

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	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	REMARKS
<i>Beauveria bassiana</i> balEncE	biological	7.5 oz/4 gal water/25000 sq ft of adult fly resting sites.	Safe for Animals or people to re-enter when dry	Use a higher rate to treat maggot habitat. BalEncE is potentially hazardous to bees. Do not contaminate surface water with balEncE or its rinsate.
<i>beta-cyfluthrin</i> Tempo 1SC Ultra Tempo 10WP Tempo 20WP	3A	8-16 ml 1SC in sufficient water to cover 1000 sq ft 10-20 grams 10WP in sufficient water to cover 1000 sq ft	Safe for Animals or people to re-enter when dry	Remove animals before spraying and do not return them until spray dries. Do not contaminate feed, drinking water, milk or milk handling equipment. Do not apply as a space spray. Do not apply directly to animals. 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 spray/500-1000 sq ft). Repeat as needed. For bait solutions add 1 lb sugar/gal of spray.
<i>bifenthrin</i> ActiShield	3A	0.33-1 fl oz 0.66EC/gal water 1000 sq ft	Safe for Animals or people to re-enter when dry	For adult fly control in and around animal facilities, spray application should target areas where flies will rest.
<i>chlorpyrifos</i> Durashield	1B	Restricted use pesticide For use by certified applicators		Restricted use pesticide, for use by certified applicators. Apply according to label directions to adult fly resting sites.
<i>cyfluthrin</i> Optashield CS	3A	Mix 1-2 fl oz with 1 gal water		Apply 1 gal/1000 sq ft.
<i>deltamethrin</i> 0.02% Annihilator Insecticide Premise	3A	Ready-to-use when purchased.	None	Apply thoroughly to surfaces until wet. Repeat as necessary, but not more than once/week. Do not spray animals or humans, or apply to animal feed or watering equipment.
<i>diazinon</i> 50%WP, OP	1B	<u>Residual Spray</u> : Mix 2 lb or 4 lb of 50% WP in 25 gal 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/350-750 sq ft to ceilings and walls of livestock sheds, calf barns, hog barns, loafing sheds and other farm buildings.
<i>dichlorvos</i> Vapona	1B	Ready to use		Apply as coarse spray, 1 pint/1000 sq ft of surface
<i>esfenvalerate</i> Endure 35WP Onslaught	3A	Mix 1 or 2 scoops with 1 gal of water and spray 1 gal/1000 sq ft		Do not apply when feed is present.
<i>gamma-cyhalothrin</i> StandGuard 5.9	3A	Mix 0.16 fl oz (5 ml)/gal of water.		Spray 1 gal of diluted spray to treat 500-1000 sq ft of fly resting surfaces.
<i>imidacloprid</i> QuickBayt 10%EC Spot Spray.	4A	Mix at the rate of 1 lb/gal of water to treat 1000 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.
<i>lambda-cyhalothrin</i> Grenade ER 9.7% Insecticide Demand CS	3A	Mix 0.2-0.4 oz (6-12 ml)/gal water.		Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present.

FLY CONTROL IN LIVESTOCK FACILITIES

RESIDUAL AND BAIT SPRAYS¹

INSECTICIDE ²	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	REMARKS
<i>permethrin</i> Atroban 05.7 EC Ectiban 25%WP Insectrin 11% EC Insectrin 40% EC	3A	5.7% EC is ready-to-use as a mist-spray OR mix 1 qt. 5.7% EC in 12.5 gal of water Mix 6.67 oz 25% WP in 10 gal of water Mix 1 pt 11% EC in 10 gal of water Mix 90-118 ml 40% EC in 10 gal water.		Do not apply more often than once every 2 weeks. Do not apply directly to livestock or poultry. Do not apply in milk rooms or egg storage areas. Do not spray manure or litter. Apply as a residual surface spray to fly resting areas. Apply 5.7% EC undiluted at 4 oz/1000 sq ft of surface area or apply diluted WP and EC mixtures at 1 gal/750 sq ft.
<i>spinosyn</i> Elector 2.46%	5	0.08% spinosad – 20 oz (around 600 ml) /5 gal water		Spray fly-inhabiting surfaces in animal premises to the point of runoff. Use approx. 1 gal of spray/500-1000 sq ft. Repeat as needed, but not more often than once/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.
<i>spinosad</i> Elector PSP spinosyn 44.2%	5	Dilute according to label chart.		Spray fly-resting surfaces. Do not apply where birds are present. Follow label directions.
<i>tetrachlorvinphos + vapona</i> Rabon 50 WP	1B	Mix 0.5 lb in 1.5 gal water		Spray 1 gal/500 sq ft.
Rabon EC		Mix 5 oz/gal water		Apply 1 gal spray/500-1000 sq ft, treating fly resting sites
<i>tetrachlorvinphos + dichlorvos</i> Ravap EC	1B	1.25-2.5% spray. Mix 1 gal or 2 gal EC in 25 gal of water.		Apply at a rate of 1 gal of spray/500-1000 sq ft to cover walls, floors and other resting sites.

SPACE SPRAYS (Aerosols, Fogs and Mist-sprays)³

INSECTICIDE ²	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	REMARKS
<i>dichlorvos</i> Vapona or DDVP 2 lb ai/gal (23.4%) EC, OP, LE	1B	0.5% or 1%. Mix 1 pt EC in 3 gal or 6 gal of water.		Apply 1 pt of 1% solution or 1 qt of 0.5% solution/8000 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.
<i>permethrin</i> Insectrin 5.7% EC, 40% EC, SPY, LE	3A	Mix 1 pt of 5.7% EC in 6.25 gal of diesel fuel or mineral oil OR mix 10-45 ml in 1 gal of water.		Apply fog at 2-4 fl oz/1000 cubic feet of air space in confined facility. Repeat as needed.
<i>pyrethrins</i> 0.1-1% + <i>synergist</i> 0.5-5.0% NPY, HE	3A	Ready-to-use when purchased.		Apply fogs or spray mists at 1 fl oz/1000 cu ft as fine atomized spray. Repeat as needed.

FLY CONTROL IN LIVESTOCK FACILITIES

BAITS

INSECTICIDE ²	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	REMARKS
<i>Beauveria bassiana</i> balEnce Bait	Biological			Use as a house fly bait around livestock and poultry facilities. Keep out of the reach of children and animals.
<i>cyantraniliprole</i> Zyrox Fly Granular bait	28	Ready-to-use when purchased.	None	Apply in bait station that is inaccessible to children, pets and food animals. Use 2 lb bait/1000 sq ft/yr.
<i>dinotefuran</i> QuikStrike Scatter Bait	4A			Apply around livestock and poultry facilities where house flies are found. Apply as a scatter bait at the rate of 1/4 lb/500 sq ft, or place in bait stations. Do not apply where children or animals might have access.
<i>imidacloprid</i> 0.5% QuickBayt	4A	Ready-to-use when purchased.		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.
QuickBayt Fly Strip		Ready-to-use when purchased.		QuickBayt Fly Strip: Use in buildings where animals are kept and where flies are a nuisance.
<i>methomyl</i> Blue Streak Golden Malrin Bait, CR, HE	1A	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/500-1000 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.
<i>nithiazine</i> QuikStrike 1% fly abatement strip	4	Ready-to-use strip.		Hang 1 strip/100 sq ft or 300 sq ft depending on fly population in enclosed areas that are protected from rain.
<i>spinosad</i> Spinosyn 0.5%	5	Ready-to-use when purchased.		Follow label directions for scatter bait, station/tray bait, or paint/spray bait use. Locate where inaccessible to animals and children.

LARVICIDES – Treat maggot-infested areas

INSECTICIDE ²	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	REMARKS
<i>cyromazine</i> 2% Neporex	17	Ready-to-use or spray.		Scatter granules on maggot-infested sites at rate of 1 lb/200 sq ft. Treat edges and spillage areas where manure accumulates. Treat floor area of calf hutches.

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, and Annie Rich, Graduate Student

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

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>coumaphos</i> Co-Ral 11.6%	1B			Mix 2.5-5 fl oz/4 gal water and spray to complete wetting.
	<i>dichlorvos</i> Vapona EC	1B	Mix 1 qt 21.8% EC in 6 gal of water. Restricted Use Pesticide.	– 1 D	Apply 1-2 fl oz 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 oz/animal each day.
	<i>permethrin</i> Permethrin EC Spray Permethrin II Atroban 11%	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	Spray animal thoroughly. Re-treat as needed but not more than once every 14 days. To control lice or mites, a second treatment may be needed 10-21 days later.
	Permethrin EC Spray (low pressure)	3A	Mix 1 qt 11% EC in 5 gal water.	– 0 D	Apply 1-2 oz spray mixture/animal. Spot treat the back, face, legs and ears.
	Permethrin EC Spray		Mix 1 cup 42.5% EC in 100 gal water or mix 1 pt 40% EC in 100 gal water.		Apply 1 qt of low concentration spray mixture/animal to control horn flies only. Apply 2 qt of high concentration spray/animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days.
	<i>phosmet</i> Prolate/Lintox Prolate/Lintox HD	1B	Mix 1 qt in 25-50 gal water (depending on target pest), and spray to run-off.	– 3 D	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal/animal. Do not re-treat within 7 days. Follow label restrictions.
	<i>pyrethrins</i> Pyrethrins - synergized.	3A	Ready-to-use when purchased.	– 0 D	Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
	0.5% stirofos + 0.1% dichlorvos Ravap EC spray	1B	Mix 1 pt 28.7% EC in 6 gal of water.	– 0 D	Apply as a coarse spray. Apply 1/2 gal spray/animal. Do not repeat application within 10 days.
	<i>tetrachlorvinphos</i> or <i>stirofos</i> Rabon WP spray	1B	Mix 1 lb 50% WP in 18 gal of water.	– 0 D	Apply as a coarse spray. Apply 2 qt-1 gal/animal to obtain complete wetting.
Dusts	<i>coumaphos</i> 1% Livestock Dust Co-Ral Livestock Dust	1B	Ready-to-use when purchased.		Use shaker can to apply 2 oz/animal over head, neck, shoulders, and back.
	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.	– 0 D	Use in dust bags or apply up to 2 oz directly to animals. Re-treat 14-21 days later if needed for lice control.
	<i>tetrachlorvinphos</i> Rabon 3% Dust. Ready-to-use.	1B	Ready-to-use when purchased.	– 0 D	Apply 2 oz of dust/animal by hand or duster to thoroughly penetrate hair coat.
	<i>zeta-cypermethrin</i> PYthon dust 0.075% zeta-cypermethrin	3A	Ready-to-use when purchased.		Apply up to 2 oz/animal evenly as necessary but not more often than every 3 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS^{1,2,3}	
Ear-tags and Dust Bags (Self Treatment)	<i>abamectin</i> abamectin 8% XP-820 Ear Tag	6	Ready-to-use when purchased.		For control of horn flies and ticks. Use 1 tag/animal for up to 3 months control, or 2 tags/animal for up to 5 months control.	
	<i>beta-cyfluthrin</i> CyLence Ultra Insecticide Cattle Ear Tags 8%	3A	Ready-to-use when purchased.		For control of horn flies, face flies, Gulf Coast ticks and spinose ear ticks on beef cattle. For adequate control of horn flies attach 1 tag/animal. For optimum control of face flies, horn flies, Gulf Coast ticks and spinose ear ticks, attach 1 tag to each ear (2/animal). CyLence Ultra Insecticide Ear Tags have been proven to be effective against face and horn flies for up to 5 months.	
	<i>coumaphos</i> Corathon Insecticide Cattle Ear Tag 15% coumaphos 35% diazinon	1B	Ready-to-use when purchased.		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 1 tag to each ear (2/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.	
	Co-Ral Livestock Dust				Place contents of package in any commercially available dust bag. Suspend bags in areas frequented by cattle or in gateways or lanes through which the animals pass daily for water, feed or minerals. Bags may also be suspended in loafing sheds or in front of protected mineral feeders. For lactating dairy cows, bags may be suspended in the exit through which cows leave the milking barn. In all cases the bags should be adjusted so that the bottom of the bag will hang 4-6” below the topline of the cattle.	
	<i>diazinon</i> OPTimizer 21.4% insecticide ear tag	1B	Ready-to-use when purchased.		– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Tags should be removed when control drops off, at the end of fly season or before slaughter.
	Patriot 40% insecticide cattle ear tag				Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly season or before slaughter.	
	Warrior 40% insecticide ear tag 30% <i>diazinon</i> + 10% <i>chlorpyrifos</i>				Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season or before slaughter.	
	<i>lambda-cyhalothrin</i> Saber Extra 10% insecticide ear tag 10% lambda-cyhalothrin + 13% piperonyl butoxide	3A	Ready-to-use when purchased.		– 0 D	Apply 1 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.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag 6.8% lambda-cyhalothrin + 14.0% pirimiphos methyl	3A	Ready-to-use when purchased.		– 0 D	Apply 1 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.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Ear-tags and Dust Bags (Self Treatment) <i>(continued)</i>	<i>permethrin</i> Permethrin 10% Insecticide Ear Tag Gard Star Plus	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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.
	<i>pirimiphos-methyl</i> Dominador 20% insecticide ear tag 20% pirimiphos methyl	3A	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first.
	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.	– 0 D	Apply 2 oz of dust/animal by hand or duster to thoroughly penetrate hair coat. Or, apply in dust bags that 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.
	<i>zeta-cypermethrin</i> PYthon Magnum 10% insecticide ear tag zeta-cypermethrin 10% + piperonyl butoxide 20%	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.
Backrubbers and Facerubbers	<i>permethrin</i> Permethrin Rubbing Mixture	3A	10% or 11% EC in 1 gal of #2 diesel fuel or mineral oil or mix 118 ml 40% EC in 10 gal of diesel oil or suitable mineral oil.	– 0 D	Keep rubbing device charged. Daily forced use provides best results.
	<i>stirofos + dichlorvos</i> Ravap 1% stirofos + 0.25% dichlorvos in oil	1B	Mix 5 oz 28.7% EC in 1 gal of #2 diesel fuel	– 0 D	Pour 1 gal of mixture/20 ft of cable. Keep rubbing device charged.
Injectable Pour-on Spot-on	<i>lambda-cyhalothrin with piperonyl butoxide</i> Aim-L Vetcap	3A			Apply only with a SmartVet Approved Vetcap Application Device according to label directions
	<i>cyfluthrin</i> Cylence 1% pour-on insecticide.	3A	Ready-to-use when purchased.	– 0 D	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 lb, 8 ml to animals weighing 400-800 lb and 12 ml to animals weighing over 800 lb. Do not re-treat within 3 weeks following treatment. Double the dose for biting and sucking lice.
	<i>doramectin</i> Dectomax Pour-On	6	Ready-to-use when purchased.	– 45 D	Apply Pour-On along the top of the back and top of the head at the rate of 1 ml/22 lb of body weight. Provides 7 days of horn fly control and 42-77 days of louse suppression.
	<i>eprinomectin</i> Ivomec Eprinex pour-on for beef cattle. Contains 5 mg. eprinomectin/ml.	6	Ready-to-use when purchased.	– 0 D	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml/22 lb body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead.
	<i>gamma-cyhalothrin</i> StandGuard Pour-on 0.5%	3A	Ready-to-use when purchased.		For cattle weighing less than 600 lb, apply 10 ml (1/3 fl oz) product along backline. For cattle weighing more than 600 lb, apply 15 ml (1/2 fl oz) along backline.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS^{1,2,3}
Injectable Pour-on Spot-on <i>(continued)</i>	<i>ivermectin</i> Ivomec pour-on, 5 mg ivermectin/ml	6	Ready-to-use when purchased.	– 48 D	Apply 1 ml/22 lb of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead.
	<i>lambda-cyhalothrin</i> Saber 1% pour-on insecticide	3A	Ready-to-use when purchased.	– 0 D	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml (1/3 fl oz)/animal for cattle weighing less than 600 lb or at a rate of 15 ml (1/2 fl oz)/animal for cattle weighing more than 600 lb. Repeat as needed but not more than every 2 weeks and not more than 4 applications within a 6 month period..
	<i>moxidectin</i> Moxidectin Cydectin Pour-on	6	Inject 1 mg/110 lb. body weight	– 35 D	Use 22.7 mg/100 lb body weight (mites and lice).
	<i>permethrin</i> Atroban DeLice 1% pour on.	3A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% permethrin Ultra-Boss Pour-on 5% permethrin				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.
<i>permethrin 5% + diflubenzuron 5%</i> Clean-up Pour-on Insecticide with IGR	3A	Ready-to-use when purchased.	– 0 D	Ready-to-use. Follow label directions.	
Bolus, Feed Additives	<i>diflubenzuron</i> diflubenzuron 8% ClariFly	15	Ready-to-use when purchased.		Mix according to label instructions and feed at rates stipulated based on cattle weights. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding treated cattle early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	<i>methoprene</i> Altosid 0.02% mineral mix or block Altosid IGR 1% Liquid - Feed-through	7A	Ready-to-use when purchased.	– 0 D	Feed free choice at 1/4-1/2 lb/100 lb animal body weight monthly/animal. Mix in feed to achieve consumption rate of 1.13 mg/100 lb animal body weight/day.
	<i>tetrachlorvinphos</i> Rabon 7.76% granular oral laticide.	1B	Pre-mix or ready-to-use blocks and mineral feeds are available commercially.	– 0 D	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 lb body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

