

INCEPTION REPORT**PROJECT ON FRUIT FLIES IN THE SOUTH PACIFIC
TCP/RAS/0055****BACKGROUND**

Fresh fruits and vegetables production is seen by South Pacific countries as a means of achieving export earnings, diversifying the agricultural sector and removing the dependence on copra where prices are low and likely to remain so. Attempts to develop such industries have begun in Cook Islands (papaya, mangoes, capsicum), Fiji (papaya, mangoes, eggplant, watermelon and others), Tonga (bananas, capsicum, squash, watermelon) and Western Samoa (bananas, passionfruit). The markets are the Pacific rim countries of Australia, New Zealand, Japan and the United States of America. In terms of international trade the value of these crops is insignificant, but to small economies of the South Pacific they represent substantial contributions.

Industries based on these commodities are ideally suited to Pacific islands. Geographically, the countries are close to major markets where their exports may obtain preferential entry. The commodities are high-value, which means that viable industries can be based on relatively small land areas and they can absorb high labour costs.

An additional advantage of Pacific island countries has always been their relative freedom from major pests. This favourable quarantine status was a factor that countries had hoped to exploit to considerable advantage. However, Pacific island countries have a large fauna of fruit flies. From present knowledge, five species are of economic importance; these species are not found in the importing countries. Post-harvest quarantine treatments were available to adequately deal with these.

Recent developments have, changed this situation and the trade which has been developed, is now jeopardy. The use of ethylene dibromide (EDB), once accepted worldwide as a fumigant to kill immature stages of fruit flies in fruits and vegetables is now under question. Health authorities are concerned that residues may cause cancer and have consequently reduced the allowable levels of EDB to 0.1ppm instead of 50ppm inorganic bromide (USA in 1984; Australia in 1989; and NZ in 1991). Similar questions are being posed about methyl bromide (MB). In some countries, residue limits are not yet enforced but changes are anticipated. Trade based on such uncertainty is unsatisfactory.

The need for new treatments, with the minimal risk of the environment and to human health, is obvious. The most promising is that of high temperature forced air (HTFA), and the current project will initiate a programme to transfer this technology to Pacific island

countries, assist in adapting it to local conditions and provide training for this process. This one-year preparatory phase is in anticipation of a larger, 3 year project to be funded by UNDP and AIDAB.

OBJECTIVE/WORK PLAN

Objective

To assist the Pacific Islands Governments in finding a solution to the problem of fruit fly quarantine treatments.

Work Plan

The following activities will commence within the first 12 months of the project and, dependent upon approval of the second phase of the project, will continue.

1. Provide equipment for trapping, conducting host fruit and vegetable surveys, and processing fruit flies to each country as required by mid-November, 1990.
2. Establish permanent trapping sites in major production areas and in rainforest areas, service traps monthly, and process and identify fruit flies, commencing in mid-November, 1990. To continue for a period of two years with a review option on an annual basis.
3. Conduct broad host fruit and vegetable surveys (wild and commercial) at regular intervals throughout the year, rear fruit flies, and process flies that emerge. To be commenced in mid-November, 1990 and continued on a monthly basis for the period of the project.
4. Process and arrange for the identification of voucher botanical specimens. Done in conjunction with Activity 3.
5. Rear and identify parasites of fruit flies from Activity 3. This Activity is done in conjunction with Activity 3.
6. As part of Activity 3, conduct intensive host surveys of commercial fruits and vegetables to assess damage levels caused by fruit flies. To commence toward the end of November, 1990, after project staff have some experience in host surveys. Sampling to be done every 3 weeks during fruiting season for a period of two years.
7. As an adjunct of Activities 3 and 6, assess the stages of maturity of fruits and vegetables at which fruit fly infestation occurs. As for Activity 6, except that this activity should be completed in one year.
8. Review and report on existing and future quarantine protocols or bilateral quarantine agreements and tailor quality assurance schemes to meet the importing countries requirements. Review and report on

existing protocols/agreements by end of January, 1990. Monitor new agreements as needed.

9. Develop database and input data from Activities 1 and 8. To commence in November, 1990.

10. Arrange for plants protection or quarantine personnel from project countries to attend the International Training Workshop on Fruit Flies in Brisbane, Australia, 5-23 November, 1990. Immediate - October, 1990. A work planning meeting between the Chief Technical Adviser and participants from Cook Islands, Fiji, Tonga and Western Samoa will be held at night while in Brisbane (14-16 November).

11. Convene a project meeting prior to the completion of the first year of the project, involving project staff and counterpart personnel to assess the achievements, to discuss future work, and review and/or endorse the project document. This will be done in June, 1991 as part of the FAO project evaluation.

12. Visit Tonga, Western Samoa and Cook Islands for supervision and training of UNV's and national counterparts. Visits are planned for December 1990. March, August and November, 1991. After 1991, visits to be identified at a later stage.

