

ANIMALS

FLY CONTROL IN LIVESTOCK FACILITIES

Dairy Barns, Swine Barns, Livestock Sheds, Other Animal Buildings

Nancy C. Hinkle, Veterinary Entomologist

RESIDUAL AND BAIT SPRAYS¹

INSECTICIDE ²	SPRAY CONCENTRATION AND MIXING INSTRUCTIONS	METHODS OF APPLICATION AND SAFETY RESTRICTIONS
beta-cyfluthrin (Tempo, Tempo SC Ultra Premise Spray) 11.8% SC, 24.3% EC, 20% WP, SPY, HE	Mix 9.5 grams or 19 grams of 20% WP OR mix 16 ml of 24.3% EC in sufficient water to cover 1000 ft. ²	Direct as a coarse, wetting spray to surfaces in livestock facilities where flies congregate, such as ceilings, walls, fences, posts, and manure. Apply to point of runoff (1 gal. per 500 to 1000). Do not contaminate feed, drinking water, milk or milk handling equipment. Do not apply as a space spray. Do not apply directly to animals. Repeat as needed. For baited solutions add 1 lb. of sugar per gal. of spray. Remove animals before spraying and return them when spray dries.
Bifenthrin (ActiShield)	Mix 0.33-1 oz with 1 gal water; apply per 1,000 sq ft	For adult fly control in and around animal facilities, spray application should target areas where flies will rest.
Chlorpyrifos (Durashield, Duratrol)	Restricted use pesticide For use by certified applicators	Apply according to label directions to adult fly resting sites
Cyfluthrin (Optashield CS)	Mix 1-2 fl. oz. with 1 gal. water	Apply 1 gal. per 1,000 sq. ft.
diazinon 50%WP, OP, LE	<u>Residual Spray</u> : Mix 2 lbs. or 4 lbs. of 50% WP in 25 gals. of water. To make a bait spray mix 1 lb. of sugar or 2 cups of syrup or molasses in the spray mixture.	Remove animals from buildings or corrals prior to treatment and keep animals out until dry. Do not apply in dairy barns, milk rooms and poultry houses. Apply 1 gal. of residual spray as an overall spray at the rate of 1 gal. per 350 to 750 square feet to ceilings and walls of livestock sheds, calf barns, hog barns, loafing sheds and other farm buildings. See restrictions for cyfluthrin above.
Dichlorvos (Vapona)	Ready to use	Apply as coarse spray, 1 pint per 1,000 sq. ft. of surface
Esfenvalerate (35%) Endure 35WP	Mix one or two scoops with one gallon of water and spray 1 gal/1,000 sq. ft.	Do not apply when feed is present.
Gamma-cyhalothrin (5.9%) (StandGuard)	Mix 0.16 fl. oz. (5 ml) per gallon of water.	Spray 1 gallon of diluted spray to treat 500 to 1,000 sq. ft. of fly resting surfaces.
Imidacloprid 10% QuickBayt Spot Spray.	Mixed at the rate of 1 lb./gallon of water to treat 1,000 sq. ft. of fly resting areas.	Product can be sprayed on virtually any surface (out of reach of animals) where flies rest or congregate, indoors or outdoors. Examples include posts, beams, ceilings, railings, door frames, windows, and walls. Residual activity of up to 6 weeks indoors and 2 weeks outdoors.
Lambdacyhalothrin (9.7%) (Grenade ER Insecticide) (Demand CS)	Mix 0.2 to 0.4 oz. (6 to 12 ml) per gallon water.	Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present.
malathion 8 lbs. a.i. per gal. EC, OP, LE	Mix 1.25 pt. EC in 12 gals. of water.	See methods of application and safety restrictions for cyfluthrin above.
permethrin (Atroban, Ectiban, Insectrin, Permethrin) 5.7% EC, 11% EC, 40% EC or 25% WP, SPY, HE	5.7% EC is ready-to-use as a mist spray OR mix 1 qt. 5.7% EC in 12.5 gals. of water OR mix 6.67 ozs. 25% WP in 10 gals. of water OR mix 1 pt. 11% EC in 10 gals. of water OR mix 90 to 118 ml. 40% EC in 10 gals. water.	Apply as a residual surface spray to fly resting areas. Do not spray manure or litter. Do not apply directly to livestock or poultry. Do not apply in milk rooms or egg storage areas. Apply 5.7% EC undiluted at 4 ozs. per 1000 sq. ft. of surface area or apply diluted WP and EC mixtures at 1 gal./750 sq. ft. Do not apply more often than once every 2 weeks.
Spinosyn Elector (2.46% Spinosad)	Dilute 20 oz. (approx. 600 ml) to 5 gal. water to give 0.08% spinosad	Spray fly-inhabiting surfaces in animal premises to the point of runoff. Use approx. 1 gal. of spray per 500 to 1,000 sq. ft. Repeat as needed, but not more often than once per week. Spray in early morning when flies are resting. Lactating and non-lactating dairy and beef cattle may be present at time of premise treatment; horses not intended for human consumption may be present during premise treatment. Do not use in poultry, swine, or sheep facilities when animals are present; allow surfaces to dry completely before readmitting animals.

FLY CONTROL IN LIVESTOCK FACILITIES (continued)

INSECTICIDE ²	SPRAY CONCENTRATION AND MIXING INSTRUCTIONS	METHODS OF APPLICATION AND SAFETY RESTRICTIONS
RESIDUAL AND BAIT SPRAYS¹ (cont.)		
spinosad (Elector PSP 44.2% spinosyn)	Dilute according to label chart.	Spray fly-resting surfaces. Do not apply where birds are present. Follow label directions.
Tetrachlorvinphos (Rabon 50 WP)	mix 0.5 lb. in 1.5 gal. water	Spray 1 gal. per 500 sq. ft.
Tetrachlorvinphos + vapona (Ravap EC)	mix 5 oz. per gal. water	Apply 1 gal. spray per 500 to 1,000 sq. ft., treating fly resting sites
tetrachlorvinphos (stirofos) 2 lbs. a.i. per gal. (23%) + dichlorvos 0.5 lb. a.i. per gal. (5.7%) (Ravap) EC, OP, HE	1.25% to 2.5% spray. Mix 1 gal. or 2 gals. EC in 25 gals. of water.	See methods of application and safety restrictions for cyfluthrin above.
SPACE SPRAYS (Aerosols, Fogs and Mist Sprays)³		
dichlorvos (Vapona or DDVP) 2 lbs. a.i. per gal. (23.4%) EC, OP, LE	0.5% or 1%. Mix 1 pt. EC in 3 gals. or 6 gals. of water.	Apply 1 pt. of 1% solution or 1 qt. of 0.5% solution per 8,000 cubic ft. as a fog or mist. Repeated applications will provide adult fly suppression. Do not use more often than once every 24 hours. Do not use if animals have been treated with other insecticides within 8 hours. Do not apply directly to animals. Close all doors and windows when fogging. Do not contaminate feed, water, milk or milking equipment.
permethrin (Insectrin) 5.7% EC, 40% EC, SPY, LE	Mix 1 pt. of 5.7% EC in 6 1/4 gals. of diesel fuel or mineral oil OR mix 10 to 45 ml in 1 gal. of water.	Apply fog at 2 to 4 fl. ozs. per 1000 cubic feet of air space in confined facility. Repeat as needed.
pyrethrin (0.1 to 1.0 %) + synergist (0.5 to 5.0%) NPY, HE	Ready-to-use.	Apply fogs or spray mists at 1 fl. oz. per 1,000 cu. ft. as fine atomized spray. Repeat as needed.
BAITS		
Imidacloprid 0.5% QuickBait	Ready-to-use.	Scatter bait directly from container onto dry level surfaces so individual granules lie near each other without forming piles. Or place in any commercial bait station. Or mix 1.5 oz. bait with 1 fl. oz. warm water and stir to create a paste; apply with brush to surfaces where flies rest. Bait should be inaccessible to food-producing animals, children, and pets.
Imidacloprid 0.5% QuickBait Fly Strip	Ready-to-use.	Use in buildings where animals are kept and where flies are a nuisance.
methomyl (Blue Streak, Golden Malrin) Bait, CR, HE	Ready-to-use as a dry bait.	As a dry bait: Scatter on floors, walkways, etc., throughout operation but away from animals. Apply heavy (about 1/4 lb. per 500 to 1000 sq. ft.) until flies are suppressed. Wear rubber gloves when applying baits. Do not allow workers on treated floors without shoes. Do not allow animals to come in contact with baits.
nithiazine (QuikStrike) 1% fly abatement strip	Ready-to-use strip.	Hang one strip per 100 ft. ² or 300 ft. ² depending on fly population in enclosed areas that are protected from rain.
spinosad (0.5% spinosyn) Elector Bait	Ready-to-use	Follow label directions for scatter bait, station/tray bait, or paint/spray bait use. Locate where inaccessible to animals and children.

¹ Residual sprays can be applied as spot sprays to control maggots in manure accumulations if permitted by the EPA label.

² HE = highly effective, LE = less effective or effectiveness not established, OP = organophosphate, CR = carbamate, SPY = synthetic pyrethroid, NPY = natural pyrethrum, CH = organochlorine, chlorinated hydrocarbon, SP = soluble powder.

³ Space sprays are designed to kill only adult flies that are present when the fog or mist is applied. There is little or no residual insecticide deposit remaining after the application. Fogs or mists must come in contact with the fly. These materials are especially effective in enclosed areas where air movement is minimal. Heavy mists can offer good adult fly kill in open areas such as in feed lots.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

Nancy C. Hinkle, Veterinary Entomologist

Find the pest to be controlled, then select the method of application (spray, dust, ear-tag, etc.) from the left column. To the right are listed the active ingredients available as well as recommendations for effective use.

INSECTICIDES TO USE AND WAYS TO APPLY THEM TO CONTROL BEEF CATTLE PESTS

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HORN FLIES		
Sprays	COUMAPHOS Coumaphos (Co-Ral 11.6%)	Mix 2.5 to 5 fl. oz. per 4 gal. water and spray to complete wetting.
	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	MALATHION Malathion EC or WP Spray. Mix 1 1/2 cups of 57% EC or 1 1/2 lbs. (about 5 cups) 25% WP in 10 gals. of water.	Spray animals thoroughly (about 2 qts. per mature animal). Apply every 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.	Spray animal thoroughly. Retreat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.
	Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water.	Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days.
	Permethrin EC Spray. Mix 1 cup 42.5% EC in 100 gals. water or mix 1 pt. 40% EC in 100 gals. water.	Apply 1 qt. of low concentration spray mixture per animal to control horn flies only. Apply 2 qts. of high concentration spray per animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days. Waiting period: 0 days.
	PHOSMET (DeI-Phos, GX-118, Prolate/Lintox) Prolate/Lintox HD. Mix 1 qt. in 2 5-50 gal. water (depending on target pest), and spray to run-off.	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal. per animal. Do not retreat within 7 days. Follow label restrictions. Waiting period: 3 days.
	PYRETHRINS Pyrethrins - synergized. Ready-to-use.	Apply 1 to 2 fluid ozs. daily or as needed. Apply to wet hair not skin. Waiting period: 0 days.
	Ravap (0.5% stirofos + 0.1% dichlorvos) EC spray. Mix 1 pt. 28.7% EC in 6 gals of water.	Apply as a coarse spray. Apply 1/2 gal. spray per animal. Do not repeat application within 10 days. Waiting period: 0 days
STIROFOS OR TETRACHLORVINPHOS Rabon WP spray. Mix 1 lb. 50% WP in 18 gals. of water.	Apply as a coarse spray. Apply 2 qts. to 1 gal. per animal to obtain complete wetting. Waiting period: 0 days.	

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HORN FLIES (continued)		
Dusts	MALATHION Malathion 4 % to 5% Dust. Ready-to-use.	Dust animal thoroughly with about 2 ozs. (2 Tbs.) per animal. Repeat in 2 to 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin 0.25% dust. Ready-to-use when purchased.	Use in dust bags or apply up to 2 ozs. directly to animals. Re-treat 14 to 21 days later if needed for lice control. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust. Ready-to-use.	Apply 2 ozs. of dust per animal by hand or duster to thoroughly penetrate hair coat. Waiting period: 0 days.
	ZETACYPERMETHRIN PYthon dust (0.075% zetacypermethrin)	Apply up to 2 oz. per animal evenly as necessary but not more often than every 3 days.
Ear-tags and Dust Bags (Self Treatment)	COUMAPHOS Co-Ral Plus Insecticide Cattle Ear Tag 20% coumaphos 20% diazinon	All mature animals in the herd should be tagged. For optimum control of Horn Flies, Gulf Coast Ticks, and Spinose Ear Ticks, and as an aid in the control of Face Flies, attach one tag to each ear (two per animal). Replace as necessary. Calves less than 3 months of age should not be tagged as ear damage may result. Remove tags at end of fly season or prior to slaughter.
	BETA-CYFLUTHRIN CyLence Ultra Insecticide Cattle Ear Tags 8% beta-cyfluthrin	For control of horn flies, face flies, coast ticks and spinose ear ticks on beef cattle. For adequate control of horn flies attach one tag per animal. For optimum control of face flies, horn flies, coast ticks and spinose ear ticks, attach one tag to each ear (two per animal). CyLence Ultra Insecticide Ear Tags have been proven to be effective against face and horn flies for up to five months.
	CYPERMETHRIN Max-Con insecticide ear tag. (7% cypermethrin +5% chlorpyrifos + 3.5% piperonyl butoxide). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	DIAZINON OPTimizer 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	OPTimizer-Calf 21.4% insecticide ear tag (21.4 % diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on calves. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.
	X-Terminator 20% insecticide ear tag. Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
Patriot 4 0% insecticide cattle ear tag. Ready- to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter. Waiting period: 0 days.	
Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.	
Ear-Tags and Dust Bags (Self Treatment) (cont.)	LAMBDCYHALOTHRIN Saber 10% insecticide ear tag (10% lambdacyhalothrin + 13% piperonyl butoxide). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag (6.8% lambdacyhalothrin + 14.0% pirimiphos methyl). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	PERMETHRIN Permethrin 10% Insecticide Ear Tag (10% permethrin). (Atroban, Deckem, Gard Star Plus). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle and calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HORN FLIES (continued)		
Ear-Tags and Dust Bags (Self Treatment) (cont.)	PIRIMIPHOS-METHYL Dominator 20% insecticide ear tag (20% pirimiphos methyl). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust. Ready-to-use. Rabon 3% Dust. Ready-to-use.	Apply 2 ozs. of dust per animal by hand or duster to thoroughly penetrate hair coat. Waiting period: 0 days. Apply in dust bags which are hung and protected from rain in dusting stations where cattle are forced to use them. Some control will be obtained by free choice use. Waiting period: 0 days.
	ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.
Backrubbers and Facerubbers	PERMETHRIN Permethrin Rubbing Mixture. Mix 1 qt. 5.7% EC in 10 gals. diesel fuel or mix 1 pt. 10% or 11% EC in one gal. of #2 diesel fuel or mineral oil or mix 118 ml. 40% EC in 10 gal. of diesel oil or suitable mineral oil.	Keep rubbing device charged. Daily forced use provides best results. Waiting period: 0 days.
	STIROFOS + DICHLORVOS Ravap (1% stirofos + 0.25% dichlorvos) in oil. Mix 5 ozs. 28.7% EC in 1 gal. of #2 diesel fuel.	Pour 1 gal. of mixture per 20 ft. of cable. Keep rubbing device charged. Waiting period: 0 days.
Injectable Pour-on Spot-on	CYFLUTHRIN Cylence 1% pour-on insecticide. Ready-to-use when purchased.	Apply pour-on along the top of the back and top of the head. For horn fly and face fly control apply 4 ml. to animals weighing less than 400 lbs., 8 ml. to animals weighing 400-800 lbs. and 12 mls. to animals weighing over 800 lbs. Do not retreat within three weeks following treatment. Double the dose for biting and sucking lice. Waiting period: 0 days.
	EPRINOMECTIN Ivomec Eprinex pour-on for beef cattle. Contains 5 mg. eprinomectin/ml. Ready-to-use when purchased.	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml. per 22 lbs. body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead. Waiting period: 0 days.
	GAMMA-CYHALOTHRIN (0.5%) (StandGuard Pour-on)	RTU For cattle weighing less than 600 pounds, apply 10 ml (1/3 fl. oz.) product along backline. For cattle weighing more than 600 pounds, apply 15 ml (1/2 fl. oz.) along backline.
	IVERMECTIN Ivomec (ivermectin) pour-on, ready-to-use. 5 mg ivermectin/ml.	Apply 1 ml. per 22 lbs. of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead. Waiting period: 48 days.
	LAMBDCYHALOTHRIN Saber 1% pour-on insecticide. Ready-to-use when purchased.	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml. (1/3 fl. oz.) per animal for cattle weighing less than 600 lbs. or at a rate of 15 ml. (1/2 fl. oz.) per animal for cattle weighing more than 600 lbs. Repeat as needed but not more often than every two weeks and not more than four applications within a six month period. Waiting period: 0 days.
	MOXIDECTIN Moxidectin 1% injectable (Cydectin 10 mg/ml)	Inject 1 mg per 110 lb. body weight; 35 day withdrawal.
	Moxidectin (Cydectin Pour-on)	Use 22.7 mg per 100 lb. body weight (mites and lice).
PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased.	Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.	

