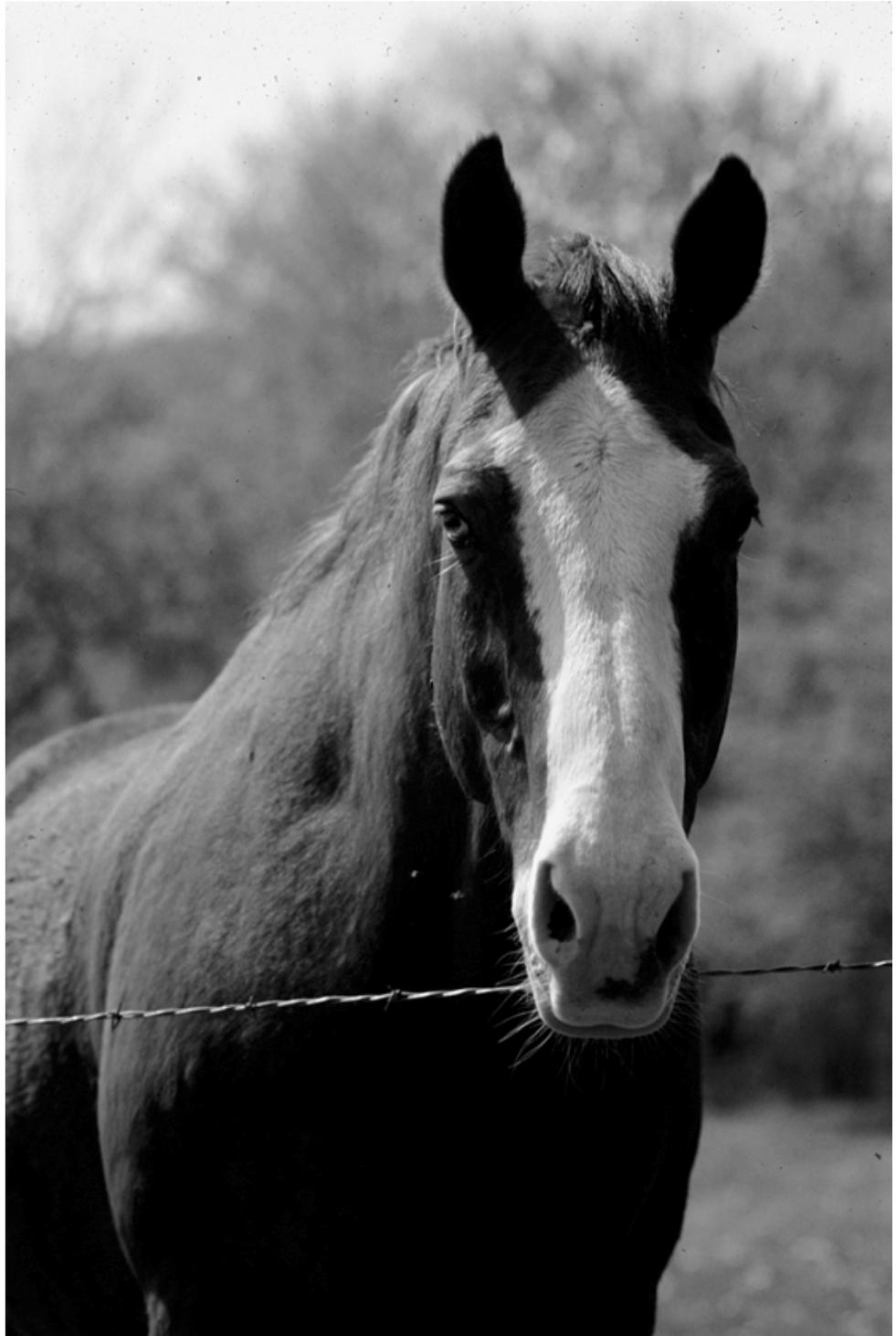


A Cornell and Penn State Cooperative Extension publication

Pest Management Recommendations for Horses



Prepared by Phillip E. Kaufman and Donald A. Rutz, Department of Entomology, Cornell University, and Charles W. Pitts, Department of Entomology, Penn State

