

REPORT OF WORKSHOP

FRUIT FLY MANAGEMENT WORKSHOP

at the Pacific Plant Protection Organisation Meeting

(Nadi, Fiji Islands, 21 March 2001)



SECRETARIAT OF THE PACIFIC COMMUNITY
NOUMEA, NEW CALEDONIA

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REPORT

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INTRODUCTION

The Fruit Fly Management Workshop was held in Nadi, Fiji Islands, on 21 March, 2001.

Dr Richard Ivess, Director, Plants Biosecurity, and Ministry of Agriculture & Forestry, New Zealand chaired the workshop. The main presenters were: Mrs Ema Tora Vueti, Coordinator, Fruit Fly Management Project, SPC and Mr Luc Leblanc, Entomologist, Fruit Fly Management Project, SPC

Participants were from: American Samoa, Fiji Islands, Guam, Nauru, Cook Islands, French Polynesia, Kiribati, New Caledonia, Niue, Palau, Samoa, Tokelau, Northern Mariana Island, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Wallis and Futuna and Vanuatu.

PROGRAMME

1. Welcome by the chairman
2. Adoption of the agenda and hours of work
3. Background of fruit fly management components and purposes of meeting
4. Recommendations of the 4th steering committee meeting
5. Recommendations of review report for RMFFP
6. Presentation and discussion on:
 - a) Regional surveillance for fruit flies
 - b) Emergency response plan for fruit flies
 - c) Eradication program
 - d) Control measures
 - e) Trade
 - f) Management issues
7. Annual work plan 2001
8. Recommendations of the meeting
9. Closure

OPENING ADDRESS

1 Dr Richard Ivess, Director, Plant Biosecurity, Ministry of Agriculture & Forestry, New Zealand welcomed the participants on behalf of SPC. He was appointed as the chairman of the workshop.

Adoption of the agenda and hours of work

2 The meeting adopted the provisional agenda and hours of work.

Background of the fruit fly management component and purpose of meeting

3 SPC reported that the Fruit Fly Project was currently part of the SPC Pest Management Project (PMP). Currently all 22 member countries are included in the project.

Fruit Fly Project History

4 Phase 1: The project started in 1990 to 1993, which involved four countries, Fiji Islands, Cook Islands, Tonga and Samoa. The objective of the project was to: upgrade the technical knowledge, develop new techniques and strengthen the technical capacity to overcome quarantine restrictions.

Phase 2: January 1994 to April 1997. Three new countries Solomon Islands, Vanuatu, Federated States of Micronesia (FSM) were included in the project with continuation of activities in the four initial countries.

Phase 3: May 1997 to December 2000 - Regional Management of fruit flies in the Pacific (RMFFP).

* All 22 PICTs covered.

* Continuation of the Fruit Fly Programs in FSM, Solomon Islands and Vanuatu and commencement of fruit fly activities in the new countries and territories, with emphasis on regional surveillance and coordination of fruit fly activities.

5 Purpose of the meeting was to: inform PPPO members about the project; have dialogue with PPPO representatives in order to inform them of the new developments and changes in fruit fly management in the region; gain views from representatives of the progress and needs of countries with regards to fruit flies; and use the workshop as a steering committee meeting for 2001. Issues raised by country representatives would be incorporated in the 2001 workplan.

Recommendations of the 4th steering committee meeting

6 Recommendation of the 4th steering committee meeting (Annex 1) was discussed. It was suggested that the steering committee meeting should be run back to back with the PPPO executive meeting every year.

Recommendations of Review Report for RMFFP

7 Recommendations from the Review of the RMFFP (Annex 2) was discussed. The activities carried out based on the recommendation was reported.

Regional Surveillance for Fruit Flies

8 Presented information regarding fruit fly surveillance in the Pacific regions, stating by countries, the fruit fly species, pest species, number of trapping sites, number of islands/atolls covered by traps, island/states/provinces covered. (Annex 3).

9 List of pest fruit flies in Pacific Island Countries and Territories was presented (Annex 4).

10 Distribution, spread and economic importance of selected pest species: *Bactrocera xanthodes* (Broun), *Bactrocera kirki* (Froggatt), Queensland fruit fly (*Bactrocera tryoni* (Froggatt)), melon fly (*Bactrocera cucurbitae*

(Coquillett)) Oriental fruit fly (*Bactrocera dorsalis* (Hendel)), mango fly (*Bactrocera frauenfeldi* (Schiner)), Asian papaya fruit fly (*Bactrocera papayae* Drew and Hancock) was presented (Annex 5).