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HORN FLIES (continued)		
Injectable Pour-on Spot-on (cont.)	Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin)	Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days.
	Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)	Ready-to-use. Follow label directions.
Bolus, Feed Additives	DIFLUBENZURON Vigilante 9.7% bolus. Ready-to-use.	Using standard balling gun, administer 1/2 bolus for cattle weighing 300-550 lbs., 1 bolus for 550-825 lbs., 1 1/2 boluses for 825-1,100 lbs., and 2 boluses for 1,100 lbs., or heavier. Do not administer to cattle weighing less than 300 lbs. Do not administer more than 2 boluses to any animal regardless of weight. Waiting period: 0 days.
	METHOPRENE Altosid 0.02% mineral mix or block. Altosid IGR 1% Liquid - Feed-through	Feed free choice at 1/4-1/2 lb./100 lbs. animal body weight monthly/animal. Waiting period: 0 days. Mix in feed to achieve consumption rate of 1.13 mg/100 lbs. animal body weight per day.
	STIROFOS OR TETRACHLORVINPHOS Rabon 7.76% granular oral laticide. Pre-mix or ready-to-use blocks and mineral feeds are available commercially.	Mix 7.76% oral larvicide with concentrate feed as directed on label. Feed ready-to-use block or mineral free choice so each animal will consume 70 mg./100 lbs. body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies. Waiting period: 0 days.
CATTLE GRUBS		
Injectable Pour-on Spot-on	DORAMECTIN 0.5% Dectomax pour-on	Apply 1 ml per 22 lb. body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age.
	EPRINOMECTIN Ivomec Eprinex pour-on for beef cattle. Contains 5 mg. eprinomectin/ml. Ready-to-use when purchased.	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml. per 22 lbs. body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead. Waiting period: 0 days.
	IVERMECTIN Ivomec (ivermectin) 1% clear, ready-to-use sterile solution.	Administer subcutaneously only 1 ml. (10 mg. ivermectin) per 110 lb. body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2 to 3/4" needle is suggested. Divide doses greater than 10 ml between two injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days.
	Ivomec (ivermectin) pour-on, ready-to-use. 5 mg ivermectin/ml.	Apply 1 ml. per 22 lbs. of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead. Waiting period: 48 days.
	MOXIDECTIN Moxidectin 1% injectable (Cydectin 10 mg/ml)	Inject 1 mg per 110 lb. body weight; 35 day withdrawal.
	Moxidectin (Cydectin Pour-on)	Use 22.7 mg per 100 lb. body weight (mites and lice).
CATTLE LICE		
Sprays	AMITRAZ Tactic 12.5% EC Mix 1 qt. 12.5% EC in 100 gals. of water. Use within 6 hours of mixing.	Apply up to 2 gals. of spray for a fully grown animal. Penetrate spray to skin until run-off. Pay particular attention to legs, udder, tail regions, head, ears, shoulder area and neck. A second application may be needed to control lice 10 to 14 days later. Waiting period: 3 days.
	COUMAPHOS Coumaphos (Co-Ral 11.6%)	Mix 2.5 to 5 fl. oz. per 4 gal. water and spray to complete wetting.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
CATTLE LICE (continued)		
Sprays	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	MALATHION Malathion EC or WP Spray. Mix 1 1/2 cups of 57% EC or 1 1/2 lbs. (about 5 cups) 25% WP in 10 gals. of water.	Spray animals thoroughly (about 2 qts. per mature animal). Apply every 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.	Spray animal thoroughly. Re-treat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.
	Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water.	Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days.
	Permethrin EC Spray. Mix 1 cup 42.5% EC in 100 gals. water or mix 1 pt. 40% EC in 100 gals. water.	Apply 1 qt. of low concentration spray mixture per animal to control horn flies only. Apply 2 qts. of high concentration spray per animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days. Waiting period: 0 days.
	PHOSMET (Del-Phos, GX-118, Prolate/Lintox) Prolate/Lintox HD. Mix 1 qt. in 2 5-50 gal. water (depending on target pest), and spray to run-off.	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal. per animal. Do not retreat within 7 days. Follow label restrictions. Waiting period: 3 days.
	PYRETHRINS Pyrethrins - synergized. Ready-t o-use.	Apply 1 to 2 fluid ozs. daily or as needed. Apply to wet hair not skin. Waiting period: 0 days.
	STIROFOS + DICHLORVOS Ravap (0.35% stirofos + 0.1% dichlorvos) EC spray. Mix 1 pt. 28.7% EC in 10 gals. of water.	Apply as a coarse spray. Apply 1/2 to 1 gal. spray per animal. Do not repeat application within 10 days. Waiting period: 0 days.
	Ravap (0.5% stirofos + 0.1% dichlorvos) EC spray. Mix 1 pt. 28.7% EC in 6 gals of water.	Apply as a coarse spray. Apply 1/2 gal. spray per animal. Do not repeat application within 10 days. Waiting period: 0 days.
STIROFOS OR TETRACHLORVINPHOS Rabon WP spray. Mix 1 lb. 50% WP in 18 gals. of water.	Apply as a coarse spray. Apply 2 qts. to 1 gal. per animal to obtain complete wetting. Waiting period: 0 days.	
Dusts	MALATHION Malathion 4 % to 5% Dust. Ready-to-use.	Dust animal thoroughly with about 2 ozs. (2 Tbs.) per animal. Repeat in 2 to 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin 0.25% dust. Ready-to-use when purchased.	Use in dust bags or apply up to 2 ozs. directly to animals. Re-treat 14 to 21 days later if needed for lice control. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust. Ready-to-use.	Apply 2 ozs. of dust per animal by hand or duster to thoroughly penetrate hair coat. Waiting period: 0 days.
	ZETACYPERMETHRIN PYthon dust (0.075% zetacypermethrin)	Apply up to 2 oz. per animal evenly as necessary but not more often than every 3 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
CATTLE LICE (continued)		
Ear-Tags and Dust Bags (Self-Treatment)	<p>COUMAPHOS Co-Ral Plus Insecticide Cattle Ear Tag</p>	<p>All mature animals in the herd should be tagged. For optimum control of Horn Flies, Gulf Coast Ticks, and Spinose Ear Ticks, and as an aid in the control of Face Flies, attach one tag to each ear (two per animal). Replace as necessary. Calves less than 3 months of age should not be tagged as ear damage may result. Remove tags at end of fly season or prior to slaughter.</p>
	<p>DIAZINON Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.</p>
	<p>PERMETHRIN Permethrin 0.25% dust. Ready-to-use when purchased.</p>	<p>Use in dust bags or apply up to 2 ozs. directly to animals. Re-treat 14 to 21 days later if needed for lice control. Waiting period: 0 days.</p>
	<p>STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust. Ready-to-use.</p>	<p>Apply in dust bags which are hung and protected from rain in dusting stations where cattle are forced to use them. Some control will be obtained by free choice use. Waiting period: 0 days.</p>
	<p>ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.</p>
Backrubbers and Facerubbers	<p>PERMETHRIN Permethrin Rubbing Mixture. Mix 1 qt. 5.7% EC in 10 gals. diesel fuel or mix 1 pt. 10% or 11% EC in one gal. of #2 diesel fuel or mineral oil or mix 118 ml. 40% EC in 10 gal. of diesel oil or suitable mineral oil.</p>	<p>Keep rubbing device charged. Daily forced use provides best results. Waiting period: 0 days.</p>
	<p>STIROFOS + DICHLORVOS Ravap (1% stirofos + 0.25% dichlorvos) in oil. Mix 5 ozs. 28.7% EC in 1 gal. of #2 diesel fuel.</p>	<p>Pour 1 gal. of mixture per 20 ft. of cable. Keep rubbing device charged. Waiting period: 0 days.</p>
Injectable Pour-on Spot-on	<p>CYFLUTHRIN Cylence 1% pour-on insecticide. Ready-to-use when purchased.</p>	<p>Apply pour-on along the top of the back and top of the head. For horn fly and face fly control apply 4 ml. to animals weighing less than 400 lbs., 8 ml. to animals weighing 400-800 lbs. and 12 mls. to animals weighing over 800 lbs. Do not retreat within three weeks following treatment. Double the dose for biting and sucking lice. Waiting period: 0 days.</p>
	<p>DORAMECTIN 0.5% Dectomax pour-on</p>	<p>Apply 1 ml per 22 lb. body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age.</p>
	<p>EPRINOMECTIN Ivomec Eprinex pour-on for beef cattle. Contains 5 m g. eprinomectin/ml. Ready-to-use when purchased.</p>	<p>Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml. per 22 lbs. body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead. Waiting period: 0 days.</p>
	<p>Gamma-cyhalothrin (0.5%) (StandGuard Pour-on)</p>	<p>RTU For cattle weighing less than 600 pounds, apply 10 ml (1/3 fl. oz) product along backline. For cattle weighing more than 600 pounds, apply 15 ml (1/2 fl. oz.) along backline.</p>
	<p>IVERMECTIN Ivomec (ivermectin) 1% clear, ready-to-use sterile solution. Ivomec (ivermectin) pour-on, ready-to-use. 5 mg ivermectin/ml.</p>	<p>Administer subcutaneously only 1 ml. (10 mg. ivermectin) per 110 lb. body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2 to 3/4" needle is suggested. Divide doses greater than 10 ml between two injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days. Apply 1 ml. per 22 lbs. of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead. Waiting period: 48 days.</p>

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
CATTLE LICE (continued)		
Injectable Pour-on Spot-on (cont.)	LAMBDAHALOTHHRIN (K3) Saber 1% pour-on insecticide. Ready-to-use when purchased.	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml. (1/3 fl. oz.) per animal for cattle weighing less than 600 lbs. or at a rate of 15 ml. (1/2 fl. oz.) per animal for cattle weighing more than 600 lbs. Repeat as needed but not more often than every two weeks and not more than four applications within a six month period. Waiting period: 0 days.
	MOXIDECTIN Moxidectin 1% injectable (Cydectin 10 mg/ml) Moxidectin (Cydectin Pour-on)	Inject 1 mg per 110 lb. body weight; 35 day withdrawal. Use 22.7 mg per 100 lb. body weight (mites and lice).
	PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased.	Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.
	Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin) Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)	Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days. Ready-to-use. Follow label directions.
FACE FLIES		
Sprays	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water.	Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days.
	PYRETHRINS Pyrethrins - synergized. Ready-to-use.	Apply 1 to 2 fluid ozs. daily or as needed. Apply to wet hair not skin. Waiting period: 0 days.
Ear-Tags and Dust Bags (Self-Treatment)	CYFLUTHRIN Beta-cyfluthrin CyLence Ultra Insecticide Cattle Ear Tags 8% beta-cyfluthrin	For control of horn flies, face flies, coast ticks and spinose ear ticks on beef and dairy cattle (including lactating). For adequate control of horn flies attach one tag per animal. For optimum control of face flies, horn flies, coast ticks and spinose ear ticks, attach one tag to each ear (two per animal). CyLence Ultra Insecticide Ear Tags have been proven to be effective against face and horn flies for up to five months.
	CYPERMETHRIN Max-Con insecticide ear tag. (7% cypermethrin + 5% chlorpyrifos + 3.5% piperonyl butoxide). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	DIAZINON Optimizer 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	Optimizer-Calf 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased. X-Terminator 20% insecticide ear tag. Ready-to-use when purchased.	Attach one tag to the inside of each ear on calves. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days. Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
FACE FLIES (continued)		
Ear-Tags and Dust Bags (Self-Treatment) (cont.)	Patriot 40% insecticide cattle ear tag. Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter. Waiting period: 0 days.
	Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.
	LAMBDAHALOTHHRIN Saber 10% insecticide ear tag (10% lambda-halothrin + 13% piperonyl butoxide). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag (6.8% lambda-halothrin + 14.0% pirimiphos methyl). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	PERMETHRIN Permethrin 10% Insecticide Ear Tag (10% permethrin). (Atroban, Deckem, Gard Star Plus). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle and calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	PIRIMIPHOS-METHYL Dominator 20% insecticide ear tag (20% pirimiphos methyl). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust. Ready-to-use.	Apply in dust bags, which are hung and protected from rain in dusting stations where cattle are forced to use them. Some control will be obtained by free choice use. Waiting period: 0 days.
ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.	
Injectable Pour-on Spot-on	CYFLUTHRIN Cylence 1% pour-on insecticide. Ready-to-use when purchased.	Apply pour-on along the top of the back and top of the head. For horn fly and face fly control apply 4 ml. to animals weighing less than 400 lbs., 8 ml. to animals weighing 400-800 lbs. and 12 mls. to animals weighing over 800 lbs. Do not retreat within three weeks following treatment. Double the dose for biting and sucking lice. Waiting period: 0 days.
	PERMETHRIN Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)	Ready-to-use. Follow label directions.
Bolus, Feed Additives	DIFLUBENZURON Vigilante 9.7% bolus. Ready-to-use.	Using standard balling gun administer 1/2 bolus for cattle weighing 300-550 lbs., 1 bolus for 550-825 lbs., 1 1/2 boluses for 825-1,100 lbs., and 2 boluses for 1,100 lbs., or heavier. Do not administer to cattle weighing less than 300 lbs. Do not administer more than 2 boluses to any animal regardless of weight. Waiting period: 0 days.
	METHOPRENE Altosid 0.02% mineral mix or block.	Feed free choice at 1/4-1/2 lb./100 lbs. animal body weight monthly/animal. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 7.76% granular oral larvicide. Pre-mix or ready-to-use blocks and mineral feeds are available commercially.	Mix 7.76% oral larvicide with concentrate feed as directed on label. Feed ready-to-use block or mineral free choice so each animal will consume 70 mg./100 lbs. body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
TICKS		
Sprays	AMITRAZ Taktic 12.5% EC Mix 1 qt. 12.5% EC in 100 gals. of water. Use within 6 hours of mixing.	Apply up to 2 gals. of spray for a fully grown animal. Penetrate spray to skin until run-off. Pay particular attention to legs, udder, tail regions, head, ears, shoulder area and neck. A second application may be needed to control lice 10 to 14 days later. Waiting period: 3 days.
	COUMAPHOS Coumaphos (Co-Ral 11.6%)	Mix 2.5 to 5 fl. oz. per 4 gal. water and spray to complete wetting.
	MALATHION Malathion EC or WP Spray. Mix 1 1/2 cups of 57% EC or 1 1/2 lbs. (about 5 cups) 25% WP in 10 gals. of water.	Spray animals thoroughly (about 2 qts. per mature animal). Apply every 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray. Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water. Permethrin EC Spray. Mix 1 cup 42.5% EC in 100 gals. water or mix 1 pt. 40% EC in 100 gals. water.	Spray animal thoroughly. Retreat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days. Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days. Apply 1 qt. of low concentration spray mixture per animal to control horn flies only. Apply 2 qts. of high concentration spray per animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days. Waiting period: 0 days.
	PHOSMET (Del-Phos, GX-118, Prolate/Lintox) Prolate/Lintox HD. Mix 1 qt. in 25-50 gal. water (depending on target pest), and spray to run-off.	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal. per animal. Do not retreat within 7 days. Follow label restrictions. Waiting period: 3 days.
	STIROFOS + DICHLORVOS Ravap (0.35% stirofos + 0.1% dichlorvos) EC spray. Mix 1 pt. 28.7% EC in 10 gals. of water.	Apply as a coarse spray. Apply 1/2 to 1 gal. spray per animal. Do not repeat application within 10 days. Waiting period: 0 days.
	Ravap (0.5% stirofos + 0.1% dichlorvos) EC spray. Mix 1 pt. 28.7% EC in 6 gals of water.	Apply as a coarse spray. Apply 1/2 gal. spray per animal animal. Do not repeat application within 10 days. Waiting period: 0 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon WP spray. Mix 1 lb. 50% WP in 18 gals. of water.	Apply as a coarse spray. Apply 2 qts. to 1 gal. per animal to obtain complete wetting. Waiting period: 0 days.
Dusts	MALATHION Malathion 4 % to 5% Dust. Ready-to-use.	Dust animal thoroughly with about 2 ozs. (2 Tbs.) per animal. Repeat in 2 to 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
Ear-Tags and Dust Bags (Self-Treatment)	COUMAPHOS Co-Ral Plus Insecticide Cattle Ear Tag	All mature animals in the herd should be tagged. For optimum control of Horn Flies, Gulf Coast Ticks, and Spinose Ear Ticks, and as an aid in the control of Face Flies, attach one tag to each ear (two per animal). Replace as necessary. Calves less than 3 months of age should not be tagged as ear damage may result. Remove tags at end of fly season or prior to slaughter.
	CYFLUTHRIN Beta-cyfluthrin CyLence Ultra Insecticide Cattle Ear Tags 8% beta-cyfluthrin	For control of horn flies, face flies, coast ticks and spinose ear ticks on beef and dairy cattle (including lactating). For adequate control of horn flies attach one tag per animal. For optimum control of face flies, horn flies, coast ticks and spinose ear ticks, attach one tag to each ear (two per animal). CyLence Ultra Insecticide Ear Tags have been proven to be effective against face and horn flies for up to five months.
	CYPERMETHRIN Max-Con insecticide ear tag. (7% cypermethrin +5% chlorpyrifos + 3.5% piperonyl butoxide). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
TICKS (continued)		
Ear-Tags and Dust Bags (Self-Treatment) (cont.)	<p>DIAZINON Optimizer 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.</p>
	<p>Optimizer-Calf 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on calves. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.</p>
	<p>X-Terminator 20% insecticide ear tag. Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.</p>
	<p>Patriot 4 0% insecticide cattle ear tag. Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter. Waiting period: 0 days.</p>
	<p>Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.</p>
	<p>LAMBDAHALOTHHRIN Saber 10% insecticide ear tag (10% lambda-halothrin + 13% piperonyl butoxide). Ready-to-use when purchased.</p>	<p>Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.</p>
	<p>PERMETHRIN Permethrin 10% Insecticide Ear Tag (10% permethrin). (Atroban, Deckem, Gard Star Plus). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle and calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.</p>
	<p>Permethrin 0.25% dust. Ready-to-use when purchased.</p>	<p>Use in dust bags or apply up to 2 ozs. directly to animals. Re-treat 14 to 21 days later if needed for lice control. Waiting period: 0 days.</p>
	<p>PIRIMIPHOS-METHYL Dominator 20% insecticide ear tag (20% pirimiphos methyl). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first. Waiting period: 0 days.</p>
<p>ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.</p>	
Backrubbers and Facerubbers	<p>PERMETHRIN Permethrin Rubbing Mixture. Mix 1 qt. 5.7% EC in 10 gals. diesel fuel or mix 1 pt. 10% or 11% EC in one gal. of #2 diesel fuel or mineral oil or mix 118 ml. 40% EC in 10 gal. of diesel oil or suitable mineral oil.</p>	<p>Keep rubbing device charged. Daily forced use provides best results. Waiting period: 0 days.</p>
	<p>STIROFOS + DICHLORVOS Ravap (1% stirofos + 0.25% dichlorvos) in oil. Mix 5 ozs. 28.7% EC in 1 gal. of #2 diesel fuel.</p>	<p>Pour 1 gal. of mixture per 20 ft. of cable. Keep rubbing device charged. Waiting period: 0 days.</p>
Pour-on Spot-on	<p>PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased.</p>	<p>Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.</p>
	<p>Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin)</p>	<p>Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days.</p>

