

TERMINAL REPORT

(MAY 1997 – DECEMBER 2000)

FAO/AusAID/UNDP/SPC

Project on:

REGIONAL MANAGEMENT OF FRUIT FLIES IN THE PACIFIC

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Project Number RAS/97/331

Funding Sources COST-SHARED BY AusAID and UNDP, additional support from NZODA

Executed by SECRETARIAT OF THE PACIFIC COMMUNITY (SPC)

Implemented by FOOD AND AGRICULTURE ORGANIZATION OF THE UN (FAO)
(until 30 April 2000)

Project starting date:
Originally planned: 1st May 1997
Actual: 1st May 1997

Project completion date:
Originally planned: 30th April 2000
New: 31st December 2000

Total budget (\$): 1,770,700



EXECUTIVE SUMMARY

The FAO/AusAID/UNDP/SPC Project on Regional Management of Fruit Flies in the Pacific (RMFFP) originated in 1990 and initially operated in Fiji Islands, Cook Islands, Tonga and Western Samoa. Phase 2 operated from January 1994 to April 1997 and included the four countries above plus Federated States of Micronesia (FSM), Solomon Islands and Vanuatu. The third phase (RMFFP) started in May 1997 and includes all 22 Pacific Island countries and territories (PICTs). The present report covers achievements by the RMFFP from May 1997 to its official ending in December 2000. Detailed coverage of achievements under each objective constitutes Section 7 of the report. Detailed profiles of status of fruit fly work and achievements in all PICTs is in Section 2 of the report. The RMFFP is funded by AusAID, UNDP and New Zealand Government (NZODA) and is executed by the Secretariat of the Pacific Community (SPC).

Protection of Horticulture

As of late 2000, there were permanent trapping stations for quarantine surveillance in all PICTs, except Pitcairn Island. Overall there are 799 sites with a Cue-lure trap and 1175 sites with a ME trap, and most sites have both a CL and a ME trap. Host fruit surveying for quarantine surveillance purposes targets high-risk commodities. Host fruit surveys are regularly carried out in American Samoa, Fiji Islands, French Polynesia, Federated States of Micronesia, Kiribati, Nauru, New Caledonia, Papua New Guinea, Samoa, Tonga, Tuvalu and Vanuatu. The status of quarantine surveillance against fruit flies in each PICT is detailed in Section 3.

As part of their training in the Nauru Fruit Fly Eradication Programme, trainees from 19 PICTs started formulating Emergency Response Plans (ERPs) for fruit flies. The ERP has been completed for Fiji Islands and submitted to the government for endorsement. ERPs are in nearly final draft form for Vanuatu, Samoa, and Solomon Islands. Good ERP drafts developed for Niue, FSM, New Caledonia and Kiribati. Preliminary drafts have also been produced by Tonga, Guam, French Polynesia, Tuvalu, Nauru and Cook Islands. A stockpile of chemicals and equipment to initiate a quick response in PICTs has been purchased by RMFFP and is stored in Fiji Islands.

The RMFFP has successfully carried out a fruit fly eradication programme in the Republic of Nauru, targeting Oriental fruit fly (*B. dorsalis*), Pacific fruit fly (*B. xanthodes*), melon fly (*B. cucurbitae*), and mango fly (*B. frauenfeldi*). The programme commenced in October 1998, and used a combination of male annihilation and protein bait spraying. For the first time, Fipronil has been used as the basic insecticide. 41 plant protection and quarantine staff from most PICTs have received hands-on training on fruit fly control and eradication techniques. Oriental fruit fly, melon fly and Pacific fruit fly have been successfully eradicated. Although mango fly populations have been reduced to a very low level, they still subsist and the eradication programme is continuing.

Oriental fruit fly was recorded in the Republic of Palau in September, 1996. A technical feasibility study for its eradication was carried out in August 1999. A socioeconomic study funded by RMFFP in March 2000 strongly supported the investment for eradication. A workshop to develop an implementation plan for the eradication programme has been conducted in January 2001.

The RMFFP has provided an advisory role to initiate the eradication programme against Oriental fruit fly in French Polynesia, discovered on Tahiti in July 1996. The program was conducted in 1997, and the fly nearly eradicated. The programme was stopped too early, though, with residual fruit fly populations breeding in isolated pockets, from which they multiplied and spread all over Tahiti and Moorea. Efforts to eradicate the species resumed in January 1999 and are still in process. In October 2000, a new eradication technology developed by Aventis CropScience, consisting of papier mâché disks treated with methyl eugenol and Fipronil, known as BactroMAT M-E, was introduced as substitute to coconut husk blocks treated with Malathion.

