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RODENT CONTROL IN BARBADOS

CHARLEY O. BROWNE, Chief Pest Control Officer, Ministry of Health, Bridgetown, Barbados, West Indies

HISTORY OF BARBADOS

Barbados, holiday paradise of the 1970s and 1980s, has been transformed from a mere land of fruitless trees when it was discovered four hundred and fifty years ago, to one of sprawling acres of cultivated crops including cane, modern hotels on popular coast lands and a proliferation of commercial houses in Bridgetown, the capital.

A stable political system that dates back to 1638, just twelve years after the first settlement, and an industrious population are factors which combine to maintain peace and quiet in the tiny sun-splashed island.

The island was nicknamed Barbados (the bearded) because of beard-like roots hanging from nonfruit-producing fig trees, or because of the strange presence of bearded indians, depending on which version of history you believe.

Discovered by shipwrecked Portuguese sailors in 1536, Barbados is the most easterly of the archipelago of West Indian islands. Its 166 square miles make it about twenty-six square miles smaller than Singapore and a little bigger than the Pacific island of Macao.

A system of parliament was established here in 1639, the second oldest outside Britain.

EARLY HISTORY OF RODENT CONTROL IN BARBADOS

Barbados has always been used as a trans-shipment point for the other islands of the eastern Caribbean. Its location and the facilities offered brought many ships from other countries for bunkering. Thus because of the many ships from all parts of the world which anchor in our ports, the likelihood of an invasion of rodents and the spread of disease is ever present. Schooners and other small craft plying the islands usually anchor along the quayside, and while the vessels are in port, are used as living quarters, where people move to-and-fro without hindrance. Because of this arrangement, the use of rat guards to prevent rats from getting on or off the boats is not feasible.

Rodent control in Barbados started in 1745 when an act was passed by the Legislature called the Rat Law of Barbados, an act to encourage the destroying of rats in the island. Incorporated in the act was the payment of two pence for the head of every rat caught or killed. The church warden of every parish was responsible for the payment of such fees for the rats collected. The preamble to the legislation states: "Whereas the amount of damage having been done to the inhabitants in general by the increase of rats in the island, in order that all proper encouragements might be given for the destruction of the said vermin. An Act passed the Legislature of this island, the sixth day of April, one thousand seven hundred and forty-five, entitled an Act to encourage the destroying of rats in this island."

There is also documented evidence that Barbados is one of the first countries in the New World to have passed legislation to control rats. Ever since that date some method of control has been carried out, and the bounty method of controlling rats continued up to the 1950s. Prior to 1978, control of rodents in Barbados was carried out by two separate ministries, the Ministry of Health and the Ministry of Agriculture. The two units were combined in 1978 to form a single rodent control unit under the jurisdiction of the Ministry of Health. This unit is part of an overall Animal and Human Health Project, whose objective is to control the diseases which can be transmitted from animal to man.

REASONS FOR INTENSIFYING RODENT CONTROL IN BARBADOS

As a result of an increase in the number of cases of the disease, leptospirosis, occurring between the years 1961 and 1971, the Government of Barbados became concerned about this health problem. With assistance from Pan American Health Organization/World Health Organization (PAHO/WHO) surveys were carried out with a hope of ascertaining the possible cause of the problem and to determine subsequent remedial action.

Following are the titles of some of the surveys, reports and the authors:

(1) Assistance to the Government of Barbados in Leptospirosis Control, Dr. Donald Blenden and Glen Hood 1971-11-29 to 1971-12-18.

(2) Examination of Leptospirosis, K.D. Taylor. 1965.

(3) Rodent Control and the Monkey Problem, K.D. Taylor. 1965.

(4) Developing a Pest Animal Control Programme in Barbados, Raymond Sheppard 72-09-25 to 73-05-09.

1982. Proceedings Tenth Vertebrate Pest Conference
(R.E. Marsh, Ed.). Univ. of California, Davis. Calif.

The reports all concluded that --

(1) most cases of leptospirosis occurred just after heavy rainfall;

(2) persons in the low socio-economic groups are more prone to acquire the disease;

(3) rats were the major reservoir of leptospira organisms; and

(4) persons performing specific types of work are the ones who are most frequently infected (e.g., farm, cane and abattoir workers).

Much human suffering and many deaths are caused annually by the disease leptospirosis. Many hospital bed hours are taken up, and a great deal of manpower is utilized in treating the disease. All these along with loss of man hours of work and of wages make an appreciable impact on the economy of the country.

Table 1 shows that approximately one in three rats examined were positive for leptospira organisms.

Table 1. The results of rodents examined for leptospira organisms.

