



General Emergency Response Plan

for Plant Pest Incursions

Dr Guenther Rapp
Secretariat of the Pacific Community
2001

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Outline

This manual contains a detailed emergency response plan (ERP) for plant pest incursions for use by Pacific Island Countries and Territories (PICTs) as a basis for national emergency response plans and pest-specific ERPs.

The initial SPC draft was significantly improved by the participants at an Emergency Response Meeting in Papua New Guinea, in June 2001, who also developed a national ERP.

The document is in two parts. Part A outlines the management structure and the functions and responsibilities of key players. Part B deals with technical processes. Since every PICT has a different administrative structure, Part A especially needs to be adapted to national needs when PICTs develop their own ERPs.

Both countries and SPC need to up-date this document and any other related plan annually. The document should also be reviewed during and after an incursion.

The manual describes functions with which SPC may be able to assist (and has already assisted) PICTs, such as:

- direct provision of expertise by SPC staff or identification of expertise;
- taxonomic contacts and funding of identifications;
- search for and provision of technical information;
- supplementary funding of operations;
- use of pesticide stockpile on a replacement basis;

In its function as Secretariat to the Pacific Plant Protection Organisation, SPC also has the duty to inform other countries about incursions in the form of PestAlerts.

Apart from preparing and reviewing ERPs, countries need to pay special attention to the following aspects when developing their preparedness for incursions:

- ❑ quarantine laws and regulations have to provide the legal justification for operations;
- ❑ procedures have to be in place that allow the fast allocation of emergency funds from other budgets.

The following papers were used as references:

- Field Instructions for Countries starting a Fruit Fly Quarantine Surveillance Program FAO/AusAID/UNDP/SPC Project RAS/97/331 Regional Management of Fruit Flies in the Pacific, Fiji, 1998, unpubl.
- Ministry of Agriculture, Fisheries, Forests & ALTA, Emergency Response Plan for Fruit Flies, Fiji, 1998, unpubl.
- Guidelines for pest eradication programmes, International Standard for Phytosanitary Measures No. 9, Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome, Italy, 1998.
- Incursion Management in Australian Plant Industries, Report by Plant Industries Sub-Committee, SCARM Task Force on Incursion Management, 1996, Canberra, Australia.
- Plant Protection Manual, Plant Pest Emergency Response Program, Ottawa, Canada, 1991.

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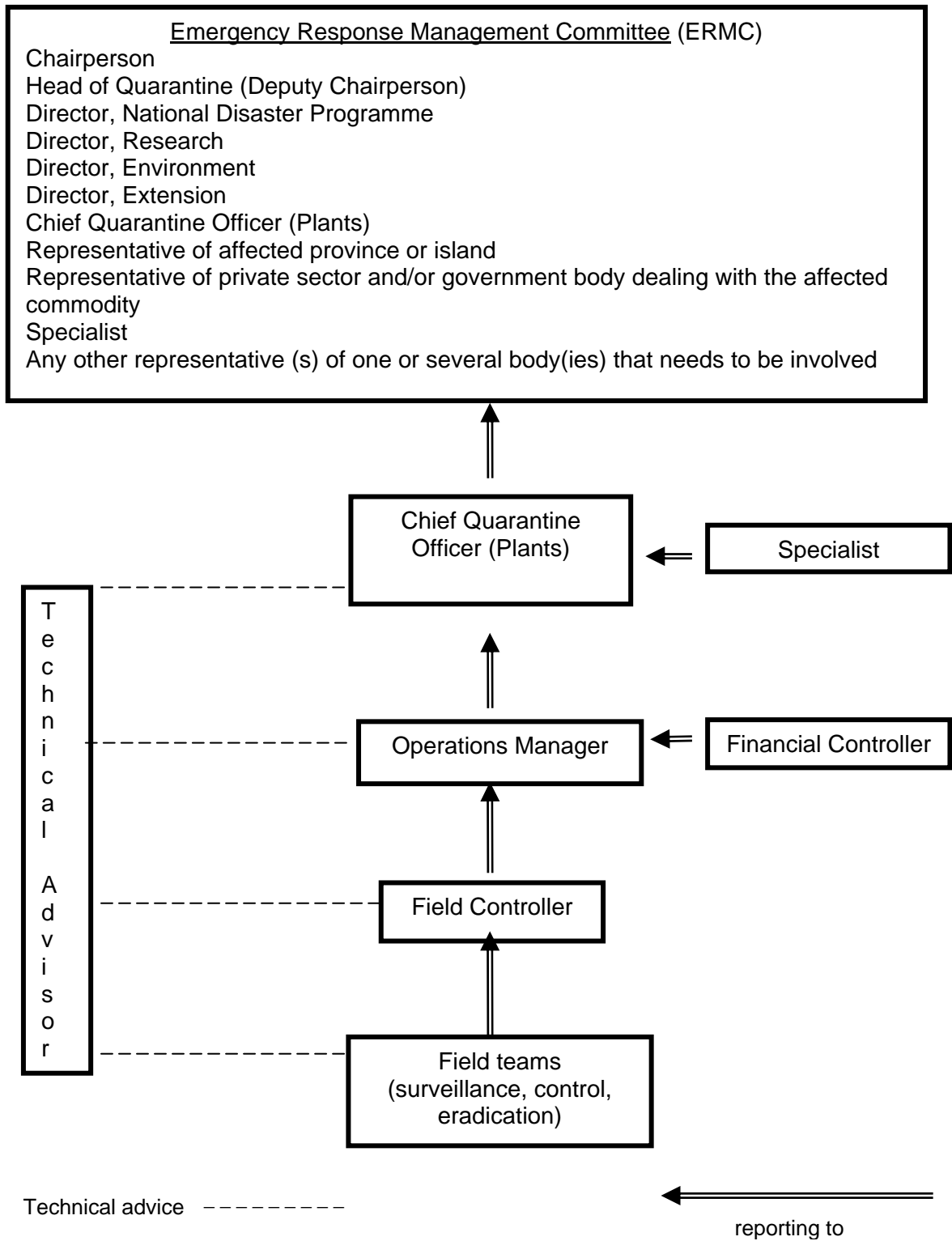
We wish to convey our gratitude to:

