WARNINGS AND INFORMATION

Pest control in livestock requires year-round management. Livestock are never free of insects and mites. Pests can lower meat and milk production and make animals more susceptible to disease. Further injury occurs when animals rub against fences, barbed wire, etc., to relieve itching. Improperly used pesticides can injure humans and animals or result in harmful and illegal residues in meat and milk.

Pest control clearly requires that you take the following precautions:

1. Use only the suggested dosages; measure carefully.
2. Do not apply chemicals closer to slaughter than the days given in this bulletin.
3. Read labels before using, and follow all instructions on labels.
4. Provide ventilation while using pesticides.
5. Prevent drift to adjacent cropland, yards, woodlots, lakes or ponds. Some materials may kill fish or wildlife.
6. Avoid treatment when animals are sick (especially in winter), overheated or stressed (shipping, dehorning, castration, recent weaning).
7. Use dust if possible instead of spray on sick or weak animals in winter, or spray on warm day. If sprayed indoors, turn out immediately to dry. Avoid undue exposure of animals to mists and vapors. Do not apply material directly on animals unless directions permit. Read label.
8. Avoid contamination of feed and water.
9. Do not breathe any form of insecticide. Use face masks.
10. If you spill any form of insecticide on the skin, wash immediately with soap and water.

BY DONALD C. CRESS
Extension Specialist in Entomology

11. Do not add chemical to old dipping water. Start with fresh water to avoid poisoning animals and excess residues in meat.
12. Keep meat and milk away from contaminating chemical.
13. Do not spread treated manure on vegetable cropland unless specific materials are approved. Read label.
14. Do not contaminate feed, mangers, watering cups, milking equipment, milk, wells, ponds or streams with pesticides.
15. Store pesticides in the original, plainly labeled containers, safely locked away from livestock, pets, and children.
16. Provide ventilation during the use of all materials.

FLY CONTROL IN BARNS AND BARNYARDS

For best results, use a combination of formulations such as baits, residual sprays, larvicides, barn atomizers, etc., during the fly season. Act promptly. Treat as fly populations begin to build-up. Treat regularly.

SANITATION

- Clean out pens as frequently as possible.
- Spread manure thinly outdoors to kill fly eggs and larvae by drying.
- Get rid of silage seepage areas, wet litter, manure stacks, wet hay or straw and other organic matter.
- Provide proper drainage in barnyards.

SPRAYS

Barn surfaces vary in how much spray can be applied to them. Smooth surfaces take less, rough ones more. Follow instructions for each insecticide. NOTE: Use no more gallons of spray than given in the tables to 1,000 square feet.

Add one of the insecticides to water as indicated in Table 1.

BAITS

Apply baits to clean concrete or wherever flies gather. Baits can be used alone, but should be used in conjunction with wall and ceiling sprays.

Use one of the following:

- DRY BAITS — 1% rotenone (Korlan) or dichlorvos; or 1% trichlorfon (Diptex, Dylox, Neguvon); or 3¼% malathion; or ¼% naled (Dibrom). Follow manufacturers' label directions. Do not use Diazinon in dairy barns or milkrooms.

- WET BAITS — (1) Add ½ pint of a malathion 57% EC plus 1 cup of sugar syrup to 2½ gallons of water; or 2 ounces of Diazinon 50% WP plus 1 pound of sugar in 5 gallons of water. Apply with a sprinkling can or other suitable equipment. (2) Use 1/10% trichlorfon (Diptex, Dylox, Neguvon); or 1/10% dichlorvos; or 2% rotenone (Korlan) liquid bait. Follow label directions carefully. Do not use Diazinon in dairy barns or milkrooms.

Warnings — Do not apply where animals can slip and fall. Keep away from children.