Species of Rodents	No. Examined	% Positive
Norway rat (*Rattus norvegicus*)	138	35
Black rat (*Rattus rattus*)	98	33
House mouse (*Mus musculus*)	12	0

The number of cases of leptospirosis which occurred during the period 1963 to 1972 and which prompted the intensification of rodent control in Barbados is shown in Table 2.

Table 2. The number of reported cases of leptospirosis during years 1963 through 1972.

Year	No. of Cases	Year	No. of Cases
1963	6	1968	7
1964	4	1969	12
1965	4	1970	64*
1966	4	1971	22
1967	7	1972	11

*Note that more cases occurred in 1970, a year of severe floods (October 1970).

SUITABLE RODENT HABITAT

Rodent damage and disease are not specific to any location in the island. Areas where food, water, harbourage and nesting material are abundant predispose to rodent infestation all the year-round. This is typical of most inhabited tropical countries. Businesses such as feed-processing plants, bakeries, butcheries, poultry farms, markets, warehouses, restaurants, etc., make ideal habitats for rodents.

The tourist industry, the backbone of the country's economy, along with numerous light industries, have brought about changes in the life style, with more money in circulation and more workers in full-time employment, people are eating out more and more; hence the mushrooming of numerous eating establishments in the island, including fast-food services. Discarded food scraps and garbage, therefore, become a prime source of food for rodents. There is a school-meal service catering to thousands of primary school children. Meals are prepared at centres throughout the country. A multitude of canteens and restaurants serving the secondary and tertiary schools, as well as workers at industrial and construction sites dot the country side. Although figures are not available, it can be assumed that over 90% of the working population, as well as those at schools, colleges, and the university, eat at least one meal per day away from home. Eating out in parks and on beaches under typical tropical surroundings has also increased.

Family gatherings and friends spend many a weekend and holiday at beaches and or parks relaxing and consuming large quantities of food and drink. Although refuse containers are provided at many of these venues, it is not uncommon to see an abundance of food scraps left at these sites to be consumed later by rodents.

AMOUNT OF FOOD CONTAMINATED BY RODENTS

Rats consume large amounts of food and contaminate much more through gnawing, urinating and defecating. Regulation 28-2 of the Health Services (Food Hygiene) Regulations 1969 states: "A Public Health Inspector may condemn, seize and carry away or cause to carry, food which appears to him to be diseased, unsound, unwholesome or unfit for human consumption, and may cause any such food to be destroyed or otherwise disposed of".

Table 3 gives the amount of food in kilograms condemned for the years 1978 through 1980 by the Rodent Control Unit.

Table 3. Food condemned, seized and destroyed by the Rodent Control Unit.

Year	Amount of Food in Kg
1978	8.049.1
1979	9.803.4
1980	16.017.0

The main items condemned for the period were: flour, sugar and meal. Other items condemned include sausages, rolled oats, fish, butter, barley, cherries, oatflakes, bacon, cheese, linseed, chocolate, lard, saga, biscuits, bread, chow mein and bananas. One tends to conclude from a look at Table 3 that amounts of food condemned in 1980 far exceeded that of the previous two years. The reason for the large increase was the condemnation of a containerized shipment of flour arriving in the island infested with rodents.

SURVEYS AND ACTION PLAN

Surveys carried out just after the start of the intensified programme in 1978, revealed that -

(1) 65% of all food businesses were infested with rodents;

(2) far too many proprietors were unaware of the damages or potential health hazards caused by rodents;

(3) 89% of buildings storing food were not rodent-proof; and

(4) 25% of all food businesses had discarded food at one time or another because of rodent contamination.

Corrective measures were introduced by the new Rodent Control Unit to combat the above-mentioned conditions by the following methods:

(1) demonstrating the use of rodent baits and bait stations, especially with liquid baits at food-handling premises and dry bait at private homes;

(2) instructing food-handling and feed-processing operators how to rodent-proof buildings, etc.;

(3) instructing business operators to adhere to a cleaning schedule;

(4) stepping up health education activities by way of radio and T.V. programmes, lectures to children and adults at schools, colleges, and to parent-teachers and other associations; and

(5) demonstrations at agricultural shows, open days at school, summer day-camps, etc.

Two other surveys were carried out during 1979 and 1980 to assess the effectiveness of the programme. One of the questions asked was: "Do you have more rats today than you had ten years ago?" These results can be seen in Table 4.

Table 4. Individuals having more or less rats than ten years ago.

Replies	1979	%	1980	%
More rats	22	10.2	17	7.6
Less rats	163	75.8	187	83.1
Did not know	30	14.0	21	9.3
Total interviewed	215	100.0	225	100.0

From Table 4 one can conclude that householders and proprietors have less rats today than they had ten years ago and that control measures are effective.