- the European Union for the funds that made this publication possible;
- the participants at the Emergency Response Meeting in Papua New Guinea for their contributions;
- Mr. Roy Benyon for editing this document.

PART A: MANAGEMENT ASPECTS

This section explains the management structure, functions and responsibilities.

Figure 1. Management Structure



A 1 Major functions and responsibilities

POSITION	FUNCTIONS AND RESPONSIBILITIES
Chairperson, ERMC.	<ul style="list-style-type: none"> - Puts the Emergency Response Plan into action; - Overall management of the programme.
Emergency Response Management Committee (ERMC).	<ul style="list-style-type: none"> - Discusses recommendations from the Technical Adviser (TA) after delimiting survey and decides on further action; - Appoints Operations Manager and Field Controller; - Quorum (5): Chairperson or Deputy, Chief Quarantine Officer (Plants), representative of affected province or island, representative of private sector and/or government body dealing with the affected commodity, TA.
Head of Quarantine (Deputy Chairperson).	<ul style="list-style-type: none"> - Acts in the absence of the Chairperson; - Commits the resources of the Quarantine Department to the problem.
Director, National Disaster Programme.	<ul style="list-style-type: none"> - Commits the resources of the organisation to the problem.
Chief Quarantine Officer (Plants).	<ul style="list-style-type: none"> - Alerts Chairperson to a suspected pest incursion; - Reports to ERMC during operational phase; - Supervises the Director of operations; - Ensures that all management plans conform to relevant legislation; - Notifies SPC of suspected new pest.
Specialist: -appointed by and reporting to Chief Quarantine Officer (Plants).	<ul style="list-style-type: none"> - Collects samples and organises identification of samples; - Collects information.
Operations Manager: -appointed by ERMC; -located in the area where the new pest is present; -should be in a position of local authority and possess management skills and administrative experience.	<ul style="list-style-type: none"> - Reports to Chief Quarantine Officer (Plants); - Manages day-to-day finances; - Oversees field operations; - Checks resource requirements; - Liaises with provincial authorities; - Selects and appoints the response team(s); - Briefs and trains response team(s) and Field Controller together with Technical Adviser.

<p>Technical Adviser:</p> <ul style="list-style-type: none"> -appointed by Chairperson; -reports to nobody to make sure that advice remains objective; -located as required; -has to be a recognised expert on the particular pest causing the incursion. 	<ul style="list-style-type: none"> - Conducts delimiting survey; -Submits report including response options, recommendations and tentative budgets to ERMC; - Briefs and trains response team(s) and Field Controller together with Operations Manager; -Provides technical advice to Chairperson, Chief Quarantine Officer (Plants), ERMC, Operations Manager, Field Controller, operational teams; - Periodically monitors operations.
<p>Financial Controller:</p> <ul style="list-style-type: none"> -nominated by Head of Quarantine; -reports to Operations Manager. 	<ul style="list-style-type: none"> - Responsible for administration and finance.
<p>Field Controller:</p> <ul style="list-style-type: none"> -appointed by ERMC; -located on site full time; -reports to Operations Manager; -should possess agricultural background and management skills. 	<ul style="list-style-type: none"> - Logistics; - Day-to-day control of field operations; - Liases with district staff and stakeholders.
<p>Field Teams:</p> <ul style="list-style-type: none"> -appointed by Operations Manager; -report to Field Controller. 	<ul style="list-style-type: none"> - Practical activities.

PART B: TECHNICAL PROCESS

This section specifies the actions to follow. Figures 2a and 2b show the flow of these actions.