CATTLE GRUBS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Injectable Pour-on Spot-on	<i>doramectin</i> 0.5% Dectomax pour-on	6	Ready-to-use when purchased.		Apply 1 ml/22 lb body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers up to 20 months of age.
	<i>eprinomectin</i>	6	Ivomec Eprinex pour-on for beef cattle. Contains 5 mg eprinomectin/ml. Ready-to-use when purchased.	– 0 D	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml/22 lb body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead.
	<i>ivermectin</i> Ivomec 1% clear, ready-to-use sterile solution.	6	Ready-to-use when purchased.	– 35 D	Administer subcutaneously only 1 ml (10 mg ivermectin)/110 lb body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2-3/4" needle is suggested. Divide doses greater than 10 ml between 2 injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days.
	Ivomec pour-on 5 mg ivermectin/ml			– 48 D	Ivomec pour-on: Apply 1 ml/22 lb of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead.
	<i>moxidectin</i> Moxidectin 1% injectable Cydectin 10 mg/ml	6	Ready-to-use when purchased.	– 35 D	Inject 1 mg/110 lb body weight.
	Cydectin Pour-on				Use 22.7 mg/100 lb body weight (mites and lice).

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>coumaphos</i> Co-Ral 11.6%				Mix 2.5-5 fl oz/4 gal water and spray to complete wetting.
	<i>dichlorvos</i> Vapona EC		Mix 1 qt 21.8% EC in 6 gal of water. Restricted Use Pesticide.	– 1 D	Apply 1-2 fl oz 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 oz/animal each day.
	<i>permethrin</i> Permethrin EC spray Permethrin II Atroban 11%	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-18 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	Permethrin EC Spray (low pressure)		Mix 1 qt 11% EC in 5 gal water.		Apply 1-2 oz spray mixture/animal. Spot treat the back, face, legs and ears.
	Permethrin EC Spray		Mix 1 cup 42.5% EC in 100 gal water or mix 1 pt 40% EC in 100 gal water.		Apply 1 qt of low concentration spray mixture/animal to control horn flies only. Apply 2 qt of high concentration spray/animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays (continued)	<i>phosmet</i> Prolate/Lintox Prolate/Lintox HD	1B	Mix 1 qt in 25-50 gal water (depending on target pest), and spray to run-off.	– 3 D	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal/animal. Do not re-treat within 7 days. Follow label restrictions.
	<i>pyrethrins</i> Pyrethrins - synergized	3A	Ready-to-use when purchased.	– 0 D	Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
	<i>stirofos + dichlorvos</i> Ravap 0.35% stirofos + 0.1% dichlorvos EC spray	1B	Mix 1 pt 28.7% EC in 10 gal of water.	– 0 D	Apply as a coarse spray. Apply 1/2-1 gal spray/animal. Do not repeat application within 10 days.
	Ravap EC spray 0.5% stirofos + 0.1% dichlorvos		Mix 1 pt 28.7% EC in 6 gal of water.		Apply as a coarse spray. Apply 1/2 gal spray/animal. Do not repeat application within 10 days.
	<i>tetrachlorvinphos</i> Rabon WP spray	1B	Mix 1 lb 50% WP in 18 gal of water.	– 0 D	Apply as a coarse spray. Apply 2 qts-1 gal/animal to obtain complete wetting.
Dusts	<i>coumaphos</i> Livestock Dust 1% Co-Ral Livestock Dust 1%	1B	Ready-to-use when purchased.		Use shaker can to apply 2 oz/animal over head, neck, shoulders, and back.
	<i>permethrin</i> Permethrin 0.25% dust	3A	Ready-to-use when purchased.	– 0 D	Use in dust bags or apply up to 2 oz directly to animals. Re-treat 14-21 days later if needed for lice control.
	<i>stirofos or tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.	– 0 D	Apply 2 oz of dust/animal by hand or duster to thoroughly penetrate hair coat.
	<i>zeta-cypermethrin</i> PYthon dust 0.075%	3A	Ready-to-use when purchased.		Apply up to 2 oz/animal evenly as necessary but not more often than every 3 days.
Ear-Tags and Dust Bags (Self-Treatment)	<i>coumaphos</i> Corathon Insecticide Cattle Ear Tag 15% coumaphos and 35% diazinon	1B	Ready-to-use when purchased.		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 1 tag to each ear (2/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.
	<i>diazinon</i> Warrior 40% insecticide ear tag 30% diazinon + 10% chlorpyrifos	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season, or before slaughter.
	<i>permethrin</i> Permethrin 0.25% dust	3A	Ready-to-use when purchased.	– 0 D	Use in dust bags or apply up to 2 oz directly to animals. Re-treat 14-21 days later if needed for lice control.
	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.	– 0 D	Apply in dust bags that 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.
	<i>zeta-cypermethrin</i> PYthon Zetagard 10% insecticide ear tag <i>zeta-cypermethrin</i> 10% + <i>piperyonyl butoxide</i> 20%	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Backrubbers and Facerubbers	<i>permethrin</i> Permethrin Rubbing Mixture	3A	Mix 1 qt. 5.7% EC in 10 gal diesel fuel or mix 1 pt 10% or 11% EC in 1 gal of #2 diesel fuel or mineral oil or mix 118 ml 40% EC in 10 gal of diesel oil or suitable mineral oil.	– 0 D	Keep rubbing device charged. Daily forced use provides best results.
	<i>stirofos + dichlorvos</i> Ravap 1% stirofos + 0.25% dichlorvos in oil	3A	Mix 5 oz 28.7% EC in 1 gal of #2 diesel fuel.	– 0 D	Pour 1 gal of mixture/20 ft of cable. Keep rubbing device charged.
Injectable Pour-on Spot-on	<i>cyfluthrin</i> Cylence 1% pour-on insecticide.	3A	Ready-to- use when purchased.	– 0 D	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 lb, 8 ml to animals weighing 400-800 lb and 12 ml to animals weighing over 800 lb. Do not re-treat within 3 weeks following treatment. Double the dose for biting and sucking lice.
	<i>doramectin 0.5%</i> Dectomax pour-on	6	Ready-to- use when purchased.		Apply 1 ml/22 lb body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers up to 20 months of age.
	<i>eprinomectin</i> Ivomec Eprinex pour-on for beef cattle. Contains 5 mg eprinomectin/ml	6	Ready-to- use when purchased.		Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml/22 lb body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead.
	<i>gamma-cyhalothrin 0.5%</i> StandGuard Pour-on	3A	Ready-to-use when purchased.		For cattle weighing less than 600 lb, apply 10 ml (1/3 fl. oz) product along backline. For cattle weighing more than 600 lb, apply 15 ml (1/2 fl oz) along backline.
	<i>ivermectin</i> Ivomec 1% clear, ready-to-use sterile solution.	6		– 35 D	Administer subcutaneously only 1 ml (10 mg ivermectin)/110 lb body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2-3/4” needle is suggested. Divide doses greater than 10 ml between 2 injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days.
	Ivomec pour-on 5 mg ivermectin/ml.	6	Ready-to-use when purchased.	– 48 D	Apply 1 ml/22 lb of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead. Waiting period: 48 days.
	<i>lambda-cyhalothrin</i> Ultra Saber 1% pour-on insecticide.	3A	Ready-to-use when purchased.	– 0 D	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml (1/3 fl oz)/animal for cattle weighing less than 600 lb or at a rate of 15 ml (½ fl oz)/animal for cattle weighing more than 600 lb. Repeat as needed but not more often than every 2 weeks and not more than 4 applications within a 6 month period.
	<i>lambda-cyhalothrin</i> with <i>piperonyl butoxide</i> Aim-L VetCaps insecticide capsules	3A	Ready-to-use when purchased.		Apply only with a SmartVet Approved Vetcap Application Device according to label directions
	<i>moxidectin</i> Moxidectin 1% injectable Cydectin 10 mg/ml	6		– 35 D	Inject 1 mg/110 lb body weight.
Moxidectin Cydectin Pour-on				Use 22.7 mg/100 lb body weight (mites and lice).	

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Injectable Pour-on Spot-on (continued)	<i>permethrin</i> Atroban DeLice 1% pour on	3A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% <i>permethrin</i> Ultra-Boss Pour-on 5% <i>permethrin</i>				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.
	Clean-up Pour-on Insecticide with IGR <i>permethrin</i> 5% + diflubenzuron 5%	3A	Ready-to-use when purchased.		Follow label directions.

FACE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>dichlorvos</i> Vapona EC	1B	Mix 1 qt 21.8% EC in 6 gal of water. Ready-to-use when purchased.	– 1 D	Apply 1-2 fl oz 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 oz/ animal each day.
	<i>permethrin</i> EC Spray (low pressure)	3A	Mix 1 qt 11% EC in 5 gal water.	– 0 D	Apply 1-2 oz spray mixture/animal. Spot treat the back, face, legs and ears.
	<i>pyrethrins</i> Pyrethrins - synergized	3A	Ready-to-use when purchased.	– 0 D	Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
Ear-Tags and Dust Bags (Self-Treatment)	<i>cyfluthrin</i> Beta-cyfluthrin CyLence Ultra Insecticide Cattle Ear Tags 8%	3A	Ready-to-use when purchased.		For control of horn flies, face flies, Gulf Coast ticks and spinose ear ticks on beef and dairy cattle (including lactating). For adequate control of horn flies attach 1 tag/animal. For optimum control of face flies, horn flies, Gulf Coast ticks and spinose ear ticks, attach 1 tag to each ear (2/animal). CyLence Ultra Insecticide Ear Tags have been proven to be effective against face and horn flies for up to five months.
	<i>diazinon</i> Optimizer 21.4% insecticide ear tag Patriot 40% insecticide cattle ear tag	1B	Ready-to-use when purchased.	– 0 D	Attach 1 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. Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly season, or before slaughter.
	Warrior 40% insecticide ear tag 30% diazinon + 10% chlorpyrifos	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season, or before slaughter.
	<i>lambda-cyhalothrin</i> Saber 10% insecticide ear tag 10% lambda-cyhalothrin + 13% piperonyl butoxide	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

FACE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Ear-Tags and Dust Bags (Self-Treatment) <i>(continued)</i>	<i>lambda-cyhalothrin</i> Double Barrel/Double Barrel VP 20.8% insecticide ear tag 6.8% lambda-cyhalothrin + 14% pirimiphos methyl	3A + 1B	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	<i>permethrin</i> Permethrin 10% Insecticide Ear Tag Gard Star Plus	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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.
	<i>pirimiphos-methyl</i> Dominator 20% insecticide ear tag	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first.
	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.	– 0 D	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.
	<i>zeta-cypermethrin</i> PYthon Magnum 10% insecticide ear tag zeta-cypermethrin 10% + piperonyl butoxide 20%	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.
Injectable Pour-on Spot-on	<i>cyfluthrin</i> Cylence 1% pour-on insecticide	3A	Ready-to- use when purchased.	– 0 D	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 lb, 8 ml to animals weighing 400-800 lb and 12 ml to animals weighing over 800 lb. Do not re-treat within 3 weeks following treatment. Double the dose for biting and sucking lice.
	<i>permethrin</i> Clean-up Pour-on Insecticide with IGR permethrin 5% + diflubenzuron 5%	3A	Ready-to- use when purchased.		Follow label directions.
Bolus, Feed Additives	<i>diflubenzuron</i> ClariFly 8%	15		– 0 D	Mix according to label instructions and feed at rates stipulated based on cattle weights. Prevents development of fly larvae in manure of treated cattle. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	<i>methoprene</i> Altosid 0.02% mineral mix or block.	7A	Ready-to- use when purchased.	– 0 D	Feed free choice at 1/4-1/2 lb/100 lb animal body weight monthly/ animal.
	<i>tetrachlorvinphos</i> Rabon 7.76% granular oral laticide	1B	Pre-mix or ready-to-use blocks and mineral feeds are available commercially.	– 0 D	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 lb body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

