MANAGEMENT OF THE TROPICAL BONT TICK (Amblyomma variegatum) IN ST LUCIA

MAY, 1988

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PROJECT PROPOSAL

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In Collaboration with

The Inter-American Institute for Cooperation on Agriculture (IICA)

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1. BACKGROUND AND JUSTIFICATION

The Caribbean Area

The tropical bont tick, Amblyomma variegatum, which parasitises both domestic animals and wildlife, was introduced into the Caribbean about 1830 when infested cattle were imported into Guadeloupe from West Africa. Amblyomma variegatum is an important vector of the rickettsia, Cowdria ruminantium, the causative agent of heartwater (cowdriosis) in ruminants which, when introduced into disease-free areas or when susceptible livestock are introduced into endemic areas, the disease causes high mortality.

The incidence of acute dermatophilosis, a skin infection caused by the bacteria Dermatophilus congolensis, increases dramatically when A. variegatum is found in a previously uninfested area.

Wherever A. variegatum and its associated diseases are found producers experience losses in livestock production. These losses are especially acute in susceptible livestock imported into the islands in order to increase production of needed animal proteins and products. Producers must treat their animals with acaricides to control ticks and with antibiotics to try to reduce mortality due to the diseases, especially dermatophilosis.

In uninfested countries in the Caribbean as well as mainland countries of North, Central and South America surrounding the Caribbean region, livestock production is threatened by the presence of A. variegatum and its associated diseases. (Annex 1 and 2)

Both have been spreading rapidly within the Caribbean in recent years. This rapid spread has been attributed to an increase in inter-island livestock movement, both legal and illegal. Another possibility is that migratory birds, such as the cattle egret, are spreading A. variegatum. Seventeen islands are now known to be infested including eight which are members or associates of CARICOM. These are Antigua, Barbados, Dominica, Montserrat, St Kitts, Nevis, Anguilla and St Lucia.

If unchecked, A. variegatum and its associated diseases have the potential to spread to uninfested islands in the Caribbean as well as mainland countries. Two other Amblyomma species, Amblyomma maculatum and Amblyomma cajennense have been shown experimentally to transmit heartwater to goats. Both ticks are distributed widely in the US, Mexico and Central America, while the latter also occurs in South America and Jamaica, Cuba and Trinidad.

Amblyomma variegatum has already been eradicated from St Croix in the US Virgin Islands to help eliminate tick-associated livestock production losses. Also, it is the subject of an ongoing eradication programme on Puerto Rico, Viegues and Culebra. The latter two islands are municipalities of Puerto Rico. In Dominica,

an infested area in Belle Vue Chopin was successfully eradicated. Another area in Woodfood Hill is now under quarantine and measures being undertaken also promise success.

In response to recommendations made by Chief Veterinary Officers and Ministers of Agriculture of CARICOM countries and other interested organizations, a feasibility study was carried out to define the strategies for the control/eradication of A. variegatum from all Caribbean Islands. The study indicated that eradication of A. variegatum is possible and recommends the preparation of project documents for national A. variegatum eradication programmes as integral parts of a regionally coordinated eradication programme.

The countries and islands in the region were placed in the following four risk classes based on estimated risk of infestation and of the present infestation levels of A. variegatum:

Risk Class I. Considered free of the tick and at lower risk of infestation - all the mainland countries and all the islands and countries of the Caribbean not listed in the remaining risk classes.

Risk Class II. Presently uninfested islands or tick reported, but not considered established, and at higher risk of infestation. - Barbados, Barbuda, Les Saintes, Saba, St Barthelemy, St Eustatius, St Vincent and the Grenadines, British Virgin Islands and US Virgin Islands.

Risk Class III. Tick established but with limited distribution. - Anguilla, Dominica, L Desirade, Martinique, Montserrat, Puerto Rico, St Lucia, and St Martin/St Maarten.

Risk Class IV. Tick widespread. - Antigua, Guadeloupe, Marie Galante, Nevis and St Kitts.