Persons were also asked question about their knowledge of disease spread by rodents. The results revealed that persons knew little of the diseases spread by rats, except for leptospirosis. Many diseases listed were not associated with rodents. Some persons mentioned that cleaning helps to rid one's premises of rodents; however, the majority said that baiting was the best method.

CONTROL OPERATIONS

As the programme in rodent control broadens, more and more is prepared and distributed to the public free of cost. The Rodent Control Assistants have also used more bait in their delivery services. Other than the Bridgetown distribution point, four other depots were identified to provide bait to a wider cross-section of the community, thus making more bait easily available to the outlying areas of Oistins in the south, Six Roads in the east and Holetown and Speightstown in the north.

Baiting demonstrations were carried out in various districts throughout the island. The criteria used in choosing the areas were:

(1) actual infestation as reported by the public after investigation by rodent control assistants;

(2) potential infestation as a result of proximity to food, e.g., markets, sugar cane, food businesses, etc.;

(3) reports of rodent complaints from health inspectors during their routine inspections;

(4) surveys of individuals requesting rodent bait as recorded in the delivery book; and

(5) high incidence of cases of leptospirosis.

It is impossible at this point in time to take baiting exercises to all parts of the island because of constraints of time, staff and funds.

Demonstrations to individuals and groups on

(1) how and where to bait for rodents;

(2) how to make simple rodent bait stations from disused containers and discarded wood, etc.;

(3) how to clean up and dispose of refuse and rubbish;

(4) how to rodent-proof;

(5) how to store food and feed properly, using disused containers, e.g., oil drums and similar containers;

were all steps taken to enlighten the populace. These steps were reinforced by the use of educational material, e.g., leaflets, booklets, posters and calendars.

It has been possible to convince the managers of the sea- and airport of the usefulness of permanent bait stations, and the necessity for having them placed at regular points throughout the compound. Other large establishments, such as Barbados Mills, a bakery and supermarkets have provided permanent rodent bait stations.

Through successful demonstration at private business places, proprietors have been convinced that good rodent control is wise in any food or feed business. They have bought and placed their own rodent bait and have been achieving good results from anticoagulant baits, especially in the liquid form (water baits).

Rodent bait prepared by the Rodent Control Unit of the Ministry of Health for distribution to the public shows a dramatic increase over the years 1978 through 1981. The number of persons obtaining bait from the Unit can be seen in Table 5 as recorded by the month and year for the period 1978 through 1981.

When the programme started in 1978, the Unit had a policy of on-site investigation of a percentage of persons obtaining bait from the Unit. This was to ascertain whether the bait was doing the job it was meant to do. As the workload increased, the Unit was forced to abandon this approach and instead carried out random surveys of persons receiving bait. These surveys were conducted during the time when persons were collecting bait from the Unit.

Table 6 shows responses to survey questions concerning the effectiveness of rodent bait obtained by householders from the Unit.

Table 5. Number of persons obtaining bait from Rodent Control Unit.

Month	1978	1979	1980	1981
January	295	588	716	816
February	192	416	663	893
March	351	447	642	860
April	351	366	675	779
May	340	417	754	709
June	395	446	837	662
July	246	552	738	819
August	295	518	703	702
September	247	385	618	914
October	308	447	628	841
November	276	415	523	670
December	251	375	577	788
Total	3547	5372	8094	9451*

*These figures speak for themselves: from a total of 3547 in 1978 to 9,451 in 1981, an increase of 166%.

Table 6. The reported effectiveness of the anticoagulant bait obtained from the Rodent Control Unit.

		Reply to Question Did you have bait before?		Answer to degree of effectiveness				No. of persons and approx. no. of rodents found dead					
								RATS			MICE		
Survey No.	No. in Survey	YES	NO	GOOD	FAIR	MOD	POOR	1-4	5-9	Over 10	1-4	5-9	Over 10
1	100	74	26	49	24	-	1	22	12	3	12	4	-
2	100	76	24	48	19	6	3	20	5	3	13	3	-
3	100	79	21	50	26	7	2	19	3	2	15	4	1

From Table 6 it is clear that anticoagulant rodent grain bait given to householders does work. Approximately 75% of all persons receiving rodent bait were satisfied with its performance as a control measure. It is worthy of note that as the number of rats decreased the number of mice kills increased.