CONTENTS

| | |
|---|---|
| Introduction | 1 |
| Bot Flies | 1 |
| Lice | 2 |
| Mange or Itch Mites | 3 |
| Pasture and Premise Pests | 3 |
| PREMISE PESTS | 3 |
| <i>House Flies</i> | 3 |
| <i>Stable Flies</i> | 4 |
| PASTURE PESTS | 6 |
| <i>Horse Flies and Deer Flies</i> | 6 |
| <i>Face Flies and Horn Flies</i> | 6 |

PREPARED BY

Phil Kaufman and Don Rutz, Department of Entomology, Cornell University, and Charlie Pitts, Department of Entomology, Penn State.

Pest Management Recommendations for Horses

INTRODUCTION

Horses are susceptible to a number of annoying pests, including bot flies, lice, and mange (itch mites). Confined horses may be plagued by house and stable flies, while those on pasture may encounter horse flies, deer flies, face flies, and horn flies. Symptoms of these pests vary from minor itching and irritation to blood loss, extreme annoyance and fatigue, and even malnutrition. Excessive fly populations also might create a public health nuisance around the farm and in nearby communities, resulting in poor community relations and threats of litigation.

Fortunately, many control options are available to help farmers manage flies and other horse pests. IPM, or integrated pest management programs incorporate accurate pest identification and monitoring with various control techniques. Cultural controls include practices such as appropriate manure management and stall sanitation. Chemical controls include various sprays and baits/traps.

Several of the most common horse pests are described in the following sections, and management recommendations are provided for each.

BOT FLIES

Two species of bot flies are serious pests of horses in the Northeast. During summer and fall, the flies lay eggs on the hairs of horses. The common bot fly, *Gastrophilus intestinalis*, hovers over the animal, darts from side to side, and cements eggs to hairs preferably on the forelegs, but also on the mane, shoulders, belly, neck, and flanks. The throat bot fly, *Gastrophilus nasa-lis*, darts at the animal and deposits eggs on the hairs under the jaw. Flies appear about the middle of June and are present until the first killing fall frost. Eggs usually can be found on horses as soon as flies are seen, and egg laying continues as long as adults are present.

Even though bot flies cannot bite, horses fear them. Fright and irritation caused by egg-laying



Figure 1. Bot fly larvae attach themselves to the stomach and intestine of the horse.

adults or newly hatched bots may cause animals to go out of control and inflict damage to themselves or anyone trying to handle them. On warm, sunny days, animals on pasture fight the flies from morning until late afternoon. While horses do this, they are unable to graze; as a result, they may lose weight and suffer from lack of proper nourishment.

To hatch, common bot fly eggs require moisture and friction from the horse's licking. Under these optimum conditions, the eggs hatch in 2 to 7 days, and the larvae burrow into the horse's lips, gums, or tongue. This causes horses to dip their lips into the water of watering troughs, then rub their lips and noses violently on the side of the tank, the ground, fences, or other nearby objects. After remaining in the mouth for 3 to 6 weeks, the larvae pass to the stomach and intestine, where they remain attached (Figure 1) with no change in position until the following summer. These attachments cause inflammation, which interferes with digestion and the passage of food. Several hundred larvae may be found in one animal, and the degree of damage done by their feeding is roughly proportional to the numbers present. The mature larvae then release their hold and pass out with the feces. When they reach the soil, they pupate and remain there for 15 to 70 days. Adult flies start emerging in early summer. The total life cycle for any of the bots is 10 to 11 months.

MANAGEMENT

Significant control can be accomplished during the fly season by clipping the hairs to remove the eggs. Also, approximately 2 weeks after the first frost has killed all of the adults, apply warm water rinses (120°F) to the animal's coat to induce hatching of the eggs and the subsequent death of the young larvae. See the chemical recommendations in the pocket inside the back cover for effective chemical control methods.

LICE

Horses are attacked by two kinds of lice: a biting and a sucking louse. The biting louse moves freely over the animal, chewing at the dry skin and hairs, while the sucking louse pierces the skin and sucks the blood. The bites are painful, and the blood loss can be a severe drain on the vitality of the host when the lice become abundant. With both types of lice, the coat about the horse's head, the withers, and the base of the tail become unkempt and full of scurf. Parts of the horse's body may be rubbed raw because of the irritation. Lice generally become noticeable during winter and early spring.

