

SOME SOCIAL AND ECONOMIC ASPECTS IN CONTROLLING VAMPIRE BATS*

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A socio-economic evaluation of the vampire bat control program in Latin America was completed. A stratified random sample of 178 cattleowners in Nicaragua were personally interviewed to obtain primary production data on the 117 farms involved in the control program and 61 farms which did not participate in the control program. Annual beef animal weight loss from vampire bat molesting was estimated to be 39.7 kilograms per head, and annual milk production loss was estimated at 69 gallons per head. Sixteen known cases of people having been bitten by vampire bats on the 178 ranches were reported. No people were bitten and no cattle died from vampire bat rabies after the control program using diphacinone was implemented on these farms.

INTRODUCTION

Presented in this paper are some results of the first socio-economic evaluation of the Vampire Bat Control Program in Nicaragua. These results are part of a larger investigation of the socio-economic environmental impact of vampire bat control in Latin America. Vampire bats (*Desmodus rotundus*) cause social and economic hardship because they feed on humans and livestock and often transmit paralytic rabies. The range of this species extends from 27° latitude north in northern Mexico along both coasts of that country, down to 33° latitude south, extending along the Pacific Coast in Chile, on the Atlantic Coast in Uruguay, and the extreme southeastern tip of Brazil (1).

Personnel of the Denver Wildlife Research Center (DWRC), in conjunction with the United States Agency for International Development (USAID), successfully developed and tested two treatment methods for vampire bat control (2). The first method is topical, which entails capturing vampire bats and spreading on their backs an anticoagulant paste, diphacinone. The bats are then released to return to their roost where grooming or preening among the bats results in the ingestion of the paste and subsequent death by internal hemorrhaging. The other method is the intraruminal injection of the anticoagulant chemical which goes into the bloodstream of the bovine. When the bovine is bitten, the feeding vampire bat ingests the anticoagulant and dies.

Considerable time and money has been expended in the control of rabies in cattle by means of anti-rabies vaccination. However, the cost of the vaccine is prohibitive for some small producers, averaging \$1.25 U.S. per dose in Nicaragua in 1974 (3). The effect of the anti-rabies vaccine is short-termed. The use of anti-rabies vaccine does not stop the spread of rabies by already infected vampire bats.

The most extensive and best documented vampire bat control program using diphacinone was established in Nicaragua. An estimated 12,000 livestock deaths (0.5 percent of national herd) occurred from paralytic rabies in 1974 in Nicaragua for an estimated direct economic loss of \$1.5 million U.S. (4, pp 1-4). In addition, considerable indirect economic and social loss was incurred from the loss of production, secondary infections, and other problems associated with the effects of vampire bat predation on humans and livestock. A four-year Nicaraguan control program, costing \$482,400 U.S. annually, was initiated in January, 1974. Twenty technicians and two veterinarians were directly involved in the program (5).

METHODS

Basic gain, loss, and cost data were obtained from personal interviews of a sample of 178 randomly selected cattleowners from the control program files; 117 of these had participated in the control program. The

*Professional Paper P-611 of the Oklahoma Agriculture Experiment Station.

sample was stratified by size of cattle herd, type of cattle owned, year when treatment was received (if treated), department, and region. The sample was based on lists of livestock producers maintained by personnel of Vampire Bat Control campaign in the Ministry of Agriculture.

Cattlemen were asked to provide: (a) economic and socially descriptive information of their agricultural enterprise; (b) extent and nature of the vampire bat problem before and after treatment (if treated); (c) length of time over which the vampire bat control was effective; and (d) economic significance of the control program.

RESULTS

The 44 cattle herds in the sample with one to ten head contained an average of two beef and four dairy cattle on 79 acres of land per ranch. (One hectare equals 2.47 acres). There were an average of 20 beef and 20 dairy cattle in the sample of 67 farms with from 11 to 100 head of cattle, with an average of 148 acres of land per farm. The largest herd sample (over 101 head) of 69 farms had 1,348 acres with an average 193 dairy and 384 beef cattle, for a total of 577 head.

Cattle owners who participated in the campaign recalled that 82 beef animals and 23 dairy animals died between 1970 and 1974 from paralytic rabies, after having been bitten by vampire bats. Among the nonparticipant cattle owners, 65 beef and 2 dairy animal deaths were attributed to paralytic rabies. No livestock were reported to have died from paralytic rabies after the diphacinone was used on the sample farms in the treatment program.

A beef animal bitten frequently by vampire bats may go "off feed" and/or otherwise suffer a reduction in weight gain. Thirty-five ranchers estimated that frequent biting by bats would result in a slower rate of gain; this decreased meat production averaged about 39.7 kilograms or 84 pounds per year. A dairy animal, if fed upon continually, would decrease milk production by an average of 1.9 liters per day (69 gallons per year), according to 40 dairymen in the sample.

Cattle owners whose cattle had been systematically treated in the control program claimed they would be willing to pay an average of \$1.14 U.S. per head injected. Cattle owners whose cattle had not been systematically treated in the control program claimed they would be willing to pay an average of only \$0.69 U.S. per head treated. Some economic benefits must be attributed to the control program by producers, if they are willing to pay for the diphacinone treatment.

Sixteen people were reported to have been bitten by vampire bats in 1970 to 1974, prior to the control program. Seven of those bitten were children, three were the cattle owners, and the remaining six were workers on the ranches. Several of the people, particularly the children, had been bitten repeatedly. None of the people bitten received anti-rabies treatments. Fear of being bitten by vampire bats was admitted by 42 of the interviewees, although no case of paralytic rabies in humans was indicated in the survey over the time period 1970-1978. However, between 1973 and 1977, 81 rural residents were given anti-rabies treatments by the Nicaraguan Ministry of Health as a precautionary measure. There was no report of people on participant farms being bitten after the vampire bat control program was implemented on those farms. Thus, the quality of life of these people has been improved.

Vampire bat control on the sample farms was 100 percent effective in 63 of the herds for an average time lapse between the dates of treatment and interviews of 30.2 months. A recurrence of biting was noted on an average of 9.4 months after treatment on the remaining 54 control program farms in the sample. The average of the estimates of all 117 participant cattle owners was 19.9 months of respite from vampire bat bites after treatment.

Nationwide, the herds on 1,912 ranches were treated by the personnel of the Nicaraguan Ministry of Agriculture. There were 945 (0.5 percent) cattle injected from herds with 10 head or less. Another 24.9 percent (36,830 head) were from herds with from 11 to 100 head and 74.5 percent (110,367 head) of the cattle injected were from herds with more than 101 head.

ACKNOWLEDGMENTS

The assistance of the following individuals is gratefully acknowledged: Dr.

Rodrigo Gonzales, Chief of the Division of Animal Health, Nicaraguan Ministry of Agriculture, Dr. Clay Mitchell and Dr. Dan Thompson of the Denver Wildlife Research Center, Dr. Carlton Infanger of USAID/Washington, Mr. Tim O'Hare and Armando Gonzalez of USAID/Nicaragua, and Dr. Dennis Constantine, Mencio Medrano Perez, and Beatriz Glover.

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