ENY-281

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Management of External Parasites with Forced-Use Dust Bags[1]

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Over the past 13 years IFAS entomologists have been investigating various methods of controlling external parasites on cattle. One technique, forced-use dust bags, has proven to be the best technique available to Florida cattlemen. Forced-use dust bags are:

1. Safe
2. Economical
3. Effective

These three advantages give dust bags a distinct advantage over other types of external parasite control in Florida.

Background (External Parasites)

The horn fly is one of the most serious and injurious pests of cattle. In Florida alone, losses to the horn fly are estimated to total 40 million dollars per year.

Horn flies pierce the skin of cattle to blood feed and may take up to 20 meals per day. The irritation and blood loss cause reduced weight gain of 0.3 to 0.5 lbs. per day and for dairy animals cause lower milk production. Large populations of horn flies may cause open sores on the head and underline which can predispose the animals to secondary infections of both disease and parasites. Because of their piercing-sucking mouthparts, horn flies are suspected of mechanically transmitting anthrax and other diseases within a herd.

Horn fly numbers of 50 or more per animal are considered to be of economic importance. Extreme numbers of 10,000 to 20,000 flies per animal have been reported and could make blood loss alone (0.5 gal/month) an important factor in reduced production.

The cattle tail louse is the most important and damaging louse in Florida. The cattle tail louse is a blood-sucking louse, and extensive infestations may cause anemia in cattle. Infested cattle show poor condition, slower weight gain, low vitality, and reduced milk production. Heavy infestations of sucking lice can cause abortion and anemia in animals and may have caused abortion problems on about 400 head in Putnam County.

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Adult populations of more than 5 lice may cause economic damage to cattle. Tail louse control can be readily achieved by timed treatments or self-treatment with proper insecticides.

Although tail lice may be present year-round, spring to fall are preferable for treatment. From early are good treatment times. Proper control procedures in the fall will prevent the winter buildup of eggs and subsequent damage when the nymphs emerge. Early spring applications will control the damaging emergence of nymphs from the over-winter build-up of eggs as well as aiding in horn fly control. Mid-winter spray treatments are not economically feasible since the population is generally in the egg stage and will not be killed by an insecticide application.

Late spring and summer use of dust bags will give excellent control of tail lice as well as horn flies. This optimum timing of proper pesticides can result in the control of multiple pests for the cost of controlling one species.

Background (Pesticides)

Cattlemen should be aware that certain breeds of animals may react adversely to certain pesticides or materials contained in pesticide formulations. Sensitive animals should not be treated or should be treated with extreme care. For instance, Brahman cattle may be sensitive to organophosphate pesticides. If a pesticide label states "Do not treat Brahman cattle," the pesticide should not be applied to those animals. If there is uncertainty about an animal's sensitivity, treat a small area of skin and observe the area for 24 hours before treating the entire animal.

Individual animals also may react adversely to a pesticide or pesticide formulation. Sensitive animals should be identified and treated only with acceptable chemicals. If an animal does react adversely to an application, efforts should be made to remove the pesticidal formulation from the animal.

The age, size and condition of an animal is also important when applying pesticides. Young animals are generally smaller and consequently more susceptible to pesticides. Care should be taken when treating young animals, and precautions on the label should be checked to determine whether it prohibits application to young animals. Many insecticides should be applied according the size of the animal. Less pesticide should be applied to smaller animals to prevent toxicity. Stressed or diseased animals are also sensitive to pesticides. Often the additional stress of a pesticide application is enough to kill stressed or diseased animals. Also, some solvents tend to stay in the air and cause toxicity problems to animals in the holding area.

With cancellation of many of the chlorinated hydrocarbons in recent years, the use of organophosphate and carbamate pesticides for pest control on or around animals has increased. In general, the organophosphate and carbamate pesticides are more toxic to warm-blooded animals and active for shorter periods of time than the chlorinated hydrocarbons. Consequently, a more toxic compound must be used more often and there has been increased incidence of pesticide poisonings among domestic and agricultural animals in recent years. Dust formulations are generally less toxic than emulsifiable formulations.

Background (Dust Bags)

Dust bags are an effective method of horn fly and louse control. However, dust bags are only effective when hung in places where cattle are forced to use them. These locations are best attained in areas where cattle must pass once or twice a day, or every other day, for instance between mineral boxes or water and pasture.