The biting louse is about 1/10 inch long and is chestnut brown except for the abdomen, which is yellowish with dark crossbands. The head is broad and rounded in front and forms a full semicircle in front of the antennae. Eggs are glued to horses' hairs close to the skin, especially around the angle of the jaw and on the flanks. The eggs hatch in 5 to 10 days, into small lice of the same general shape as the adult. They are fully grown in 3 or 4 weeks. Breeding is continuous throughout the year, but the numbers become fewer during the summer.

The sucking louse is a dirty grayish or yellowish-brown color, and is about 1/8 inch long. The thorax is only half as wide as the abdomen, and the head, which is distinctly narrowed toward the front, is less than one-third the width of the abdomen. The lice generally are found about the horse's head and neck, and at the base of its tail. The egg stage normally lasts from 11 to 20 days, but eggs may hatch as long as a month after they are laid. The young lice are similar in shape to the adults, except paler in color, and reach maturity in 2 to 4 weeks. There are several generations in a year.

MANAGEMENT

Producers can save on the cost of insecticide treatments for lice by adopting cultural control practices. New horses brought to the farm should be isolated and carefully inspected for lice before they are allowed to mingle with the rest of the animals. Careful and regular monitoring for lice can detect problems before an infestation gets out of control.

Many insecticides and application procedures are effective for managing lice. See the chemical recommendations in the pocket inside the back cover for effective chemical control methods. As with any insecticide application, it is essential to consult the label to ensure the insecticide is registered for use on horses. Several application methods are available.

Insecticides must be used properly to achieve satisfactory control of lice. Many louse-control products require two treatments, 10 to 14 days apart. The second treatment is essential to kill newly hatched lice that were present as eggs at the time of the first treatment and therefore were not killed. Failure to make the second treatment in a timely manner will create problems requiring many more subsequent treatments.

MANGE OR ITCH MITES

Mange is caused by a small oval mite that burrows beneath the skin of the animal and makes slender winding tunnels from 1/10 to nearly one inch long. Infested animals rub and scratch their bodies vigorously. Areas on the head, neck, or back, or at the base of the tail become inflamed, pimply, and scurfy, with the hairs bristling and only scattered hairs remaining. Later, the infestation may spread over the entire body, forming large, dry, cracked scabs on the thickened skin.

Excretions and the tunneling cause extreme pain, and animals often rub the area until it is raw. Within each tunnel, the female lays about 24 eggs, which hatch within 2 to 10 days. Mating occurs from 10 days to a month later. The males then die, and the females begin new tunnels. The problem is most evident in the winter, but some of the mites live on the animals year-round unless treated.

MANAGEMENT

Mange mites, like lice, are permanent external parasites that do not survive away from the host for very long. The best way to minimize the risk of introducing the mites is to be cautious when buying or boarding new animals. Avoid any animals that show visible skin lesions or that appear to be abnormally itchy or agitated. Mites also can be transferred to horses from blankets and combs that were used on infected animals. Mange is contagious, and the most important control is the isolation and quarantine of infested animals. A veterinarian should be called if any of the animals show signs of unusual itchiness.

Several pesticides used for controlling cattle lice also are effective against chorioptic mange mites. Because of the severity of sarcoptic mange, it is regarded from a regulatory standpoint as a reportable disease. Therefore, the threshold for placing animals under quarantine is the discovery of a single mite.

PASTURE AND PREMISE PESTS

Pasture flies, including horse flies, deer flies, horn flies, and face flies; and premise flies, including house flies and stable flies all are significant pests of horses. Summer sores are vectored (spread) by house flies.

PREMISE PESTS

The two principal fly pests of confined horses are house flies and stable flies.

