



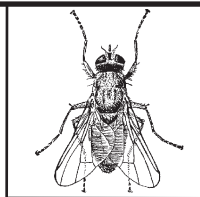
# Control External Parasites of **Beef Cattle**

External parasites of beef cattle include several species of insects, mites and ticks. Most of these pests feed on blood, but some feed only on the skin. External parasites infest cattle of all ages, but the economic loss is usually measured in reduced weight gain of growing animals. The stress and energy loss caused by these pests result in fewer pounds of beef production. Other more direct effects of external parasites include less milk production by mother cows, disease transmission, anemia and damage to hide and meat. They can reduce cattle's resistance to diseases and environmental extremes, too. Only in extreme cases do heavy infestations of external parasites result in death of beef cattle.

The major external parasites of beef cattle in Louisiana are the horn fly, the stable fly, horse flies and deer flies. Lice are of lesser importance. Ticks, mange mites and the cattle grub tend to be minor pests in Louisiana. Mosquitoes and black flies can be serious pests during epidemics.

## Horn Flies

The horn fly is probably the most important external parasite of Louisiana beef cattle. This annual pest infests cattle statewide.



Economic infestations (200 or more flies per animal) usually develop in May and then persist into the fall.

Heavy infestations of this blood-sucking pest irritate and stress animals, which, in turn, affect grazing, milk production and nursing calves. Horn flies reduce beef production efficiency, and the economic loss is manifested in growing cattle. That is, cows wean lighter calves and yearlings or stocker cattle gain less weight over a given period. Normally, growing cattle gain an

extra 1.5 pounds per week when horn flies are controlled.

Horn flies are a greater problem in pastured cattle because they require a fresh, intact manure pad to complete their life cycle. Adult horn flies spend their entire lives resting and feeding on cattle, although female flies leave cattle occasionally to lay eggs. The egg, larva (maggot) and pupa stages of the life cycle all occur either in or under manure pads. Life cycle development from egg to adult fly requires about two weeks. Newly emerged horn flies immediately seek out cattle to feed on, thus beginning a new generation.

Because the horn fly spends all of its adult life on cattle, control with insecticides can be highly effective. Insecticide-impregnated ear tags, pour-ons, sprays and self-treatment devices can all be effective when applied properly.

Just as the habits of the horn fly make the pest vulnerable to insecticide treatments, this same behavior can create problems with insecticide resistance. Continuous use of the same insecticide or class of insecticides will eventually result in fly populations that cannot be controlled. Ear tags are especially bad about this, because they provide continuous exposure of the same insecticide for several months.

## Stable Flies

Stable flies are biting flies that are normally a problem in Louisiana during the cooler months. They are similar to house flies in size and appearance, but they have sword-like mouthparts.



In addition to causing blood loss, they annoy cattle and interfere with their normal feeding behavior. This results in weight loss or reduced weight

gain. Stable flies normally feed below the knees and hocks of cattle, but they can move onto the sides and backs if populations are heavy. Cattle will often bunch together in an effort to defend themselves from heavy stable fly infestations. They will also stand in water to protect their lower extremities. In either situation, there is a negative expenditure of time and energy. Although there is no official economic threshold for this pest, reduced weight gain in feeder cattle has been documented from as few as two stable flies per leg.

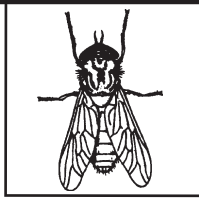
The larva or maggot of this fly develops in decaying vegetation or organic matter. Manure mixed with stall litter, spilled feed or hay makes an ideal medium for stable flies to lay their eggs. For this reason, stable flies have traditionally been a bigger problem around barns and feed lots. In Louisiana, this pest has become a more important pasture pest because of feeding large, round hay bales during the cool season. Hay spillage and manure in feeding areas make an ideal breeding medium for stable flies.

Spraying cattle with recommended insecticides is somewhat effective in controlling stable flies, but most chemicals approved for this use have a short-lived effectiveness. Therefore, multiple applications may be required to protect cattle during the fly season.