While several countries of the region have adequate veterinary services for routine purposes, most are generally ill-equipped technically, organizationally and financially to deal with the problem. Existing animal health regulations appear to be adequate in most cases to control legal animal movements. Several countries have tick control programmes, atlthough they are in most cases not aimed at tick eradication.

In the economic evaluation, the cost of eradication and/or prevention of introduction or spread of ticks was weighted against potential livestock production losses avoided for islands in Risk Class II, III and IV separately and together over a 20-year period. In valuing milk production losses, a weighted average price for milk as reported in surveys of each of the islands was used. For valuing meat losses avoided, two alternative meat prices were used - a border price roughly equal to the world price for similar quality meat (US$ 0.60 per kg) and a weighted average live weight price (US$ 2.55 per kg) for the Caribbean. For Risk Class II islands, the returns to investment in the prevention of introduction were attractive (Benefit/Cost (B/C) = 4.2) using a discount rate of 6

percent and the border price for meat even when 50% of th cost for coordination, research and training for the entire regional programme was included. For Risk Class III islands, the country costs of eradicating the tick-infested areas and stopping spread to other areas of the islands yielded a favourable B/C of 2.3. In contrast, in Risk Class IV islands, where control costs are highest and estimated direct savings per animal lowest a negative ratio (B/C = 0.65) was obtained. When the benefits estimated for the aggregate of these 3 risk classes were weighted against all country costs for eradication and the entire regional program costs for coordination, research and training, a modest B/C ratio of 1.4 was estimated when border prices are used. However, when the weighted average price for meat is employed, a price which better reflects actual producer benefits and incentives, the B/C ratio for all classes of islands is 3.9 Even if the discount rate is increased to 15 percent, the estimated B/C ratio is 2.1. The impact of introduction of the tick and associated diseases to island and mainland areas in Risk Class I was not evaluated because there was no basis on which to estimate the location or time of introduction of the problem.

In addition to B/C ratios, other factors which should be taken into account are: 1) the tick presently infests relatively small areas, and its eradication now would be easier than if it infested large land areas, 2) in many islands present animal health services are having difficulties making significant advances against tick infestion, 3) the tick is moving to new locations and risks to other islands and the mainlands increase, and 4) if the tick is eradicated from the Caribbean its reintroduction from Africa is very remote.

ST LUCIA

Amblyomma variegatum has probably been present on the island for about 20 years but was not reported until 1975. Periodic outbreaks of acute dermatophilosis have occurred in both cattle and goats and have been recognized by local farmers to be associated with infestation by A variegatum. Until recently this tick was restricted in its distribution to the northern end of the island. However, an infestation was found to be established in the southern part of the island in 1984.

A recent government-sponsored tick control program has reduced the population density of this tick in the northern infested area to the point where ticks are scarce. The incidence of acute dermatophilosis has been reduced as a result of the control programme.

The problem of Amblyomma Tick infestation of livestock on St Lucia has been a longstanding and serious concern to the Ministry of Agriculture and the Government of St Lucia, over the years. The tick has caused considerable damage to the livestock in terms of illness, skin problems and the potential for the spread of the devastating disease of ruminants, Heartwater.

Concern for the activities of the tick has been instrumental in action to seek technical assistance from institutions such as FAO, IICA, OAS and USDA, in providing technical assistance to look into all aspects of the tick problem on St Lucia, and further to this, joint action has commenced with other Caribbean countries in seeking funding for a regional approach to eradicate the tick.

The latest initiative has been the recent survey conducted by three FAO experts in August 1987, during which a comprehensive examination was made of all aspects of the problem, resulting in the presentation of a detailed document which has now been submitted to the government for its consideration. In this report, the experts pointed out that the GOSL/OAS sponsored tick control programme has worked very well but there is need for immediate intensification of our efforts, if the spread of the tick is to be checked.