TICKS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>coumaphos</i> Co-Ral 11.6%	1B			Mix 2.5-5 fl oz in 4 gal water and spray to complete wetting.
	<i>permethrin</i> Permethrin EC spray Permethrin II Atroban 11%	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	Permethrin EC Spray (low pressure)		Mix 1 qt 11% EC in 5 gal water.		Apply 1-2 oz spray mixture/animal. Spot treat the back, face, legs and ears.
	Permethrin EC Spray		Mix 1 cup 42.5% EC in 100 gal water or mix 1 pt 40% EC in 100 gal water.		Apply 2 qt of high concentration spray/animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days.
	<i>phosmet</i> Prolate/Lintox Prolate/Lintox HD	1B	Mix 1 qt in 25-50 gal water (depending on target pest), and spray to run-off.	– 3 D	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal/animal. Do not re-treat within 7 days. Follow label restrictions.
	<i>stirofos + dichlorvos</i> Ravap EC spray 0.35% stirofos + 0.1% dichlorvos	1B	Mix 1 pt 28.7% EC in 10 gal of water.	– 0 D	Apply as a coarse spray. Apply 0.5-1 gal spray/animal. Do not repeat application within 10 days.
	Ravap EC spray 0.5% stirofos + 0.1% dichlorvos		Mix 1 pt 28.7% EC in 6 gal of water.		Apply as a coarse spray. Apply 0.5 gal spray/animal animal. Do not repeat application within 10 days.
	<i>tetrachlorvinphos</i> Rabon WP spray	1B	Mix 1 lb 50% WP in 18 gal of water.	– 0 D	Apply as a coarse spray. Apply 2 qt-1 gal/animal to obtain complete wetting.
Ear-Tags and Dust Bags (Self-Treatment)	<i>coumaphos</i> Corathon Insecticide Cattle Ear Tag 15% coumaphos+35% diazinon	1B	Ready-to-use when purchased.		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 1 tag to each ear (2/animal). Replace as necessary. Calves less that 3 months of age should not be tagged as ear damage may result. Remove tags at end of fly season, or prior to slaughter.
	<i>cyfluthrin</i> Beta-cyfluthrin CyLence Ultra Insecticide Cattle Ear Tags 8%	3A	Ready-to-use when purchased.		All mature animals in the herd should be tagged. For optimum control of horn flies, coast ticks, and spinose ear ticks, and as an aid in the control of face flies, attach 1 tag to each ear (2/animal). Replace as necessary. Calves less that 3 months of age should not be tagged as ear damage may result. Remove tags at end of fly season, or prior to slaughter.
	<i>diazinon</i> OPTimizer 21.4% insecticide ear tag	1B	Ready-to-use when purchased.	– 0 D	Attach 1 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.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

TICKS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS^{1,2,3}
Ear-Tags and Dust Bags (Self-Treatment) <i>(continued)</i>	<i>diazinon</i> Patriot 40% insecticide cattle ear tag.	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly season, or before slaughter.
	Warrior 40% insecticide ear tag 30% diazinon + 10% chlorpyrifos				Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly or lice season, or before slaughter.
	<i>lambda-cyhalothrin</i> Saber 10% insecticide ear tag 10% lambda-cyhalothrin + 13% piperonyl butoxide	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	<i>permethrin</i> Permethrin 10% Insecticide Ear Tag Gard Star Plus	2A	Ready-to-use when purchased.	– 0 D	Attach 1 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.
	Permethrin 0.25% dust	3A			Use in dust bags or apply up to 2 oz directly to animals. Re-treat 14-21 days later if needed for lice control.
	<i>pirimiphos-methyl</i> Dominator 20% insecticide ear tag 20% pirimiphos methyl	3A	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first.
	<i>zeta-cypermethrin</i> PYthon Magnum 10% insecticide ear tag zeta-cypermethrin 10% + piperonyl butoxide 20%	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.
Backrubbers and Facerubbers	<i>permethrin</i> Permethrin Rubbing Mixture	3A	Mix 1 qt 5.7% EC in 10 gal diesel fuel or mix 1 pt 10% or 11% EC in 1 gal of #2 diesel fuel or mineral oil or mix 118 ml 40% EC in 10 gal of diesel oil or suitable mineral oil.	– 0 D	Keep rubbing device charged. Daily forced use provides best results.
	<i>stirofos + dichlorvos</i> Ravap 1% stirofos + 0.25% dichlorvos in oil.	1B	Mix 5 oz 28.7% EC in 1 gal of #2 diesel fuel.	– 0 D	Pour 1 gal of mixture/20 ft of cable. Keep rubbing device charged.
Pour-on Spot-on	<i>permethrin</i> Atroban DeLice 1% pour on	3A	Ready-to-use when purchased.	align="center">– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% Ultra-Boss Pour-on 5%				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

STABLE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>dichlorvos</i> Vapona EC	1B	Mix 1 qt 21.8% EC in 6 gal of water. Restricted Use Pesticide.	– 1 D	Apply 1-2 fl oz 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 oz/ animal each day.
	<i>permethrin</i> Permethrin EC spray Permethrin II Atroban 11%	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	Permethrin EC Spray (low pressure)		Mix 1 qt 11% EC in 5 gal water.		
	Permethrin EC Spray		Mix 1 cup 42.5% EC in 100 gal water or mix 1 pt 40% EC in 100 gal water.		
	Pyrethrins Pyrethrins – synergized		Ready-to-use when purchased.		Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
Ear-Tags and Dust Bags (Self-Treatment)	<i>diazinon</i> Optimizer 21.4% insecticide ear tag	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly season, or before slaughter.
	Patriot 40% insecticide cattle ear tag.				
	Warrior 40% insecticide ear tag 30% diazinon + 10% chlorpyrifos				
	<i>lambda-cyhalothrin</i> Saber 10% insecticide ear tag 10% lambda-cyhalothrin + 13% piperonyl butoxide	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag 6.8% lambda-cyhalothrin + 14% pirimiphos methyl	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	<i>permethrin</i> Permethrin 10% Insecticide ear tag Gard Star Plus	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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.
	<i>pirimiphos-methyl</i> Dominator 20% insecticide ear tag	3A	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

STABLE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Ear-Tags and Dust Bags (Self-Treatment) <i>(continued)</i>	<i>zeta-cypermethrin</i> PYthon Zetagard 10% insecticide ear tag <i>zeta-cypermethrin 10% + piperonyl butoxide 20%</i>	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.
Backrubbers and Facerubbers	<i>permethrin</i> Permethrin Rubbing Mixture	3A	Mix 1 qt 5.7% EC in 10 gal diesel fuel or mix 1 pt 10% or 11% EC in 1 gal of #2 diesel fuel or mineral oil or mix 118 ml 40% EC in 10 gal of diesel oil or suitable mineral oil.	– 0 D	Keep rubbing device charged. Daily forced use provides best results.
Pour-on Spot-on	<i>lambda-cyhalothrin with piperonyl butoxide</i> Vetcap AIM-L insecticide capsules	2A			Apply only with a SmartVet Approved Vetcap Application Device according to label directions
	<i>lambda-cyhalothrin</i> Saber 1% pour-on insecticide	2A	Ready-to-use when purchased.	– 0 D	Apply to beef cattle and calves for lice and horn flies. Apply pour-on down the backline at 10 ml (1/3 fl oz)/animal for cattle weighing less than 600 lb or at a rate of 15 ml (1/2 fl oz)/animal for cattle weighing more than 600 lb. Repeat as needed but not more often than every 2 weeks and not more than 4 applications within a six month period.
	<i>permethrin</i> Atroban DeLice 1% pour-on	2A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% Ultra-Boss Pour-on 5%				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.
	Clean-up Pour-on Insecticide with IGR <i>permethrin 5% + diflubenzuron 5%</i>	2A/15			Follow label directions.

MAGGOTS IN WOUNDS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
	<i>coumaphos</i> Co-Ral 11.6%	1B	Mix 2.5-5 fl oz/gal water		Mix 2.5-5 fl oz/4 gal water and spray to complete wetting.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HORSE FLIES, DEER FLIES, MOSQUITOES, BLACK FLIES, EYE GNATS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>dichlorvos</i> Vapona EC	1B	Mix 1 qt 21.8% EC in 6 gal of water. Restricted Use Pesticide	– 1 D	Apply 1-2 fl oz 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 oz/ animal each day.
	<i>permethrin</i> Permethrin EC spray	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	Permethrin EC Spray (low pressure)		Mix 1 qt 11% EC in 5 gal water.		Apply 1-2 oz spray mixture/animal. Spot treat the back, face, legs and ears.
	Permethrin EC Spray Permethrin II Atroban 11%		Mix 1 cup 42.5% EC in 100 gal water or mix 1 pt 40% EC in 100 gals. water.		Apply 1 qt of low concentration spray mixture/animal to control horn flies only. Apply 2 qt of high concentration spray/animal to control all labeled parasites. Repeat treatment as needed but not more than every 14 days.
	<i>pyrethrins</i> Pyrethrins - synergized	3A	Ready-to-use when purchased.	– 0 D	Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
Ear-Tags and Dust Bags (Self-Treatment)	<i>permethrin</i> Permethrin 0.25% dust	3A	Ready-to-use when purchased.	– 0 D	Use in dust bags or apply up to 2 oz directly to animals. Re-treat 14-21 days later if needed for lice control.
Backrubbers and Facerubbers	<i>permethrin</i> Permethrin Rubbing Mixture	3A	Mix 1 qt 5.7% EC in 10 gal diesel fuel or mix 1 pt 10% or 11% EC in 1 gal of #2 diesel fuel or mineral oil or mix 118 ml 40% EC in 10 gal of diesel oil or suitable mineral oil.	– 0 D	Keep rubbing device charged. Daily forced use provides best results.
Pour-on Spot-on	<i>permethrin</i> Atroban DeLice 1% pou-on	3A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% Ultra-Boss Pour-on 5%				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.
	Clean-up Pour-on Insecticide with IGR <i>permethrin</i> 5% + <i>diflubenzuron</i> 5%				Follow label directions.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HOUSE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>dichlorvos</i> Vapona EC	1B	Mix 1 qt 21.8% EC in 6 gal of water. Restricted Use Pesticide	– 1 D	Apply 1-2 fl oz 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 oz/ animal each day.
	<i>permethrin</i> Permethrin EC spray Permethrin II Atroban 11%	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	<i>pyrethrins</i> Pyrethrins - synergized	3A	Ready-to-use when purchased.	– 0 D	Apply 1-2 fl oz daily or as needed. Apply to wet hair not skin.
Ear-Tags and Dust Bags (Self-Treatment)	<i>diazinon</i> OPTimizer 21.4% insecticide ear tag 21.4% <i>diazinon</i> Patriot 40% insecticide cattle ear tag Warrior 40% insecticide ear tag (30% <i>diazinon</i> + 10% <i>chlorpyrifos</i>)	1B	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of 1 or both ears of mature animals. Remove tags when control drops off, at the end of fly season, or before slaughter.
	<i>lambda-cyhalothrin</i> Saber 10% insecticide ear tag 10% <i>lambda-cyhalothrin</i> + 13% <i>piperonyl butoxide</i>	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	Double Barrel/Double Barrel VP 20.8% insecticide ear tag 6.8% <i>lambda-cyhalothrin</i> + 14% <i>pirimiphos methyl</i>	3A	Ready-to-use when purchased.	– 0 D	Apply 1 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.
	<i>permethrin</i> Permethrin 10% Insecticide Ear Tag Gard Star Plus	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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.
	<i>pirimiphos-methyl</i> Dominator 20% insecticide ear tag	3A	Ready-to-use when purchased.	– 0 D	Attach 1 tag to the inside of each ear on mature cattle. Remove tags when control drops off or in the fall, whichever occurs first.
	<i>zeta-cypermethrin</i> PYthon Magnum 10% insecticide ear tag <i>zeta-cypermethrin</i> 10% + <i>piperonyl butoxide</i> 20%	3A	Ready-to-use when purchased.	– 0 D	Attach 1 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, 1 tag/animal can be used on cows. Calves can be tagged with 1 tag as needed.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

HOUSE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Pour-on Spot-on	<i>permethrin</i> Atroban DeLice 1.0% pour-on	3A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% Ultra-Boss Pour-on 5%				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.
	Clean-up Pour-on Insecticide with IGR permethrin 5% + diflubenzuron 5%	3A + 15			Ready-to-use. Follow label directions.
Bolus, Feed Additives	<i>diflubenzuron</i> ClariFly (8%)	15		– 0 D	Mix according to label instructions and feed at rates stipulated based on cattle weights. Prevents development of fly larvae in manure of treated cattle. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	<i>tetrachlorvinphos</i> Rabon 7.76% granular oral laticide	1B	Pre-mix or ready-to-use blocks and mineral feeds are available commercially.	– 0 D	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 lb body weight daily. Begin feeding before flies appear in spring. Feed continuously until frost. Does not affect adult flies.

MITES, SCABIES (Psoroptic, Chorioptic, Sarcoptic)

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Sprays	<i>permethrin</i> Permethrin EC spray	3A	Mix 1 qt of 5.7% EC OR mix 1 pt of 10% EC or 11% EC in 100 gal water or mix 30-118 ml of 40% EC in 25 gal of water or apply 1% pour-on as an undiluted spray.	– 0 D	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.
	<i>phosmet</i> Prolate/Lintox Prolate/Lintox HD	1B	Mix 1 qt in 25-50 gal water (depending on target pest), and spray to run-off.	– 3 D	Apply as a coarse high pressure spray to thoroughly wet the skin and hair of the animal. Apply up to 1 gal/animal. Do not re-treat within 7 days. Follow label restrictions.

