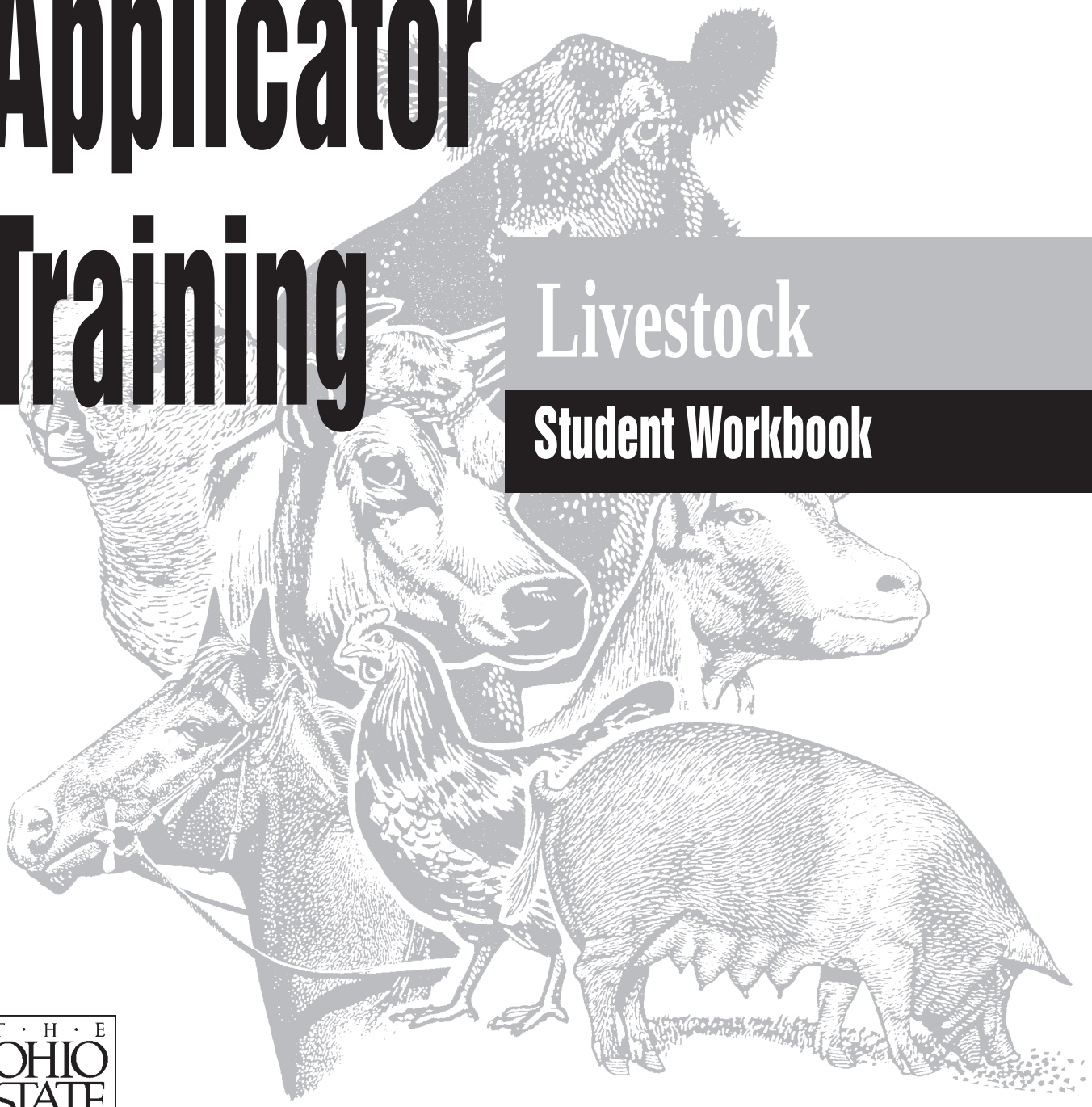
Bulletin 821-8

Ohio Pesticide Applicator Training

Livestock

Student Workbook



THE OHIO STATE UNIVERSITY EXTENSION

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Preface

This workbook was prepared by Ohio State University Extension for use as a self-study guide or in combination with an educational program. It has been developed to assist pesticide applicators in better preparing themselves for taking the exam required for certification in the livestock and livestock buildings category. The sample questions presented in this manual will help the reader obtain a general understanding of the basic core information needed to apply and use pesticides safely.

How to Use this Workbook

This workbook is designed to serve as a supplementary study guide to the following bulletins published by Ohio State University Extension. These and other publications are available through local county Extension offices.

Reference Publications

Bulletin 473	*Pest Management Recommendations for Livestock and Livestock Buildings*
Bulletin L-256	*Pesticides for Poultry and Poultry Buildings*
Bulletin 825	*Applying Pesticides Correctly*

Users of this workbook should read the reference materials before attempting the workbook. When completing this workbook, use the flap on the back cover to conceal the answers while answering the questions on the left-hand page. Once all the questions are answered, the user should check to see if the responses are correct, mark those incorrect, and read the explanation for each question. If the explanation is the least bit confusing or if you disagree with the answer or explanation, refer to the section indicated in the reference.

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DESCRIPTIONS OF COMMON LIVESTOCK PESTS

INTRODUCTION

A knowledge of pest life cycles is essential to effectively target control measures for a pest. The key component is to find the stage in a pest life cycle that is most susceptible to available controls. Often animal pests are hidden during a portion of the pests life making them undetectable. Knowing when and where a pest may be found increases the ability to limit potential losses in animal performance or death.

Animals can be attacked by insects, mites, ticks and predators. Losses occur in the following ways:

* killing animals
* spreading disease
* causing loss of blood (anemia)
* physically lowering the value of meat, wool, hides and other animal products
* lowering the rate of gain, milk and egg production and other animal products
* lowering animal resistance to disease

Pest control is necessary to maintain efficient and quality livestock production. Actual losses are difficult to determine but estimated losses due to pest injury exceed $3 million per year in the US alone. This points out the need to increase producer awareness of common animal pests to lower these staggering losses.

CATTLE PESTS

HORN FLY

The horn fly is a small pest fly. This fly is about half the size of the common house fly at 3/16 of an inch and is similar in color. Primarily injury is caused by sucking blood from cattle. Horn fly problems are limited to pasture and range cattle and not commonly a problem in buildings or feedlot situations. The economic loss from horn flies is greater than for any other livestock pest.

HORN FLY

Female flies periodically leave the animals to deposit their eggs in fresh cattle manure. The eggs hatch and larval development occurs in the manure. Pupation occurs either in the manure or on the ground immediately beneath or around the manure. Adult horn flies spend most of their time resting or feeding on cattle. The entire life cycle from egg to adult is completed in 10 to 14 days. Horn flies overwinter as pupae in or beneath cattle manure.

Control is relatively easy since the fly spends most of its time on the cattle. Sprays are effective but usually require frequent reapplication. Backrubbers and dust bags provide efficient control when properly maintained and animals are forced to use them on a daily basis. Insecticide impregnated ear-tags offer a convenient method of control. Tags can be placed in the ear during early spring and sometimes provide control throughout the summer. A caution to the use of tags is the old generation pyrethriod ear tags have shown resistance. Switching between tags containing insecticides from different chemical families is suggested for horn fly control. Feed additives are also available for controlling horn fly larvae developing in manure. Cattle must ingest the proper amount of feed additive in order for this method to work effectively. Since adult flies are not controlled, supplemental control methods for adults may be necessary.

Large "walk-through" fly traps, which do not use insecticide, can be positioned at pasture gates where cattle must pass regularly may reduce horn fly populations 50-70%. This can provide acceptable control when fly levels are less than 200 flies per animal.

FACE FLY

Adult face flies are slightly larger and darker than the common house fly. They are best identified by their habit of swarming and lighting on the nostrils, muzzle, and eyes of cattle. Face flies are primarily a pastured animal pest. They are active during the day and avoid dark buildings or shaded areas. Females lay their eggs in fresh cattle manure. Larvae develop in manure and pupate in the soil. The entire life cycle takes 15 to 25 days to complete. Several generations per year may occur. The adult stage overwinters in protected walls and spaces in buildings.

FACE FLY

Face flies have sponging mouthparts and are not capable of piercing the skin. The fly feeds on mucous material of the eye, nose and mouth or blood from wounds. Cattle may huddle or seek shelter and refuse feed when face flies are present. Face flies can transmit pinkeye and certain eye worms.

The difficulty in controlling face flies is due to several factors: 1) they feed in the face area, a difficult place to treat, 2) limited time is spent on the animal and 3) their ability to travel long distances.

Control methods include sprays, dust bags, backrubbers, facerubbers, and feed additives. Insecticide-impregnated ear tags may also provide some control although they work better on horn flies than face flies.

CATTLE GRUB (HEEL FLY)

Cattle grub are normally more of a problem with out of state rather than Ohio raised cattle. The heel fly resembles a honey bee in size and color. Economic damage occurs as the grubs migrate throughout the cattle's body. Tissues containing cysts must be trimmed, resulting in a loss of meat and carcass value. A grubby hide has reduced value. Meat and milk production is also affected. Adult flies do not bite but cattle trying to avoid contact may become frightened and injure themselves causing additional losses.

HEEL FLY

CATTLE GRUB

Female flies attach eggs to hairs on the legs and belly of cattle during late spring or summer. Eggs hatch in 2 to 6 days and the larvae penetrate the skin. Larvae migrate in connective tissues during the next 6-8 months until reaching the gullet or spinal canal region. Grubs cut breathing holes in the hide and complete larval development in cyst (warbles) under the skin. Mature larvae squeeze out the breathing hole, fall to the ground and pupate under trash or manure. Adult flies emerge 3 to 10 weeks later. The complete life cycle requires 1 year, with most of the time spent in the animal's body.

