DUST BAGS

E. C. LOOMIS •

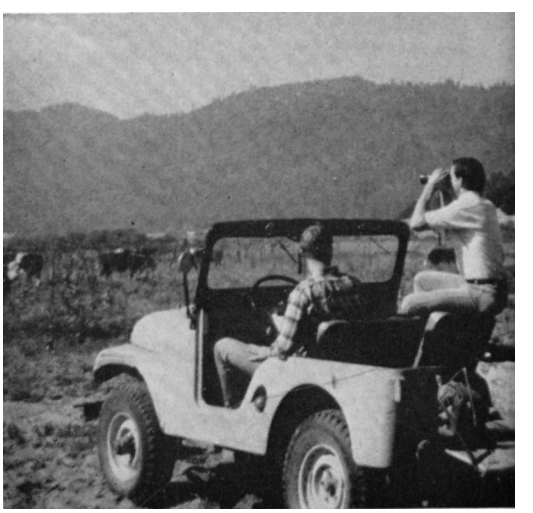
The horn fly, *Haematobia irritans*, is a permanent, blood-sucking parasite of livestock which, under dense populations may be responsible for reduction in either weight gains or in milk production. Spraying is the most common method of horn fly control but involves capital investment in power-spray equipment, excessive labor for repetitive spray treatments, and in some instances, considerable animal stress. An earlier study showed the effectiveness of Ronnel when this animal systemic insecticide was mixed with cottonseed supplement and fed throughout the summer season. Cattle grub control also was obtained the following winter, but high costs (three cents per head per day) and the methods of supplementing summer rations were not applicable to all winter livestock management operations. For these reasons, and because of the threat of a face fly invasion of California, the use of insecticidal dust-charged burlap sacks ("dust bags") was investigated in 1966 and successfully field tested during the next two years.

Close-up photo above shows blood-sucking attack of horn flies on the back of a beef animal.

Left photo shows top view of the horn fly, Hoematobia irritans.

Close-up of bull (photo below) shows part of back which was covered with uncontrolled infestation of an estimated 1,500 to 2,000 horn flies.

Counting horn flies on cattle in the field was done from the vehicle shown below, to right, using a pair of 10 × 50 binoculars at about 25 to 30 yards.



FOR HORN FLY CONTROL ON BEEF CATTLE

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A PRELIMINARY STUDY was conducted for horn fly control on the Haldan Ranch in High Valley, Lake County in 1966. Dust bags filled with 0.5 per cent or 5 per cent Coumaphos (Co-Ral) or 5 per cent Tiguvon were hung in front of a water trough for daily use by 25 cows on irrigated pasture. Another 25-cow herd was pastured within ¼ mile and sprayed once in August with 0.06 per cent Coumaphos for a comparison of horn fly counts. A third herd, consisting of only eight cows, was pastured in another field which contained a 45-degree, rope-type backrubber charged with a mixture of DDT-toxaphene and lindane. The results of horn fly control are shown in the graph.

Fly counts were negligible on the herd treated with dust bags except for the two

The original test of dust bags for horn fly control, shown below, forced cattle to go under the bags to get to the water trough at the Haldan Ranch, Lake County.