Figure 2a: Initial Emergency Response

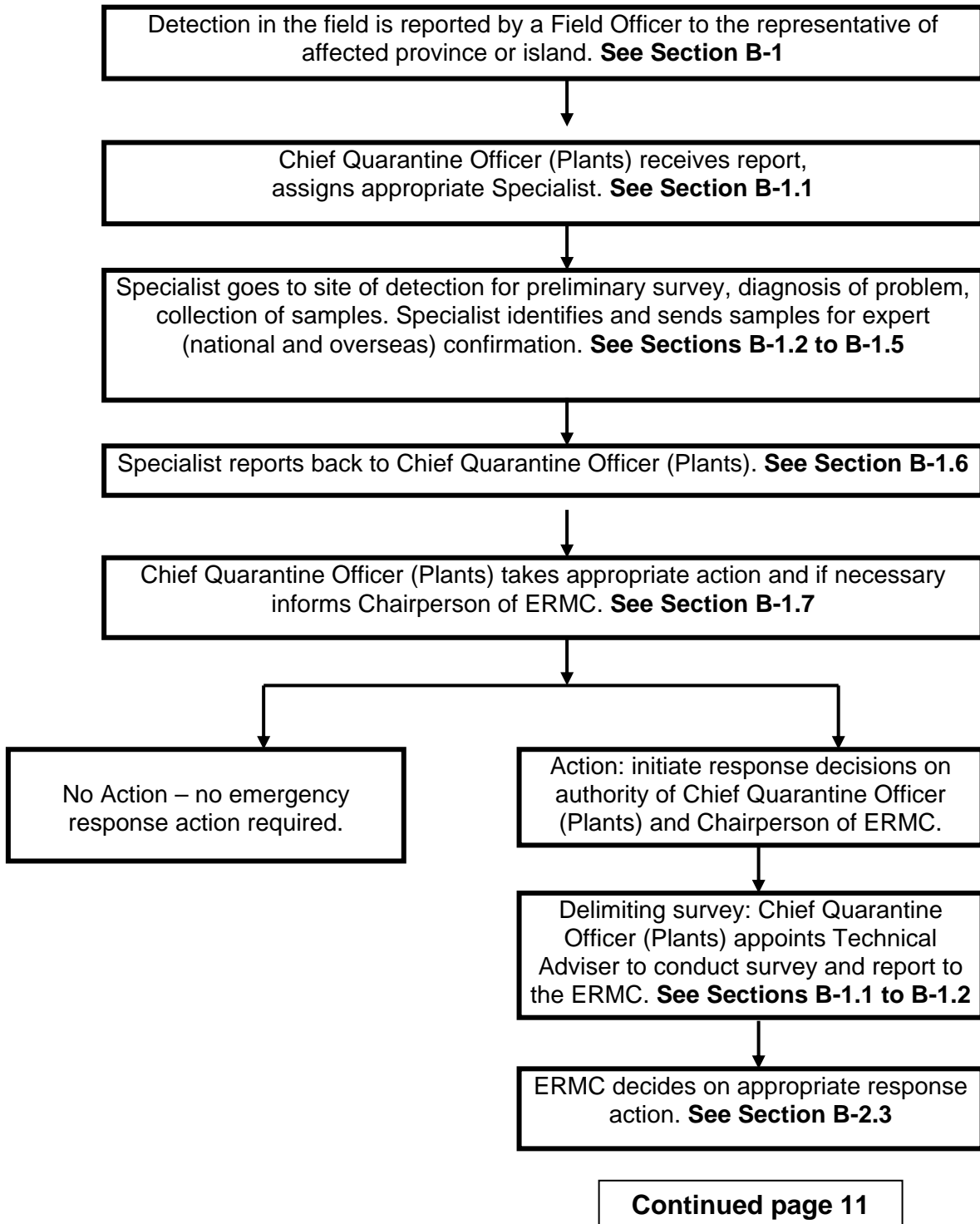
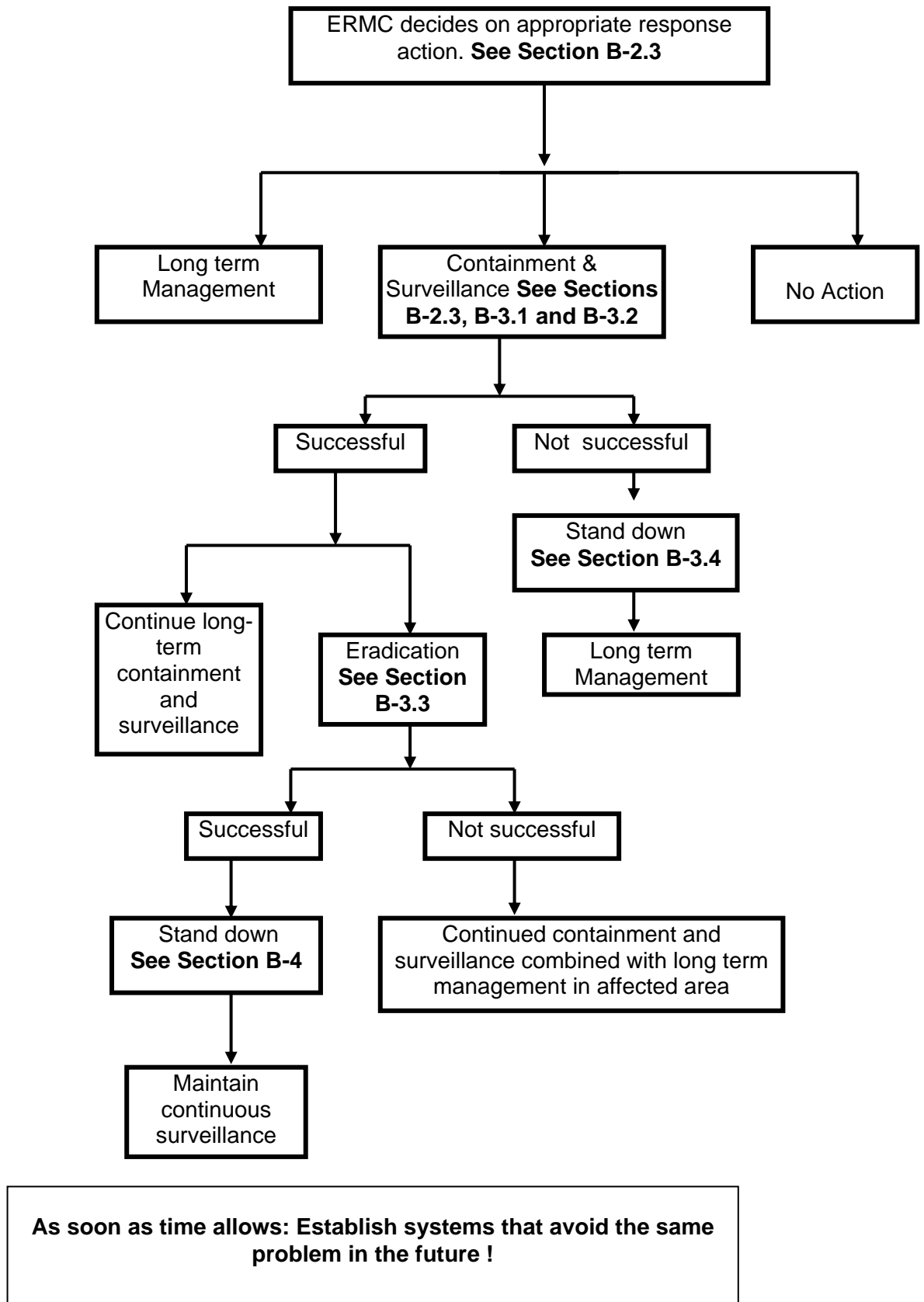