They pointed out that in the last few years a new focus has been established in the Vieux-Fort area and the tick has actually spread in the northern regions because of animal movement within what appears to be ideal environmental and climatic conditions which exist in this area. (Annex 3 - Map of St Lucia)

The entire Vieux-Fort area appears to be clinically ideally suited for spread of the tick and this, coupled with the large concentration of suitable animal hosts in that area, seems to spell disaster once this tick is properly established in the region.

It is therefore imperative that immediate action is taken to curtail further spread of Amblyomma. The FAO report has identified all the affected areas and in addition sets out clearly demarcated buffer zones where treatment must also take place to avoid outward spread of the problem. It must be appreciated that farmers within the affected areas are aware of the problem caused by the tick but those in the surrounding buffer zones who have not had such problems

will not readily accept paying for treatment of animals to prevent eventual spread of the ticks. As a result the programme will have to be a free one, in order to have full participation of all the farmers in both infected and buffer zones.

The report further points out that a treatment programme must be set up to handle 800 cattle, 1600 sheep and goats, 200 horses and 1000 swine within the affected and buffer zones. These animals must be treated twice a month without fail for a period of two (2) years.

Livestock Situation in St Lucia

The present population of livestock includes 11,000 cattle, 14,000 sheep, 10,000 goats, 10,000 swine and 3,000 equines.

The Government's Livestock Station at Beausejour, Mon Vieux Fort in the South is the largest cattle enterprise. Marginal and small farmers with land either keep cattle and no small ruminants or up to 40 sheep and goats and less than six cattle. Landless owners keep about five adult cattle and five adult sheep and goats. Communal pastures exist and tethered systems for grazing are prevalent. About half the farmers may own some land but a higher percent make use of grazing on land they do not own. Livestock are kept because owners wanted to and land was available. Cattle, especially, acted as savings against emergencies. Sheep and goats were mainly kept for food for the family or special occasions.

Available land is perceived as the main constraint to owning livestock or to enlarging herds and flocks. Management capacity is aimed at subsistence mainly and not production.

The common St Lucian cattle are mixtures of Channel Island Breeds with others such as the Jamaica Red. The average cow had two calves only by her sixth year. Purchase of young stock for rearing is limited. Bulls are slaughtered at around two years of age weighing about 500 lb apparently before they are lost to larceny or prove too difficult to handle.

Sheep and goat management is based on keeping stock. Promiscuous breeding occurs and lambing records are non existent. Young males are slaughtered for home consumption. A few females become available for purchase by other farmers.

Inadequate nutrition, internal parasities and tick problems are the main health concerns. Boophilus microplus (Tropical Cattle Tick). Anocentor nitens (Tropical Horse Tick) and Rhipicephalus sanguineus (Brown Dog Tick) are the other tick species that are present and distributed throughout the island. Outbreaks of Babesiosis and Anaplasmosis were reported following importation of cattle for the Vieux Fort Livestock Project at Beausejour. Because of Dermatophilosis farmers go out of the livestock business altogether.

Small scale poultry operations have begun on the island as well as swine raising. Domestic and stray dogs are present on St Lucia. There are a few dogs and wild life is restricted to some mongoose, agouti and opossum. Ground doves, cattle egrets and grackles are found all over the island.

Meat produced is consumed fresh locally. Basic slaughtering facilities are provided only and exist island-wide. Meat is sold chiefly on week-ends under government price controls. A system of meat inspection by officials in the Ministry of Health is carried out. The main abattoir is in Castries but there are plans for its relocation.

2. Related Projects

A survey of ticks on livestock in St Lucia and development of a preliminary proposal for the eradication of A. variegatum from the Island was undertaken by Dr Glen Garris in 1983 as well as a socio-economic study by Dr Martin Hugh Jones later in the same year.

The consultants' conclusions were that it would be worthwhile to eradicate A. variegatum to protect St Lucian livestock especially if it could be achieved within five years. These visits were sponsored by IICA.