HOUSE FLIES

House flies, *Musca domestica*, are nonbiting insects that breed in animal droppings, manure piles, decaying silage, spilled feed, bedding, and other moist, warm decaying organic matter. Adult house flies are about 1/4 inch long and mostly dull gray in color, with four black stripes on the thorax (Figure 2). Their mouthparts are spongelike and are used for ingesting liquid foods. Each female can produce up to six batches of 75 to 200 eggs at 3- to 4-day intervals, laying the eggs in cracks and crevices under the surface of the breeding material. Larvae (maggots) hatch from the eggs in 12 to 24 hours (Figure 3). They are white and cylindrical, tapering at the front. Maggots complete their development in 4 to 7 days, passing through three



Figure 2. The four black stripes on the thorax distinguish the common house fly.

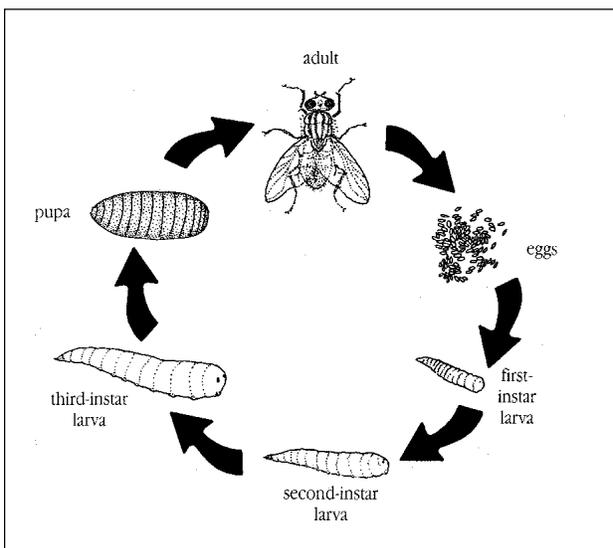


Figure 3. The house fly life cycle.

growth stages, or instars, as they grow larger. Mature larvae form a dark reddish-brown hardened case, called a puparium, from the larval skin, and then pupate. The pupal stage usually lasts 3 to 4 days, after which an adult fly emerges to complete the cycle. Generations overlap; all stages are present at the same time. The life cycle is temperature-dependent, requiring 10 days at 85°F, 21 days at 70°F, and 45 days at 60°F.

Adult flies live an average of 3 to 4 weeks, but they can live twice as long. They are most active during the day at temperatures of 80°F to 90°F and become inactive at night and at temperatures below 45°F. Resting adults can be seen inside facilities on ceilings,

walls, posts, and other surfaces. Outside, they can be seen beneath roof overhangs and on walls, fences, and vegetation. Preferred resting places can be detected by the accumulation of “fly specks,” light-colored spots formed from regurgitated fluid and darker fecal spots. Even though flies appear to have no direct effect on production, they are a concern to producers because they can cause public health and nuisance problems resulting in poor community relations and legal action. House fly dispersal range is 1/2 to 2 miles, but distances as great as 10 to 20 miles have been reported. Generally, flies disperse either across or into the wind, with nuisance densities highest closest to the source.

STABLE FLIES

The stable fly, *Stomoxys calcitrans*, is a biting fly about the size of a house fly but dark gray (Figure 4). Its abdomen has seven rounded dark spots on the upper surface, and the adult’s piercing mouthparts protrude spearlike from under the head. Stable flies breed in wet straw and manure, spilled feed, silage, grass clippings, and in various other types of decaying vegetation. Each female lives about 20 to 30 days and lays 200 to 400 eggs during her lifetime. Under optimum conditions, an egg develops to an adult in about 3 weeks.

Horses are most irritated by these pests during the warm summer months. Both male and female stable flies feed on blood several times each day, taking one to two drops at each meal. Stomping of feet is

Figure 4. The piercing mouthparts of the adult stable fly protrude from beneath its head.



a good indication that stable flies are present, since they normally attack animal legs and bellies.

MANAGEMENT

CULTURAL/PHYSICAL CONTROL

A variety of cultural control practices can be used effectively to manage house flies and stable flies.

Practice sanitation. The fly life cycle requires that immature flies (eggs, larvae, pupae) live in manure, moist hay, spilled silage, wet grain, etc., for 10 to 21 days. *Removing and spreading fly breeding materials weekly helps to break the cycle. Waste management is therefore the first line of defense in developing an effective fly management program.* It is much easier and less costly to prevent a heavy fly buildup than to attempt to control large fly populations once they have become established.

