (PIJAC) training materials.

Receiving Birds

Birds should be purchased only from reputable breeders or brokers or from USDA-approved quarantine stations. Any individual offering birds at a bargain price may be attempting to sell stolen or smuggled birds. Such birds may be incubating a fatal disease that could destroy your aviary and your reputation. Periodically review published price lists and advertisements in avicultural magazines to get an idea of current prices.

Check both Federal and state laws to determine which species of birds are prohibited and which require permits to be brought into the state to sell or possess. Check each bird against the original order to ascertain that the correct species and number are received.

The Pet Industry Joint Advisory Council (PIJAC) strongly endorses the use of an avian veterinary specialist to examine and supervise the medication and treatment of birds.

Even though federal regulations do not require that bird shipments be picked up within four hours after arrival, PIJAC urges that the four hour rule be followed for birds. Upon receipt, check the birds against the information on the shipping documents.

Before receiving new birds, check to be sure that all necessary supplies are available and the receiving cages have been cleaned and sanitized and are ready with food and water.

Check with your suppliers to determine the birds' diet. Be prepared to continue feeding the birds' previous diet to avoid sudden dietary changes which may result in unnecessary stress. Gradually change the birds' food to the diet preferred in your facility. Do not give grit—stressed birds may overeat.

Birds should be unpacked quickly and then left alone with adequate light to allow them to find food and become acquainted with their new environment. If the birds arrive at night, dimmed lights should be left on.

Bird Examination

All birds should receive a cursory examination as they are removed from the crate and placed in the cage. The following preliminary examination should take only minutes and will not add significant stress to the shipping procedure. Obtain assistance from an experienced professional or veterinarian.

Newly arrived birds will usually look healthy. They will assume a flight or fight posture except when they are so debilitated they would be unable to fly. When placed in the new cage, they should remain alert and tightly feathered until the transfer is completed and the receiver has left the area.

Observe birds daily. The first observance should be from a distance of greater than 10 feet to prevent the birds from feeling intimidated and assuming the flight or fight position. Observe each bird and take notes on all birds that act list-

less or appear to have fluffed feathers. As you enter the area where the birds are housed, the birds should become alert and watch you. **Birds exhibiting abnormal behavior should be isolated and individually examined with the assistance of a veterinarian.** Examine the birds':

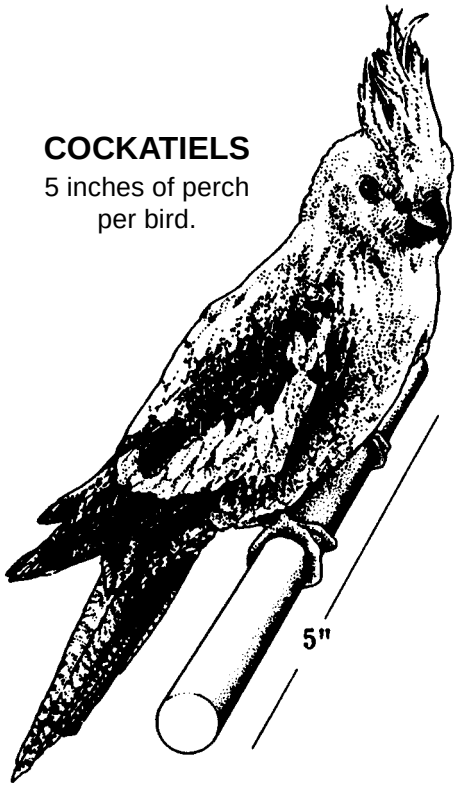
- Weight.
- Eyes.
- Nose.
- Feathers.
- Beak and mouth.
- Feet, legs and wings.

NOTE: Failure to eat is common following shipment, but any bird that does not eat after 24 hours is in danger of starvation and may require force-feeding. Check with the supplier for suggestions on diet or management.

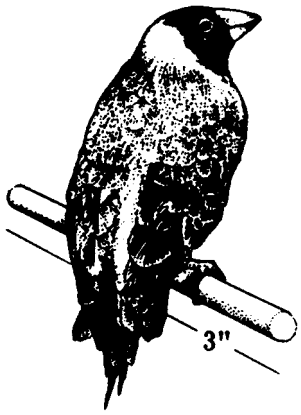
Housing

1. Caging should be constructed of materials that are impervious to moisture, easy to disinfect and strong enough to withstand chewing of occupants. The paint on cages from foreign countries should be checked as a potential source of lead.
2. Birds—except for long-tailed species—use horizontal cage space more efficiently than vertical space. Horizontal cages have more floor space, reduce fecal contamination of food and water supplies, as well as soiling of other birds, and provide better space for exercise.
3. Height provides security for birds. Housing birds at or above eye level reduces stress and limits access to the birds by curious children or mammals that may escape or be allowed to roam in the shop.
4. Cages must be strong enough to prevent birds from pulling them apart.
5. Cages for long-tailed birds should have adequate room for the bird to fully open the wings without touching the sides and top. Natural wood perches from non-toxic trees provide the best foot exercise as well as chewing material for psittacines (parrots). Finches and canaries should have two perches available to encourage them to fly between them.
6. Parrots and other large bird species should have sufficient cage space or sufficient T-stand perch space.
7. Perches in the isolation area should be of an impervious material such as PVC to allow for easy disinfection (wood surfaces are too porous).
8. Perches in the sales area may be wooden dowels of adequate size to afford the bird a secure, comfortable grip. Natural limbs, however, provide better foot exercise and chewing opportunities and are aesthetically pleasing. Branches are replaced easily and should be pesticide free and from non-toxic trees such as northern hardwoods, citrus, eucalyptus or Australian pine. Sandpaper perches should not be used.
9. A single well placed perch may be adequate for agile climbers. Passerine birds should be provided two perches to fly or hop between. In cages with more than one bird, all perches should be at the same height to avoid fighting over the highest perch. Perch space should be adequate so that all birds can sit comfortably on the perches simultaneously.
10. Discard wooden perches used by a sick bird.
11. If a perch is detrimental to the health of a particular species, perches should be omitted.
12. Feed cups and water containers should be located for easy accessibility by the bird.
13. Food and water containers should be hooded, if necessary, or placed away from perches to prevent fecal contamination.
14. Grit is not necessary for psittacine birds, though a few pieces provided once or twice yearly are not harmful.
15. During the molting of feathers, additional fat, protein and vitamins are recommended and the bird may require more time to sleep.
16. A healthy bird can tolerate temperatures that are normally comfortable to humans. Sudden temperature changes may be a potential threat to sick birds.
17. Cages or aviaries should be cleaned daily.
18. Daily paper change and weekly cage washing are recommended.
19. Many birds benefit from the availability of a hiding place such as a box or paper bag.
20. Toys are useful as mental diversions and tend to encourage exercise and beak wear. Chewable items are preferred and safety must be considered in toy selection. A few toys, which may be provided alternately, are preferable to many toys filling a cage.
21. A healthy, tamed, trained bird is easier to sell than a bird that is not socially adapted to human contact. Make sure to take time each day to play with and talk to the birds in your store. Birds must socialize before being handled. Birds that respond to customers will help sell themselves.