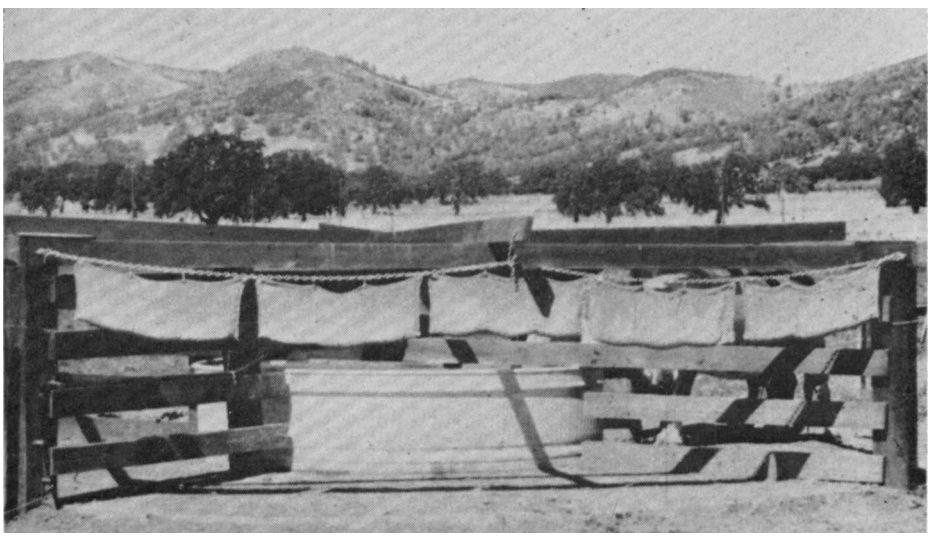


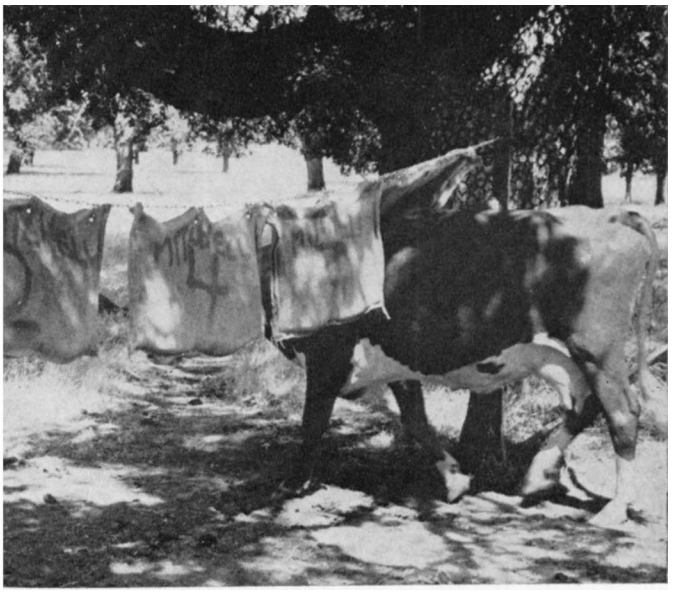
TABLE 1. PER CENT HORN FLY REDUCTION[1] ON CATTLE UNDER VARIOUS INSECTICIDE TREATMENTS, CALIFORNIA, 1967

Dates	LAKE COUNTY		PLUMAS COUNTY				UNIVERSITY OF CALIFORNIA			
	Mitchell[2]	Haldan[3]	Openshaw Ranch[4]		Brown Ranch[5]		Davis-Yolo Co[6]	SFRFS, Yuba County[6]		
	0.5% Coumaphos Dust Bags (DB)	5% Tiguvon Dust Bags (DB)	5% Tiguvon Dust Bags (DB)	Lindane-Tox-DDT Spray (SP)	5% Coumaphos Dust Bags (DB)	Korlan 1% and/or Imidan ½% Sprays (SP)	3% Ciodrin (1) 2% DDD-DDT (2) Dust Bags (DB)	Lindane-Tox-DDT Dust Bags (DB)	5% Tiguvon Dust Bags (DB)	Korlan 1% Spray (SP)
July 3			73	SP	57	SP–I	DB-1			
12	DB		36[a]	87	88	92	99			
19	47		59	36	98	46	100			
25	47		68	0	91	57 SP-K	100			
Aug. 2	74	DB	0[a]	0 SP	87	99	99			
8	91	99	70	98	73	30	97			
16	99	99	75	92	75	18 SP-K	DB-2	DB	DB	SP
21	99	99	95	73	30[b]	80	100	98	86	99
29	100	99	78	88	73	74	100	96	97	97
Sept. 6	100	100	80	85	16[c]	59 SP-I	95	99	99	93
12	99	100	82	87	78	55	83	97	98	84
19	99	100	60[a]	87	43	NC	81	98	99	86
27	99	100	10	73	NC	NC	NC	84	97	86