Systemic insecticides provide effective control if applications are timed correctly and applied properly. Systemics can be applied as sprays, dips, pour-ons, spot treatments, feed additives or injectables. Application should be made when the grubs are small and before they reach the gullet or spinal canal region. Heavy infestations treated late in the grubs life cycle may cause serious side effects. The gullet may swell causing bloating or difficult breathing. Grubs may block nerves in the spinal canal causing paralysis. The best time to treat Ohio cattle is between September 1 and November 1.

Systemic treatments are not labeled for lactating dairy cows. They may be used on dry cows if the waiting period on the label is observed.

STABLE FLY

The stable fly is 1/4 inch long and grayish in color with distinct white areas on the face, checkered abdomen and long piercing mouthparts. They feed by sucking blood and are vicious biters. Stable flies are primarily a pest of feedlot and dairy cattle. Stable flies are typically outdoor, daytime-biting flies. They are more active during the summer and fall months or after heavy rainfall. Both the male and female feed on cattle and usually attack the lower leg areas. Cattle will stomp their feet to try and dislodge this pest. Animals lose blood, weight, milk production and become unmanageable under extreme conditions.

STABLE FLY

The stable fly breeds in a variety of organic materials like silage, spilled feeds, animal bedding, manure, and moist hay. Eggs hatch, the larvae develop and pupation occurs in the organic materials. The life cycle is completed in 20-30 days for stable flies. They are believed to overwinter as larvae or pupae in strawy manure.

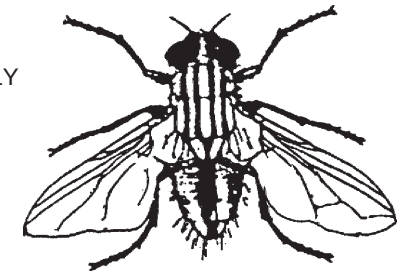
Sanitation is the most important step in controlling stable flies. Frequent removal of animal waste and organic matter is essential.

Chemical controls only work when used in conjunction with sanitation. Since flies remain on the animal for only short periods, direct sprays do not work. Residual sprays offer some protection if applied to locations where the flies rest. Feed additives are available but are not effective for adult flies or larvae that develop in organic material other than manure. Bolus containing insecticides may also be administered to cattle.

HOUSE FLY

The house fly is very similar in size and coloration to the stable fly. The house fly is 1/4 inch long and has a white to yellow abdomen underside. House flies do not bite but feed on manure and animal secretions through sponging mouthparts. Populations increase in spring and summer reaching a maximum number in late summer or early fall. The annoyance can cause reduction in production efficiency. House flies may also transmit several animal diseases.

HOUSE FLY



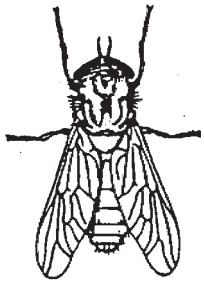
The house fly may reproduce in a variety of organic materials such as decaying silage, spilled feeds, animal bedding, manure, and moist hay. The house fly prefers to lay it's eggs in manure where the larval and pupal stages occur. The life cycle takes 10-20 days to complete. They overwinter as larvae or pupae. Adults may survive in heated buildings.

Control is similar to that of the stable fly. Sanitation is the key. Chemicals are effective only when used in conjunction with sanitation. Residual sprays can be effective as a surface treatment where flies light. Insecticidal bolus may be administered.

HORSE AND DEER FLIES

Horse and deer flies are persistent, blood sucking pests of cattle and horses. Several species of horse flies exist ranging in size from 1/3 inch to 1 inch in length. These are day biting pests that cause production losses due to the painful bites that continue to bleed after the fly leaves. Only female flies feed on blood. They are efficient transmitters of cattle diseases.

HORSE FLY



The life cycle of some species may take more than one year to complete. The larval stages are found in water generally in wooded areas or meadows.

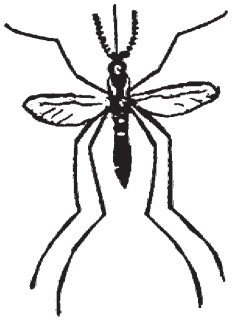
No satisfactory methods of control are currently available. Repellents or repellents plus quick acting insecticides applied in a fine mist may be beneficial. Although most insecticides applied directly to animals may eventually be fatal to horse flies, feeding is normally completed before the insecticide can affect the fly. Frequent applications are necessary and the flies' ability to migrate long distances to quickly reinfest animals makes control nearly impossible.

NOTE:
Horse and deer flies may also attack humans. Patches containing an adhesive for deer flies is attached to a hat or other clothing. They were tested in 1991 in Ohio. Producers may want to keep an eye out for these type of developments.

MOSQUITOES

Adult mosquitoes are small, fragile insects with slender bodies, one pair of wings, 3 pair of long, slender legs and vary in length from 3/16 to 1/2 inch long. Only female mosquitoes with piercing mouth parts feed on blood. Mosquitoes transmit disease and may reduce production efficiencies. The insect is most active in early morning, late afternoon and night.

MOSQUITOES



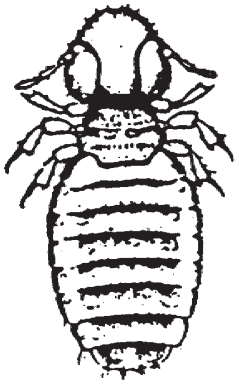
The life cycle of mosquitoes varies greatly with the type of mosquito and environmental conditions. The female lays eggs in water. The larval and pupal stages develop in water before maturing into adults.

Most methods of control require well planned programs. Eliminating standing water is the most effective mosquito control program.

Larvicides can be applied to potential breeding waters. Adult control includes direct spraying on animals and area wide application to resting areas with foggers, hydraulic sprayers or aerial applicators.

LICE

Chewing (biting) and sucking lice can infest cattle. Lice are small, wingless, tough skinned, flattened, usually dark colored external parasites. Most are not easily seen by the naked eye. Chewing lice feed on sloughing skin. Sucking lice puncture the skin and feed on blood making them a more serious pest. The feeding activity of both lice cause an intense irritation leading to scratching, rubbing, licking, and biting of infested areas. Heavy infestations may result in reduced production, general unthriftiness and anemia.



CHEWING LOUSE

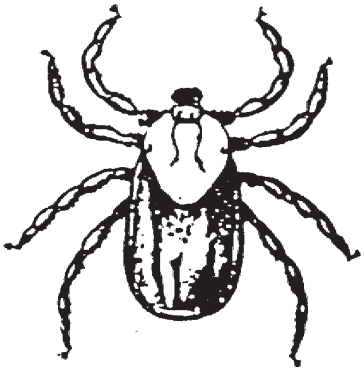
SUCKING LOUSE

Lice are host specific and spend their entire life on the animal. Eggs (nits) are attached to hair and hatch into nymphs. Nymphs resemble adults in every characteristic except size. Development from egg to adult generally takes 30 days. Lice are spread by direct contact with infested animals. Some animals (carriers) in most herds seem to harbor infestations each year and are instrumental in reinfesting the entire herd. Lice populations are generally light in the summer and increase into winter and spring.

Control of lice with sprays can be successful. Complete wetting and thorough coverage are essential and repeat applications maybe necessary. Dust treatments may be used when cold weather does not permit spraying. For more information on timing of lice controls see Bulletin 473 Pest Management Recommendations for Livestock and Livestock Buildings.

TICKS

Ticks are important external parasites of cattle. The loss of blood and injection of toxins during tick feeding can affect production gains and general health. Ticks can transmit several diseases.



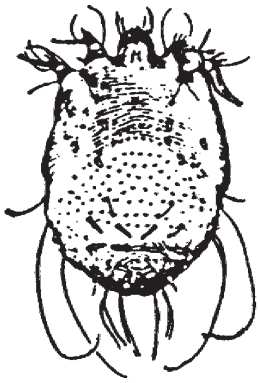
HARD TICK

Correct identification is critical for effective, economical control. Ear infesting ticks can be controlled by directly applying sprays, smears, or dust to the ears. Insecticide impregnated ear tags will control ear ticks. Body tick treatment involves treating the entire body with high pressure sprays or dips. Retreatment may be needed in some cases.

SCABIES (CATTLE MANGE)

Scabies is a contagious disease of cattle caused by tiny, parasitic mites living on or in the skin. Intense inflammation is caused by the saliva of the mite. Severe weight loss, reduced milk production and even death may occur. Scabies infested animals are also more susceptible to other cattle diseases. Transmission is by direct contact with infested animals or mite-contaminated materials. Lesions may occur anywhere on the body with the neck, shoulder and tail head the most likely locations.

CATTLE SCABIES MITE



Scabies is regulated by federal quarantine laws. Animals with scabies should be removed from the herd and the veterinarian contacted immediately. Two treatments 7-10 days apart are required to control cattle scabies.

SWINE PESTS

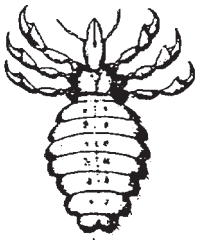
FLIES

House flies and stable flies can be pests of swine. Refer to page 3 and 4 for descriptions and Extension Bulletin 473 for control recommendations.

LICE

The hog louse at 3/8 inch in length is the largest blood-sucking louse infesting domestic animals. Winter is the time when most lice infestations occur, but they may be found throughout the year. Excessive scratching and rubbing may indicate the presence of hog lice. Damage is primarily from irritation, making hogs restless, and decreasing feed intake and growth rate. Anemia can occur in young pigs. The hog louse is capable of transmitting swine pox and other diseases.