BEEF CATTLE EXTERNAL PARASITE AND GRUB CONTROL

MITES, SCABIES (Psoroptic, Chorioptic, Sarcoptic)

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS ^{1,2,3}
Injectable Pour-on Spot-on	<i>cyfluthrin</i> Cylence 1% pour-on insecticide	3A	Ready-to-use when purchased.	– 0 D	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 lb, 8 ml to animals weighing 400-800 lb and 12 ml to animals weighing over 800 lb. Do not re-treat within 3 weeks following treatment. Double the dose for biting and sucking lice.
	<i>doramectin</i> 0.5% Dectomax pour-on	6	Ready-to-use when purchased.		Apply 1 ml/22 lb body weight, along midline of the back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers up to 20 months of age.
	<i>eprinomectin</i> Ivomec Eprinex pour-on for beef cattle. Contains 5 mg. eprinomectin/ml.	6	Ready-to-use when purchased.	– 0 D	Administer pour-on to cattle 8 weeks of age or older. Apply at the dose of 1 ml/22 lb body weight. Apply pour-on to the top of the animal along the backline from the withers to the tailhead.
	<i>ivermectin</i> Ivomec 1% clear, ready-to-use sterile solution.	6	Ready-to-use when purchased.	– 35 D	Administer subcutaneously only 1 ml (10 mg ivermectin)/110 lb body weight. Restrain animals and inject under the loose skin in front of or behind the shoulder. A sterile, 16-gauge, 1/2-3/4” needle is suggested. Divide doses greater than 10 ml between 2 injection sites to reduce occasional transitory discomfort or site reaction. Waiting period between application and slaughter: 35 days.
	Ivomec pour-on, ready-to-use. 5 mg ivermectin/ml.			– 48 D	Apply 1 ml/22 lb of body weight. Apply along the topline in a narrow strip extending from the withers to the tailhead.
Injectable Pour-on Spot-on	<i>moxidectin</i> Moxidectin 1% injectable Cydectin 10 mg/ml	6		35 D	Inject 1 mg/10 lb body weight.
	Cydectin Pour-on				Use 22.7 mg/100 lb body weight (mites and lice).
	<i>permethrin</i> Atroban DeLice 1% pour-on	3A	Ready-to-use when purchased.	– 0 D	Apply 0.5% fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour correct dose along back and down face.
	Brute Pour-on 10% Ultra-Boss Pour-on 5%				Apply 15 cc (10%) or 30 cc (5%)/1000 lb down mid-line of back. Repeat the application in 10-14 days for mites.

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.

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>coumaphos</i> Coumaphos Co-Ral 6.15%	1B			Mix 2.5 fl oz/4 gal water and spray to complete wetting.
	<i>dichlorvos</i> Prozap Beef and Dairy RTU		Apply 1-2 oz/animal.		Apply no more than 2 fl oz 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.
	Vapona Insecticide Dairy Cattle Spray		Ready-to-use when purchased.		Apply no more than 2 fl oz 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.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	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		Mix 1 qt 5.7% EC in 25 gal water.		Apply 1-2 qt diluted spray thoroughly/animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Permethrin 0.5% EC Spray		Mix 1 qt 5.7% EC in 1.5 gal water.		Apply 1-2 oz diluted spray as a low pressure spray to face and shoulders of animal. Re-treat as needed but not more often than every 14 days.
	Permethrin 5.7% Ectiban EC		Mix 1 qt in 25 gal water.		Apply 1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>phosmet</i> Prolate/Lintox (11.75%)	1B	Mix with water according to label directions		Spray cattle to control horn flies, lice, scabies mites, and ticks. Repeat no more frequently than every 7-10 days. Do not apply within 28 days of freshening. Cattle may be slaughtered 3 days after spraying.
	<i>pyrethrins + synergist</i> <i>piperonyl butoxide</i>	3A			Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	Oil Solution or EC Spray pyrethrins 0.05-0.1% + synergist 0.5-1% pyrethrins 0.075% + synergist 0.75%		Oil Solution is Ready-to-use when purchased. EC spray, mix according to label instructions.		Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed.
	EC Spray pyrethrins 0.025% + synergist 0.25% pyrethrins 0.05% + synergist 0.5% pyrethrins 0.1% + synergist 1%		Mix according to label instructions.		Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap EC	1B	Dilute 2 oz in 3 gal. Direct spray to cover thoroughly with up to 0.5 gal/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

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Dusts	<i>coumaphos</i> 1% Co-Ral Livestock Dust, ProZap Zipcide Dust	1B	Ready-to-use when purchased.		Using shaker can, apply no more than 1 oz/animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times/year. Wait 10 days between applications. No milk withholding.
	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.		Apply up to 2 oz (5 Tbsp)/animal. Re-treat as needed but not more often than every 14 days.
	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.		Apply 2 oz of dust/animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	<i>zeta-cypermethrin</i> Python Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Feed Additives	<i>diflubenzuron</i> ClariFly 8%	15	Mix according to label instructions.		Feed at rates stipulated based on cattle weights. Prevents development of fly larvae in manure of treated cattle. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	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.
	<i>methoprene</i> Methoprene Altosid 0.02% feed mixture or mineral block IGR	7A	Ready-to-use when purchased.		Animals should consume 0.25-0.5 lb/100 lb 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.		Altosid IGR: Mix in feed to achieve consumption rate of 1.13 mg/100 lb animal body weight/day.
	<i>tetrachlorvinphos</i> Rabon Oral Larvicide Feed Mixture	1B	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)	<i>coumaphos</i> 1% Co-Ral Livestock Dust, ProZap Zipcide Dust	1B	Ready-to-use when purchased.		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 4-6" below the topline of the cattle. No milk withholding.
	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.		Apply 4-10 lb 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 4-6" below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.
	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.		Apply 2 oz of dust/animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
Backrubbers and Facerubbers	<i>coumaphos</i> Co-Ral Fly and Tick Spray 6.15%	1B	Mix 4 qt 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

HORN FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Backrubbers and Facerubbers (continued)	<i>permethrin</i> Synergized DeLice 1% solution	3A			<u>Back rubber use:</u> Keep rubbing device charged. Results improved by daily forced use.
	<i>Permethrin</i> 10% PY, ME		Mix 1 pt in 10 gal diesel oil		Keep rubbing device charged with 1 gal mixture/20 ft of cable. Cattle should be forced to use rubbing device daily.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Mix 1 gal in 25 gal oil		Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour 1 gal/20 linear ft of backrubber. Recharge as needed.
Ear Tags	<i>beta-cyfluthrin</i> Cylence Ultra	3A	Ready-to-use when purchased.		Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	<i>diazinon</i> Cattle ear tags Optimizer, Patriot	1B	Ready-to-use when purchased.		Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Beef and non-lactating animals only.
	<i>permethrin</i> GardStar Plus	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals
	<i>zeta-cypermethrin</i> PYthon, PYthon Magnum Zeta Gard	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
Pour-On	<i>doramectin</i> Dectomax Pour-on 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>eprinomectin</i> Eprinex Pour-on 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>moxidectin</i> Cydectin Pour-on 0.5%	6	Ready-to-use when purchased.		Pour weight-determined dose evenly along animal's backline 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 or untreated cattle may serve as source of reinfestation, requiring re-treatment.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 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.
	Ultra Boss 5%				Apply 3 ml/100 lb body weight up to a maximum of 30 ml/animal. Pour along back and down face.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

FACE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>coumaphos</i> Co-Ral 6.15%	1B			Mix 2.5 fl oz/4 gal water and spray to complete wetting.
	<i>dichlorvos</i> Prozap Beef and Dairy RTU	1B	Apply 1-2 oz/anima		Apply no more than 2 fl oz 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.
	Vapona Insecticide Dairy Cattle Spray		Ready-to-use when purchased.		Use according to label; apply less than 2 oz/animal.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 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.
	Mix 1 qt 5.7% EC in 25 gal water.		Mix 1 qt 5.7% EC in 25 gal water.		Apply 1-2 qt diluted spray thoroughly/animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	0.5% EC Spray		Mix 1 qt 5.7% EC in 1.5 gal water.		Apply 1-2 oz diluted spray as a low pressure spray to face and shoulders of animal. Re-treat as needed but not more often than every 14 days.
	5.7% Ectiban EC		Mix 1 qt in 25 gal water		1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>pyrethrins + synergist</i> <i>piperonyl butoxide</i> Oil Solution or EC Spray <i>pyrethrins</i> 0.05-0.1% + <i>synergist</i> 0.5-1% <i>pyrethrins</i> 0.075% + <i>synergist</i> 0.75%	3A	Oil Solution is ready-to-use. EC spray, mix according to label instructions.		Oil Solution or EC Spray: Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	EC Spray <i>pyrethrins</i> 0.025% + <i>synergist</i> 0.25% <i>pyrethrins</i> 0.05% + <i>synergist</i> 0.5% <i>pyrethrins</i> 0.1% + <i>synergist</i> 1%		Mix according to label instructions.		Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed. Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Dilute 2 oz in 3 gal Direct spray to cover thoroughly with up to 0.5 gal/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	<i>coumaphos</i> 1% Co-Ral Livestock Dust, ProZap Zipcide Dust	1B	Ready-to-use when purchased.		Using shaker can, apply no more than 1 oz/animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times/year. Wait 10 days between applications. No milk withholding.
	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.		Apply up to 2 oz (5 Tbsp)/animal. Re-treat as needed but not more often than every 14 days.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

FACE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Dusts (continued)	<i>tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.		Apply 2 oz of dust/animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	<i>zeta-cypermethrin</i> Python Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Feed Additives	<i>diflubenzuron</i> ClariFly 8%	15	Mix according to label instructions.		Feed at rates stipulated based on cattle weights. Prevents development of fly larvae in manure of treated cattle. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	<i>diflubenzuron</i> Vigilante Bolus 4.75 g Dimilin	15	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.
	<i>methoprene</i> Altosid 0.02% feed mixture or mineral block IGR	7A	Ready-to-use when purchased.		Animals should consume 0.25-0.5 lb/100 lb 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 lb animal body weight/day.
	<i>tetrachlorvinphos</i> Rabon Oral Larvicide Feed Mixture	1B	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)	<i>coumaphos</i> Co-Ral Livestock Dust, ProZap Zipcide Dust 1%	1B	Ready-to-use when purchased.		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 4-6" below the topline of the cattle. No milk withholding.
	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.		Apply 4-10 lb 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 4-6" below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.
	<i>stirofos or tetrachlorvinphos</i> Rabon 3% Dust	1B	Ready-to-use when purchased.		Apply 2 oz of dust/animal. Rub in lightly or apply in suspended self-treatment dust bags. Repeat as needed.
	<i>zeta-cypermethrin</i> Python Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Backrubbers and Facerubbers	<i>coumaphos</i> Co-Ral Fly and Tick Spray 6.15%	1B	Mix 4 qt 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.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Back rubber use: Mix 1 pt/gal of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
permethrin 10%	Mix 1 pt in 10 gal diesel oil.			Keep rubbing device charged with 1 gal mixture/20 ft of cable. Cattle should be forced to use rubbing device daily.	

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

FACE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Ear Tags	<i>beta-cyfluthrin</i> Cylence Ultra	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	<i>permethrin</i> GardStar Plus	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	<i>zeta-cypermethrin</i> PYthon, PYthon Magnum	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.

HOUSE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>dichlorvos</i> Prozap Beef and Dairy RTU	1B	Apply 1-2 oz/animal.		Apply no more than 2 fl oz 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.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	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.
	Ectiban EC 5.7%	A	Mix 1 qt in 25 gal water		1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>pyrethrins + synergist</i> <i>piperonyl butoxide</i> Oil Solution or EC Spray <i>pyrethrins</i> 0.05-0.1% + <i>synergist</i> 0.5-1% <i>pyrethrins</i> 0.075% + <i>synergist</i> 0.75%	3A	Oil Solution is Ready-to-use when purchased. EC spray, mix according to label instructions.		Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	EC Spray <i>pyrethrins</i> 0.025% + <i>synergist</i> 0.25% <i>pyrethrins</i> 0.05% + <i>synergist</i> 0.5% <i>pyrethrins</i> 0.1% + <i>synergist</i> 1%		Mix according to label instructions.		Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed. Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
	<i>tetrachlorvinphos + dichlorvos</i> Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1B	1 gal in 200 gal water for lactating dairy cattle		Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

HOUSE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Feed Additives	<i>diflubenzuron</i> ClariFly 8%	15	Mix according to label instructions.		Feed at rates stipulated based on cattle weights. Prevents development of fly larvae in manure of treated cattle. Prevents emergence of horn flies, face flies, house flies, and stable flies from manure of treated cattle. Start feeding early in the spring before flies appear and continue until cold weather restricts fly activity. Does not affect adult flies. No withdrawal; no milk withholding.
	Vigilante Bolus 4.75g 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.
	<i>tetrachlorvinphos</i> Rabon Oral Larvicide Feed Mixture	1B	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	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Back rubber use: Mix 1 pint/gal of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 10%		Mix 1 pt in 10 gal diesel oil.		Keep rubbing device charged with 1 gal mixture/20 ft of cable. Cattle should be forced to use rubbing device daily.
Ear Tags	<i>zeta-cypermethrin</i> PYthon Magnum Insecticide Cattle Ear Tag	3A	Ready-to-use when purchased.		Apply 1 tag/head to the front or back of 1 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

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>dichlorvos</i> Prozap Beef and Dairy RTU	1B	Apply 1-2 oz/animal.		Apply no more than 2 fl oz 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.
	Vapona Insecticide Dairy Cattle Spray		Ready-to-use when purchased.		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.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		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.
	EC Spray 11%		Mix 1 pt 11% EC in 25 gal water.		Apply 1-2 qt diluted spray thoroughly/animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	Ectiban EC 5.7%		Mix 1 qt in 25 gal water		Apply 1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

STABLE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays (continued)	<i>permethrin + synergist piperonyl butoxide</i>	3A			
	Oil Solution or EC Spray permethrin 0.05-0.1% + synergist 0.5-1% permethrin 0.075% + synergist 0.75%		Oil Solution is ready-to-use when purchased. EC spray, mix according to label instructions.		Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	EC Spray permethrin 0.025% + synergist 0.25% permethrin 0.05% + synergist 0.5% permethrin 0.1% + synergist 1%		Mix according to label instructions.		Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed. Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
	<i>tetrachlorvinphos + dichlorvos</i> Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1B	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	<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Feed Additives	<i>tetrachlorvinphos</i> Rabon Oral Larvicide Feed Mixture	1B	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)	<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Backrubbers and Facerubbers	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		<u>Back rubber use:</u> Mix 1 pt/gal of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	<i>permethrin</i> 10% PY, ME		Mix 1 pt in 10 gal diesel oil.		Keep rubbing device charged with 1 gal mixture/20 ft of cable. Cattle should be forced to use rubbing device daily.
Ear Tags	<i>beta-cyfluthrin</i> Cylence Ultra	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	<i>permethrin</i> GardStar Plus				
	<i>zeta-cypermethrin</i> PYthon, PYthon Magnum				