Based on OAS Grant Funds, regular treatment programmes over a two-year period commenced in 1985. This was a voluntary farmer participation programme.

Veterinary personnel used an organo-phosphate acaricide (Asuntol) but recently Bayticol (Flumethrin) - a pour-on - has become available and farmer response has been improved. The reduced incidence of Dermatophilosis has been impressive but farmers become reluctant to maintain the two-week schedule because of the effectiveness of the treatment.

3. Government's Interest and Support

The Government of St Lucia will support efforts to eradicate Amblyomma variegatum to the best of its ability. The objective in the past has been to limit and prevent the spread of the tick from the existing foci and to promote farmer education in tick control measures. The Government awaits the development of a project to eliminate the problem in view of their financial and personnel constraints.

Objectives

1. Development Objective

The eradication of Amblyomma variegatum will increase the revenue from livestock rearing and improve the living conditions of the rural sector.

It will provide incentive for farmers to increase livestock production and improve their management systems.

It will reduce the threat of Heartwater developing on the Island. It will eliminate a source of tick infestation to neighbouring islands and the mainland countries of the hemisphere.

It will remove the restrictions on the export of livestock from the country at the present time.

2. Immediate Objective

- The eradication of A. variegatum from the Island of St Lucia
- The Reduction of the incidence of Dermatophilosis in St Lucia
- The Limitation of the spread of A. variegatum to other islands in the Caribbean and mainland countries
- The prevention of the establishment of Heartwater in St Lucia

Plan of Action

1. Strategy

St Lucia is classified in Risk Class III; viz islands with geographically limited infestation with A. variegatum. Eradication may be achieved in three phases.

Phase 1

a. Establish a thorough surveillance programme to determine distribution of A. variegatum in livestock and wildlife. This was achieved by the FAO/Government of St Lucia in 1987.

b. Carry out an intensive information and training programme for producers and animal health personnel to ensure that the objectives of the programme are fully understood, accepted and control measures continued. This has been ongoing since 1985 - OAS/Government of St Lucia Project.

c. Introduce legislation to ensure that:

   i the presence of A. variegatum and associated diseases is a notifiable condition to authorities.

   ii premises or areas infested with A. variegatum are placed under quarantine.

d. Monitor and limit movement of livestock and dogs in and out of quarantined or designated areas.

e. Establish regulations preventing the importation or exportation of live animals infested with A. variegatum.

Phase II

Initiate and continue for a period of eighteen months to two years a mandatory systemic acaricide treatment programme of livestock, dogs and other hosts to eradicate A. variegatum.

Phase III

a. Maintain an official surveillance system until A. variegatum is eliminated from the Caribbean.

b. Should A. variegatum be found, quarantine measures be taken and Phase II operations resumed.

The eradication techniques developed during the A. variegatum programme in Puerto Rico and Dominica can be utilised in the planning of a similar programme in St Lucia.

In 1978 in Puerto Rico, A. variegatum was expected to spread by 30%, annually. Over a five year period a spread of only 24% occurred and it is expected that an information programme leading to limited purchase of A. variegatum infested cattle, continued acaricide applications and other factors will further restrict the spread.

An eradication will only succeed with strong producer and political support. The information system to actively seek this support and the quarantining of infested premises must be the main initial thrusts. Identification of animals under quarantine will also be essential. Legislation must be established to support these initiatives and the following treatment schedules.

Based on the recent survey, the designated areas are placed under quarantine and treatment activities can begin on a regular schedule. Bayticol (Flumethrin) Bayer is considered best at the present time either as a pour-on or as a spray. Maximum control of A. variegatum is achieved for up to 2 weeks and will require 26 treatments per year. St Lucia already has some experience with the product and producer acceptance is very high. Since it is very new on the market acaricide resistance should not be a problem within the period of the campaign. Some acaricides may not be applicable to all hosts. With the availability of Amitraz and other formulations such as Asuntol flexibility is ensured.

