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RODENT PROBLEMS OF THE WEST INDIES

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ABSTRACT: The commensal rodents as we know them are an introduced species into the West Indies. They came with the first explorers from Europe and the first slaves from Africa and were spread not only in the West Indies but North and South America as well. The first record of attempts at their control was in Barbados in the 1700s when two pence was paid for each rat caught. Active control has been going on in the islands since the 1960s and 1970s with only partial success. The Pan American Health Organization is now assisting many of the governments with their problem and programs.

INTRODUCTION

We may think that rodents are a recent problem, but their remains have been found in Israel dating to prehistoric time, in the Old Testament of the Bible rats are mentioned in 1,300 B.C. and again in 600 B.C. The origin of rodents is placed somewhere in Central Asia or South Central Africa, which is the cradle of man's civilization. With the westward movement of man, so moved the rat. Man carried him to every part of the world that he explored and to all the areas that he settled. The rodents' landing date in the West Indies is not exactly known, but the first reports from South America were in 1544 and North America in 1609. In many of the islands all three of the commensal rodents are found, but in others only two are found with the house mouse (Mus musculus) always being in residence.

Rodent-borne diseases, specifically plague, has been the most predominant one associated with rats. Plague found its way into the West Indies, but the last known case was in Trinidad in 1912. Leptospirosis is probably the most known rodent-borne disease with 395 cases reported in 1984 and 310 cases in 1985. The major problem, however, is that many of the islands do not have the medical facilities to do the laboratory work, resulting in only some of the islands reporting.

Economic losses caused by rodents probably far outweigh the losses caused by rodent-borne diseases in the West Indies. The World Health Organization estimates that 33 million tons of food are lost to rodents every year and would be enough to feed 130 million people during the same period. But from the standpoint of a small islands' economy, these figures are too large. Taking it down to facts that they can understand, for example, US$ 2.9 million lost in 1974 to the green sugarcane in Barbados, losses of 20 to 50% in coconuts in Saint Lucia, and as high as 95% to cocoa in Montserrat. These losses people can understand and in turn do affect the health of the people, because a hungry person is not a healthy person.

METHODS AND MATERIALS

The Pan American Health Organization recognized that, with the formation of the rodent control unit in 1974 within the Ministry of Health in Barbados, there was still a great need for assistance within the West Indies from the number of requests it was receiving. In June 1984 this advisor was brought back into the Caribbean with the aim of assisting local personnel in planning, organizing and executing field operations, actively training local personnel, and providing and giving support to the field supervision activities of the rodent control programs, and, in addition, assisting in supervising the activities in the rural health programs where rodent control is carried out in coordination with other rural health programs.

The program is set up on an individual island or country basis. It involves the training of public health inspectors, assistant public health inspectors, public health educators, public health nurses, rodent control officers and mosquito control officers. In many cases this is working with very small groups or even individuals as many of the islands have only a small Public Health force. The individuals are provided training in rodent biology, characteristics, recognizing infestations, urban and rural methods of survey, methods of control, rodenticides, methods of safe handling of rodenticides, public awareness and community participation. They are provided with manuals, handouts, survey forms and survey manuals in addition to audio visual material.

RESULTS OR OBSERVATIONS

The results are slowly beginning to show an increase in the awareness of the problems associated with rodents. As you can see from the following brief descriptions of the islands that are at present involved in the program, their problems range from very small to ones that will take considerable input of manpower and financial support.

ANGUILLA

Anguilla is a British Colony and is the most northerly of the Leeward Islands. It is also known as Eel Island because of its shape and is 16 miles long and 3 miles wide with an elevation of 213 feet and is located 5 miles north of Saint Maarten/St. Martin. The population is only 7,000 people and the economy is based on fishing, boat-building and tourism.

The island does not have a rodent control program or staff but they do answer complaints on an individual basis when they can. They are now starting on a program of training the Aedes aegypti control staff in rodent control and a community awareness program with the public health educator.

COMMONWEALTH OF THE BAHAMAS

The history of the Bahamas, which cover an area of over 100,000 square miles, began in October 1492 when Columbus made his first landfall on the Island of San Salvador. The Spanish claimed them but the English settled and claimed them from 1629.

The first president, George Washington, referred to them as the "Isles of Perpetual June" due primarily to the climate. They are also called "The Playground of the Western World" and "The South Sea Islands of the Atlantic", and have had an important history with the United States, from blockade-running during the Civil War, bootlegging during the Prohibition era, shipwrecking to salvage goods, to tourism, the principal industry of today.