The main fly sources in confinement areas are animal pens. The pack of manure and bedding under horses should be cleaned out at least once a week. In barns, the next most important fly breeding areas are the stalls, which should be properly drained and designed to encourage complete manure removal. Wet feed remaining in the ends of troughs breeds flies and should be cleaned out at least weekly.

Spreading manure and bedding as thinly as possible will help ensure that it dries out quickly. Eliminate drainage problems that allow manure to mix with mud and accumulate along fence lines in exercise yards. Seal gaps under feed bunks where moist feed can accumulate.

Use sticky tapes/ribbons. Sticky ribbons, especially the giant ones, are very effective for managing small to moderate fly populations. Their only disadvantage is that they need to be changed every 1 to 2 weeks because they dry out, get coated with dust, or get "saturated" with flies.

CHEMICAL CONTROL

Insecticides can play an important role in integrated fly management programs. Chemical control options include space sprays, baits, larvicides, residual premise sprays, and whole-animal sprays. Space sprays, mist foggers, and baits are compatible with naturally occurring fly biological control organisms such as predators and parasitoids.



Figure 5. A one-gallon plastic milk container can serve as a baited-jug trap for flies.

Space sprays and mist foggers provide a quick knockdown of adult flies in an enclosed air space. Because space sprays have very little residual activity, resistance to these insecticides is still relatively low.

Fly baits containing an insecticide are also very useful for managing low to moderate fly populations. Commercial traps are available, but a baited-jug trap can be made easily from a gallon plastic milk jug (Figure 5). Cut four access holes, each 2 to 2.5 inches in diameter, equidistant around the upper part of the jug, and attach a wire to the screwtop for hanging. Place about 1 oz of a commercial fly bait on the inside bottom of the jug; a bait containing the fly pheromone muscalure (Muscamone, Z-9-tricosene) is most effective. Hang the traps above animals, since scattering bait will destroy beneficial insects. Ensure that baits will not accidentally be eaten by animals or mixed into their feed.

Avoid directly applying insecticides to manure

and bedding because of harmful effects on beneficial insects. The only exception is occasional spot treatment of breeding sites that are heavily infested with fly larvae that cannot be cleaned out.

Treatment of building surfaces with residual sprays has been one of the most popular fly control strategies over the years. As a result, high levels of resistance to these insecticides are now very common. These materials should be used sparingly and only as a last resort to control fly outbreaks that cannot be managed using the previously mentioned tactics.

Whole-animal sprays can be made directly on the animals to manage stable fly problems. Although this approach can provide needed relief from biting fly pressure, the control is rather short-lived.

PASTURE PESTS

HORSE FLIES AND DEER FLIES

Horse flies (Figure 6) and deer flies (Figure 7) belong to the fly family *Tabanidae*. They represent a complex of at least 300 species, some of which are very annoying and can inflict great pain. Horses on pasture occasionally suffer severe attacks by these flies, particularly on pastures that border woodlands or wet, marshy areas. Female horse flies and deer flies cut through the skin of the animal with knifelike mouthparts. They then feed on the blood that pools around the wound. The wound continues to bleed after the fly leaves and often attracts face flies.

Large numbers of these flies can cause extreme annoyance and fatigue, blood loss, and reduced weight gain. Female flies typically lay their eggs in distinctively shaped egg masses on vegetation near marshes, ponds, or streams. Development from egg to adult requires 70 days to 2 years, depending on the species.

Horse flies and deer flies are notoriously difficult to control. They are strong fliers that move long distances between breeding areas and hosts. Because they land on host animals to feed for only a very short time, it is difficult to deliver a lethal dose of insecticide.

Moreover, because horses represent only one of the many host animals these pests feed on, treating the animals will have a negligible impact on total fly populations. Severe horse fly and deer fly pressure is generally temporary because of the seasonality of fly activity. In some cases, animals can be moved during periods of peak activity from low-lying pastures near



Figure 6. Adult horse flies.