FLY MAGGOTS IN MANURE

Treat manure piles with one of the following mixed in 25 gallons of water:

- Dimethoate — 1 gallon emulsion containing 2 pounds chemical per gallon.
- Malathion — 3 pints emulsion containing 5 pounds chemical per gallon or 8 pounds 25% wettable powder.
- Rabon — 4 pounds 50% wettable powder.
Table 1.—INSECTICIDE MATERIALS FOR SPRAY APPLICATION IN BARNS.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Amount per 1,000 sq. ft.</th>
<th>Comments and Warnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethoate, 1% in water spray.</td>
<td>1 gal.</td>
<td>Mix 1 gal. of 23.4% EC in 25 gal. of water. Apply thoroughly as a surface spray to interior and exterior surfaces. Remove animals before spraying. Do not contaminate milk or milking equipment.</td>
</tr>
<tr>
<td>Fenthion (Baytex), 1.25% in water spray.</td>
<td>2 gals.</td>
<td>Mix 1 quart of 93% LC in 25 gals. of water. Apply thoroughly to walls, ceilings, etc. Do not apply directly to animals. Do not use as a space spray. Do not contaminate milk or milking equipment.</td>
</tr>
<tr>
<td>Malathion, 1% in water spray.</td>
<td>1 to 2 gals.</td>
<td>Mix 8 lbs. of 25% WP or 2 quarts of 57% EC in 25 gals. of water. Apply thoroughly to walls, ceilings, etc. Do not contaminate milk or milking equipment.</td>
</tr>
<tr>
<td>Ronnel (Korlan), 1% in water spray.</td>
<td>1 gal.</td>
<td>Mix 1 gal. 24% EC in 25 gals. of water. Apply to walls, ceilings, etc. Do not contaminate milk or milking equipment.</td>
</tr>
<tr>
<td>Diazinon, ½% in water spray.</td>
<td>1 to 2 gals.</td>
<td>Mix 2 lbs. of 50% WP in 25 gals. of water. Apply thoroughly to walls, ceilings and other areas where flies congregate. Do not use in dairy barns, milkrooms or poultry houses. Do not contaminate food, feed, or water.</td>
</tr>
<tr>
<td>Ravap (23% Rabon, and 5.3% dichlorvos) 1% in water spray.</td>
<td>1 gal.</td>
<td>Mix 1 gal. Ravap in 25 gals. water. Apply to walls, ceilings, etc. of beef and dairy barns, livestock sheds, calf and hog barns and other farm buildings. Do not contaminate milk or milking equipment.</td>
</tr>
</tbody>
</table>

Ronnel (Korlan) — 1 gallon emulsion containing 2 pounds active ingredient per gallon.

Diazinon — 10 ounces of 50% wettable powder. Wet the surface of the manure. It is not necessary to soak it. Repeat as needed.

Warnings: Do not apply dime-thoate, malathion, Ronnel or Ravap to livestock unless the package label or Michigan State University literature gives instructions to do so. Do not apply chemically treated manure to vegetable cropland unless specific materials are approved.

SPRAYS FOR FEED LOTS

Removal of manure from feedlots is a must. For sprays around fences, over manure piles and inside walls of loafing pens, use Rabon or Ronnel as given for treating inside walls and ceilings of barns.

Warnings: Do not spray animals directly with these materials unless other sections of this bulletin give approval. Avoid treating livestock-resting areas. Keep these clean and well bedded.

SPRAY FOR OUTSIDE BARNs

Use dimethoate, malathion, Ronnel, or Fenthion as given for treating inside walls and ceilings. Follow all label instructions for use outside dairy barns. Do not apply to water and feed crops. Do not use Diazinon in dairy barns or milkrooms.

SPACE OR AEROSOL SPRAYS

Space sprays or aerosols containing 0.1% pyrethrins and 1% piperonyl butoxide (½ fluid ounce per 1,000 cubic feet) give satisfactory knockdown and kill of flies. A 1% dichlorvos (Vapona) or naled (Dibrom) insecticide applied as a fog or mist is effective. One pint of a 1% solution will treat 8,000 cubic feet (40 x 20 x 10). Do not use this fogging solution in areas where animals have received a direct application within the previous 8 hours. Avoid contamination of milk and milk utensils. Daily use of atomizers or foggers is necessary when they are used alone. Read the label for mixing instructions.

SHEEP, GOAT PESTS

LICE

All stages of the biting louse, the blood sucking body louse and the foot louse live on the animals. Eggs are attached to the hairs, but can hatch even after being dislodged from the animals for several weeks. Immature and adult lice can survive for a week off the host.