HOG LOUSE



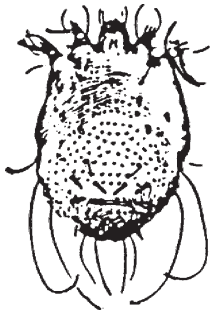
Lice are found primarily on the inside upper leg, around the tail and on the ears or neck. The life cycle of the hog louse is similar to the cattle louse taking 25-30 days to complete. Transmission is by direct contact with infested animals.

Insecticidal sprays or pour-ons can successfully control hog lice. Dust formulations can be used on young and mature pigs and as a bedding treatment. Repeated periodic treatments are often needed for effective control.

MANGE MITES

Hog mange is caused by tiny parasitic mites which burrow into the skin to feed and lay eggs. The burrowing activity causes intense irritation. Animals rub and scratch to relieve the irritation. Infested animals have hides that are dry, cracked, and bloody. Mange is mainly a problem in cold weather. Mange is highly susceptible and can spread rapidly from infected animals.

HOG MANGE MITE



Good management is essential to prevent rapid spread. Routine treatment will prevent outbreaks. Programs for mange control should include treatment of pigs at weaning, sows one month before farrowing, boars prior to the breeding season and all incoming hogs during the fall and winter months. If a mange outbreak is detected, treat the entire herd even though certain animals appear unaffected.

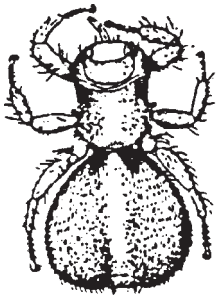
Treatment with insecticidal sprays provide effective treatment as long as care is given to make sure treatment is thorough. Dust formulations used for young and mature pigs can also be used for bedding.

SHEEP AND GOAT PESTS

SHEEP KEDS

Sheep keds are wingless flies spending their entire life on sheep. Adult keds feed by sucking blood. The feeding activity produces an intense irritation leading to scratching, rubbing and biting of infested areas. Sheep infested with large numbers of keds become anemic and have reduced weight gains. Bluetongue is spread by keds. Feeding also causes defects in sheepskins known as cockle. Infestations are heaviest during winter and spring. Populations decline during the summer months. Goats may occasionally be infested with keds.

SHEEP KED



The ked life cycle is unique. A single egg hatches within the female ked uterus. The resulting larvae develops to maturity in about 8 days. It is deposited and cemented in place on the wool. A red, barrel shaped pupae quickly forms. The adult emerges in 2 to 3 weeks. Female keds live 3 to 4 months producing 15 or more larvae during their life time.

Insecticidal sprays are effective for ked control if used as a part of routine sheep and lamb management. Shearing provides partial control due to ked removal with the wool. Shorn wool should be removed to prevent reinfestation. Sprays and dips applied after shearing provide effective control due to increased penetration and coverage. Treat all animals within the flock and all additions to the flock. One or two infested animals can reinfest the entire flock. Dust formulations provide control and are more desirable during cold weather. Dust should be worked into the wool making it impractical for large flocks.

LICE

Chewing and sucking lice can infest sheep. Description and symptoms are similar to cattle. See page 5 for details and Extension Bulletin 473 for control recommendations.

WOOL MAGGOTS

The maggots of several blow flies can infest sheep during the warm months. Animals infested with wool maggots become restless, stamp their feet and bite infested areas. Increasing infestations cause sheep to leave the flock and hide in secluded areas. Heavily infested sheep become weak and die.

The life cycle of all blow flies are very similar. Female flies are attracted to foul odor from open wounds or soiled wetted wool. Eggs are deposited in wool surrounding wounds or in wet matted wool in the animals crotch. After hatching the maggots move over the animal and feed on the skin surface.

Good flock management can prevent wool maggot infestations. Sheep should be kept as clean as possible. Areas under the tail and between the hind legs should be clipped when these areas become saturated with manure or urine. Shearing prior to blow fly activity early in the spring is good prevention. Prompt wound care is also important. Planning early spring lambing is advised since wool soiled by afterbirth and exposed umbilical cords will attract flies. Early lambing also allows for docking and castrating prior to blow fly activity. Infestations of wool maggots can be controlled by insecticide sprays.

SHEEP SCABIES

Sheep scabies (wet mange) is caused by tiny parasitic mites living in or on the skin of sheep. The mites cause wool to fall out and skin to become rough and covered with dried crust and scabs. Animals become irritated and bite or rub infested areas continuously. Sheep with serious infections may die.

Scabies is regulated by federal quarantine laws. A nationwide eradication program has been in effect since 1960. Animals suspected of having scabies should be quarantined and a veterinarian consulted. The preferred method of treatment is by dipping. Treatment methods and materials must be approved by state and federal veterinarians.

PEST OF HORSES, MULES, DONKEYS AND PONIES

FLIES

Horn flies, face flies, stable flies, house flies, horse flies, deer flies and mosquitoes may be pest of horses, mules, donkeys and ponies. Refer to information in the cattle section and Extension Bulletin 473 for control recommendations.

HORSE BOTS

HORSE BOT

The nose bot, chin bot, and common bot all attack horses. They cause intense irritation to the stomach and intestinal membrane. Reduced adsorption of nutrients and obstruction of food flow can occur. Inflammations or perforations (cuts) of the stomach lining may occur resulting in colic, ulcers, peritonitis or death.

All of the bot flies mentioned have similar life cycles. Adults become active in late summer or early fall. Mating occurs and females attach eggs to the hair on the forelegs, chest, neck, belly and sometimes flanks or hind legs. Larvae hatch only if licked or eaten and migrate to the stomach and intestinal area where they attach, feeding on membrane secretions. Mature larvae detach and leave in feces. Pupation occurs in the soil with adults emerging the following spring. Horse bots generally have one generation per year.

Horse bots can be effectively treated with insecticidal drenches, feed additives, oral paste or injectables. Treatments are most effective when administered 30 days after a killing frost.

LICE

Chewing and sucking lice can infest horses. Description and symptoms are similar to cattle. See cattle section for details and Extension Bulletin 473 for control recommendations.

TICKS

Several species of ticks may be pests of horses. Descriptions and symptoms are listed in the cattle section and controls are listed in Extension Bulletin 473.

POULTRY PESTS

Refer to Extension Bulletin L-256 for descriptions and control information for common poultry insects.

ANIMAL PREDATORS

A variety of animal predators can attack livestock and poultry. Injury or losses may result from direct predator attack, results of stampeding when frightened by a predator or transmission of disease to livestock.

Predator controls consist mainly of shooting, trapping, poisoning and management. You should make proper identification and contact the Ohio Department of Natural Resource to check on the latest regulations on the control of livestock predators.

TOXICITY

Pesticides are poisons thus animal and applicator care should be an important consideration in applying pesticides to livestock and livestock buildings. Individual animals may show toxicity to certain pesticides and materials contained in pesticides. Poisoning signs usually include excessive:

* salivation
* eye watering
* defecation
* urination
* muscle twitching

RESIDUE POTENTIAL

Most livestock products are raised for human food. Increasing concerns about harmful drug and pesticide residues should cause farmers to closely watch waiting periods and tolerance levels for different pesticides. Some pesticides stay in an animals system long periods of time. Marketing after the pesticide has been eliminated from the tissue is essential. A use interval is the time between treatment and the sale of animal products for human consumption.

Failure to follow label directions and use intervals may result in confiscation of the product and prosecution of the responsible individuals.

PESTICIDE FORMULATIONS

The pesticide formulation to be used must be taken into consideration when treating animals. Sprays are best suited for treating most animals except in freezing weather. Spraying during freezing weather may predispose animals to diseases like pneumonia. During periods of cold weather it may be more advisable to use pour ons or dust formulations since these materials do not add excessive moisture to the animals.

Some types of livestock may show toxic effects when oils are applied to their skin. Care should be taken when applying ready-to-use oil sprays to not allow the oil to penetrate the animals hair and contact the skin.

STRESS

Pesticide application should not be made to livestock under stress or that will be put under stress shortly after treatment. Animals under any of the following stresses should not be treated:

* shipping
* vaccination
* dehorning
* castration
* disease
* exhaustion
* weaning

READ THE LABEL

The size, age and breed of animals should all be taken into consideration when applying insecticides. Young unweaned animals generally should not be treated unless the application is clearly stated. Other pesticides are applied according to the size of the animal. Individual breeds may show sensitivity to different products. Closely follow these restrictions and safety precautions. **The label is the law!**

LIVESTOCK & LIVESTOCK BUILDINGS

1. The pesticide user is always responsible for the effects of residues on his livestock and crops, as well as for problems arising from drift of pesticide from his property to that of others.
    A. True
    B. False

2. Few animals are killed from the consumption of pesticides because the pesticides usually have a bad smell and taste.
    A. True
    B. False

3. New hazardous waste regulations went into effect November 19, 1980. These regulations require:
    A. That empty containers which held hazardous wastes be disposed in a designated hazardous waste site.
    B. That farmers or private applicators may be exempt from regulations providing they follow proper disposal procedures.
    C. That all empty pesticide containers be triple rinsed, using the rinse in a tank mix whenever possible or disposing of the residue on the farm.
    D. That triple rinsed pesticide containers may be disposed at a sanitary landfill.
    E. All of the above

4. Any person who applies a pesticide on public property must be licensed by the Ohio Department of Agriculture, even if the pesticide is not restricted.
    A. True
    B. False

5. Which of the following is not a good safety procedure?
    A. Read the label and follow directions and safety precautions. (Never use pesticides inconsistent with the label.)
    B. If pesticides are spilled on clothes, washing the clothes once with water will take out all of the pesticide.
    C. Record all pesticide usage including the common name, trade name, formulation, dilution, application rate, and date of treatment.
    D. To prevent illegal meat and milk residues and possible harm to the animal, never exceed label rates of application.

