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VAMPIRE BAT CONTROL PROGRAMS IN LATIN AMERICA

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ABSTRACT: Studies in Mexico in 1972 showed that diphacinone (Diphenadione)¹ (2-diphenylacetyl-1, 3-indandione) was effective in reducing both vampire bat (Desmodus rotundus) populations and the incidence of bat-transmitted rabies in cattle. Two highly selective methods were developed: treating cattle systemically and treating vampire bats topically.

Since 1972, Denver Wildlife Research Center personnel have assisted Latin American Ministries of Agriculture in developing control campaigns. Brazil, Bolivia, Colombia, Costa Rica, Ecuador, Guyana, Panama, Venezuela, and Nicaragua have either undertaken or are considering operational vampire bat control programs.

INTRODUCTION

Vampire bats (Desmodus rotundus) attack and feed on the blood of man and other animals throughout most of Latin America. Blood loss, however, represents only one problem caused by vampire bats, because their feeding habits have the potential of spreading paralytic rabies and their bites provide avenues for many other kinds of infections.

Great numbers of livestock live within the geographic range of the vampire bat, which extends from northern Mexico to central Argentina, and many suffer nightly attacks from vampire bats. Annual losses attributed to vampire-bat-transmitted rabies in Latin America are estimated at one-half million head for bovines, and about 2 million head for all types of livestock (Constantine, 1970).

Because of the great loss of livestock to rabies, most Latin American countries have attempted to reduce vampire bat populations. Control methods included gassing, poisoning, dynamiting, and smoking bats out of caves (Greenhall, 1970). These attempts proved to be expensive, generally ineffective, and most important, not specific for vampire bats.

In 1967, a 10-year agreement was signed by the Administrator for the United States Agency for International Development (USAID) and the Secretary of the Interior committing the U.S. Fish and Wildlife Service to studies to reduce food losses caused by rats, bats, and noxious birds on a worldwide basis. The USAID's Bureau of Technical Assistance provides the funds and the Denver Wildlife Research Center (DWRC) is responsible for implementation.

One of the programs funded by USAID was to develop species-specific control methods for vampire bats. This joint project with the Government of Mexico was initiated in June 1968 and completed in December 1973. In just 5 years, starting with the most basic information, biologists, using the anticoagulant diphacinone, developed a solution to a problem that has plagued man for centuries.

CONTROL METHODS

Topical Treatments of Vampire Bats with Diphacinone

Vampire bats are captured with mist nets set around corralled cattle or at cave entrances. Approximately 1.5 cc of a vaseline-diphacinone mixture is applied to the dorsal surface of each captured bat, and the bat is released. The bats return to their roost, and by cross-contamination in the compact colonies, pass the chemical from one to another. The bats die after ingesting the chemical during grooming (Linhart et al., 1972).

¹Reference to trade names does not imply endorsement of commercial products by the U.S. government.

Systemic Treatments of Cattle with Diphacinone

Cattle are injected (intraruminal) with 1.0 mg of diphacinone per kg of body weight. The drug is rapidly absorbed into the blood stream. Any vampire bat that feeds from a properly treated animal within 72 hours after treatment receives a lethal dose of the drug (Thompson et al., 1972).

Tests in Mexico indicated a positive correlation ($r = .92$) between the number of fresh bites on cattle and the number of vampire bats captured in mist nets set around the same group of cattle. Therefore, the primary measure of effectiveness for both control methods is simply the reduction in numbers of fresh bites.

Implementation

Most Latin American countries have shown tremendous interest in these control methods and the following countries have either undertaken or are planning vampire bat control programs:

Brazil - Initiated vampire bat research and control projects in 1974 as part of a national rabies control program.

Bolivia - This country has a major vampire bat problem and is planning to organize a national control program. Funding is expected in a pending Inter-American Development Bank loan for agricultural development.

Colombia - Planning a large regional campaign in the northern states of Guajira, Cesar, and Antioquia. A rabies outbreak in 1971 resulted in heavy livestock losses; on one small farm in Guajira, 99 out of 100 cattle died within a 2-month period as a result of vampire-bat-transmitted rabies.

Costa Rica - Started a control program in 1975 with a training workshop in organization and techniques, assisted by the Ministry of Agriculture of Nicaragua.

Ecuador - Evaluating the extent of vampire bat predation on livestock on a state-by-state basis before initiating a control program. Field demonstrations of control methods were conducted by DWRC personnel for Ministry of Agriculture veterinarians in June 1974.

Guyana - Initiated a national control program in 1975 following a series of workshops on control methods in October 1974. The demonstrations were jointly funded by USAID, the International Bank for Reconstruction and Development, and the Ministry of Agriculture.

Panama - Launched a national program in 1975 with 10 control teams--7 for each of the agricultural sectors in the country and 3 for a regional program in the Darien strip which borders Colombia.