Emergency Response Plan for Fruit Flies

- 10 With regards to the emergency response plan it was reported that:
- ◆ 19 PICTs that have been trained in Nauru have formulated draft ERPs.
 - ◆ Fiji Islands, Vanuatu, Solomon Islands and Samoa have either completed or are in final drafts.
 - ◆ Niue, FSM, New Caledonia and Kiribati are being reviewed or will be finalised.
 - ◆ Preliminary drafts have been received from Cook Islands, Tonga, Guam, French Polynesia, Tuvalu and Nauru.
 - ◆ ERPs for fruit fly will be used as the basis of formulating general ERPs.
 - ◆ Stockpile of supplies needed to initiate an emergency response is with SPC.

Eradication Programmes

11 Report on Nauru Fruit Fly Eradication programme highlighted that: over 41 plant protection and quarantine staff in the region, including New Zealand were trained; eradication of three fruit fly species using male annihilation and protein bait spraying techniques; and establishment of a quarantine service.

12 Tahiti Fruit Fly Eradication Programme reported that, eradication of Oriental fruit fly commenced in 1997, had to re-start the program in 1999 - 2001 (French Government funding). Eradication of Pacific fruit fly and Queensland fruit fly commenced in 1999 using male annihilation and protein bait spraying techniques.

13 Eradication programmes elsewhere: planning of the Palau Oriental fruit fly eradication program, and Melon fly in Guam and CMNI.

14 It was reported that during the Nauru Fruit Fly Eradication Programme, development of BactroMAT and BactroGel was carried out in conjunction with Aventis Crop Science.

Control Measures

15 Fruit fly control measures such as bait spraying, BactroMAT (BactroMAT C-L: Fipronil + Cue - lure and BactroMAT M-E: Fipronil + Methyl eugenol), and fruit fly bagging was presented. Issues on the registration of the Fipronil for fruit fly control was raised by the delegates.

Trade

16 It was stated that in order to enhance trade there is a need for an effective and ongoing quarantine surveillance programme and trade negotiations (PRA, levels of risk, access 'winter window'). In addition to this; maintenance of fruit fly laboratory colonies in Cook Islands, Fiji Islands, Samoa, Tonga, FSM, Vanuatu, Palau, PNG, and New Caledonia (funded by French government). Research on heat tolerance and confirmatory tests conducted in Cook Islands, Tonga, Fiji Islands, Samoa, New Caledonia.

17 It was reported that research on heat tolerance studies is completed for *B. trilineola* in Vanuatu; data analysis is completed.

18 Forced Hot Air technology in Cook Islands, Fiji Islands, Tonga and New Caledonia was reported to be an approved treatment for papaya, eggplant, mango, tomatoes, breadfruit, avocado and capsicum.

19 Non-host status was for: 'hot rod' and 'red fire' chilli in Fiji Islands, 'bird eye' chilli in Cook Islands, 'candy red' and 'sugar baby' watermelons in Tonga, cucumber and squash in Vanuatu, watermelon, lime and squash in New Caledonia

Management Issues

20 PMP staff informed the meeting about the management activities the project is currently engaged in such as:

21 *Training:*

- ◆ Sub-regional workshops in Vanuatu and Samoa.
- ◆ Nauru Fruit Fly Eradication Program
- ◆ Attachment training in Fiji, PNG, and Samoa for participants from Palau, Solomon Islands, Tonga
- ◆ Collaborated with ACIAR for training of Plant Protection and Quarantine staff in Solomon Is. and PNG
- ◆ Training of commercial citrus farmers in Vanuatu
- ◆ In-country refresher training for local staff (new staff, turn-over of staff and knowledge is shared)
- ◆ Sub-regional training
- ◆ Use of regional staff who have been trained in fruit fly management to assist other PICTs

22 *Management:*

- ◆ Continuation of fruit fly steering committee meetings
- ◆ Sustainability of fruit fly programs
- ◆ Funding for postgraduate degrees (cost-share, in-country/extension).

Comments and Questions

23 Solomon Islands expressed concern regarding the fruit fly surveillance program in PNG. PNG commented that NAQIA had stepped in and taken over monitoring the surveillance program in PNG.

24 Kiribati commented that they have no information on presence of melon fruit fly in Christmas Island and the Phoenix Island, so more work in this area was required.