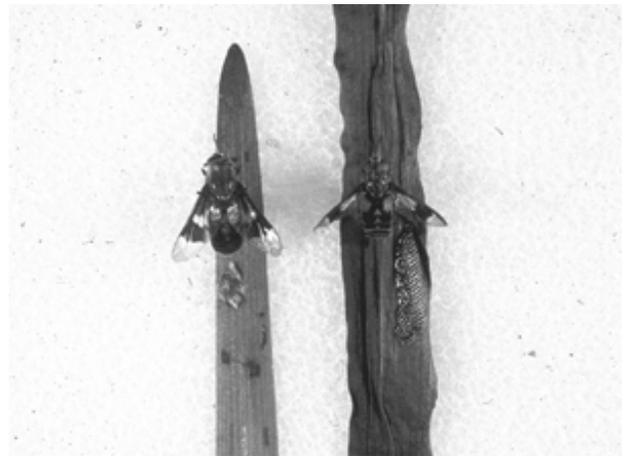


Figure 7. Adult deer flies have a distinctive pattern on their wings.

marshy areas to other pastures where fly pressure is lower.

FACE FLIES AND HORN FLIES

The face fly, *Musca autumnalis*, is a robust fly that superficially resembles the house fly (Figure 8). It is a nonbiting fly that feeds on animal secretions, nectar, and dung liquids. Adult female face flies typically cluster around the animals' eyes, nose, and muzzle, causing extreme annoyance. Their activity around the animals' eyes allows face flies to serve as vectors of eye diseases and parasites such as pinkeye and *Thelazia* eye worms. They are also "facultative blood feeders," which means that they gather around wounds



Figure 8. Adult face flies.

caused by mechanical damage or biting fly activity to feed on blood and other exudates.

By contrast, male face flies feed only on nectar and dung. They spend much of their time resting on branches and fences and attempting to catch and copulate with female flies as they move about. Females lay their eggs on very fresh cattle droppings on pasture, and development from egg to adult is completed in about 2 to 3 weeks, depending on temperature.

Face flies are strong fliers that can travel several miles. Unlike house flies, face flies do not enter darkened barns or stables during the summer months. In the fall, however, they enter buildings and overwinter indoors in a state of diapause, or hibernation.

Figure 9. Adult horn flies are about half the size of house flies or stable flies.



The adult horn fly, *Haematobia irritans*, is about half the size of a house fly or stable fly (Figure 9). Both sexes have piercing mouthparts that they use to penetrate animal skin to obtain blood meals. Horn flies are intermittent feeders that take 20 or more small blood meals each day. The flies normally congregate on the shoulders, backs, and sides of the animals. During very hot or rainy weather, the flies move to the underside of the belly.

Unlike most other flies, horn flies remain on the animals almost constantly, leaving only for brief periods to lay eggs on very fresh (less than 10-minute-old) cattle droppings. Development from egg to adult is completed in 10 to 20 days. The flies overwinter as pupae in or under dung pats. Horn flies can be a serious pest of horses by causing blood loss and animal annoyance and fatigue.

MANAGEMENT

Horn flies and face flies breed exclusively in very fresh cattle manure on pasture. As a result, cultural controls such as manure management practices in and around barn areas that are highly effective against house flies and stable flies will have no impact on horn fly and face fly populations. Masks have proven to be an effective barrier from face fly attacks for horses. Biological control of these pests at present is limited to beneficial organisms that occur naturally in the field. Face flies are attacked by parasitic nematodes, and immature stages of both horn flies and face flies are attacked by predaceous mites, predaceous beetles, and parasitoids. Manure competitors such as dung beetles also limit fly populations by removing and burying cattle dung before immature flies can complete their development. Adult flies are attacked by predaceous yellow dung flies, and face flies are occasionally attacked by pathogenic fungi.

In spite of the diversity and importance of natural enemies of face flies and horn flies, methods are not known for exploiting these biological control agents in pest management programs. Parasitoid releases for house fly and stable fly control are not effective against these pasture pests.

Insecticidal control options for horn flies and face flies include whole-animal sprays and wipes. Whole-animal sprays provide rapid relief from fly pressure. Animal sprays are applied either as a dilute coarse spray or as a fine, low-volume, more concentrated mist.

INFORMATION ON SYMPTOMS AND TREATMENT OF TOXIC CHEMICAL EXPOSURE

You can obtain prompt and up-to-date information about the symptoms and treatment of cases resulting from exposure to toxic agricultural chemicals by telephoning any of the centers listed below and asking for "Poison Control Center."