Sanitation is an effective management practice that reduces stable flies by eliminating their breeding habitat. These practices include proper disposal or handling of manure, feed and hay residues. Spreading or disking helps to dry out residues around feeding areas. The use of hay racks reduces spillage and spoilage of hay. Also, rotating the location where hay is fed will prevent a constant buildup of hay and manure in one area.

## Horse Flies and Deer Flies

There are many species of horse flies and deer flies that belong to a broad group of flies referred to as tabanids. In Louisiana,



more than 100 species of tabanids are pests of livestock. These flies have certain common characteristics, but they vary in appearance and size, ranging from ¼ inch to 1 ¾ inches in length. Tabanids are blood-sucking flies that have broad, flat, blade-like mouthparts that inflict a deep and painful wound.

Adult female flies require a blood meal to support egg development, but the remainder of the life cycle is independent of livestock. Male flies do not bite or suck blood. Female flies lay their eggs on vegetation that usually borders some source of water. The larval stage develops in the water, but they pupate in drier soil. The entire life cycle requires from two months to two years, but most species have only one generation per year. Adult flies are normally present for about a month, but the tabanid season can be longer if multiple species are present.

Tabanids cause extreme annoyance and blood loss to cattle. Heavy attack results in weight loss or reduced weight gain in growing cattle. The annoyance causes cattle to bunch together, and sometimes they hurt themselves by stampeding or hooking and kicking each other. Tabanids are also vectors of numerous diseases such as anaplasmosis and equine infectious anemia.

Horse flies and deer flies are the most difficult livestock pest to control, primarily because of their life cycles. The entire life cycle, except for the female fly, is independent of livestock. Furthermore, the female flies spend only a few minutes feeding on cattle to generate eggs for the next generation.

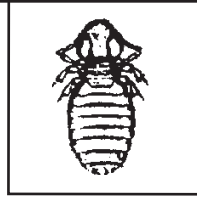
Spraying cattle with recommended insecticides provides partial protection from tabanids. Some insecticides reduce feeding time and blood consumption if applied regularly. The drawback is the limited residual control, plus the expense and work involved with multiple application. Pour-ons, ear tags and

other methods of insecticide control are essentially ineffective.

Proper management of cattle herds may be the most realistic, but least popular, approach to tabanid control. Locating cattle away from tabanid breeding habitats and wooded areas will help avoid attack from these flies. Some protection can be obtained by providing cattle with covered shelters or something as simple as an open-sided roof supported by posts.

## Lice

Lice are generally not major pests of beef cattle in Louisiana, probably because of the mild winter climate, but they are occasional pests that can cause serious problems in livestock when heavy infestations occur.



As many as four species of sucking lice and one species of biting lice infest beef cattle. Sucking lice have piercing-sucking mouthparts that pierce the hide and suck blood; biting lice have chewing mouthparts for feeding on the skin and hair. Sucking lice usually have the greatest impact on herd health and cause the greatest economic loss.

Lice are tiny (1/8 inch or less in length), wingless insects that spend the entire life cycle on the cattle host. Immature lice (nymphs) resemble the adults, except they are smaller. The entire life cycle from egg to adult requires three to four weeks for most species. Lice are spread within a herd by bodily contact.

Lice are generally a cold weather pest problem. Populations generally increase in the fall and rapidly decline in the early spring. In summer, lice survive in very low numbers on carrier animals.

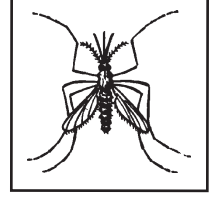
Lice cause irritation and blood loss to cattle. Infested cattle are often seen rubbing on posts, trees and other objects, resulting in hair loss. Further irritation can result in bleeding and sores. The economic loss is the result of weight loss, reduced weight gain, or possibly sickness and death. The impact of lice infestations is usually greater on animals that are already stressed by cold weather or other factors.

Depending on the species, lice are often found first on the neck, shoulders, back, dewlap or base of the tail. Under heavy infestations, lice will spread to all body areas.

