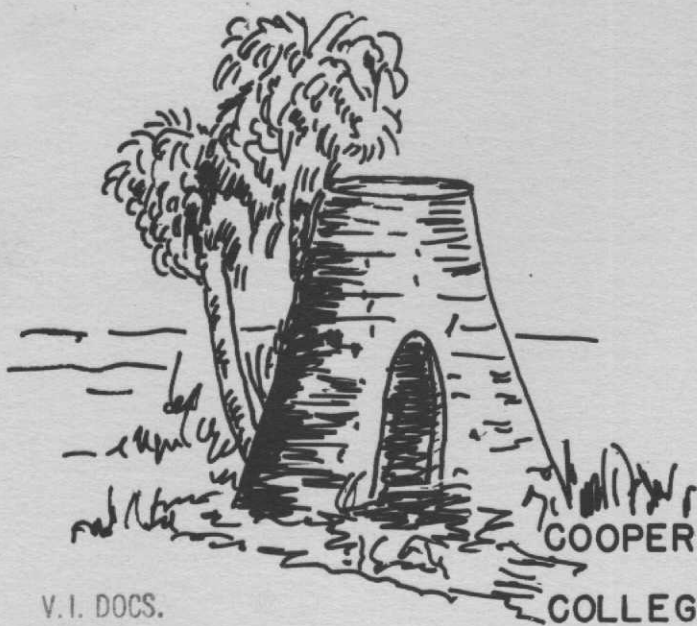


COMMERCIAL PESTICIDE APPLICATORS MANUAL :

AGRICULTURE - ANIMAL



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COMMERCIAL PESTICIDES

COMMERCIAL PESTICIDES APPLICATOR MANUAL:

AGRICULTURE: ANIMAL

This manual was adapted for Virgin Islands needs from materials furnished by the Training Branch, Operations Division, Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington, D.C. It supplements the EPA/USDA publication: "APPLY PESTICIDES CORRECTLY -- A GUIDE FOR COMMERCIAL APPLICATORS." That publication should be read first.

The information herein provides a base to use in preparing for the certification examination in the category of AGRICULTURE: ANIMAL PEST CONTROL.

Reference to commercial products or trade names is made with the understanding no discrimination is intended and no endorsement is implied by the College of the Virgin Islands Cooperative Extension Service.

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January, 1976

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

(Acts of May 8 and June 30, 1914)

Agricultural Extension Service, College of the Virgin Islands
and the United States Department of Agriculture, cooperating
D. S. Padda, Director

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COMMERCIAL PESTICIDE MANUFACTURER'S HANDBOOK
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AGRICULTURE - ANIMAL

W. D. Fitzwater, D. F. William and B. Lavaetz

The U.S. Environmental Protection Agency has set the following standards for commercial applicators engaged in agricultural (animal) pest control:

"Applicators applying pesticides directly to animals must demonstrate practical knowledge of such animals and their associated pests. A practical knowledge is also required concerning specific pesticide toxicity and residue potential, since most animals will frequently be used for food. Further, the applicator must know the relative hazards associated with such factors as formulation, application techniques, age of animals, stress and extent of treatment".

PESTICIDE SAFETY

Pesticides are toxic substances which can cause severe illness or death if misused. Although pesticide accidents do occur from eating or drinking the product, especially among children or animals, applicators

can also be injured or killed by breathing a pesticide vapor or getting a pesticide on their skin. Repeated exposure to small amounts of certain pesticides also can cause severe illness.

Most pesticides can enter the body through the skin. Some pesticides are toxic enough to cause death through skin contact alone. Adequate protection from pesticide poisoning requires knowledge of:

- - symptoms of pesticide poisoning
- - first aid procedures for pesticide poisoning by skin contact, inhalation, and swallowing
- - how to protect the body with proper clothing, equipment, and cleanup measures
- - which kind of respiratory protective devices to wear and when to wear them

The user is also responsible for:

- - choosing the proper pesticide for the type of control needed
- - the safe transport of the pesticide

- - correct storage of pesticides away from children and unauthorized persons
- - safe mixing and loading of pesticides.
- - correct calibration of application equipment
- - correct field or animal application
- - cleaning of equipment
- - safe disposal of excess pesticides

ENVIRONMENTAL CONCERNS

Pesticides also can be harmful to the environment if misused. They can injure plants and animals, leave illegal residues, and cause other types of damage. Damage is usually caused by:

- - contact with non-target plants or animals
- - injury to sensitive crops by persistent pesticides
- - accumulation of pesticides in the food chain
- - movement of pesticides off-target
- - pesticide contamination of water

When planning a pesticide application, choose the pesticide that will do the least damage while giving good control. Pesticides can help the environment when chosen and used correctly.