25 Fiji stated concern about Australia Biosecurity's acceptance regarding the heat treatment data submitted to them for market access for papaya. SPC said that if countries had problems with market access approval of a treatment for fruit fly host commodities, they were willing to assist.

26 In Tuvalu and Tokelau, few species of fruit flies have been reported. However, its host fruit range was not known well, thus there was a need to conduct host fruit surveys in these countries.

27 Questions were raised as about a series of campaigns for eradication in Tahiti rather than a single campaign. It was explained that a single campaign was not enough to complete the eradication of fruit flies. For example, more than six campaigns were done, in the case of Tahiti, to ensure eradication.

28 Protein bait spraying trials which are based in village areas in Niue. This was the first time such trial was carried out. It was reported that the trial was in its fifth week, and the results are promising so far.

29 It was explained that protein bait spraying was developed on the knowledge that immature female fruit flies need a feed of protein to be reproductively viable. Fipronil was introduced as a new insecticide used for protein bait spraying and was going to replace Malathion.

30 SPC entomologist explained that the product Bactrogeel which contains Fipronil if used for bait spraying over comes the problems of baits been washed away by rain.

31 Fiji, Tonga, and Samoa have registered Fipronil for research purpose; it was emphasised that Malathion may be banned soon so there is a need to look for alternatives.

32 It was highlighted that Fipronil was not a new product, but has been used for controlling other pests such as termites, it is not systematic, and works on the nervous system of the insect.

33 The alarming situation regarding the spread of some species of fruit flies was highlighted, and it was emphasised that in order to trade, surveillance was very important. No surveillance means no trade. It was also added that if a country did not undertake surveillance this would be interpreted as no survey, no evidence, hence the exporting country might have to undertake unnecessary treatment measures for produce.

34 Regarding emergency response planning, Tonga commented on the stock piles, especially where two countries find the same species at the same time. SPC clarified that there were enough supplies to cater for such incidents and PICTs may also ask New Zealand.

Annual Work Plan 2001

35 The annual work plan for 2001 was endorsed

Recommendations

36 (i) SPC-FFM continues with activities as recommended by the 4th Fruit Fly Steering Committee, Technical review and as reflected in the workplan for 2001 to ensure that fruit fly management is maintained and enhanced nationally and regionally.

(ii) This meeting recommends that the issue of sustainability of fruit fly programmes in PICTs should be raised at the PHALPs meeting in June 2001.

(iii) To ensure the continuation of the steering committee, it is recommended that meetings be carried out back to back with regional technical meetings such as PPPO and RTMPP and annually with the executive committee meetings of PPPO.

ANNEXES

Annex 1

1.0 Recommendations from the Fourth Steering Committee Meeting

1. RMFFP/FFM and FAO provide assistance to carry out host fruit surveying and trapping on Christmas Island and other Line Islands, and Phoenix Islands Group in Kiribati to confirm the absence of exotic fruit flies and to determine fruit fly fauna present.
2. PICTs continue carrying out refresher training on fruit fly management for Extension, Quarantine and Plant Protection staff, due to the turn-over of staff. RMFFP/FFM to provide technical backstopping for these training, whenever requested.
3. Nauru eradication program should continue until end of 2000. A review to decide on continuing or stopping the eradication shall be conducted in early 2001 (January).
4. RMFFP/FFM facilitate the use of Fipronil and other insecticides alternative to Malathine in collaboration with Aventis CropScience (Australia) and PBARC and to obtain information on the costs of BactroGel and BactroMAT.
5. RMFFP/FFM facilitate through SPC PPPO or otherwise, the negotiation for use of Non-Host Status and Forced Hot Air Treatments for exports to Australia, USA and Japan.
6. RMFFP/FFM revive negotiations on the access to R-Base Database on fruit flies in the PICTs, which is currently held by QDPI for PICTs. There is a need to match the data in R-Base Database and those existing in the PICTs. A letter of agreement with Griffith University should be made for the release of data on fruit flies in Solomon Islands, Vanuatu and Papua New Guinea kept by the University.
7. PICTs be encouraged to deposit National reports on Agriculture, plant protection and fruit flies in the SPC Library with authorization on accessibility for all PICTs.
8. RMFFP/FFM assist the re-establishment of the Quarantine Surveillance systems in Western Province in Solomon Islands to detect Asian papaya fruit fly and other exotic fruit flies.
9. PNG, with technical assistance from RMFFP/FFM, rationalize and review trapping system, justifying the proposed sites based on quarantine risk.
10. PICTs adopt the presence/absence method for recording trapping data, instead of counting all flies from each sample, in their surveillance systems and Vanuatu to provide a model form used for this activity.
11. RMFFP/FFM provide assistance for rearing fruit fly species that are difficult to rear in PNG (melon fly), Cook Islands (*B. melanotus*), Tonga (*B. kirki*), and other countries where requested.
12. Improve regional communication for Steering Committee Meeting, there should be meetings to discuss fruit fly issues with participants whenever they attend other sub-regional training or meetings. In addition, the SPC-RMFFP/FFM coordinate the collection of reports from PICTs where there are communication difficulties and distribute to the sub-regional representatives prior to Steering Committee Meetings.
13. RMFFP/FFM provide a list of contacts of people working in fruit fly programs in PICTs and also the list of suppliers of fruit fly related equipment and supplies. These lists should also be sent to the Heads of Agriculture in PICTs as well as fruit fly workers.
14. RMFFP/FFM assist in the planning and implementation of the Palau Eradication Program.