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
STABLE FLIES		
Sprays	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	MALATHION Malathion EC or WP Spray. Mix 1 1/2 cups of 57% EC or 1 1/2 lbs. (about 5 cups) 25% WP in 10 gals. of water.	Spray animals thoroughly (about 2 qts. per mature animal). Apply every 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.	Spray animal thoroughly. Retreat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.
	Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water.	Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days.
	Permethrin EC Spray. Mix 1 cup 42.5% EC in 100 gals. water or mix 1 pt. 40% EC in 100 gals. water.	Apply 1 qt. of low concentration spray mixture per animal to control horn flies only. Apply 2 qts. of high concentration spray per animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days. Waiting period: 0 days.
Dusts	MALATHION Malathion 4 % to 5% Dust. Ready-to-use.	Dust animal thoroughly with about 2 ozs. (2 Tbs.) per animal. Repeat in 2 to 3 weeks, if needed. Do not treat calves less than 1 month old. Waiting period: 0 days.
Ear-Tags and Dust Bags (Self-Treatment)	CYPERMETHRIN Max-Con insecticide ear tag. (7% cypermethrin +5% chlorpyrifos + 3.5% piperonyl butoxide). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	DIAZINON Optimizer 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	Optimizer-Calf 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on calves. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.
	X-Terminator 20% insecticide ear tag. Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	Patriot 40% insecticide cattle ear tag. Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter. Waiting period: 0 days.
	Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.
	LAMBDCYHALOTHRIN Saber 10% insecticide ear tag (10% lambdacyhalothrin + 13% piperonyl butoxide). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag (6.8% lambdacyhalothrin + 14.0% pirimiphos methyl). Ready-to-use when purchased.	Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
STABLE FLIES (continued)		
Ear-Tags and Dust Bags (Self-Treatment) (cont.)	PERMETHRIN Permethrin 10% Insecticide Ear Tag (10% permethrin). (Atroban, Deckem, Gard Star Plus). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle and calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.
	PIRIMIPHOS-METHYL Dominator 20% insecticide ear tag (20% pirimiphos methyl). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first. Waiting period: 0 days.
	ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.
Backrubbers and Facerubbers	PERMETHRIN Permethrin Rubbing Mixture. Mix 1 qt. 5.7% EC in 10 gals. diesel fuel or mix 1 pt. 10% or 11% EC in one gal. of #2 diesel fuel or mineral oil or mix 118 ml. 40% EC in 10 gal. of diesel oil or suitable mineral oil.	Keep rubbing device charged. Daily forced use provides best results. Waiting period: 0 days.
Pour-on Spot-on	LAMBDAHALOTHHRIN Saber 1% pour-on insecticide. Ready-to-use when purchased.	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml. (1/3 fl. oz.) per animal for cattle weighing less than 600 lbs. or at a rate of 15 ml. (1/2 fl. oz.) per animal for cattle weighing more than 600 lbs. Repeat as needed but not more often than every two weeks and not more than four applications within a six month period. Waiting period: 0 days.
	PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased.	Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.
	Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin) Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)	Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days. Ready-to-use. Follow label directions.
MAGGOTS IN WOUNDS		
	COUMAPHOS Coumaphos (Co-Ral 11.6%)	Mix 2.5 to 5 fl. oz. per 4 gal. water and spray to complete wetting.
HORSE FLIES, DEER FLIES, MOSQUITOES, BLACK FLIES, EYE GNATS		
Sprays	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.	Spray animal thoroughly. Retreat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.
	Permethrin EC Spray (low pressure). Mix 1 qt. 11% EC in 5 gals. water.	Apply 1 to 2 ozs. spray mixture per animal. Spot treat the back, face, legs and ears. Waiting period: 0 days.
	Permethrin EC Spray. Mix 1 cup 42.5% EC in 100 gals. water or mix 1 pt. 40% EC in 100 gals. water.	Apply 1 qt. of low concentration spray mixture per animal to control horn flies only. Apply 2 qts. of high concentration spray per animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days. Waiting period: 0 days.
	PYRETHRINS Pyrethrins - synergized. Ready-to-use.	Apply 1 to 2 fluid ozs. daily or as needed. Apply to wet hair not skin. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HORSE FLIES, DEER FLIES, MOSQUITOES, BLACK FLIES, EYE GNATS (continued)		
Ear-Tags and Dust Bags (Self-Treatment)	PERMETHRIN Permethrin 0.25% dust. Ready-to-use when purchased.	Use in dust bags or apply up to 2 ozs. directly to animals. Re-treat 14 to 21 days later if needed for lice control. Waiting period: 0 days.
Backrubbers and Facerubbers	PERMETHRIN Permethrin Rubbing Mixture. Mix 1 qt. 5.7% EC in 10 gals. diesel fuel or mix 1 pt. 10% or 11% EC in one gal. of #2 diesel fuel or mineral oil or mix 118 ml. 40% EC in 10 gal. of diesel oil or suitable mineral oil.	Keep rubbing device charged. Daily forced use provides best results. Waiting period: 0 days.
Pour-on Spot-on	PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased. Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin) Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)	Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face. Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days. Ready-to-use. Follow label directions.
HOUSE FLIES		
Sprays	DICHLORVOS Vapona EC. Mix 1 qt. 21.8% EC in 6 gals. of water	Apply 1 to 2 fl. ozs. as a light mist spray daily. Spray to cover all parts of the animal. Do not wet the skin. Do not apply more than 2 fl. ozs. per animal each day. Waiting period: 1 day.
	PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.	Spray animal thoroughly. Re-treat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.
	PYRETHRINS Pyrethrins - synergized. Ready-to-use.	Apply 1 to 2 fluid ozs. daily or as needed. Apply to wet hair not skin. Waiting period: 0 days.
Ear-Tags and Dust Bags (Self-Treatment)	CYPERMETHRIN Max-Con insecticide ear tag. (7% cypermethrin + 5% chlorpyrifos + 3.5% piperonyl butoxide). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	DIAZINON OPTimizer 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	Optimizer-Calf 21.4% insecticide ear tag (21.4% diazinon). Ready-to-use when purchased.	Attach one tag to the inside of each ear on calves. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.
	X-Terminator 20% insecticide ear tag. Ready-to-use when purchased.	Attach one tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of the fly season or before slaughter. Waiting period: 0 days.
	Patriot 40% insecticide cattle ear tag. Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter. Waiting period: 0 days.
	Warrior 40% insecticide ear tag (30% diazinon + 10% chlorpyrifos). Ready-to-use when purchased.	Attach one tag to the inside of one or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter. Waiting period: 0 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
HOUSE FLIES (cont.)		
	<p>LAMBDCYHALOTHRIN Saber 10% insecticide ear tag (10% lambdacyhalothrin + 13% piperonyl butoxide). Ready-to-use when purchased.</p> <p>Double Barrel/Double Barrel VP 20.8% insecticide ear tag (6.8% lambdacyhalothrin + 14.0% pirimiphos methyl). Ready-to-use when purchased.</p>	<p>Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.</p> <p>Apply one tag to the inside of each ear on mature cattle or calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.</p>
	<p>PERMETHRIN Permethrin 10% Insecticide Ear Tag (10% permethrin). (Atroban, Deckem, Gard Star Plus). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle and calves. Remove tags when control drops off, at the end of fly season, or before slaughter. Waiting period: 0 days.</p>
	<p>PIRIMIPHOS-METHYL Dominator 20% insecticide ear tag (20% pirimiphos methyl). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first. Waiting period: 0 days.</p>
	<p>ZETACYPERMETHRIN PYthon (Zetagard) 10% insecticide ear tag (zetacypermethrin 10% + piperonyl butoxide 20%). Ready-to-use when purchased.</p>	<p>Attach one tag to the inside of each ear on mature cattle. Remove tags when control drops off, at the end of fly or lice season, or before slaughter. During the horn fly season, one tag per animal can be used on cows. Calves can be tagged with one tag as needed. Waiting period: 0 days.</p>
<p>Pour-on Spot-on</p>	<p>PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased.</p> <p>Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin)</p> <p>Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)</p>	<p>Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.</p> <p>Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days.</p> <p>Ready-to-use. Follow label directions.</p>
<p>Bolus, Feed Additives</p>	<p>STIROFOS OR TETRACHLORVINPHOS Rabon 7.76% granular oral larvicide. Pre-mix or ready-to-use blocks and mineral feeds are available commercially.</p>	<p>Mix 7.76% oral larvicide with concentrate feed as directed on label. Feed ready-to-use block or mineral free choice so each animal will consume 70 mg./100 lbs. body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies. Waiting period: 0 days.</p>
MITES, SCABIES (Psoroptic, Chorioptic, Sarcoptic)		
<p>Sprays</p>	<p>AMITRAZ Taktic 12.5% EC Mix 1 qt. 12.5% EC in 100 gals. of water. Use within 6 hours of mixing.</p> <p>PERMETHRIN Permethrin EC spray. Mix 1 qt. of 5.7% EC OR mix 1 pt. of 10% EC or 11% EC in 100 gals. water or mix 30 to 118 ml. of 40% EC in 25 gals. of water or apply 1% pour-on as an undiluted spray.</p> <p>PHOSMET (Del-Phos, GX-118, Prolate/Lintox) Prolate/Lintox HD. Mix 1 qt. in 25-50 gal. water (depending on target pest), and spray to run-off.</p>	<p>Apply up to 2 gals. of spray for a fully grown animal. Penetrate spray to skin until run-off. Pay particular attention to legs, udder, tail regions, head, ears, shoulder area and neck. A second application may be needed to control lice 10 to 14 days later. Waiting period: 3 days.</p> <p>Spray animal thoroughly. Retreat as needed but not more often than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later. Waiting period: 0 days.</p> <p>Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal. per animal. Do not retreat within 7 days. Follow label restrictions. Waiting period: 3 days.</p>

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL (continued)

WAYS TO APPLY INSECTICIDES	INSECTICIDE FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
MITES, SCABIES (Psoroptic, Chorioptic, Sarcoptic) (cont.)		
Injectable Pour-on Spot-on	CYFLUTHRIN Cylence 1% pour-on insecticide. Ready-to-use when purchased.	Apply pour-on along the top of the back and top of the head. For horn fly and face fly control apply 4 ml. to animals weighing less than 400 lbs., 8 ml. to animals weighing 400-800 lbs. and 12 mls. to animals weighing over 800 lbs. Do not retreat within three weeks following treatment. Double the dose for biting and sucking lice. Waiting period: 0 days.
	DORAMECTIN 0.5% Dectomax pour-on	Apply 1 ml per 22 lb. body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age.
	EPRINOMECTIN Ivomec Eprinex pour-on for beef cattle. Contains 5 m g. eprinomectin/ml. Ready-to-use when purchased.	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml. per 22 lbs. body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead. Waiting period: 0 days.
	IVERMECTIN Ivomec (ivermectin) 1% clear, ready-to-use sterile solution. Ivomec (ivermectin) pour-on, ready-to-use. 5 mg ivermectin/ml.	Administer subcutaneously only 1 ml. (10 mg. ivermectin) per 110 lb. body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2 to 3/4" needle is suggested. Divide doses greater than 10 ml between two injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days.
		Apply 1 ml. per 22 lbs. of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead. Waiting period: 48 days.
	MOXIDECTIN Moxidectin 1% injectable (Cydectin 10 mg/ml) Moxidectin (Cydectin Pour-on)	Inject 1 mg per 110 lb. body weight; 35 day withdrawal.
		Use 22.7 mg per 100 lb. body weight (mites and lice).
PERMETHRIN Atroban Delice 1.0% pour on. Ready-to-use when purchased. Brute Pour-on (10% permethrin) Ultra-Boss Pour-on (5% permethrin)	Apply 0.5% fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. Pour correct dose along back and down face.	
	Apply 15 cc (10%) or 30 cc (5%) per 1,000 lbs. down mid-line of back. Repeat the application in 10 to 14 days for mites. Waiting period: 0 days.	
Dips	AMITRAZ Taktic 12.5% EC Mix 1 qt. 12.5% EC in 50 gals. of water. Use within 6 hours of mixing.	Apply in a spray dip machine as instructed by USDA, APHIS in mange mite (scabies) control. A second application is required 7 to 10 days later. Waiting period: 0 days.

¹ Waiting periods refer to the time interval between the last application of the insecticide and slaughter of beef animals.

² Do not treat calves under 6 months of age with insecticides unless specifically allowed on the insecticide label.

³ Do not treat Brahman cattle with organophosphate insecticides unless specifically allowed on the insecticide label.

⁴ Available from Veterinarians.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

Nancy C. Hinkle, Veterinary Entomologist

Listed here are products for lactating and non-lactating dairy cattle. Read instructions carefully and determine if the product is suitable for both the target pest and the animal.

Be sure to observe all precautions on insecticide labels to prevent injury to animals and humans and to prevent illegal insecticide residues in milk and milk by-products.

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HORN FLIES			
Sprays	COUMAPHOS Coumaphos (Co-Ral 6.15%)		Mix 2.5 fl. oz. per 4 gal. water and spray to complete wetting.
	DICHLORVOS (Prozap Beef and Dairy RTU) OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	Dichlorvos (Vapona Insecticide Dairy Cattle Spray)	Ready-to-Use	(same as Prozap)
	PERMETHRIN (Synergized Delice 1.0% solution) PY, ME	Ready-to-use when purchased.	<u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray and pour-on treatments as needed, but not more than once every 14 days.
	Permethrin 0.05% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 25 gals. water.	Apply 1-2 qts. diluted spray thoroughly per animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Permethrin 0.5% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 1 1/2 gals. water.	Apply 1-2 ozs. diluted spray as a low pressure spray to face and shoulders of animal. Retreat as needed but not more often than every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 q t. in 2 5 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or apply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.	
Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.	
Tetrachlorvinphos (23.0 %) + dichlorvos (5.3%) (Ravap E.C.)	Dilute 2 oz. in 3 gal. Direct spray to cover thoroughly with up to ½ gal. per animal.	Repeat as necessary. No milk discard is required. Apply at least 20 minutes prior to milking, or spray after milking has been completed.	