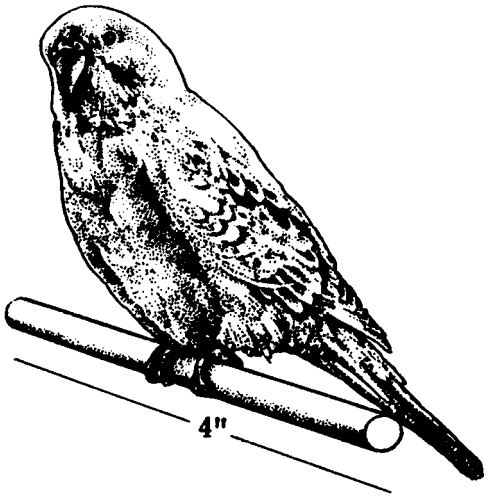
Minimum Perch Length Guidelines



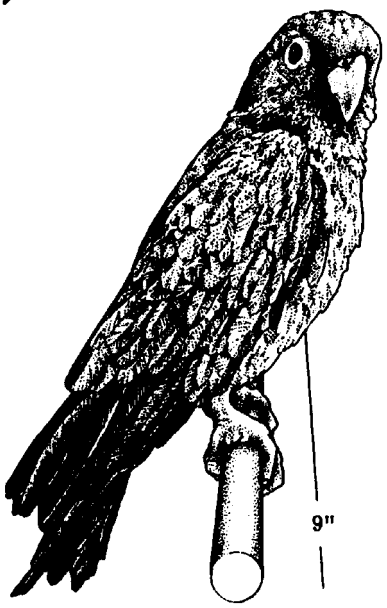
COCKATIELS
5 inches of perch per bird.



FINCHES
3 inches of perch per bird.

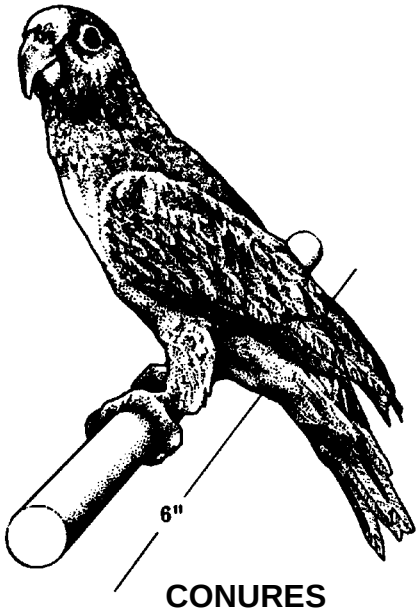


PARAKEETS
4 inches of perch per bird.



PARROTS
9 inches of perch per bird.

MACAWS & COCATOOS
10 inches of perch per bird.



CONURES
6 inches of perch per bird.

Feeding and Nutrition

Providing the most accurate, up-to-date information on bird care is a vital function of the pet shop. The sale of high quality nutritional items and bird care products, along with suitable housing for the bird, make it a better companion pet.

Over-the-counter remedies should be available for those customers who will not seek veterinary care. Shop personnel, however, should avoid playing veterinarian. The following recommendations should provide a basis for bird care in the shop as well as recommendations to customers.

Proper nutrition and a varied diet should be stressed. Many good commercial pelleted or extruded diets are on the market. These products may be fed exclusively but should be mixed with seeds and other foodstuffs.

Mixes should contain a variety of seeds and must be clean, fresh and free of insects. Feed should be stored in closed bins.

The diet should be supplemented with fresh fruits, vegetables (dark green and meaty yellow vegetables), beans and whole grain products. Consult a veterinarian for proper types and proportions of foods that should be fed to seed-eating or soft-billed birds.

Illness Identification

The most important tool for early identification and treatment of illness is observation. Part of your daily review of the bird department must include time spent observing each bird. In addition to recognizing disease symptoms early enough for effective treatment, you may prevent the spread of a disease among other birds. Birds can regress rapidly when ill. Early diagnosis and a veterinarian's assistance and treatment are essential in helping the bird recover.

The following list and chart will help you identify illness and other disorders, treat the birds and prevent the spread of the problem. For additional information you should refer to your bird supplier, publications on aviculture and your veterinarian.

Warning Signs of Bird Problems:

1. Birds should appear calm and be sitting on the perch or climbing around the cage. A bird that is sitting on the floor is usually either frightened or ill and should be examined. The bird should be able to bear weight on both feet and both feet should grip the perch.
2. Nails are overgrown.
3. Wings are not held in proper position and are not symmetrical.
4. Feathers are puffed and dull or bird is not fully feathered and has bare spots.
5. Eyes are dull, not bright and clear. Any scabs on the eyelids, cere or toes should be noted—they may indicate pox virus infection.
6. Eye or nasal discharge is visible.
7. Beak is overgrown or asymmetrical.
8. Respiration is labored or accompanied by tail bobbing or open mouth breathing. Listen for wheezing, coughing or sneezing.
9. Fecal material has accumulated on the feathers or feet.
10. Bird is lethargic.
11. Bird is off feed — look for scraps on cage floor.
12. Growths or enlargements are obvious.

Any suspicious bird condition should be examined by your veterinarian and reported to the supplier as soon as illness is suspected.

Bird Maintenance Program

DAILY:

SEED-EATING BIRDS

1. Observe each bird for signs of distress or illness. Note appetite, abnormal droppings or other problems on health records. Report illness, abnormality or loss to manager or veterinarian.
2. Remove birds exhibiting distress or illness to isolation area. Advise manager and consult veterinarian.
3. Remove and empty all water and seed cups.
4. Wash, disinfect, rinse, dry and refill seed cups with fresh seed. Replace in cage.
5. Wash, disinfect, rinse and refill water cups with fresh water. Replace in cage.
6. Remove and change cage paper as needed.
7. Clean and reposition perches as needed.
8. Remove fecal matter, loose feathers and excessive debris from cage.
9. Wipe off all cages with damp cloth to remove dust and fecal material. Clean glass.
10. Clean window glass and door glass.
11. Remove all loose seed, feathers and debris from bird area,including display shelves, cage stands and floor.

Table 1. Some Bird Pests and Parasites.

Pest/Illness	Species Affected	Signs	Diagnosis	Treatment
Scaly face Scaly leg Mite Tassel foot	All birds— parakeets, canaries most common	White, scaly deposits on eyelids, beak corners, legs, toes and vent	Skin scraping examined by microscope	Veterinarian
Feather mites (Red mites)	All birds	Restlessness, severe scratching, feather picking, skin irritation	Small, moving red dots on white cloth hung over cage at night (red mites are nocturnal). Use magnifying glass. Red mites live in crevices in cage and feed on birds at night.	Dismantle, clean and spray cage. Use approved insecticide spray on bird according to label directions.
Lice	All birds	Same as feather mites; feathers appear "moth eaten"	Eggs or lice attached to feathers. Lice are elongated.	Apply approved insecticide according to label. Be sure to apply under wings.
Roundworms (Ascarid)	All birds	Poor feather condition, weight loss, loose droppings	Stool sample— long, thin, white worms	Veterinarian
Threadworms (Capillaria)	All birds; parakeets and macaws most likely	Loss of appetite, weight loss, loose droppings, regurgitation, poor plumage	Microscopic exam of stool specimen	Veterinarian

SOFT-BILLED BIRDS — Same maintenance procedure as above, plus:

1. Wash, disinfect, rinse, dry and refill food cup with fresh food. Replace cup in cage.
2. Check cages several times during day to remove fecal materials as needed.
3. Check food several times a day to prevent contamination or souring.

WEEKLY:

1. Scrape all perches, wash and disinfect cages and trays.
2. Inspect and wipe clean ventilation system in bird area.
3. Redistribute bird inventory so there are no empty cages.
4. Check drug, food and cleaning supplies inventories. Prepare list of needed supplies for manager.

RECORDKEEPING: (Use a bird log sheet)

A record of sale of each psittacine bird should be maintained. Include:

PURCHASES –By species, the common and scientific name, the number, date of receipt, the name, address and telephone number of supplier. Verify name and address from identification document (driver's license) if supplier does not normally supply pet store.

SALES –By species, the common and scientific name, the number, date of sale, and name, address, and telephone number of customer.

APPENDIX C

RESOURCES

To advance in your field and to stay up to date on information and practices, it is beneficial to become involved with professional organizations affiliated with the small animal industry. It is also valuable to acquire resources to use as references for your work.