It is estimated that some Acaricide applications will take place in races for cattle and possibly horses and a race with foot bath for sheep and goats. Such facilities may need to be provided in each area. Each race requires concrete floor drainage and sump with foot bath facilities for sheep and goat races.

Organisation

Because of the constant work to be undertaken during the treatment cycles, it was suggested that the Animal Health Assistants (AHA's) could be better used in the animal health programmes currently undertaken by the division and that other persons be recruited and trained in the use and application of acaricides and the identification of ticks and they be used to provide a year round service free of interruptions from other duties.

It is suggested that each team consist of a driver/helper and two technicians. The driver will also be trained and can assist especially if a technician is sick or on vacation. Each team will be provided with a vehicle (4 wheel drive), animal restraint equipment, protective clothing, a back sprayer, acaricide and tick collection equipment. One team will function in the south, and the other in the north of the island. Based on the experience in Puerto Rico and Dominica, the number of animals to be placed under Treatment will be easily handled.

It must be stressed that at this point in time the situation is not a static one, there is continuous movement of the tick and if not contained now, the problem may be a very different one in a years time. This will result in the expenditure of more money and the deployment of more resources if the tick is to be enventually controlled.

Each treatment team would have the responsibility for field execution of the eradication programme. They will receive training in tick identification, scratching techniques, surveillance, quarantine measures, permissible animal movements, certification, treatment applications, use of equipment, control of supplies and record keeping. The team leader would be responsible for reporting on the activities of his team to the Director. The team would be engaged in information dissemination to the producers and be familiar with all aspects of the programme. They will diligently execute all phases of the campaign.

Phase I should be on-going but will not be less than six months initially.

Phase II should be completed in 2 to 3 years.

Phase III should ascertain freedom from A. variegatum within the country with on-going surveillance to prevent reintroduction.

There is every likelihood that the campaign against A. variegatum will also eliminate B. microplus and A.nitens in the two areas. Susceptibility to Babesiosis and Anaplasmosis is expected to develop. Appropriate drugs must be available to deal with this contingency should it arise.

Amidocarb (IMIZOL - Cooper's) may be used prophylactically or therapeutically to control Babesiosis. Vaccines against Anaplasmosis may be incorporated into the programme or reliance set on the tetracyclines (antibiotics).

Success of the project against Amblyomma variegatum should incite producers to demand eradication of Boophilus and Anocentor species across the island. It will also certainly provide a mechanism for better extension and animal care to producers.

SUMMARY OF RECOMMENDATIONS - FAO EXPERTS - 1987

(a) The tick control programme, carried out in the A. variegatum infested areas in Gros Islet and Vieux Fort, has been effective but did not prevent the tick from spreading. It MUST continue, not only in the hereby reported newly delineated areas, but also in the buffer zones selected as high hazard possibilities for future spread.

(b) Flumethrin Pour-on should be applied by authorized personnel at the recommended doses for two years and strategically for one year, and ticks assessed before each application. A follow-up surveillance should be carried out for several years after.

(c) Preparatory steps should be taken to assure an immediate fitting in of this programme with the contemplated regional scheme for A. variegatum eradication. The necessary infrastructure should be provided and the pertinent legislation revised and up-dated.

(d) The programme should form an integral part of a national policy for the improvement of animal health and production. Any changes in enzootic stability of animals towards tick-borne diseases, due to the tick control/eradication programme, should be remedied by treatment and/or vaccination.

(e) Although dermatophilosis occurs throughout St Lucia, it is more prevalent in the A. variegatum infested areas. The tick control programme operating in the Gros Islet district over the past 1 1/2 years, has been accompanied by a dramatic reduction in the

prevalence of dermatophilosis. The control of clinical dermatophilosis in St Lucia will, to a large extent, follow from the effective control of A. variegatum ticks. It is therefore recommended that an eradication programme for A. variegatum ticks be regarded as the most desirable option.