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HORN FLIES (continued)			
Dusts	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Using shaker can, apply no more than 1 oz. per animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times per year. Wait 10 days between applications. No milk withholding.
	PERMETHRIN Permethrin 0.25% Dust PY, ME	Ready-to-use.	Apply up to 2 ozs. (5 Tbs.) per animal. Re-treat as needed but not more often than every 14 days.
	STIROFOS OR TETRACHLORVINPHOS (Rabon 3% Dust) OP, ME	Ready-to-use	Apply 2 ozs. of dust per animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	(PYthon Dust (0.075%) zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Feed Additives	DIFLUBENZURON (Vigilante Bolus) (4.75 g dimilin)	Ready-to-use Bolus	Administer with standard bailing gun. Controlled-release bolus emits IGR to kill fly larvae in the manure for up to 5 months. Requires no preslaughter withholding time or milk discard time.
	METHOPRENE Methoprene (Altosid) 0.02% feed mixture or mineral block IGR, LE	Ready-to-use	Animals should consume 0.25 to 0.5 lb. per 100 lbs. body weight each month. Feed this oral insect growth regulator as free choice mineral or mixed in supplements for pasture cattle early in the spring before horn flies appear. May be used in lactating dairy animals.
	Altosid IGR 1% Liquid	Feed-through	Mix in feed to achieve consumption rate of 1.13 mg/100 lbs. animal body weight per day.
	STIROFOSOR TETRACHLORVINPHOS Rabon Oral Larvicide Feed Mixture OP, LE	Mix Rabon 7.76% Oral Larvicide Pre-mix in feed or mineral mixes. It is also available in ready-to-use products.	Feed the appropriate larvicidal feed or mineral mix to milking cows to prevent the development of fly larvae in manure. Follow manufacturers' instructions to ensure adequate amounts are consumed.
Dust Bags (Self-Treatment)	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Place contents in dust bag and suspend in area frequented by cattle to force daily use. For lactating dairy cattle, bags may be suspended in the exit through which cattle leave the milking barn. Suspend so that the bottom of the bag will hang four to six inches below the topline of the cattle. No milk withholding.
	PERMETHRIN Permethrin 0.25% Dust PY, ME	Ready-to-use	Apply 4 to 10 lbs. in self-treatment cotton cloth, doubled burlap bags or commercial dust bags. Suspend where animals will treat themselves daily, such as near mineral stations, salt blocks or in milking barn exit. Bags should hang 4 to 6 inches below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.
	STIROFOS OR TETRACHLORVINPHOS (Rabon 3% Dust) OP, ME	Ready-to-use.	Apply 2 ozs. of dust per animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
Backrubbers and Facerubbers	Coumaphos (6.15%) (Co-Ral Fly and Tick Spray)	Mix 4 qts. in 13 gal. oil	Saturate the backrubber with mixture. Place in location to force daily use. Suspend at height to prevent straddling. No milk withholding.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HORN FLIES (continued)			
Backrubbers and facerubbers (cont.)	PERMETHRIN (Synergized Delice) 1.0% solution PY, ME	Mix 1 pt. in 10 gals. diesel oil	<u>Back rubber use:</u> Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 10% PY, ME		Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.
	Tetrachlorvinphos (23.0%) + dichlorvos (5.3%) (Ravap E.C.)	Mix 1 gal. in 25 gal. oil	Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour one gallon per 20 linear feet of backrubber. Recharge as needed.
Ear Tags	Beta-cyfluthrin (Cylence Ultra)	Ready-to-use	Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Cypermethrin + Chlorpyrifos (Max-Con)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	DIAZINON Cattle ear tags (Optimizer, X-Terminator, Patriot)	Ready-to-use	Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Beef and non-lactating animals only.
	Endosulfan (Avenger)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Permethrin (Atroban Extra, GardStar Plus, Super Deckem II)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Zeta-cypermethrin (PYthon, PYthon Magnum) Zeta Gard		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
Pour-On	DORAMECTIN 0.5% Dectomax Pour-on	Ready-to-use	Apply 1 ml per 22 lb. body wt. along midline of back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age. Applications of macrocyclic lactones will also control blood sucking lice (nymphs and adults). Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.
	EPRINOMECTIN 0.5% Eprinex Pour-on	Ready-to-use.	Apply 1 ml per 22 lb. body wt. along midline of the back between withers and tailback. Safe for all beef and dairy (including lactating) cattle. Applications of macrocyclic lactones will also control blood sucking lice (nymphs and adults). Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HORN FLIES (continued)			
Pour-On (cont.)	MOXIDECTIN 0.5% Cydectin Pour-on	Ready-to-use	Pour weight-determined dose evenly along animal's back-line from withers to tailhead (basing dose on label weight table). Provides 7 days of activity against horn flies. No pre-slaughter or milk discard interval. Applications of macrocyclic lactones will also control blood sucking lice (nymphs and adults). Lice eggs may hatch on untreated cattle may serve as source of reinfestation, requiring retreatment.
	PERMETHRIN (Synergized Delice 1.0% solution) PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Pour-On:</u> Pour correct dose a long back and down face. Repeat pour-on treatments as needed, but not more than once every 14 days.
	Pemethrin (5.0%) (Ultra Boss)	RTU	Apply 3 ml per 100 lbs body weight up to a maximum of 30 ml per animal. Pour a long back and down face.
FACE FLIES			
Sprays	COUMAPHOS Coumaphos (Co-Ral 6.15%)		Mix 2.5 fl. oz. per 4 gal. water and spray to complete wetting.
	DICHLORVOS Prozap Beef and Dairy RTU OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	Dichlorvos (Vapona Insecticide Dairy Cattle Spray)	Ready-to-Use	Use according to label; apply less than 2 oz. per animal.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray and pour-on treatments as needed, but not more than once every 14 days.
	Permethrin 0.05% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 25 gals. water.	Apply 1-2 qts. diluted spray thoroughly per animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Permethrin 0.5% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 1 1/2 gals. water.	Apply 1-2 ozs. diluted spray as a low pressure spray to face and shoulders of animal. Retreat as needed but not more often than every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
FACE FLIES (continued)			
Sprays (cont.)	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or apply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.
	Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.
	Tetrachlorvinphos (23.0%) + dichlorvos (5.3%) (Ravap E.C.)	Dilute 2 oz. in 3 gal. Direct spray to cover thoroughly with up to ½ gal. per animal.	Repeat as necessary. No milk discard is required. Apply at least 20 minutes prior to milking, or spray after milking has been completed.
Dusts	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Using shaker can, apply no more than 1 oz. per animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times per year. Wait 10 days between applications. No milk withholding.
	PERMETHRIN Permethrin 0.25% Dust PY, ME	Ready-to-use.	Apply up to 2 ozs. (5 Tbs.) per animal. Retreat as needed but not more often than every 14 days.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust OP, ME	Ready-to-use.	Apply 2 ozs. of dust per animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	ZETA-CYPERMETHRIN Python Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Feed Additives	DIFLUBENZURON Vigilante Bolus (4.75 g dimilin)	Ready-to-use Bolus	Administer with standard balling gun. Controlled-release bolus emits IGR to kill fly larvae in the manure for up to 5 months. Requires no preslaughter withholding time or milk discard time.
	METHOPRENE Methoprene (Altosid) 0.02% feed mixture or mineral block IGR, LE	Ready-to-use.	Animals should consume 0.25 to 0.5 lb. per 100 lbs. body weight each month. Feed this oral insect growth regulator as free choice mineral or mixed in supplements for pasture cattle early in the spring before horn flies appear. May be used in lactating dairy animals.
	Altosid IGR 1% Liquid	Feed-through	Mix in feed to achieve consumption rate of 1.13 mg/100 lbs. animal body weight per day.
	STIROFOS OR TETRACHLORVINPHOS Rabon Oral Larvicide Feed Mixture OP, LE	Mix Rabon 7.76% Oral Larvicide Pre-mix in feed or mineral mixes. It is also available in ready-to-use products.	Feed the appropriate larvicidal feed or mineral mix to milking cows to prevent the development of fly larvae in manure. Follow manufacturers' instructions to ensure adequate amounts are consumed.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
FACE FLIES (continued)			
Dust Bags (Self-Treatment)	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Place contents in dust bag and suspend in area frequented by cattle to force daily use. For lactating dairy cattle, bags may be suspended in the exit through which cattle leave the milking barn. Suspend so that the bottom of the bag will hang four to six inches below the topline of the cattle. No milk withholding.
	PERMETHRIN Permethrin 0.25% Dust PY, ME	Ready-to-use.	Apply 4 to 10 lbs. in self-treatment cotton cloth, doubled burlap bags or commercial dust bags. Suspend where animals will treat themselves daily, such as near mineral stations, salt blocks or in milking barn exit. Bags should hang 4 to 6 inches below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.
	STIROFOS OR TETRACHLORVINPHOS Rabon 3% Dust OP, ME	Ready-to-use.	Apply 2 ozs. of dust per animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	ZETA-CYPERMETHRIN Python Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Backrubbers and Facerubbers	Coumaphos (6.15%) (Co-Ral Fly and Tick Spray)	Mix 4 qts. in 13 gal. oil	Saturate the backrubber with mixture. Place in location to force daily use. Suspend at height to prevent straddling. No milk with holding.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME Permethrin 10% PY, ME	Ready-to-use when purchased. Mix 1 pt. in 10 gals. diesel oil	<u>Back rubber use:</u> Mix one pint per gal. of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use. Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.
Ear Tags	Beta-cyfluthrin (Cylence Ultra)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Cypermethrin + Chlorpyrifos (Max-Con)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Endosulfan (Avenger)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Permethrin (Atroban Extra, GardStar Plus, Super Deckem II)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Zeta-cypermethrin (PYthon, PYthon Magnum)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HOUSE FLIES			
Sprays	DICHLORVOS Prozap Beef and Dairy RTU OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray and pour-on treatments as needed, but not more than once every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or apply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.
Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.	
TETRACHLORVINPHOS + DICHLORVOS Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1 gal. in 200 gal. water for lactating dairy	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.	
Feed Additives	DIFLUBENZURON Vigilante Bolus (4.75 g dimilin)	Ready-to-use Bolus	Administer with standard balling gun. Controlled-release bolus emits IGR to kill fly larvae in the manure for up to 5 months. Requires no preslaughter withholding time or milk discard time.
	STIROFOS OR TETRACHLORVINPHOS Rabon Oral Larvicide Feed Mixture OP, LE	Mix Rabon 7.76% Oral Larvicide Pre-mix in feed or mineral mixes. It is also available in ready-to-use products.	Feed the appropriate larvicidal feed or mineral mix to milking cows to prevent the development of fly larvae in manure. Follow manufacturers' instructions to ensure adequate amounts are consumed.
Backrubbers and Facerubbers	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Back rubber use:</u> Mix one pint per gal. of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 10% PY, ME	Mix 1 pt. in 10 gals. diesel oil	Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HOUSE FLIES (continued)			
Ear Tags	ENDOSULFAN Avenger	Ready-to-use	Follow label instructions regarding number of tags per head; remove when effectiveness diminished and at end of season.
	ZETA-CYPERMETHRIN PYthon Magnum Insecticide Cattle Ear Tag	Ready-to-use	Apply 1 tag per head to the front or back of one ear on each animal to control most strains of horn flies and to aid in the control of face flies, stable flies, and house flies for up to 4 months.
STABLE FLIES			
Sprays	DICHLORVOS Prozap Beef and Dairy RTU OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	Dichlorvos (Vapona Insecticide Dairy Cattle Spray)	Ready-to-Use	(same as Prozap)
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray treatments as needed, but not more than once every 14 days.
	Permethrin 0.05% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 25 gals. water.	Apply 1-2 qts. diluted spray thoroughly per animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instruc- tions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or ap- ply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.	
Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.	
TETRACHLORVINPHOS + DICHLORVOS Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1 gal. in 200 gal. water for lactating dairy	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.	

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
STABLE FLIES (continued)			
Dusts	ZETA-CYPERMETHRIN PYthon Dust (0.075% zeta-cypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Feed Additives	Rabon Oral Larvicide Feed Mixture OP, LE	Mix Rabon 7.76% Oral Larvicide Pre-mix in feed or mineral mixes. It is also available in ready-to-use products.	Feed the appropriate larvicidal feed or mineral mix to milking cows to prevent the development of fly larvae in manure. Follow manufacturers' instructions to ensure adequate amounts are consumed.
Dust Bags (Self-Treatment)	ZETA-CYPERMETHRIN PYthon Dust (0.075% zeta-cypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Backrubbers and Facerubbers	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Back rubber use:</u> Mix one pint per gal. of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 10% PY, ME	Mix 1 pt. in 10 gals. diesel oil	Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.
Ear Tags	Beta-cyfluthrin (Cylence Ultra)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Cypermethrin + Chlorpyrifos (Max-Con)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Endosulfan (Avenger)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Permethrin (Atroban Extra, GardStar Plus, Super Deckem II)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Zeta-cypermethrin (PYthon, PYthon Magnum)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
HORSE FLIES			
Sprays	DICHLORVOS Prozap Beef and Dairy RTU OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray and pour-on treatments as needed, but not more than once every 14 days.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
HORSE FLIES (continued)			
Sprays (cont.)	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or apply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.
	Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.
Backrubbers and Facerubbers	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Back rubber use:</u> Mix one pint per gal. of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 0.01% EC backrubber and Facerubber Oil Mixture PY, ME	Mix 1 qt. 5.7% EC in 10 gals. diesel oil	Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.
MOSQUITOES			
Sprays	DICHLORVOS Prozap Beef and Dairy RTU OP, ME	Apply 1-2 oz. per animal.	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	Dichlorvos (Vapona Insecticide Dairy Cattle Spray)	Ready-to-Use	Apply no more than 2 fl. ozs. daily as a light mist spray to cover all body parts, especially head, back, legs and sides. Do not wet skin, only hair of animal. Do not apply to animals less than 6 months old.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Ready-to-use spray:</u> Use undiluted in a mist sprayer to apply correct dose. Apply directly to neck, face, back, legs and ears. Repeat spray and pour-on treatments as needed, but not more than once every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
MOSQUITOES (continued)			
Sprays (cont.)	PYRETHRIN + SYNERGIST (piperonyl butoxide) Pyrethrin 0.075% + Synergist 0.75% Oil Solution or EC Spray NPY, ME	Oil Solution is ready-to-use. EC spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a fine mist spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.05% + Synergist 0.5% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as wet spray every 3 to 7 days if needed.
	Pyrethrin 0.05% to 0.1% + Synergist 0.5% to 1% Oil Solution or EC Spray NPY, ME	Oil Solution ready-to-use. EC Spray, mix according to label instructions.	Apply 1 to 2 fl. ozs. as a light mist spray to dairy cattle with hand or automatic sprayer. Do not wet skin.
	Pyrethrin 0.1% + Synergist 1% EC Spray NPY, ME	Mix according to label instructions.	Apply 1 to 2 qts. as a wet spray every 2 to 3 days or apply 1 to 2 fl. ozs. as a light mist spray daily with hand or automatic sprayer.
	Pyrethrin 0.025% + Synergist 0.25% EC Spray NPY, ME	Mix according to label instructions.	Apply thoroughly as wetting spray. Repeat after 2 to 3 weeks if needed.
	TETRACHLORVINPHOS + DICHLORVOS Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1 gal. in 200 gal. water for lactating dairy	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.
Dusts	Permethrin Permethrin 0.25% Dust PY, ME	Ready-to-use.	Apply up to 2 ozs. (5 Tbs.) per animal. For lice a second treatment may be needed 14-21 days later. Retreat as needed but not more often than every 14 days.
Dust Bags (Self-Treatment)	Permethrin Permethrin 0.25% Dust PY, ME	Ready-to-use.	Apply 4 to 10 lbs. in self-treatment cotton cloth, doubled burlap bags or commercial dust bags. Suspend where animals will treat themselves daily, such as near mineral stations, salt blocks or in milking barn exit. Bags should hang 4 to 6 inches below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.
Backrubbers and Facerubbers	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	<u>Back rubber use:</u> Mix one pint per gal. of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 10% PY, ME	Mix 1 pt. 10 gals. diesel oil	Keep rubbing device charged with 1 gal. mixture per 20 feet of cable. Cattle should be forced to use rubbing device daily.
	TETRACHLORVINPHOS + DICHLORVOS Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	Diluted in oil for backrubber.	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.
Pour-On	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Pour-On:</u> Pour correct dose along back and down face. Repeat pour-on treatments as needed, but not more than once every 14 days.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
TICKS			
Sprays	COUMAPHOS Coumaphos (Co-Ral 11.6%)		Mix 1.25 fl. oz. per 4 gal. water and spray to complete wetting.
	PERMETHRIN Permethrin 0.05% EC Spray PY, ME	Mix 1 qt. 5.7% EC in 25 gals. water.	Apply 1-2 qts. diluted spray thoroughly per animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	Tetrachlorvinphos (23.0%) + dichlorvos (5.3%) (Ravap E.C.)	Dilute 2 oz. in 3 gal. Direct spray to cover thoroughly with up to ½ gal. per animal.	Repeat as necessary. No milk discard is required. Apply at least 20 minutes prior to milking, or spray after milking has been completed.
Dusts	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Using shaker can, apply no more than 1 oz. per animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times per year. Wait 10 days between applications. No milk withholding.
	ZETA-CYPERMETHRIN PYthon Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Dust Bags (Self-Treatment)	ZETA-CYPERMETHRIN PYthon Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Backrubber and Facerubbers	Coumaphos (6.15%) (Co-Ral Fly and Tick Spray)	Mix 4 qts. in 13 gal. oil	Saturate the backrubber with mixture. Place in location to force daily use. Suspend at height to prevent straddling. No milk with holding.
	Tetrachlorvinphos (23.0 %) + dichlorvos (5.3%) (Ravap E.C.)	Mix 1 gal. in 25 gal. oil	Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour one gallon per 20 linear feet of backrubber. Recharge as needed.
Ear Tags	Beta-cyfluthrin (Cylence Ultra)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Cypermethrin + Chlorpyrifos (Max-Con)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Endosulfan (Avenger)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Permethrin (Atroban Extra, GardStar Plus, Super Deckem II)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	Zeta-cypermethrin (PYthon, PYthon Magnum)		Follow label instructions regarding number of tags per head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
Pour-On	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Pour-On:</u> Pour correct dose along back and down face. Repeat pour-on treatments as needed, but not more than once every 14 days.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
CATTLE GRUBS			
Pour-On (cont.)	DORAMECTIN 0.5% Dectomax Pour-on	Ready-to-use	Apply 1 ml per 22 lb. body wt. along midline of back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age.
	EPRINOMECTIN 0.5% Eprinex Pour-on	Ready-to-use.	Apply 1 ml per 22 lb. body wt. along midline of the back between withers and tailback. Safe for all beef and dairy (including lactating) cattle. Applications of macrocyclic lactones will also control blood sucking lice (nymphs and adults). Lice eggs may hatch on untreated cattle may serve as source of reinfestation, requiring retreatment.
	IVERMECTIN 0.5% Ivomec Pour-on	Ready-to-use	Apply 1 ml per 22 lb body wt., along midline of the back between withers and tailhead. Safe for all beef cattle; cattle must not be treated within 48 days of slaughter for human consumption. Do not use in female dairy cattle of breeding age.
	MOXIDECTIN 0.5% Cydectin Pour-on	Ready-to-use	Pour weight-determined dose evenly along animal's back-line from withers to tailhead (basing dose on label weight table). No pre-slaughter or milk discard interval.
CATTLE LICE			
Sprays	COUMAPHOS Coumaphos (Co-Ral 6.15%)		Mix 2.5 fl. oz. per 4 gal. water and spray to complete wetting.
	Permethrin (5.7%) (Ectiban EC)	Mix 1 qt. in 25 gals. water	1 to 2 qts. of coarse spray per animal over whole body surface. Thoroughly wet animal.
	Tetrachlorvinphos (23.0 %) + dichlorvos (5.3%) (Ravap E.C.)	Dilute 2 oz. in 3 gal. Direct spray to cover thoroughly with up to ½ gal. per animal.	Repeat as necessary. No milk discard is required. Apply at least 20 minutes prior to milking, or spray after milking has been completed.
Dusts	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Using shaker can, apply no more than 1 oz. per animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times per year. Wait 10 days between applications. No milk withholding.
	Permethrin (0.25%) (Permethrin Fly & Louse Dust)	RTU	Using shaker can, apply no more than 2 oz. per animal over the head, neck, shoulders, back and tailhead. Repeat as necessary.
	ZETA-CYPE RMETHRIN PYthon Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.
Dust Bags (Self-Treatment)	Coumaphos (1%) (Co-Ral Livestock Dust, ProZap Zipcide Dust)	RTU	Place contents in dust bag and suspend in area frequented by cattle to force daily use. For lactating dairy cattle, bags may be suspended in the exit through which cattle leave the milking barn. Suspend so that the bottom of the bag will hang four to six inches below the topline of the cattle. No milk withholding.
	Permethrin (0.25%) (Permethrin Fly & Louse Dust)	RTU	Place contents in dust bag and suspend in area frequented by cattle to force daily use. For lactating dairy cattle, bags may be suspended in the exit through which cattle leave the milking barn. Suspend so that the bottom of the bag will hang four to six inches below the topline of the cattle. No milk withholding.
	ZETA-CYPERMETHRIN PYthon Dust (0.075% zetacypermethrin)	Ready-to-use	Apply with dust bag or shaker.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL (continued)