PESTICIDE TOXICITY

Pesticides will protect animals from pests, but they can be toxic to animals being treated as well as to the pests. Apply them correctly to prevent injury. Individual animals and species may be sensitive to certain pesticides. Poisoning symptoms usually include excessive:

- - salivation
- - eye watering
- - defecation

- - urination
- - muscle twitching

Even when animals are healthy, their age and size are important considerations when applying pesticides. Many insecticides are applied according to the size of the animal with less being applied to small animals and more to large animals. Many applications are applied to the point of runoff. Generally, this is the amount of insecticide recommended. Systemic insecticides and ready-to-use oil sprays must be applied in exact amounts for adequate control of pests and prevention of injury to animals.

Young animals, especially those under six months of age, should not be treated when information on the pesticide label specifically prevents application to younger animals.

Do not treat animals which are under stress or which will be put under stress.

Many pests on agricultural animals can be controlled with very small quantities of pesticides when applied to specific areas on the infected animal. For example, when treating infested wounds on animals, treat only the wound and immediate surrounding area.

When treating livestock for fly control, it is usually more efficient to treat animals daily with small quantities of pesticides. If rubbing devices are used in places where animals cannot avoid them, they will treat themselves daily with small amounts. The best application technique gives adequate control with least excitement of treated animals and least contamination of the environment.

Individual animals can show toxicity to certain pesticides and other materials in pesticide formulations. Sensitive animals should not be treated or should be treated only with pesticide formulations non-toxic to the animal. Brahman beef cattle can show sensitivity to some organic phosphate insecticides. For this reason, organic phosphate pesticides should not be applied to these animals if so indicated on the pesticide label. Pesticides should not be applied in combination with other pesticides unless so stated on the label.

The skin of some horses is extremely sensitive to various pesticide formulations. Before treating horses, it is recommended that a small patch of skin on each animal be treated with pesticide formulation approximately 24 hours before the entire animal is treated.

RESIDUE POTENTIAL

Follow closely the label recommendations for time intervals between application of pesticides and slaughter or marketing. Failure to do this can result in illegal residues. The animals may be confiscated and you could be prosecuted.

PESTICIDE FORMULATIONS

Consider the pesticide formulation when treating animals. Sprays are generally suited for treating most animals. Do not let oil sprays penetrate the hair to the animal's skin.

PESTICIDE APPLICATION

When using contact insecticides

for external parasites, be sure the insecticides reach the pest. When treating for lice, mites and ticks, use 100-200 pounds of pressure. As the pesticides normally kill only the adults and not the eggs, retreatment is usually needed to kill the newly hatched pests. In grub spray treatments, the skin of the animal and not just the hair must be thoroughly wetted. Spray pressures of 200-400 psi are recommended depending upon the thickness of the animal's coat.

For applying liquid contact insecticides use:

- - power sprayers
- - knapsack sprayers
- - compressed air sprayers
- - rubbing devices (back and face rubbers)