Dusting stations should be well-constructed and properly maintained to provide effective ectoparasite control. One dusting station with 2 bags is sufficient for treating approximately 50-60 head of cattle. Dusting stations should be constructed so bags hang at a level which will allow the head, sides, and top of cattle to come in contact with them at mid-shoulder height. To prevent tearing of the bags during use, cover or remove all sharp objects such as nails and barbed wire which might tear the bag. Horned cattle have sometimes torn bags but that is generally a minor problem. Dusting stations should be kept in good repair. Old and worn materials should be replaced whenever they are noticed.

Directions for Hanging Commercial Dust Bags

Forced-use dusting stations can be constructed from materials available on the farm. Figures 1, 2 and 3 illustrate dusting station construction. Table 1 indicates insecticides which may be used in dust bags. Read the label to insure proper usage.

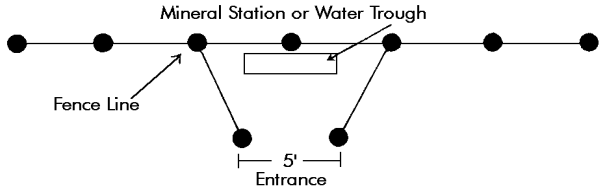

Figure 1. Aerial view of dusting station construction.

Figure 2. Directions for hanging commercial dust bags.

Safety of Dust Bags

Organophosphate pesticides inhibit cholinesterase in treated animals sometimes causing symptoms of poisoning such as: excessive constriction of pupils muscular tremors, excessive salivation, loss of reflexes etc. Even animals not exhibiting these symptoms may not show optimum weight gain after treatment with some of the pesticides.

Dust formulations of a pesticide applied to Brahman and crossbred steers do not inhibit cholinesterase as severely as the same pesticide applied as a spray. Dust bags are thus safer than spray formulations, especially when applied to sensitive or stressed animals. Also there is less likelihood that control operations will decrease weight gains in treated animals.

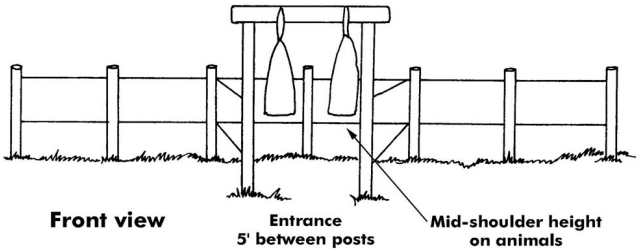

Figure 3. Frontal view of dusting station construction.

Cost of Treatment

IFAS researchers have considered the costs of various control strategies for efficient external parasite control. Table 2 lists the costs of controlling external parasites with various application methods. The methods were ranked from least expensive to most expensive. It is noteable that the 3 least expensive items are dust bags which cost approximately 1/2 cent per day per animal. This estimate includes only the cost of materials and does not include the manpower costs. Since dust bags utilize the animal's behavior to apply a pesticide to itself, the savings in manpower required to pen the cattle for pest control are considerable. Also penning animals causes stress, consequently, self-application strategies such as dust bags provide additional benefits.

Table 1. Insecticides approved for use in dust bags.

Insecticide	Concentration
Coumaphos (Co-Ral)	1% D
Methoxychlor	10% D
Permethrin	0.25 D

Effectiveness of Dust Bags

In cooperation with county agents and local cattlemen, dust bags were set up under actual production circumstances. Cattlemen provided two equivalent herds and placed the animals on equivalent pastures. Dust bags were hung on treated herds so animals had to pass the bags to obtain water or minerals. Non-treated animals were managed according to the cattlemen's normal practice. Weights of animals were recorded before and after treatment. Horn fly counts were recorded during the trial by county agents. Table 3 presents some of the typical information which was compiled.

In field tests, forced-use dust bags provided an average of 90% horn fly control. Production was increased by an average of 34% over the normal management practice. This increase in production was equivalent to 1/3 lb/animal/day.

Estimating Horn Fly Numbers

To determine the effectiveness of control procedures, horn fly numbers should be estimated in a herd (Figure 4).