Lice are relatively easy to control with recommended insecticide sprays and pour-ons. A second application, 14 days after initial treatment, is usually recommended to control newly hatched lice, because most insecticides are not effective on lice eggs.

## Mosquitoes

Mosquitos are not major pests of beef cattle in Louisiana, but they may be the most underrated. Because of their small size and nocturnal feeding behavior, mosquito infestations are not always obvious to the producer. Mosquitoes are blood-sucking insects that irritate and stress cattle, thus reducing feed intake. In extreme cases, heavy infestations can result in death through suffocation or heavy blood loss.



Many species of mosquitoes attack cattle, and their habits vary greatly. All, however, require some source of water for the immature stages to develop. Females lay their eggs in water or in places that will eventually be flooded. Once eggs are in contact with water, the life cycle from egg to adult requires about one to two weeks. Only the adult females of most species suck blood.

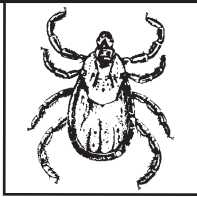
Massive numbers of mosquitoes can build quickly in south Louisiana under certain environmental conditions. Several species of floodwater mosquitoes can develop huge populations when heavy rainfall follows an extended drought. Large numbers of eggs are laid in dry areas, but they remain dormant until activated by rain and rising water.

Spraying cattle with recommended insecticides will provide temporary relief from mosquitoes, but multiple applications may be required to protect cattle during the mosquito season. Control programs that encompass agricultural areas can have a major impact. Aerial insecticide treatments are usually the best approach in years when heavy infestations suddenly emerge. Solitary

cattle such as bulls are always the most susceptible to massive mosquito attack. Cattle herds can partially defend themselves by bunching together and lying in mud.

## Ticks

Ticks are potentially one of the most damaging parasites of beef cattle. Fortunately, ticks are no longer a major, statewide problem in Louisiana.



Problems still occur on a small scale, but there are only a few areas where ticks are considered to be an important pest of cattle. The demise of ticks as a major livestock pest is thought to be caused in part by the high density movement of fire ants into Louisiana in the 1950s.

Several species of ticks infest cattle, with the lone star tick and gulf coast tick being two of the most important. Most ticks require three blood meals to complete the life cycle. That is, the larva, nymph and adult stages all need an animal host from which to suck blood. After feeding, the larval and nymphal stages drop from their host animals and then molt to the next stage. Adult ticks drop to the ground and lay eggs for the next generation. In some species all life stages can infest cattle, while the immature stages of other species will infest birds and smaller mammals. Regardless of the species, it is the wild animals that maintain tick populations in cattle pastures.

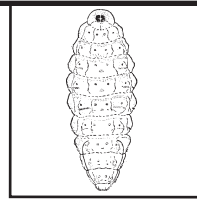
Economic losses from ticks result from blood losses, injection of toxic secretions or transmission of diseases. The symptoms include weight loss, anemia and loss of condition, all of which reduce the pounds of beef produced. The lone star tick normally attaches to the lower half of the body, and the gulf coast tick feeds in and around the ears. Ticks are normally a bigger problem in wooded or brushy pastures. Tall weeds and brush along cattle paths are likely locations where ticks seek out cattle hosts.

Lone star ticks can be controlled with high pressure insecticide sprays applied to all parts of the animal's body. Ear ticks can be controlled with

insecticide ear tags or small doses of insecticide sprays and dusts applied in and around the ear.

## Cattle Grubs

Cattle grubs are the larval stage of the heel fly, a very large fly that resembles the color of a honeybee. Cattle grubs are actually internal parasites, but the adult heel fly does not bite or suck blood from the cattle. Cattle grubs are not a major problem in Louisiana, although at one time they were common.



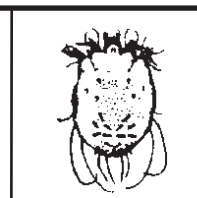
There is one generation of cattle grubs per year. It begins with the adult heel flies laying their eggs on the legs and undersides of cattle. Although these large flies do not feed on cattle, they disturb them and disrupt grazing. Newly hatched larvae penetrate the skin and begin an eight-month migration through the connective tissue. After reaching the back, the grub makes a breathing hole in the skin. This situation is referred to as a warble. After one to two months of feeding, the grub squeezes through the breathing hole and drops to the ground where it pupates.