15. Sub-regional training on fruit fly management be held for Micronesian countries and territories, particularly Commonwealth of Northern Mariana Islands (CNMI) and attachment training for American Samoa and Samoa on fruit fly management and protein bait spraying techniques, respectively.
16. RMFFP/FFM continue to provide assistance in technical backstopping for the proposed activities for 2001 in PICTs, as reflected in the work plan for 2001.
17. RMFFP/FFM actively encourage and assist Wallis and Futuna in maintaining their quarantine surveillance programme.
18. RMFFP/FFM provide advice and information on cold treatments and recommendations for alternative post-harvest treatments for in-country trade in French Polynesia.
19. RMFFP/FFM assist Tuvalu and Tokelau in carrying out the collection of more specimens through host surveying to confirm the taxonomic identity of species in the *B. passiflorae* complex.
20. RMFFP/FFM liaise with Prof. Drew of Griffith University, Brisbane, to encourage the completion and prompt publication of the taxonomic descriptions of the species of fruit flies in the Pacific region in the *passiflorae*, *xanthodes* and *musae* complexes.
21. PICT governments and administrations assume the financial responsibility for national quarantine surveillance programmes as soon as possible, with technical support from the RMFFP/FFM and other major partners.
22. SPC, in consultation with national Departments of Agriculture, actively promotes the raising of the priority of Agricultural Disasters, created by the incursion of exotic fruit flies and other pests, to the same level of importance as that of Natural Disasters and that Agricultural Disasters be incorporated into the national Natural Disaster programmes to ensure adequate funding is available, when required.
23. RMFFP/FFM promote the adoption of an integrated approach to fruit fly control including crop sanitation, bagging, protein bait spraying, conservation of parasitoids and area-wide suppression in PICTs.
24. SPC facilitate the introduction of plant protection school manual to school curriculum in PICTs.
25. SPC carry out a pest risk analysis to quantify the risk of entry of fruit flies into selected PICTs and to produce a video on the risk and impact of entry of exotic fruit flies to sensitise the government and the public.
26. RMFFP Steering Committee endorse the work plan and recommends that the balance of funds for RMFFP 2000 be carried over into 2001, and that the provision made by UNDP of USD100,000 be used to support the projected work plan for FFM 2001.

