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*Meeting Export Requirements for Agricultural Diversification —  
Fruit Fly Survey in the Windward Islands*

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## INTRODUCTION

The economy of the Windward Islands — Dominica, Grenada, St. Lucia and St. Vincent and The Grenadines is predominantly an agricultural one and will continue to be so for a very long time. Agriculture's contribution to GDP in 1984 was 13.9% St. Lucia, 19.9% St. Vincent, 21.7% Grenada and 35.2% Dominica. Thus, these countries will continue to be primary producers of agricultural products and because of their small population will continue to be dependent on external markets for the sale of produce which could be of any significance to their national incomes. The countries have been dependent on a small range of export crops — bananas, nutmegs and cocoa. Therefore, there can be serious effects on their economies because of world market situations. They have been faced with price fluctuations, currency devaluations and market competition. Therefore, to reduce the risk and recognising the increasing demand for tropical fruits in Europe and North America, they have been making serious attempts at penetrating these markets. Their rugged terrain, humid climate and volcanic soils favour the cultivation of fruit trees.

## JUSTIFICATION

The entry of all agricultural produce into the USA is regulated by the U.S. Department of Agriculture (USDA). In the past the USA accepted products from developing countries, inspecting them at port of entry and treating them if necessary. Treatment methods are aimed at eliminating the pest risk by killing the pest infesting the produce. Some methods, for example, Ethylene dibromide fumigation and irradiation are not acceptable. Recently, the frequencies of pest introductions into the USA have been high and the USA has been spending large sums in eradication programmes. The USA is therefore encouraging countries that propose

to export to show either that they do not have pests that are of quarantine importance to the U.S. as verified by survey or that they have the necessary plant quarantine infrastructure to detect, treat or eliminate these pests from produce to be exported to the USA. Under the Caribbean Basin Initiative (CBI), the USA is assisting CBI countries in developing programmes to detect, control and eradicate economically important pests which form barriers to the export of agricultural produce to the USA. The activities are aimed at reducing and/or eliminating pest risk at the source of origin of the produce.

## DETECTION PROGRAMME

Results of pest surveys conducted in the Eastern Caribbean Islands, between 1942 and 1982 demonstrated the occurrence of fruit flies in all the islands except Grenada, St. Vincent and The Grenadines, Antigua and Barbados (Pollard, 1984). However, the USDA/Animal and Plant Health Inspection Service (APHIS) determined that it was necessary to conduct additional detection surveys to assess the status of fruit flies of concern before allowing the Eastern Caribbean countries to export certain produce to the USA. In the Windward Island this is being executed in two Phases. Phase I was executed in the period May 1986 to October 1987 where the status of fruit flies and mango seed weevil was determined in Grenada and St. Vincent and The Grenadines. The programme included fruit fly trapping, fruit examination, strengthening plant quarantine systems and promoting public awareness. In Phase II the activities of Phase I will be repeated in Dominica and St. Lucia for a period of 18 months and the pest risk monitored in Grenada and St. Vincent for that period. The activities which were carried out in Phase I are briefly outlined.

## Fruit Fly

### (i) Trapping

A training workshop oriented towards basic fruit fly trapping techniques was conducted for the designated trapping personnel. There was a Project Manager, two supervisors and three trappers in Grenada. In St. Vincent there was a Project Manager, one supervisor/entomologist and four trappers. The entomologist assisted in insect identification in St. Vincent and Grenada. All project personnel were attached to the Ministry of Agriculture in the respective countries (Appendix I). Following the workshop, traps were placed in the agricultural areas and at the major ports of entry. Two types of traps were used, Jackson and McPhail traps (Appendix II). The Jackson traps were baited with either Trimedlure<sup>1</sup> only or Curehuc<sup>2</sup> and Methyl Eugenol<sup>3</sup> at a ratio of 30% to 70% by volume respectively to which Dibrom<sup>4</sup> 1% by volume is added. McPhail traps were baited with Torula yeast. The traps were examined for trapped pests weekly and rebaited if necessary. The weekly findings and activities carried out were recorded and insects trapped were taken to the laboratory for identification. The status of trapping in the field on a monthly basis is given in Appendix III. The fruit trees trapped were mainly primary hosts of fruit flies and they comprised mango, citrus, guava, sugar apple, (sweet sop), sapodilla (naseberry), pawpaw, pomeac (otaheiti apple or French cashew), soursop, West Indian cherry, golden apple (Jew plum), almond, plum, custard apple, passion fruit, avocado, breadfruit, star apple (Appendix IV).