Cattle grubs reduce carcass value as well as the hide's leather value. The parasitic activity of cattle grubs also results in nutritional loss and stress.

Cattle grubs can be controlled with systemic insecticide sprays and pour-ons. Some of the new anti-parasitic materials also have insecticidal activity on cattle grubs. Treatments should be made after the heel fly season, but before the grubs reach the back area.

## Mange and Scab Mites

Mange, itch and scabies are terms that refer to skin diseases of cattle caused by parasitic mites. There are actually several types of this skin disease; each is caused by a different species of mite. Psoroptic (common) scab and sarcopic mange are probably the two most important. Mange and scabies are not



very common in Louisiana cattle. These skin diseases tend to be more prevalent in cooler climates, especially in feed lots where cattle remain in close contact. Nevertheless, mange and scabies can be serious diseases when they occur.

Subclinical diagnosis of scabies is difficult because these mites are about 1/40 inch in length or less. These mites have life cycles that range from two to three weeks, and all life stages are found on the cattle host. Mites have piercing-sucking mouthparts they use to suck lymph from the skin.

Mites multiply rapidly and produce the most severe skin lesions during the cool months. Intense feeding results in small wounds that progress to running sores. As scabs form over the lesions, the mites move out to the edges and perimeter of the sores. Early detection can be made by taking skin scrapings from the surrounding area of the scabs.

These skin diseases result in weight loss, reduced weight gain or reduced milk production. Cattle may become unthrifty and in extreme cases die. Scab and mange result in itching and irritation, and cattle are often seen licking their sores.

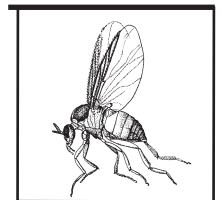
These parasitic mites are normally spread by bodily contact among cattle; however, they can survive for several days without a host on fences, stalls, trailers and other cattle-working facilities.

Mange and scab mites can be controlled with various sprays, dips and pour-ons. In severe cases, producers should consult a veterinarian for proper treatment and care of infested cattle.

## Black Flies or Buffalo Gnats

Black flies or buffalo gnats are tiny (1/25 to 1/5 inch in length), robust flies that range in color from orange to black. The females are biting flies that require a blood meal to produce and lay eggs. Black flies and buffalo gnats are sporadic, localized pests in Louisiana, but they can be quite damaging when massive outbreaks occur.

The life cycle, egg to adult fly, requires 20 days to 15 weeks, depending



on the species and climatic conditions. Eggs are laid in or on the edge of flowing water, and the larvae feed on small aquatic life. Adult flies emerge from the water and mate shortly afterward.

These flies are vicious biters and can transmit certain diseases. They are most dangerous when explosive outbreaks occur along river basins and streams. Heavy, relentless infestations can kill livestock in a matter of hours. Death is the result of acute toxemia, shock, heavy blood loss or, in some cases, suffocation from inhaling large numbers of flies.

Black flies are very difficult to control with conventional livestock insecticides. Spraying cattle might give some temporary relief, but multiple applications will be needed. Area-wide management programs that involve treatment of rivers and streams with microbial insecticides have been successful, but this approach requires good timing and coordination. Management practices include the use of smoky fires to repel flies and moving cattle away from the aquatic sources of infestation.

## Formulations and Treatment Methods

### Spray Concentrates

These formulations include emulsifiable concentrates, flowables and wettable powders that are diluted before the application. Most concentrates are diluted with a high volume of water and applied with high-pressure equipment to provide a coarse spray. The objective is to wet the animal thoroughly. A few concentrates can be diluted with low-volume oil solvents and applied as a fine mist to moisten the animal's surface. Spray treatments offer the advantage of complete coverage of the animal's body. They usually provide very good initial control, but their residual effectiveness may be short-lived. To spray cattle, producers need a corral, application equipment and a source of water.