BITING OR RED CHEWING LOUSE

It is 1/20 inch long with a light brown body. The head is reddish and broadly rounded in front. Each segment of the abdomen has one row of hairs running across it. It crawls about chewing wool fibers and skin scales, causing irritation to the animal and damage to the wool.

BLOOD SUCKING BODY LICE

This pest infests the entire body and face next to the skin, often clustering in large groups. It closely resembles the blood-sucking foot louse, but is more slender, and head is twice as long as broad. It is up to 1/12 inch long and dark-gray or bluish in color. The blood-sucking body louse injures sheep mainly by sucking blood.

BLOOD SUCKING FOOT LICE

It is about 1/12 inch long and dark-gray or bluish in color. The head is about as long as wide. Each segment of the abdomen has two rows of hairs running across it. The foot louse is found on the legs in the short hairs below the true wool. Generally, it is not so damaging to sheep as the blood sucking body louse or the red chewing louse.

Five lice infest goats and can be controlled as suggested for sheep lice.

SHEEP TICK OR KED

This wingless fly is brown, ¼ inch long and has 6 legs. The abdomen is sac-like; and the mouth parts are of the sucking type. Its food is blood and lymph taken from sheep and occasionally from goats. The insect stains the wool and robs animals of nutrition.

Sheep keds usually spend their entire lives on the animals except when accidentally dislodged. However, they crawl readily from ewes to lambs. The females give birth to living young (maggots) which are attached immediately to hairs, mainly on the belly and neck. Immature maggots are ¼ inch long, whitish, oval and without legs. Within 24 hours, the skin of the maggots turn brown, forming pupal cases. The adult keds "hatch" from the pupal case in 3 to 5 weeks, depending on the temperature, since more time is needed to
change from maggots to the adults in winter.

FLEECE WORMS
These worms may be one or more of several fly maggots, but usually the green and bluebottle flies (blow flies) are responsible. The maggots have blunt tails and pointed heads. They live in matted and soiled wool. They often occur in open wounds.

MITES
SHEEP SCAB OR SCABIES
This trouble is caused by a mite. It is white or yellowish and very small—barely visible to the unaided eye. It pierces the skin with very sharp mouth parts, causing inflammation and itching. Scabs form over the mites where blood and serum ooze from the wounds.

Sheep infested with scabies are subject to State and Federal quarantine. Consequently, all known or suspected sheep must be reported to the State Veterinarian's Office. When reporting, you may ask the help of your county agricultural agent, your local veterinarian, or the Animal Husbandry Department, Michigan State University, East Lansing, Michigan.

Table 2. INSECT AND MITE CONTROL PROGRAM FOR SHEEP AND GOATS

<table>
<thead>
<tr>
<th>Pest</th>
<th>Material and Formulation</th>
<th>Min. Days from Last Appl. to Slaughter</th>
<th>Amount per Animal or Area, if Appropriate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>LICE</td>
<td>Ciovap EC (10%) Ciordin and 2.5% dichlorvos; ¼% in water spray. Use in water sprays, coumaphos (Co-Ral); ¼% or diazinon 0.06% or lindane 0.06% or malathion ¼% or malathion Koral; ¼% or toxaphene ¼%</td>
<td>0</td>
<td>Depends on size of animal and length of wool or hair.</td>
<td>Mix 2½ pints of Ciovap EC in 16 gals. of water. Spray animals thoroughly. Repeat as necessary but not more often than once in 7 days. READ THE LABEL. Use Diazinon on sheep only. Korlan — Do not use within 28 days of slaughter.</td>
</tr>
<tr>
<td>SCAB (SCABIES)</td>
<td>Sheep scab in a reportable disease subject to State and Federal quarantine and control operations must be supervised by personnel of the State Veterinarian's Office. Rigid regulations against importation of this disease are in effect. If you suspect scab, ask for help from your County Agricultural Agent.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TICKS (Keds), HORN FLIES</td>
<td>coumaphos (Co-Ral); ¼% in water spray.</td>
<td>15</td>
<td>Depends on animal size and wool or hair length.</td>
<td>Mix 4 lbs. Co-Ral 25% WP for ticks or 2 lbs. Co-Ral 25% WP for horn flies in 100 gals. of water. Do not treat animals less than 3 months old. Spray thoroughly. READ THE LABEL.</td>
</tr>
<tr>
<td></td>
<td>coumaphos (Co-Ral); 0.5% dust, (Use as bought.)</td>
<td>15</td>
<td>1 to 2 oz. per sheep.</td>
<td>Dust treatment recommended in cold weather. Follow label directions. Use a hand duster. READ THE LABEL.</td>
</tr>
<tr>
<td></td>
<td>Diazinon, (Sheep only), 0.06% in water spray.</td>
<td>14</td>
<td>Use about 1 quart per animal.</td>
<td>Mix 1 lb. diazinon 50% WP per 100 gals. of water. Spray thoroughly. Use low pressure sprayer. Do not use for horn fly control. READ THE LABEL.</td>
</tr>
<tr>
<td></td>
<td>Diazinon, (Sheep only), 2% dust.</td>
<td>14</td>
<td>1¼ oz. per animal.</td>
<td>Dust treatment recommended in cold weather. Follow label directions. Use a hand duster. READ THE LABEL.</td>
</tr>
<tr>
<td></td>
<td>Lindane, 0.06% in water spray.</td>
<td>30</td>
<td>Depends on animal size and wool or hair length.</td>
<td>Mix 1 quart of lindane 20% EC, or use 2 lbs. of lindane 25% WP in 100 gals. of water. A second spray application 2 to 3 weeks later may be necessary. Spray thoroughly. Do not use lindane on dairy goats.</td>
</tr>
</tbody>
</table>