6. Which of the following are good safety practices?
    A. Do not eat, drink, or smoke while applying pesticides.
    B. Avoid treatment of animals that are sick, overheated or stressed from shipping, dehorning, castration, recent weaning, etc.
    C. Avoid contamination of feed mangers, water, milk, and milking equipment.
    D. Do not apply more than 5 tons of manure per acre per year from animals fed Larvadex.
    E. All of the above

ANSWERS FOR - LIVESTOCK & LIVESTOCK BUILDINGS

1. **Correct Answer: A**, Pest Management Recommendations
   Explanation: The pesticide user is responsible for the effects of pesticides he/she uses on livestock or crops.

2. **Correct Answer: B**, Pest Management Recommendations: Livestock Pesticide Poisoning
   Explanation: Each year many livestock are killed by pesticides spilled on the ground or accidently mixed with feed.

3. **Correct Answer: E**, Pest Management Recommendations: Rinse'em Out
   Explanation: All the statements are part of the regulations. Empty containers should be triple rinsed and disposed of at a sanitary landfill. Hazardous wastes should be disposed at a designated hazardous waste land fill. Farmers or private applicators may be exempt from some regulations providing they follow proper disposal procedures.

4. **Correct Answer: A**, Pest Management Recommendations: Licensing
   Explanation: If a pesticide is applied on public property, a license is required even if it is not restricted. The Ohio Department of Agriculture, Pesticide Regulation Sections is responsible for pesticide applicators.

5. **Correct Answer: B**, Pest Management Recommendations: Safety Tips For Using Pesticides
   Explanation: Not only should the clothes be washed with soap and water, but the clothes should also be changed. Reading the label and recording pesticide usage are good safety procedures. Label rates should never be exceeded especially with livestock, and all slaughter dates should be strictly followed.

6. **Correct Answer: E**, Pest Management Recommendations: Safety Tips For Using Pesticides
   Explanation: Do not eat, drink or smoke while applying pesticides. Avoid treating stressed or sick animals and avoid contaminating feed. Do not treat cropland with treated manure <u>unless</u> the label approves it.

7. In cases of suspected pesticide poisoning of the pesticide operator, which of the following are true?
    A. Contact a physician at once.
    B. Symptoms of organic phosphate poison include blurred vision, abdominal cramps, and tightening in the chest.
    C. Atropine is an antidote for all organophosphorus pesticides.
    D. A & B
    E. All of the above.

8. In horses, horse bots usually are controlled by which of the following treatments?
    A. Sprays
    B. Dusts
    C. Feed additives, oral pastes, or oral drenches
    D. All of the above
    E. None of the above

9. Which of the following is not a characteristic of horse bot flies and horse bots?
    A. Horse bot eggs are pale yellow and deposited only on the hind legs of horses where they burrow into the skin and complete their life cycle.
    B. Bot flies are active from mid-summer until the first killing frost.
    C. Sponging a horse with warm water (104-120F) on cool days (less than 60F) will cause horse bot eggs to hatch and die of exposure.
    D. Clipping horse hair infested with horse bot eggs will aid in control.
    E. Horse bots are not true worms, they are the larva stage of bot flies.

10. Which of the following is a true statements about encephalitis?
    A. Encephalitis a virus disease affecting horses, mules, donkey but not humans.
    B. Encephalitis is transmitted only by mosquitoes and causes high death losses by affecting the central nervous system in horses.
    C. Signs of encephalitis include a rapid rise in body temperature up to 106 degrees F, rapid pulse, loss of appetite, and depression. The animal may display a drifting gait and hang its head and appear drowsy.
    D. Commonly, the animal may circle continuously until prostrate with death occurring in 6 to 8 weeks.
    E. After the animal dies, consult the Ohio Department of Health in suspected cases so that a local veterinarian can draw blood.

11. Good sanitation is the basis for controlling flies around livestock barns. Sanitation is at least 75% of good fly control in preventing the breeding of flies.
    A. True
    B. False

12. Along with good sanitation, for a successful fly control program:
    A. A single pesticide product usually gives the best control.
    B. Since fly resistance is always a possibility, it is best to never rotate among different families of chemicals.
    C. It is easier and less expensive to treat heavier fly populations after they occur than to try to prevent them.
    D. It is best to rotate among synthetic pyrethroid, carbamate, and organophosphate insecticides.
    E. None of the above

7. **Correct Answer: D**, Pest Management Recommendations: Poison Information Center
   Explanation: In cases of suspected pesticide poisoning always contact a physician at once. Symptoms of organic phosphate poisoning include blurred vision, cramps and tightness in the chest. Atropine is antidote for some organophosphorus pesticides.

8. **Correct Answer: C**, Pest Management Recommendations, Types Pesticide Formulations Used
   Explanation: In horses, only feed additives, oral pastes, or oral drenches can be used to control horse bots. The best time to control horse bots is 30 days after the first killing frost in the fall. Applicators can apply a preventatine worm spray of 0.5% malathion during the autumn months at the chest, legs and jaw where eggs are usually found.

9. **Correct Answer: A**, Pest Management Recommendations: When To Treat For Horse Bots
   Explanation: Horse bots do not burrow into the skin but they can be ingested by licking. Clipping horse hair and sponging with warm water will aid in horse bot control. Horse bots are the larva stage of botflies which are active from mid-summer to the first killing frost. Usually, eggs are deposited on forelegs, chest, neck, belly, and occasionally flanks or hindlegs of the animal.

10. **Correct Answer: C**, Pest Management Recommendations: Encephalitis In Horses
    Explanation: Encephalitis signs include a rapid rise in body temperature, rapid pulse, loss of appetite, and depression. Humans can also get encephalitis and it is transmitted by mosquitos and possible other insects. Death in horses occur in 6 to 8 days. The Ohio Department of Health and a local veterinarian should be consulted before the animal dies in suspected encephalitis cases.

11. **Correct Answer: A**, Pest Management Recommendations: Control Of Flies In And Around Livestock
    Explanation: This is a true statement. Sanitation is at least 75% of a good fly control program in preventing fly breeding. However, it is often necessary to supplement sanitation practices with pesticides.

12. **Correct Answer: D**, Pest Management Recommendations: Control Of Flies In And Around Livestock
    Explanation: Rotating among synthetic pyrethroid, organophosphate, and carbamate insecticides will help prevent resistance from building up in the fly population. A single pesticide rarely gives the most effective and economical control. It is much easier and less expensive to prevent heavy fly build-up than it is to try to control them.

13. Which of the following are not good sanitation procedures and practices?
    A. All manure should be removed from livestock pens as frequently as possible to control flies.
    B. Manure should be spread thinly in order to kill fly eggs and larva through drying.
    C. Applying a larvicide to manure is the best way to kill all flies, larva, and eggs.
    D. Wet litter, manure stacks, old bales, and other organic matter may attract flies and should be eliminated.
    E. Proper drainage in the barnyards will help eliminate low wet spots in the barn yard and help improve fly control.

14. When applying baits, what is the minimum amount of bait to apply?
    A. 4 ounces per 100 square feet
    B. 4 ounces per 1000 square feet
    C. 4 pounds per 100 square feet
    D. 4 pounds per 1000 square feet
    E. None of the above

15. Baits are most effective when used in conjunction with other control measures. However, do not apply where livestock, pets, children or wildlife may eat them.
    A. True
    B. False

16. When using aerosol sprays and foggers, for the best control, reduce air movement as much as possible by closing doors and windows. Animals may be present during application as long as they are not directly treated with dimethoate or fenthion insecticides.
    A. True
    B. False

17. Mixing insecticides with ordinary lime whitewash will increase the effectiveness of insecticides in controlling insects.
    A. True
    B. False

18. Which of the following statements is true regarding controlling flies with feed additives?
    A. All feces must be treated in an area in order to effectively control fly populations.
    B. The area must be many miles across because flies readily move from herd to herd within a day or two.
    C. The treatment is more effective against face flies than horn flies.
    D. A & B
    E. B & C

19. Oral larvicides prevent the development of flies in the manure and are not effective against adults.
    A. True
    B. False

13. **Correct Answer: C**, Pest Management Recommendations: Manure Treatments
    Explanation: The other four procedures are all good sanitation practices. Also, larvicides if water based, tend to liquify the manure. Some feel larvicides contribute to building up pesticide resistance faster and kills benificial arthapods in manure.

14. **Correct Answer: B**, Pest Management Recommendations: Baits
    Explanation: The correct answer is to apply a minimum of 4 ounces of bait per 1000 square feet of floor area.

15. **Correct Answer: A**, Pest Management Recommendations: Baits
    Explanation: Baits are more effective when used with other control measures. Pesticide applicators should be careful in applying baits so they do not contaminate feed or water.

16. **Correct Answer: A**, Pest Management Recommendations: Space or Aerosol Sprays
    Explanation: This is a true statement. Reducing air movement increases the effectiveness of the pesticide. Animals may be present as long as they are not directly treated with dimethoate or fenthion insecticides.

17. **Correct Answer: B**, Pest Management Recommendations: White Wash And Fly Control
    Explanation: Never mix insecticides in ordinary lime whitewash. Lime whitewashes are very alkaline and cause insecticides to become ineffective in controlling insects.

18. **Correct Answer: D**, Pest Management Recommendations: Feed Additives
    Explanation: To control flies with feed additives, all feces must be treated and the area must be many miles across because flies will move from herd to herd. The treatment is more effective against horn flies than it is against face flies.

19. **Correct Answer: A**, Pest Management Recommendations: Manure Treatments
    Explanation: Oral larvicides are effective against fly larva and have no effect on adults.