WAYS TO APPLY PESTICIDES	INSECTICIDE	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND RESTRICTIONS
CATTLE LICE (continued)			
Backrubbers and Facerubbers	Coumaphos (6.15%) (Co-Ral Fly and Tick Spray)	Mix 4 qts. in 13 gal. oil	Saturate the backrubber with mixture. Place in location to force daily use. Suspend at height to prevent straddling. No milk with holding.
	Tetrachlorvinphos (23.0 %) + dichlorvos (5.3%) (Ravap E.C.)	Mix 1 gal. in 25 gal. oil	Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour one gallon per 20 linear feet of backrubber. Recharge as needed.
Ear Tags	ENDOSULFAN Avenger	Ready-to-use	Follow label instructions regarding number of tags per head; remove when effectiveness diminished and at end of season.
Pour-On	DORAMECTIN 0.5% Dectomax Pour-on	Ready-to-use	Apply 1 ml per 22 lb. body wt. along midline of back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age. Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.
	EPRINOMECTIN 0.5% Eprinex Pour-on	Ready-to-use.	Apply 1 ml per 22 lb. body wt. along midline of the back between withers and tailback. Safe for all beef and dairy (including lactating) cattle. Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.
	IVERMECTIN 0.5% Ivomec Pour-on	Ready-to-use	Apply 1 ml per 22 lb body wt., along midline of the back between withers and tailhead. Cattle must not be treated within 48 days of slaughter for human consumption. Do not use in female dairy cattle of breeding age. Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.
	MOXIDECTIN 0.5% Cydectin Pour-on	Ready-to-use	Pour weight-determined dose evenly along animal's back-line from withers to tailhead (basing dose on label weight table). Provides 7 days of activity against horn flies. No pre-slaughter or milk discard interval. Lice eggs may hatch or untreated cattle may serve as source of reinfestation, requiring retreatment.
	PERMETHRIN Synergized Delice 1.0% solution PY, ME	Ready-to-use when purchased.	Apply 0.5 fl. oz. (15 cc) per 100 lbs. body weight of animal up to a maximum of 5 fl. oz. for any one animal. <u>Pour-On:</u> Pour correct dose along back and down face. Repeat pour-on treatments as needed, but not more than once every 14 days.
MITES (Chorioptic)			
Pour-On	DORAMECTIN 0.5% Dectomax Pour-on	Ready-to-use	Apply 1 ml per 22 lb. body wt. along midline of back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers to 20 months of age.
	EPRINOMECTIN 0.5% Eprinex Pour-on	Ready-to-use	Apply 1 ml per 22 lb. body wt. along midline of the back between withers and tailback. Safe for all beef and dairy (including lactating) cattle.
	IVERMECTIN 0.5% Ivomec Pour-on	Ready-to-use	Apply 1 ml per 22 lb body wt., along midline of the back between withers and tailhead. Safe for all beef cattle; cattle must not be treated within 48 days of slaughter for human consumption. Do not use in female dairy cattle of breeding age.
	MOXIDECTIN 0.5% Cydectin Pour-on	Ready-to-use	Pour weight-determined dose evenly along animal's back-line from withers to tailhead (basing dose on label weight table). No pre-slaughter or milk discard interval.

CATTLE EAR TAGS

TAG NAME	ACTIVE INGREDIENT	CHEMICAL CLASS	BEEF	LACTATING DAIRY
Atroban Extra	Permethrin	Pyrethroid	YES	YES
Avenger	Endosulfan	Cyclodiene	YES	YES
Co-Ral Plus	Diazinon + Coumaphos	Organophosphate	YES	NO
Corathon	Coumaphos+Diazinon	OP	YES	YES
Cylence Ultra	Beta-cyfluthrin	Pyrethroid	YES	YES
Diaphos P	Diazinon + Chlorpyrifos	Organophosphate	YES	NO
Dominator	Pirimiphos methyl	Organophosphate	YES	NO
Double Barrel	Lambdacyhalothrin + Pirimiphosmethyl	Pyrethroid + Organophosphate	YES	NO
GardStar Plus	Permethrin	Pyrethroid	YES	YES
Max-Con	Cypermethrin + Chlorpyrifos	Pyrethroid + Organophosphate	YES	YES
OPTimizer	Diazinon	Organophosphate	YES	NO
Patriot	Diazinon	Organophosphate	YES	NO
PYthon	Zeta-cypermethrin	Pyrethroid	YES	YES
PYthon Magnum	Zeta-cypermethrin	Pyrethroid	YES	YES
Saber Extra	Lambdacyhalothrin	Pyrethroid	YES	NO
Super Deckem II	Permethrin	Pyrethroid	YES	YES
Terminator II	Diazinon	OP	YES	NO
Warrior	Diazinon + Chlorpyrifos	Organophosphate	YES	NO
XP820	Abamectin	Macrocyclic lactone	YES	NO
X-Terminator	Diazinon	Organophosphate	YES	NO
ZetaGard	Zeta-cypermethrin	Pyrethroid	YES	YES

Ear tags are generally effective against horn flies; they aid in control of face flies, stable flies, house flies and ear ticks. Remove tags when control declines, at the end of fly season, or before slaughter.

SWINE — EXTERNAL PARASITE CONTROL¹

Nancy C. Hinkle, Veterinary Entomologist

HOG LICE CONTROL ¹						
INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS AND RESTRICTIONS
SPRAYS ^{4,5}						
Amitraz (Taktic) ME	12.5%	0.06%	Mix 1 qt. of 12.5% EC in 50 gals. of water or mix 1 fl. oz. EC in 2 gals. of water.	Apply a coarse spray to point of runoff. Pay strict attention to jowls, legs, inside of ears and the under-side of the body. Use 70-150 psi. Spray must wet skin until runoff. Piglets (weaners) can be dipped.	1	Remove feed from pen and cover drinking bowls. Remove and destroy bedding. Hose out feces and excess feed. Use Taktic solutions within 6 hours of mixing. Treat each animal thoroughly. Spray walls, floor and fittings in the pen. Repeat 7 to 10 days after the first treatment for mange mites and 10-14 days for lice. Do not treat animals more than 4 times per year.
Coumaphos (Co-Ral)	6.15%	0.06%	Mix 2 qt. per 50 gal. water (or 5 oz. Per 4 gal. water)	Wet to point of runoff. Treat no more than six times per year. Do not make applications less than 10 days apart.	0	Do not treat sick, convalescent or stressed animals. Do not spray animals for 10 days before or after shipping or weaning, or after exposure to contagious or infectious diseases. Do not spray in a confined, non-ventilated area. Do not apply in conjunction with oral drenches or other internal medications, or with natural or synthetic pyrethroids or their synergists, or with other organophosphates or cholinesterase inhibiting drugs, pesticides or chemicals.
Emulsifiable Livestock Insecticide (Restricted Use)	11.6%	0.06%	Mix 1 qt. per 50 gal. water (or 2.5 oz. per 4 gal. water)			
GardStar 40% EC (40% permethrin)			60-118 ml to 25 gals. water (treats 50-100).		5	Thoroughly wet and dip animals including ears. Allow 5 days between last treatment and slaughter. For Mange, spray pen floors, sides and bedding. Repeat at 14 days.
Permethrin SY, ME	42.5% EC	0.108%	Mix 8 ozs. of 42.5% EC in 25 gals. of water.	Spray animals thoroughly (approximately 1 pint/animal)	5	Spray entire animal thoroughly. Pay special attention to ears and hard to spray areas. Make a second application 14 days later if needed.

SWINE - EXTERNAL PARASITE CONTROL¹ (continued)

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS AND RESTRICTIONS
Permethrin (Atroban, Ectiban, Gardstar, Permectrin) SP, ME	5.7% EC 10% EC 11% EC 40% EC 42.5% EC	0.025-0.054%	Mix 1 pint of 11% EC OR mix 1 qt. of 5.7% EC OR mix 1 cup 10% EC OR mix 60-118 ml of 40% EC OR mix 4 ozs. of 42.5% EC in 25 gals. of water.	Wet thoroughly. (Approximately 1 pint per animal)	5	Spray entire animal thoroughly. Pay special attention to ears and hard-to-spray areas. Make a second application 14 days later if needed.
Swine Guard	10%	Ready-to-use	No mixing	3 cc/100 lb.	5	Apply across back of head and ears, then apply down midline of neck over shoulders.
Phosmet (Del-Phos, Pro-late/Lintox-HD) OP, ME	11.75% EC	0.06%	Mix 1 qt. of 11.6% EC in 25 gals. of water.	Wet to point of runoff. Wet thoroughly to skin.	1	Single application should be effective. Should a second application be needed it may be made 14 days following the first treatment. Do not treat suckling pigs.
Stirofos or tetrachlorvinphos (Rabon) OP, ME	50% WP	0.5%	Mix 4 lbs. of 50% WP in 50 gals. of water.	1 to 2 qts. Wet animal thoroughly.	0	Apply as a coarse spray. Repeat in 2 weeks, if needed.
LARVICIDE SPRAYS						
Cyromazine (Neporex 2SG)			Mix 1 lb. per gal. of water			Spray manure where fly larvae are found.
Diflubenzuron (Dimilin 2L)			Mix 5 fl. oz. in 10 gal. water			Apply as a directed spray in spot treatments at a volume of 1 quart of spray solution to 10 sq. ft. of surface area where maggots are developing.
Pyriproxyfen (Archer Nylar Insect Growth Regulator 1.3%) (NyGuard IGR 10%) (Pyri-Shield EC 1.3%)			mix 1 fl. oz. in 1 gal. water mix 4 ml in sufficient water to cover 1,500 sq. ft. mix 1 fl. oz. in 1 gal. water			Wet surfaces where larvae are found; may repeat 14 days afterward. Apply to maggot habitats at rate of 4 ml per 1,500 sq. ft. Apply to 1,500 sq. ft. of surface area.
DIPS⁵						
Permethrin (Gardstar) SY, ME	40% EC	0.025-0.05%	Mix 60-118 ml in 25 gals. of water.	Immerse entire animal.	5	Dip animals including ears. Spray pen floors, sides and bedding. Repeat at 14 days.

SWINE - EXTERNAL PARASITE CONTROL¹ (continued)

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS AND RESTRICTIONS
DUSTS⁵						
Permethrin (Ectiban, Insectrin) PY, ME	0.25% D	Ready-to-use	No mixing required.	Dust thoroughly.	5	Apply up to 1 oz. (2 1/2 Tbs.) per animal. Pay particular attention to ears and other hard-to-reach areas. Re-treat 14 days later if needed.
Coumaphos (Co-Ral 11.6% coumaphos)						
Phosmet (Prostate) OP, ME	1% D	Ready-to-use	No mixing required	Dust thoroughly. Apply 1/2 to 1 ounce of dust per animal to backline and lightly rub in. Repeat in 10 to 14 days or as needed.	1	Dust animals thoroughly. See restrictions under Co-Ral above.
INJECTABLE⁵						
Doramectin injectable (Decto Max)	1%		Ready-to-use	Inject 1 ml/75 lbs.	24	Intramuscular injection.
Ivermectin (Ivomec) ME	1%	Ready-to-use	No mixing required	1 ml per 75 lbs. body weight. (300 mcg of ivermectin per kilogram of body weight)	18	Inject subcutaneously. Follow label instructions.
CONTROL OF HOG MANGE MITES						
POUR-ON⁵						
Permethrin SP, ME (10% pour-on)	To control mange mites, lice and fleas. Apply 3 ml/100 lbs. body weight.					
CONTROL OF BLOWFLIES, MOSQUITOES, FLEAS AND TICKS^{4,5}						
Permethrin (Permethrin II) SP, ME	10% EC	0.025%	Mix 1 qt. of 10% EC in 25 gals. of water.	Spray, paint or dip to apply 1 pint per hog, especially around ears.	5	
Phosmet (Del-Phos, Proiate/Lintox-HD) OP, ME	Use according to label.					

SWINE - EXTERNAL PARASITE CONTROL¹ (continued)

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS AND RESTRICTIONS
CONTROL OF TICKS^{4,5}						
Coumaphos (Co-Ral)	6.15%	0.06%	Mix 2 qt. per 50 gal. water (or 5 oz. Per 4 gal. water)	Wet to point of run-off. Treat no more than six times per year. Do not make applications less than 10 days apart.	0	Do not treat sick, convalescent or stressed animals. Do not spray animals for 10 days before or after shipping or weaning, or after exposure to contagious or infectious diseases. Do not spray in a confined, non-ventilated area. Do not apply in conjunction with oral drenches or other internal medications, or with natural or synthetic pyrethroids or their synergists, or with other organophosphates or cholinesterase inhibiting drugs, pesticides or chemicals.
Emulsifiable Livestock Insecticide	11.6%	0.06%	Mix 1 qt. per 50 gal. water (or 2.5 oz. per 4 gal. water)			
Coumaphos (Co-Ral) OP, ME	25% WP	0.24%	Mix 8 lbs. of 25% WP in 100 gals. of water.	Thoroughly treat wound and surrounding area with light but thorough coverage.	0	Application instructions and restrictions same as for Co-Ral above. Repeat as needed but not more often than every 14 days.

¹ Insecticides recommended for hog lice control will aid in the control of ticks, mange mites and flies on swine.

² When applying insecticides, do not contaminate feed or drinking water.

³ Do not treat animals less than 3 months old with insecticides unless specifically allowed on the insecticide label.

⁴ Limit spray applications in winter to warm, calm days when temperatures are above freezing.

⁵ Do not treat sick, convalescent or stressed animals. OP - organophosphate, SP - pyrethroids, NP - natural pyrethrins, CH- organochlorine, CR - carbamate, LE - less effective or effectiveness not determined, ME - most effective.

HORSES — EXTERNAL PARASITE CONTROL

Nancy C. Hinkle, Veterinary Entomologist

Insecticide preparations that contain a combination of ingredients are available for use on horses. Included in the insecticide preparation may be insecticides, synergists, repellants and carriers.