Warning:
None of the materials suggested in this bulletin for control of lice, lice, stable fly and fleece worms (blow flies) can be used for scabies unless approved by the State of Michigan Veterinarian's Office.

Abbreviations in this bulletin:
WP means Wettable Powder
EC means Emulsifiable Concentrate, or Emulsion
LC means Liquid Concentrate
SC means Suspension Concentrate
D means Dust
Tbsp. means tablespoon
tsps. means teaspoons
### Table 2. INSECT AND MITE CONTROL PROGRAM FOR SHEEP AND GOATS — continued

<table>
<thead>
<tr>
<th>Pest</th>
<th>Material and Formulation</th>
<th>Min. Days from Last Appl. to Slaughter</th>
<th>Amount per Animal or Area, if Appropriate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticks (Keds), Horn Flies (Continued)</td>
<td>rotenone (Korlan), ½% in water spray</td>
<td>28</td>
<td>1 quart</td>
<td>Mix 1 gal. of rotenone 24% EC in 100 gals. of water. Do not apply more frequently than once every 2 weeks.</td>
</tr>
<tr>
<td></td>
<td>toxaphene, ½% in water spray</td>
<td>28</td>
<td>Depends on animal size and wool or hair length</td>
<td>Mix 3 quarts of 60% emulsifiable toxaphene in 100 gals. of water. May also be used in a dip. Hold the animal in the vat at least 30 seconds and completely immerse twice. Keep the dipping solution clean. Do not use on dairy goats.</td>
</tr>
<tr>
<td>Face Fly</td>
<td>pyrethrum oil solution 0.1% plus 1.0% synergist</td>
<td>0</td>
<td>1 to 2 fl. oz.</td>
<td>Apply daily as a mist (in the morning). Do not wet hair or skin. Apply to head, neck and front legs.</td>
</tr>
<tr>
<td>Wool Maggots (fleece worms)</td>
<td>coumaphos (Co-Ral), ½% in water spray</td>
<td>15</td>
<td>Depends on animal size and wool or hair coat</td>
<td>Mix 8 lbs. of Co-Ral 25% WP per 100 gals. of water. Spray thoroughly.</td>
</tr>
<tr>
<td></td>
<td>coumaphos (Co-Ral), 0.5% dust (Use as bought)</td>
<td>15</td>
<td>1 to 2 oz. per sheep</td>
<td>Dust treatment. Follow label directions. Use a hand duster.</td>
</tr>
<tr>
<td></td>
<td>rotenone (Korlan), ½% in water spray</td>
<td>28</td>
<td>Depends on animal size and wool or hair coat</td>
<td>Mix 2 gals. of rotenone 24% EC per 100 gals. of water. Repeat if necessary but not more often than once every 2 weeks. Spray thoroughly.</td>
</tr>
<tr>
<td></td>
<td>toxaphene, ½% in water spray</td>
<td>Same as for Ticks (keds)</td>
<td>Apply as a spray or as a dip.</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING:** Avoid dumping dipping vat or spray solutions into or near ponds, wells, or streams. Malpractices have resulted in large fish kills and severe fines to the offender.