20. Which of the following statements about manure treatments (larviciding) is true?
    A. Manure treatments applied directly to manure surfaces to control fly maggots is discouraged because beneficial arthropods may be killed.
    B. Efforts should be made to keep all manure as dry as possible or less than 30% moisture to reduce or halt fly breeding.
    C. Wide spread use of manure sprays should be avoided. Do not apply where animals or birds may come in contact.
    D. Liquid manure treatments should be applied to wet the manure surface (not soak), and repeat as necessary but not more than once every 7 days.
    E. All of the above

21. Residual surface sprays should never be sprayed in a milk house. When using residual surface sprays, avoid contaminating feed and water and cover all drinking cups and mangers during spraying.
    A. True
    B. False

22. All animals should be removed from buildings sprayed with a residual surface spray for a minimum of 40 minutes.
    A. True
    B. False

23. Rattailed maggots can be controlled by never allowing manure above the water line in lagoons. Usually the lagoon becomes "out-of-balance" with the water level and solids in the lagoon, promoting fly development. Keep the banks steep and weeds under control to keep rattailed maggot populations low.
    A. True
    B. False

24. Diatomaceous Earth has been proven to control flies when used as a feed additive or dust.
    A. True
    B. False

25. Since fly traps usually contain no insecticides, they are safe to use around children and livestock, but they are not effective by themselves, in feedlots, or over wide areas.
    A. True
    B. False

26. Which of the following statements are true regarding electrocuter light traps and ultrasonic devices?
    A. Electrocuter lights should never be placed in doorways or windows where insects may become a nuisance.
    B. Electrocuter light traps may actually concentrate and attract insects and are not effective in wide open spaces.
    C. Ultrasonic pest repellers are not effective in controlling insects, will not penetrate walls, and may actually cause some insects to bite more frequently.
    D. All of the above
    E. None of the above

20. **Correct Answer: E**, Pest Management Recommendations: Manure Treatments
Explanation: All of the statements are true. Surface treatments can kill or harm beneficial arthropods, animals or birds which come in contact with the spray. Manure should be kept below 30% moisture to reduce or halt fly breeding. Apply to wet the manure surface (not soak), and repeat applications as necessary, but not more often than once every 7 days.

21. **Correct Answer: A**, Pest Management Recommendations: Residual Surface Sprays
Explanation: Never use residual sprays in a milk house and avoid contaminating feed, water, or milking equipment.

22. **Correct Answer: B**, Pest Management Recommendations: Residual Surface Sprays
Explanation: Read the label! While it is a good practice to remove animals from the barn while applying residual surfaces sprays, the label should be consulted for removal times. Most residual surface sprays require that animals be removed for a minimum of 4 hours.

23. **Correct Answer: A**, Pest Management Recommendations: Control Measures
Explanation: This is a true statement. Never allow accumulations of manure above the water line, or allow materials to float or stick to the sides, because these conditions enhance fly development.

24. **Correct Answer: B**, Pest Management Recommendations: Diatomaceous Earth
Explanation: Little or no control will be achieved by using diatomaceous earth. It is best to control flies using more conventional practices.

25. **Correct Answer: A**, Pest Management Recommendations: Fly Traps
Explanation: Fly traps by themselves are limited in their usefulness but they are safe, especially around children and animals.

26. **Correct Answer: D**, Pest Management Recommendations: Electrocuter Traps & Ultrasonic Devices
Explanation: All the statements are true. Ultrasonic devices have not proven to be effective and electrocuter light traps may actually attract and concentrate insects to an area. Electrocuter light traps are more of an insect survey or monitoring tool and are not effective when they are used alone in and around livestock operations.

27. In biological control systems:
    A. Natural parasitic wasps and predators: (beetles and mites) which are natural enemies of flies are used to control flies.
    B. Residual insecticides such as synthetic pyrethroids namely permethrin will not harm beneficial insects.
    C. Parasitic wasps are less than 1/10" long and do not sting or bite humans. Parasitic wasps do not propagate as fast as flies, so there may be a delay in control.
    D. A & C
    E. All of the above

PESTICIDES FOR POULTRY & POULTRY BUILDINGS

28. Northern Fowl mites:
    A. Can reduce egg production by 10-15%
    B. Completes its entire life cycle on poultry.
    C. Can complete their entire life cycle in one week.
    D. May increase in cooler weather.
    E. All of the above

29. Which of the following are natural pests of poultry?
    A. House Fly
    B. Northern Fowl mites
    C. Chicken mites
    D. Lice
    E. All of the above

30. House flies may develop resistance to insecticides under heavy insecticide dosages. The only proven solution is to rotate among classes of insecticides.
    A. True
    B. False

31. One of the largest management problems facing poultry producers is fly control. About 95% of the problems involve the house fly.
    A. True
    B. False

32. Manure management is the most effective means for fly control in poultry barns. Fresh poultry manure contains 75-80% moisture. Fly breeding can be eliminated by reducing the moisture content to 30% or less.
    A. True
    B. False

33. Sanitation is the most important aid in successful fly control. Which of the following management practice will help reduce fly outbreaks the most?
    A. Quick removal and disposal of dead birds.
    B. Reduced feed spills and disposal of broken eggs.
    C. Keeping manure at 30% moisture or less by preventing excessive water leaks.
    D. Cleaning up and disposing of wet feed spills.
    E. All of the above

34. Hide beetle larvae are an important economic pest of poultry houses because they bore into wood and insulation.
    A. True
    B. False

27. **Correct Answer: D**, Pest Management Recommendations: Biological Control
Explanation: Synthetic pyrethroid such as permethrin insecticides also kill beneficial insects, such as parasitic wasps and beetles which are natural enemies of flies. Parasitic wasp are very small and do not harm humans. A general recommendation is to release relatively small numbers of these predators throughout the fly breeding season rather than at one single massive release time. Research has not proven whether this is an economically effective fly control measure.

ANSWERS FOR - PESTICIDES FOR POULTRY & POULTRY BUILDINGS

28. **Correct Answer: E**, Pesticides for Poultry and Poultry Building: Northern Fowl Mite
Explanation: All the statements are true. The Northern Fowl Mite is an important external parasite of poultry and are usually first noticed on the eggs. Check for mites on layers by examining first the vent, the tail and back legs. Feathers will become soiled from mite eggs, cast skin, and dried blood from feeding and excrement.

29. **Correct Answer: E**, Pest Management Recommendations
Explanation: House Flies, Northern Fowl Mites, Chicken Mites, and Lice are all common natural pests of poultry.

30. **Correct Answer: A**, Pesticides for Poultry and Poultry Building: Resistance
Explanation: House fly resistance is genetic in nature and develops more quickly under heavy doses or frequent applications. The best solution is to rotate among classes of insecticides to reduce resistance problems.

31. **Correct Answer: A**,
Pesticides for Poultry and Poultry Building: Control Of House Flies In and Around Poultry Barns
Explanation: This is a true statement. The house fly is capable of moving up to 20 miles from the site of development but normally only move one or two miles.

32. **Correct Answer: A**, Pesticides for Poultry and Poultry Building: Cultural Control
Explanation: Manure management is important in controlling flies. Fresh poultry manure is 75%-80 moisture but it must be reduced to 30% or less moisture to reduce fly populations.

33. **Correct Answer: E**, Pesticides for Poultry and Poultry Building: Sanitation
Explanation: All of the practices mentioned will help reduce fly outbreaks. In addition, keeping weeds under control and improving drainage so that water is not standing around poultry and other livestock buildings is encouraged.

34. **Correct Answer: A**, Pesticides for Poultry and Poultry Building: Hide Beetle
Explanation: Hide beetle larvae have a habit of boring into wood, foam insulation, and even drywall or panelling to pupate. This “honeycombing” may cause a serious weakening of these structures.

(see page 42 to check your score)

PESTS OF CATTLE

HORN FLIES

1. Horn flies cause injury to cattle by:
    A. Sucking blood.
    B. Feeding on mucous of the eyes.
    C. By feeding on sloughing skin.
    D. None of the above

2. The female horn fly deposits her eggs:
    A. On the hairs and belly of cattle.
    B. In fresh cattle manure.
    C. Old water holes.
    D. None of the above

3. Horn fly larval development takes place:
    A. In the manure.
    B. In open wounds.
    C. Under the skin.
    D. In wet areas around the Great Lakes.

4. The horn fly life cycle takes:
    A. 20 days.
    B. 10 to 14 days.
    C. 18 to 22 days.
    D. 90 days.

5. As pests on cattle, horn fly problems usually occur:
    A. In big feed lots.
    B. On pasture.
    C. On open ranges.
    D. A. and B. from above
    E. B. and C. from above

6. Ohio was one of the first states to successfully use ear tags on cattle for control of horn flies and face flies. It is best to use:
    A. 2 tags per head delayed until flies reach economic levels and removed in autumn.
    B. 2 tags per head beginning when flies first appear in the summer.
    C. 2 tags per head beginning when flies first appear in the spring.
    D. 2 tags per head after flies begin to build up.

7. Horn fly resistance to synthetic pyrethroid ear tags is a possible problem. If horn flies are abundant after 5 weeks of synthetic pyrethroid ear tag use, horn fly resistance may be developing. Ideally, remove the tags and use:
    A. Another brand of synthetic pyrethroid ear tag.
    B. A different chemical class such as an organophosphate or chlorinated hydrocarbon ear tag.
    C. None of the above

ANSWERS FOR - PESTS OF CATTLE

HORN FLIES

1. **Correct Answer: A**, Livestock Study Guide Text
   Explanation: The primary injury caused to cattle is piercing the skin and sucking blood from the animal. Face flies feed on mucous of the eyes, nose and mouth and on blood oozing from insect bites or open wounds. Chewing lice feed on sloughing skin.

2. **Correct Answer: B**, Livestock Study Guide Text
   Explanation: This is one of the reason why sanitation is so important. The female horn fly deposits its eggs in fresh cattle manure. Female heel flies attach their eggs to the hairs and bellies of cattle. Mosquitoes deposit their eggs in water.