Figure 2b: Emergency Response Action.



B 1 Detection and Identification

The first step in managing a possible incursion is to know exactly what pest is concerned. This includes having the pest identified by a reliable institution, collecting information on the pest and then deciding if further action is necessary or not. Since these identifications are usually done overseas and can take time, every effort should be made to arrange for the shipment of a sample as fast as possible.

B 1.1 Detection

Anybody who finds a possible new pest or receives information about a possible new pest should inform the Field Officer of the local extension service in the area, who would then report it immediately to the representative of the affected province or island. The representative immediately informs the Chief Quarantine Officer (Plants). The Chief Quarantine Officer (Plants) immediately appoints a Specialist to travel to the site and investigate further.

B 1.2 Information from the detection site

The Specialist immediately contacts the Field Officer and then the person who first reported the detection of the pest in the area.

The Specialist asks:

- what the pest looks like,
- what damage or symptoms it causes,
- on what crop(s) the pest is found,
- the size of the infested area,
- how the pest may have reached the area,
- when and where it was first noticed.

This information should indicate what type of pest is responsible for the reported problem (e.g. insect, fungus, virus or weed) and the probable origin of the pest.

B 1.3 Collection of samples

The Specialist and the Field Officer immediately collect samples from the detection site. Whether the pest is an insect, fungus, virus or weed, samples must be handled safely to avoid accidental introduction into other endangered areas. Detailed instructions for sampling and handling are given in Annexes 1–3. Where possible, photographs of pest and damage caused should be taken and immediately developed.

B 1.4 Identification

The initial identification is done by the Specialist. The Specialist may refer samples to a recognised national or international institute for confirmation because the result may have to withstand scientific or legal challenge. Contact details are listed in Annex 4. SPC can be contacted to assist with finding an appropriate specialist or institution and to cover identification charges.

B 1.5 Handling and dispatching samples

The Specialist:

- contacts the identifying institution immediately by the fastest means of communication;
- seeks advice on import permits, packaging, shipping and any other requirements additional to Annexes 1–3;
- clarifies the mode of payment for identification charges;
- forwards his/her phone and fax numbers and email address to the institution;
- asks to be informed when the specimen arrives;
- asks the institution to fax the result of the identification, specifying if this identification would be a new record for a country, information on the pest's distribution in the region, ecology and control, and to send a hard copy of the fax by airmail.

The Specialist immediately makes arrangements to obtain an import permit if required and to obtain a phytosanitary certificate and/or export permit from the national quarantine service.