The following list was created from suggestions by the industry committee that provided guidance in the development of this category 7G training manual. Reference to these resources, associations, products or companies does not imply endorsement by MSU Extension or bias against those not mentioned.

PROFESSIONAL ORGANIZATIONS

Pet Industry Joint Advisory Council, 1710 Rhode Island Avenue, N.W., Washington, D.C. 20036. Telephone (202) 452-1525.

Michigan Professional Groomers Association. To become involved with the association's activities and training, contact a current member. Use the telephone directory to find current members by noting their affiliation in their advertisements. They will be able to provide you information about membership.

REFERENCE BOOKS

The Book of The Cat. Michael Wright and Sally Walters. Summit Books. 1980. New York, N.Y. 10020.

Cat Owner's Veterinary Handbook. Carlson and Griffin, Howell Publishers.

The Complete Dog Book. 18th Edition, American Kennel Club, Howell Publishers.

The Cornell Book of Cats. Cornell Feline Health Center, College of Veterinary Medicine, 618 VRT, Ithaca, NY 14853-6401.

Dog Owner's Home Veterinary Handbook. Delbert G. Carlson, D.V.M., and James M. Giffin, M.D. 1989. New York, N.Y. 10169. Howell Book House.

Manual of Clinical Procedures In the Dog and Cat. Steven E. Crow, D.V.M. and Sally O. Walshaw, M.A., V.M.D. 1987. J.B. Lippincott Company, PA.

Merck Veterinary Manual. 7th Edition, 1991. Merck.

Natural Health for Dogs and Cats. Richard H. Pitcairn, D.V.M., Ph.D., and Susan Hubble Pitcairn. 1982. Rodale Press. Emmaus, PA 18049.

The New Natural Cat: A Complete Guide for Finicky Owners. Anitra Frazier with Norma Eckroate. 1990. New York, N.Y. 10014. Penguin books USA, Inc.

Pet Allergies: Remedies for an Epidemic. Alfred J. Plechner, D.V.M., and Martin Zucker, 1986. Inglewood, CA 90309. Very Healthy Enterprises.

Your Healthy Pet: A Practical Guide to Choosing and Raising Happier, Healthier Dogs and Cats. Amy Marder. 1994. Rodale Press. The columnist for Prevention shares her years of experience as a veterinarian by offering insights into cat and dog care, including: understanding symptoms of illness, feeding and weight maintenance, travelling with a pet, caring for teeth and proper vaccinations.

MAGAZINES, NEWSLETTERS, SUPPLIERS

Advocate, 9725 E. Hampden Ave., Denver, CO 80231. Offical magazine of the American Humane Society.

Borderline, 4575 Galley Rd., Suite 400-A, Colorado Springs, CO 80915. Official magazine of the American Boarding Kennels Association.

Cat Fancy, P.O. Box 6050, Mission Viejo, CA 92690.

Dog Fancy, P.O. Box 6050, Mission Viejo, CA 92690. Twelve issues for $17.97.

Dog World, P.O. Box 6500, Chicago, IL 60680. Newsstand sales or subscriptions available.

DVM Newsmagazine, 120 W. 2nd, Duluth, MN 55820. Veterinary magazine.

Groom & Board, 207 S. Wabash Ave., Chicago, IL 60604. Groomer and kennel operator magazine with annual buyer's guide. Free to pet care professionals.

Groomer to Groomer, 341 N. 19th St., Camp Hill, PA 17011. Business-building newsletter with seminar information and letters from groomers nationwide. Free to purchasers of Barkleigh products or $15/year.

Groomer's Voice, P.O. Box 101, Clark, PA 16113. Newsletter for members of National Dog Groomers Association of America. This group also sponsors continuing education training.

Off Lead, P.O. Box Drawer A, 13 Clinton St., Clark Mills, NY 13321. Dog obedience training magazine.

New England Serum Company, Groomer/Kennel Products Division, P.O. Box 128, Topsfield, MA 01983. 1-800-637-3786.

Pet Age, 207 S. Wabash Ave., Chicago, IL 60604. Free to pet professionals.

Pet Business, 5400 N.W. 84th Ave., Miami, FL 33166.

The Pet Dealer, 567 Morris Ave., Elizabeth, NJ 07802. Contains groomer column and calender. Special subscription rate.

Pets-Supplies-Marketing, E. First St. Duluth, MN 55802. Contains groomer calender and Shirlee Kalstone's grooming column plus buyer's guide. Free to pet professionals.

Pure Bred Dogs-AKC Gazette, 51 Madison Ave., New York, NY 10010. $18/year.

Veterinary Forum, 1610-A Fredrica Rd., St. Simons Islands, GA 31522. $15/year.

PESTICIDE USE AND SAFETY INFORMATION

Pesticides: How They Work, Human Poisoning Treatments. MSU Extension bulletin E-0789.

Pesticide Emergency Information. May 1994, MSU Extension bulletin AM-37 or AM-37SP (Spanish version).

10 Tips for Laundering Pesticide Soiled Clothing. MSU Extension bulletin E-2149.

OTHER INFORMATION SOURCES:

Michigan Department of Agriculture
Pesticide and Plant Pest Management Division
P.O. Box 30017
Lansing, MI 48909 East Lansing, MI 48823
(517) 373-1087

Michigan Department of Agriculture
Animal Industry Division
1615 South Harrison Road
(517) 373-8782

Regional MDA Offices:

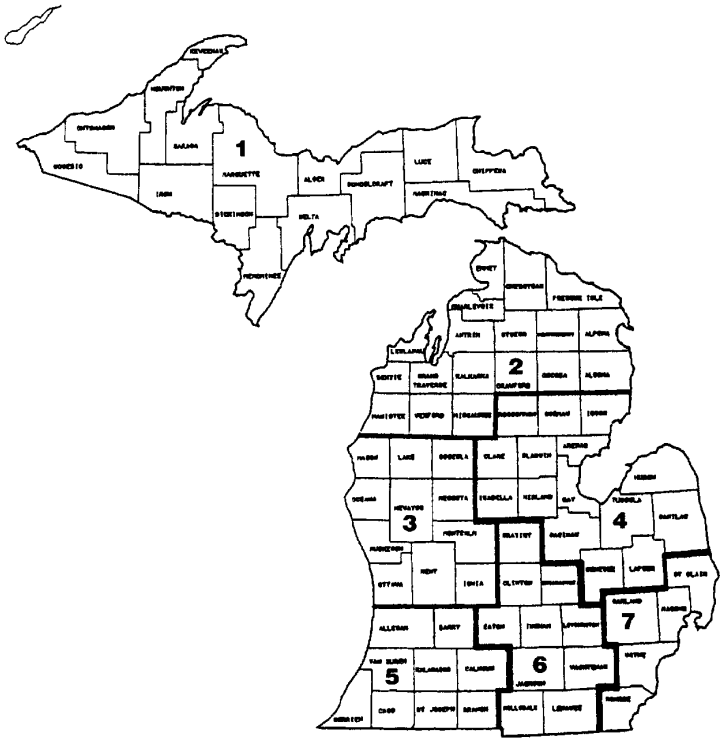
REGION 1 Room 117
State Office Bldg
Escanaba, MI 49829
(906) 786-5462 (616) 947-3171

REGION 2 Bldg. 42, Apt 132
701 S. Elmwood Ave
Traverse City, MI 49684

REGION 3 State Office Bldg.
350 Ottawa, N.W.
Grand Rapids, MI 49503
(616) 456-6988 (517) 771-1778

REGION 4 Saginaw State Office Bldg
411-F East Genesee
Saginaw, MI 48607

REGION 5 4032 M-139, Bldg. 116
St. Joseph, MI 49805-964
(616) 428-2575 Lansing, MI 48933



REGION 6 611 W. Ottaw
North Ottawa Bldg.
(517) 373-1087

REGION 7 Lahser Center Bldg.
26400 Lahser Road
Southfield, MI 48034

Michigan State University Extension county- and campus-based personnel. County office locations and telephone numbers are listed in the white pages of your telephone book.