3. **Correct Answer: A**, Livestock Study Guide Text
   Explanation: Larvae development takes place in the manure or around the manure pile. The screw fly larva develop in wounds. The cattle grub larvae develop under the top hide in cattle. Mosquitoes develop in any wet area.

4. **Correct Answer: B**, Livestock Study Guide Text
   Explanation: The life cycle for the horn fly is completed in about 10 to 14 days.

5. **Correct Answer: E**, Livestock Study Guide Text
   Explanation: Horn fly problems are limited to pasture and range situations and are not of significance to feedlot operation.

6. **Correct Answer: A**, Pest Management Recommendations
   Explanation: Delay tagging until flies reach economic levels of approximately 100-200 horn flies per animal. Remove tags in the autumn, before slaughter. Be sure to read and follow label directions.

7. **Correct Answer: B**, Pest Management Recommendations
   Explanation: Switching to organophosphate ear tags is helpful in preventing fly resistance, only when pyrethroid ear tags fail to give adequate control. You need to take care not to use the same family of ear tags two years in a row. Ideally, different chemical ear tags should be rotated 2-3 times each year after every 3-4 generations of horn flies.

8. Feed additives can be added to lactating dairy rations such as Altosid and Rabon from May through September to control:
    A. Mosquitoes.
    B. Horse flies.
    C. Horn flies.
    D. Lice.

9. Feed additives such as (Rabon) work by controlling which part of the life cycle of the horn fly?
    A. Egg
    B. Larvae
    C. Pupae
    C. Adult

10. Backrubbers and facerubbers can be used to control which of the following two types of flies?
    A. Stable flies and heel flies
    B. Face flies and horn flies
    C. House flies and lice
    D. Horse flies and mosquitoes

11. The face fly is about the same size as the house fly and similar in color. In the field the simplest way to identify the face fly is:
    A. By its purple legs.
    B. By its large wing span.
    C. By its sucking blood.
    D. By their swarming and lighting about the eyes, nostrils, muzzle of cattle.

12. Face flies have what type of mouth parts?
    A. Sponging mouth parts
    B. Chewing mouth parts
    C. Siphoning mouth parts
    D. Piercing-sucking mouth parts

13. Face flies can become quite troublesome on cattle and horses during the spring and summer months, by feeding on the watery secretions around the eyes, nose, mouth and wounds and may transmit:
    A. Encephalitis.
    B. Tuberculosis.
    C. Pinkeye.
    D. Poliomyelitis.

14. Face flies only infest and bother cattle during the day and avoid darkened buildings and shady areas.
    A. True
    B. False

15. The life cycle of the face fly is 15 to 25 days. Eggs are deposited in fresh cattle dung. The life stages that develop in the manure are:
    A. Eggs and larvae.
    B. Eggs and nymph.
    C. Eggs, larvae and pupa.
    D. Eggs.

8. **Correct Answer: C**, Pest Management Recommendations
   Explanation: Under Feed Additives, it is recommended to feed through the months of May through September. In order to make the oral larvicide work, animals must consume the recommended dosage. Note: Oral larvicides are to be used extensively, that is; all feces must be treated within an area many miles wide in order to reduce fly populations. Feed additives are more effective against horn flies than face fly.

9. **Correct Answer: B**, Livestock Study Guide Text
   Explanation: Horn fly feed additives are used to control larvae developing in the manure.

10. **Correct Answer: B**, Livestock Study Guide Text
    Explanation: Backrubbers and facerubbers give efficient control for horn and face flies.

11. **Correct Answer: D**, Livestock Study Guide Text
    Explanation: Field identification is simply noted by the way face flies swarm around and light upon the cattle. The face fly does not have a large wing span and is not capable of piercing the skin to feed on blood because of its sponging mouth parts, however it readily feeds on blood on the animal caused from horse fly and deer fly wounds. The coloring is similar to that of a house fly.

12. **Correct Answer: A**, Livestock Study Guide Text, Applying Pesticides Correctly
    Explanation: The face fly has sponging-lapping mouth parts.

13. **Correct Answer: C**, Livestock Study Guide Text
    Explanation: Face flies can transmit pinkeye.

14. **Correct Answer: A**, Livestock Study Guide Text
    Explanation: Face flies will not bother cattle in dark buildings or at night.

15. **Correct Answer: A**, Livestock Study Guide Text
    Explanation: The face fly goes through complete metamorphosis. The female face fly lays her eggs in fresh cattle manure. The larvae hatch and develop in the manure. Pupation (resting stage of development) occurs in the soil.

16. Face flies are difficult to control because:
    A. Of their habit of feeding primarily upon the face of an animal.
    B. They travel long distances to infest animals.
    C. They have no metamorphosis.
    D. A. and B. from above
    E. A. and C. from above

17. A bolus product can be used in both lactating as well as non-lactating dairy cows and beef cattle to control face flies.
    A. True
    B. False

18. When using ear tags for face flies and horn flies, an operator should avoid using the same chemical ear tag two years in a row.
    A. True
    B. False

19. The adult female heel fly:
    A. Lays eggs in fresh manure.
    B. Attaches eggs to hairs on the legs and belly of cattle.
    C. Lays eggs in the organic bedding of livestock.
    D. None of the above

20. Two species of heel fly which bother cattle are the Common Cattle Grub and the Northern Cattle Grub.
    A. True
    B. False

21. The larva stage of the heel fly migrates through:
    A. Connective tissue.
    B. Muscle.
    C. Arteries.
    D. Bone.

22. Depending on the species of heel fly larvae, the larvae will, in 6 to 8 months, reach:
    A. The gullet.
    B. Spinal cord.
    C. A. and B. from above
    D. None of the above

23. Common Grubs and Northern Cattle Grubs reach the backline of cattle after January 1.
    A. True
    B. False

24. Cattle grubs cut breathing holes in the hide and complete larvae development as cysts (warbles) under the skin.

    A. True
    B. False

16. **Correct Answer: D**, Livestock Study Guide Text
    Explanation: The face fly has complete metamorphosis. (Bulletin 713). There are two factors that make control difficult. One is that they feed in the face area of cattle. The second problem is that they travel long distances.

17. **Correct Answer: A**, Pest Management Recommendations
    Explanation: Vigilante, a bolus product, can be used for both lactating dairy cattle as well as non-lactating dairy cattle or beef cattle. Be sure to follow label directions.

18. **Correct Answer: A**, Pest Management Recommendations
    Explanation: Switching to a different chemical family of ear tags helps to prevent resistance from the flies. Ideally different ear tags should be rotated 2-3 times each year after 3-4 generations of horn flies.

19. **Correct Answer: B**, Livestock Study Guide Text
    Explanation: The adult heel fly attaches her eggs to the hairs on the belly and legs of cattle.

20. **Correct Answer: A**, Pest Management Recommendations
    Explanation: There are 2 types of grubs caused by heel flies. The Common Cattle Grub Hypoderma lineatum (devillers) and the Northern Cattle Grub Hypoderma bovis (L.) that affect cattle.

21. **Correct Answer: A**, Livestock Study Guide Text
    Explanation: The larvae migrate through the connective tissues for 6-8 months before reaching the gullet or spinal cord, depending on type of adult heel fly larvae.

22. **Correct Answer: C**, Livestock Study Guide Text
    Explanation: The Common Cattle Grubs reaches the gullet in 6-8 months. The Northern Cattle Grub reaches the spinal cord in the 6-8 months.

23. **Correct Answer: A**, Pest Management Recommendations
    Explanation: Both grub larvae will migrate from either the spinal column or the esophagus and go towards the backline of cattle after January 1.

24. **Correct Answer: A**, Livestock Study Guide Text
    Explanation: Cattle grubs do cut holes in the hide of cattle to be able to breath.

25. Cattle grubs cause economic damage to cattle by:
    A. Damaging the animals' hide.
    B. Tunneling damage to the meat.
    C. Causing hair loss.
    D. A. and B. from above
    E. None of the above

26. No pesticides are currently registered for lactating dairy cattle for control of:
    A. Lice.
    B. Mites (mange).
    C. Cattle grubs.
    D. Mosquitoes.

27. What are some of the host-parasite reactions that could happen when the Common Cattle Grub in cattle reaches the gullet and the Northern Cattle Grub in cattle reaches the spinal cord?
    A. Bloat
    B. Difficulty in breathing
    C. Staggering
    D. Paralysis
    E. All of the above

28. Normally, Ohio cattle do not have grub infestation as great as out of state cattle. Ohio cattle should be treated no later than:
    A. November 1.
    B. December 1.
    C. October 15.
    D. September 3.

29. Be careful when applying pesticides to non-lactating dairy cattle. Should the cow freshen before the minimum number of days shown on the label, do not use the milk for the balance of the days.
    A. True
    B. False

30. Systemic organophosphate insecticides such as Warbex and Tiguvon may be hazardous to certain birds because:
    A. Birds will become drunk.
    B. Some birds will pull hair for nest building and be killed.
    C. The smell will cause the bird to stop eating.
    D. None of the above

31. What are some possible ways to control flies in the milk room?
    A. Practice strict sanitation
    B. Use tight fitting screens for doors and windows
    C. Use mist or aerosol sprays containing pyrethrin plus piperonyl butoxide oil base
    D. Use sticky fly traps
    E. Use all of the above

32. In the milk room it is illegal to use baits, residual surface sprays or space sprays other than those containing pyrethrin and synergist.
    A. True
    B. False

25. **Correct Answer: D**, Livestock Study Guide Text
    Explanation: Cattle grubs not only damage the hide of cattle but also damage the meat as they bore through the connective tissue.

26. **Correct Answer: C** Pest Management Recommendations
    Explanation: There are no pesticides currently registered for grub control of cattle grubs on lactating dairy cattle.