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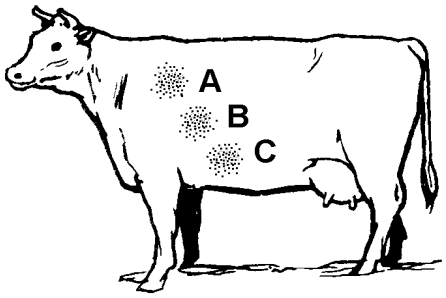
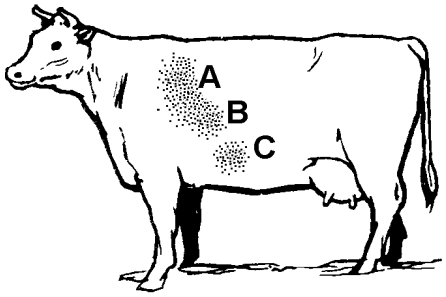
Use the following criteria to estimate fly numbers:

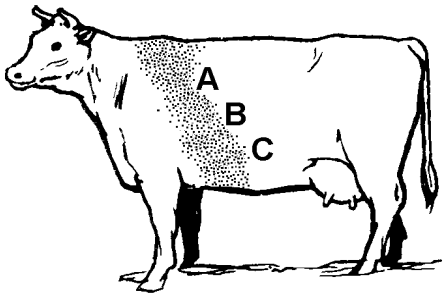
1. A single small patch of flies = 25 to 50 flies. The patch is located in area A, B or C.



2. A single patch of flies that covers areas A and B, or B and C = 100 to 125 flies.



3. A patch of flies that extends through areas A, B and C = 200 to 350 flies.



4. A patch of flies that extensively covers areas A, B and C = 500+ flies.

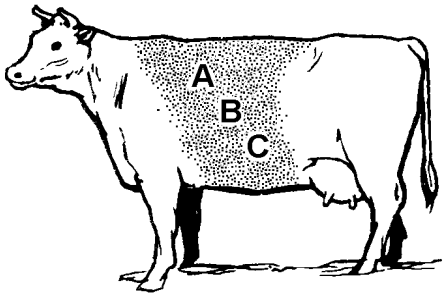


Figure 4. A method of estimating horn fly numbers in the field.

Table 2. Estimated cost of controlling external parasites on cattle with various application devices.

Rank According To Cost	Method	Type	$/Day/Animal	Effective Service	Researchers
1	Dust Bag	Continuous	0.005-0.006	4-8 weeks	Butler, Strayer 1974
2	Co-ral Dust Bag	Continuous	0.003-0.005	9 months	Butler 1976
3	Rabon Dust Bag	Continuous	0.005-0.01	9 months	Butler, Koehler 1976
4	Residual Spray	Multiple	0.01-0.02	28 days	Butler, Strayer 1974
5	Spray	5 Treatments	0.01-0.02	1 year	Ronald-Wingo
6	Spotton	Multiple	0.02	14 days (0-900 lb) animals	Butler 1976
7	Backrubber	Continuous	0.02	1 year	Ronald-Wingo
8	Feed Add Ronnel	Continuous	0.024	l year	Ronald-Wingo
9	Rabon Oral Larvicide	Continuous	0.25	1 year	Shell 1976
10	Dip	1/21 days	0.05	1 year = 17 times	Southerst 1974

Table 3. Horn fly populations and weight gain demonstration results, Alachua County.

Santa Fe River Ranch Alachua Co., FL Hereford Heifers 79 days in trial		
	No Dust Bags*	**Dust Bags**
Avg. Final Wt. (lb)	777.3	816.67
Avg. Initial Wt. (lb)	711.90	730.71
Difference in Wt. (lb)	65.48	85.96
Daily St. Gain (lb/day)	0.83	1.08
Horn Fly Population (Pretreatment)	21.5	22.5
2	24.0	23.5
4	49.0	5.1
6	61.0	0.9
Number of Animals	21	21
* Animals sprayed with malathion + toxaphene		

Table 4. Summary of dust bag demonstration results for external parasite control in Florida.

Location	% Control (Horn Fly)	% Increase in Production	Lb/Day Difference (Treated-Check)
Polk County	95%	10%	.09
Manatee County	75%	26%	.34
Alachua County	99%	30%	.25
Levy County	87%	72%	.64
Average	90%	34%	.33