Nassau, the capital of the Bahamas, located on New Providence Island, is the hub of the 700 islands in the Bahamian Archipelago, of which fewer than 30 are inhabited. It receives more than a million tourists every year. The Ministry of Health is divided into various departments, of which rodent control comes under the Department of Environmental Health Services and is included in the Vector Control Services section. This unit, which was comprised of six rodent control officers, has now been increased to eight. These persons are divided into teams which consist of one public health inspector (district), one insect control officer, one rodent control officer and a driver. There are five teams which cover designated areas, while other personnel cover the seaports, airport, government facilities, complaints and surveillance. The Government is well aware of the serious threat that they are confronted with if they do not control the rodents, especially to their main industry--Tourism. They have therefore given this high priority and have also mounted awareness and clean-up programs.

BRITISH VIRGIN ISLANDS - TORTOLA

The British Virgin Islands are a group of over 50 islands, rocks and cays forming the northwestern extremity of the Leeward Islands. The Island of Tortola is some 60 miles east of Puerto Rico and covers an area of 42 square miles. It is volcanic in nature with the highest point reaching 1,780 feet above sea level. The population is around 9,000 on Tortola, primarily living around the capital, Road Town. The main industry is tourism and sailing. Up until now the primary public health functions have been Aedes aegypti control. The health authorities have realized the problems connected with rodents and are now forming a rodent control unit under the direction of the public health department and these people are undergoing in-service training.

BARBADOS

Barbados, the most easterly island in the Caribbean was first discovered by the Portuguese in 1536 and so named for the bearded fruitless fig trees found growing there. The English first settled the island in 1625 and it was always under their control until independence in 1966. The island is 21 miles long by 14 miles wide with an elevation of 1,105 feet. The population is 258,000, the highest number of persons per square mile of any of the islands in the Caribbean.

The government is part of the Commonwealth and has one of the oldest constitutions within it. The island was never occupied or attacked by any of the other countries, mainly because of its location and the direction of the wind, which is always from the east. The economy is based mainly on sugarcane and tourism (the ratings change with the seasons), and light industry.

Rodent control in Barbados was reported here in 1982 at the 10th Vertebrate Pest Conference and has not changed to any degree since. There are still one chief pest control officer, one supervisor, 12 rodent control assistants, one driver and one maid. The most noted change seen is that because of the training and expertise they have had over the last 12 years, they are now being used as a training unit to assist personnel from the smaller or less-developed islands in the Caribbean.

CAYMAN ISLANDS

The Cayman Islands are a group of three small islands located south of Cuba and northwest of Jamaica. The islands were first discovered by Columbus in 1503 and comprise a total land area of 100 square miles. Grand Cayman Island is the largest and covers 76 square miles. Georgetown is the capital. The Caymans are a British Colony and have a total population of 17,000, of which 16,000 reside in Grand Cayman. The economy is based on tourism and offshore banking. The population has a high standard of living and pays no taxes. Grand Cayman is flat with a maximum elevation of 60 feet, and is covered with areas of mangrove swamps with brackish water.

The original rodent control program started in 1980 with the senior public health inspector being sent to Barbados to observe the operation of the program there. Upon his return a similar program was established. The original staff consisted of one senior public health inspector, two public health inspectors and four rodent control operators.

The initial part of the program was to conduct a rodent survey as to the areas of highest density and for the determination of species. The species were found to be all three of the commensal ones. The survey showed that out of a total of 950 residences and businesses surveyed there was a total of 743 positive or 79.43%. The control program started in November 1980 with the rodenticides being supplied and applied to the residential areas free of cost. Commercial areas are required to purchase their own rodenticide with technical assistance being provided by the Rodent Control Operators.

The present program now consists of seven rodent control operators, two for each Sanitary District and one as acting supervisor who is also responsible for storage and mixing of the rodenticides as well as the control operations in government buildings. The rodenticides being used are (1) warfarin, (2) diphacinone, (3) brodifacioum and (4) zinc phosphide. Nos. 1 and 2 are mixed with cornmeal, oats and sugar, nos. 3 and 4 are commercially mixed products. Wax-block formulations are used for outside areas. The mobility of the staff of the unit is by small motorcycles.