The Specialist immediately prepares the specimen(s) in accordance with the requirements of the identifying institution and the guidelines in Annexes 1 - 3.

Unless covered by SPC, the costs of identification and shipping charges are covered by the Specialist's employer. The Specialist needs to inform the finance officer of this institution accordingly.

The Specialist sends the sample by courier service to save time. In the Pacific, 'EMS' is the fastest courier service (e.g. one week from Fiji to England). If EMS is not available, DHL should be the next choice; if DHL is not an option, express airmail should be used. The Specialist explains the urgency and importance of this shipment to the courier service. The Specialist informs the identifying institution that the sample is on its way and forwards the details of shipping arrangements. The Specialist directs all invoices to the finance officer.

B 1.6 Preliminary information on the pest

It will take at least three weeks to receive the result of an expert identification. At this stage, then, the identity of the pest has not been confirmed. Nevertheless, the Specialist should start collecting preliminary information to save time. The Specialist contacts appropriate national, regional or international experts including SPC (Annexes 4 and 6) and the plant protection and/or quarantine department in the suspected country of origin (Annex 7).

The Specialist seeks information on:

- control measures;

- ecology, with emphasis on:
 - speed of dispersal,
 - mode of dispersal (does it fly, walk, is it carried by the wind?),
 - number of known hosts.

- financial and social impact,
- cost of export treatments,
- implications for trade,
- extent of government expenditure for research, extension or quarantine work on this pest,
- time spent by public and private sector in dealing with this pest,
- experience of earlier attempts to contain or eradicate,
- surveillance, containment and eradication manuals.

and asks for:

- a search of CAB abstracts of relevant publications,
- a picture of pest and damage unless already available.

While contacted institutions follow up on the Specialist's request, the Specialist arranges to obtain the latest versions of the national pest list and of the national exotic pest list. Once the result of the identification is available, the national pest list will be needed to see if the pest has been recorded before. The exotic pest list will be needed to see if the pest is classified as a quarantine pest.

The Specialist will pursue all avenues to access information. This includes searching the Internet. Good search engines are <http://www.google.com>, <http://www.altavista.com>, and <http://infoseek.go.com>. If Internet access is a problem, SPC can run a websearch for the Specialist.

In 2001, SPC distributed the CABI Crop Protection Compendium on CD with information on thousands of pests. The Specialist can contact SPC to identify the person or department in the country concerned who holds this document and request them to do a search. If a local search is not possible, SPC's information officer can access the CD on behalf of the Specialist.

Once the pest identification is confirmed, the Specialist prepares an information file on the pest. If the result of the identification is different from the initially suspected pest, the Specialist has to repeat the information gathering process.

The file contains:

- the result of the identification,
- picture(s) of pest and its damage,
- date and details of first report,
- size of the infested area,
- affected crop(s),
- if possible, an indication as to how the pest may have reached the area,
- if possible, an indication as to its origin,
- potential costs in terms of:
 - financial losses,
 - social damage to community,
- expected amount of government expenditure for research, extension and quarantine work,
- expected time spent by public and private sector ,
- expected cost of export treatments,
- known control measures ,
- experience of earlier attempts to contain or eradicate the pest in other countries,
- information on:
 - speed of its dispersal,
 - mode of dispersal,
 - number of hosts,
 - regional distribution,

- relevant copies of information obtained,
- list of key publications on the pest that may be required in the future.

The file should contain all the relevant information but should be written in brief and understandable wording without much time spent on formatting, layout and other cosmetic improvements that take time.

The Specialist submits the file to the Chief Quarantine Officer (Plants) via the fastest mode of communication. The Chief Quarantine Officer (Plants) decides if further action is required; if so, he/she contacts the Chairperson, ERMIC and forwards the dossier.

B 1.7 Initial response decisions

The final decision on further action lies with the ERMIC Chairperson.

If the organism is not likely to cause any yield or financial loss and is not included in a national exotic pest list, no further action is necessary.

If the organism is likely to cause yield or cash losses, the Chairperson appoints a Technical Adviser to conduct the delimiting survey and mobilises the necessary funds. (please note that also the Specialist could fulfil this function if sufficiently qualified). The Chief Quarantine Officer (Plants) establishes quarantine restrictions if required.

The Technical Adviser immediately starts to organise a delimiting survey.

Based on the experience gained, the Chief Quarantine Officer (Plants) improves this section of the Emergency Response Plan.

B 2 Delimiting survey

Objectives:

- Establish the borders of the area that is infested with the pest,
- Gather information for deciding what actions should follow.

B 2.1 Organisation of the survey

The Technical Adviser, with the assistance of the Specialist, develops the methods to be used in the survey within 48 hours of being appointed.

The delimiting survey is carried out by a survey team composed of the Technical Adviser, the Specialist, a capable extension officer who knows the affected area and the Field Officer who reported the incident in the first place.

The Technical Adviser writes the survey plan and necessary budget, giving consideration to costs for:

- Personnel requirements,
- Wages, overtime payments, lunch allowances,
- Accommodation and per diem,
- Transport,
- Material needed.

