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A STUDY OF FLY CONTROL BY STIRRING POULTRY DROPPINGS WITH AND WITHOUT A BACTERIAL SPRAY

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OBJECTIVE:

To determine the effectiveness of the following three fly control practices:

1) Stirring a bacterial spray into poultry droppings once a week.

2) Stirring droppings once a week.

3) Stirring droppings three times a week-Monday, Wednesday and Friday.

METHODS AND PROCEDURE:

The 34' x 224' lay house used in this study was a typical truss roof house with four rows of back-to-back cages and three hens per 12-inch cage. Welded wire (1" x 4" - 8" wide) was suspended below the cages to facilitate drying of droppings. The entire house was used for the test. Each treatment, applied at random once in each row, was repeated in each of the four rows and was applied to poultry droppings covering an area 3½' wide and 50' long. Control plots consisted of untreated and undisturbed droppings.

Treatments started in late March. Poultry droppings were collected for fly emergence counts four weeks later, and again after another two weeks. Between the first and second sampling, treatments already outlined were continued. Data were also collected on rainfall, air temperature, and the temperature and moisture content of droppings.

A machine manufactured by the Boregson Welding Shop in Santa Ana, California, was used for stirring. This machine thoroughly stirred the droppings in a row about two feet wide. By going down the row and stirring on one side and coming back on the other side, the entire plot for each treatment was thoroughly stirred. The bacterial spray was produced by Calzyme, Inc., Los Angeles, California, and their verbal suggestions on its application were followed. The spray mixture presumably contained 35 different species of bacteria, which were not identified by the company.

The bacterial spray was made beforehand; two pounds of bacterial culture were placed in 50 gallons of water and left overnight. Approximately three gallons of bacterial spray were applied (175 sq. feet) at weekly intervals during the test.

Samples for determining fly emergence were collected prior to any treatments scheduled on the sampling date. Thus, bacterial spray was applied and stirred into the droppings four times (March 29, April 5, April 12, and April 19), prior to collecting the first samples for fly emergence on April 26. Stirring three times a week had been performed 12 times when the first samples were collected.

The fly emergence traps used for this test were constructed as shown in Figure 1. Flies which did not rise to the collection cup on top were disregarded.

Moisture determinations were made weekly on droppings collected from replications A, B, and C. The sample was weighed fresh and later air-dried, as well as oven-dried at 105°F. When weight loss no longer occurred in any sample, all the samples were weighed and the differences between fresh weights and dry weights were used to calculate moisture.

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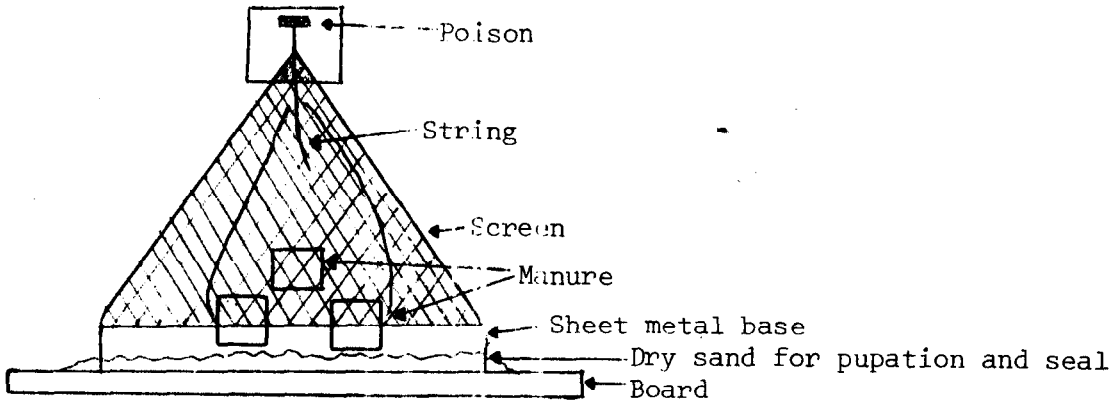
Fig. 1. FLY EMERGENCE TRAP



RESULTS AND DISCUSSION

The data in Tables 1 and 2 show fly emergence for samples collected April 26 and May 10, and indicate that none of the treatments under study gave satisfactory control, although stirring, per se, did reduce fly numbers ($P < .05$). Each number in Tables 1 and 2 represents the number of flies at the top of the trap emerging from one gallon of poultry droppings.

The untreated plots (controls) produced significantly more flies ($P < .05$) than the treated plots. Although stirring three times a week resulted in the least number of flies, significantly less ($P < .05$) than the untreated controls, it did not provide satisfactory control under the prevailing conditions. There was no significant difference between stirring three times a week and stirring once a week, with or without bacterial spray. The bacterial spray with stirring once a week gave essentially the same results as stirring only once a week.

Table 1. Fly counts from manure sampled April 26

Previous treatments	Replications A	B	C	D	Avg.
1. Untreated	364	741	500	463	517
2. Bacterial spray and stirring once a week	260	215	237	285	250
3. Stirring only once a week	367	232	312	*	304
4. Stirring Monday, Wednesday and Friday	284	138	236	*	219

Table 2. Fly counts from manure sampled May 10

Previous treatments	Replications A	B	C	D	Avg.
1. Untreated	*	456	575	457	496
2. Bacterial spray and stirring once a week	276	285	291	559	353
3. Stirring only once a week	345	110	570	465	373
4. Stirring Monday, Wednesday and Friday	124	210	312	236	220