27. **Correct Answer: E**, Livestock Study Guide Text
    Explanation: There is a possible host parasitic reaction that can happen to cattle with heavy infestations of cattle grubs. The common cattle grub can cause the swelling of the gullet which causes bloating and difficulty in breathing. The Northern Cattle Grub when reaching the spinal cord can cause paralysis which can cause staggering by the animal.

28. **Correct Answer: A**, Pest Management Recommendations
    Explanation: Cattle here in Ohio should be treated no later than Nov. 1.

29. **Correct Answer: A**, Pest Management Recommendations
    Explanation: You need to record the day in which the non-lactating dairy animal is treated. If she freshens before the minimum number of days shown on the label do not use the milk for the balance of the remaining days.

30. **Correct Answer: B**, Pest Management Recommendations
    Explanation: Some of the pour on grubicides, such as famphur (Warbex) and fenthion (Tiguvon), may present some problems to the bird populations. Some birds pull hair from the backs of treated animals and are killed. Certain birds which feed on carcasses of dead animals also could be killed. If bird hazards are a problem you may need to used an injection type of application.

31. **Correct Answer: E**, Pest Management Recommendations
    Explanation: You need to use all of the procedures in your fight against flies in the milk room.

32. **Correct Answer: A**, Pest Management Recommendations
    Explanation: You can only use materials that have pyrethrin or synergist in the products. Always read and follow label directions.

33. When applying residual sprays to walls, ceilings, partitions, stanchions, post and other fly resting places, it is best to:
    A. Wear protective clothing and respirator during spraying.
    B. Avoid contamination of feed, water and milking utensils.
    C. Cover drinking cups and mangers during spraying.
    D. All of the above

34. One of the ways to distinguish between stable flies and house flies is their mouth parts. A stable fly has:
    A. Long piercing-sucking mouth parts.
    B. Sponging mouth parts.
    C. Siphoning mouth parts.
    D. Chewing mouth parts.

35. Stable flies usually attack which area on cattle?
    A. Feet and heels
    B. Around face
    C. Lower leg areas
    D. Tail head

36. The most important step in controlling stable and house flies is:
    A. Sanitation.
    B. Systemic insecticides.
    C. None of the above

37. The house fly goes through stages of development with none of the young resembling the adult. This is known as complete metamorphosis or complete change. Which are the growth stages of the common house fly.
    A. Egg, nymph, adult
    B. Egg, young, adult
    C. Egg, larvae, pupa, adult
    D. Egg, naiads, adult

38. Only the female horse fly and deer fly feeds on blood, and produce painful bites which usually continue to bleed after the fly leaves.
    A. True
    B. False

39. The larval and pupal stages of the mosquito develop in water. Thus, the best method of control is:
    A. Spray all forest land.
    B. Eliminate fresh manure.
    C. Eliminate standing water.
    D. None of the above

40. There are two types of lice which affect cattle in Ohio—the chewing (biting) and sucking lice.
    A. True
    B. False

41. Chewing lice feed on sloughing skin while sucking lice pierce the skin and feed on blood.
    A. True
    B. False

33. **Correct Answer: D**, Pest Management Recommendations, Applying Pesticides Correctly
Explanation: Make sure you follow the PRECAUTIONARY STATEMENTS ON THE LABEL.

34. **Correct Answer: A**, Livestock Study Guide Text, Applying Pesticides Correctly
Explanation: One of the ways to identify insects is their mouth parts. The stable fly has a long piercing-sucking mouth part.

35. **Correct Answer: C,** Livestock Study Guide Text
Explanation: Both sexes of the stable fly feed on the lower legs of cattle. This is why you will notice cattle doing a lot of stomping of their feet as they are trying to dislodge the flies.

36. **Correct Answer: A**. Livestock Study Guide Text
Explanation: Sanitation is the most important step in controlling the stable and house fly. Without proper sanitation you will not get the most out of your investment in chemicals for control of stable and house flies.

37. **Correct Answer: C**, Livestock Study Guide Text, Applying Pesticides Correctly
Explanation: The house fly goes through four stages of development. The egg, larvae, and the pupa stages can occur in spoiled silage, spilled feeds, animal bedding and manure before the adult stage develops. The female house fly prefers manure to lay her eggs in.

38. **Correct Answer: A**, Livestock Study Guide Text
Explanation: As with a lot of insects only the females feed on blood. The deer fly and horse fly are only day time biters.

39. **Correct Answer: C**, Livestock Study Guide Text
Explanation: The best method of control is a cultural control program of eliminating places where water can stand. Larvicidal insecticides can also be applied but it could be more cost effective and safer for the environment to eliminate mosquitoes' breeding grounds such as potholes, water tanks tires and other human made structures.

40. **Correct Answer: A**, Livestock Study Guide Text
Explanation: There are two types of lice which bother cattle. That is the chewing and sucking type of lice.

41. **Correct Answer: A**, Livestock Study Guide Text
Explanation: The chewing lice feed on sloughing skin while the sucking lice feed on blood from cattle. Both types of lice produce an intense irritation which leads to scratching, rubbing, licking, and biting of the infested area.

42. Heavy infestations of lice affects which of the following?
    A. Weight gain
    B. Reduced milk production
    C. Anemia of the animal
    D. All of the above

43. Lice are host specific and spend their entire life on the animal.
    A. True
    B. False

44. Lice infestations are generally high in the summer and low in the winter.
    A. True
    B. False

45. The eggs from lice attach to:
    A. Hair.
    B. Open wounds.
    C. Mucous around the eyes.
    D. None of the above

46. Grub treatment before Ohio's November cutoff date will often not take care of cattle lice problems.
    A. True
    B. False

47. Mites are tiny parasitic organisms which live on or in the skin. They cause which of the following quarantinable diseases?
    A. Encephalitis
    B. Poliomyelitis
    C. Tuberculosis
    D. Psoroptic mange (scabies)

42. **Correct Answer: D**, Livestock Study Guide Text
Explanation: Because of their intense irritation caused by lice, the animal will do poorly, thus all of the listed things will happen.

43. **Correct Answer: A**, Livestock Study Guide Text
Explanation: The cattle lice are host specific and will not bother other animals other than cattle.

44. **Correct Answer: B**, Livestock Study Guide Text
Explanation: Lice population are generally lighter in the summer months compared to the winter months. Generally there is one affected animal that is infested the year around. As you get animals in winter quarters where there is direct contact between animals, thus a reinfestation.

45. **Correct Answer: A**, Livestock Study Guide Text, Applying Pesticides Correctly
Explanation: The eggs are attached to the hairs on cattle and hatch into nymphs. This is an example of gradual metamorphosis.

46. **Correct Answer: A**, Pest Management Recommendations
Explanation: Louse eggs are not as susceptible to insecticides as the lice themselves and therefore animals should be re-examined about every three weeks after grub treatment to determine if viable lice eggs have hatched and reinfested the herd.

47. **Correct Answer: D** Pest Management Recommendations
Explanation: Psoroptic mange is a reportable, quarantinable disease. By law, treatment must be approved and overseen by federal and state veterinarians. Any suspected cases of psoroptic mange should be reported to an Ohio veterinarian.

(see page 43 to check your score)

SHEEP, GOATS, AND GENERAL LIVESTOCK

1. Three common external parasites found in Ohio Sheep flocks are:
    A. Hard ticks, keds (ticks), lice.
    B. Wool maggots, keds (ticks), lice.
    C. Heel flies, hard ticks, lice.
    D. Bedbugs, fleas, keds (ticks).

2. Which of the following is a quarantinable disease and control operations must be supervised by personnel of The Ohio Department of Agriculture?
    A. Lice
    B. Foot rot
    C. Ticks
    D. Scab mites (Scabies, Wet Mange)

3. Ewes and lambs with dung locks during the warm, wet spring weather may most likely become infested with:
    A. Lice.
    B. Scab.
    C. Keds (ticks).
    D. Wool maggots (fleece worms).

4. Residual sprays, applied to walls, ceilings, partitions, stanchions, posts and other fly resting places are still the "mainstay" of fly control on livestock farms. Barn surfaces vary in amount of spray that should be applied to them. Which statement is correct in regards to application?
    A. Rough porous surfaces require less spray than smooth surfaces.
    B. Rough porous surfaces and smooth surface require the same amount of spray.
    C. Smooth surfaces require less spray than rough, porous surfaces.
    D. None of the above.

5. In routine sheep dipping, animals should not be sprayed if under the age of:
    A. 3 months.
    B. 4 months.
    C. 5 months.
    D. 6 months.

6. Which of the following products is labeled for control of sheep keds (ticks), lice and wool maggots as a spray or dip?
    A. Lindane 25% WP
    B. Toxaphene 61% EC
    C. Coumaphos (Co-Ral)
    D. Stirofos (Rabon) 50% WP

ANSWERS FOR - SHEEP, GOATS & GENERAL LIVESTOCK

1. **Correct answer: B**, Livestock Study Guide
   Explanation: The only three external parasites common to sheep are, wool maggots,keds (ticks), and lice. Hard ticks, bedbugs and fleas are not common external parasites found in sheep flocks.

2. **Correct answer: D**, Pest Management Recommendations
   Explanation: Scabies control is regulated by federal quarantine laws, because of the severity of this pest a nationwide eradication program has been in effect since 1960.

3. **Correct answer: D**, Livestock Study Guide
   Explanation: Female flies are attracted to foul odors emitted from soiled wet wool or open bloody wounds. Eggs are deposited in the wool surrounding these wounds or in the wet matted wool around the crotch of the animal. Wool maggot infestations can be prevented by good flock management.

4. **Correct answer: C**, Pest Management Recommendations
   Explanation: Smooth surfaces require less spray than rough, porous surfaces. It may be necessary to lower the pressure to 80 to 100 pounds per square inch and thoroughly wet the surface.