The training and background of the staff is very good. The inspector in overall charge of the unit has a B.S. degree, in Environmental Health and is working towards a Masters in Public Health. In addition he has also received training in rodent biology and control form PAHO. The rodent control operators are receiving in-service training as part of an ongoing program. The rodent control efforts of the unit are provided in Table 1.

Table 1. Unit efforts in the way of inspections and treatment of premises for the period of February - December 1982. The number of bait placements and total amount of bait used are also given.

Type	Total	Untreated	Treated	Bait Points	Lbs. Used
Commercial	200	164	36	4627	
Government	35	-	35	2829	518
Residential					
Eastern (NE)	481	162	319	6144	1214
Eastern (SW)	582	198	384	6332	1361
Central-East	511	173	338	6699	1331
Central-West	448	134	314	4373	1043
Western-East	538	171	367	6473	1471
Western-West	436	101	335	4233	1032

As can be seen from these figures, the program is well organized and operated. The program is still operating and to this date does not require outside assistance. In addition, there are well-organized-and-operated cleanup and sanitation programs to augment the control program.

ST. CHRISTOPHER/NEVIS

Columbus spotted this island and named it St. Christopher in 1493 and the English later renamed it St. Kitts. It is a fertile island 33 miles long and 6-1/2 miles wide with mountain ranges to 4,000 feet in elevation. It was once jointly settled by the English and French which is why the capital is Basseterre. There are 34,000 people in St. Kitts and about 12,000 in the sister island of Nevis. St. Kitts boasts one of the most impressive forts in the Caribbean, Brimstone Hill, which was known as the "Gibralter of the West Indies" and took a century to constuct. The main economy is sugar and has been since the 17th century. A small tourist industry is starting to bloom. The Public Health Department has a small two-man rodent control unit for treating government facilities and answering complaints; however, at present one position is vacant. The unit at present is too small to be effective, but all of the public health personnel are receiving training.

COMMONWEALTH OF DOMINICA

The largest of the Windward Islands was discovered by Columbus in 1493 and fought over by the English and French until Britain assumed control in 1805. The island became independent in 1978 and has a population of 80,000. There are reported 365 rivers or one for every day and it covers an area of 290 square miles with an elevation of 4,747 feet with much of it being tropical rain forest.

The rodent control program in Dominica, which began after hurricanes David and Frederick struck in 1979, is part of an overall vector control program. The unit was set up with a supervisor, squad leaders and vector control operators. The training they were receiving was in the form of in-service from their supervisors and assistance from the PAHO advisors in mosquito and rodent control. Unfortunately the program is stopped at present because of economic conditions.

The island is infested with all three of the commensal species, with the Norway rat and house mouse in the more developed and populated areas and the roof rat more of a pest in the agricultural and rural areas. While the program was functioning, the rodenticides used were commercially prepared first- and second-generation types.

NETHERLANDS ANTILLES

The Netherlands Antilles are part of Holland and are divided into two groups or areas. The first, the ABC's, Aruba, Bonaire and Curacao, are just off the northern coast of Venezuela. The three cover an

area of 363 square miles with a desert-like habitat and have a population of around 225,000 people. Aruba and Curacao are most noted for their oil refineries where Venezuelan crude oil is refined. The economies of these three islands are petroleum, tourism and salt. The other group is referred to as the "Dutch Windwards," which are actually in the Leeward Island group: Saint Maarten, Saba and Saint Eustatius. These three islands cover an area of 29 square miles and are located just north of St. Christopher and south of Anguilla. Saint Maarten is an island of actually 37 square miles, but 21 of those miles are French. The population of 28,000 is engaged mainly in tourism as Saint Maarten is a freeport and has many tourist facilities. Saint Eustatius is 8 square miles with a population of around 1,600. This island was the first country to recognize the revolutionary government of the United States in 1776. The economy is basically agriculture with a little tourism. Saba is 5 square miles with a population of around 1,000 and is the tip of a volcano. Most of the inhabitants are of Scottish ancestry and the economy is agriculture and tourism.

Of the six islands in the group, only Curacao has any organized rodent control program. This unit consists of one supervisor and six rodent control officers. The program consists of treating government facilities and handling complaints. When complaints are received, surveys are conducted around the immediate area for any further infestations. There is also a small industrial and commercial rodent control section which does work in these areas, but charges a fee. In Aruba, which has no program, the public health inspectors are working with the community and church groups in a public awareness program, so that the people can help themselves. In Bonaire and the other three islands there are no organized programs and any complaints are handled by the public health inspectors.