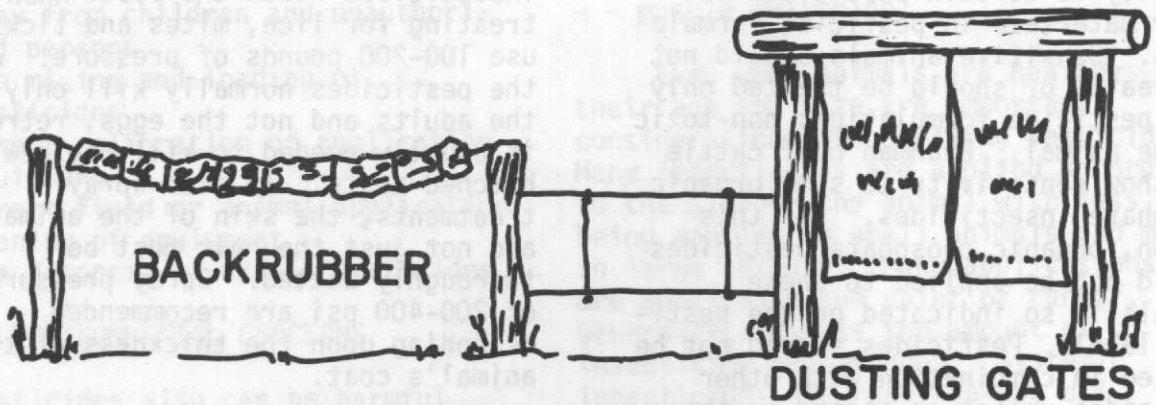
Dust may be applied in the same way or applied by hand. Systemic insecticides are picked up and transported throughout the animal's system. They can be applied by:

- - pour-ons
- - spot-ons
- - sprays
- - feed additives
- - dipping vats and spray dip machines

PESTS OF AGRICULTURAL ANIMALS

Agricultural animals are attacked by mites, ticks, flies, lice, and other insects, as well as vertebrate pests. These pests affect animal productivity by:

- - killing animals
- - spreading disease agents
- - causing diseases
- - causing loss of blood
- - causing anemia
- - reducing weight gains



- - directly damaging animals or animal products
- - reducing milk production
- - lowering feed efficiency
- - decreasing animal resistance to disease
- - reduction of available food supplies through competition

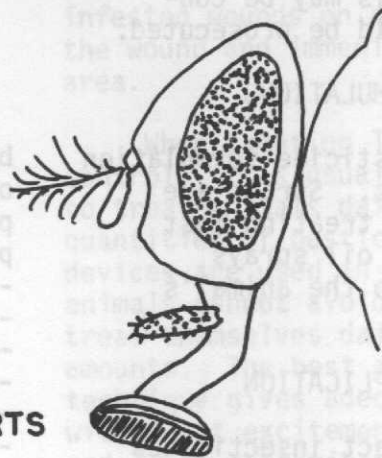
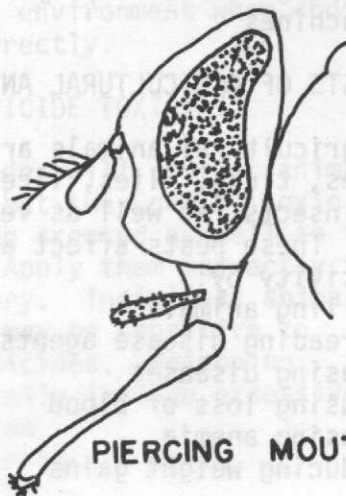
Cattle

Cattle are an important factor in the economy of the Islands. They are attacked by a number of insect

pests including:

HOUSE FLIES

House flies can transmit many animal diseases, as they feed on manure and animal secretions. They have sponging mouthparts. Large numbers of flies may annoy penned cattle causing reduced efficiency or production. The egg develops to adult in a life cycle of about 7 to 14 days. Continuous development occurs throughout the year.



STABLE FLIES

This fly is similar to the house fly but has piercing mouthparts which protrude bayonet-like from the head. Stable flies develop in decaying plant matter such as silage, rotting straw bedding, and aquatic vegetation. The life cycle takes about 14-21 days. Continuous development occurs in the Virgin Islands.

FLY CONTROL

Sanitation is the key step in control of these flies. Disposal of animal wastes and organic debris is essential. Chemical control works better when used in conjunction with good sanitation practices.

If you cannot clean up the areas where flies develop, spray them with a larvicide. However, frequent and prolonged use of insecticides, particularly larvicides, eventually results in fly resistance and loss of effective control. Apply residual sprays to fly resting areas, such as fences, feed bunks, buildings, and vegetation. Repeat application may also be effective in controlling house flies. Local milk regulations determine what control measures may be used in dairies.