The Technical Adviser, Chief Quarantine Officer (Plants) and the Chairperson discuss the methods and budget involved.

The Chairperson authorises the release of funds to the Technical Adviser. If local funds are not sufficient, the Chairperson can contact SPC and other potential donor agencies that may have funds available.

The Chief Quarantine Officer (Plants) contacts the representative of the affected province or island and the Director, Extension, asks them to support the survey and to release a capable extension officer and requests that the Field Officer who reported the incident in the first place be part of the survey team.

The Specialist supplies the extension officer and the Field Officer with his file of relevant information, including pictures of the pest.

Extension staff or the representative of the affected province or island contact the local authorities (District Officer, village chief etc.) to advise that a Survey Team will arrive.

The Technical Adviser ensures that all items required for the survey are available, such as:

- emergency response plan, including current quarantine law;
- a map of the area (unless already provided by local extension service);
- notebooks, pens, markers;
- equipment to examine hosts for symptoms of the pest (e.g. pocket knife, spade, hand lens, specimen bottles, plastic bags in various sizes, 70% alcohol solution, torch, gloves, camera);
- first aid kit;
- bag to carry the equipment.

Together with the representative of the affected province or island and/or local extension staff, the Technical Adviser is responsible for logistics such as:

- pick-ups from airport,
- local transport,
- accommodation,
- recording names, titles, telephone and fax numbers of local contacts.

B 2.2 The survey

The survey starts from the area where the incursion was reported. Actions included are to:

- establish exactly how and when the pest reached the area;
- monitor the speed of the pest's dispersal;
- map boundaries and estimate size of both the infested area and of the endangered area to which where the pest could spread;
- assess the area that is currently cultivated with host plants within these sites;
- use Annex 5 to assess the financial loss and social damage caused by the pest in the infested area;
- use Annex 5 to assess the possible financial loss and social damage caused by the pest if it spread to the whole endangered area;
- identify plants, plant products, or other articles whose movement out of the infested area would need to be regulated in the containment of the pest;
- identify the owners of these plants, plant products, or other articles;
- identify how these plants, plant products, or other articles could spread further e.g. wind, human transport (boats, aircraft, public and private vehicles);
- assess the possibility of stopping the pest from spreading further;
- assess the feasibility, costs and possible problems of containing, eradicating and managing the pest;
- identify how and where infested plants and/or products could be treated or disposed of;
- take pictures of pest, symptoms, affected plants and areas;
- inform local authorities, extension officers and producers of host crops about the pest;
- recommend local staff who would need to be part of further actions.

The Technical Adviser is responsible for paying all expenses and collecting all receipts.

Within 3 days after return and in consultation with the other team members, the Technical Adviser completes a survey report with the addresses of all stakeholders as an annex and distributes it to both the survey team and the ERM members. The survey report includes response options, recommendations and tentative budgets.

Response options:

- a) If the organism is not likely to cause any significant yield or financial loss, no further action is necessary.
- b) If the organism will cause yield or financial loss, but cannot be contained, the pest is established. A long-term management approach is required. The plant protection department needs to consider the new pest in future pest management operations. The quarantine department may need to consider treatment of exports against the pest.
- c) If the organism will cause yield or financial loss and can be contained, there are two short-term management options for further action:
 - i) if the pest cannot be eradicated in the infested area: containment within the infested area and surveillance in endangered areas;
 - ii) if the pest could be eradicated in the infested area: containment in the infested area and surveillance in endangered areas, followed by eradication in the infested area if the first step was successful.

If the Technical Adviser recommends either of the options under c), the Technical Adviser has to consider that:

- regardless of the type of further action, its costs have to be lower than the costs that arise after the pest has spread to endangered areas;
- the proposed activities are feasible.

The Technical Adviser also develops a draft action plan and budget. Specifics to consider when organising containment, eradication and surveillance are in sections 3.1.1, 3.2.1 and 3.3.1 of this manual.

The Chairperson calls an ERMC meeting to discuss the Technical Adviser's report for the fifth day after the Technical Adviser's return.

The ERMC members have to read the Technical Adviser's report on the fourth day after the Technical Adviser's return.

The Technical Adviser submits all receipts and leftover funds to the Chairperson.

B 2.3 Response decisions to be made at ERMC meeting

The ERMC decides on further action. If the meeting favours containment and surveillance followed by possible eradication the following actions should take place:

- ❑ The meeting appoints an Operations Manager and a Field Controller. The Head of Quarantine nominates a Financial Controller. Part A outlines their duties and responsibilities.
- ❑ The Head of Quarantine may need to invoke appropriate provisions of the quarantine law as legal justification for future action. If the quarantine law does not provide this justification, or if emergency regulations cannot be put in place, there is no point starting a containment or eradication operation. If a specific emergency regulation needs to be put into place, then the Head of Quarantine needs to arrange for that and can use Annex 8 as a guide.
- ❑ The meeting needs to clarify if, under what conditions and how much compensation is to be paid. As alternatives to compensation, the meeting can consider food support or the promotion of non-host crops.
- ❑ The Technical Adviser develops the final action plan and budget in consultation with the Operations Manager, Financial Controller and Chief Quarantine Officer (Plants) for approval by the Chairperson. Specifics to consider when

implementing containment, surveillance and eradication are in sections 3.1.2, 3.2.2 and 3.3.2 of this manual.