2.0 Recommendations from the Terminal Review of the RMFFP

1. That the technical, managerial and financial control structure that was adopted in the RMFFP project (RAS/97/331) and its predecessor projects RAS/90/004 and RAS/93/300, and FAO Technical Cooperation Projects, where control was vested in the Chief Technical Adviser, be adopted in PMP/FFM program. We hold this view because we believe this organisational structure was a significant contributing factor to the objectives of the program being met in an effective and timely manner.
2. That PMP/FFM and SPC actively encourage all PICTs to continue to support fully their activities in quarantine surveillance and fruit fly research, and the regional approach to the control of fruit flies in the Pacific region.
3. That PMP/FFM closely monitor the state of the quarantine surveillance systems in PNG and the Solomon Islands, and provide additional financial and or technical assistance should that be necessary.
4. That PMP/FFM encourage those PICTs that have not yet done so to assume responsibility for quarantine surveillance.
5. That a technical assessment of the current state of the Nauru fruit fly eradication campaign be undertaken in January 2001 in order to determine whether the attempt to eradicate *Bactrocera frauenfeldi* should continue.
6. That PMP/FFM continue to pursue the possibility of eradicating *Bactrocera dorsalis* from Palau.
7. That PMP/FFM continue to support the eradication programs against *Bactrocera dorsalis*, *B. tryoni*, and *B. xanthodes* in French Polynesia.
8. That PMP/FFM continue to evaluate the possibility of eradication of *Bactrocera cucurbitae* in Guam and CNMI by male annihilation and protein hydrolysate treatments.
9. That to ensure current and potential importing countries have confidence in the quarantine procedures implemented by each PICT, these be audited from time to time by an appropriate organisation.
10. That in order to expand export opportunities for fruits and/or vegetables PMP/FFM assist PICTs in establishing a formal dialogue with appropriate authorities of potential importing countries to establish their requirements for host free status and disinfestation.
11. That there be increased extension activity aimed at promoting control of fruit flies at three levels of production: (i) bagging at the village or backyard level, (ii) bagging and protein bait spraying at the small landholder/semi-commercial level, and (iii) bagging and protein bait spraying at the commercial level. At the commercial level this approach should evolve toward a Integrated Pest Management (IPM) approach that includes: sanitation, bagging, protein bait spraying, male annihilation, and conservation or augmentation of natural enemies.
12. That PMP/FFM continue to collaborate with Aventis Crop Science (Australia) to expedite registration of fipronil in Australia as this should facilitate acceptance by the PICTs of fipronil for fruit fly control.
13. That PMP/FFM collaborate with extension officers in the PICTs to improve the dissemination of information on fruit fly control measures and the importance of quarantine surveillance. The PMP/FFM should provide training for extension officers and extension material to facilitate this activity.
14. That staff of PICTs be encouraged to publish in an appropriate format the data they have accumulated on fruit fly abundance, seasonal activity, host fruit records, natural enemies, etc.

15. That the Nauru eradication campaign, when completed, be written up and published in an appropriate scientific journal.
16. That training in the range of fruit fly monitoring and control activities, for both new and existing staff, be recognised as a continuing responsibility of PICTs; technical support for the activity should be provided by PMP/FFM.
17. That PMP/FFM provide further training in fruit fly control techniques to staff of Micronesian countries and territories.
18. That the RMFFP website (<http://www.pacifly.org>), the creation of which was a commendable initiative, be updated regularly to ensure that all PICTs view it as a valuable resource.
19. That the PMP/FFM, in association with ACIAR funded projects, consolidate the data relating to all aspects of the fruit fly projects which currently exist in several computerized data bases into one 'user friendly' database in a Pacific location (e.g. SPC), and that protocols governing access to the data base be developed and agreed to by all parties, namely SPC, ACIAR, Griffith University, Queensland Department of Primary Industries and the national Governments and Administrations.
20. That Professor Drew be approached about the need for taxonomic revisions of the *Bactrocera xanthodes*, *B. passiflorae* and *B. musae* complexes.
21. That the fruit fly fauna of Christmas Island and the Phoenix Islands be investigated.

Annex 4**4.0 List of pest fruit flies in Pacific Island countries and territories:**

Bactrocera atramentata

Mango fly (*B. frauenfeldi*)

Bactrocera psidii

Bactrocera atrisetosa

Bactrocera kirki

Bactrocera strigifinis

Bactrocera bryoniae

Bactrocera lineata

Bactrocera trilineola

Melon fly (*B. cucurbitae*)

Bactrocera melanotus

Bactrocera trivialis

Bactrocera curvifera

Bactrocera moluccensis

Queensland fruit fly (*B. tryoni*)

Bactrocera curvipennis

Banana fly (*B. musae*)

Breadfruit fly (*B. umbrosa*)

Pumpkin fly (*B. decipiens*)

Bactrocera neohumeralis

Pacific fruit fly (*B. xanthodes*)

Bactrocera distincta

Bactrocera obliqua

Dacus axanus

Oriental fruit fly (*B. dorsalis*)

Asian papaya fruit fly (*B. papayae*)

Dacus solomonensis

Bactrocera facialis

B. passiflorae

Annex 5

5.0 Distribution and Spread of Selected Pest Species:

PACIFIC FRUIT FLY (*Bactrocera xanthodes* (Broun))

Distribution: Native range: Fiji Islands, Tonga, Niue, Samoa, American Samoa, Wallis and Futuna. Introduced to Southern group of Cook Islands (introduced in the early 1970's), on Nauru (first detected in 1992, but eradicated since early 2000), Raivavae island in French Polynesia (detected in April 1998, but being eradicated by male annihilation).