### Pour-ons and Spot-ons

Pour-ons are formulated so that a small amount of insecticide can be applied down the backline of the animal. Most pour-ons are formulated as ready-to-use materials and require no further

dilution. Some pour-ons are systemic insecticides that move into the animal and circulate through the body. Other non-systemic materials simply spread across the body surface with body oils and moisture. A spot-on differs only in that a small amount of material is applied at one location along the backline of an animal. Pour-ons allow for an exact dosage to be applied to each animal, plus ease of application. To apply pour-ons, producers will need a corral and squeeze chute. Some pour-ons can be more easily applied with a syringe gun. Residual effectiveness varies, but it is usually measured in two or more weeks.

### Insecticide Ear Tags

Ear tags can be impregnated with insecticide concentrate that is slowly released over an extended period. The ear tag is a controlled released applicator, but the amount of insecticide released decreases over time. Ear tags are not systemic, but rather the insecticide is spread over the body as animals groom themselves and rub against each other. To apply ear tags, producers will need an ear tag applicator, corral and a squeeze chute with a head-gate. Ear tags can be labor intensive, especially the first time cattle are tagged, but they can be cost-effective. A good ear tag can provide three to four months' control of a susceptible target pest.

### Dusts

These ready-to-use formulations combine a low concentration of active insecticide with a dust diluent. Dusts are not formulated for mixing with water. Dusts can be applied with hand shakers, mechanical applicators or self-treatment dust bags.

### Feed Throughs

This method involves mixing a small dosage of insecticide or insect growth regulator with cattle feed or minerals. Most feed throughs are mixed and formulated by the feed or mineral supply company. Insecticide boluses can be classified as a feed through also. Feed through chemicals pass through the digestive system and are excreted in the manure. The chemicals control fly maggots or the larval (immature) stage of the adult fly. They do not control

adult flies. Feeds and minerals with insecticide additives must be consumed continuously during the fly season so that cattle manure is always treated. A bolus allows for slow continuous release once it has been applied. A feed through can be a supplemental component of a fly control program, but success has been limited when used alone. Feed throughs also tend to be more effective when used in isolated herds. The LSU AgCenter does not recommend any feed-through products.

### Injectables

This procedure involves the subcutaneous injection of a small, concentrated dosage of product. Certain anti-parasitic materials are labeled for subcutaneous injection. The LSU AgCenter does not recommend any injectables for external parasite control.

### Dips

This treatment involves mixing insecticide concentrates in large pools of water referred to as dipping vats. Good coverage is ensured because animals are wet thoroughly as they walk through the vat. Dipping vats are no longer commonly used in Louisiana.

### Self-treatment Devices

1. **Backrubber** – A device constructed by wrapping burlap bags around a cable or chain and then hung where cattle can pass under it. See LCES Pub. 1343 for detailed construction plans. Commercial, preconstructed backrubbers are available from at least one manufacturer. Backrubbers are charged with insecticide concentrates that are diluted with #2 diesel oil or other approved base oils as per label instructions. Apply 1 gallon of diluted solution per 20 feet of homemade burlap backrubber. Commercial backrubbers may require 2 to 3 gallons to be fully charged. Recharge backrubbers every two to three weeks or whenever they become dry and no longer feel oily.

To get maximum benefits from backrubbers, place them in alleys or locations where cattle must pass regularly. Place them between cattle and their feed, water or minerals. Free choice locations do not ensure

regular use, but cattle can learn to use a backrubber in a shady, loafing area. The effectiveness of a backrubber is determined not only by the insecticide of choice, but by the frequency of use.

2. **Dust Bags** – This self-treatment device operates under the same principle as a backrubber. Dust bags must always be covered to prevent rain from soaking the dust. Weatherproof dust bags are commercially available. Nevertheless, high humidity and steamy weather sometimes impair their use in Louisiana.