EXTERNAL PARASITES	INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND USE RESTRICTIONS
Flies: biting midges, black flies, deer flies, face flies, gnats, horn flies, horse flies, lice, mosquitoes, punkies, ticks, wound-infesting larvae (screw- worms)	Coumaphos (Co-Ral 11.6%)	Fly control: Mix 2.5 fl. oz. in 4 gal. water and spray to complete wetting.	Do not use on horses intended for slaughter.
	cypermethrin 0.15% (Bite Free, Tri-Tec 14) SP, ME	Fly control: Ready-to-use.	Mist spray or wipe-on: Apply mist spray to horses as needed every 5 to 14 days. Not for use on horses intended for human consumption.
	permethrin 5.7% EC (Insectrin) SP, ME	Fly, mange, tick and lice control: Mix 1 pt. of 5.7 % EC in 12.5 gals. of water Lice control: Mix 1 pt. of 5.7% EC in 25 gals. of water Fly and ear tick control: Mix 1 pt. of 5.7% EC in 1 .25 gals. of water	Spray 1 to 2 qts. per animal over whole body surface. For mange, lice, and scabies control, thoroughly soak animal and apply a second treatment 14 days later. No waiting period between application and slaughter. Spray until animal is thoroughly treated. A second application is recommended 14 days later. No waiting period between application and slaughter. Spray mist: Apply 1 to 2 ozs. per animal. Spot treat back, face, legs and ears. Do not use on horses intended for human consumption
	permethrin 10.0% to 11.0% EC (Atroban, Permethrin II) SP, ME	Fly and lice control: Mix 1 pt. of EC in 25 or 50 gals. water (1 oz. in 6 qts. of water).	Spray: Use high concentrations for stable flies and face flies. Apply directly to animals at 1 qt. to 2 qts. per animal. Light rates are for horn fly control only. Repeat as needed but not more often than once every 2 weeks. Do not contaminate feed or water.
	permethrin 0.4% to 1.0% ready-to-use spray or wipe-on (Buzz Off II, Hard Hitter) SP, ME	Fly, lice and tick control: Ready-to-use when purchased. No mixing required.	Spray or wipe-on: Apply as needed. Do not soak hair or skin. Pay particular attention to legs, shoulders and neck. Do not get in animal's eyes. Do not treat horses intended for human consumption.
	permethrin 1.84% Pour-on (Poridon Insecticide Pour-on) SP, LE	Aids in fly control: Ready-to-use when purchased. No mixing required	Pour-on: Apply 2 to 4 ozs. per animal. Start by pouring a line from the poll, along the neck, and continue posteriorly down the back parallel with the spinal column or apply as a wipe-on.
	permethrin 25 % WP (Permethrin) SP, ME	Fly, lice, tick & mite control: Mix 6 ozs. (21 level Tbs.) of 25% WP in 19 gals. of water.	Spray: Spray to run off or use 1 gal. spray mix per head. Do not spray feed or water.
	permethrin 40% EC (Gardstar) SP, ME	Fly, mite, tick and lice control: Mix 7.5 ml in 1 pt. of water (0.64%)	Spray: Apply as a low pressure spray. Apply 1-2 fl. oz. (30-60 ml) spray per animal. Spot treat back, face, legs, tail and ears.
		Fly, mite, tick and lice control: Mix 5-12.5 ml in 2 gals. of water (0.026-0.067%)	Dip wash: Thoroughly wet animal to skin with sponge or rag. Let drip dry. Do not wet the animal's face.
	Brute 10% permethrin		Pour-on or wipe: Apply 3-6 ml per 200 lb. body weight, up to 30 ml max. Do not treat foals under 12 weeks of age.
	Permethrin (5.0%) Ultra Boss Pour-on		RTU; apply 3 ml per 100 lbs body weight of animal up to a maximum of 30 ml per animal. Pour along back and down face. Do not saddle animal for 6 hours after application.
	Permethrin (5%) + Diflubenzuron (5%) (Clean-up Pour-on Insecticide with IGR)		Ready-to-use for fly and lice control. Follow label directions as wipe-on or undiluted RTU spray.
	pyrethrins + synergist NP, LE	Fly control: 0.05% to 0.2% plus synergist mist spray. Ready-to-use. No mixing required.	Spray or wipe-on: Apply mist spray or wipe-on to wet the ends of the hair but not enough to wet the hide (1 to 4 fl. ozs. per animal). Direct application will kill ticks. Repeat as needed.
pyrethrins 0.4% + synergist EC (Repel- X) NP, LE	Fly and tick control: Mix 1 pt. of 0.4% EC in enough water to make 1 gal. of mixture. For horse flies, deer flies (Tabanids), stable flies and ticks, mix 1 pt. of 0.4% EC in 2 qts. of water.	Spray or sponge-on: Apply heavily to wet animal every 3 to 4 days or as needed to control flies and ticks. Do not use on animals intended for human consumption. Avoid getting into animal's eyes.	

HORSES - EXTERNAL PARASITE CONTROL (continued)

EXTERNAL PARASITES	INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND USE RESTRICTIONS
Flies (cont.)	pyrethrins 0.36% + synergist spray (Swat) NP, LE	Fly, lice, tick and flea control: Ready-to-use when purchased. No mixing required.	Spray or wipe-on: Apply to wet hair but not skin of animal. Remove excess dirt and dust before treating. Repeat as needed. Do not treat horses intended for human consumption
	pyrethrins 0.05% + synergist 0.5% + permethrin 0.1% to 0.5% ready-to-use spray (Repel-X) NP + SP, LE		
	pyrethrins 0.1% + synergist spray and Wipe-on (Wipe II) NP, LE	Fly, gnat and mosquito control: Ready-to-use when purchased. No mixing required.	Spray or wipe-on: Apply to wet hair but not the skin. Remove excess dirt and dust before treating. Repeat as needed.
	pyrethrins 0.2% + synergist wipe-on (Wipe) NP, LE	Fly, gnat and mosquito control: Ready-to-use when purchased. No mixing required.	Wipe-on: Apply as a wipe-on to wet hair but not the skin. Remove excess dust and dirt before treating. Repeat as needed.
	pyrethrins 0.2% + synergist ointment (Swat) NP, LE	Fly repellent/control: Ready-to-use when purchased. No mixing required.	Ointment: To treat superficial wounds, abrasions, sores and scratches, apply enough ointment to cover the wound. Apply directly to the wound and use daily.
	resmethrin 0.5% + butoxypolypropylene glycol 10.0 % (Super Shield II) SP + R, LE	Fly control: Ready-to-use. No mixing required.	Spray or wipe-on: Apply to wet hair but not the skin of animal. For maximum protection apply 4 to 6 ozs. to animal and repeat every 2 to 3 days if needed. Do not use on horses intended for slaughter.
	resmethrin 0.554% + butoxypolypropylene glycol 11.0% (Fly Repellent) SP + R, LE	Fly and tick control: Apply by spray or wipe-on. Mix 4 ozs. of concentrate in 28 ozs. of water to make one quart.	As a wipe-on: Dampen a soft cloth and rub over hair after cleaning debris from animal. Apply spray mist to horse's coat. Pay particular attention to legs, shoulders, and neck while avoiding eyes. Do not use on horses intended for slaughter.
zetacypermethrin PYthon Dust (0.075%)	Ready-to-use	Can be applied by shaker can, dusting glove, or mechanical dust applicator. Apply up to 2 oz. (6 tablespoons) evenly into hair. Repeat as needed, but not more than once every 3 days.	
Flies: face flies, horn flies	tetrachlorvinphos 0.475% to 2.468% Horse Feed Supplement (Rabon, Equitrol, Vita-Plus with Equitrol, Drive with Equitrol) OP, LE	Manure breeding flies: Ready-to-use feed supplement. Each horse must consume 70 mg. tetrachlorvinphos per 100 lbs. of body weight daily.	Feed additive: Follow feeding instructions on the label. Each horse must consume sufficient quantities if adequate control is to be achieved. Do not feed to horses intended for slaughter. This product must be supplemented with other fly control products.
	diflubenzuron 0.24% (SimpliFly) 6.8 mg diflubenzuron per 100 lb. body weight daily.	Manure breeding flies: Ready to use feed supplement.	Feed additive: Follow feeding instructions on the label. Each horse must consume sufficient quantities if adequate control is to be achieved. Do not feed to horses intended for slaughter. This product must be supplemented with other fly control products.
	Diflubenzuron (Dimilin 2L)	Mix 5 fl. oz. in 10 gal. water	Apply as a directed spray in spot treatments at a volume of 1 quart of spray solution to 10 sq. ft. of surface area where maggots are developing.
	cyromazine (2.12%) 1 scoop (300 mg) per horse per day (Solitude IGR)		Feed additive: Follow feeding instructions on the label. Each horse must consume sufficient quantities if adequate control is to be achieved. Do not feed to horses intended for slaughter.
	Cyromazine (Neporex 2SG)	Ready-to-use granular	Scatter 1 lb. per 200 sq. ft. to wet areas where maggots develop.
	Pyriproxyfen (Archer Nylar Insect Growth Regulator 1.3%) (NyGuard IGR 10%)	mix 1 fl. oz. in 1 gal. water	Wet surfaces where larvae are found; may repeat 14 days afterward.
	(Pyri-Shield EC 1.3%)	mix 4 ml in sufficient water to cover 1,500 sq. ft. mix 1 fl. oz. in 1 gal. water	Apply to maggot habitats at rate of 4 ml per 1,500 sq. ft. Apply to 1,500 sq. ft. of surface area.

HORSES - EXTERNAL PARASITE CONTROL (continued)

EXTERNAL PARASITES	INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND USE RESTRICTIONS
Mange	permethrin 5.7% EC (Purina Hard Hitter, Stable Spray, Insectrin) SP, LE	Fly, mange, tick and lice control: Mix 1 pt. of 5.7% EC in 12.5 gals. of water.	Spray 1 to 2 qts. per animal over whole body surface. For mange, lice and scabies control, thoroughly soak animal and apply a second treatment 14 days later. No waiting period between application and slaughter.
Bots	ivermectin (Eqvalan, Zimectrin) ME	1.87% oral paste. Ready-to-use when purchased. No mixing required.	Follow directions on pre-filled syringe. Do not treat horses less than 4 months of age. Do not treat horses intended for food purposes.
	moxidectin 2% ML	Ready-to-use	Follow directions on pre-filled syringe. Do not treat horses less than 6 months of age or those intended for food purposes.

¹ OP = organophosphate; SP = synthetic pyrethroid; CH = chlorinated hydrocarbons; NP = natural pyrethrin; CR = carbamate; LE = Less effective or effectiveness not determined; ME = more effective; R = repellent; ML = Macrocytic lactone

FLY CONTROL IN HORSE FACILITIES — RESIDUAL (CONTACT) SPRAYS¹ AND BAITS²

INSECTICIDE	SPRAY CONCENTRATION/ MIXING INSTRUCTION	METHODS OF APPLICATION AND SAFETY REGULATIONS
cyfluthrin (Countdown) 24.3% EC, 20.0% WP SP, ME	Mix 9.5 grams or 19 gram s of 20.0% WP OR mix 16 ml of 24.3% EC in sufficient water to cover 1000 ft. ²	Direct as a coarse, wetting spray to surfaces in horse operations where flies congregate to include ceilings, walls, fences, posts and manure. Apply to point of runoff (1 gal. per 500 to 1000 ft. ²). Do not contaminate feed or drinking water. Do not apply as a space spray. Do not apply directly to animals. Repeat as needed. For baited solutions add 1 lb. of sugar per gal. of spray. Remove animals before spraying and return them when spray dries.
beta-cyfluthrin (Tempo) 11.8% SC, 24.3% EC, 20% WP, SPY, HE	Mix 8 to 16 milliliters of 11.8% Tempo SC Ultra Premise Spray in sufficient water to cover 1,000 sq. ft.	
Deltamethrin (0.02%) Annihilator Insecticide Premise Spray	Ready-to-use	Apply thoroughly to surfaces until wet. Repeat as necessary, but not more than once per week. Do not spray animals or humans, or apply to animal feed or watering equipment.
Gamma-cyhalothrin (5.9%) (StandGuard)	Mix 0.16 fl. oz. (5 ml) per gallon of water.	Spray 1 gallon of diluted spray to treat 500 to 1,000 sq. ft. of fly resting surfaces.
Imidacloprid 10% (QuickBait Spot Spray.)	Mixed at the rate of 1 lb./gallon of water to treat 1,000 sq. ft. of fly resting areas.	Product can be sprayed on virtually any surface (out of reach of animals) where flies rest or congregate, indoors or outdoors. Examples include posts, beams, ceilings, railings, door frames, windows, and stable walls. Residual activity of up to 6 weeks indoors and 2 weeks outdoors.
Lambda-cyhalothrin (9.7%) (Grenade ER Insecticide) (Demand CS)	Mix 0.2 to 0.4 oz. (6 to 12 ml) per gallon water.	Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present
permethrin (Atroban, Ectiban, Insectrin, Overkill, Permethrin) 5.7% EC, 11% EC or 25% WP, SP, ME	5.7% EC is ready-to-use as a mist spray OR mix 1 qt. 5.7% EC in 12.5 gals. of water OR mix 6 ozs. 25% WP in 11 gals. of water OR mix 1 pt. 11% EC in 10 gals. of water.	Apply as a residual surface spray to fly resting areas. Do not spray manure or litter. Do not apply directly to horses. Apply 5.7% EC undiluted at 4 ozs. per 1,000 sq. ft. of surface area or apply diluted WP and EC mixtures at 1 gal. per 750 sq. ft. Do not apply more often than once every 2 weeks.
tetrachlorvinphos, stirofos (Rabon) 2 lbs. a.i. per gal. (23%) + dichlorvos (Vapona) 0.5 lb. a.i. per gal. (Ravap) (5.7%) EC, OP, ME	1.25% to 2.5% spray. Mix 1 gal. or 2 gals. EC in 25 gals. of water	Direct a coarse, wetting spray to surfaces when flies congregate, to include ceilings, walls, fences, posts, and floor. Apply to point of runoff (1 gal. per 500 to 1,000 sq. ft.) Do not contaminate feed or drinking water. Do not apply as a space spray. Repeat as permitted by label. Do not apply directly to animals. Remove animals before spraying and return them after spray dries.

¹ Residual sprays can be applied as spot sprays to control maggots in manure accumulations.

² ME=more effective, LE=less effective or effectiveness not established, OP=organophosphate, CR=carbamate, SP=synthetic pyrethroid, NP= natural pyrethrum, CH=organochlorine, chlorinated hydrocarbon

FLY CONTROL IN HORSE FACILITIES - RESIDUAL (CONTACT) SPRAYS¹ AND BAITS² (continued)

INSECTICIDE	SPRAY CONCENTRATION/ MIXING INSTRUCTION	METHODS OF APPLICATION AND SAFETY REGULATIONS
Space sprays²; fogs or mists		
Esfenvalerate (35%) Endure 35WP	Mix one or two scoops with one gallon of water and spray 1 gal/1,000 sq. ft.	Do not apply when feed is present.
permethrin 5.7% EC, SP, ME	Mix 1 pt. 5.7% EC in 6.25 gals. diesel or mineral oil	Apply fog at 4 fl. oz. per 1,000 cu. ft. of air space in confined facility. Repeat as needed.
Permethrin (0.5%) and Tetramethrin (0.2%) Indoor Fogger	Ready-to-use	Remove animals from area. Turn off all ignition sources (flames, pilot lights, etc.). One fogger treats 6,000 cu. ft.
pyrethrin (0.1 to 0.75%) + synergist (0.5 to 3.75%) NP, ME	Ready-to-use	Apply fogs or spray mists at 1 fl. oz. per 1,000 cu. ft. as fine atomized spray. Repeat as needed.
Spinosad (44.2%) Elector PSP	Mix 2 fl. oz. (60 ml) in 10 gallons of water to treat 5,000 to 10,000 sq. ft. Use sufficient water in a directed spray to contact flies and their resting surfaces.	
Baits		
imidacloprid 0.5% QuickBait	ready-to-use	Scatter bait directly from container onto dry level surfaces so individual granules lie near each other without forming piles. Or place in any commercial bait station. Or mix 1.5 oz. bait with 1 fl. oz. warm water and stir to create a paste; apply with brush to surfaces where flies rest. Bait should be inaccessible to food-producing animals, children, and pets.
QuickBait Fly Strip	ready-to-use	Use in buildings where animals are kept and where flies are a nuisance.
methomyl 1.0% Fly Bait (Blue Streak, Golden Malrin) CR, ME	ready-to-use	Scatter on floors, walkways, etc. throughout operation but away from animals. Apply lightly (about 1/4 lb. per 500 to 1,000 sq. ft.) until flies are suppressed. Wear rubber gloves when applying baits. Do not allow workers on treated floors without shoes. Do not allow animals to come in contact with baits.
Nithiazine (1%) QuickStrike Fly Abatement Strip	ready-to-use	Place in areas where flies congregate and feed. Do not expose to sunlight or moisture. Follow label directions.
spinosyn (0.5% spinosad) Elector Bait	ready-to-use	Follow label directions for scatter bait, station/tray bait, or paint/spray bait use. Locate where inaccessible to animals and children.

¹ ME = more effective, LE = less effective or effectiveness not established, OP = organophosphate, CR = carbamate, SP = synthetic pyrethroid, NP = natural pyrethrum, C H = organochlorine, chlorinated hydrocarbon

² Space sprays are designed to kill adult flies that are present when the fog or mist is applied. There is little or no residual insecticide deposit remaining after the application unless synthetic pyrethroids are applied. Fogs or mists must come in contact with the fly. These materials are especially effective in enclosed areas where air movement is minimal. Heavy mists can offer some adult house fly kill in open areas.

SHEEP AND GOATS — EXTERNAL PARASITE CONTROL¹

Nancy C. Hinkle, Veterinary Entomologist

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER AND METHOD OF APPLICATION	MIXING INSTRUCTIONS / AMOUNT INSECTICIDE MIXTURE TO ADD TO WATER	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION INSTRUCTIONS AND RESTRICTION
NASAL BOTS						
Ivomec Sheep Drench	0.08% Ivermectin			Administer orally at a dose of 3 ml per 26 lbs. body wt. Delivers 0.2 mg ivermectin per 1 kg body wt.		For nasal bots: Ready-to-use solution is specifically formulated for use in sheep only. May cause severe reactions in other animals. Do not treat sheep within 11 days of slaughter.
LICE, KEDS, TICKS, HORN FLIES, HOUSE FLIES AND STABLE FLIES						
Permethrin Prozap Pour-on Xtra	1.0% permethrin					Pour along back, applying ¼ fl. oz. per 50 lbs. body weight of animal, up to maximum of 3 fl. oz. per animal. For optimal control, all animals in flock should be treated after shearing.
Permethrin* (Gardstar) PY	40% EC	0.013-0.05% high pressure spray	Mix 30 - 118 ml in 25 gals. of water.	Apply 1 to 2 qts. of coarse spray per animal over the entire body.	0	Repeat application in 10-14 days for mites and lice.
		0.5% low pressure spray (hand pump sprayer)	Mix 118 ml in 2.5 gals. of water.	Apply 1.5 fl. oz. of spray to midline from face to tailhead to point of runoff, but do not let runoff occur.	0	Repeat application in 10-14 days for mites and lice.
Permethrin* (Atroban 11%, Permethrin II 10%) PY	10% EC 11% EC	0.05% spray	Mix 1 pt. of 11% EC in 25 gals. of water OR mix 8 ozs. of 10% EC in 25 gals. of water	Apply 1 to 2 qts. of coarse spray per animal to thoroughly wet the animal.	0	Repeat the application in 10-14 days for mites.
Permethrin* (Atroban 42.5% EC) PY	42.5% EC	0.054% spray	Mix 1 pt. of 42.5% EC in 100 gals. of water.	Apply sufficient spray (Approximately 2 qts./animal) to thoroughly wet animals to ensure complete coverage.	0	Repeat the application as needed but not more often than once every two weeks.