SAINT LUCIA

The discoverer of the second largest of the Windward Islands is unknown, but it appears on a Vatican map in 1520. However, before being finally settled by the English, it changed hands 14 times between them and the French. The island is 27 miles long and 14 miles wide, volcanic in formation and is fairly hilly, with the highest peak being 3,145 feet above sea level.

Saint Lucia has a population of 140,000 people with the official language being English, but with the French influence alot of "Patois" is also spoken. The economy is mainly agriculture with bananas, cocoa and coconuts being the main crops. Light industry and tourism is also developing in the country. The Public Health Department in the Ministry of Education and Health is primarily concerned with mosquito control and does not have a rodent control program. Although they do have an interest, the main problem is in organizing and economics.

ST. VINCENT AND THE GRENADINES

St. Vincent is an island 18 miles long and 12 miles wide, capped by a volcano rising some 4,000 feet in elevation. A very fertile island, it specializes in banana, coconut, arrowroot and breadfruit of Captain Bligh fame with the ship HMS Bounty. The economy of the population of 110,000 is based primarily on agriculture and light industry. Situated 100 miles west of Barbados, it is the gateway to the Grenadines, a small chain of islands extending some 40 miles south and west of St. Vincent towards Grenada, Trinidad, and Tobago. In these islands tourism is budding, especially for yachting people.

Until 1985 the Public Health Department was concerned primarily with only mosquitos. At this time the services and budget were obtained for two rodent control officers to assist in the vector control program. At present these individuals are receiving training and doing control work only in government facilities. The district public health inspectors handle complaints and give assistance to the homeowners.

TRINIDAD AND TOBAGO

Trinidad and Tobago were discovered by Columbus on his third voyage in 1498 and remained with Spain until captured by the British in 1797 and ceded to England in 1802. The islands are the most southernly in the Caribbean, lying just 7 miles off the coast of Venezuela and opposite the mouth of the Orinoco River. The islands are populated by approximately 1-1/4 million people of whom about 40% each are equally divided between African and East Indian descent with the remaining percentage divided between white, Chinese, mixed, and other nationalities.

Trinidad is one of the few petroleum-producing countries in the Caribbean, with the first commercial well being drilled in 1908. This was the reason that during World War II there were large US military installations here, to give protection to the oil installations here and in Venezuela and the Netherlands Antilles. Industry is quite developed with light, medium, and heavy industry being represented. Agriculture, which in the past had declined, is on its way back with large increases seen in sugar, rice, citrus and many other products. Poultry, pork, and fish are also large developments with beef showing increases.

The Ministry of Health and Environment does not have a rodent control program, but does have a large insect vector control program for the control of Aedes aegypti. The City of Port of Spain, the capital, does have a 40-man unit specifically for rodent control within the Public Health Department. They have the city divided into nine districts with squads assigned to each one. All of the premises are visited once every 4 months and, if found infested, control measures are taken. The residents are advised at each visit as to what they can do in the way of sanitation and rodent-proofing. The unit is well organized and efficient in their operation, but are hampered by way of refusals of entry, closed houses and delivery of new stock. The rodenticide being used is Racumin prepared bait which is diluted down with fresh cornmeal. Although this formulation is not normal, it does appear to give adequate control.

DISCUSSION

In the past there have been many short-term consultants working throughout the West Indies on the problem of rodents and control. These consultants have been very useful but only up to a point. In most cases they are not in an area long enough to be able to carry through on what they have been able to initiate.

In 1983 there was a Rodent Biology and Control course held in Trinidad for 2 weeks and the participants were from all of the English-speaking islands. The course was sponsored by the Pan American Health Organization with resource persons being brought in from outside agencies including commercial companies. The training that they received and the material they carried home was of the type with which they could in turn train their people in their own islands and countries. But, as in many cases, rodent control is only a small part of the public health problem and program, and there is no time to initiate any active program. One big program was started in the Public Health Department of the City of Port of Spain. But this was an existing 40-man unit which even now has budget limitations.

The initiating of a regional rodent control advisor in the West Indies to work with each island or country on an individual basis is beginning to meet with a degree of success. Not that all of the rats are going to be under control overnight or even next year, but evidence shows that control is on the upward movement. As the public health personnel becomes more trained, the public becomes more aware, the community learns what it can do, the problem becomes integrated and the chances of success are greater.

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