Economic Importance: It is known to attack at least 34 host plant species in 26 genera and 19 families. Damage assessments have provided data on percent of ripe edible fruits infested by Pacific fruit fly. In Samoa, it infests 4-31% of the "Sunset" variety papayas and 19-37% of the local variety. In American Samoa, it attacks up to 62% of ripe breadfruits. In Nauru, it damaged 12% of ripe breadfruits before its eradication commenced. In Cook Islands, *B. xanthodes* and *B. melanotus* both infest papaya, and losses by both species are 12% during the summer and 1% during the winter.

Bactrocera kirki (Froggatt)

Distribution: Native range: Tonga, American Samoa, Samoa, Niue, Wallis and Futuna, and Fiji Islands (on Rotuma only). Introduced to French Polynesia (detected in 1928), but absent from the Marquesas.

Economic Importance: Its known host range includes 46 host species in 29 genera and 22 families. This species infests 45-99% of guavas in Samoa. In Tonga, 90% of guavas are infested by *B. kirki* and *B. facialis*.

QUEENSLAND FRUIT FLY (*Bactrocera tryoni* (Froggatt))

Distribution: Native to and common in Australia (eastern half of Queensland, eastern New South Wales, extreme east of Victoria). Introduced in New Caledonia around 1969 and French Polynesia around 1970. Now widespread in New Caledonia, French Polynesia and Pitcairn Islands. Introduced but eradicated from Perth (Western Australia) and Easter Island in the mid-Pacific.

Economic Importance: A polyphagous species recorded from more than 113 host plant species in Australia. The most damaging pest fruit fly in Australia.

MELON FLY (*Bactrocera cucurbitae* (Coquillett))

Distribution: Native and widespread in tropical Asia, as far west as Pakistan. It is present and common all over Papua New Guinea (introduced probably around World war II) (but still free from Manus Province) and all Solomon Islands Provinces (first detected in 1984), except Makira, Rennell-Bellona and Temotu. It has been introduced and occurs in Hawaii (detected in 1895), Guam (detected in 1936), Commonwealth of Northern Mariana Islands (detected in 1943, eradicated by sterile insect release in 1963, but reestablished, from neighboring Guam, in 1981), and Nauru (detected in 1982 and eradicated in 1999 by male annihilation and protein bait spraying). It was detected on Christmas Island, in Kiribati, but has apparently been eradicated. It is also present in some parts of Africa (Kenya, Tanzania, Mauritius, Réunion).

Economic Importance: Over 125 species of hosts have been recorded for this species, based on extensive host surveys in Asia and Hawaii. Plants in the family Cucurbitaceae are, however, the usual hosts. In southeast Asia, it has been reared from 42 host species, in 26 genera and 12 families. Nine species of cucurbit hosts have been recorded in the Pacific. Melon fly causes considerable damage to all cucurbit crops everywhere it occurs. In Papua New Guinea, 95% of bitter gourds are infested and destroyed. In Solomon Islands, it attacks over 90% of snake gourds and 60-87% of pumpkins.

ORIENTAL FRUIT FLY (*Bactrocera dorsalis* (Hendel))

Distribution: Native and widespread in tropical Asia (India, Sri Lanka, Burma, China, Taiwan, Thailand, Laos, Vietnam, Cambodia). In the Pacific, it has been introduced in Hawaii (detected in 1946), Guam (detected in 1948, eradicated since 1965), Commonwealth of Northern Mariana Islands (detected in 1936, eradicated since 1965), Nauru (detected in the 1980s, eradicated since 1999), French Polynesia (since July 1996), and Palau (since September 1996).

Economic Importance: A polyphagous species and major pest recorded in Asia from 117 host species, in 76 genera and 37 families. A very damaging pest everywhere it occurs. In Nauru, before its eradication, Oriental fruit fly and mango fly (*B. frauenfeldi*) used to infest 95% of mangos, 90% of guavas and almost 10% of soursop. Since its eradication, damage by mango fly on mango and soursop has been negligible.

MANGO FLY (*Bactrocera frauenfeldi* (Schiner))

Distribution: Widespread and native in Papua New Guinea, Solomon Islands, Palau, Federated States of Micronesia, Marshall Islands, Gilbert Islands of Kiribati and Nauru. It is present and abundant even on remote atolls. Introduced and established into Northern Queensland (Australia) since 1974.

