

1986

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Recommended Citation

Easton, Emmert R. and Catangui, Michael A., "The Release of Insects Sterilized by Colbalt 60 to Control a Wild Population of Stable Flies at the SDSU Beef Cattle and Sheep Nutrition Unit in Brookings" (1986). *South Dakota Beef Report, 1986*. Paper 17.
http://openprairie.sdstate.edu/sd_beefreport_1986/17

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**THE RELEASE OF INSECTS STERILIZED BY COBALT 60 TO CONTROL
A WILD POPULATION OF STABLE FLIES AT THE SDSU BEEF
CATTLE AND SHEEP NUTRITION UNIT IN BROOKINGS**

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CATTLE 86-16

Summary

Sterile stable flies were released weekly at the SDSU Beef Cattle and Sheep Nutrition Unit at Brookings from July 24 through September during the summer 1986 season to eliminate wild populations of insects. Flies that were sterilized were marked with a dye so when recaptured by an insect net or a sticky trap they could be differentiated from wild, normal or fertile flies. A trend toward reduced fly numbers was observed 3 weeks following the first release. A 1:5 ratio of sterile to wild flies was achieved in 6 weeks.

(Key Words: Stable Fly, Sterile Male Release, Control.)

Introduction

The sterile-male technique is one of the known ways of controlling specific insect pests of agriculture and public health. It has the sole distinction of being capable of nearly eradicating an insect species when the method is seriously and thoroughly undertaken. The eradication of the screwworm in the southeastern United States by the workers at the Agricultural Research Service of the U.S. Department of Agriculture and the Florida Livestock Board (Knipling, 1985) provided proof that the technique is effective.

Mass-rearing of an insect to be sterilized and eventually released in the wild population is a basic prerequisite of the sterile-male technique. In the eradication of the screwworm, a mechanized factory, for example, was built and millions of insects reared. Williams et al. (1981) documented a method for producing 250,000 to 300,000 adult stable flies per day in connection with sterile male releases at St. Croix Island in the West Indies. Obviously, for a feedlot scale operation fewer sterile flies would be required. A study was conducted to determine the feasibility of controlling stable flies in a feedlot environment using the sterile fly technique.

Methods and Materials

Mass Rearing. Adult flies, *Stomoxys calcitrans*, were housed in a series of 16 x 16 x 16" aluminum screened cages maintained in a rearing room under constant illumination (overhead lamps) with temperature and relative humidity maintained at 70° F and 60 to 80%, respectively. Flies were fed citrated beef blood daily and eggs were laid on black cloths that were suspended in tap water in the cages. Eggs collected on the cloths were quantified volumetrically and placed on artificial media (combination of wheat bran, fish meal, zonolite and water) for larvae to develop. Pupation of the larvae began after 7 days and pupae were collected from the media 4 days later.

Sterilization. After pupae were collected, they were separated from the artificial media, placed in plastic bags (10,000/bag) and sent in a cool box on the bus to Fargo, North Dakota (USDA Lab), where they were irradiated with a Cobalt 60 source. Irradiated pupae were returned to Brookings on the next southbound bus.

Release. Sterilized pupae were placed in aluminum cages and emerging adults fed on beef blood before being dyed with Day-glo marking pigment (Day-Glo Color Corporation, Cleveland, Ohio). Flies were released at the SDSU Nutrition Unit at Brookings weekly from July through September but only during optimal climatic conditions so that the released flies would be as competitive as possible and mate with the wild population.

Recapture. Williams' sticky traps were used to recapture sterile (marked flies) as well as wild flies. Panels composed of two translucent fiberglass (Aalsynite Series 600, 1.2 mm thick, Reichold Chemicals, Shawnee Mission, Kansas) rectangles were fitted together at their mid-points and covered with 10 mm clear plastic sheets. The panels and sleeves were positioned in slots cut in 2 x 2" wooden stakes (driven previously into the ground with a postdriver). The covered panels were then coated with Tangle Trap adhesive (The Tanglefoot Company, Grand Rapids, Michigan).

Results and Discussion

When fly counts on the front legs of beef cattle in the feedlot were carried out at three time intervals during the day, one day each week from June 12 to September 4 (table 1), numbers of stable flies in general were found to be the lowest in the mornings and highest in the afternoons. With the release of sterile insects weekly from July 24 to September 4, fly counts on the animals were expected to increase immediately following release and to decrease following mating and the subsequent production of sterile eggs. Length of adult life for a typical fly (both sterile as well as fertile) was estimated at 2 weeks. A trend toward lower numbers of flies was observed starting August 15, 3 weeks after the first sterile fly release. We hope that, when the data for the month of September are complete, we will be able to demonstrate a greater reduction in the numbers of flies that are available to feed on potential animals.

When sterile insects were released starting the week of July 24, the ratio of sterile:fertile (wild flies) in the feedlot was estimated at 1:26 using the Williams' sticky traps (table 2). On August 29 after the release of sterile insects over a period of 6 weeks, the ratio of sterile:wild flies was increased to 1:5. Based on these data, the ratio of sterile:wild flies during the month of September should be increased to 1:1 or 1:0. The investigators plan to continue their releases during September to reduce the wild population as far as possible toward zero. Fewer numbers of fertile insects will then be available to successfully overwinter and the population of stable flies in early 1987 is expected to be dramatically less.

Literature Cited

- Knipling, E. R. 1985. Sterile insect technique as a screwworm control measure: the concept and its development. In: Symposium on Eradication of the Screwworm from the United States and Mexico, O. H. Graham (Ed.). Entomological Soc. America Misc. Publ. 62, College Park, Maryland.
- Williams, D. F., R. S. Patterson, G. C. LaBrecque and D. E. Weidhaas. 1981. Control of the stable fly, *Stomoxys calcitrans*, on St. Croix, U.S. Virgin Islands, using integrated pest management measures. II. Mass rearing and sterilization. *J. Med. Entomology* 18:197-202.

TABLE 1. AVERAGE NUMBER OF STABLE FLIES (BITING OR ALIGHTING) ON THE POSTERIOR ASPECT OF THE FORELEGS OF 20 CATTLE PER MINUTE AT THE SDSU BEEF CATTLE AND SHEEP NUTRITION UNIT DURING THE 1986 SEASON

Date		9 a.m.	12 noon	3 p.m.
June 12		1	14	10
June 19		13	24	28
June 26		8	22	23
July 3		3	13	16
July 10		11	18	36
July 17		11	18	20
July 24	7,559 ^a	7	22	37
July 31	19,737 ^a	1	23	32
August 8	31,916 ^a	6	26	30
August 15	14,258 ^a	4	9	19
August 22	33,379 ^a	1	8	12
August 29	25,551 ^a	1	5	7
September 4		1	3	21
\bar{x}		5	16	22

^a Number of sterile flies released.

TABLE 2. NUMBER OF STABLE FLIES CAPTURED FROM TWO WILLIAMS' TRAPS AT THE SDSU BEEF CATTLE AND SHEEP NUTRITION UNIT DURING THE 1986 SEASON

Date	Total count		Sterile:wild ratio
June 12	175		0:175
June 19	618		0:618
June 26	226		0:226
July 3	227		0:227
July 10	295		0:295
July 17	783		0:783
July 24	472	7,559 ^a	0:472
July 31	807	19,737 ^a	30:777 1:26
August 3	792	31,916 ^a	64:728 1:11
August 15	673	14,258 ^a	45:628 1:14
August 22	448	33,379 ^a	33:415 1:13
August 29	522	25,551 ^a	83:439 1:5

^a Number of sterile flies released.