- ❑ The Financial Controller checks if the required funds are available from local resources and informs the Chairperson accordingly. The Chairperson arranges for these funds to be made available. If local funds are not sufficient, the Chairperson can contact SPC and other potential donor agencies that may have funds available.
- ❑ If necessary, the Chairperson requests the allocation of personnel from national institutions such as police, army, public works and NGOs. The inclusion of army and police personnel is important when operations require the quick mobilisation of large numbers of people. Assistance by public works becomes important when machinery is needed.
- ❑ The Chairperson ensures that the required regulations, funds and human resources are in place for as long as the operations run.
- ❑ The Chairperson informs all stakeholders and sets a date for the start of the operation as soon as possible.

B 2.4 Notifications

The Chairperson immediately briefs senior agricultural officials on further action to take.

Within one week, the Chief Quarantine Officer (Plants) needs to alert growers, traders, trading partners and other stakeholders about the new pest.

To fulfil the requirements of National Plant Protection Organisations under the International Plant Protection Convention (New Revised Text: Article VII 2j, Article VIII 1a and 1c), the Chief Quarantine Officer (Plants) needs to inform SPC's Plant Protection Adviser as Secretary of the Pacific Plant Protection Organisation about the incursion and any further action, preferably within the same week (address under Annex 7). SPC will then compile information about the pest, its spread and the

measures taken in co-operation with the Chief Quarantine Officer (Plants) and distribute the information to other stakeholders in the region in the form of a PestAlert.

Contents of PestAlert:

- Name of new pest in title;
- Where did it happen and when?
- Pest was identified by who?
- Characteristics of the pest;
- Quarantine importance of this pest to other countries;
- Measures taken by affected country;
- Contact of the officer dealing with the incursion in affected country and at SPC.

Previous PestAlerts are available from SPC's Information Section as guides.

B 3. Containment – Surveillance – Eradication

B 3.1 Containment

Objective: To have operations in place that prevent the pest from reaching endangered areas.

Parallel to the containment operation, a surveillance system needs to be established in endangered areas (see Section 3.2).

Containment may be a temporary initial response. It will only be a permanent long-term response where the pest can be contained within a defined geographical area, but cannot be eradicated.

B 3.1.1 Preparation

The Technical Adviser, with assistance from the Chief Quarantine Officer (Plants) investigates legal provisions for any future action. If the quarantine law does not provide this basis, or if emergency regulations cannot be put in place, there is no point starting the operation.

The Technical Adviser determines the best technical options to inspect, treat or destroy infested products.

Options may include:

- trapping, lures or other physical control methods,
- host destruction – possibly by burning,
- disinfestation of equipment and facilities,
- chemical or biological pesticide treatment.

The representative of the affected province or island devises appropriate public awareness measures in consultation with the Technical Adviser. This includes provision of information on pests and on legal aspects of the Containment Plan.

The Technical Adviser develops the initial draft action plan and budget. After approval by ERMC, the Technical Adviser finalises the action plan and budget in consultation with the Operations Manager, Financial Controller and Chief Quarantine Officer (Plants) for approval by the Chairperson.

The Containment Plan addresses the following points:

- Specification of plants, plant products, or other articles that could be hosts or carry the pest.
- Definition of the infested area.

- Measures that achieve co-operation from owners of possibly infested plants, plant products or other articles in the infested area, growers associations, traders, local extension officers and authorities.
- Specific awareness measures (radio broadcasts, posters, signboards, leaflets, public meetings) to inform the public about the pest and the operation.
- Marking of small infested areas with quarantine tape, posts, paint etc.
- Procedures to trace, check and if necessary treat or destroy host materials that may have been removed from the infested area.
- Measures to stop all operations that are likely to assist the pest in reaching an endangered area.
- Establishment of inspection points (e.g. harbour, airport, crossroads) to prevent the uncontrolled movement of plants, plant products, or other articles out of the infested area.
- Type of inspections to be done.
- List of required inspection and treatment equipment (preferably locally available). Stockpiles of pesticides for treatments that can be used and replaced may be available with SPC or other organisations. Consideration should be given at an early stage to the registration of any pesticides that are not already registered.
- Procedures for the release of plants, plant products, or other articles from the quarantine area after clearance by appointed officers.
- Action if suspicious specimen are found. Options are cleaning, treatment or destruction, followed by immediate notification of the Operations Manager.
- Suspicious specimens have to be killed immediately but preserved and identified by a local specialist (probably the Specialist or Technical Adviser) whose contact details have to be included in the plan.
- Establishment of an operational control centre.
- Maintenance and processing of work sheets and assignment of responsibility for this task because trading partners will request information to support claims of pest freedom.
- Starting date for monthly reviews of the operation.