When you are unable to reach a Poison Control Center or obtain the information your doctor needs, the office of the NYS Pesticide Coordinator at Cornell University (607) 255-1866 or the Pesticide Education Program at Penn State (814) 863-0263 may be able to assist you in obtaining such information.

PENNSYLVANIA POISON CONTROL CENTERS



NEW YORK POISON CONTROL CENTERS

| | |
|------------------------------------|--------------|
| Western New York | 800-888-7655 |
| Rochester | 800-333-0542 |
| Central and Southern Tier New York | 800-252-5655 |
| Eastern and Northern New York | 800-366-6997 |
| New York City | 212-340-4494 |
| Long Island | 516-542-2323 |

PESTICIDE EMERGENCY NUMBERS

Pesticide Spills and Accidents

CHEMTREC
800-424-9300

Pesticide Information/Emergencies

National Pesticide Telecommunications Network
800-858-7378

Report Oil and Hazardous Material Spills

NYS Department of Environmental Conservation
800-457-7362
518-457-7362

TIPS FOR LAUNDERING PESTICIDE-CONTAMINATED CLOTHING

■ Air

Hang garments **outdoors** to air.

■ Prerinse

Use one of **three methods**:

1. Hose off garments outdoors.
2. Rinse in separate tub or pail.
3. Agitate in automatic washer.

■ Pretreat (heavily soiled garments)

Use heavy-duty liquid.

■ Washer Load

Wash garments **separately** from family wash.
Wash garments contaminated with the same pesticide together.

■ Load Size

Wash only a **few** garments at once.

■ Water Level

Use **full** water level.

■ Water Temperature

Use **hot** water, 140°F or higher.

■ Wash Cycle

Use **normal** 12-minute wash cycle.

■ Laundry Detergent

Use a **heavy-duty detergent**.
Use amount recommended on package, or more for heavy soil/hard water.

■ Rinse

Use **two full warm** water rinses.

■ Dry

Line dry to avoid contaminating dryer.

■ Clean Washer

Run complete, but empty, cycle.
Use **hot water and detergent**.

OTHER TIPS

■ Wear a disposable coverall over work clothes.

■ Remove contaminated clothing **before** entering enclosed tractor cabs.

■ Remove contaminated clothing **outdoors** or in an entry. If a granular pesticide was used, shake clothing outdoors. **Empty pockets and cuffs.**

■ Save clothing worn while handling pesticides for that use only. Keep separate from other clothing **before, during, and after** laundering.

■ Wear **chemical-resistant gloves** when handling highly contaminated clothing. **Replace** gloves periodically.

■ Wash contaminated clothing after **each** use. When applying pesticides daily, wash clothing **daily**.

■ Rewash contaminated garments **two or three times** before reuse for more complete pesticide removal.

Tips prepared by Charlotte Coffman, Department of Textiles and Apparel, Cornell University.

Hang this information in the laundry room.

A list of pesticides registered for pest control on horses is enclosed in this pocket. WARNING: Always read product labels carefully before applying any pesticide; mix and apply as directed, do not overdose, do not treat too often, and follow all precautions exactly. Remember that improper practices can lead to illegal residues even when proper materials are used. It is illegal to use a pesticide in any manner inconsistent with its label.

A Cornell and Penn State Cooperative Extension publication



PENNSTATE



College of Agricultural Sciences
Agricultural Research and
Cooperative Extension

Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U. S. Department of Agriculture.

This publication is available from the Publications Distribution Center, The Pennsylvania State University, 112 Agricultural Administration Building, University Park, PA 16802. For information telephone (814) 865-6713.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension or Cornell Cooperative Extension is implied.

Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914. Produced with the cooperation of the U. S. Department of Agriculture, Cornell Cooperative Extension, and Penn State Cooperative Extension.

This publication is available in alternative media on request.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. The Pennsylvania State University does not discriminate against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 201 Willard Building, University Park, PA 16802-2801: Tel. (814) 865-4700/V, (814) 863-1150/TTY.

© The Pennsylvania State University 2000

5M7/00CP