Economic Importance: A polyphagous species recorded from more than 72 host plant species in 45 genera and 29 families. Damage assessments have provided data on percent of ripe edible fruits infested by mango fly larvae. In Federated States of Micronesia: guava (31-91%), tropical almond (69%), Surinam cherry (61%), avocado (57%), Tahitian chestnut (56%), *Syzygium* spp apples (38-51%), breadfruit (37%), soursop (28%), pond apple (26%), tangerine (20%), carambola (18%), mango (8%), orange (4%), and acerola (3.7%). In Papua New Guinea: guava (28-88%), carambola (1-80%), cashew (6-66%), Tahitian chestnut (60%), fallen mango (53%), tropical almond (23%), yellow mangosteen (18%), ripe papaya (15%), and ripe banana (0.5%). In Solomon Islands: guava (30%). In Kiribati, Infestation levels are 70-80% on guava and 90% on Indian jujube in Tarawa. The suspected cause of fruit rot that infects 70-80% of breadfruits in Butaritari atoll could be contributed by mango fly damage on fruit, but has however not been confirmed.

ASIAN PAPAYA FRUIT FLY (*Bactrocera papayae* Drew and Hancock)

Distribution: Native to and widespread in southeast Asia (Thailand, Peninsular Malaysia, East Malaysia, Singapore, Indonesia). It invaded Papua New Guinea from Asia through Irian Jaya in 1992. For a long time, it had been only trapped in the Western and West Sepik Provinces, but was later detected in Port Moresby (May 1998), Morobe Province (September 1998), and the Highlands (Eastern Highlands, Simbu, Western Highlands) (November 1998). It is present in most provinces of Mainland PNG, but not yet in the Island Provinces. It was detected in Cairns (Northern Queensland, Australia) in October 1995, but may have established about two years earlier. It has been eradicated from Queensland by implementing an eradication programme using male annihilation and protein bait spraying, that cost AUD 35 million.

Economic Importance: A polyphagous species and major pest recorded in Asia from 193 host species, in 114 genera and 50 families. There are presently not enough data available to establish a host list for Papua New Guinea. A very damaging pest. It will readily attack most species of edible fruits and fleshy vegetables. No infestations on coffee berries have been observed so far in Papua New Guinea.

Annex 6

6.0 Guam and CNMI Melon Fly Eradication Program

Initial phase planning progress and considerations

In the year 2000, Dr. Andrew McGregor completed a new economic review of the situation under the auspices and support of the RMFFP. This report concluded that earlier cost estimates were inaccurate and grossly overstated. Due to the large numbers of Japanese and other Asian Tourists entering and leaving Guam and Saipan, each year (nearly 2, 000, 000) niche export markets could be developed in certain high quality melons. The Japanese in particular prize such melons and are obligated to return home with these as gifts. Melon fly eradication will be the best first step towards such market development. Currently agriculture administrations in both Guam and the CNMI favour Pursuing melon fly eradication and export market development. Guam's new Acting Director has made this one of his top priority agenda items and has directed entomologist and chief of plant protection and quarantine to form a task force to further investigate the possibilities and requirements and to make recommendations to the Governor for legislative approval, support and funding.

New technology may improve the cost aspects of such a program, Fipronil, insecticide based products, if sufficiently efficient in attracting thus, used in large quantities may allow the eradication of melon fly to be conducted based largely or entirely on the male annihilation techniques. If the sterile insect technique is not needed then cost and other operational requirements would be greatly reduce. However, in the American Territories of Guam and CNMI, US, environmental protection agency approval for use of Fipronil based products in this fashion will be needed. This could be a serious impediment timely implementation of an eradication efforts

Annex 7

7.0 Community Representative on management of training on fruit trees in Vanuatu

Introduction

The suggestion to provide training to the community from the islands in Vanuatu was initiated by Des Park and two visitors from Aniwa Island who are working in Mr. Des Park's orchard to CTA, Mr. Allan Allwood on November 1999. Those small fruit orchards on these Islands could be resurrected to provide incomes and limited employment. The fruit are currently being severely damaged by fruit flies and fruit piercing moth. Discussion was also held with Charles Rogers of the Farm support Association (FSA), non-government Organization (NGO) based in Espritual Santo and the government of Vanuatu. Both were supportive and initiated to collaborate

Training

After the approval of the project, the FSA who is coordinating the project called a meeting involving Fruit Fly project Staff and one Agronomist from the department of Agriculture to prepare the training package. Before the training commence, we haired one local consultant to survey these four islands to find out how many farmers have fruit trees in place. After we received the report, we then commence the training. The actual training started on August 2000 with four participants, 2 from Futuna, and 2 from Anietyum. The training emphasis on disease control, tree management, budding, grafting, baits spraying, bagging and plantation hygiene. The project provides them with pruning, budding and grafting tools and they were told to lend them to other small fruit tree growers and train them to manage their own small orchard. We hold on to bait spraying equipment until the processing unit is complete. The second intake is from Tanna and Aniwa. Aniwa is an island, with there only incomes are citrus fruits and some of them are working with Mr. Des Park. They were all provided with handouts. The coordinator (FSA) plan to make a follow up visit on April this year 2001.