Venezuela - Began a regional control campaign in the western part of the country in 1974 (Rhoad, 1976).

The most extensive control program developed has been in the Central American country of Nicaragua.

NICARAGUA'S NATIONAL CAMPAIGN AGAINST VAMPIRE BATS*

Nicaragua, in Central America, has suffered for many years from problems associated with vampire bats. Direct losses of livestock from rabies and indirect losses, such as malnutrition, prompted the Ministry of Agriculture to carry out a critical review of the problem.

After learning of the successful vampire bat control methods developed in Mexico, we requested a demonstration in Nicaragua. The initial results were a complete success, and authorities in the Division of Animal Health applied to the national budgeting committee to fund a national campaign against vampire bats. The campaign was approved by the government in 1974 with an annual funding of 800,000 Cordobas (\$114,285.00).

*Translated from Spanish

The control program is administered through the Board of Livestock Services and Controls (Fig. 1). The chief of the program and field supervisors are veterinarians, while members of the field teams are trained in general agriculture and vampire bat control methodology.

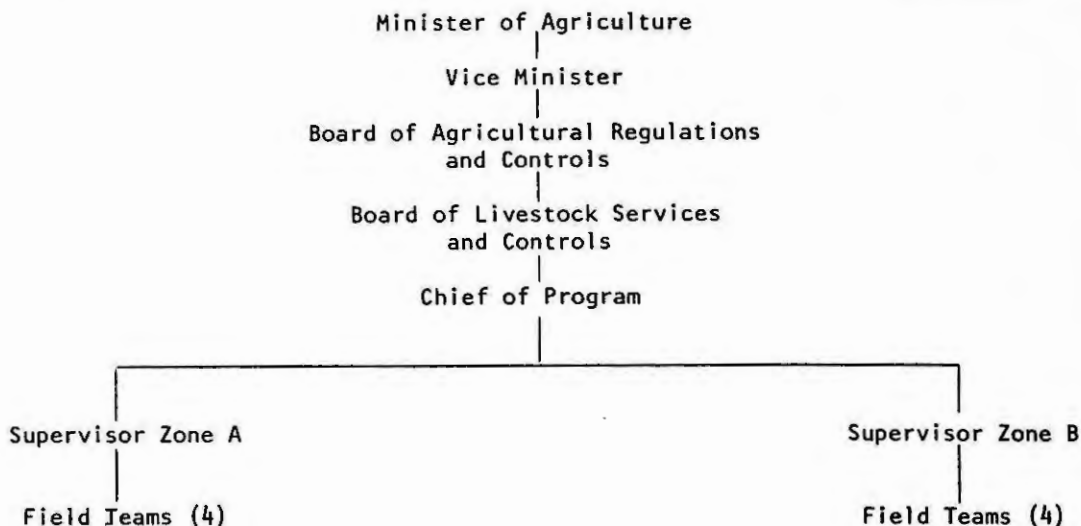


Figure 1. Infrastructure of vampire bat control program in Nicaragua.

Objectives of the Program

The vampire bat control program was initiated in 1974 with the following objectives:

- a. reduce death due to bovine paralytic rabies
- b. reduce other economic losses of vampire predation (malnutrition, lowered milk production, and secondary infections).

In a nationwide survey of the problem, animal health officials determined the campaign should be initiated in the departments (states) of Granada and Boaco which had the heaviest predation. Since then, the campaign has been extended to 9 of the 17 departments of the country.

Methods

Specific control recommendations are made after field teams, working in defined zones (counties), collect background information on the problem in their assigned areas. Decisions on work schedules and method of treatment (topical or systemic) are made after visiting individual ranches and recording: (1) name of ranch and owner, (2) availability of facilities, such as corrals and cattle chutes, (3) numbers of livestock, (4) number of fresh vampire bat bites, and (5) climatic conditions.

Results in Nicaragua

Since the initiation of the control program in January 1974 to the end of December 1975, 164,834 cattle were examined and 93,915 fresh bites recorded. During this period, 102,349 cattle were treated intraruminally and 1,488 vampire bats treated topically. Posttreatment examinations (30 days after treatment) of these cattle showed biting was reduced by 91.8%.

| | <u>Animals Examined</u> | <u>Fresh Bites</u> | <u>Cattle Treated</u> | <u>Vampires Treated</u> | <u>Percent Reduction</u> |
|-----------|-------------------------|--------------------|-----------------------|-------------------------|--------------------------|
| Nicaragua | 164,834 | 93,915 | 102,349 | 1,488 | 91.8 |

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CONCLUSION

No confirmed cases of vampire-bat-transmitted rabies have been recorded in Nicaragua since 1974. As a result of this control campaign, we feel that bat-transmitted rabies has been eliminated from this country.

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