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

HORSE FLIES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>dichlorvos</i> Prozap Beef and Dairy RTU	1B	Apply 1-2 oz/animal. Ready-to-use when purchased.		Apply no more than 2 fl oz 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.
	<i>permethrin</i> Synergized DeLice 1.0% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 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.
	Ectiban EC 5.7%		Mix 1 qt in 25 gal water		1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>permethrin + synergist piperonyl butoxide</i> Oil Solution or EC Spray permethrin 0.05-0.1% + synergist 0.5-1% permethrin 0.075% + synergist 0.75%	3A	Oil Solution is ready-to-use when purchased. EC spray, mix according to label instructions.		Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin.
	EC Spray permethrin 0.025% + synergist 0.25% permethrin 0.05% + synergist 0.5% permethrin 0.1% + synergist 1%		Mix according to label instructions.		Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed. Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
Backrubbers and Facerubbers	<i>permethrin</i> Synergized DeLice 1.0% solution	3A	Ready-to-use when purchased.		<u>Back rubber use</u> : Mix 1 pt/gal of #2 diesel fuel or mineral oil. Keep rubbing device charged. Results improved by daily forced use.
	Permethrin 1% Backrubber and Facerubber Oil Mixture		Mix 1 pt/gal #2 diesel or mineral oil.		Keep rubbing device charged with 1 gal mixture/20 ft of cable. Cattle should be forced to use rubbing device daily.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

MOSQUITOES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>dichlorvos</i> Prozap Beef and Dairy RTU	1B	Apply 1-2 oz/animal.		Apply no more than 2 fl oz 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.
	Vapona Insecticide Dairy Cattle Spray		Ready-to-use when purchased.		
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. 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.
	Ectiban EC 5.7%		Mix 1 qt in 25 gal water.		Apply 1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>permethrin + synergist</i> <i>piperonyl butoxide</i>	3A	Oil Solution is ready-to-use when purchased. EC spray, mix according to label instructions. Mix according to label instructions.		Apply 1-2 fl oz as a fine mist-spray daily to all body parts, especially head and neck, with hand or automatic sprayer. Do not wet skin. Apply thoroughly as wetting spray. Repeat after 2-3 weeks if needed. Apply 1-2 qt as wet spray every 3-7 days if needed. Apply 1-2 qt as a wet spray every 2-3 days or apply 1-2 fl oz as a light mist-spray daily with hand or automatic sprayer.
	Oil Solution or EC Spray permethrin 0.05-0.1% + synergist 0.5-1% permethrin 0.075% + synergist 0.75%				
	EC Spray permethrin 0.025% + synergist 0.25% permethrin 0.05% + synergist 0.5% permethrin 0.1% + synergist 1%				
	<i>tetrachlorvinphos + dichlorvos</i> Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1B	1 gal in 200 gal water for lactating dairy cattle.	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.	
Dusts	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.	Apply up to 2 oz (5 Tbsp)/animal. For lice a second treatment may be needed 14-21 days later. Re-treat as needed but not more often than every 14 days.	
Dust Bags (Self- Treatment)	<i>permethrin</i> Permethrin 0.25% Dust	3A	Ready-to-use when purchased.	Apply 4-10 lb 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 4-6" below topline of cattle. Protect bags from weather. Do not hang bags over feed, mineral or water troughs.	
Backrubbers and Facerubbers	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.	<u>Back rubber use:</u> Mix 1 pt/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/20 ft of cable. Cattle should be forced to use rubbing device daily.	
	Permethrin 10%		Mix 1 pt 10 gal diesel oil.		
	<i>tetrachlorvinphos + dichlorvos</i> Ravap E.C. Livestock, Poultry & Premise Insecticide Spray	1B	Diluted in oil for backrubber.	Can be used on lactating dairy cattle, with no withholding. Dilute according to label instructions.	

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

MOSQUITOES

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Pour-On	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 animal. Pour-On: Pour correct dose along back and down face. Repeat pour-on treatments as needed, but not more than once every 14 days.

TICKS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>coumaphos</i> Coumaphos Co-Ral 11.6%	1B			Mix 1.25 fl oz/4 gal water and spray to complete wetting.
	<i>permethrin</i> EC Spray 0.05%	3A	Mix 1 qt 5.7% EC in 25 gal water.		Apply 1-2 qt diluted spray thoroughly/animal as a high pressure spray. Re-treat as needed but no more than once every 14 days.
	<i>permethrin</i> Ectiban EC 5.7%		Mix 1 qt in 25 gal water		1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Dilute 2 oz in 3 gal Direct spray to cover thoroughly with up to 0.5 gal/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	<i>coumaphos</i> Co-Ral Livestock Dust, ProZap Zipcide Dust 1%	1B	Ready-to-use when purchased.		Using shaker can, apply no more than 1 oz/animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times/year. Wait 10 days between applications. No milk withholding.
	<i>zeta-cypermethrin</i> PYthon Dust 0.075% zeta-cypermethrin	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Dust Bags Self-Treatment	<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Backrubber and Facerubbers	<i>coumaphos</i> 6.15% Co-Ral Fly and Tick Spray	1B	Mix 4 qt 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.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Mix 1 gal in 25 gal oil		Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour 1 gal/20 linear feet of backrubber. Recharge as needed.
Ear Tags	<i>beta-cyfluthrin</i> Cylence Ultra	3A			Follow label instructions regarding number of tags/head; remove when effectiveness is diminished and at end of season. Can be used on lactating dairy animals.
	<i>permethrin</i> GardStar Plus				
	<i>zeta-cypermethrin</i> PYthon, PYthon Magnum				

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

TICKS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Pour-On	<i>permethrin</i> Synergized DeLice 1.0% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 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.

CATTLE GRUBS

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Pour-On	<i>doramectin</i> 0.5% Dectomax Pour-on	6	Ready-to-use when purchased.		Apply 1 ml/22 lb body wt along midline of back between withers and tailhead. Safe for all beef cattle, and replacement dairy heifers up to 20 months of age.
	<i>eprinomectin</i> 0.5% Eprinex Pour-on	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>ivermectin</i> 0.5% Ivomec Pour-on	6	Ready-to-use when purchased.		Apply 1 ml/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.
	<i>moxidectin</i> 0.5% Cydectin Pour-on	6	Ready-to-use when purchased.		Pour weight-determined dose evenly along animal's backline from withers to tailhead (basing dose on label weight table). No pre-slaughter or milk discard interval.

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Sprays	<i>coumaphos</i> Coumaphos Co-Ral 6.15%	1B			Mix 2.5 fl oz/4 gal water and spray to complete wetting.
	<i>permethrin</i> Ectiban EC 5.7%	3A	Mix 1 qt in 25 gal water		1-2 qt of coarse spray/animal over whole body surface. Thoroughly wet animal.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Dilute 2 oz in 3 gal water. Direct spray to cover thoroughly with up to 0.5 gal/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	<i>coumaphos</i> 1% Co-Ral Livestock Dust, ProZap Zipcide Dust	1B	Ready-to-use when purchased.		Using shaker can, apply no more than 1 oz/animal as a uniform coat to the head, shoulders, and back. Treat no more than 6 times/year. Wait 10 days between applications. No milk withholding.
	<i>permethrin</i> 0.25% Permethrin Fly & Louse Dust	3A	Ready-to-use when purchased.		Using shaker can, apply no more than 2 oz/animal over the head, neck, shoulders, back and tailhead. Repeat as necessary.
	<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.

DAIRY CATTLE EXTERNAL PARASITE AND CATTLE GRUB CONTROL

CATTLE LICE

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Dust Bags (Self- Treatment)	<i>coumaphos</i> 1% Co-Ral Livestock Dust, ProZap Zipcide Dust	1B	Ready-to-use when purchased.		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 4-6” below the topline of the cattle. No milk withholding.
	<i>permethrin</i> Permethrin Fly & Louse Dust 0.25%	3A	Ready-to-use when purchased.		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 4-6” below the topline of the cattle. No milk withholding.
	<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.		Apply with dust bag or shaker.
Backrubbers and Facerubbers	<i>coumaphos</i> Co-Ral Fly and Tick Spray 6.15%	1B	Mix 4 qt 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.
	<i>tetrachlorvinphos</i> 23% + <i>dichlorvos</i> 5.3% Ravap E.C.	1B	Mix 1 gal in 25 gal oil		Can be used on lactating dairy cattle with no withholding. Dilute according to label instructions. Pour 1 gal/20 linear feet of backrubber. Recharge as needed.
Pour-On	<i>doramectin</i> Dectomax 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>eprinomectin</i> Eprinex 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>ivermectin</i> Ivomec 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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 re-treatment.
	<i>moxidectin</i> Cydectin 0.5%	6	Ready-to-use when purchased.		Pour weight-determined dose evenly along animal’s backline 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 re-treatment.
	<i>permethrin</i> Synergized DeLice 1% solution	3A	Ready-to-use when purchased.		Apply 0.5 fl oz (15 cc)/100 lb body weight of animal up to a maximum of 5 fl oz for any 1 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

MITES (Chorioptic)

WAYS TO APPLY INSECTICIDES	INSECTICIDE	MOA	MIXING INSTRUCTIONS	WITHDRAWAL TIME	APPLICATION INSTRUCTIONS AND RESTRICTIONS
Pour-On	<i>doramectin</i> Dectomax 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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.
	<i>eprinomectin</i> Eprinex 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/22 lb body wt along midline of the back between withers and tailback. Safe for all beef and dairy (including lactating) cattle.
	<i>ivermectin</i> Ivomec 0.5%	6	Ready-to-use when purchased.		Apply 1 ml/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.
	<i>moxidectin</i> Cydectin 0.5%	6	Ready-to-use when purchased.		Pour weight-determined dose evenly along animal's backline from withers to tailhead (basing dose on label weight table). No pre-slaughter or milk discard interval.

CATTLE EAR TAGS

Nancy C. Hinkle, Veterinary Entomologist

TAG NAME	ACTIVE INGREDIENT	CHEMICAL CLASS	BEEF	LACTATING DAIRY
Co-Ral Plus	Diazinon + Coumaphos	Organophosphate	YES	NO
Corathon	Coumaphos+Diazinon	Organophosphate	YES	YES
CyGuard	Beta-cyfluthrin	Pyrethroid	YES	YES
Cylence Ultra	Beta-cyfluthrin	Pyrethroid	YES	YES
Diaphos P	Diazinon + Chlorpyrifos	Organophosphate	YES	NO
Dominator	Pirimiphos methyl	Organophosphate	YES	NO
Double Barrel VP	Lambdacyhalothrin + Pirimiphosmethyl	Pyrethroid + Organophosphate	YES	NO
GardStar Plus	Permethrin	Pyrethroid	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	Lambda-cyhalothrin	Pyrethroid	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 CONTROL¹

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS & RESTRICTIONS
SPRAYS^{4,5}						
<i>coumaphos</i> Co-Ral	6.15%	0.06%	Mix 2 qt/50 gal water (or 5 oz/4 gal water)	Wet to point of runoff. Treat no more than 6 times/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 pyrethrins or their synergists, or with other organophosphates or cholinesterase inhibiting drugs, pesticides or chemicals.
Co-Ral Emulsifiable Livestock Insecticide (Restricted Use)	11.6%	0.06%	Mix 1 qt/50 gal water (or 2.5 oz/4 gal water)			
<i>permethrin</i>	42.5% EC	0.108%	Mix 8 oz of 42.5% EC in 25 gal water.	Spray animals thoroughly (approximately 1 pt/ 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.
GardStar 40% EC			60-118 ml-25 gal water (treats 50-100).			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.
Atroban, Ectiban, Gardstar, Permethrin SP, ME	5.7% EC 10% EC 11% EC 40% EC 42.5% EC	0.025- 0.054%	Mix 1 pt 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 oz of 42.5% EC in 25 gal water.	Wet thoroughly. (approximately 1 pt/ animal).		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		Apply across back of head and ears, then apply down midline of neck over shoulders.
<i>phosmet</i> Prolate/Lintox-HD	11.75% EC	0.06%	Mix 1 qt of 11.6% EC in 25 gal 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.
<i>tetrachlorvinphos</i> Rabon	50% WP	0.5%	Mix 4 lb of 50% WP in 50 gal water.	1-2 qt. Wet animal thoroughly.	0	Apply as a coarse spray. Repeat in 2 weeks, if needed.

SWINE: EXTERNAL PARASITE CONTROL

HOG LICE CONTROL¹

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION^{2,3} INSTRUCTIONS & RESTRICTIONS
LARVICIDE SPRAYS						
<i>cyromazine</i> Neporex 2SG			Mix 1 lb/gal of water.			Spray manure where fly larvae are found.
<i>diflubenzuron</i> Dimilin 2L			Mix 5 fl oz in 10 gal water.			Apply as a directed spray in spot treatments at a volume of 1 qt of spray solution to 10 sq ft of surface area where maggots are developing.
<i>pyriproxyfen</i> 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.
NyGuard IGR 10%			Mix 4 ml in sufficient water to cover 1500 sq ft.			Apply to maggot habitats at rate of 4 ml/1,500 sq ft.
Pyri-Shield EC 1.3%			Mix 1 fl oz in 1 gal water.			Apply to 1500 sq ft of surface area.
DIPS⁵						
<i>permethrin</i>	40% EC	0.025-0.05%	Mix 60-118 ml in 25 gal water.	Immerse entire animal.	5	Dip animals including ears. Spray pen floors, sides and bedding. Repeat at 14 days.
DUSTS⁵						
<i>permethrin</i> Ectiban, Insectrin	0.25% D	Ready-to-use	No mixing required.	Dust thoroughly.	5	Apply up to 1 oz (2 1/2 Tbsp)/animal. Pay particular attention to ears and other hard-to-reach areas. Re-treat 14 days later if needed.
<i>coumaphos</i> Co-Ral 11.6%						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 pyrethrins or their synergists, or with other organophosphates or cholinesterase inhibiting drugs, pesticides or chemicals.
<i>phosmet</i> Prolate	1% D	Ready-to-use	No mixing required.	Dust thoroughly. Apply 0.5-1 oz of dust/animal to backline and lightly rub in. Repeat in 10-14 days or as needed.	1	Dust animals thoroughly. 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.

SWINE: EXTERNAL PARASITE CONTROL

HOG LICE CONTROL¹

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS & RESTRICTIONS
INJECTABLE⁵						
<i>doramectin</i> Decto Max injectable	1%		Ready-to-use when purchased.	Inject 1 ml/75 lb	24	Intramuscular injection.
<i>ivermectin</i> Ivomec	1%	Ready-to-use when purchased.	No mixing required	1 ml/75 lb body weight. (300 mcg of ivermectin/kilogram of body weight)	18	Inject subcutaneously. Follow label instructions.

CONTROL OF HOG MANGE MITES

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS & RESTRICTIONS
POUR-ON⁵						
<i>permethrin</i> 10% pour on	To control mange mites, lice and fleas. Apply 3 ml/100 lb body weight.					
<i>phosmet</i> Prolate	1% D	Ready-to-use when purchased.	No mixing required.	Dust thoroughly. Apply 0.5-1 oz of dust/animal to backline and lightly rub in. Repeat in 10-14 days or as needed.	1	Dust animals thoroughly. 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.