Conclusions

As the southern part of Vanuatu is not growing coconuts and cocoa, this will be one very important source of their income apart from root crops and coffee.

Annex 8

8.0 PALAU – Fruit fly Eradication Program

History and update of PFFEP

In early 1999, our congress wrote A letter to SPC, asking help in controlling our fruit fly problems.

In August, 1999, a feasibility study on eradication of fruit flies attracted methyl Eugenol in Palau report was compiled by Allan Allwood, Dr Jack Armstrong, Konard Engleberger, and Fred Sengebau. AusAID, UNDP, and New Zealand government funded it. Executed by SPC and implemented by FAO

In march 2000, Andrew McGregor completed a economic feasibility study of the eradication of oriental fruit fly and breadfruit fly from the Republic of Palau. It was funded by the regional management of fruit fly in the pacific / SPC

In January – Feb. 2001 with the help of Ms Ema Tora Vueti of RMFFP/SPC, a consultant compiled an addendum to the original 1999 feasibility study for eradication of Oriental Fruit Fly in Palau. In addition the consultant was to update changing cost and new eradication technologies and techniques. The outcome of this consultancy was the development of an implementation plan and schedule for eradication of Oriental fruit fly and funding for this was provided by SPC /PMP/FFM/ RMFFP.

Annex 9

9.0 ACRONYMS AND ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
ACP	Africa, Caribbean and the Pacific
APHIS-PPQ	Animal Plant Health Inspection Service-Plant Protection Quarantine of (USDA)
APPPC	Asia Pacific Plant Protection Commission
AQIS	Australian Quarantine Inspection Service
ASDOA	American Samoa Department of Agriculture
AusAID	Australian Agency for International Development
BioNET	BioNET-INTERNATIONAL
BQA	Bilateral Quarantine Agreement
BTA	Bilateral Trade Agreement
CABI	CAB International
CBD	Convention on Biological Diversity
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CNT	Cook Islands, Niue and Tokelau
COGENT	Coconut Genetic Resources Network
ERP	Emergency Response Plan
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFM	Fruit Fly Management Project
FICs	Forum Island Countries
GMO	Genetically Modified Organism
GPPIS	Global Plant Protection Information Service
HTFA	High Temperature Forced Air (Treatment Facility)
ICPM	Interim Commission for Phytosanitary Measures
IPPC	International Plant Protection Convention
IRA	Import Risk Analysis
ISC	Interim Standards Committee of the ICPM
ISPM	International Standards for Phytosanitary Measures
MAFF	Ministry for Agriculture Fisheries and Forest (Fiji)
NAQIA	National Agriculture Quarantine and Inspection Authority of Papua New Guinea
NARI	National Agricultural Research Institute
NGO	Non-government Organisation
NPPO	National Plant Protection Organisations
NRT	New Revised Test of IPPC
NZ MAF	New Zealand Ministry for Agriculture
NZODA	New Zealand Official Development Assistance
OCT	Overseas Countries and Territories
PAL	Pest Advisory Leaflets
PARTA	Pacific Regional Trade Agreement
PCC	PMP-Project Co-ordinating Committee
PDD	Project Design Document
PEQ	Post Entry Quarantine
PHALPs	Permanent Heads of Agriculture and Livestock Production Services
PICTs	Pacific Island countries and territories
PMP	Pest Management in the Pacific
PPPIS	Pacific Plant Protection Information System
PPPO	Pacific Plant Protection Organisation
PPPS	Pacific Plant Protection Service
PRA	Pest Risk Analysis
PRAs	Participative Rural Appraisals
RGC	Regional Germplasm Centre (SPC)
RMFFP	Regional Management of Fruit Fly in the Pacific
RPPO	Regional Plant Protection Organisation
SPC	Secretariat of the Pacific Community
SPS	Sanitary and Phytosanitary Measures
USDA	United States Department of Agriculture
WTO	World Trade Organization
WTO-SPS	WTO agreement on the application of Sanitary and Phytosanitary Measures

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