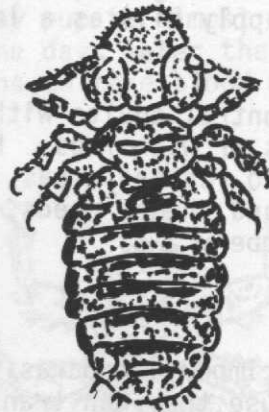
HORN FLY

This small, blood-sucking parasite remains on the animal most of the time. Migration up to several miles occurs. The female lays eggs in fresh individual cow droppings. The larvae develop here, and the adult fly then migrates to an animal host. The life cycle is completed in 7-14 days.

Control may be achieved by the use of dust bags, sprays, oilers, and mineral or feed additives. Self-applicators are most effective when cattle are forced to use them daily. Cattle sprayed by ground rigs or ULV sprays require periodic treatment. ULV sprays are satisfactory when cattle are grouped in open areas.

BITING AND SUCKING LICE

Lice spend their entire life cycle on the animal. They hatch from eggs deposited on the hair. They feed by sucking blood or biting. The total life cycle takes from 3-4 weeks. Lice are transmitted chiefly by contact with infested animals. Dust bags and oilers may aid in louse control.



CHEWING LOUSE



BITING LOUSE

MOSQUITOES

Dense populations of mosquitoes feeding on the blood of cattle may affect efficiency of meat and milk production. Life cycles of mosquitoes vary greatly, depending on the type of mosquito and the environment. The female lays eggs on water or in areas subject to flooding. Eggs usually hatch in 2 or 3 days if water is present. The larval and pupal stages also develop in water. The larval stage lasts about a week. Pupae generally change into adults in 2-3 days.

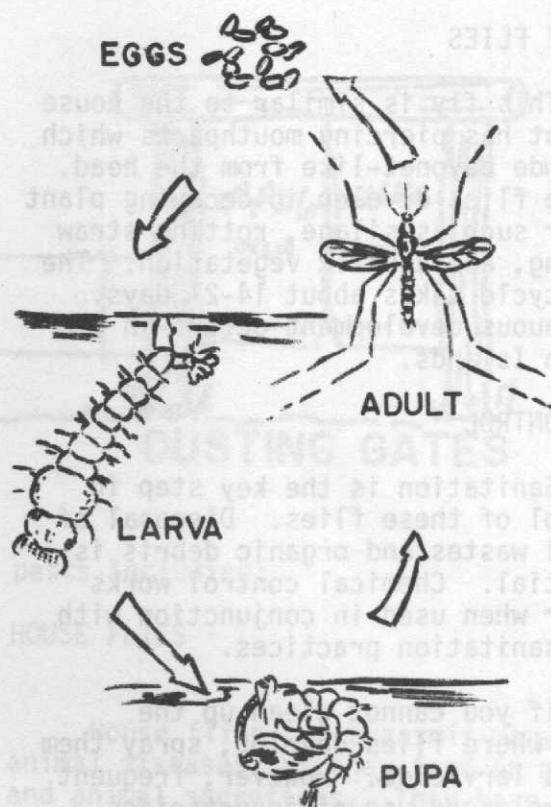
The best control method is to eliminate or minimize water-holding areas. If you cannot get rid of water containing mosquito larvae, either add top-feeding minnows (*Gambusia*) or apply oils as a larvicide.

You can control adults with residual sprays or with fogs. Use them in mosquito resting areas, such as open barns and sheds, weeds, grass, trees and shrubbery.

CATTLE TICKS

Ticks are important parasites of cattle because they can transmit several blood diseases such as piroplasmiasis. In addition loss of blood and injection of toxins during tick feeding affect animal health, weight gains, and milk production.

There are two kinds of ticks: hard ticks and soft ticks. Hard ticks have a hard covering over much of the body. Their mouthparts are visible when you look at the tick from above. Soft ticks have a leathery body covering. Their mouth parts are not generally visible from



MOSQUITO LIFE CYCLE

above.