(f) It is most likely that, in the absence of A. variegatum ticks, dermatophilosis will continue as a clinical problem in isolated cases where animals - especially more susceptible breeds - are kept under poor management conditions.

(g) Clinical cases of dermatophilosis should be treated with long-acting oxytetracycline. Animals which fail to respond within 10 days to a single injection should be slaughtered.

(h) The Government of St Lucia continue to respond to the needs of the livestock owners to control the tropical bont tick and reduce the incidence of acute dermatophilosis in livestock in St Lucia.

(i) The Government of St Lucia continue the present voluntary tick control programme of providing livestock owners with Bayticol Pouron with which to treat their animals monthly. The present programme is well accepted, reduces tick populations and decreases incidence of acute dermatophilosis in livestock, but has not stopped the geographical spread of the tropical bont tick.

(j) The Government of St Lucia seek support to undertake a tropical bont tick eradication programme in order to eliminate the tick (and acute dermatophilosis) from the island. A proposed budget for a 5 year eradication program is estimated to total about $1,000,000 US. The limited distribution of the tropical bont tick, the relatively small numbers of livestock infested and the low population levels of the tick argue for an immediate programme with the ultimate goal to eradicate the tick. At no time in the future would it be easier or less costly to eliminate the tick than it is now.

(k) The Government of St Lucia actively join with other governments in the Caribbean and international organizations in establishing a Caribbean-wide programme to eradicate the tropical bont tick and heartwater from the Caribbean.

RECOMMENDATION FOR ERADICATION OF AMBLYOMMA VARIEGATUM (IICA/USDA FEASIBILITY PROPOSAL)

Risk Class III - Islands with geographically-limited infestation(s) of A. variegatum (Anguilla, Dominica, La Desirade, Martinique, Montserrat, Puerto Rico, St Lucia, St Maarten, St Martin).

1. Establish a thorough surveillance program to determine distribution of A. variegatum in livestock and wildlife.
2. Carry out an intensive information and training program (manuals, videos, courses, TV, radio, etc) for producers and animal health personnel, respectively, to ensure that the objectives of the program are fully understood and accepted.
3. Establish a system of producer advisory committees for program development and oversight.
4. Initiate and continue, for a period of two years, a mandatory systematic acaricide treatment program of livestock, dogs, and other hosts to eradicate A. variegatum.
5. Concurrently monitor and limit movement of livestock and dogs in and out of designated treatment areas.
6. Establish a monitoring program to determine populations of A. variegatum on livestock and dogs that are being treated.

7. Establish a country-wide program to prevent the importing or exporting of animals infested with A. variegatum.

8. Maintain an official surveillance program until A. variegatum is eradicated from the Caribbean.

TECHNICAL WORKSHOP ON THE TROPICAL BONT TICK

Amblyomma variegatum

RESOLUTION IV

RESOLUTION FOR COUNTRIES ALREADY UNDERTAKING TROPICAL BONT TICK EMERGENCY CONTROL ACTIVITIES

Be it resolved by the representatives of the Technical Workshop on the Management of the Tropical Bont Tick, Amblyomma variegatum, held in Barbados, 17-19 March 1987, recognising the dramatic spread of this Tick and its associated diseases in the Eastern Caribbean, and the need to apply emergency measures to reduce its spread, and considering that a regional programme is in the preliminary stages of development, this Workshop recommends that island countries presently undertaking emergency control campaigns approach appropriate agencies such as the Food and Agriculture Organisation (FAO), the Inter-American Institute for Cooperation on Agriculture (IICA), the United Nations Development Programme (UNDP) and the European Economic Community (EEC) for immediate emergency support.