## General Precautions for Livestock Insecticides

1. **The label is the law.** Always follow the application directions and safety precautions on the insecticide label.
2. Do not treat sick, convalescent or stressed cattle.
3. Exceeding labeled use rates may result in illegal insecticide residues in the beef or possible harm to the animals.
4. Always observe the pre-slaughter treatment interval. Treatment of animals closer to slaughter than the number of days prescribed on the label can result in illegal residues in the beef.
5. Do not contaminate feed, feed troughs, water troughs or allow runoff into streams, ponds, etc.
6. Store insecticides properly and dispose of empty insecticide containers according to regulations.

## Precautions For Specific Pesticides

**Atroban** – Don't treat more than once every two weeks.

**Co-Ral** – Don't apply to calves less than 3 months old. Do not apply in conjunction with natural or synthetic pyrethroids or their synergists or with other organophosphates.

**Cydectin** – None

**Cylence** – Don't apply more than once every three weeks.

**Delice** – Don't treat more than once every two weeks.

**Dectomax** – May be irritating to human skin and eyes.

**Ectiban** – Don't treat more than

once every two weeks.

**Eprinex** – Do not treat cattle younger than 8 weeks old.

**Ivomec** – Do not use if rain is expected to wet cattle within six hours after treatment. Flammable; do not use electric prods when treating cattle.

**Lintox-HD** – Do not treat cattle younger than 3 months old.

**Pyrethrins** – None.

**Python (dust)** – Don't apply at less than three-day intervals.

**Rabon** – None.

**Ravap** – Don't treat more than once every 10 days.

**Saber** – Don't apply more than once every two weeks, or more than four times within a six-month period.

**Taktic** – None.

## Horn Fly Insecticide Resistance Management

1. Begin horn fly control procedures in the spring when cattle average approximately 200 horn flies.
2. If ear tags are used, the insecticide classes must be rotated between pyrethroid and organophosphate ear tags. **The insecticide class of each recommended ear tag is indicated in the table of insecticides under horn flies.** Do not use a pyrethroid

ear tag more than once every three years. Do not use an organophosphate ear tag more than two years in succession. Continuous use of ear tags in the same insecticide class will eventually result in horn fly resistance.

3. Remove ear tags at the end of the fly season or when they lose their effectiveness. Do not tag cattle more than once per fly season, regardless of insecticide class.
4. If additional horn fly control is needed later in the year, use sprays, pour-ons, dusts or backrubbers. If possible, alternate insecticide classes when changing control methods.
5. If pyrethroid ear tags have failed to control horn flies in the previous year, pyrethroid insecticides in any form should not be used for at least two years. In the meantime, use non-pyrethroid ear tags, sprays, pour-ons, etc.
6. The following horn fly insecticides (sprays, pour-ons, dusts and backrubber concentrates) are listed according to insecticide class.



**Organophosphates** – Co-Ral, Rabon, Ravap and Lintox-HD

**Pyrethroids** – Ectiban, Atroban, Delice, Cylence, Saber, Python and Permethrin





**Endectocides** - Ivomec and Dectomax





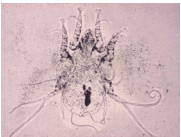
## Pesticides for External Parasite Control on Beef Cattle