Answer Key to Pest Management for Small Animals Review Questions

Chapter 1 Pesticide Laws and Regulations

1. FIFRA
2. Certified pesticide applicators
3. False
4. True
5. d
6. a
7. Department of Transportation (DOT)
8. Michigan Department of Agriculture
9. b
10. True
11. False
12. Agreements between states to allow certified applicators in one state to use pesticides in another state.
13. b
14. True
15. c
16. Michigan Department of Natural Resources
17. True
18. True
19. Animal Welfare Act of 1976

    Act 224 of 1969, Use of Dogs and Cats For Research

    Act 287 of 1969, Pet Shops, Dog Pounds, and Animal Shelters

Chapter 2 – Pests and Integrated Pest Management (IPM)

1. Adult insects have three body regions: head, thorax and abdomen, and three pairs of legs.
2. b
3. c
4. An organism the pest is associated with.
5. True
6. Dermatitis is the direct damage and inflamma tory reactions of animal skin caused by arthro pod bites and body secretions.
7. The four groups of important animal insect pests are:

    -biting and non-biting flies.

    -invasive flies.

    -chewing and sucking lice.

    -fleas.
8. Integrated pest management—the use of all available strategies to manage pests so that an acceptable yield and quality can be achieved economically with the least disruption to the environment.

    1. Detection, 2. Identification, 3. Economic or medical significance, 4. Control method selection, and 5. Evaluation.
9. Early detection of small pests:

    -allows the manager more control options.

    -reduces animal discomfort by preventing increased pest populations.
10. Identifying the pest allows the animal manager to gather information about that particular pest (life cycle, biology) so that the pest's susceptible life stage can be targeted for control.
11. Economic injury levels are most important in agricultural settings (livestock, etc.).
12. The fifth step in IPM is evaluation of the pest control method used.
13. The applicator must consider dose-response relationships and pesticide choice.
14. IPM strategies include:

    biological – use of predators and parasites.

    cultural – keep pet well groomed and its environment clean, provide adequate diet and exercise.

    mechanical- groom pets, vacuum area regularly, use lights to attract pests away from animals.

physical – sticky flypaper, separate animals, clean up after infested animals.

pest-resistant breeds – use breeds of animals that are resistant to certain conditions and characteristics of that area.

sanitation – keep kennels, pet exercise areas, houses and bedding clean.

quarantines – isolate a new animal to confirm it is pest-free.

chemical- pesticides.

Chapter 3 – Pesticides

1. e
2. 1. Types of pests managed, 2. How pesticides work, 3. Pesticide chemistry, 4. Pesticide formulations.
3. insects
4. e
5. True
6. Tremors, vomiting, salivation, ataxia, loss of appetite, diarrhea, seizures, breathing difficulty, weakness, death.
7. Organophosphates and carbamates. A wide range of insects including fleas, ticks, mites and lice.
8. True
9. False
10. b
11. Contact pesticides kill pests when they come into contact with them; systemic pesticides are absorbed by one part of the animal or plant and then are distributed internally to other parts of the plant or animal to kill the pest.
12. a
13. True

14. Chlorinated hydrocarbons, organophosphates, carbamates, synthetic pyrethroids.

15. A premise spray will persist in an animal's living area for a long period of time. A space or area spray does not have residual qualities and kills only the pests present at the time of application.
16. Identify the pest to be sure the product is effective in controlling it; determine if the product is labeled for use on small animals; determine if there are use restrictions for certain animals, such as young ones or cats; type and percentage of active ingredient; toxi city; formulation; equipment required to make the application; requirements for retreatment.
17. An incompatible mixture of pesticides is either ineffective or unsafe for the applicator or the animal being treated.
18. Physical, chemical, host tolerance, timing and timing incompatibility. See these sections of the chapter for definitions.
19. On the pesticide label.
20. Nontarget organisms may be people, animals, insects or plants that are not intended to be treated or exposed to a pesticide application.

Chapter 4 – Pesticides and the Environment

1. Any of the following: adsorption, absorption, volatilization, runoff, leaching, microbial degradation, chemical degradation, photo-degradation.
2. False—vapor drift is not visible.
3. Run-off; leaching
4. aquifers.
5. The rate of breakdown will be slower because of less available light, heat and oxygen.
6. Point source contamination is from a discharge at a single location. Nonpoint sources include land runoff, precipitation, acid rain and percolation.
7. Prevention
8. See section titled "Keeping Pesticides Out of Groundwater" in the chapter.
9. c
10. Animals eat granules, baits or treated seed; they become exposed directly to a spray; they eat the treated crop or contaminated water; they feed on pesticide-contaminated prey.

Chapter 5 – Pesticides and Human Health

1. Toxicity measures the capacity of a pesticide to cause injury. Hazard is the potential for injury.

2. True. Wear a hat or face shield.
3. False
4. Children
5. Inhaling pesticides during mixing, loading or application. Any activity where pesticides enter the mouth, such as siphoning a pesticide with your mouth, or eating or drinking while working with pesticides.
6. Chronic, acute
7. e
8. b
9. b
10. Pesticide label
11. Organophosphates, carbamates
12. Cholinesterase
13. People who work with organophosphates or carbamates for an extended time.
14. Pesticide label
15. Remove contaminated clothing; drench skin with water, wash with soap and rinse twice; dry and wrap person in a blanket; cover chemical burns with a loose, clean, soft cloth.
16. e
17. Get to fresh air; loosen tight clothing; give mouth-to-mouth resuscitation if needed; keep victim quiet; prevent chilling.
18. Toxicity, exposure
19. False
20. d
21. Wash clothing at the end of each day of use.
22. True

Chapter 6 – Pesticide Handling, Storage and Disposal

1. False
2. 5.0, 7.0
3. See the section titled “Storage Area.”
4. b
5. True
6. The date will help you determine if the pesticide is too old to be effective and allows you to use older products first.
7. During mixing, you may see excessive clumping, poor suspension, layering or abnormal coloration. The target pest may not be controlled.
8. Apply the pesticide in a recommended manner listed on the label.
9. See the section titled “Cleaning and Disposing of Containers.”
10. Michigan Department of Natural Resources Waste Management Division
11. False
12. Securely in the back of a truck.
13. True
14. Pesticides containing oils or petroleum solvents.
15. Any of the points listed under the section “Pesticide Fire Safety.”
16. Clear everyone from the area.

Chapter 7 – The Label

1. True
2. True
3. False
4. d
5. False
6. True
7. Health and safety information about a particular pesticide. They are available from chemical dealers.
8. Yes
9. No
10. d
11. False
12. Yes. Birds, fish and bees.
13. False

Chapter 8 – Fleas

1. True
2. An allergic condition that can be brought on by a single flea bite in an allergic or sensitized animal.

3. "Hot spots" occur when the animal continually scratches at highly inflamed sites on the skin caused by flea bites, creating conditions for bacterial infection. A hot spot is painful to the animal and may exude pus.
4. False
5. A few eggs per day and several hundred over the course of her life.
6. True
7. d
8. Treating for fleas on the host animal and in the host's environment at the same time.
9. True
10. It is an illegal use of the products and can harm you, your family or your pets by creating dusts or fumes that could be inhaled.
11. They prevent flea larvae from developing to the adult stage.
12. fires or explosions.