The RMFFP also funded a consultant to review the economic feasibility study to eradicate melon fly from Guam and CNMI originally published by Kevin Boyle in 1993.

Increased Production

The economic impact of pest fruit flies has been assessed on selected crops of commercial or edible fruits by collecting and setting up large series of fruits in separate containers to determine the proportion of individual fruits that are infested. Extensive data have been collected from assessments in Cook Islands, Fiji Islands, FSM, PNG, Samoa, Solomon Islands, Tonga and Vanuatu.

Protein bait spraying has been extensively tested and demonstrated to farmers in Fiji Islands, Tonga, Cook Islands, FSM, Solomon Islands, Vanuatu and PNG and some farmers have adopted the control technology. It has even become a part of the quarantine pathway for export of mangoes, papayas and eggplants from Fiji, Tonga and Cook Islands to New Zealand. Results from some tests carried out with support from RFFP-RMFFP are presented in the report.

To overcome the problem of heavy rain washing off a significant amount of bait, often resulting in poor control, a new formulation, known as "Bactrogeel", has been developed by Aventis CropScience in Australia. It is a Fipronil-based powder that forms a gel when mixed with a protein source used for protein bait spraying. It adheres to foliage better than other protein bait spray formulations and therefore resists better heavy rain. Also, the amount of Fipronil used is vastly smaller than the amount of Malathion currently used in protein bait sprays and a much smaller amount of bait solution, 10-15ml per spot, is sufficient to achieve control.

Bactrogeel has been used since late 1998 in the Nauru eradication programme. It will soon be registered for commercial use in Australia but is already available to PICTs. Fipronil has already been registered by governments of Fiji Islands and French Polynesia (for commercial use), and Samoa, Tonga, New Caledonia and Niue (for experimental use) in preparation for its future availability on the market.

Fruits bagging has been introduced and promoted in PICTs as an inexpensive alternative to the use of chemicals. It is ideally suited for small backyard fruit production. A Pest Advisory Leaflet on fruit bagging has been published and distributed to all PICTs. Demonstrations of bagging to farmers and school children during field visits, school visits and agricultural shows are ongoing in PICTs.

The RMFFP has been involved in the development of technology to convert waste yeast from breweries into fruit fly bait, as an inexpensive substitute to the import of Mauri's Pinnacle Protein Insect Lure from Australia. Royal Tonga Brewery has now a waste yeast conversion unit. The commercial product, known as Royal Tongalure, was launched in March 1998 and has been adopted by Tongan farmers. A similar unit has been shipped to Vanuatu in December 2000. Research is underway to convert waste yeast conversion in Carlton Brewery in Fiji Islands. Breweries in Samoa, Solomon Islands and especially Papua New Guinea have shown interest in adopting the waste yeast conversion technology.

A consultant economist (Dr. Andrew McGregor) was hired in 1998-1999 to carry out a socioeconomic study to review the 1996 estimates of the benefits and impact from fruit fly project and to assess the impact of fruit flies at the village level. The study involved field visits and consultancies in Fiji Islands, Vanuatu and Solomon Islands. The complete report was presented in October 1999, and published in August 2000 as a book entitled "A Socioeconomic evaluation of the Regional Fruit Fly Projects". The executive summary of the report constitutes Section 9 of the report.

Enhanced Trade

Laboratory colonies of economic species have been maintained in Fiji Islands, Cook Islands, Samoa, Tonga, Vanuatu, Solomon Islands, PNG, Palau, FSM and New Caledonia. At present, 13-14 species are kept in culture. Heat tolerance research has been completed in PICTs for *Bactrocera curvipennis*, *B. facialis*, *B. kirki*, *B. melanotus*, *B. passiflorae*, *B. psidii*, *B. tryoni*, *B. xanthodes*, and, in early 2000, *B. trilineola*.

Forced Hot Air (FHA) units have allowed to make commodities that are fruit fly hosts exportable to New Zealand. There are functional units in Fiji Islands, Tonga, Cook Islands and New Caledonia. Fiji Islands and Cook Islands currently export fresh HFA-treated papaya, mango and eggplant to New Zealand. Fiji Islands has conducted confirmatory tests in 1999-2000 in view of exporting papaya to Australia. Results have been submitted to AQIS, but no reply has yet been received.

The Non-Host Status standard specified in the New Zealand Ministry of Agriculture and Forestry (MAF) Regulatory authority Standard 155.02.02 Specification for Determination of Host Status as a Treatment, was developed largely by the Regional Fruit Fly Project to assist PICTs export fresh fruits and vegetables to New Zealand without additional quarantine treatments. Many commodities have been demonstrated to be non-hosts using the standard test in Fiji Islands, Tonga, Samoa, Cook Islands, FSM, Solomon Islands, Vanuatu

and New Caledonia. Commodities exported to New Zealand on non-host status basis are "Hot Rod" and "Red Fire" chillis from Fiji, Birdseye chilli from Cook Islands, green bananas from Samoa, "Candy Red" and "Sugar Baby" watermelons from Tonga, watermelon, lime and squash from New Caledonia, cucumber and squash from Vanuatu.