Hard ticks usually live in unprotected environments, such as fields or brushy woodlots. Soft ticks are most often found in animal burrows or in cracks and crevices of animal houses. Soft ticks may have several nymphal stages while hard ticks have only one. Larvae have 6 legs, nymphs and adults have 8 legs. The life cycle of ticks varies in length from several months to 6-8 years, depending upon the availability of hosts. Females begin egg-laying within 3 days to 3 weeks after feeding. Eggs are laid under leaves or other debris and hatch within 30 days. The larvae climb

nearby plants and catch on to passing animals. Some species remain on the host while they develop from larvae to adults. Other species drop to the ground after each blood meal and molt to the next stage. Fed females of all species drop to the ground for egg-laying.

Control application depends upon the species of ticks involved. For those infesting the body, treat the entire body with high pressure sprays or dips. Because of the large number of species and various developmental stages, control may be required at any time during the year.

CATTLE SCABIES

Mites are tiny versions of the tick. Identification of the various species causing skin irritation is important in determining methods of control.

Psoroptic scabies is the most serious form requiring immediate quarantine and treatment. The life cycle is completed in 10-12 days.

Sarcoptic scabies are somewhat smaller than the common or psoroptic mites. The life cycle requires 1-4 weeks. Animals must be quarantined under Federal regulations for both.



MANGE MITE

Mange mites tunnel into the skin

and deposit eggs. These hatch in 1-3 days. The larvae and nymphs either continue to tunnel or may crawl on the surface of the skin. The life cycle is about 2 weeks. Infestation can cause decreased efficiency. Treat infested animals by spraying or dipping them in registered pesticides.

Sheep and Goats

The insects and related pests that attack sheep and goats include:

SHEEP KED

The sheep ked adult is a wingless fly which spends its entire life cycle on sheep. It is occasionally found on goats. The nearby mature larvae are deposited on wool strands, where they pupate almost immediately. Twenty-one days later the ked emerges and begins to take blood meals.



SHEEP KED

The sheep ked reduces efficiency

reduces efficiency of sheep and causes a damaging hide condition called "cockle". Lambs on high energy rations in feedlots may not need treatments. Several insecticides are registered for use on these animals. Application may be done by spraying, dusting, or dipping.

BITING AND SUCKING LICE

Sheep and goat lice cause:

- - intense skin irritation, resulting in reduced quality and quantity of fleeces
- - blood loss, resulting in anemia

Life cycles take from 3-4 weeks. Transmission is by contact with infested animals. Insecticides applied as dips, sprays, or dusts will provide louse control.

SHEEP SCABIES

See under CATTLE SCABIES

NOSE BOT FLY.

Living fly larvae are deposited in the nostril opening of the sheep. The larvae migrate to head sinuses, where they develop. At maturity, they migrate back down the nasal passages and drop to the ground, where they develop into adults. The life cycle takes 6-12 months. Migration of the larvae irritates the nasal membranes and causes secondary infections.

The presence of nose bots is indicated by:

- - blood flecks in the nasal mucus
- - sheep banging their heads against feed bunks, fences, or the ground

No registered treatment is available

WOOL MAGGOT

The wool maggot or black blow fly lays eggs in dirty wool or on wounds. After hatching, the fly maggots spread over the animal and feed on dead tissue under the fleece. The life cycle takes 10-14 days.

Fly infested sheep are restless. They bite irritated areas, causing fleece damage and wool loss. Early shearing and medication of wounds before blowfly season is an effective preventative measure. Clipping and cleaning of the fleece will help prevent infestations. Insecticide sprays, dips, or smears are effective in controlling this pest.

Swine

Insects and related pests of swine include:

FLIES

Refer to the section on these under Cattle.

HOG LICE

The presence of hog lice may be indicated by excessive scratching and rubbing. This causes reddening and thickening of skin and results in reduction of weight, particularly in young pigs. Heavy infestations may cause death.

The hog louse is large enough to be seen easily. It is found primarily around the shoulders and ears. Lice remain on the host at all times. The life cycle is about a month. Control hog lice with dusts or sprays or with insecticide granules applied to the bedding.

HOG SCABIES

Refer to this section under cattle.

Horses and Other Equines

TICKS

The tropical horse tick is a serious problem because it transmits piroplasmiasis. All stages can be found in the ears of the host. The female drops to the ground to lay eggs. When the larvae hatch, they reinfest the horse's ears. The life cycle is 45-60 days under ideal conditions.