RODENT CONTROL UNIT ORGANIZATION AND FUNCTIONS

Prior to 1978 Rodent Control in Barbados was carried out by two ministries, the Ministry of Health and the Ministry of Agriculture. In 1978 the two teams combined to form the Rodent Control Unit, which is part of an overall project, the Animal and Human Health Project, with one of its chief aims to control diseases which can be spread by rodents to man and domestic animals.

Rodent control to reduce economic losses, although considered secondary to the health aspects, is still important because a reduction of available food to man has a debilitating effect on his health.

The Unit presently consists of the following workers:

(1) One Chief Pest Control Officer

(2) One Supervisor

(3) Twelve Rodent Control Assistants

(4) One Driver

(5) One Maid

The first priority of the Unit is to bait and control rodents at all government places. These include such places as schools, public markets, ports, post offices, police stations, courts, hospitals, prisons, clinics, administrative buildings, etc.

Other activities include:

(1) responding to all rodent complaints;

(2) assisting in the investigation of leptospirosis cases;

(3) making and packaging of rodent baits;

(4) demonstration of rodent baiting at business places;

(5) assisting in the baiting for rodents at small private farms, e.g., poultry farms, piggeries, etc.

(6) assisting in the baiting of private premises;

(7) inspection of ships and boats and the issuing of Deratting Exemption Certificates;

(8) health education in schools, colleges, associations, church groups, etc.;

(9) routine rodent inspections of premises within the city area;

(10) block demonstration and rodent baiting in rural and suburban areas;

(11) assisting in the field training of health inspectors and other allied workers on matters of rodent control;

(12) inspection of food and the condemnation, seizure and destruction of foods contaminated by rodents;

(13) enforcing the Health Services (Rodent Control) Regulations 1969.

The staff is well trained in rodent control. Inservice training was carried out over a period of two years. Two PAHO/WHO experts from the University of California shared their expert knowledge in rodent control during four separate sessions.

Such was the interest shown by the team that whenever the consultants arrived in the country, although not always assigned to this Unit, they would give some of their valuable time to refresher training.

The Chief Pest Control Officer (Unit Leader) spent two sessions in England attached to the Ministry of Agriculture, Food and Fisheries, in Tolworth, Surrey, reviewing and learning the latest in rodent control techniques.

The Unit was able to share its knowledge with at least one other country. A Senior Health Inspector from Grand Cayman was assigned to this Unit for two weeks. The Unit is willing to share its knowledge with any country which is desirous of some insight into rodent control.

HEALTH EDUCATION

With generous assistance from PAHO/WHO, Miss S. Forde, the Ministry's Public Health Educator, Mr. Rex Marsh, Specialist in Vertebrate Control, University of California, and two business firms in Barbados, a wide and varied collection of reading and other educational material has been made available to the public.

Available are:

(1) Leaflets

(a) Leptospirosis, a disease of man and animals.

(b) Rats and mice, let us get rid of them.

(2) Booklets

(a) Farm rodent control.

(b) The control of rats.

(c) The control of the house mouse.

(3) Films

(a) It's my neighbour.

(b) The Norway rat and habits.

(c) The rat problem.

(d) The rat man.

(e) Practical rat control.

(f) Rural rat control.

(g) Rat proofing,

(h) Minus one.

(i) Rat attack,

(j) Ratopolis.

Other materials used to promote rodent control include pencils, rulers and almanac, slides, posters, rubber stamps, graphic illustrations, colouring books and teaching packages for schools.

AN OVERVIEW OF ACCOMPLISHMENTS

The Rodent Control Unit, after only four short years of operation, has made an impression on the public as a good service organization, whose assistance in public health and economic rodent control has contributed to a better life for all. Prompt attention is given to rodent complaints and problems are usually resolved. The public and business community have come to appreciate the service provided by the Unit. Information on any aspect of the Unit's operations is easily available to any person desirous of having it.

Because of the educational thrust, it has been possible to motivate college students, etc., to assist in rodent control efforts by active participation. Many students choose rodent control as their assignments for obvious reasons:

(1) the interest built up through lectures, seminars, film shows, etc., and

(2) the availability of materials for research work.

On the whole, Barbadians are more aware of the rodent problem in the island today than during the pre-Unit era, when rats and mice were commonly seen in our public markets, bonds, warehouses, institutions, and dock areas. Today, in spite of the numerous eating places, stores, food and feed plants, etc., the rodent problem is relatively minor as compared with the past. The public is also more aware of the potential problems with rodents, and therefore quickly seeks help from the Rodent Control Unit which is sure to provide the assistance needed.

A systematic approach to rodent control has been achieved. Anticoagulant rodent baits (liquid and solid) are used extensively in the control work. Rodent Control work in Barbados is an ongoing process and is second-to-none in the Caribbean.

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