Improved Technical Capacities

Several formal training courses and hands-on training workshops have been organized and delivered, some jointly with ACIAR, during the Project; 1. A training course on "Identification, biology and Surveillance of Fruit Flies in Solomon Islands, Vanuatu and Papua New Guinea", at Griffith University, Brisbane (June 1997), jointly funded and delivered by RMFFP and ACIAR. 2: In-country fruit fly identification and management workshops, organized and funded mainly by ACIAR, with RMFFP contribution, in Vanuatu (October 1997), Solomon Islands (January 1998) and PNG (August 1999). 3: A hands-on practical training workshop on the Generation of Heat Tolerance Data for Immature Stages of Fruit Flies in Port Vila (November 1999) for participants from PNG, Solomon Islands, Vanuatu, SPC and ACIAR. 4: A refresher training course on fruit fly management in Samoa (August 2000) for participants from Samoa, American Samoa, Tonga, Cook Islands, Tuvalu, Tokelau and Niue. 5: Hands-on training for of 41 research, plant protection and quarantine officers from all PICTs (except CNMI, French Polynesia and Pitcairn), and from New Zealand and SPC, on fruit fly eradication techniques, control methods, trapping and host surveys, and developing emergency response plans to cope with the incursion of exotic fruit flies as part of the Nauru Fruit Fly Eradication Programme.

Short-term attachments have also been provided to some of the national fruit fly workers to cover more specific needs that are relevant to their countries. Workers from Palau, Tonga, Samoa, Solomon Islands, Vanuatu and French Polynesia have benefited from attachments.

Under the special project developed in collaboration with UNDP-ICARE: "Promotion of Income Generation Opportunities from Fruit Production in Island Communities in Vanuatu". Citrus farmers from the islands of Aniwa, Anatom, Futuna, Tanna and northwest Santo were brought to Efate for practical training on fruit fly control and orchard management.

The RMFFP has funded the positions for three Junior Scientific Officers in PNG who have received intensive hands-on training on fruit fly research and management in PNG from the United Nations Volunteer who has worked in PNG from 1997 to 1999.

The RMFFP has financially assisted in the establishment of fruit fly facilities through refurbishment of available buildings in PNG (three facilities, in Kerevat, East New Britain, Bubia, Morobe, and Laloki, Port Moresby), Solomon Islands, Nauru and Palau.

Information

Country status reports describe the present status of the quarantine surveillance in the country. They include seasonal abundance data from trapping, analysis of host record data, and the status of quarantine surveillance. They may be submitted to potential importing countries as a basis for negotiation of quarantine export pathways. Status reports have been completed for Vanuatu, Solomon Islands, FSM and Fiji Islands, and the Tonga report is in progress.

Data generated by fruit fly trapping and host fruit surveying in the seven countries originally covered by the RFFP have been entered in a large database, using R-Base software, developed at Queensland DPI. More recently, the RMFFP has started developing a database on fruit fly distribution and host records in all PICTs. The interactive database will later become available in the Pacific Fruit Fly WEB site.

Reference collections of pinned fruit fly specimens from most PICTs have been developed in countries with a large species diversity, especially PNG, Solomon Islands and Vanuatu, by ACIAR and the RMFFP. A regional reference collection, housed at SPC in Fiji, contains 3463 pinned and labeled specimens belonging to 117 species. From this collection, reference collections of about sixty species will be provided to PICTs with collection storage and curation facilities in early 2001.

The RMFFP has developed and launched a WEB site on fruit flies in the Pacific. The site contains 145 pages covering project description and document, success stories pages (fruit exports from PICTs, quarantine surveillance throughout the Pacific, Nauru eradication programme, local production of protein bait), fruit fly

control (bagging and protein bait spraying), country profiles, species profiles and online publications. To visit the site, you can consult <http://www.pacifly.org>.