### (ii) Fruit Examination

Fruit examination for the larvae of fruit flies and other pests was a regular exercise of the programme. The fruits were sampled both in the field and in the laboratory. Fruits

<sup>1</sup>tert-butyl 4 - (or 5) - Chloro-2-methyl cyclohexane carboxylate

<sup>2</sup>14 - (phydroxyphenyl) - 2 - butanone acetate

<sup>3</sup>1 - 1 Ally 1-3, 4 dimethoxybenzene

<sup>4</sup>1, 2 Dibromo - 2,2, Dichlorethyl diemthyl phosphate

sampled were mango, orange, guava, cherry, grapefruit, star apple, cashew, red plum, almond, pomeac, soursop and pawpaw.

### (iii) Public Awareness

Actions to foster good public relations and increased public awareness of detection activities in both countries were carried out.

Spot announcements were made on the local radio stations daily. Posters and leaflets on the programme were distributed islandwide. Talks were given to schools, interviews, between project personnel and farmers were aired on the local radio stations and newspaper articles on the programme were printed in the local newspaper in an effort to acquaint the public with operations of the programme.

### Mango Seed Weevil

Detection survey for mango seed weevil (*Sternochetus maniferae*) was carried out in both countries. Over 4,000 fruits, distributed in different parts of the island were examined in each island.

## MONITORING AND EVALUATION

The Inter-American Institute for Cooperation on Agriculture (IICA) which had contributed to the development of the project (Stubbs, Brathwaite and Rodriguez) was responsible for monitoring the activities of the programme. This author, an IICA Plant Protection Specialist, was in regular contact with the project leaders and paid monthly visits to review project operations both on the field and in the laboratory in each country. There was also regular contact with APHIS about project operations. Evaluation visits were also paid by APHIS officials.

## RESULTS

Three suspicious flies (two from St. Vincent and one from Grenada) were identified (Appendix V) and sent to the USDA laboratory for verification. Results from that laboratory indicated that the flies although Tephrids (Appendix V) were those which bred on flower heads or galls of Asteraceae. They were not parasites of fruits and so were not of importance to this project.

Larvae were found in West Indian cherry (*Malpighia glabra*) at two sites in St.

Vincent and one in Grenada and were identified by Dr. Gene Pollard, University of the West Indies (UWI), as *Drosophilid* flies (*Drosophila* sp). An insect reference collection has been established in each country with the help of Miss Amy Dreves.

No mango seed weevils were found during the survey in either country.

The operations of the detection survey were carried out satisfactorily. This view was expressed by all the persons who visited the project for evaluation. The results of the detection survey confirmed the findings of the previous workers that there are no fruit flies of quarantine importance in these countries.

#### CERTIFICATION OF FRUIT FLY FREE ZONE (GRENADA, ST. VINCENT AND THE GRENADINES)

The results of the detection survey were reviewed by APHIS and the countries were asked to present a list of the commodities they intended to export to the U.S. The countries have been declared fruit fly free and certain fruits are being allowed entry into the U.S.

This decision puts the countries at a comparative advantage with regards to export of fruits to the U.S. and the regional markets. Meanwhile, Phase II of the programme has been initiated both in Grenada and St. Vincent to monitor pest infestation both by continued trapping at the country level and inspection at the U.S. ports of entry. These countries must maintain an effective plant quarantine system and regulate trade to avoid infestation of quarantine pests.

#### REFERENCES

<sup>1</sup>Pollard, G.V.,(1984). Insect Pests of Plant Quarantine Importance for the Caribbean 1. Life History Economic Importance and Distribution Paper presented at FAO Regional Plant Quarantine Training Course, St. Lucia, August 1984.

<sup>2</sup>Stubbs, E.; Brathwaite, C.W. and Rodriguez, F.(1984). A Feasibility Study of the Potential for Compliance of Eastern Caribbean Countries with U.S. Department of Agriculture Import Regulations for Tropic Fruits Subject to Fruit Fly Infestation. Mimeo 17 pp.