CONTROL OF BLOWFLIES, MOSQUITOES, FLEAS AND TICKS^{4,5}

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION ^{2,3} INSTRUCTIONS & RESTRICTIONS
<i>permethrin</i> Permethrin II	10% EC	0.025%	Mix 1 qt of 10% EC in 25 gal of water.	Spray, paint or dip to apply 1 pt/hog, especially around ears.	5	

SWINE: EXTERNAL PARASITE CONTROL

CONTROL OF TICKS^{4,5}

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION^{2,3} INSTRUCTIONS & RESTRICTIONS
<i>coumaphos</i> Co-Ral	6.15%	0.06%	Mix 2 qt/50 gal water (or 5 oz/4 gal water).	Wet to point of runoff. Treat no more than 6 times/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 pyrethrins or their synergists, or with other organophosphates or cholinesterase inhibiting drugs, pesticides or chemicals.
Emulsifiable Livestock Insecticide	11.6%		Mix 1 qt/50 gal water (or 2.5 oz/4 gal water)			
Co-Ral	25% WP	0.24%	Mix 8 lb of 25% WP in 100 gal of water.	Thoroughly treat wound and surrounding area with light but thorough coverage.		
<i>phosmet</i> Prolate	1% D	Ready-to-use when purchased.	No mixing required.	Dust thoroughly. Apply 0.5-1 oz of dust/animal to backline and lightly rub in. Repeat in 10-14 days or as needed.	1	Dust animals thoroughly. 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.

- 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.

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	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS & USE RESTRICTIONS
Flies: biting midges, black flies, deer flies, face flies, gnats, horn flies, horse flies, lice, mosquitoes, punkies, ticks, wound-infesting larvae (screwworms)	<i>coumaphos</i> 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. Apply specified dosage in 4 gallons of water for complete wetting. Repeat as necessary.
	<i>cypermethrin</i> Bite Free, Tri-Tec 14, 0.15%	Fly control: Ready-to-use when purchased.	Mist-spray or wipe-on: Apply mist-spray to horses as needed every 5-14 days. Not for use on horses intended for human consumption.
	<i>permethrin</i> EC Insectrin 5.7%	Fly, mange, tick and lice control: Mix 1 pt of 5.7 % EC in 12.5 gal of water. Lice control: Mix 1 pt of 5.7% EC in 25 gal of water. Fly and ear tick control: Mix 1 pt of 5.7% EC in 1.25 gal of water.	Spray 1-2 qt/animal over whole body surface. For mange, lice, and scabies control, thoroughly soak animal and apply a second treatment 14 days later. Spray until animal is thoroughly treated. A second application is recommended 14 days later. Spray mist: Apply 1-2 oz/animal. Spot treat back, face, legs and ears. Do not use on horses intended for human consumption.
	EC Atroban, Permethrin II 10-11%	Fly and lice control: Mix 1 pt of EC in 25 or 50 gal water (1 oz in 6 qt of water).	Spray: Use high concentrations for stable flies and face flies. Apply directly to animals at 1-2 qt/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.
	Buzz Off II, Hard Hitter, 0.4-1% ready-to-use spray or wipe-on	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.
	Poridon Insecticide Pour-on 1.84%	Aids in fly control: Ready-to-use when purchased. No mixing required.	Pour-on: Apply 2-4 oz/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	Fly, lice, tick & mite control: Mix 6 oz (21 level Tbsp) of 25% WP in 19 gal water.	Spray: Spray to run off or use 1 gal spray mix/head. Do not spray feed or water.
	GardStar SP, ME 40% EC	Fly, mite, tick and lice control: Mix 7.5 ml in 1 pt of water (0.64%). Fly, mite, tick and lice control: Mix 5-12.5 ml in 2 gal water (0.026-0.067%).	Spray: Apply as a low pressure spray. Apply 1-2 fl oz (30-60 ml) spray/animal. Spot treat back, face, legs, tail and ears. Dip wash: Thoroughly wet animal to skin with sponge or rag. Let drip dry. Do not wet the animal's face.
	Brute 10%		Pour-on or wipe: Apply 3-6 ml/200 lb body weight, up to 30 ml max. Do not treat foals under 12 weeks of age.
	Ultra Boss Pour-on 5%	Ready-to-use when purchased.	Apply 3 ml/100 lb body weight of animal up to a maximum of 30 ml/animal. Pour along back and down face. Do not saddle animal for 6 hours after application.
Clean-up Pour-on Insecticide with IGR <i>permethrin</i> 5% + <i>diflubenzuron</i> 5%	Ready-to-use when purchased for fly and lice control.	Ready-to-use for fly and lice control. Follow label directions as wipe-on or undiluted RTU spray.	

HORSES: EXTERNAL PARASITE CONTROL

EXTERNAL PARASITES	INSECTICIDE¹	MOA	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS & USE RESTRICTIONS
Flies: biting midges, black flies, deer flies, face flies, gnats, horn flies, horse flies, lice, mosquitoes, punkies, ticks, wound-infesting larvae (screwworms) <i>(continued)</i>	<i>pyrethrins + synergist</i> Spray and wipe-on.	3A	Fly control: 0.05%-0.2% plus synergist mist-spray. Ready-to-use when purchased. 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 (1-4 fl oz/animal). Direct application will kill ticks. Repeat as needed.
	Repel-X EC <i>pyrethrins 0.4% + synergist</i>		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 qt of water.	Spray or sponge-on: Apply heavily to wet animal every 3-4 days or as needed to control flies and ticks. Do not use on animals intended for human consumption. Avoid getting into animal's eyes.
	Swat <i>pyrethrins 0.36% + synergist spray</i>		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
	Repel-X <i>pyrethrins 0.05% + synergist 0.5% + permethrin 0.1% to 0.5%</i>			
	Wipe II <i>pyrethrins 0.1% + synergist</i>		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.
	<i>pyrethrins 0.2% + synergist</i> Wipe-on Swat ointment		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. Ointment: To treat superficial wounds, abrasions, sores and scratches, apply enough ointment to cover the wound. Apply directly to the wound and use daily.
	<i>resmethrin 0.5% + butoxypolypropylene glycol 10.0%</i> Super Shield II	3A	Fly control: Ready-to-use when purchased. No mixing required.	Spray or wipe-on: Apply to wet hair but not the skin of animal. For maximum protection apply 4-6 oz to animal and repeat every 2-3 days if needed. Do not use on horses intended for slaughter.
	<i>resmethrin 0.554% + butoxypolypropylene glycol 11.0%</i> Fly Repellent	3A	Fly and tick control: Apply by spray or wipe-on. Mix 4 oz of concentrate in 28 oz of water to make 1 qt.	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.
<i>zeta-cypermethrin</i> PYthon Dust 0.075%	3A	Ready-to-use when purchased.	Can be applied by shaker can, dusting glove, or mechanical dust applicator. Apply up to 2 oz (6 Tbsp) evenly into hair. Repeat as needed, but not more than once every 3 days.	
Flies: face flies, horn flies	<i>tetrachlorvinphos 0.475-2.468%</i> Horse Feed Supplement Rabon, Equitrol, Vita-Plus with Equitrol, Drive with Equitrol	1B	Manure breeding flies: Ready-to-use feed supplement. Each horse must consume 70 mg tetrachlorvinphos/100 lb 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.
	<i>diflubenzuron</i> SimpliFly 0.24%	15	Manure breeding flies: Ready to use feed supplement. Each horse must consume 6.8 mg diflubenzuron/100 lb. 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.
	Dimilin 2L		Mix 5 fl oz in 10 gal water.	Apply as a directed spray in spot treatments at a volume of 1 qt of spray solution to 10 sq ft of surface area where maggots are developing.

HORSES: EXTERNAL PARASITE CONTROL

EXTERNAL PARASITES	INSECTICIDE ¹	MOA	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS & USE RESTRICTIONS
Flies: face flies, horn flies (continued)	<i>cyromazine</i> Solitude IGR 2.12%	17	1 scoop 300 mg/horse/day.	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.
	Neporex 2SG		Ready-to-use granular.	Scatter 1 lb/200 sq ft to wet areas where maggots develop.
	<i>pyriproxyfen</i> Archer Nylar Insect Growth Regulator 1.3%	7C	Mix 1 fl oz in 1 gal water.	Wet surfaces where larvae are found; may repeat 14 days afterward.
	NyGuard IGR 10%		Mix 4 ml in sufficient water to cover 1,500 sq ft.	Apply to maggot habitats at rate of 4 ml/1,500 sq ft.
Pyri-Shied EC 1.3%		Mix 1 fl oz in 1 gal water.	Apply to 1,500 sq ft of surface area.	
Mange	<i>permethrin</i> Purina Hard Hitter, Stable Spray, Insectrin 5.7% EC	3A	Mix 1 pt of 5.7% EC in 12.5 gal water.	Fly, mange, tick and lice control: Spray 1-2 qt/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	<i>ivermectin</i> Eqvalan, Zimectrin	6	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.
	<i>moxidectin</i> 2%	6	Ready-to-use when purchased.	Follow directions on pre-filled syringe. Do not treat horses less than 6 months of age or those intended for food purposes.

FLY CONTROL IN HORSE FACILITIES: RESIDUAL (CONTACT) SPRAYS¹ AND BAITS

INSECTICIDE	MOA	MIXING INSTRUCTIONS	METHODS OF APPLICATION AND SAFETY REGULATIONS
<i>cyantraniliprole</i> Zyrox Fly Granular bait	28	Ready-to-use when purchased.	Apply in bait station, inaccessible to children, pets and food animals. Use 2 lb bait/1000 sq ft/yr.
<i>cyfluthrin</i> Countdown 24.3% EC, 20% WP	3A	Mix 9.5 grams or 19 grams of 20% WP OR mix 16 ml of 24.3% EC in sufficient water to cover 1000 sq ft.	Direct as a coarse, wetting spray to surfaces in horse operations where flies congregate, including ceilings, walls, fences, posts and manure. Apply to point of runoff (1 gal/500-1000 sq ft). 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/gal of spray. Remove animals before spraying and return them when spray dries.
<i>beta-cyfluthrin</i> Tempo 11.8% SC, 24.3% EC, 20% WP	3A	Mix 8-16 milliliters of 11.8% Tempo SC Ultra Premise Spray in sufficient water to cover 1000 sq ft.	
<i>deltamethrin</i> Annihilator Insecticide Premise Spray 0.02%	3A	Ready-to-use when purchased.	Apply thoroughly to surfaces until wet. Repeat as necessary, but not more than once/week. Do not spray animals or humans, or apply to animal feed or watering equipment.
<i>gamma-cyhalothrin</i> StandGuard 5.9%	3A	Mix 0.16 fl oz (5 ml)/gal of water.	Spray 1 gal of diluted spray to treat 500-1000 sq ft of fly resting surfaces.
<i>imidacloprid</i> QuickBayt Spot Spray 10%	4A	Mixed at the rate of 1 lb/gal water to treat 1000 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.
<i>lambda-cyhalothrin</i> Grenade ER Insecticide 9.7% Demand CS 9.7%	3A	Mix 0.2-0.4 oz (6-12 ml)/gal water.	Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present
<i>permethrin</i> Atroban Ectiban Insectrin Overkill Permethrin 5.7% EC, 11% EC or 25% WP	3A	5.7% EC is ready-to-use as a mist-spray OR mix 1 qt 5.7% EC in 12.5 gal of water OR mix 6 oz 25% WP in 11 gal of water OR mix 1 pt 11% EC in 10 gal 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 oz/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.
<i>tetrachlorvinphos</i> Rabon 2 lb ai/gal 23% + dichlorvos Vapona 0.5 lb ai/gal Ravap 5.7% EC3A	1B	1.25%-2.5% spray. Mix 1 gal or 2 gal EC in 25 gal.	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/500-1000 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.

FLY CONTROL IN HORSE FACILITIES: RESIDUAL (CONTACT) SPRAYS¹ AND BAITS¹

INSECTICIDE	MOA	MIXING INSTRUCTION	METHODS OF APPLICATION AND SAFETY REGULATIONS
SPACE SPRAYS¹; FOGS OR MISTS			
<i>esfenvalerate</i> 35% Endure 35WP	3A	Mix 1 or 2 scoops with 1 gal water and spray 1 gal/1000 sq ft	Do not apply when feed is present.
<i>permethrin</i> 5.7% EC	3A	Mix 1 pt 5.7% EC in 6.25 gal diesel or mineral oil	Apply fog at 4 fl oz/1000 cu ft of air space in confined facility. Repeat as needed.
<i>permethrin</i> 0.5% + <i>tetramethrin</i> 0.2% Indoor Fogger	3A	Ready-to-use when purchased.	Remove animals from area. Turn off all ignition sources (flames, pilot lights, etc). 1 fogger treats 6000 cu ft.
<i>pyrethrins</i> 0.1-0.75% + <i>synergist</i> 0.5-3.75%	3A	Ready-to-use when purchased.	Apply fogs or spray mists at 1 fl oz/1000 cu ft as fine atomized spray. Repeat as needed.
<i>spinosad</i> 44.2% Elector PSP	5	Mix 2 fl oz (60 ml) in 10 gal water to treat 5000-10000 sq ft. Use sufficient water in a directed spray to contact flies and their resting surfaces.	
BAITS			
<i>cyantraniliprole</i> Zyrox Fly Granular bait	28	Ready-to-use when purchased.	Apply in bait station, inaccessible to children, pets and food animals. Use 2 lb bait/1000 sq ft/year.
<i>dinotefuran</i> QuickStrike Scatter Bait 0.5%	4A	Ready-to-use when purchased.	Use as a scatter bait outdoors around animal agricultural facilities; do not place in areas where bait might be accessible to children or animals. Use in bait stations inside poultry and livestock facilities, placing bait stations so they will be inaccessible to children and animals. Bait is effective only against adult house flies. Follow label directions.
<i>imidacloprid</i> QuickBait 0.5%	4A	Ready-to-use when purchased.	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			Use in buildings where animals are kept and where flies are a nuisance.
<i>methomyl</i> Blue Streak, Golden Malrin 1% Fly Bait	1A	Ready-to-use when purchased.	Scatter on floors, walkways, etc. throughout operation but away from animals. Apply lightly (about 1/4 lb/500-1000 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.
<i>nithiazine</i> 1% QuickStrike Fly Abatement Strip	4	Ready-to-use when purchased.	Place in areas where flies congregate and feed. Do not expose to sunlight or moisture. Follow label directions.
<i>spinosyn</i> 0.5% spinosad	5	Ready-to-use when purchased.	Follow label directions for scatter bait, station/tray bait, or paint/spray bait use. Locate where inaccessible to animals and children.
thiamethoxam	4A	Dissolve 8 oz in 60 fl oz water	Follow label directions for spraying adult fly resting sites.