BUDGET SUMMARY (US$)

INTERIM MANAGEMENT OF TROPICAL BONT TICK IN ST LUCIA

DONOR AGENCY

Year 1	$ 91492
Year 2	$ 61376
Year 3	$ 30552
TOTAL	$183420

GOVERNMENT OF ST LUCIA

Year 1	$ 22660
Year 2	$ 23716
Year 3	$ 23716
Total	$ 70092

GRAND TOTAL $253512

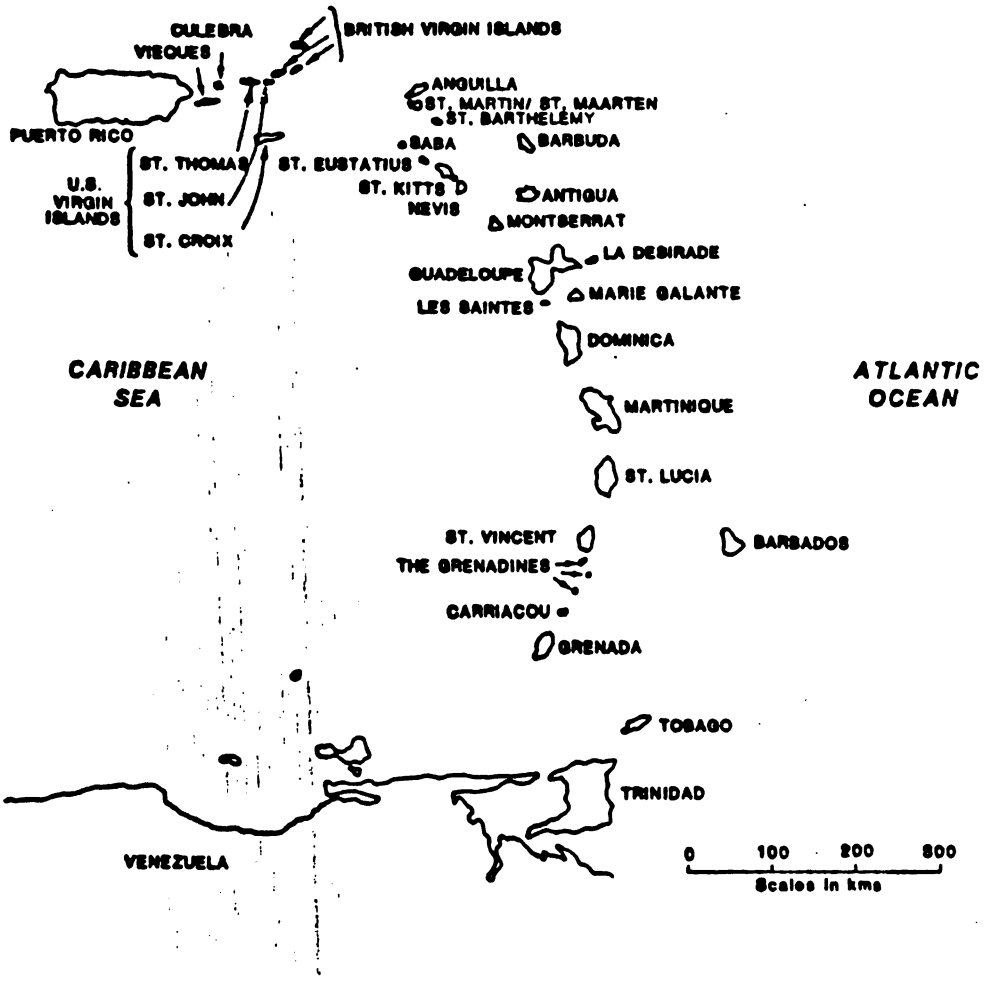

Figure 1. The Eastern Caribbean. A. variegatum is found on Anguilla, Antigua, Dominica, Guadeloupe, La Desirade, Marie Galante, St. Martin, Martinique, Montserrat, Puerto Rico, Culebra, Vieques, St. Kitts and Nevis, St. Lucia, and St. Maarten. Heartwater occurs on Antigua, Guadeloupe and Marie Galante.

Figure 2. Potential distribution of Amblyomma variegatum in the Western Hemisphere (Modified from Sutherst and Maywald, 1985).