[1] Based on side counts per animal compared to those before treatment.
[2] Bags hung across gateway between pastures leading to water source.
[3] Bags hung across entrance to water trough servicing pastures.
[4] Bags hung across gateway leading to salt and bedding area in one pasture.
[5] Bags hung free choice in middle of pasture.
[6] Bags hung across gateway of enclosure containing 1-ton supplement feeder.
[a] Herd taken off dust bag pasture 7/8–14, 7/29–8/10, and from 9/15 on.
[b] Twenty-three new animals added to herd previously untreated.
[c] Cows calving and not using bags as frequently as before.

TABLE 2. WEIGHT GAINS ON CALVES FROM OPENSHAW COW HERDS, INDIAN VALLEY, PLUMAS COUNTY, 1968

Weight Gain Data	GROUP A TREATED (20 HD)					GROUP B UNTREATED (21 HD)				
	June 5	July 8	August 2	August 21	Total	June 5	July 8	August 2	August 21	Total
Total lbs	6420	8165	9205	9970	3550	7050	8335	9335	9900	2850
Mean lbs/hd	321.0	408.3	460.3	498.5	177.5	335.7	396.9	444.5	471.4	135.7
Mean lbs/hd/day	....	2.64	2.08	1.75	2.31	....	1.85	1.90	1.42	1.76
No. days	....	(33)	(25)	(19)	(77)	....	(33)	(25)	(19)	(77)



Dust bags for horn fly control were hung between two trees in the loafing area at the Openshaw Ranch, Plumas County, as shown above (left), for free choice use by the beef cattle. Mandatory-use test at the Mitchell Ranch, Lake County, was conducted as shown above (right), by putting dust bags across the gateway to the water reservoir.

periods when the bags were removed to change the insecticide. In contrast, the eight cows exposed to the backrubber maintained an almost constant fly population and the large amount of insecticide remaining in the container fitted to the backrubber indicated very little use of the device. Fly counts remained high on the second 25-cow herd except for the four weeks after spraying in August. Seasonal use of all three dusts measured 0.53 ounce per head per day (oz/h.d.) with a range of 0.33 (Tiguvon) to 0.77 (Coumaphos 5 per cent). These amounts were well below the recommended use of from 1 to 2 oz per h.d.

1967 field tests

Results of the preliminary study were encouraging in terms of economics (labor and materials) and livestock management. Additional field tests were conducted during 1967 to include dust bag treatments of two herds in High Valley, two herds in Indian Valley, Plumas County and three herds maintained by the University of California at Davis and at the Sierra Foothill Field Station, Yuba County. Ciodrin 3 per cent and a mixture of 2 per cent methoxychlor and 2 per cent DDT dust were tested, in addition to the same dusts used in 1966. Additional herds at all four locations were untreated, sprayed, or exposed to backrubber devices with different insecticides for comparisons of fly control between herds treated with dust bags.

The resulting horn fly control in 10 herds in four county locations is shown in table 1. At the Mitchell Ranch, Lake County, two weeks were required before all cows became accustomed to passing through or under the dust bags which were stretched across the gateway leading to their water source. The Haldan Ranch cow herd which had been previously exposed to dust bags in 1966 showed an immediate fly reduction one week after the bags were hung in front of their water trough.

Openshaw ranch

Cows at the Openshaw Ranch, Plumas County, did not have continuous use of the dust bags, because of rotational pasture irrigation, but fly control was considered good-to-excellent when the herd was returned to the pasture containing the dust bags. The spray treatment to the second herd in July was effective only one week, but effects of the August spray treatment lasted seven weeks.