Chapter 9 – Mites and Ticks

1. 1. four pairs of legs (insects have three pairs);
   2. two major body units—the cephalothorax and the abdomen—while insects have three body units—head, thorax and abdomen.
2. 1. by damaging tissues and causing dermatitis; 2. by causing blood or body fluid loss; 3. by causing allergic reactions; or 4). by creating conditions for secondary bacterial infection.
3. Mange or scabies. Mange is a deterioration of the skin's condition, leading to hair or feather loss, skin often disfiguring, and in severe cases, lethargy and weakness.
4. Mites mate and the females lay eggs. Eggs hatch and six-legged larvae emerge. Larve feed and molt to the eight-legged nymph. Later, after feeding, the nymphs molt and become adult male or female mites.
5. As little as eight days to as long as four weeks, depending on the species of mite and temperature and humidity.
6. Because of their burrowing behavior and feeding.
7. True
8. True
9. They occur in cats and rabbits but also occasionally in dogs.
10. Detection and identification of non-burrowing mange mites requires skin scrapings.
11. True
12. True
13. In the scaly skin condition, skin thickens and wrinkles and hair falls out. Skin turns color from normal to red or bruised-looking. In the pustular skin condition, pimples or pustules filled with pus develop. The pustules can develop into severe abscesses or nodules filled with fluid and pus. This skin condition usually develops after the scaly condition and reflects the development of secondary bacterial infections in the follicles. In both conditions, itching occurs.
14. These skin conditions are collectively called demodectic mange.
15. True
16. False
17. 1. they cause blood loss, 2. their feeding causes inflammation and irritation of the skin, 3. they may stimulate hypersensitive allergic reactions, 4. they may cause a toxic reaction in the host, complicated by paralysis (called "tick paralysis"), and 5. they transmit microorganisms that cause disease.
18. True
19. True
20. On animals, tick control can be achieved using approved acaricides by dipping, spraying the entire animal or applying whole animal dusts.

Chapter 10 – Chewing and Sucking Lice

1. Sucking lice feed on blood. Their mouthparts penetrate the skin of an animal and they draw the food from blood vessels.
2. False
3. The head of a sucking louse is narrower than the thorax.

   The head of a chewing louse is wider than the thorax.
4. Grooming; animal's immune system can help protect against lice.

5. If parents, especially the mother, do not have lice, offspring will not risk infestation through exposure to them.
6. life cycle

Chapter 11 – Flies

1. One
2. Blood-feeding flies not associated with manure or animal waste.

   Filth flies associated with animal waste or manure.

   Parasitic bot flies.
3. Worm-like and may be true maggots.
4. Mosquitoes, black flies, biting midges, deer flies and horse flies are blood-feeding flies.
5. All of them
6. True
7. 1. Modification of the habitat and environment to reduce the sources of the flies.
   2. Separate animals from the flies through physical means— i.e., keep animals indoors when flies are biting.
   3. Use of repellents on the bodies of animals and insecticides applied to the animals directly or in their immediate environment where the flies occur.
8. They degrade manure to simpler components and reduce the volume of waste material.
9. True
10. Space or area sprays typically control flies at the time of application, whereas residual sprays offer longer control activity.

GLOSSARY

Acari – Scientific grouping of organisms within the class Arachnida, including mites and ticks.

Acariasis – Veterinary term for an infestation of mites in or on an animal.

Acaricides – Pesticides that control mites or ticks.

Active immunity – Immunity (antibodies and immune cells) developed by an animal in response to a disease challenge or a vaccine antigen, as opposed to passive immunity, which is immunity conferred by the mother through internal antibodies. Active immunity is long-lived. Passive immunity is short-lived.

Active ingredient (a.i.) – The chemical(s) in a formulated product that is (are) principally responsible for the pesticidal effects and that is (are) shown as active ingredient(s) on pesticide labels.

Acute exposure – Exposure to a single dose of pesticide.

Acute toxicity – The quality or potential of a substance to cause injury or illness shortly after exposure to a relatively high dose.

Additive – A chemical added to a pesticide formulation to increase its effectiveness or safety; same as adjuvant.

Adsorption – The process by which a pesticide bonds with a surface; e.g., a soil colloidal surface.

Adulterated – (1) A pesticide whose strength or purity falls below that specified on the label. (2) A food, feed or product that contains illegal pesticide residues.

Agitation – The process of stirring or mixing in a sprayer.

Agricultural animals – Those used for production of food and fiber; livestock.

Allergic effects statement – A statement on a pesticide label that tells whether tests or other data indicate that a pesticide product has the potential to cause allergic effects, such as skin irritation or asthma. Sometimes the labeling refers to allergic effects as "sensitization."

Allergies – Hypersensitivity to substances that are harmless to most other individuals.

Alopecia – Hair, feather or wool loss: may be due to any of a variety of causes. Complete loss of hair is usually a hormonal problem.

Amitraz – A formamidine chemical with insecticidal and acaricidal properties.

Anaphylactic shock – An often severe and sometimes fatal systemic reaction in a susceptible animal upon exposure to a specific antigen (such as wasp or fly venom) after previous sensitization; characterized especially by respiratory symptoms, fainting, and itching.

Ancylostoma caninum – Canine hookworm.

Anemia – Reduction or loss of red blood corpuscles.

Anemic – Weakened; lack of vitality due to blood loss or iron deficiency.

Antagonism – An interaction of two or more chemicals whose combined effect is less than the effect predicted on the basis of the activity of each chemical applied separately.

Antibiotics – Chemical substances that destroy or inhibit the growth of bacteria and some other organisms. A veterinarian may prescribe antibiotics for a viral disease to prevent secondary bacterial infections, but antibiotics do not affect the viruses themselves.

Antidote – A substance used as a medical treatment to counteract poisoning.

Anti-siphoning device – An attachment to the filling hose designed to prevent backward flow into the water source.

Arachnids – Organisms from the class Arachnida, such as spiders, mites and ticks.

Ascarids – Any of the genus of parasitic roundworms.

Attractants – Substances that lure insects to traps or to poison-bait stations; bait.

Bacteria – Extremely small, single-celled microorganisms that usually lack chlorophyll, reproduce by fission (splitting of the cell into two equal halves) and may cause diseases.

Bioaccumulation – The buildup of pesticides or other chemicals in the bodies of animals (including humans), particularly in fat tissue.

Biological controls – Control by pathogens, predators and parasites, either naturally occurring or introduced.

Biotic – Relating to living organisms.

Biotype – A population within a species that has distinct genetic variation.

Bitch – Female canine.

Bordetella – Infectious bacterium that can cause tracheobronchitis.

Botanicals – An insecticide/acaricide class that includes rotenone and pyrethrin, which are derived from plants; they may be synergized in certain formulations with PBO.

Broad-spectrum pesticide – A pesticide that is effective against a wide range of species.

Bronchitis – Inflammation of the bronchial passages (branches of the windpipe and passages in the lungs).

Calibration – The process of equipment adjustment to obtain a desired application rate and distribution.

Carbamates – An insecticide/acaricide class similar to organophosphates in activity; includes carbaryl and methomyl.

Carcinogenic – Capable of causing cancer in animals or humans.

Carrier – A gas, liquid or solid substance used to dilute, propel or suspend a pesticide during its application.

Chemical degradation – The breakdown of a pesticide by oxidation, reduction, hydrolysis or other chemical means.

Chemical name – Name applied to a pesticide active ingredient that describes its chemical structure according to rules prescribed by the American Chemical Society and published in the Chemical Abstracts Indexes.

Cherry eye – Swollen gland of the third eyelid of an animal that is visible as a large red mass on the inner corner of the eyelids.

Chigger – A six-legged mite larva that sucks the blood of vertebrates and causes intense irritation.

Chlorinated hydrocarbons – An insecticide/acaricide class that includes lindane, methoxychlor and naled.

Chorioptic mange – Veterinary term for infestation of Chorioptes bovis, a species of non-burrowing mange mites.

Cholinesterase – An enzyme that helps to control the transmission of nerve impulses in animals and humans.

Chronic exposure – Exposure to repeated doses of a pesticide over a period of time.