SHEEP AND GOATS - EXTERNAL PARASITE CONTROL¹

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER AND METHOD OF APPLICATION	MIXING INSTRUCTIONS / AMOUNT INSECTICIDE MIXTURE TO ADD TO WATER	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION INSTRUCTIONS AND RESTRICTION
Permethrin* (Atroban Delice, Permectrin, Synergized Delice) PY	1% Solution	No mixing required. Ready-to-use when purchased.	Pour along back. Apply 0.25 fl. oz. (7.5 cc) per 50 lbs. body weight of animal, up to a maximum of 3 fl. oz. for any one animal.		0	Do not treat goats. For optimum control all animals in the flock should be treated after shearing. Repeat treatment as needed, but not more often than once every 14 days. For optimum control, two treatments at a 14 day interval are recommended.
Permethrin* (Gardstar) PY						
Permethrin* (Boss) PY	5.0% Pour-On Solution	No mixing required. Ready-to-use when purchased. Pour-On	Pour-On. No mixing required.	Pour along the back. Apply 1.5 ml per 50 lbs. of body weight of animal up to a maximum of 18 ml for any one animal.	0	Repeat treatment as needed, but not more often than once every two (2) weeks. For optimum lice control, two (2) treatments at 14 day intervals are recommended.
Permethrin (5.0%)	Ultra Boss Pour-on RTU			Apply 1.5 ml per 50 lbs body weight of animal up to a maximum of 18 ml per animal. Pour along back and down face.		
Zetacypermethrin PYthon Dust (0.075% zetacypemethrin)				Apply up to 2 oz. (6 tablespoons) of dust per animal.		For control of keds, lice, ticks and flies. Repeat as necessary, but not more often than once in 3 days.

¹ Do not treat sick, convalescent or stressed animals. Do not spray in a confined, non-ventilated area.

* Do not apply to milk goats.

OP - organophosphate, PY - pyrethroid.

POULTRY – FLY CONTROL

Nancy C. Hinkle, Veterinary Entomologist

IMPORTANT: Effective, economical fly control depends on producer management. Check fly-breeding areas (manure, around feed bins, etc.) weekly and maintain an integrated pest management program (IPM) to ensure long term fly control.

INSECTICIDE	SPRAY CONCENTRATIONS AND MIXING INSTRUCTIONS	APPLICATION METHODS AND SAFETY RESTRICTIONS ¹
Residual and Bait Sprays		
Residual and bait sprays are used when a residual insecticide deposit is needed for adult fly control. Apply to surfaces in poultry operations where flies rest and feed.		
NOTE: Use of residual sprays promotes insecticide resistance. Use of synthetic pyrethroid (SP) insecticides virtually eliminates the implementation of a dump fly (<i>Hydrotaea aeneascens</i>) biological control program.		
Esfenvalerate (35%)	Apply according to label directions.	Do not apply when feed is present.
Permethrin (Atroban, Ectiban, Insectrin, Permectrin) 5.7% EC, 10% EC or 25% WP, SP, LE	5.7% EC is ready-to-use as a mist spray OR mix 1 qt. 5.7% EC in 12 1/2 gals. of water OR mix 6 ozs. 25% WP in 11 gals. of water OR mix 1 qt. 10% EC in 25 gals. of water.	Apply as a residual surface spray to fly resting areas (walls, ceilings, etc.). Do not spray manure or litter. Do not apply directly to poultry. Do not apply in egg storage areas. Apply 5.7% EC undiluted at 4 ozs. per 1000 sq.ft. of surface area or apply diluted WP and EC mixtures at 1 gal./750 sq. ft. Don't apply more than once every 2 weeks.
beta-cyfluthrin (Tempo) 11.8% SC, 24.3% EC, 20% WP, SPY, HE	Mix 8 to 16 milliliters of 11.8% Tempo SC Ultra Premise Spray in sufficient water to cover 1,000 sq. ft.	
Bifenthrin (ActiShield)	Mix 0.33-1 oz with 1 gal water; apply per 1,000 sq ft	For adult fly control in and around animal facilities, spray application should target areas where flies will rest.
Chlorpyrifos (Durashield, Duratrol)	Restricted use pesticide for use by certified applicators	Apply according to label directions to adult fly resting sites
Cyfluthrin (Optashield CS)	Mix 1-2 fl. oz. with 1 gal. water	Apply 1 gal. per 1,000 sq. ft.
Dichlorvos (Vapona)	Ready to use	Apply as coarse spray, 1 pint per 1,000 sq. ft. of surface.
Gamma-cyhalothrin (5.9%) (StandGuard)	Mix 0.16 fl. oz. (5 ml) per gallon of water.	Spray 1 gallon of diluted spray to treat 500 to 1,000 sq. ft. of fly resting surfaces.
Imidacloprid 10% (QuickBayt Spot Spray.)	Mix at the rate of 1 lb./gallon of water to treat 1,000 sq. ft. of fly resting areas.	Product can be sprayed on virtually any surface (out of reach of animals) where flies rest or congregate, indoors or outdoors. Examples include posts, beams, ceilings, railings, door frames, windows, and walls. Residual activity of up to 6 weeks indoors and 2 weeks outdoors.
Lambdacyhalothrin (9.7%) (Grenade ER Insecticide) (Demand CS)	Mix 0.2 to 0.4 oz. (6 to 12 ml) per gallon water.	Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present
Ravap (Rabon 2 lbs., a.i. per gal. (23%) and Vapona 0.5 lb., a.i. per gal. (5.7%) EC, OP, LE	1.0% spray. Mix 1 gal. EC in 25 gals. of water (12 Tbs./gal.)	Direct spray to inside and outside surfaces of poultry buildings where flies congregate and feed to include floors, manure, walls, ceilings, grass, etc. Apply thoroughly to point of runoff (about 1 gal. per 500 to 1,000 sq. ft.). To make bait spray, add 1 cup sugar or syrup per gal. of spray. Do not contaminate eggs, feed or water. Keep spray away from birds.
Spinosad (Elector 2.46% spinosyn)	Dilute 10 oz. in 5 gal. water to give 0.04% spinosad.	Remove all animals from facility. Spray fly-resting surfaces to point of runoff, using approx. 1 gal. per 500 to 1,000 sq. ft. Repeat as needed, but not more often than once per week. Spray in early morning when flies are resting. Do not use in poultry facilities when animals are present; allow surfaces to dry completely before readmitting animals.

POULTRY - FLY CONTROL (continued)

INSECTICIDE	SPRAY CONCENTRATIONS AND MIXING INSTRUCTIONS	APPLICATION METHODS AND SAFETY RESTRICTIONS ¹
Residual and Bait Sprays (continued)		
Spinosad (Elector PSP 44.2% spinosyn)	Dilute according to label chart.	Spray fly-resting surfaces. Do not apply where birds are present. Follow label directions.
Spinosad (44.2%) Elector PSP	Mix 2 fl. oz. (60 ml) in 10 gallons of water to treat 5,000 to 10,000 sq. ft.	Use sufficient water in a directed spray to contact flies and their resting surfaces.
Tetrachlorvinphos (Rabon 50 WP)	mix 0.5 lb. in 1.5 gal. water	Spray 1 gal. per 500 sq. ft.
Tetrachlorvinphos + vapona (Ravap EC)	mix 5 oz. per gal. water	apply 1 gal. spray per 500 to 1,000 sq. ft., treating fly resting sites
Contact Sprays		
These sprays are also called space sprays and are only effective for very short periods. They kill flies directly contacted by the spray. Several types of mist, aerosol and ULV (ultra-low volume) equipment are sold for applying these sprays. Be sure that insecticides bear full label instructions for use in poultry houses to avoid violation of Federal and State laws.		
Dichlorvos (Vapona)	Ready-to-use	Remove animals before fogging; dispense 1 pint per 8,000 cubic ft.
Pyrethrins (Clear Zone)	Ready-to-use	Apply 1-3 sec per 1,000 cu. ft.
Pyrethrins (0.3 - 5.0 %) plus Piperonyl Butoxide (1.5 - 25%) NP, ME	Ready-to-use, dilute oil sprays. Aerosols, ULV concentrates, and concentrates for dilution are available.	Apply fog or mist sprays when adult flies are present to obtain temporary adult fly suppression. Advantage is safety when used around animals and food products. Pyrethrin knockdown sprays are essential for emergency fly control. Aerosol, dilute mist or ULV cold fog equipment should be available for use when needed.
Vapona or DDVP 1% (dichlorvos)	RTU	Apply as a light mist spray when adult flies are present. Direct space spray throughout fly infested area. Do not apply directly to birds. Do not contaminate eggs, feed or water.
Larvicide (Maggot) Sprays and Feed Through Larvicides		
Another way to control flies is to destroy the immature fly (maggot). Heavy use of a given insecticide could result in flies developing resistance to the insecticide. To kill adult flies, use fly traps and apply baits, residual sprays, bait sprays and contact sprays either alone or in combination.		
<i>Beauveria bassiana</i> (balEence Biological Fly Spray)	15 oz. container diluted in 6 to 8 gal. water treats up to 50,000 sq. ft.	Apply spray to manure. Repeat treatment as recommended on label.
Cyromazine (Larvadex), 1% Premix, HE	5 parts per million in total diet of commercial layers or hatching egg layers. Mix 1 lb. of 1.0% premix per 2000 lbs. of feed.	Feed treated feed as daily ration as needed to control house flies. Treated feed must not be fed to layers for a minimum of 3 days (72 hours) before slaughter for food.
Cyromazine (1%) (Flyzine 1% Premix)		Blend into poultry ration for layer and breeder operations at the rate of 1 pound per ton of feed.
Cyromazine (2%) (Neporex 2SG)	RTU	Scatter directly and evenly on wet fly larval development sites (manure). Wear gloves. To spray, mix 1 pound in one gallon of water and spray 200 sq. ft. Do not apply directly to birds or feed. Do not use in conjunction with other cyromazine products.
Cyromazine (Larvadex 2SL)	Mix 32 fl. oz. per 5 gal. water	Apply 1 gal. per 100 sq. ft. of maggot breeding area.
Diflubenzuron (Dimilin 2L)	Mix 5 fl. oz. in 10 gal. water	Apply spray in spot treatments to maggot developmental sites in manure
Pyriproxyfen (Archer Nylar Insect Growth Regulator 1.3%)	Mix 1 fl. oz. in 1 gal. water	Wet surfaces where larvae are found; may repeat 14 days afterward.

POULTRY - FLY CONTROL (continued)

INSECTICIDE	SPRAY CONCENTRATIONS AND MIXING INSTRUCTIONS	APPLICATION METHODS AND SAFETY RESTRICTIONS ¹
Larvicide (Maggot) Sprays and Feed Through Larvicides (continued)		
(NyGuard IGR 10%)	mix 4 ml in sufficient water to cover 1,000 sq. ft.	Apply to litter at rate of 4 ml per 1,000 sq. ft.
(Pyri-Shield EC 1.3%)	mix 1 fl. oz. in 1 gal. water	Apply to 1,500 sq. ft. of surface area.
Ravap (Rabon 2 lbs. a.i. per gal. 23% and Vapona 0.5 lb. a.i. per gal. 5.7%) EC, OP, ME	1% spray. Mix 1 gal. EC in 25 gals. of water.	Under cages, use about 1 gal./100 sq. ft. of manure applied broadcast as a coarse, low-pressure spray. Apply at 7-10 day intervals along with an intensive adult house fly control program until manure begins to dry or cone up. Spot spraying of manure and continued use of adult house fly control will maintain control. Do not contaminate eggs, feed or water. Keep spray away from birds.
Vapona or DDVP (dichlorvos) 2 lbs. a.i. per gal. (21.8%) EC, OP, ME	0.5% spray. Mix 3 1/3 cups EC in 10 gals. of water.	Apply enough spray to penetrate manure (until thoroughly wet). Since Vapona has such a short residual, heavy treatment is required for larval kill. Once control is established, Vapona is an economical spot spray. Observe same methods of application and safety restrictions as for Ravap above.
Baits		
In some operations, baits can be used to control adult house flies. These materials can be bought ready-to-use.		
<i>Beauveria bassiana</i> (balEnce Biological Fly Bait)		Use in bait stations at least 4 ft. above ground at the rate of ¼ pound per 50 sq. ft. Do not use within reach of children or animals. Replace every 5 to 7 days.
Imidacloprid 0.5% QuickBayt	Ready-to-use	Scatter bait directly from container on to dry level surfaces so individual granules lie near each other without forming piles. Or place in any commercial bait station. Or mix 1.5 oz. bait with 1 fl. oz. warm water and stir to create a paste; apply with brush to surfaces where flies rest. Bait should be inaccessible to food-producing animals, children, and pets.
QuickBayt Fly Strip	Ready-to-use	Use in buildings where animals are kept and where flies are a nuisance.
Imidacloprid (QuickBayt Spot Spray)	Mix 16 oz. in 1 gal. water	Treat 1,000 sq. ft. of adult fly resting surface in areas inaccessible to food animals.
methomyl (Apache, Golden Malrin, Improved Golden Malrin, Blue Streak) 1% bait. CR, ME	Ready-to-use bait.	Scatter on floors, walkways, etc., throughout house. Apply heavy (about 1/2 - 2 lbs./1,000 sq. ft.) until flies are suppressed. Wear rubber gloves when applying baits. Do not allow workers on treated floors without shoes. Keep pets out of house. Do not contaminate eggs, feed or water. Keep baits away from birds.
nithiazine (QuikStrike) 1.0% fly abatement strips	Ready-to-use strip.	Hang one strip per 100 ft. ² or 300 ft. ² depending on fly population in enclosed areas that are protected from rain.
spinosad (Elector Bait 0.5% spinosyn)	Ready-to-use bait	Apply at rate of 12 to 16 oz. of bait per 2,000 sq. ft. of building. Follow label directions.
Spinosyns (Elector Fly Bait)	Ready-to-use	Distribute, according to label directions, in areas frequented by adult flies.

¹ Do not contaminate feed, water or feeding and watering equipment. OP - organophosphate, CR - carbamate, SP - synthetic pyrethroid, NP - natural pyrethrin, LE - less effective or effectiveness not determined, ME - most effective.

POULTRY EXTERNAL PARASITE CONTROL

Nancy C. Hinkle, Veterinary Entomologist

INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
BEDBUGS, CHICKEN LICE, FLEAS, FOWL TICKS, AND MITES FOR DIRECT TREATMENT TO BIRDS OR POULTRY FACILITY		
DUSTS³		
Malathion 4 % or 5% Dust, OP	Dust. Ready-to-use.	Apply 1 lb./100 birds by direct application to birds or apply 1 lb./50 sq. ft. of litter and floor space and to nests, roosts and adjacent areas or apply 1 lb. in 18"x12"x3" dust box/30 birds.
Permethrin (Ectiban, Insectrin, Permethrin) 0.25% Dust, PY	Dust. Ready-to-use.	Apply 1 lb./100 birds. Ensure thorough treatment of vent for northern fowl mite control.
SPRAYS⁴		
Malathion (Cythion) 25% WP or 5 lbs. a.i. per gal. EC (57%), OP	0.5% spray. Mix 1.5 lbs. WP OR 2/3 cup (2 Tbs./ gal.) EC in 10 gals. water. 1.0% spray. Mix 3 lbs. WP OR 1 1/3 cups EC in 10 gals. water	Apply 1 gal./100 birds of 0.5% spray OR apply 1 gal. 1.0% spray/1,000 sq. ft. to litter, walls, ceilings, nests, roosts and adjacent areas. Do not apply 1.0% spray directly to birds.
Permethrin (Ectiban, Permethrin) 5.7% EC, SP	0.05% spray. Mix 1 qt. 5.7% EC OR 1 pt. 11% EC in 25 gals. water.	Apply 1 gal. diluted spray to 100 hens using high pressure. Apply to vent area for best results. A second application may be needed 4 weeks later.
Ravap (23.0% stirofos + 5.7% dichlorvos) 28.7% EC, OP	0.5% spray. Mix 2 qts. EC in 24 gals. water.	Apply 1 gal./100 birds. Apply directly to birds. Spray vent and fluff areas from below using high pressure (100 p.s.i. and up) sprays. Wet feathers around vent area for effective control. Do not spray birds more often than once every 14 days. For floor birds, apply 1 to 2 gals. of spray per 1,000 sq. ft. of litter. Spray birds lightly.
BEDBUGS, CHICKEN MITES, FLEAS AND FOWL MITES FOR TREATMENT OF POULTRY FACILITY ONLY-NOT FOR DIRECT APPLICATION TO BIRDS		
Malathion 5 lbs. a.i. per gal. EC (57 %), OP	3.0% spray. Mix 3 /4 cup EC in 1 gal. water.	Apply 1 to 2 gals./1,000 sq. ft. Force into cracks. Do not apply to birds, nests or eggs.
Ravap (23%) stirofos, tetrachlorvinphos + (5.7%) dichlorvos 28.7% EC. OP	1.25% or 2.5% spray or 1.25% roost paint. Mix 1 gal. EC in 12.5 gals. of water to make 2.5% mixture or mix 1 gal. EC in 25 gals. of water to make 1.25% mixture.	Apply roost paint at the rate of 1 pt. of finished mixture per 100 ft. of roost area with brush or spray OR apply 1 gal. of spray per 100-150 ft. ² for fowl ticks or 1 gal. of spray per 500-1000 ft. ² for other parasites.