The results obtained on the Brown Ranch were quite different from those at Openshaw's Ranch. The cow herd exposed to dust bags hung free choice had from excellent-to-good horn fly reduction until new cows were added to the herd during the third week of August and also when calving started the first of September. Both Korlan and Imidan sprays did not give more than one to two weeks' fly control, and the final Imidan spray in September showed poor control one week after treatment. The need for more frequent spray applications on this ranch—in contrast to only two sprays needed at Openshaw's—may have resulted from the closeness of adjacent herds left untreated around the Brown Ranch, and the possible exchange of fly populations from these animals to those in the spray-treated herd.

Excellent fly control resulted in the University of California herds exposed to daily use of dust bags hung before water troughs or at entrances to supplemental feeders. Because most herds on the Sierra Foothill Range Field Station were under insecticide treatment, the herds sprayed with Korlan showed a protective period of six weeks' fly control.

Free choice

Insecticide dust use was extremely economical as experienced in 1966. Lowest costs were recorded for the herds maintained under free-choice dust bags at the Brown Ranch. Overall use ranged from 0.04 to 0.73 oz/h.d. The cost per animal per 100-day fly season would vary from 10 cents to $1.00 (at 25 cents per pound for insecticide) depending on dust bag construction and whether use was free-choice or mandatory daily herd use, as well as individual cattle use. A minimum spray application at 3 cents per head per treatment would cost from 6 cents (two sprays) to 12 cents (four sprays) per head per 100-day fly season—plus costs of labor for cattle roundup, depreciation

costs on power spray equipment, and dollar value lost in animal stress, adding up well above the costs of dust bag treatment.

1968 field tests

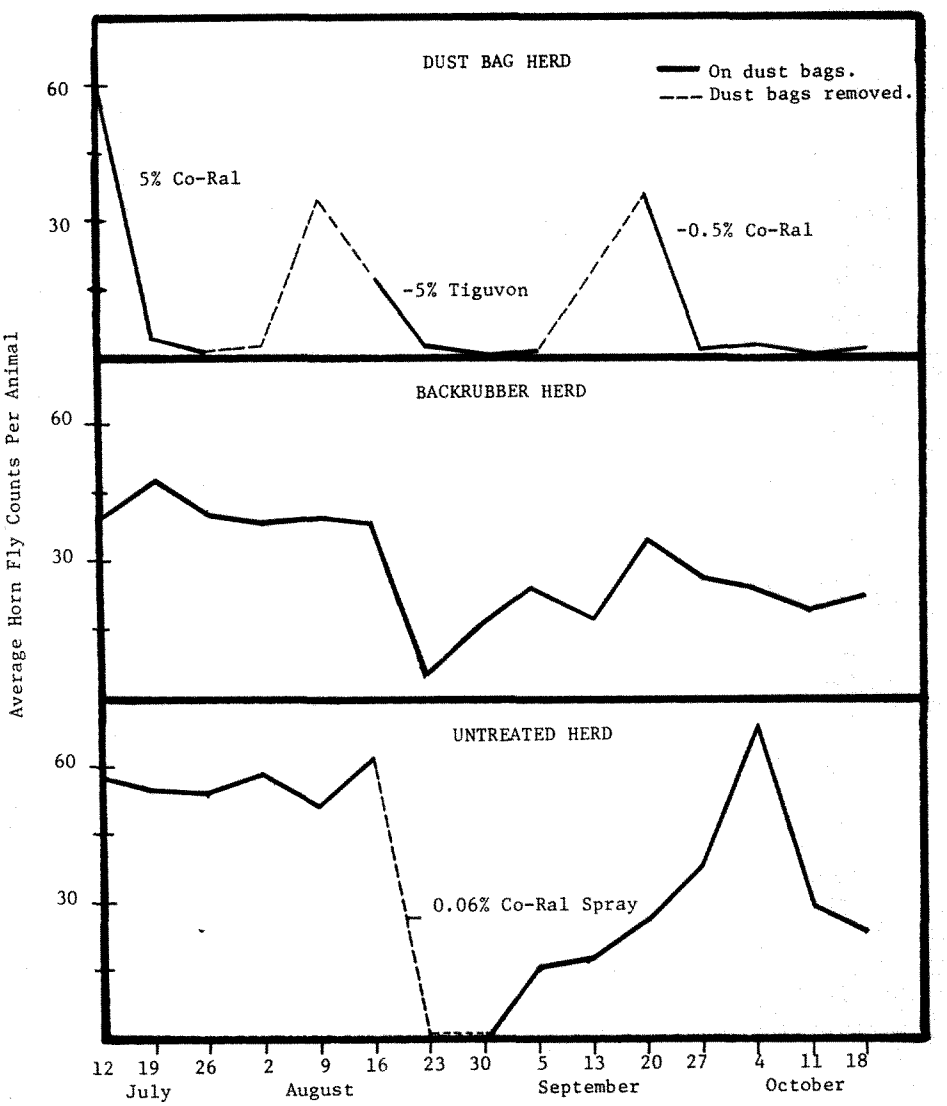
At the Openshaw Ranch as in Plumas County in 1967, the dust-bag-treated cattle grazed the pastures during most of the day, did not bunch up, and spent less time fighting flies by tail switching and head licking of body areas. Untreated cattle usually hunted shade, congregated into groups and continuously fought flies while grazing pastures.