Chronic toxicity – Quality or potential of a substance to cause injury or illness after repeated exposure over an extended period of time.

Closed mixing systems – Systems in which liquid pesticide concentrates are transferred from their original containers to mix or spray tanks through a closed series of hoses, pipes, etc. Such systems are designed to prevent or minimize human exposure to the concentrates.

Coccidia – Parasitic protozoan that infests the digestive tract and can cause blood-tinged diarrhea in young puppies.

Colostrum – Mammary secretion containing antibodies of the bitch. Puppies receive this fluid upon the first suckling and receive maternal antibodies and passive immunity to those diseases to which the bitch has immunity.

Comatose – Inactive, as in a coma.

Common name – (1) When referring to a pesticide, an abbreviated name applied to a herbicide active ingredient; usually agreed upon by the American National Standards Institute and the International Organization for Standardization. (2) When referring to an organism, a name derived from local common usage that is agreed upon by some accepted authority but may not be unique.

Companion animals – Pets such as dogs and cats.

Compatibility – Mixable in the formulation or in the spray tank for application in the same carrier without undesirable alterations in the characteristics or effects of the individual components.

Concentration – The amount of active ingredient or herbicide equivalent in a quantity of diluent expressed as percent, pounds per gallon (lb/gal), kilograms per liter (kg/l), etc.

Congenital – Condition existing at time of birth.

Cross-contamination – When one pesticide gets into or mixes with another pesticide accidentally; usually occurs in a pesticide container or in a poorly cleaned sprayer.

Cultural control – Control by changing management practices to reduce pest numbers without using pesticides; includes maintaining overall good health of animals.

Degradation – The breakdown of a pesticide into a simpler compound that is usually, but not always, non-toxic; may be either chemical, physical or biological or any combination of the three.

Dehydration – Caused by insufficient fluid intake or abnormal loss of fluids.

Dew claws – Claws high on the inner side of dogs' legs that serve no useful function for most breeds. Consult veterinarian regarding removal.

Demodectic mange – A variety of skin conditions caused by an infestation of follicle mites.

Dermatitis – The direct damage and inflammatory reaction of an animal's skin to arthropod bites or body secretions.

Detection – The first step in an IPM program; requires thorough and regular monitoring of animals for pest infestations or other signs and symptoms that indicate a pest is present on the animal or in the animal's environment.

Diluent – Any gas, liquid or solid material used to reduce the concentration of an active ingredient in a pesticide formulation.

Dilute – To make less concentrated by adding water, another liquid or a solid.

Directed application – Precise application to a specific area.

Dirofilaria immitis – Canine heartworm.

Disinfection – Disinfection is the act of maintaining animals and birds in an environment that is cleaned and sanitized daily, including kennels, doors, grids, eating bowls, water bottles, walls, ceiling, floors, food utensils, isolation areas, puppy rooms, runs, exercise areas and examination areas. Maintenance personnel should wear clean clothes daily and wash hands and arms after handling any animals with a disease problem.

Dispersible granule – A dry, granular formulation that will separate or disperse to form a suspension when added to water.

Distemper – Common worldwide disease of dogs caused by canine distemper virus.

Dock – Shorten tail by cutting.

Dog – Male canine.

Dose – (1) Amount, quantity or portion of a pesticide that is applied to a target. (2) A measure of exposure used in animal testing to determine acute and chronic toxicities; usually expressed in milligrams per kilogram of body weight.

Drift – (1) The movement of pesticides through the air to non-target areas, either as solid or liquid particles or as vapors. (2) (Legal definition) The drifting or movement of pesticide by air currents or diffusion onto property beyond the boundaries of the target area to be treated with pesticide, other than by pesticide overspray.

Dust – A dry pesticide formulation.

Ear mites – Parasite that inhabits the ear canal and feeds by piercing the skin. Mites are visible to the naked eye. Ear mite infestation can be suspected if the ear passage contains a dark brown exudate with a characteristic odor.

Eastern equine encephalitis – Disease of horses, pheasants and humans caused by a virus transmitted by swamp mosquitoes among wild birds.

Ecto – Prefix meaning "outside of the body."

Ectoparasite – Organism that lives on the outside of the host body, more or less in permanent association.

Ecology – The science that studies the interrelationships of living organisms and their environment.

Economic damage – The amount of injury that will justify the cost of applied control measures.

Efficacy – Effectiveness of a vaccine, pesticide or medication.

Emulsifier – A surface-active substance that promotes the suspension of one liquid in another; e.g., a chemical that allows a petroleum-based pesticide to mix with water.

Emulsion – The suspension of one liquid as minute globules in another liquid; e.g., oil dispersed in water.

Encapsulated formulation – A pesticide enclosed in capsules or beads of thin polyvinyl or other material to control the rate of release of the chemical and thereby extend the period of activity.

Endangered species – A group of organisms on the brink of extinction.

Endo – Prefix meaning "inside the body."

Endoparasite – Organism that invades internal body parts of the host.

EPA – Environmental Protection Agency.

Eradication – The complete elimination of a pest from a site, an area or a geographic region.

Euthanize – Destroy in a humane manner.

Exotic – Native to other regions, countries or continents.

Facultative myiasis – Infestation by flies that are attracted to and lay eggs in wounds or injuries on animals.

FDA – Food and Drug Administration.

FIFRA – The Federal Insecticide, Fungicide and Rodenticide Act — The federal law dealing with pesticide regulations and use.

Flowable (F or L) – A pesticide formulation in which the active ingredient is impregnated on a diluent such as clay that is then finely ground and suspended in a small amount of liquid; the resulting paste or cream-like formulation is added to water in the spray tank and forms a suspension.

Food chain – A group of plants, animals and/or microorganisms linked together as sources and consumers of food.

Formulation – (1) A pesticidal preparation supplied by a manufacturer for practical use. (2) The process, carried out by manufacturers, of preparing pesticides for practical use.

Fowl pox – Viral disease of domestic fowl and wild birds.

Fungus – A largely undifferentiated, usually microscopic organism lacking chlorophyll and conductive tissues and living either as a saprophyte or a parasite. The vegetative body of a fungus is normally composed of hyphae, and reproduction is by sexual and/or asexual spores.

GPA – Gallons per acre.

GPM – Gallons per minute.

Granule or granulation – A dry formulation of pesticide and other components in discrete particles, generally less than 10 cubic millimeters, and designed to be applied without a liquid carrier.

Growth regulator – A substance used for controlling or modifying insect or plant growth processes.

Hazard – The risk of harmful effects. Hazard depends on both the toxicity of the substance and the exposure received in a given situation.

Health certificate – Document signed by a veterinarian that states an animal is free of clinical evidence of disease. Considered in most states to be an official document.

Heartworm – Thread-like worms (Dirofilaria immitis) that reside mostly in the right ventricle of the heart; transmitted by mosquitoes. Prevention possible.

Herbicide – A chemical used to control, suppress or kill plants or to severely interrupt their normal growth process.

Hereditary defect – Abnormal condition of the sire or dam, or of past generations of the sire or dam, that may be passed on to the current generation of animals.

Hookworms – An endoparasite (Ancylostoma caninum) that attaches to the intestinal wall and ingests blood. Infestation can lead to severe anemia and death.

Hormone mimics – A class of insecticides that prevents development of immature insects to the adult stage. These chemicals simulate the activity of juvenile hormone, the hormone in insects that maintains immature characteristics. (See insect growth regulator.)

Host – Organism on which a pest is located.

Hypersensitivity – An extreme allergic reaction to insect bites, stings or secretions.

Hypostome – Feeding apparatus of a mite.

I**mmunized** – Creation of antibody levels high enough to prevent a disease.

Incompatibility – When two or more pesticides cannot be effectively mixed without a loss in activity, an increase in toxicity or hazard to the applicator, or harm to the crop or the environment.

Incubation – Period of time between exposure to disease and development of clinical evidence of the disease.