### POISON INFORMATION CENTER

**Detroit**
- Detroit City Health Department
  - 1155 Taylor Avenue 48202
  - (313) 834-3540

**Adrian**
- Emma L. Bieby Hospital
  - 818 Riverside Ave. 49221
  - (313) 263-2412

**Ann Arbor**
- University Hospital
  - 1465 E. Ann Street 48104
  - (313) 764-5102

**Battle Creek**
- Community Hospital
  - 500 Tomkins St. 49016
  - (616) 963-5521

**Bay City**
- Bay Medical Center
  - 100 10th Street 48706
  - (517) 893-5311

**Berrien Center**
- Berrien General Hospital
  - Aux's Hill Road 49002
  - (616) 471-7761

**Coldwater**
- Community Health Center of Branch County
  - 274 E. Chicago Street 49036
  - (517) 278-7291

**Detroit**
- Children's Hospital of Michigan
  - 3901 Beaubien 48201
  - (313) 494-5711
- Mount Carmel Mercy Hospital
  - 6071 W. Outer Drive
  - (313) 864-5400 ext. 417 or 864-5506

** Eloise**
- Wayne County General Hospital
  - 30712 Michigan Avenue 48132
  - (313) 722-3748 8 a.m.-11 p.m.
  - 274-3000 11 p.m.-8 a.m.

**Flint**
- Hurley Hospital
  - 6th Ave. & Regue 48502
  - (313) 232-6181 ext. 200

**Grand Rapids**
- Bledgett Memorial Hospital
  - 1840 Wealthy. S.E. 49506
  - (616) 774-7740
- Butterworth Hospital
  - 100 Michigan, N.E. 49503
  - (616) 774-7740
- St. Mary's Hospital
  - 201 Lafayette, S.E. 49503
  - (616) 774-6789
- Grand Rapids Orthopedic Hospital
  - 1019 Burton St., S.E.
  - (616) 452-5151

**Holladay**
- 902 Michigan Avenue 49400
  - (616) 492-1122

**Jackson**
- W.A. Foote Memorial Hospital
  - 201 N. East Street 49001
  - (517) 783-2771

**Kalamazoo**
- Borgess Hospital
  - 1921 Gull Road 49001
  - (616) 533-4416
- Bronson Methodist Hospital
  - 252 E. Lovell Street 49005
  - (616) 383-6338 — 383-6386

**Lansing**
- St. Lawrence Hospital
  - 1230 W. Saginaw Street 48914
  - (517) 728-3619 ext. 305

**Marquette**
- Marquette General Hospital
  - 425 W. Fisher Street 49855
  - (906) 225-3440 ext. 416

**Midland**
- Midland Hospital
  - 4005 Orchard Drive 48640
  - (517) 835-6771 ext. 308 or 328

**Monroe**
- Mercy Memorial Hospital Corp.
  - 700 Stewart Road 48161
  - (734) 241-8000

**Petroskey**
- Little Traverse Hospital
  - 410 Cassadaga 49775
  - (616) 347-7737 ext. 251

**Pontiac**
- St. Joseph Mercy Hospital
  - 900 Woodward Avenue 48033
  - (313) 835-3600

**Port Huron**
- Port Huron Hospital
  - 1000 Kearney St. 48060
  - (517) 982-2411

**Saginaw**
- Saginaw General Hospital
  - 1477 N. Harrison Road 49002
  - (517) 793-3411

**Traverse City**
- Munson Medical Center
  - Sixth Street 49684
  - (616) 947-6140 ext. 280

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**POISON TREATMENT CENTERS** (Information and Treatment)

**ADRIAN**
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  - 100 10th Street 48706
  - (517) 893-5311

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  - Aux's Hill Road 49002
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