Pest	When to Treat	When to Use			Amount to Mix With		How to Apply	Minimum Days from Last Treatment to Slaughter
		Pesticides	Concentration	Formulation	50 Gal Water	3 Gal Water		
<b>Horn Flies<sup>1</sup></b>  	When cattle avg. 200 flies per animal	Co-Ral	6.1%	E.C.	2 qt	4 oz	Spray	None
		Co-Ral	11.6%	E.C.	1 qt	2 oz	Spray	None
		Rabon	50%	W.P.	2.66 lb	2.5 oz	Spray	None
		Ravap	23% + 5.7%	E.C.	2.6 qt	5 oz	Spray	None
		Ectiban <sup>2</sup> (permethrin)	5.7%	E.C.	1 qt	1.5 oz	Spray	None
		Atroban <sup>2</sup> (permethrin)	11%	E.C.	1 pt	1 oz	Spray	None
		Delice <sup>2</sup> (permethrin)	1%	Ready-to-use	Apply 0.5 oz per 100 lb of body weight along back. Max. of 5 oz per animal.		Pour-on	None
		Ivomec <sup>3</sup> (ivermectin)	0.5%	Ready-to-use	Apply 1 ml./per 22 lb of body weight down the back.		Pour-on	48
		Dectomax	0.5%	Ready-to-use	Apply 1 ml./per 22 lb of body weight down the back.		Pour-on	45
		Cylence	1%	Ready-to-use	Apply down backline, 4 ml. 400 lb of body weight, 12 ml. for animals over 800 lb		Pour-on	None
Saber	1 %	Ready-to-use	Apply down backline, 10 ml. per head for cattle less than 600 lb, 15 ml. per head for cattle greater than 600 lb		Pour-on	None		
<b>Backrubber</b>		Co-Ral	1 % oil solution		Refer to labels.		Backrubber	None
		Ravap	1% + 0.25% oil solution		Refer to labels.		Backrubber	None
		Delice	0.1% oil solution		Refer to labels.		Backrubber	None
		Lintox-HD	2% oil solution		Refer to labels.		Backrubber	3
<b>Dusts</b>		Co-Ral	1%	Dust			Dust Bag/Applicator	None
		Python	0.075%	Dust			Dust Bag/Applicator	None
		Permethrin	0.25%	Dust			Dust Bag/Applicator	None
		Rabon	3%	Dust			Dust Bag/Applicator	None
<b>Ear Tags</b> <i>All recommended ear tags will provide at least 10 weeks control of susceptible horn fly populations. Satisfactory control of insecticide resistant populations is more likely with those ear tags with an asterick (*).</i>		X-Terminator	(Organophosphate)				Attach 2 tags/animal	None
		Optimizer	(Organophosphate)				Attach 2 tags/animal	None
		*Patriot	(Organophosphate)				Attach 1-2 tags/animal	None
		Dominator	(Organophosphate)				Attach 2 tags/animal	None
		Co-Ral Plus	(Organophosphate)				Attach 2 tags/animal	None
		*Warrior	(Organophosphate)				Attach 1-2 tags/animal	None
		Cylence Ultra	(Pyrethroid)				Attach 2 tags/animal	None
		Python	(Pyrethroid)				Attach 2 tags/animal	None
		Python Magnum	(Pyrethroid)				Attach 1 tag/animal	None
		Saber Extra	(Pyrethroid)				Attach 2 tags/animal	None
	Avenger	(Cyclodiene)				Attach 2 tags/animal	??	