SAINT LUCIA

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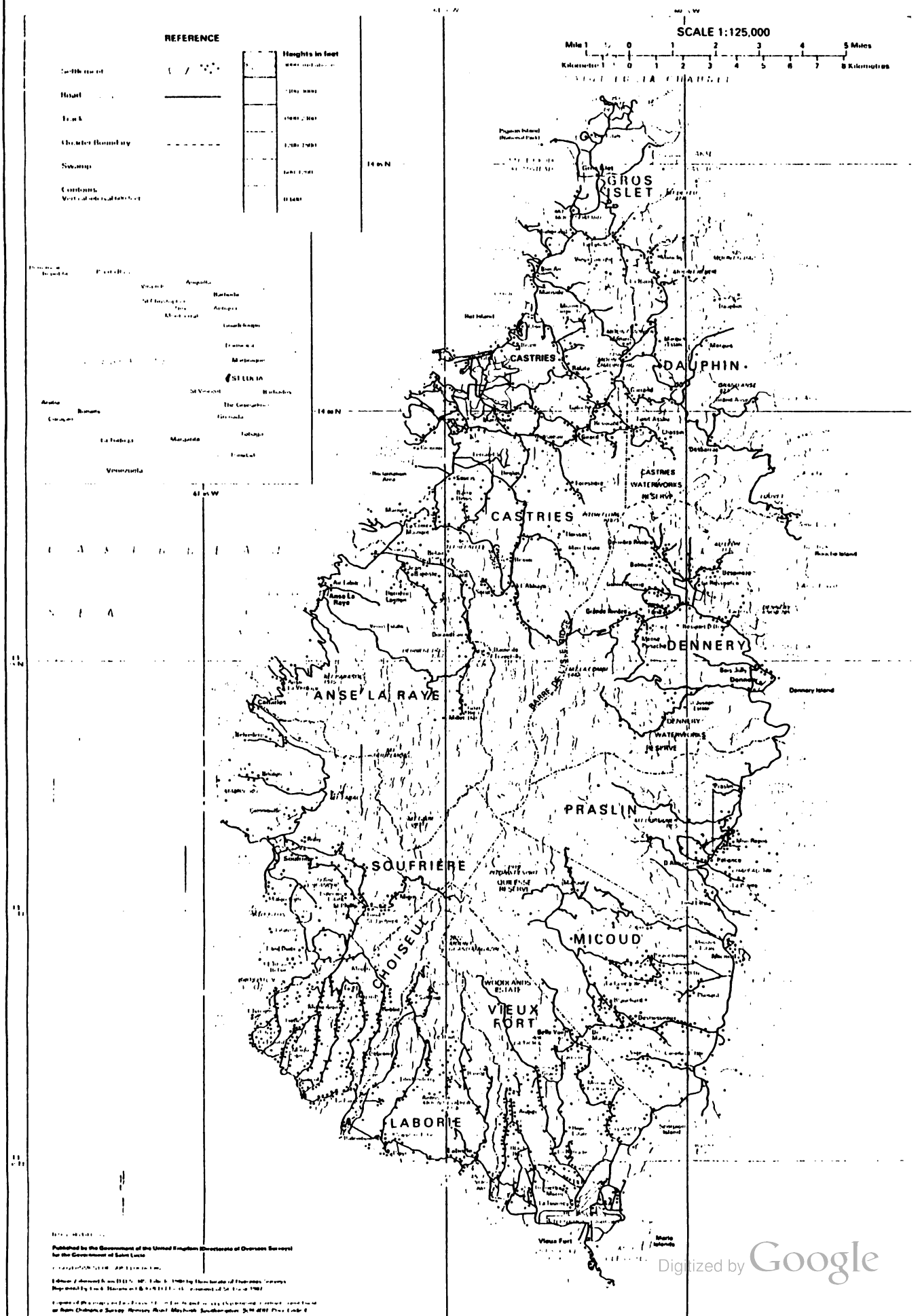

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