13. Identify potential sources of cheap protein autolysate, formulate by heating and changing the pH, if necessary, and test the attractancy of the protein in the laboratory and in the field. To commence in December, 1990 and be completed by the end of March, 1991

14. Undertake field experiments on selected fruit and vegetable crops to test the efficacy of protein autolysate + malathion, using the attractancy of the bait to fruit flies and reductions in levels of damage as indicators of efficacy. To commence in April, 1991 and will continue for the period of the project.

15. Introduce bait spraying technology and developments to producers by facilitating demonstrations on a commercial scale in conjunction with plant protection and extension services in each country. To commence in mid to late 1991, and is dependent on results from Activity 14. This activity will continue until the major fruit and vegetable crops are covered.

16. Assess the advantages (if any) of improving crop hygiene as an adjunct to bait spray technology for pre-harvest control. To be done in conjunction with Activities 6,7, and 15. The activity will involve assessments of larval loads in fallen fruits.

17. Establish, where appropriate, laboratory cultures of the following economically important fruit fly species:- *Bactrocera facialis*, *B. kirki*, *B. melanotus*, *B. passiflorae*, *B. xanthodes*. Other species that are identified from Activities 3,6 and 7 may have to be added to the list. Fruit fly from Activity 3 will be used to start cultures. To commence in December, 1990.

18. Determine the duration of the various stages of fruit flies (egg, larval, instars, pupa) at prescribed temperature/relative humidity regimes. To commence in March 1991, dependent on the strength of cultures.

19. Develop temperature/expose time/mortality data for the stage of the major fruit fly species. To commence in late March-early April, 1991.

20. Using an experimental HTFA unit, undertake laboratory testing of post-harvest disinfestation treatments against the major economic fruit fly species that infest exportable produce. This will be undertaken under subcontract. (At this stage, no research on post-harvest disinfestation will be done in Western Samoa as technology developed in other countries will apply to species and commodities in Western Samoa). Subcontract to be awarded via tender to be circulated to groups in Australia, New Zealand and the USA (Hawaii) by end of November, 1990. Disinfestation research to commence not later than end of June 1991, but it is dependent on the strength of cultures and fruit availability. To continue for period of the project.

21. Arrange attachments for up to four weeks per person for at least one plant protection or quarantine staff member from each country to be trained in new post-harvest disinfestation treatments and quality assurance in Fiji. To commence in September, 1991.

22. Demonstrate new post-harvest treatments to growers and marketing associations, in conjunction with national protection, quarantine, and extension staff. To commence after September, 1991.

DISCUSSIONS UNDERTAKEN

FAO Headquarters: 15-21 August, 1991

<u>Personnel</u>	<u>Purpose</u>
Mr. Steve Reynolds (CPO)	Structure of FAO; plant briefing; budget allocation; reporting procedures; contacts in FAO Headquarters.
Dr. Tonie Putter	Project implementation; FAO database; technical advice.
Dr. Schulten Task Force Meeting	Technical project briefing. Project briefing and identification of areas for revision e.g. vehicle.

Directors Briefing	Role of FAO in developing countries.
Mrs Caiola (Personnel)	Briefing on Personnel procedures and entitlements.
Mr. Guidugli (Finance)	Salaries and entitlements
Mr. Cotier	Reporting procedures
Ms Kharas	Training-briefing on study tours and fellowships.
Mr. Piled/Ms. Brini	Purchasing and inventory procedures.
Ms Joan Holloway	TCP briefing and briefing on Task Force meeting. Identified areas of project that need revision e.g. date of commencement and need for vehicle in Fiji.
Mr. Bob Ikin	Quarantine in South Pacific and other areas of the world.

South Pacific

Permanent Secretary/Secretaries Cook Islands, Fiji, Tonga and Western Samoa	By letter, informing them of commencement of project, Terms of Reference and CTAs employment background.
Mr. Parei Joseph, MPI, Cook Islands	Problems with cultures and training.
Mr. Bill Hosking, MPI, Cook Islands	Attendance at International Training Workshop on Fruit Flies, Brisbane.
Dr. S.T. Semisi, Asst. Director (Research), Western Samoa	Project information and International Training Workshop attendance.
Mr. Ofa Fakalata/ Konrad Engelberger Min. Of Agri. & Fisheries Tonga	Project Information, intended visit in December, Attendance at International Training

Workshop.

Dr. Duve (Director of
Research) Mr. Jainendra
Kumar, MPI, Suva.

Briefings on project and
commitment of facilities
and staff at Koronivia
Research Station.
Attendance at
International Training
Workshop.

Mr. Graham Nicholls (AIDAB)

Future support for project
Response was positive
about A.\$127,000 has been
earmarked for second and
third years but is
dependent on budget
allocation.