Because of these differences in cattle behavior, a test was set up to determine if beneficial gains would result in a herd maintained with daily exposure to insecticide dust bags. A herd of 265 cows and 256 calves (dropped from January 1 to April 15) was divided into two groups. Group A consisted of 150 cows with 142 calves rotated between two pastures of 129 and 120 acres each. Each pasture had a set of five dust bags hung at cow level between trees, and a supply of mineral salt blocks was placed nearby. The dust bags were charged with a mixture of DDT, toxaphene, and lindane, and bag weights were taken every two weeks to determine insecticide use. Horn fly counts were taken on animals in both herds during the same interval.

Rotation

Group B contained 115 cows with 114 calves rotated between three pastures of 46, 52, and 53 acres each. This herd was located across a county road from herd A and did not receive any horn fly treatment during the test. Herd B foraged on timothy, ladino, and alsike clover, alfalfa, and Kentucky bluegrass while herd A had slightly inferior pastures consisting of ladino and alsike clover, Kentucky bluegrass, rushes and sedges. A group of 24 calves was selected at random from each of the two herds, individually identified by numbered ear tags and weighed before the start of the test on June 5 and for three consecutive times thereafter (July 7, August 2, and 21).

AVERAGE WEEKLY HORN FLY COUNT PER ANIMAL EXPOSED TO VARIOUS CHEMICAL CONTROL METHODS, HALDAN RANCH, HIGH VALLEY, LAKE COUNTY, 1966.



Calf weights

Weight gain data are summarized in table 2 for the two groups of calves whose dams had horn fly control and those without control. Only during the latter part of July were calf weights nearly equal between the two groups. For the entire 77-day test, the calves from horn fly treated dams gained an average of 0.55 lb per head per day over the control group from dams without fly control.

Statistical analysis of data on 20 to 21 calves from each group on which consecutive weights were recorded showed positive significance at the 1 per cent level for the periods June 5 to July 8, July 8 to August 21, and again for the entire test period June 5 to August 21.

Horn fly counts

Horn fly counts during the 77-day test period averaged only 17 flies per dust-treated cow compared with 115 flies on the untreated cows. The dust-bag-treated cows used 0.12 oz per head per day at a cost of 14½ cents for the 77-day period.

The effectiveness and economy of using chemically charged dust bags for control of horn flies on range cattle was further supported by reports in 1968 received from eight northern California mountain counties, four central valley counties, and three southern California coastal counties. Dust bag kits containing several types of homemade burlap sacks and chains for hanging bags were sent to county livestock farm advisors in these counties for demonstration purposes at different ranches. However, additional data are needed to support the above evidence that animal weight gains are a positive factor for insecticide-dust-treated animals.

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