I**nert ingredients** – The materials in a pesticide formulation that have no pesticide activity.

Ingestion – Eating or swallowing.

I**ngredient name** – The active ingredients and the amount of each ingredient (as a percentage of the total product) in a pesticide listed by the official chemical name and/or common name for each active ingredient.

Inhalation toxicity – A measure of the capacity of a pesticide to cause injury when absorbed through the lungs.

Inoculation – Injection of a vaccine or bacterium.

Inorganic pesticides – Pesticides of mineral origin—they do not contain carbon.

Insecticide – A chemical used to control insects.

Insect growth regulators – A class of insecticides that prevent development of immature insects to the adult stage.

Integrated pest management – An ecological approach to pest management that consolidates all available necessary techniques into a unified program to manage pest populations so as to avoid economic damage and minimize adverse effects to the environment and nontarget organisms.

Intermediate host – A host that is usually used by a parasite in the course of its life cycle and in which it may multiply.

Intranasal – Administration of antigen via nasal passages.

Invertebrates – A class of animals that lack spinal cords.

Ivermectins – Group of insecticides labeled as drugs, that often come into use for pest control on animals.

Isolate – Set apart to prevent disease transmission.

Isolation area – An area or caging constructed to prevent spread of contagious conditions. The area or cage should have a ventilation system that prevents commingling of air from the isolation area with air in the healthy animal area.

Label – The information printed on or attached to the pesticide container or wrapper.

Labeling – The pesticide label and all additional product information provided by the manufacturer such as brochures and flyers provided by the dealer.

Larva – The immature stage of an insect.

Larvicide – A pesticide that controls immature insects.

LC50 – The concentration of a chemical in air (inhalation toxicity) or water (aquatic toxicity) that will kill 50 percent of the organisms in a specific test situation.

LD50 – The dose (quantity) of a chemical calculated to be lethal to 50 percent of the organisms in a specific test situation. It is expressed in weight of the chemical (mg) per unit of body weight (kg) of the test organism. The toxicant may be fed (oral LD50) or applied to the skin (dermal LD50).

Leaching – Downward movement of a pesticide or other soluble material through the soil as a result of water movement.

Lesions – Damage to an organ or tissue.

Lethal – Causing or capable of causing death.

Lethargy – Lack of energy, drowsy, dull, sluggish or inactive.

Life cycle – The progression of stages in the development of an organism.

Lime sulfur – Inorganic chemical (calcium polysulfide) used for lice control.

Mange – Deterioration of the skin's condition, leading to hair or feather loss, skin discoloration, often disfiguring and, in severe cases, lethargy and weakness. Associated with mite infestation.

Material Safety Data Sheets (MSDS) – These data sheets contain specific information on toxicity, first aid, personal protection equipment, storage and handling precautions, spill and leak cleanup and disposal practices, transportation, physical data and reactivity data. MSDS are available from manufacturers.

Mechanical control – Pest control by physically altering the environment; e.g., use of screens as barriers to insects.

Metabolite – A compound derived from metabolic transformation of a chemical by plants or other organisms.

Microfilaria – Immature stages of canine heartworm that circulate in the blood.

Microorganism – An organism that is so small that it cannot be seen without the aid of a microscope.

Mineral oil – Barrier against biting flies; also a diluent in some ear mite treatments that contain carbaryl.

Miticide – Pesticide that controls mites.

Mode of action – The way in which a pesticide exerts a toxic effect.

Monitoring – The process of information gathering and collection through observation of a site or target organism.

Mucopurulent – White or yellowish discharge containing mucus and pus, typically seen from the eyes or nose.

Natural enemies – The predators and parasites that attack a species.

Neoprene – A synthetic rubber.

Nits – The eggs of lice.

Nontarget species – Species not intentionally affected by a pesticide.

Nymphs – Larvae that emerge from insect eggs of many insects and arthropods.

Obligatory myiasis – Infestation of bot flies in animals occurring when the larval stages are living inside the skin or tissues of the animal.

Ocular – Pertaining to the eye.

Oncogenic – Capable of producing or inducing tumors in animals, either benign (non-cancerous) or malignant (cancerous).

Oral toxicity – A measure of the capacity of a pesticide to cause injury when taken by mouth.

Organic pesticides – Pesticides that contain carbon. Most are synthetic; some are derived or extracted from plants.

Organophosphates – An insecticide/acaricide class that includes chlorpyrifos, malathion, DDVP, ronnel, stiriphos and others. They range from acutely mildly to toxic to animals.

Parainfluenza – Pneumonia-like infection caused by canine parainfluenza virus.

Parasite – Plant or animal that lives in or on another organism.

Parts per million, weight (PPMW) – One part of a substance in one million parts of another substance, by weight.

Parasiticide – Substance that kills parasites.

Parvovirus – Virus that attacks growing tissues (especially the intestinal tract) in puppies that are not immunized.

Passive immunity – Immunity not of the young animal's own making, for example from maternal antibodies that offer only temporary protection.

Patella – Kneecap.

Pelleted formulation – A dry formulation of pesticide and other components in discrete particles, usually larger than 10 cubic millimeters, and designed to be applied without a liquid carrier.

Personal protective equipment (PPE) – Clothing and devices worn to protect the human body from contact with pesticides or pesticide residues.

Pesticide interaction – The action or influence of one pesticide upon another and the combined effect of the pesticide on the pest(s) or crop system.

Physical control – Control for animal pests that may include the use of sticky flypaper to reduce nuisance flying insects in confined areas.

Pour-ons – High-concentrate, low-volume pesticide formulations applied directly to animals from the containers they are purchased in.

Premise spray – An insecticide that will persist on the surfaces in an animal's living area for a period of time.

Psoroptic mange – Veterinary term for infestation of Psoroptes ovis, species of non-burrowing mange mites.

pH – A measure of the acidity or alkalinity of a solution.

Photodecomposition – Degradation of a pesticide by light.

Phytotoxic – Injurious or lethal to plants.

PPB – Parts per billion. One ppb equals 1 pound in 500,000 tons.

PPM – Parts per million. One ppm equals 1 pound in 500 tons.

PPT – Parts per trillion. One ppt equals 1 pound in 500,000,000 tons.

Precipitate – A solid substance that will no longer remain dissolved in water because of some physical or chemical process.

Predator – An animal that attacks, kills and feeds on other animals.

PSI – Pounds per square inch.

Psittacines – Birds related to parrots.

Pustules – Eruptions containing pus, such as boils or pimples.

Rabies – Virus that affects the central nervous system.

Rate – The amount of active ingredient applied per unit area or other treatment unit.

RCRA – The Resource Conservation and Recovery Act, the federal law regulating the transport, storage, treatment and disposal of hazardous wastes.

Ready to use – Formulation requiring no mixing or combining with other ingredients or diluents and applied directly from the manufacturer's container.

Registration – The regulatory process designated by FIFRA and conducted by the EPA through which a pesticide is legally approved for use.

Repellents – A class of insecticide/acaricide that helps prevent animal pest establishment, though repellents are not always insecticides—diethyl-meta-toluamide (DEET), butoxypolyproplylene glycol, and diproplyl isocinchomeronate are repellents that have activity against certain arthropods.

Residue – That quantity of a pesticide remaining in or on the soil, plant tissue, animal tissue, whole organisms and surfaces after an application.

Restricted use pesticide – A pesticide that may be used only by a certified applicator. It is designated as such by the Environmental Protection Agency because of its potential to cause unreasonable adverse effects on the environment, including injury to the applicator.

Resurgence – A dramatic increase in the population level of a target pest some time after a pesticide application because the pesticide destroyed its natural enemies. Pest numbers may soon surpass pretreatment levels.

Ringworm – Ring-shaped patch on skin caused by a fungus.

Roundworm – Internal parasitic worm (ascarid).