Dilute dusts and/or oil-based insecticide solutions applied to the ear give satisfactory results. All other equine ticks are similar to cattle ticks.

Poultry

LICE

Only biting lice infest poultry. They spend their entire life cycle on the host. The life cycle takes 4-7 weeks. Louse transmission is by direct contact with infested animals.

Infested birds become restless and damage themselves by pecking at body areas. Weight gain and egg production may decrease. Treatment consists of application of dusts or sprays onto the bird or providing self-treatment devices such as dust boxes.

MITES

Several species of mites infest poultry. The chicken mite feeds on blood at night whereas the fowl mites are found on the birds at all times.

Infested birds become irritated and anemic. If not controlled dense mite populations may reduce weight gains and egg laying or cause death. The life cycle takes 10-21 days. Mite infestations are transferred from bird to bird, and sometimes as the result of an invasion from wild birds. Other means are in infested feathers and poultry handling equipment, flats, manure, workers, and poultry feet.

Mites are controlled with acaricide sprays or dusts directly on the birds or in self-treatment devices. Mites which infest only the legs of poultry can be controlled by dipping the bird in insecticide solutions.

FLEAS

The sticktight fleas may occasionally become a pest on poultry. More serious infestations occur on chicks than on mature birds. Under extreme conditions, flea infestations can cause death of chicks and poults. The adult fleas usually are attached to the bird around the head. The immature stages are found in the litter.

Flea control is best achieved by spraying infested birds and the premises. The sticktight flea is not a problem under good sanitation conditions.

FLIES

Many types of domestic flies are pests on poultry farms. These include the common house fly and the drone fly. All these develop in poultry droppings. Various blow-fly larvae develop in carcasses of dead birds and possibly in droppings.

The life cycle of these flies take from 1-3 weeks. Some flies may transmit disease to poultry. Adults which disperse into the surrounding environment are a nuisance to man and may transmit human diseases. Good sanitation is important for successful fly control. Dead bird disposal and good water management are also essential for overall fly control. See also Fly Control under Cattle.

Vertebrate Pests

MONGOOSE

These Asian animals introduced under the mistaken concept they would control rats have become strongly established on the Islands. They are a menace to poultry as well as native ground nesting birds. They could be a serious rabies reservoir potential if the disease ever became established on the Islands.

While most rodenticides would work against these animals there are no registered chemicals available. Control consists of protective netting for poultry and small steel jump traps to catch individuals.

RATS AND MICE

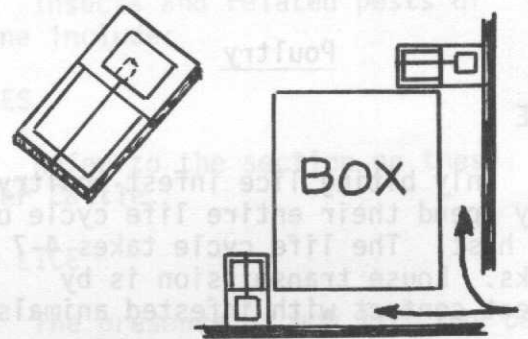
These rodents are extremely important pests of domestic animals as they can steal eggs, kill young birds, and transmit diseases such as trichinosis to hogs. In addition they eat and contaminate feed and damage buildings housing farm animals.

They are particularly difficult to control under animal husbandry situations because food must be available to the domestic animals

and it is extremely difficult to keep them out of typical livestock housing. Thus outside of "rodent-proofing" vital feed storage areas with resistant materials, the only methods available are continuous reductional efforts.

Outside burrow systems can be dusted with calcium cyanide dust through a foot plump duster providing these do not lead into an enclosed structure.

Common snap traps must be kept out of reach of small chickens but are safe for most situations. These should be modified by enlarging the bait pan as shown below. When set perpendicular to rodent runways they are very effective if a large number are used and maintained.



Of the two general types of poisons available (single and multiple dose) the latter are the safest to use around domestic animals. These are the "anticoagulant" poisons which animals have to eat for 3-14 days before building up a lethal dose in the body. Vitamin K₁ is an effective antidote. However, it is advisable to expose these baits under cover where other animals cannot get to them. Specially built bait boxes protect other animals when other cover is not present and give the rodents an attractive place in which to feed.