Pest Advisory Leaflets (PALs) have been published on fruit flies of Cook Islands (in 1994) and mango fly (*B. frauenfeldi*) in English (in 1997) and in Tok Pisin (in 1998). A professional photographer, hired by the RMFFP, traveled to New Caledonia, Fiji Islands, Tonga, Samoa, Vanuatu and Solomon Islands in 1998, and to PNG in 2000. In total, a collection of hundreds of slides from 48 species were photographed. These photos are used for the production of PALs, posters and other printed material. During RMFFP phase, PALs have been published on fruit flies of Solomon Islands, Vanuatu (English and French), Fiji Islands, New Caledonia (French and English), French Polynesia and Pitcairn (French and English), and on melon fly. To complete the series, PALs on fruit flies of PNG, Samoa, Tonga, and American Samoa-Niue-Tuvalu-Tokelau (combined leaflet) will be released in early 2001. The first leaflet specifically on control, about fruit bagging, was published in late 1999. A general leaflet on fruit fly management practices, to complement country-based leaflets, will be published as soon as Fipronil -based new products are registered in Australia.

Numerous technical and duty travel trip reports have been produced during RMFFP time. Some of the key ones include: The Proceedings of the Symposium on Regional Management of Fruit Flies in the Pacific (October 1996), published by ACIAR, manuals on fruit flies for Vanuatu and Solomon Islands, and Andrew McGregor's "Socioeconomic evaluation of the Regional Fruit Fly Projects".

Awareness newsletters have been regularly published in Nauru (FFERAD News) and Papua New Guinea (INFOFLY-PNG) for wide distribution to government and private sector. Radio shows in national languages on fruit flies were recorded in PNG, Solomon Islands and Vanuatu.

Video footage has been produced on the fruit fly eradication programme in Nauru and on fruit fly control in orchards in Papua New Guinea. A long-term project is to produce with SPC Media Centre a video documentary on fruit flies, their quarantine and economic importance and control.

Management Issues

The RMFFP phase of the fruit fly project has introduced the use of Steering Committee Meetings to allow country representatives to get together regularly, informally assess progress in Project implementation and provide recommendations on priority activities to be carried out until the next meeting. Four meetings have taken place in September 1997, March 1998, February and November 2000. The recommendations from the meetings and notes on their subsequent implementation are included in Section 6.

The linkages with host governments and other organizations, international research institutes, NGOs, the private sector, and donor organizations are discussed in details in the report.

The financial Statement, as of December 2000, is in Section 12.

The RMFFP has officially ended on December 31st 2000. Starting in January 2001, fruit fly activities have become Component 2, "Fruit Fly Management", of the newly established Project on "Pest Management in the Pacific", executed by SPC. The six outputs and indicative activities of the fruit fly component of the PMP are: 1. Sustainable fruit fly management practices adopted at farm level. 2. Enhanced public awareness of fruit flies and their quarantine status. 3. Improved and sustainable systems for national fruit fly surveillance. 4. Increased regional and national preparedness to respond to fruit fly incursions. 5. Co-ordinated regional management of fruit flies. 6. Systems to fulfil negotiated trade protocols established nationally.

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ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
AQIS	Australian Quarantine and Inspection Service
AusAID	Australian Agency for International Development
CIRAD-FLHOR	Centre de Coopération Internationale en Recherche Agronomique pour le Développement - Fruits, Légumes, Horticulture
CNMI	Commonwealth of Northern Mariana Islands
CRGA	Committee of Regional Governments and Administrations
CTA	Chief Technical Advisor
ERP	Emergency Program Plans
FAO	Food and Agricultural Organization of the United Nations
FFERAD	Fruit Fly Eradication programme in Nauru
FFM	Fruit Fly Management
FHA	Forced Hot Air
FSA	Farm Support Association (Vanuatu)
FSM	Federated States of Micronesia
GPPIS	Global Pests and Plant Information System
HTFA	High Temperature Forced Air
HTT	Heat Tolerance Testing
ICARE	Integrated Community Approach for Resource and Environment
JSO	Junior Scientific Officer
MARDI	Malaysia Agriculture Research and Development Institute
MPPIL	Mauri's Pinnacle Protein Insect Lure
NAQIA	National Agricultural Quarantine Inspection Authority (PNG)
NARI	National Agricultural Research Institute (in PNG)
NGO	Non-Government Organization
NZODA	New Zealand Overseas Development Assistance
PAL	Pest Advisory Leaflet
PBARC	Pacific Basin Agriculture Research Center
PHALPS	Permanent Heads of Agriculture and Livestock Production Services
PICTs	Pacific Island countries and territories
PMP	Pest Management in the Pacific
PNG	Papua New Guinea
PPS	Plant Protection Service
RFFP	Regional Fruit Fly Project in the South Pacific
RMFFP	Regional Management of Fruit Flies in the Pacific
RMI	Republic of Marshall Islands
SIDT	Solomon Islands Development Trust
SPC	Secretariat of the Pacific Community
UNDP	United Nations Development Programme
USAID	United States of America International Development
USDA	United States Department of Agriculture
USDA-ARS	United States Department of Agriculture - Agricultural Research Services
VDWs	Village Demonstration Workers (of SIDT)