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Pest	When to Treat	When to Use			Amount to Mix With		How to Apply	Minimum Days from Last Treatment to Slaughter
		Pesticides	Concentration	Formulation	50 Gal Water	3 Gal Water		
<b>Horse Flies</b> <sup>5</sup> 	During the warm months when horse flies are abundant.	Pyrethrins + Synergist	1% + 10%	E.C.	2 1/2 gal Apply 1-2 qt per animal every 2-3 days.	1 1/4 pints	Spray	None
		Pyrethrins + Synergist	0.1% + 1.0%	oil solution	1-2 oz per animal daily.		Mist Spray	None
<b>Stable Flies</b> <sup>5</sup> 	During the early spring and other months when stable flies are present.	Pyrethrins + Synergist	1% + 10%	E.C.	2 1/2 gal Apply 1-2 qt per animal every 2-3 days.	1 1/4 pints	Spray	None
		Pyrethrins + Synergist	0.1%+ 1.0%	oil solution	1-2 oz per animal daily.		Mist Spray	None
		Ectiban <sup>2</sup> (permethrin)	5.7%	E.C.	1 qt	1.5 oz	Spray	None
		Atroban <sup>2</sup> (permethrin)	11%	E.C.	1 qt.	1 oz.	Spray	None
<b>Mosquitoes</b> <sup>5</sup> 	During the warm months when mosquitoes are abundant.	Pyrethrins + Synergist	1%+ 10%	E.C.	2 1/2 gal Apply 1-2 qts per animal every 2-3 days.	1 1/4 pints	Spray	None
		Pyrethrins + Synergist	0.1% + 1.0%	oil solution	1-2 oz per animal daily.		Mist Spray	None
		Ectiban <sup>2</sup> (permethrin)	5.7%	E.C.	1 qt	1.5 oz	Spray	None
		Atroban <sup>2</sup> (permethrin)	11%	E.C.	1 qt	1 oz	Spray	None
<b>Lice</b> 	Generally during the fall and winter or whenever lice are abundant.	Co-Ral	6.1%	E.C.	2 qt	4 oz	Spray	None
		Co-Ral	11.6 %	E.C.	1 qt	2 oz	Spray	None
		Taktic (amitraz) <sup>4</sup>	12.5%	E.C.	1 pt	1 oz	Spray	None
		Rabon	50%	W.P.	2.66 lb	2.5 oz	Spray	None
		Ravap	23% + 5.7%	E.C.	2.6 qt	5 oz	Spray	None
		Delice <sup>2</sup> (permethrin)	1%	Ready-to-use	Apply 0.5 oz per 100 lb body weight along back. Max. of 5 oz per animal.		Pour-on	None
		Ivomec <sup>3</sup> (ivermectin)	0.5%	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the back weight along the back.		Pour-on	48
		Eprinex	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body		Pour-on	0
		Dectomax	0.5%	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the backline.		Pour-on	45
		Cydectin	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the backline.		Pour-on	0
		Cylence	1%	Ready-to-use	Apply down backline, 8 ml. per 400 lb body weight, 24 ml. for animals over 800 lb.		Pour-on	None
Saber	1%	Ready-to-use	Apply down backline, 10 ml. per head for cattle less than 600 lb, 15 ml. per head for cattle over 600 lb		Pour-on	None		

## Pesticides for External Parasite Control on Beef Cattle

Pest	When to Treat	When to Use			Amount to Mix With		How to Apply	Minimum Days from Last Treatment to Slaughter
		Pesticides	Concentration	Formulation	50 Gal Water	3 Gal Water		
<b>Ticks</b> 	When ticks are abundant on cattle, especially in the late spring and fall.  Ear tags recommended for hornflies will also control ear ticks.	Co-Ral	6.1%	E.C.	1 Gal	8 oz	Spray	None
		Co-Ral	11.6%	E.C.	1/2 Gal	4 oz	Spray	None
		Co-Ral	42%	E.C.	1-2 pts		Dip	None
		Taktic (amitraz) <sup>4</sup>	12.5%	E.C.	1 pt	1 oz	Spray	None
		Rabon	50%	W.P.	4 lb	1/4 lb	Spray	None
		Ravap	23% + 5.3%	E.C.	1 qt	2 oz	Spray	None
<b>Cattle Grubs</b> 	May through September	Ivomec <sup>3</sup> (ivermectin)	0.5%	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the back		Pour-on	48
		Eprinex	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the back		Pour-on	0
		Cydectin	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the backline.		Pour-on	0
		Dectomax	0.5%	Ready-to use	Apply 1 ml. per 22 lb of body weight along the backside		Pour on	45
<b>Mange Mites</b> 	When cattle are infested.	Co-Ral	42%	Flowable	2.5 pts		Dip	None
		Taktic (amitraz) <sup>4</sup>	12.5%	E.C.	1 pt	1 oz	Spray	None
		Ivomec <sup>3</sup> (ivermectin)	0.5%	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the back		Pour-on	48
		Eprinex	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the back		Pour-on	0
		Dectomax	0.5%	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the backline.		Pour-on	45
		Cydectin	5 mg/ml	Ready-to-use	Apply 1 ml. per 22 lb of body weight along the backline.		Pour-on	0

<sup>1</sup> See insecticide resistance management plan on page 5.

<sup>2</sup> And other permethrin products, i.e. numerous trade names.

<sup>3</sup> And other ivermectin products.

<sup>4</sup> And other Amitraz products.

<sup>5</sup> Effective control with insecticides may be difficult to achieve and require multiple applications.

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