*Accidental loss of data

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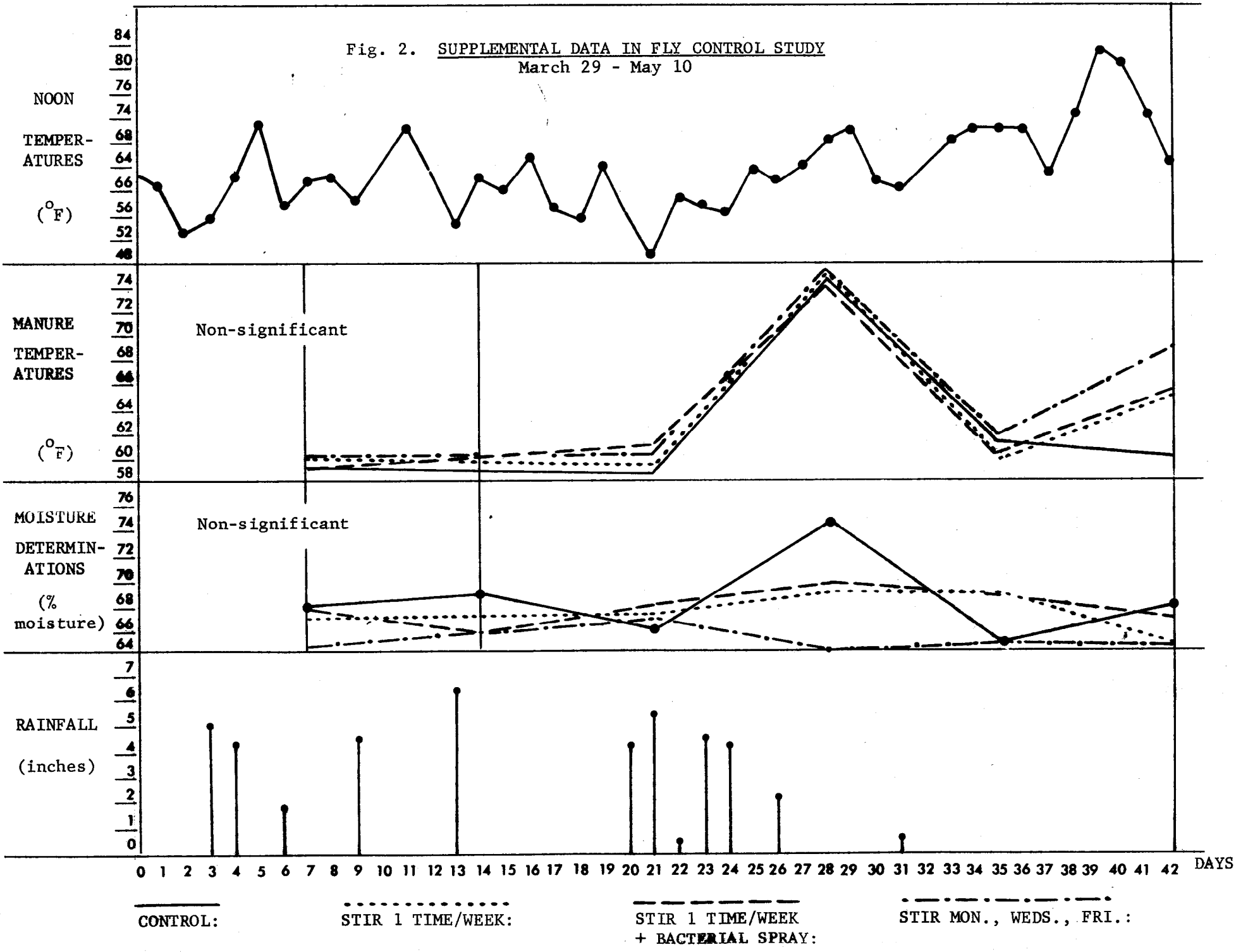
Fig. 2. SUPPLEMENTAL DATA IN FLY CONTROL STUDY
March 29 - May 10



The various fly species collected in the fly emergence traps were as shown below. The common house fly was not observed.

	No.	Percent of total
Fannia canicularis (Little House Fly)	6,968	70.4
Fannia femoralis (Coastal Fly)	2,386	24.1
Muscina (False Stable Fly)	518	5.2
Ophyra (Black Garbage Fly)	33	0.3
Total	9,905	100.0

Environmental conditions during the test are shown in Figure 2; plotted are noontime daily temperature inside the poultry house, manure temperature, and rainfall. Weather was cooler and rainfall greater than expected; over the 6-week period, noon temperatures averaged 63°F and rainfall totaled 4.83 inches. These conditions probably resulted in poorer fly control with stirring three times a week than would have been the case with drier and warmer weather.

Weekly temperatures in the droppings approximated air temperatures and treatments did not influence the temperature of the droppings. If a bacterial spray were to effectively prevent fly production, it might happen as a result of greatly increased temperature in the droppings. Such heating has reportedly occurred when dairy or poultry manures have been placed in piles several feet high. Droppings in this test were in the range of 6 to 12 inches high and no heating was observed.

The moisture content of droppings did not vary significantly with treatment. Moisture in the droppings at the start of the test averaged 70.7 percent; samples taken weekly over the next six weeks showed an average of 68.6 percent moisture in the controls; 67.7 percent with the bacterial spray; 67.3 percent with once a week stirring; and 65.1 percent with stirring three times a week.

CONCLUSIONS:

1) During the test period, none of the three treatments produced satisfactory fly control. Droppings stirred three times a week produced the fewest flies. Stirring did not significantly reduce the moisture content of the droppings.

2) Six applications at weekly intervals of a bacterial spray stirred in the droppings gave approximately the same results as six weekly stirrings without a bacterial spray. There was no significant difference between these two treatments.

3) The Little House Fly and the Coastal Fly comprised about 95 percent of the flies collected in the fly emergence traps.

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