Runoff – Movement of water carrying with it other liquid compounds, soil with contaminants bound to it or both.

Sarcoptic mange mite – Parasite that burrows under the skin, causing intense itching; can be transmitted to people.

Scabies – Any skin condition of man or animal associated with a mite; a particularly serious, debilitating, mange condition.

Scientific name – The Latin name of the genus and species of an organism, designated by taxonomists and universally accepted. Scientific names are used to avoid the confusion that can result from the use of common names, which may vary from one area to another.

Scouting – Checking a crop or animal on a regular basis and in a prescribed manner to determine pest population levels and the extent of pest damage (monitoring).

Sebaceous glands – Oil glands.

Secondary infection – Infection that occurs following the primary infection, as a result of lowered immunity; e.g., infection following the scratching of flea bites.

Selectivity – The ability of a chemical to be more toxic to some species than to others; may be a function of dosage or mode of application.

Self-limiting – Refers to a disease or condition that will clear up by itself after a period of time.

Shampoo – Formulation of insecticide and other ingredients that is applied to an animal's wet fur and worked into a lather.

Signal words – The signal words DANGER, WARNING or CAUTION must appear, by law, in large letters on the front panel of a pesticide label. They indicate how acutely toxic to humans the product is.

Site – The animal, crop or area infested by a pest and to which a pesticide is applied.

Space spray – Method of application of an insecticide that kills the insects that are in the area at the time of application.

Spot-ons – High-concentrate, low volume pesticide formulation applied directly to the animal from the container the product is sold in.

Solubility – The ability of a solid to dissolve in a liquid.

Solution – A homogeneous mixture of one or more substances (solutes) in another substance (solvent), which is usually a liquid. The solutes are completely dissolved and will not settle out or separate under normal conditions.

Solvent – A liquid in which one or more substances dissolve to form a true solution.

Species – The basic unit of taxonomic classification, designating a group of closely related individuals that are capable of interbreeding.

Spot treatment – Application of pesticides to limited area(s) of a whole unit; e.g., treatment of spots or patches of cracks and crevices within a larger kennel or building area.

Spray drift – Movement of airborne spray from the intended area of application.

Staphylococcus – Type of bacterium frequently associated with skin infectioStatement of practical treatment (first aid) – Instructions on how to respond to an emergency exposure involving a pesticide product.

Subclinical – Not readily apparent disease.

Surfactant – A material that improves the emulsifying, dispersing, spreading, wetting or other surface-modifying properties of liquids.

Susceptibility – The sensitivity to or degree to which a plant is injured by a pesticide treatment. (See tolerance.)

Suspension – A mixture containing finely divided particles evenly dispersed in a solid, liquid or gas.

Symptom – (1) Any detectable change in an organism resulting from the activities of a pathogen or other pest. (2) An indication of pesticide poisoning.

Synergism – An interaction of two or more chemicals whose combined effect is greater than the

effect predicted on the basis of the activity of each chemical applied separately.

Synergist – Something that enhances the effectiveness of the active ingredient(s) in a formulation.

Synthetic chemical – A manufactured chemical.

Synthetic pyrethroids – A class of insecticides/acaricides—including permethrin, resmethrin and allethrin—that shows properties of low mammalian toxicity but good activity against insects, ticks and mites.

Systemic pesticide – A chemical that is absorbed and translocated (moved) within a plant or animal.

Tapeworm – Intestinal parasitic worm (Cestode).

Tank-mix combination – Mixing two or more pesticides in the spray tank at the time of application.

Target organism – The pest against which a particular pesticide or other control method is directed.

Taxonomy – The classification of living organisms into groups on the basis of similarities and relationships.

Terrestrial – Living or growing on land; not aquatic.

Tolerance – (1) Capacity to withstand pesticide treatment without marked deviation from normal growth or function. (See susceptibility.) (2) The concentration of pesticide residue that will be allowed in or on agricultural products.

Topical – External, upon the skin.

Toxemia – An abnormal condition associated with the presence of toxic substances in the blood.

Toxicity – The quality or potential of a substance to cause injury or illness.

Toxicology – The study of the principles or mechanisms of toxicity.

Tracheobronchitis – Upper respiratory infection. Common name is “kennel cough.”

Trade name – A trademark applied to a product such as a pesticide formulation by its manufacturer.

Trichuris vulpis – Endoparasite (whipworm) that attaches to the intestinal wall and ingests blood.

Ulceration – Open sore.

USDA – United States Department of Agriculture.

Vaccine – Antigens introduced into the body that stimulates the formation of protective immunity.

Vapor drift – The movement of chemical vapors from the area of application. Note: vapor injury and injury from spray drift are often difficult to distinguish.

Venomous – Having a venom-producing gland and able to inflict a poisoned wound.

Vertebrate – An animal with a spinal column.

Viral – Involving or relating to viruses.

Virulent – Highly infectious; capable of causing disease.

Watershed – The area of land draining into a body of water.

Weed – A plant growing where it is not desired; any plant that is objectionable or interferes with the activities or welfare of humans.

Wettable powder (WP) – A fine textured, dry pesticide formulation that can be suspended in water.

Wetting agent – (1) A substance that serves to reduce interfacial tensions and causes spray solutions or suspensions to make better contact with treated surfaces (see surfactant). (2) A substance in a wettable powder formulation that causes it to wet readily when added to water.

Whipworm – Internal parasite (Trichuris vulpis) that infests lower intestinal tract .

Wipes – Pesticide formulation applied directly to the animal; cloths or sponges saturated with the product.

Woods lamp – Ultraviolet light with an eye-protecting filter; helpful in identifying some kinds of ringworm.

(PLEASE POST IN AN APPROPRIATE PLACE)

PESTICIDE EMERGENCY INFORMATION

For any type of an emergency involving a pesticide, immediately contact the following emergency information centers for assistance.

Current as of May 1994

Human Pesticide Poisoning

Eastern Half of Michigan

*(313) 745-5711

Poison Control Center

Children's Hospital of Michigan
3901 Beaubien
Detroit, MI 48201

Western Half of Michigan

Contact local hospital emergency room.

Upper Peninsula of Michigan

within Marquette city proper:

*(906) 225-3497

Upper Peninsula only:

*1-800-562-9781

U.P. Poison Control Center

Marquette General Hospital
420 West Magnetic Street
Marquette, MI 48955

Special Pesticide Emergencies

Animal Poisoning

Your veterinarian:

_____
Phone No.

or

Animal Health Diagnostic Laboratory (Toxicology) Michigan State University:

*(517) 355-0281

Pesticide Fire

Local fire department:

_____
Phone No.

and

Fire Marshal Division, Michigan State Police:
M – F: 8 –12, 1– 5

*(517) 322-5847

Traffic Accident

Local police department or sheriff's department:

_____
Phone No.

and

Operations Division, Michigan State Police:

*(517) 336-6605

Environmental Pollution

Pollution Emergency Alerting System (PEAS}, Michigan Department of Natural Resources:

_____
Phone No.

and

For environmental emergencies:

*1-800-292-4706

Pesticide disposal information

Michigan Department of Natural Resources.
Waste Management Division.
Monday– Friday: 8 a.m.–5 p.m.

*(517) 373-2730

National Pesticide Telecommunications Network

Provides advice on recognizing and managing pesticide poisoning, toxicology, general pesticide information and emergency response assistance, Funded by EPA, based at Texas Tech University Health Services Center.

Monday – Friday: 8:00 a.m. – 6:00 p.m. Central Time Zone

*1-800-858-7378

***** *Telephone Number Operated 24 Hours*

Michigan State University Extension
Extension Bulletin AM–37
(***Revised May 1994 — Destroy previous editions)***

Revised by
Larry G. Olsen
Pesticide Education Coordinator

MICHIGAN STATE UNIVERSITY EXTENSION