UNDP Staff:

<ul style="list-style-type: none"> . Mr. Abdul Latif . Ms Pat Duggan 	<p>Project briefing and preparation of draft project document.</p>
<ul style="list-style-type: none"> . Mr. Graham Soper 	<p>Finance and purchasing procedures.</p>
<ul style="list-style-type: none"> . Mr. Joseph Fong 	<p>Personnel procedures</p>
<ul style="list-style-type: none"> . Ms Pat Pratap 	<p>Fruit and Nut Project - Possible relationship with fruit flies.</p>

USAID Staff:

<ul style="list-style-type: none"> . Mr. Eric Witt . Mr. Andrew McGregor 	<p>USAID's approach to commercialization of HTFA post-harvest disinfestation treatment using industry involvement.</p>
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SPC Staff:

<ul style="list-style-type: none"> . Mr. Robert Macfarlane . Mr. Graham Jackson 	<p>Project briefing and draft project document preparation, general advice.</p>
<ul style="list-style-type: none"> . Mr. Peter Walton 	<p>Information systems and library facilities.</p>

Queensland Dept. of Primary
Industries.

International Training
Workshop and involvement
of ACIAR in future
project.

TASKS UNDERTAKEN

1. Draft project document for second phase of project is completed and is with UNDP for comment on format and content. Copy will be sent to CPO, FAO Rome in pouch because it is 20 pages + Annexes
2. Arrangements for participants in International Training Workshop on Fruit Flies, Brisbane, 5-23 November, 1990 are in place. Attendance are Jainendra Kumar (Fiji), Sione Foliaki (Tonga), and Morris Albert Peters (Western Samoa). As the Cook Islands is sending two participants funded by AIDAB, Mr. Bill Hosking and CTA agreed that an extra attendee using FAO funding was not necessary. Any funds remaining in training allocation could be used for other training for Cook Islands staff at a later date. Their training needs will be discussed when Directors of Agriculture are in Suva on 5-8 November.
3. Work planning meeting with national counterparts in Brisbane at night has been planned to ensure input from the Pacific Island countries and to encourage an ownership of the project by them.
4. Laboratory/insectory facilities and national staff to assist with the project in Fiji have been committed by the Director of Research, MPI.
5. Procedures for host fruit surveys and rearing fruit flies and hosts are in draft and will be circulated to each country and discussed. This includes the design of a data recording sheet for trapping data and host fruit surveys.
6. List of equipment to set up training and host fruit surveys kits for each country have been drawn up and ordering/purchasing of components will take place during last week of October.

COMMENTS ON PROJECT

1. With assistance from USDA, Tonga has commenced to establish cultures of *Bactrocera kirki* and *Bactrocera xanthodes* and consequently, have been able to develop disinfestation treatments for capsicums, unfortunately using methyl bromide. It will be necessary to establish cultures of *B. facialis* as this species occurs only in Tonga. This is a good sign that Tonga is committed to the project.
2. Similarly, with assistance from DSIR (NZ), Cook Islands has established cultures of *B. xanthodes* and *B. melanotus*. Though the

cultures were strong (producing 50,000 eggs per week), they have deteriorated recently possibly because the protein food source has been changed or because of pesticide contamination. A contract for post-harvest work in the Cook Islands will be let to either DSIR or NAF (NZ), by the New Zealand Government only after the FAO project is running.

3. There is no official from potential importing countries on the development of post-harvest disinfestation treatments based on the most heat tolerant stage of the problem fruit fly species. The CTA hopes to clarify this issue with New Zealand and Australian quarantine authorities by mid-November. Their reactions to this question will determine the type of laboratory studies and the methods of developing treatment schedules. If the importing countries are not supportive of using the most heat tolerant immature stage for treatment, it will mean that procedures will have to be put in place to test eggs and third instar larvae (at least) for each economically important fruit fly species in a variety of horticultural commodities.

4. There has been a slight delay in implementing some activities of the project, primarily due to preoccupation with the preparation of the draft project document. It was planned to commence collection of biological data on fruit flies (trapping and host surveys) by the end of October. This will now commence in mid-November. The only effect this will have on the progress of the project is to delay slightly the establishment of cultures.

5. Visits to Cook Islands, Tonga and Western Samoa are planned for the first week of December, at which time the three UNV's under UNDP funding will be in place (Fiji's UNV Graham Walker arrived on 23 October) and participants in the International Training Workshop on Fruit Flies will have returned.

6. The CTA's office accommodation at SPC is expected to be available in about two or three weeks. If not, alternative accommodation in another area of SPC will have to be found. Other support (typing, communications, general and technical advice) has been excellent.

7. Field work in Fiji to commence in early November will be hampered considerably if a project vehicle is not available in the next few weeks.

8. Though very little project expenditure has occurred up to now, the purchase of equipment to start the field work in all countries and the planned travel (both local and inter-country) in November and December will account for the funds allocated for 1990. The travel to Cook Islands, Tonga and Western Samoa will cost about F.\$3,000.

A.J. Allwood
Chief Technical Adviser
TCP/RAS/0055

29 October 1990.