¹ 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	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION INSTRUCTIONS & RESTRICTIONS
NASAL BOTS						
<i>ivermectin</i> Ivomec Sheep Drench	0.08% Ivermectin			Administer orally at a dose of 3 ml/26 lb body wt. Delivers 0.2 mg ivermectin/1 kg body wt.	11	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						
<i>permethrin</i> Permethrin Prozap Pour-on Xtra	1% permethrin					Pour along back, applying ¼ fl oz/50 lb body weight of animal, up to maximum of 3 fl oz/animal. For optimal control, all animals in flock should be treated after shearing.
<i>permethrin</i> * Gardstar	40% EC	0.013-0.05% high pressure spray	Mix 30-118 ml in 25 gal of water.	Apply 1-2 qt of coarse spray/animal over the entire body.	0	Repeat application in 10-14 days for mites and lice. Do not apply to milk goats.
		0.5% low pressure spray (hand pump sprayer)	Mix 118 ml in 2.5 gal 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.		Repeat application in 10-14 days for mites and lice. Do not apply to milk goats.
Atroban 11%, Permethrin II 10%	10% EC 11% EC	0.05% spray	Mix 1 pt of 11% EC in 25 gal water OR mix 8 oz of 10% EC in 25 gal water.	Apply 1-2 qt of coarse spray/animal to thoroughly wet the animal.		Repeat the application in 10-14 days for mites. Do not apply to milk goats.
Atroban 42.5% EC	42.5% EC	0.054% spray	Mix 1 pt of 42.5% EC in 100 gal of water.	Apply sufficient spray (Approximately 2 qt/ animal) to thoroughly wet animals to ensure complete coverage.		Repeat the application as needed but not more often than once every 2 weeks. Do not apply to milk goats.
Atroban DeLice, Permethrin, Synergized DeLice	1% Solution	No mixing required. Ready-to-use when purchased.	Pour along back. Apply 0.25 fl oz (7.5 cc)/50 lb body weight of animal, up to a maximum of 3 fl oz for any 1 animal.			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, 2 treatments at a 14 day interval are recommended. Do not apply to milk goats.

SHEEP AND GOATS: EXTERNAL PARASITE CONTROL¹

INSECTICIDE	FORMULATION	FINAL STRENGTH IN WATER	MIXING INSTRUCTIONS	AMOUNT PER MATURE ANIMAL	DAYS FROM LAST APPLICATION UNTIL SLAUGHTER	APPLICATION INSTRUCTIONS & RESTRICTIONS
LICE, KEDS, TICKS, HORN FLIES, HOUSE FLIES AND STABLE FLIES						
<i>permethrin</i> Boss	5% Pour-On Solution	No mixing required. Ready-to-use when purchased.	Pour-On. No mixing required.	Pour along the back. Apply 1.5 ml/50 lb of body weight of animal up to a maximum of 18 ml for any 1 animal.	0	Repeat treatment as needed, but not more often than once every 2 weeks. For optimum lice control, 2 treatments at 14 day intervals are recommended. Do not apply to milk goats.
Ultra Boss 5.0%	Pour-on RTU			Apply 1.5 ml/50 lb body weight of animal up to a maximum of 18 ml/animal. Pour along back and down face.		
Permethrin	Spray			Follow label instructions.		
<i>zeta-cypermethrin</i> PYthon Dust 0.075%				Apply up to 2 oz (6 Tbsp) of dust/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.

OP - organophosphate, PY - pyrethroid.

POULTRY: FLY CONTROL

Nancy C. Hinkle, Veterinary Entomologist, and Brent Phelan, Graduate Student

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	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & 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.			
<i>cyantraniliprole</i> Zyrox Fly Granular bait	28	Ready-to-use when purchased.	Apply in bait station, inaccessible to children, pets and food animals. Use 0.2-0.4 lb bait/1000 sq ft/yr.
<i>esfenvalerate</i> 35%	3A	Apply according to label directions.	Do not apply when feed is present.
<i>permethrin</i> Atroban, Ectiban, Insectrin, Permethrin 5.7% EC, 10% EC or 25% WP	3A	5.7% EC is ready-to-use as a mist-spray OR mix 1 qt 5.7% EC in 12 1/2 gal of water OR mix 6 oz 25% WP in 11 gal of water OR mix 1 qt 10% EC in 25 gal 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 oz/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.
<i>Beauveria bassiana</i> HF 23 balEnce 1.12% ES (5.6x10 ⁹ cfu/ml)		Follow label instructions for dilution instructions.	Apply at a rate of 1.5-2 fl oz/5000 sq ft of floor area. Apply to floors, walls, posts, and manure areas where the greatest number of pests are located. Equipment must not be used with a filter or screen smaller than 50 microns. Re-treat every 2-7 days while pests persist.
<i>beta-cyfluthrin</i> Tempo 11.8% SC, 24.3% EC, 20% WP	3A	Mix 8-16 milliliters of 11.8% Tempo SC Ultra Premise Spray in sufficient water to cover 1000 sq ft.	
<i>bifenthrin</i> Actishield	3A	Mix 0.33-1 oz with 1 gal water; apply/1000 sq ft	For adult fly control in and around animal facilities, spray application should target areas where flies will rest.
<i>chlorpyrifos</i> Durashield, Duratrol	1B	Restricted use pesticide for use by certified applicators	Apply according to label directions to adult fly resting sites
<i>cyfluthrin</i> Optashield CS	3A	Mix 1-2 fl oz with 1 gal water	Apply 1 gal/1000 sq ft.
<i>deltamethrin</i> Deltagard 2%	3A	Follow label instructions for dilution recommendations.	Product intended for use with handheld, backpack, portable and truck mounted ULV or mist-sprayers. Apply in areas where flies congregate. Cover all feed and water sources. Follow application rate chart for flow rate recommendations.
<i>dichlorvos</i> Vapona	1B	Ready to use	Apply as coarse spray, 1 pt/1000 sq ft of surface.
<i>gamma-cyhalothrin</i> StandGuard 5.9%	3A	Mix 0.16 fl oz (5 ml)/gal of water.	Spray 1 gal of diluted spray to treat 500-1000 sq ft of fly resting surfaces.
<i>imidacloprid</i> QuickBayt Spot Spray 10%	4A	Mix at the rate of 1 lb/gal of water to treat 1000 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.
<i>lambda-cyhalothrin</i> 9.7% Grenade ER Insecticide Demand CS	3A	Mix 0.2-0.4 oz (6-12 ml)/gal water.	Make a directed application to fly-resting surfaces and allow to dry before reintroduction of animals. Do not apply when animals are present

POULTRY: FLY CONTROL

INSECTICIDE	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & SAFETY RESTRICTIONS ¹
RESIDUAL AND BAIT SPRAYS (continued)			
<p style="text-align: center;">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.</p> <p>NOTE: Use of residual sprays promotes insecticide resistance. Use of synthetic pyrethroid (SP) insecticides virtually eliminates the implementation of a dump fly (<i>Hydrotaea aenescens</i>) biological control program.</p>			
<i>Ravap Rabon</i> 2 lb ai/gal 23% + <i>Vapona</i> 0.5 lb ai/gal 5.7% EC	1B	1% spray. Mix 1 gal EC in 25 gal of water (12 Tbsp/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/500-1000 sq ft). To make bait spray, add 1 cup sugar or syrup/gal of spray. Do not contaminate eggs, feed or water. Keep spray away from birds.
<i>spinosad</i> Elector 2.46% spinosyn	5	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/500-1000 sq ft. Repeat as needed, but not more often than once/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.
<i>spinosad</i> Elector PSP 44.2% spinosyn	5	Mix 2 fl oz (60 ml) in 10 gal of water to treat 5000-10000 sq ft.	Use sufficient water in a directed spray to contact flies and their resting surfaces. Do not apply where birds are present. Follow label directions.
<i>tetrachlorvinphos</i> Rabon 50 WP	1B	Mix 0.5 lb in 1.5 gal water.	Spray 1 gal/500 sq ft.
<i>tetrachlorvinphos</i> + <i>vapona</i> Ravap EC	1B	Mix 5 oz/gal water.	Apply 1 gal spray/500-1000 sq ft, treating fly resting sites.
CONTACT SPRAYS			
<p>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.</p>			
<i>dichlorvos</i> Vapona or DDVP 1%	1B	Ready-to-use when purchased.	Remove animals before fogging; dispense 1 pt/8000 cu ft. 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.
<i>pyrethrins</i> Clear Zone	3A	Ready-to-use when purchased.	Apply 1-3 sec/1000 cu ft.
<i>pyrethrins</i> 0.3-5% + <i>piperonyl butoxide</i> 1.5-25% NP, ME	3A	Ready-to-use when purchased, 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.

POULTRY: FLY CONTROL

INSECTICIDE	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & SAFETY RESTRICTIONS ¹
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> balEnce Biological Fly Spray	Biological	15 oz container diluted in 6-8 gal water. Treats up to 50000 sq ft.	Apply spray to manure. Repeat treatment as recommended on label.
<i>cyromazine</i> Larvadex 1% Premix, HE	17	5 parts/million in total diet of commercial layers or hatching egg layers. Mix 1 lb of 1% premix/2000 lb of feed.	Administer 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.
Flyzine 1% Premix			Blend into poultry ration for layer and breeder operations at the rate of 1 lb/ton of feed.
Neporex 2SG		Ready-to-use when purchased.	Scatter directly and evenly on wet fly larval development sites (manure). Wear gloves. To spray, mix 1 lb in 1 gal of water and spray 200 sq ft. Do not apply directly to birds or feed. Do not use in conjunction with other cyromazine products.
Larvadex 2SL		Mix 32 fl oz/5 gal water.	Apply 1 gal/100 sq ft of maggot breeding area.
<i>diflubenzuron</i> Dimilin 2L	15	Mix 5 fl oz in 10 gal water.	Apply spray in spot treatments to maggot developmental sites in manure
<i>novaluron</i> Tekko 10 IGR 9.3%	15	Mix 2-3 oz in 1 gal water	Apply as a coarse spot, crack, or crevice spray at a rate of 1.5-3 oz/1000 sq ft. Product is stable, not volatile and may be used while facility is in operation so long as exposed feed and water sources are covered. Do not spray into the air or over water sources. Allow at least 1 day between application and slaughter of animals.
<i>pyriproxifen</i> Archer Nylar Insect Growth Regulator 1.3%	7C	Mix 1 fl oz in 1 gal water.	Wet surfaces where larvae are found; may repeat 14 days afterward.
NyGuard IGR 10%		Mix 4 ml in sufficient water to cover 1000 sq ft.	Apply to litter at rate of 4 ml/1000 sq ft.
Pyri-Shield EC 1.3%		Mix 1 fl oz in 1 gal water.	Apply to 1500 sq ft of surface area.
Ravap	1B	1% spray. Mix 1 gal EC in 25 gal of water.	Under cages, broadcast treatment as a coarse low-pressure spray at a rate of 1 gal/100 sq ft of manure.
Rabon 2 lb ai/gal 23% and Vapona 0.5 lb ai/gal 5.7% EC			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 lb ai/gal 21.8% EC	1B	0.5% spray. Mix 3 1/3 cups EC in 10 gal 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.

POULTRY: FLY CONTROL

INSECTICIDE	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & SAFETY RESTRICTIONS ¹
BAITS			
In some operations, baits can be used to control adult house flies. These materials can be bought ready-to-use.			
<i>cyantraniliprole</i> Zyrox Fly Granular bait	28	Ready-to-use when purchased.	Apply in bait station, inaccessible to children, pets and food animals. Use 2 lb bait/1000 sq ft/year. Apply using granular spreader at a rate of 3.2-6.4 oz/1000 sq ft. Reapply every 7 days. Do not apply where children or pets are present, or when it is raining. Keep out of reach of food-producing animals. Do not apply more than 2 lb/1000 sq ft/calendar year when using outdoors as a broadcast spreader.
<i>Beauveria bassiana</i> balEnce Biological Fly Bait	Biological		Use in bait stations at least 4 ft above ground at the rate of 0.25 lb/50 sq ft. Do not use within reach of children or animals. Replace every 5-7 days.
<i>dinotefuran</i> QuikStrike Scatter Bait 0.50%	4A	Ready-to-use when purchased.	Use as a scatter bait outdoors around animal agricultural facilities; do not place in areas where bait might be accessible to children or animals. Use in bait stations inside poultry and livestock facilities, placing bait stations so they will be inaccessible to children and animals. Bait is effective only against adult house flies. Follow label directions.
<i>imidacloprid</i> QuickBayt 0.5%	4A	Ready-to-use when purchased.	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.
QuickBayt Fly Strip		Ready-to-use when purchased.	Use in buildings where animals are kept and where flies are a nuisance.
QuickBayt Spot Spray		Mix 16 oz in 1 gal water.	Treat 1000 sq ft of adult fly resting surface in areas inaccessible to food animals.
<i>methomyl</i> Apache Golden Malrin Improved Golden Malrin Blue Streak 1% bait	1A	Ready-to-use bait.	Scatter on floors, walkways, etc., throughout house. Apply heavy (about 1/2-2 lb/1000 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.
<i>nithiazine</i> QuikStrike 1.0% fly abatement strips	4	Ready-to-use strip.	Hang 1 strip/100 sq ft or 300 sq ft depending on fly population in enclosed areas that are protected from rain.
<i>spinosad</i> Elector Bait 0.5% spinosyn	5	Ready-to-use bait.	Apply at rate of 12-16 oz of bait/2,000 sq ft of building. Follow label directions.
<i>thiamethoxam</i> Agita 10 WG	4A	Mix 8 oz per/60 fl oz water.	Treat adult fly resting sites; keep out of reach of animals and children. Follow label directions.