APPENDIX 1: *Persons Associated with the Trapping Programme*

COUNTRY NAME PER COUNTRY FUNCTION

GRENADA

Miss Dale Francis	Project Manager
Mr. Roland Harford	Supervisor
Mr. Peter Joseph	Supervisor
Miss Hermelyn Francis	Trapper
Mr. Lincoln Augustine	Trapper
Mr. Dennis Andrew	Trapper

ST. VINCENT

Mr. Sylvester Lynch	Project Manager
Mr. Morris Fairbairn	Assistant Project Manager
Miss Amy Dreves	Entomologist/Supervisor (Peace Corps Volunteer)
Miss Cauldric Jones	Trapper
Mr. Lennox Cupid	Trapper
Miss Annis Fergus	Trapper
Miss Jennie Neverson	Trapper

APPENDIX II: *Trap Type, Lures and Fruit Flies Attracted Primarily*

Trap Name	Lure	Fruit Flies Attracted
Jackson	Trimedlure (T)	Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> Wiedemamm) Natal Fruit Fly ( <i>Ceratitis rosa</i> karsch)
	Curelure (C)	Melon Fruit Fly ( <i>Dacus cucurbitae</i> Coquillett)
	+ Methyl Eugenol	Queensland Fruit Fly ( <i>Daucus tryoni</i> Froggatt) Oriental Fruit Fly ( <i>Dacus dorsalis</i> Hendel)
McPhail	Torula Yeast Pellets	Mexican Fruit Fly ( <i>Anastrepha ludens</i> Loew) but will attract all the above fruit flies including the West Indian and Caribbean Fruit Flies ( <i>Anastrepha</i> spp.).

APPENDIX III: Number of Traps Placed in the Field in St. Vincent and Grenada.

Year	Island Month	McPhail	Trap Type Jackson T	Jackson C	Total	Number Serviced
	Grenada					
1986	May	84	63	92	239	861
	June	90	68	90	248	1037
	July	96	65	87	248a	1072
	August	90	59	75	224e	741
	September	110	64	80	254b	911
	October	109	76	76	261b	961
	November	108	77	81	266b	991
	December	110	77	81	268b	1128
1987	January	113	74	80	267b	1039
	February	114	72	83	269b	1054
	March	109	66	93	268b	1153
	April	109	69	90	268b	1156
	May	109	79	87	273b	925
	June	104	84	84	272b	1195
	July	102	87	83	272b	1231
	August	101	86	84	271b	1127
	September	N.A.	N.A.	N.A.	N.A.	N.A.
	October	N.A.	N.A.	N.A.	N.A.	N.A.
	St. Vincent					
1986	May	90	92	3	185	530
	June	104	94	27	225	N.A.
	July	123	92	47	262c	N.A.
	August	117	98	47	262c	953
	September	117	98	47	262c	997
	October	115	98	48	261d	1095
	November	114	94	45	253*	1030
	December	114	95	45	254*	1189
1987	January	113	95	46	253*	1051
	February	112	95	46	253*	1052
	March	112	95	46	253*	1118
	April	116	94	49	259*	1121
	May	120	96	51	267f	1046
	June	121	97	53	271d	1145
	July	121	97	53	271d	1154
	August	121	97	53	271d	1086
	September	121	97	53	271d	1147
	October	N.A.	N.A.	N.A.	N.A.	N.A.

a excludes Carriacou (20)  
 b includes Carriacou (20)  
 c includes Bequia (12)  
 d includes Bequia (10)

e excludes Carriacou (11)  
 f includes Bequia (8)  
 \* excludes Bequia  
 N.A. Not available

#### APPENDIX IV: *Number and Types of Host Trees Trapped*

COMMON NAME	SCIENTIFIC NAME
Mango	<i>Mangifera indica</i>
Citrus	<i>Citrus</i> spp.
Guava	<i>Psidium guajava</i>
Sugar apple	<i>Annona squamosa</i>
Sapodilla	<i>Calocarpum mammosum</i>
Papaya	<i>Carica papaya</i>
Pomerac	<i>Eugenia malacensis</i>
Soursop	<i>Annona muricata</i>
Carambola	<i>Averrhoa carambola</i>
Chili plum	<i>Spondias purpurea</i> var <i>lutea</i>
Jamaican plum	<i>Spondias purpurea</i>
Hog plum	<i>Spondias mombin</i>
Golden apple	<i>Spondias cytherea</i>
Breadfruit	<i>Artocarpus communis</i>
West Indian cherry	<i>Malpighia glabra</i>
Almond	<i>Terminalia catappa</i>
Custard apple	<i>Annona reticulata</i>
Passion fruit	<i>Passiflora edulis</i>
Avocado	<i>Persea americana</i>
Star apple	<i>Chrysophyllum cainito</i>

#### APPENDIX V

Family – Tephritidae

Sub Family – Tephritinae

1. *Dyseuaresta* sp prob. *mexicana*  
(Weidemann)
2. *Dictyotrypeta* sp prob. undescribed
3. *Tomoplagia* sp. prob. undescribed

\* All species breed in flower heads or galls of Asteraceae (composites – not of economic importance).

\*USDA Laboratory Belts Ville, Maryland.