¹ Abbreviations used: CR - carbamate; NP - natural pyrethrum; OP - organophosphate; INO - inorganic; SP - synthetic pyrethroid.

² Do not contaminate feed, water or feeding and watering equipment.

³ Dust birds thoroughly, especially under the wings and around the vent. Provide thorough ventilation while dusting.

⁴ Penetration of feathers around vent is essential for northern fowl mite control. Apply directed sprays using 100 to 125 p.s.i. Provide thorough ventilation while spraying. Force sprays into cracks and crevices when treating for chicken red mites, bedbugs, fleas and fowl ticks.

POULTRY HOUSE PEST CONTROL

Nancy C. Hinkle, Veterinary Entomologist

INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
LITTER BEETLES Darkling beetles (black bugs, black poultry bugs, lesser mealworms) and Hide Beetles		
Bifenthrin (Actishield 7.9%) (Talstar Professional Insecticide 7.9%) Nemesis 7.9%)	Apply at rate of 0.33 to 1 fl. oz. per 1,000 sq. ft.	Apply to litter surface when birds not present.
chlorpyrifos (Duratrol Darkling Beetle Spray) - Restricted use pesticide	Certified applicator only	Follow label directions.
Chlorpyrifos (Duratrol Darkling Beetle Spray 20%, Durashield CS 20%)	Restricted Use Pesticide - Certified Applicator	Follow label directions
Cyfluthrin (Optashield CS 6%)	Apply at rate of 1.0 to 2.0 oz. per 1,000 sq. ft.	Remove all animals from facility, Do not apply to feedstuffs or watering equipment.
cyfluthrin (Tempo SC Ultra) 11.8% WP, SP	Mix 16 ml in 1 gal. water.	Apply as a general surface and/or a crack and crevice spray. Do not make applications when birds are present. Do not make applications to feed, water and feeding and watering equipment.
cyfluthrin (Tempo) 1% Dust	Ready-to-use.	Remove all animals from facility. Apply dust using hand or power dusters or other suitable equipment. Apply uniformly at 0.5 to 1 pound per 1,000 sq. ft. Do not apply to feedstuffs or watering equipment. Repeat treatment as necessary.
cyfluthrin (Tempo) 20 WP Insecticide	Add 9.5 g (1 scoopful) Tempo 20 WP to adequate water to cover 1,000 sq. ft. (based on label chart)	Remove all animals from facility. Based on label chart, spray adequate material to adequately cover area but not allow dripping or run-off to occur. Do not apply to feedstuffs or watering equipment. Do not re-apply more frequently than every 10 days.
Esfenvalerate (Clear Zone Farm Residual Concentrate 9.36%)	Mix 0.8 oz. product in 1 gal. water.	Apply 1 gal. of mixture to treat 1,000 sq. ft.
Gamma-cyhalothrin (5.9%) (StandGuard)	Mix 0.65 fl. oz. (20 mi) per gallon of water. Spray 1 gallon of diluted spray to treat 500 to 1,000 sq. ft.	Apply to floor area, with particular attention to areas under feed and water lines. Do not apply when birds are present.
Imidacloprid (Credo SC 42.8%)	Apply at rate of 3 fl. oz. per 1,000 sq. ft.	Do not apply when birds are present. Cover or remove exposed feed and water. Allow to dry before restocking birds.
Lambdacyhalothrin (9.7%) (Grenade ER Insecticide) (Demand CS) (OxyFly 9.7%)	Mix 0.8 oz. (24 ml) per gallon water.	Apply to walls and floors at cleanout, before reintroduction of animals. Pay attention to areas where beetles frequently occur (under feed lines, along walls). Do not apply when birds are present.
Orthoboric acid (Safecide Brand IC 99%) (Borid 99%) (BorActin 99%)	Ready-to-use	Remove birds. Apply dust uniformly to floor of poultry house or old litter with a fertilizer or seed spreader, at the rate of 1 to 2 pounds per 100 sq. ft. in bands along feeder lines. Cover with fresh shavings.
Orthoboric acid (99%) (Safecide Brand IC)	Ready-to-use.	Remove birds. Apply dust uniformly to floor of poultry house or to old litter with a fertilizer or seed spreader, at the rate of 1 to 2 pounds per 100 sq. ft. in bands along feeder lines.
Permethrin (Tengard SFR 36.8%)	Apply at rate of 4 fl. oz. in 12.5 gal. water. Spray 1 gal. per 750 sq. ft.	Do not apply when birds are present.
Pyrethrin (Riptide ULV 5.0%)	Ready-to-use.	Apply undiluted at 0.25-1.0 fl. oz. per 1,000 cu. ft. for knockdown of accessible insects; provides no residual.

POULTRY HOUSE PEST CONTROL (continued)

INSECTICIDE ¹	FORMULATION AND MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
Pyriproxyfen (Archer Insect Growth Regulator) 1.3% (NyGuard IGR 10%) (Pyri-Shield EC 1.3%)	mix 1 fl. oz. in 1 gal. water mix 4 ml in sufficient water to wet surface being treated mix 1 oz. in 1 gal.	Wet surfaces where larvae are found; water volume may be increased to enhance litter penetration. Wet area where larvae are found. Apply 1 gal. per 1,000 sq. ft. where larvae are found.
Spinosad (44.2%) Elector PSP (Extinosad PSP 44.2%)	Mix 2 fl. oz. (60 ml) in 10 gallons of water to treat 5,000 sq. ft. Mix 2 oz. with 10 gal. water.	Use sufficient water to ensure thorough coverage, treating litter along feed and water lines, walls and support beams. Reapply after each grow-out. Apply 1 gal. per 500 sq. ft.
Tetrachlorvinphos (Rabon Beetle Shield 3% dust) (Rabon 50WP)	Ready-to-use. Ready-to-use.	Use 4 to 8 oz./100 sq. ft., applied using plunger or rotary type duster. Use rotary, mechanical or electrostatic duster to apply ¾ oz. per 100 sq. ft. of surface.
Tetrachlorvinphos + dichlorvos Ravap E.C. (23% tetrachlorvinphos + 5.3% dichlorvos) (Rabon 50WP)	1 gal. in 25 gal. water (for extreme infestations dilute 1 gal. in 12.5 gal. water) Mix 8 lb. with 100 gal. water.	Apply 1 gal. of spray per 500 to 1,000 sq. ft. to cover walls, floors, and other sites where beetles congregate. Apply 1-2 gal. per 100 sq. ft.
MOTHS IN FEED (webbing clogging auger and feed lines)		
Diatomaceous earth (DE)	Ready-to-use.	Mix 4 to 6 pounds of DE per ton of feed and run through lines monthly to prevent caterpillars from spinning webbing. Existing webbing must be removed by hand; DE does not affect silk webbing.

¹ Abbreviations used: CR - carbamate; NP - natural pyrethrum; OP - organophosphate; INO - inorganic; SP - synthetic pyrethroid.

² Do not contaminate feed, water or feeding and watering equipment.

HONEY BEE DISEASE AND PEST CONTROL

Keith S. Delaplane, Extension Entomologist

PEST	MATERIAL AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
American foulbrood (AFB)	Terramycin	Operator-mixed formulations of Terramycin Soluble Powder are no longer labeled for beekeeping use. However, the same active ingredient (oxytetracycline) is available for beekeeping use in several pre-formulated products, including Tetra Bee Mix (Dadant & Sons), Terra-Pro (Mann Lake Ltd.), and Terramycin Pre Mix (Brushy Mountain). Use only according to label directions.	Antibiotics are strictly for <u>preventing</u> disease. Treat in February and September and never within 4 weeks of a marketable nectar flow. Diseased colonies must be burned. Dig a pit and burn all bees, combs, and frames. Bottom boards, supers, and lids can be salvaged by scorching their interiors. With medicated extender patties, remove all uneaten portions after 4 weeks of treatment and never treat within 4 weeks of a marketable nectar flow. The use of genetically AFB - resistant queens expressing hygienic behavior can reduce or eliminate the need for antibiotic treatments.
	Tylosin	Honey bee colonies should receive three treatments administered as a dust in confectioners/powder sugar. Mix 200 mg tylosin in 20 g confectioners/powdered sugar. The 200 mg dose is applied (dusted) over the top bars of the brood chamber. Apply 3 single doses, each one week apart. For use in limited amounts, mix 1 tablespoon with 2 boxes (1.93 lbs.) of powdered sugar. This will provide treatment for 44 colonies with single doses or 15 colonies with 3 doses (for a complete treatment)	
Chalkbrood	None		Keep hives well ventilated. Prop lid slightly to exhaust warm, damp air. Lean hive forward to drain rain water from interior. Use hygienic selected bee stock.
European foulbrood (EFB)	Terramycin Tylosin	Same as for American foulbrood	Drug is for preventing and treating disease. Treat in February and September and never within 4 weeks of a marketable nectar flow. Help infected colonies by adding unsealed brood and feeding 1 : 1 sugar syrup. Use hygienic - selected bee stock.
Nosema	Fumagilin B	Dissolve 1 teaspoon of Fumagilin B in 1.1 gallons of sugar syrup.	Feed medicated syrup in spring and fall and never immediately before a marketable nectar flow. Keep hives well ventilated. Prop lid slightly to exhaust warm, damp air. Lean hive forward to drain rain water from interior.
Small Hive Beetles	2. Permethrin (GardStar 40% E.C.) 3. Predatory soil nematodes especially <i>Heterohabditis indica</i> (Southeastern Insectaries, Perry, GA).	1. <u>For treatment inside colonies:</u> Adult beetles can be trapped and drowned in vegetable oil with any of the numerous in-hive adult beetle traps available by bee suppliers. 2. <u>For treatment outside colonies:</u> Mix 5 ml GardStar concentrate with 1 gal water. Thoroughly wet ground in an area 18-24 in. wide in front of each hive (1 gal per 6 hives). 3. <u>For treatment outside colonies:</u> Mix 1 million infective juveniles in 2 gal. water per colony. Strain out gelatin globules and trickle solution on ground in front of hive. Treat ground under hive if screen bottoms are used.	2. <u>GardStar:</u> Product is designed to kill immature beetles when they leave hive in order to pupate in the soil. Product is highly toxic to bees. Avoid direct spray onto hive surfaces. Apply in late evening after bees become inactive. For pre-placement cleanup of new apiary site, apply thoroughly to ground surface 24-48 hours prior to hive placement. 3. <u>Management:</u> Predatory nematodes have been shown to effectively kill SHB pupae in soil in front of hives.

HONEY BEE DISEASE AND PEST CONTROL (continued)

PEST	MATERIAL AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Tracheal mites	menthol	one 1.8 oz. packet per colony	Do not use on hives containing marketable honey. Enclose 1.8 oz. menthol in a 7-inch square plastic (or other porous) screen packet. Treat colonies in fall and early spring and only when daytime highs range from 60°-90° F. If daytime high is > 80° F., place packet on bottom board. If daytime high is 60°-79° F., place packet on top bars. Replace menthol as needed. Remove all menthol 10-12 weeks after first treatment and at least 1 month before nectar flows. Vegetable oil such as s in the medicated extender patty described above for AFB and EFB helps control tracheal mites.
	oil patties	Mix patties with 2 parts sugar: 1 part vegetable cooking shortening. Each patty should be 0.5 lb.	Place oil patty on top bars of brood frames. Spring treatments (February-April) are most effective.
Varroa mites	<p>1. fluvalinate (Apistan)</p> <p>2. coumaphos (CheckMite+ Strip)</p> <p>3. Apiguard</p>	<p>1 strip for each 5 combs of bees in each brood chamber</p> <p>1 strip for each 5 combs of bees in each brood chamber</p> <p>1 tray per colony, repeated after 2 weeks</p>	<p>Treatable threshold for varroa mite is 60-180 mites recovered in one 24-hour exposure with a bottom board sticky sheet, without use of miticide.</p> <p>1. Apistan: Do not use on hives containing marketable honey. Hang one strip between frames 3 and 4, and another strip between frames 7 and 8. Leave strips in hive for 42 to 56 days. Apistan treatments are usually most effective if given in early fall. Supplement Apistan with Terramycin treatments as described above for AFB.</p> <p>2. CheckMite: Hang the strips within two combs of the edge of the bee cluster. If two deep supers are used for the brood nest, hang CheckMite+ Strips in alternate corners of the cluster, in the top and bottom super. Remove honey supers before application of CheckMite+ Strips and do not replace until 14 days after the strips are removed. Treat all infested colonies within yard. The treatment is most effective when brood rearing is lowest. Do not treat when surplus honey is being produced. Leave the strips in the hive for at least 42 days (six weeks). Do not leave strips in hive for more than 45 days. Do not treat more than twice a year for varroa mites.</p> <p>3. Apiguard: Open the hive. Peel back the foil lid of the APIGUARD tray leaving one corner of the lid attached to the tray. Place the open tray centrally on top of the brood frames, gel side up. Ensure that there is a free space of at least 0.5-inch between the top of the tray and the hive cover board, for example, by placing an empty super on top of the brood box. Close the hive. After two weeks replace the first tray with a new one, according to the same instruction. Leave the product in the colony until the tray is empty. Remove the product when installing the supers on the colony.</p> <p>The efficacy of APIGUARD is maximized if the product is used in late summer after the honey harvest (when the amount of the brood present is diminishing). However, in the case of severe infestations, APIGUARD can also be used during springtime, when temperatures are above 60° F. Efficacy will vary between colonies due to the nature of the application. Therefore, APIGUARD should be used as one treatment among others within an Integrated Pest Management program, and mite fall regularly monitored. If further significant mite fall is observed during the following winter or spring, use an additional secondary winter or spring treatment for varroa.</p>

HOUSEHOLD PESTICIDE DILUTION TABLE

Dan Suiter, Extension Entomologist

Pesticide Formulation	(Amount of Pesticide Formulation for One Gallon of Water) Percentage of Actual Chemical Wanted in Mixture								
	0.0313%	0.0625%	0.125%	0.25%	0.5%	1.0%	20%	3.0%	5.0%
15% WP	2 1/2 tsp.	5 tsp.	10 tsp.	7 Tbs.	1 cup	2 cups	4 cups	6 cups	10 cups
25% WP	1 1/2 tsp.	3 tsp.	6 tsp.	12 tsp.	8 Tbs.	1 cup	2 cups	3 cups	5 cups
40% WP	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1 1/4 cups	2 cups	3 1/4 cups
50% WP	3/4 tsp.	1 1/2 tsp.	3 tsp.	6 tsp.	4 Tbs.	8 Tbs.	1 cup	1 1/2 cups	2 1/2 cups
75% WP	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1 cup	2 cups
Emulsifiable Concentrate (EC)*									
10% - 12% EC 1 lb. actual/gal.	2 tsp.	4 tsp.	8 tsp.	16 tsp.	10 Tbs.	2/3 pt.	1 1/3 pts.	1 qt.	3 1/4 pts.
15% - 20% EC 1.5 lbs. actual/gal.	1 1/2 tsp.	3 tsp.	6 tsp.	12 tsp.	7 1/4 Tbs.	1/2 pt.	1 pt.	1 1/2 pts.	2 1/2 pts.
25% EC 2 lbs. actual/gal.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	2/3 pt.	1 pt.	1 3/4 pts.
33% - 35% EC 3 lbs. actual gal.	3/4 tsp.	1 1/2 tsp.	3 tsp.	6 tsp.	4 Tbs.	8 Tbs.	1/2 pt.	3/4 pt.	1 1/3 pts.
40% - 50% EC 4 lbs. actual/gal.	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1/2 pt.	4/5 pt.
57% EC 5 lbs. actual/gal.	7/16 tsp.	7/8 tsp.	1 3/4 tsp.	3 1/2 tsp.	7 tsp.	4 1/2 Tbs.	9 Tbs.	14 Tbs.	1 1/2 cups
60% - 65% EC 6 lbs. actual/gal.	3/8 tsp.	3/4 tsp.	1/2 Tbs.	1 Tbs.	2 Tbs.	4 Tbs.	8 Tbs.	12 Tbs.	1 1/2 cups
70% - 75% EC 8 lbs. actual/gal.	1/4 tsp.	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	7 1/2 Tbs.	13 Tbs.

* Quantity based on a standard weight of 8.3 lbs. liquid per gallon.

MILLILITERS OF CONCENTRATE REQUIRED TO PREPARE 1-GALLON OF SPRAY USING VARIOUS PERCENT CONCENTRATES

The figures in the Table are in milliliters. To convert to fluid ounces divide by 30, to teaspoons divide by 5 or tablespoons divide by 15.

By Wt Lb AI* (%) Per Gal	Percent Concentrate Desired								
	1/4	1/2	3/4	1	2	3	4	5	6
10-12 = 1 lb.	78.9	157.8	236.7	315.6	631.1	946.7	1262.2	1577.8	1893.4
15-20 = 1 1/2	52.6	105.2	157.8	210.4	420.7	631.1	841.5	1051.9	1262.2
25 = 2 lb.	39.4	78.9	118.3	157.8	315.6	473.3	631.1	788.9	946.7
30-35 = 3 lb.	26.3	52.6	78.9	105.2	210.4	315.6	420.7	525.9	631.1
40-50 = 4 lb.	19.7	39.4	59.2	78.9	157.8	236.7	315.6	394.5	473.3
55-57 = 5 lb.	15.8	31.6	47.3	63.1	126.2	189.3	252.4	315.6	378.7
60-65 = 6 lb.	13.1	26.3	39.4	52.6	105.2	157.8	210.4	263.9	315.6
66-70 = 7 lb.	11.3	22.5	33.8	45.1	90.2	135.2	180.3	225.4	270.5
72-85 = 8 lb.	9.9	19.7	29.6	39.4	78.9	118.3	157.8	197.2	236.7