POULTRY EXTERNAL PARASITE CONTROL

Nancy C. Hinkle, Veterinary Entomologist, and Brent Phelan, Graduate Student

BEDBUGS, CHICKEN LICE, FLEAS, FOWL TICKS, AND MITES FOR DIRECT TREATMENT TO BIRDS OR POULTRY FACILITY

INSECTICIDE	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & SAFETY RESTRICTIONS ¹
DUSTS²			
<i>permethrin</i> Ectiban, Insectrin, Permethrin 0.25% Dust	3A	Ready-to-use dust.	Apply 1 lb/100 birds. Ensure thorough treatment of vent for northern fowl mite control.
Sulfur Yellow Jacket Wettable Dusting Sulfur II	Inorganic	Ready-to-use dust.	Dust liberally on birds and rub into plumage, concentrating on area around vent
SPRAYS³			
<i>permethrin</i> Ectiban, Permethrin 5.7% EC	3A	Mix 1 qt 5.7% EC <u>OR</u> 1 pt 11% EC in 25 gal 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.
23% <i>stirofos</i> + 5.7% <i>dichlorvos</i> Ravap 28.7% EC	1B	Mix 2 qt EC in 24 gal water.	Apply 1 gal/100 birds. Apply directly to birds. Spray vent and fluff areas from below using high pressure (100 psi 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 1-2 gal of spray/1000 sq ft of litter. Spray birds lightly.
<i>spinosad</i> Elector PSP 44.2% spinosad	5	Mix 3 fl oz Elector PSP in 10 gal water.	Apply 100 gal of coarse spray/100 Elector PSP to birds to ensure adequate coverage, directed toward the vent area.
<i>sulfur</i> Yellow Jacket Wettable Dusting Sulfur II	Inorganic	Mix 25-50 lb/100 gal water.	Spray 200-250 lb/20000 sq ft to all interior services, forcing into cracks and crevices. Do not spray birds.

BEDBUGS, CHICKEN MITES, FLEAS AND FOWL MITES FOR TREATMENT OF POULTRY FACILITY ONLY (Not For Direct Application To Birds)

INSECTICIDE	MOA	MIXING INSTRUCTIONS	APPLICATION METHODS & SAFETY RESTRICTIONS ¹
<i>pyrethrins 1-2%</i> + <i>piperonyl butoxide</i> + 3% <i>bicycloheptane dicarboximide</i> Surekill SK 100	3A	Concentrate designed for undiluted use in mechanical sprayers that give particles of aerosol size.	Apply at a rate of 3 fl oz/1000 cu ft undiluted, using a ULV spraying device. Remove feed, water, and live animals before application. Apply to all areas where insects take shelter. Allow product to thoroughly dry before re-entry.
<i>tetrachlorvinphos</i> + (5.7%) <i>dichlorvos</i> 28.7% Ravap (23%)	1B	1.25% or 2.5% spray or 1.25% roost paint. Mix 1 gal EC in 12.5 gal of water to make 2.5% mixture or mix 1 gal EC in 25 gal of water to make 1.25% mixture.	Apply roost paint at the rate of 1 pt of finished mixture/100 ft of roost area with brush or spray OR apply 1 gal of spray/100-150 sq ft for fowl ticks or 1 gal of spray/500-1000 sq ft for other parasites.

¹ Do not contaminate feed, water or feeding and watering equipment.

² Dust birds thoroughly, especially under the wings and around the vent. Provide thorough ventilation while dusting.

³ Penetration of feathers around vent is essential for northern fowl mite control. Apply directed sprays using 100-125 psi. 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, and Brent Phelan, Graduate Student

LITTER BEETLES—Darkling Beetles (black bugs, black poultry bugs, lesser mealworms) and Hide Beetles

INSECTICIDE ¹	MOA	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
<i>Beauveria bassiana</i> HF 23 FBP23 ES 0.46% (1.1x10 ¹⁰ cfu/ml)		Apply at a rate of 1.5-2 fl oz to treat 5000 sq ft.	Do not use equipment with a filter or screen smaller than 50 microns. Apply treatment to walls, floors and posts where the greatest number of pests are located. Re-treat between flocks as needed. No restriction on maximum amount that can be applied within a 1-year period.
FBP23 LBT Bait 0.137% (6.5.1x10 ⁹ cfu/ml)		Apply at a rate of 1 oz/sq ft using a drop spreader or hand shaker.	Apply before birds are placed in houses. Cover or remove water sources. If beetle numbers are high at flock start, re-treatment may be done in 4-week intervals. Only apply to poultry or livestock manure that is to be composted. Avoid using in areas where foraging honey bees are present.
<i>bifenthrin</i> Actishield 7.9% Talstar Professional Insecticide 7.9% Nemesis 7.9%	3A	Apply at rate of 0.33-1 fl oz/1000 sq ft.	Apply to litter surface when birds not present.
<i>chlorpyrifos</i> Duratrol Darkling Beetle Spray Restricted use pesticide	1B	Restricted use only	Follow label directions.
<i>clothianidin</i> Darlex	4A	Mix 80 oz in 10-40 gal to treat 20,000 sq ft.	For whole-house broadcast spray or band application under feeders along water lines, and along walls.
<i>cyfluthrin</i> Optashield CS 6%	3A	Apply at rate of 1-2 oz/1000 sq ft.	Remove all animals from facility, Do not apply to feedstuffs or watering equipment.
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.
Tempo 1% Dust		Ready-to-use when purchased.	Remove all animals from facility. Apply dust using hand or power dusters or other suitable equipment. Apply uniformly at 0.5-1 lb/1000 sq ft. Do not apply to feedstuffs or watering equipment. Repeat treatment as necessary.
Tempo 20 WP Insecticide		Add 9.5 g (1 scoopful) Tempo 20 WP to adequate water to cover 1000 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.
<i>esfenvalerate</i> Clear Zone Farm Residual Concentrate 9.36%	3A	Mix 0.8 oz product in 1 gal water.	Apply 1 gal of mixture to treat 1000 sq ft.
<i>gamma-cyhalothrin</i> 5.9% StandGuard	3A	Mix 0.65 fl oz. (20 ml)/gal of water. Spray 1 gal of diluted spray to treat 500-1000 sq ft.	Apply to floor area, with particular attention to areas under feed and water lines. Do not apply when birds are present.
<i>imidacloprid</i> Credo SC 42.8%	4A	Apply at rate of 3 fl oz/1000 sq ft.	Do not apply when birds are present. Cover or remove exposed feed and water. Allow to dry before restocking birds.
Adonis 4F 40.4%		Mix 3 fl oz/2 gal water; treat 1000 sq ft.	Apply between flocks following sanitation procedures; do not apply when birds are present.
<i>lambda-cyhalothrin</i> 9.7% Grenade ER Insecticide Demand CS OxyFly 9.7%	3A	Mix 0.8 oz (24 ml)/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.

POULTRY HOUSE PEST CONTROL

LITTER BEETLES—Darkling Beetles (black bugs, black poultry bugs, lesser mealworms) and Hide Beetles

INSECTICIDE ¹	MOA	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
<i>orthoboric acid</i> Safecide Brand IC 99% Borid 99% BorActin 99% Safecide Brand IC	8D	Ready-to-use when purchased.	Remove birds. Apply dust uniformly to floor of poultry house or old litter with a fertilizer or seed spreader, at the rate of 1-2 lb/100 sq ft in bands along feeder lines. Cover with fresh shavings.
<i>permethrin</i> Tengard SFR 36.8%	2A	Apply at rate of 4 fl oz in 12.5 gal water. Spray 1 gal/750 sq ft.	Do not apply when birds are present.
<i>pyrethrins</i> Riptide ULV 5%	3A	Ready-to-use when purchased.	Apply undiluted at 0.25-1 fl oz/1000 cu ft for knockdown of accessible insects; provides no residual.
<i>pyriproxyfen</i> Archer Insect Growth Regulator 1.3%	7C	Mix 1 fl oz in 1 gal water.	Wet surfaces where larvae are found; water volume may be increased to enhance litter penetration.
NyGuard IGR 10%		Mix 4 ml in sufficient water to wet surface being treated.	Wet area where larvae are found.
Pyri-Shield EC 1.3%		Mix 1 oz in 1 gal.	Apply 1 gal/1000 sq ft where larvae are found.
<i>spinosad</i> 44.2% Elector PSP	5	Mix 2 fl oz (60 ml) in 10 gal of water to treat 5000 sq ft.	Use sufficient water to ensure thorough coverage, treating litter along feed and water lines, walls and support beams. Reapply after each grow-out.
Extinosad PSP 44.2%		Mix 2 oz with 10 gal water.	Apply 1 gal/500 sq ft.
<i>tetrachlorvinphos</i> Rabon Beetle Shield 3% dust	1B	Ready-to-use when purchased.	Use 4-8 oz/100 sq ft, applied using plunger or rotary type duster
Rabon 50WP			Use rotary, mechanical or electrostatic duster to apply ¾ oz/100 sq ft of surface.
<i>tetrachlorvinphos</i> + <i>dichlorvos</i> Ravap E.C. 23% <i>tetrachlorvinphos</i> + 5.3% <i>dichlorvos</i>	1B	1 gal in 25 gal water (for extreme infestations dilute 1 gal in 12.5 gal water)	Apply 1 gal of spray/500-1000 sq ft to cover walls, floors, and other sites where beetles congregate.
Rabon 50WP	1B	Mix 8 lb with 100 gal water.	Apply 1-2 gal/100 sq ft.
<i>zeta-cypermethrin</i> ZetaGard LBT	3A	RTU dust	Use a drop spreader to make band applications under feedlines and along walls; 50 lb/20,000 sq ft broiler house.

MOTHS IN FEED (webbing clogging auger and feed lines)

INSECTICIDE ¹	MOA	MIXING INSTRUCTIONS	APPLICATION INSTRUCTIONS AND SAFETY RESTRICTIONS ²
Diatomaceous earth DE	Inorganic	Ready-to-use when purchased.	Mix 4-6 lb of DE/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) *important changes pending: as of time of writing, the US Food and Drug Administration is in the process of converting Terramycin from over-the-counter to prescription use only by licensed veterinarians. Similar changes may be forthcoming for Tylosin and Lincomycin.	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 3 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 1 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).	
	Lincomycin	Honey bee colonies should receive 3 treatments administered as a dust in confectioners/powder sugar. Mix 100 mg Lincomycin in 20 g confectioners/powdered sugar. The 100 mg dose is applied (dusted) over the top bars of the brood chamber. Apply 3 single doses, each 1 week apart.	
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) *see note above for AFB.	Terramycin	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		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. <i>permethrin</i> (GardStar 40% E.C.)	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/6 hives).	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. Predatory soil nematodes especially <i>Heterohabditis indica</i> (Southeastern Insectaries, Perry, GA).	3. <u>For treatment outside colonies</u> : Mix 1 million infective juveniles in 2 gal. water/colony. Strain out gelatin globules and trickle solution on ground in front of hive. Treat ground under hive if screen bottoms are used.	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

PEST	MATERIAL AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Tracheal mites	menthol	One 1.8 oz packet/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 in the medicated extender patty described below helps control AFB, EFB 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			Varroa mite is the most important priority in honey bee health management. The optimum treatment window is mid-July through August. It is important that the bees are healthy that will be making up the future winter cluster. Early treatments (Feb-Mar) have been shown to provide an added measure of control. Avoid using Apistan and CheckMite at the same time or in near succession, as these products are known to synergize in a way that harms bees. As with all medications, do not treat during marketable nectar flows.
	1. <i>fluvalinate</i> Apistan	1 strip for each 5 combs of bees in each brood chamber	1. Apistan: Hang strips in the center of the brood nest with at least 2 frames in between such that bees can readily contact the surface.. Leave strips in hive for 42 to 56 days.
	2. <i>coumaphos</i> CheckMite + Strip	1 strip for each 5 combs of bees in each brood chamber	2. CheckMite: Hang the strips within 2 combs of the edge of the bee cluster. If 2 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. 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.
	3. <i>thymol</i> Apiguard	1 tray/colony, repeated after 2 weeks	3. Apiguard: Open the hive. Peel back the foil lid of the Apiguard tray leaving 1 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 2 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. 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 1 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.

HONEY BEE DISEASE AND PEST CONTROL

PEST	MATERIAL AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Varroa mites <i>(continued)</i>	4. <i>thymol</i> ApiLife VAR	1 treatment consists of 3 wafers over 2-32 days	<p>4. ApiLife VAR: Applications can be made in any season (spring, summer, fall, winter) in which all applicable restrictions, precautions and directions for use can be followed. Do not use when surplus honey supers are in place. Use when average daily temperatures are between 59° F and 69° F. Do not use ApiLife VAR at temperatures above 90°F.</p> <p>2 treatments/year may be made. A treatment (3 tablets) consists of the following:</p> <p>Take 1 tablet and break into four equal pieces. Place pieces on the top corners of the hive body. Avoid placing pieces directly above the brood nest. After 7-10 days, replace with a fresh tablet broken into pieces as above. Repeat procedure again, 7-10 days later and leave last tablet for 12 days. After 12 days, remove residuals from the colony.</p> <p>To prevent the bees from gnawing the tablet either enclose each piece of tablet in an envelope of screen wire (8 mesh/inch) or place the uncovered pieces above a sheet of metal screen that prevents bees from contacting it.</p> <p>Remove ApiLife VAR tablets from hive at least 1 month (30 days) prior to harvesting the honey.</p>
	5. <i>formic acid</i> Mite-Away Quick Strips	2 strips	<p>5. Optimal treatment season is spring or fall corresponding to optimal temperature windows described below. Outside daytime temperature highs should be between 50 - 92° F. Temperatures > 95° F during the first three days of treatment can cause excessive brood mortality and absconding. Remove strips from pouch. For hives with single brood chambers lay 2 strips across the top bars of the frames of the brood chambers, staggering them so they lay flat and across the full width of the hive body, with approximately 2 inches between strips and 4 inches between the ends of the brood chamber and the outer edges of the strips. For hives with 2 brood chambers place the strips as described above on the frame top bars of the lower hive body, so the strips are in-between the brood chambers. Put on honey supers if a honey flow is anticipated. The active ingredient dissipates after 3 days; however, do not disturb the colony for 7 days to allow it to recover from manipulation. Spent strips need not be removed after use.</p>
	6. <i>amitraz</i> Apivar	2 strips	<p>6. Apivar: Hang strips in the center of the brood nest with at least 2 frames in between such that bees can readily contact the surface. If colony fills 2 brood chambers then use 4 strips, 2/brood chamber. Leave strips in hive for a minimum of 42 days then remove.</p>
Wax moths	PDB crystals	Stack stored supers, cover stack and make air-tight with newspaper or duct tape. At intervals equal to the height of 5 deep supers or 10 shallow supers, insert 6 tablespoons of PDB. Put crystals on a small piece of cardboard placed on top bars of frames. Replace crystals as they evaporate. Air-out supers before using on live bee hives.	Wax moths are secondary scavengers. Wax moths in living colonies indicate an underlying problem. Check for queenlessness, disease, or mites. Protect stored combs by: (1) storing them on top of strong colonies, (2) freezing combs and supers, then stacking them and taping shut all cracks to exclude moths, (3) stacking combs so they are constantly exposed to air and daylight, (4) operating an electronic “bug zapper” in the super storage room to kill adult moths, (5) using PDB crystals.