5. **Correct answer: A**, Pest Management Recommendations
   Explanation: The product recommended for sheep and non-lactating goats, coumaphos (Co-Ral), contains the following limitations. Do not dip sick, convalescent or stressed sheep or lambs less than 3 months old.

6. **Correct answer: C**, Pest Management Recommendations
   Explanation: Coumaphos (Co-Ral) is the only product listed as both dip and spray formulations for control of keds, lice and wool maggots.

7. Keds (ticks) are a pest which would most likely be found on:
    A. Horses and donkeys.
    B. Sheep and goats.
    C. Swine and Poultry.
    D. Dairy cows and beef cattle.

8. Sheep keds are wingless flies which spend their entire lives on sheep.
    A. True
    B. False

9. Hard ticks are important parasites of sheep and swine.
    A. True
    B. False

10. Which of the following is <u>not</u> a pesticide commonly used on sheep and goats?
    A. Diazinon
    B. Malathion
    C. Coumaphos (Co-Ral)
    D. Trichlorfon (Combat)

11. Ultrasonic pest repellers are effective in controlling insects.
    A. True
    B. False

12. Pest Management recommendations for livestock and livestock buildings can be obtained from Ohio State University Extension Bulletin 473.
    A. True
    B. False

13. Which of the following is a product labeled for control of external parasites on swine?
    A. Amitraz (Taktic)
    B. Lindane
    C. Stirofos (Rabon)
    D. Fenvalerate (Ectrin)
    E. All of the above

14. The largest of the livestock and poultry blood-sucking lice is:
    A. Hog louse.
    B. Cattle chewing louse.
    C. Chicken body louse.
    D. Horse sucking louse.

15. Pesticide applications should not be applied to animals which are under stress.
    A. True
    B. False

7. **Correct answer: B**, Livestock Study Guide
   Explanation: Sheep keds are wingless flies which spend their entire lives on sheep. Sheep keds may also be found on goats, but do not occur on other animals.

8. **Correct answer: A**, Livestock Study Guide
   Explanation: Sheep keds (ticks) are actually wingless flies and not true ticks since they have six legs, and they spend their entire lives on sheep.

9. **Correct answer: B**, Livestock Study Guide
   Explanation: Hard ticks are important parasites of cattle. Several species of ticks may also be pests of horses, mules and donkeys.

10. **Correct answer: D**, Pest Management Recommendations
    Explanation: A, B, C, are all pesticides listed for control of various pests on sheep and goats. Trichlorfon (Combat) is listed on page 18 of Bulletin 473, for horse bots control.

11. **Correct answer: B**, Pest Management Recommendations
    Explanation: False, Ultrasonic pest repellents are not effective in controlling insects.

12. **Correct answer: A**. Livestock Study Guide
    Explanation: Bulletin 473 can be purchased through your County Extension Office. However, always follow label recommendations.

13. **Correct answer: E**, Pest Management Recommendations
    Explanation: Amitraz (Taktic), Lindane, Stirofos (Rabon), and Fenvalerate (Ectrin), are all products listed for control of external parasites on swine.

14. **Correct answer: A**, Livestock Study Guide
    Explanation: The hog louse is the largest bloodsucking louse infesting domestic animals.

15. **Correct answer: A**, Livestock Study Guide
    Explanation: Animals should not be treated with any pesticide when under stress from shipping, vaccination, dehorning, castration, disease, exhaustion, or weaning.

16. The pesticide formulation to be used must be taken into consideration when treating agricultural animals. Which formulation would most likely not be used in freezing weather?
    A. Spray
    B Pour-on
    C. Dust
    D. Feed additive

17. An injectable pesticide labeled for control of both internal and external parasites in swine is:
    A. Rabon.
    B. Malathion.
    C. Taktic.
    D. Ivermectin (Ivomec).

18. Swine crowd together for warmth during the cool autumn and winter. What pest has the greatest probability of spreading at this time?
    A. Mange and lice
    B. Horn fly
    C. Ticks
    D. Maggots

19. Individual animals can show toxicity to certain pesticides and materials contained in pesticide formulations. Which of the following would be considered a sign of poisoning?
    A. Excessive salivation
    B. Excessive eye watering
    C. Excessive defecation and urination
    D. All of the above

20. Which of the following correctly completes this statement? The slaughter interval is the time in days required by law before an animal or product can be:
    A. Slaughtered or consumed after a pesticide treatment.
    B. Used as breeding livestock on a commercial operation.
    C. Shown at the county or state fair.
    D. None of the above

21. These tiny pests burrow into the skin to feed, causing animals to rub and scratch vigorously. What are they called?
    A. Sheep keds (ticks)
    B. Hard ticks
    C. Lice
    D. Mange mites

22. All of the following types of lice may infest livestock, except:
    A. Chewing lice.
    B. Biting lice.
    C. Sucking lice.
    D. All of the above are correct.

16. **Correct answer: A**, Livestock Study Guide
    Explanation: Sprays are generally suited for treating most animals except in freezing weather. Spraying during freezing weather may predispose animals to disease such as pneumonia.

17. **Correct answer: D**, Pest Management Recommendations
    Explanation: Ivomec 1% injection will control both internal and external parasites in swine, beef, and non-lactating dairy cattle.

18. **Correct answer: A**, Livestock Study Guide
    Explanation: Mange and lice can rapidly spread through a herd when animals are huddled together. Transmission is by direct contact with infested animals or contaminated materials.

19. **Correct answer: D**, Livestock Study Guide
    Explanation: All of the answers are correct. These are all signs of toxicity. Pesticides will protect animals from pests. However, all pesticides are poisons and can be toxic to the animals being treated, as well as to pests.

20. **Correct answer: A**, Livestock Study Guide
    Explanation: Slaughter intervals are established for all pesticides used on agricultural animals in order to avoid excessive undesirable residues in animal products.

21. **Correct answer: D**, Livestock Study Guide
    Explanation: Mange mites are tiny parasitic mites which cause the skin of infested animals to appear dry, cracked, and bloody.

22. **Correct answer: D**, Livestock Study Guide
    Explanation: Chewing or (biting) lice and sucking lice are pests of livestock, although not all are common pests of swine, sheep and goats.

23. There is no product which can be injected into swine for control of both internal and external parasites.
    A. True
    B. False

24. Some chemicals have application limitations on minimum days from last application to slaughter.
    A. True
    B. False

25. These insects when eaten in hay, (alfalfa) can cause sickness and even death to horses and other livestock. The toxic chemical in their body fluid is cantharidin. What are these insects?
    A. Blister beetles
    B. Grasshoppers
    C. Japanese beetles
    D. Green clover worms

26. What disease affects horses, mules, donkeys and humans and is transmitted by mosquitoes?
    A. Haemophilus
    B. Mastitis
    C. Encephalitis
    D. All of the above

27. When treating for wool maggots on sheep, dipping the animal thoroughly in a washtub or some other container containing coumaphos (Co-Ral) most effectively eliminates wool maggots.
    A. True
    B. False

23. **Correct answer: B**, Pest Management Recommendations
    Explanation: Invermectin (Ivomec) 1% ready to use, can be injected subcutaneously for control of both internal and external parasites in swine.

24. **Correct answer: A**
    Explanation: Listed throughout Bulletin 473 are the minimum day from last application to slaughter.

25. **Correct answer: A**, Livestock Study Guide
    Explanation: Blister beetles, alive or dead, when eaten can cause sickness and even death to livestock.

26. **Correct answer: C**, Pest Management Recommendations
    Explanation: Encephalitis affects the central nervous systems in horses, and causes respiratory illness in man.

27. **Correct answer: A**, Pest Management Recommendations
    Explanation: In the case of severe infestations of wool maggots, aerosols may give false security. Experience has shown that it is best to "dip".

(see page 44 to check your score)

(for questions on pages 12-21)

LIVESTOCK PEST CONTROL

SCORE CARD

# OF CORRECT ANSWERS	% CORRECT	EVALUATION
31-34	> 90%	**Excellent** You have a very good understanding of livestock pests and their control. Proceed to the next unit.
28-30	> 80%	**Good** Be sure you understand those questions that you missed. It may help to read the "Pest Management Recommendations" again, and re-answer the questions you missed.
24-27	> 70%	**Poor** Your score indicates a borderline level of expertise. Be sure to re-read the "PMR" again and re-answer the questions you missed.
0-23	< 70%	Re-read “Pest Management Recommendations” and work through this section of the workbook again.

(for questions on pages 22-33)

CATTLE PEST CONTROL

SCORE CARD

# OF CORRECT ANSWERS	% CORRECT	EVALUATION
43-47	>90%	**Excellent** You have a very good understanding of cattle pests and their control. Proceed to the next unit.
38-42	>80%	**Good** Be sure you understand those questions that you missed. It may help to read the sessions on cattle pests again, and re-answer the questions you missed.
33-37	>70%	**Poor** Your score indicates a borderline level of expertise. Be sure to re-read the cattle pest section again and re-answer the questions you missed.
0-32	<70%	Re-read “Pest Management Recommendations” and "Livestock Study Guide" text and work through this section of the workbook again.

(for questions on pages 34-41)

SHEEP, GOATS, SWINE AND GENERAL LIVESTOCK PEST CONTROL

SCORE CARD

# OF CORRECT ANSWERS	% CORRECT	EVALUATION
25-27	>90%	**Excellent** You have a very good understanding of livestock pests and their control. Proceed to the next unit.
22-24	>80%	**Good** Be sure you understand those questions that you missed. It may help to read the sessions on sheep, goats and swine again, and re-answer the questions you missed.
19-21	>70%	**Poor** Your score indicates a borderline level of expertise. Be sure to re-read the sheep, goats and swine section again and re-answer the questions you missed.
0-18	<70%	Re-read “Pest Management Recommendations” and "Livestock Study Guide" text and work through this section of the workbook again.