The Containment Plan should have the dossier on the pest, the delimiting survey report and the relevant part of a legal provision attached.

Budget

Points to consider in the budget are, broadly speaking, expenses for human resources, transport, material and awareness measures; in more detail, these are:

Human resources Salaries and wages
Overtime payments
Lunch allowances
Costs of accommodation and per diems
Hiring of labour

Transport Air or boat fares
Hire of transport to move staff, plants and plant material
Fuel, spare parts

Material Posts, paint, quarantine tape to mark borders of infested area
Inspection equipment
Equipment and material like pesticides or kerosene that are needed to treat, remove or destroy infested plants or plant material
Safety equipment (helmets, raincoats, gloves...) and first aid kit
Identification badges
Stationery

Public Awareness Signboards: design costs, number of boards

Radio programme

Posters: design costs, number of posters, with or without lamination

Leaflets: design costs, number of leaflets

Cost of meetings in affected areas

Compensation Appropriate compensation payments for destroyed crops or crop products

B 3.1.2 Implementation

After consultation with Chief Quarantine Officer (Plants), the Operations Manager and the Technical Adviser, the Chairperson briefs the media on the operation. The brief should include:

- Objective of the operation;
- Benefits in terms of crops saved versus cost and disruption to affected farmers and general public;
- Estimated chances of success versus chances of failure.

The representative of the affected province or island and the extension officers discuss the further action with the local authorities and implement public awareness measures in consultation with the Head of Extension.

The Chief Quarantine Officer (Plants):

- provides weekly reports to the ERMIC and answers queries;
- supplies the Containment Team with proof of their appointment and identification badges;
- supplies the Operations Manager and the Field Controller with one radio each to speed up communications.

The Operations Manager:

- reports to the Chief Quarantine Officer (Plants);
- is responsible for the overall implementation of containment measures;
- provides weekly reports to the Chief Quarantine Officer (Plants) and Technical Adviser;
- contacts the Chief Quarantine Officer (Plants) or Technical Adviser at any time to seek advice;
- establishes an operational control centre with phone, fax, possibly e-mail, stable electricity supply, computer, printer, possibly photocopier, sufficient inspection, treatment and compensation forms (Annex 9), office supplies (telephone book, calculator, calendar, paper, files, envelopes, stapler, hole-puncher, pens);
- is responsible for the purchase of all required equipment;
- ensures that equipment is available when and where needed;
- maintains an inventory of issued equipment;
- organises transport and accommodation;
- selects and appoints a Containment Team of qualified officers, including staff allocated from other institutions or departments, with the power to stop the movement of and to treat or destroy host plants, plant products, or other material. Names of team members must be provided to the Chief Quarantine Officer (Plants), who will gazette them as Plant Inspectors for the duration of the operation;
- together with the Technical Adviser, briefs and trains the Containment Team and the Field Controller on their tasks and targets and gives clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities;
- supplies the Containment Team with:
 - Containment Plan including attachments,
 - material to mark the borders of the infested area,
 - inspection equipment,
 - Inspection, Treatment and Compensation Forms,

- material to treat and/or destroy infested plants or plant material,
 - safety equipment and first aid kit,
 - data sheets, notebooks, pens, markers.
- decides on improvements to the operation that are suggested by the Technical Adviser or Field Controller;
 - manages operational funds on a day-to-day basis;
 - reports expenses to the Financial Controller every week;
 - requests new funds from the Financial Controller every week;
 - decides on compensation payments according to regulations;
 - issues compensation payments.

The Field Controller:

- reports to the Operations Manager;
- is responsible for day-to-day implementation of the operation;
- organises the establishment and manning of checkpoints;
- ensures that:
 - appropriate procedures are followed,
 - infested products are disposed off or treated in the most appropriate way,
 - treatments are applied correctly.
- if necessary, employs casual labour, writes contracts, keeps records of all casual labour employed and submits paysheets to the Operations Manager;
- forwards resource requirements to the Operations Manager;
- provides weekly summary reports to the Operations Manager with the record sheets and compensation claims attached;
- decides on improvements to the operation suggested by the Containment Team;
- suggests improvements to the Operations Manager and Technical Adviser.

The Financial Controller:

- reports to the Operations Manager;
- is in charge of administration and finance;
- establishes procedures that allow fast processing of payments;
- compiles weekly expenses reported by the Operations Manager;
- mobilises new funds requested by the Operations Manager every week.

The Containment Team:

- reports to the Field Controller;
- traces, checks, treats and if necessary destroys host materials removed from the infested area following the procedures outlined in the Containment Plan;
- issues inspection, treatment and compensation forms;
- keeps records of inspected, treated, destroyed or released plants or plant material;
- forwards resource requirements to the Field Controller;
- provides weekly summary reports to the Field Controller with the record sheets and compensation claims attached;
- suggests improvements to Field Controller and Technical Adviser.

The Technical Adviser:

- together with the Operations Manager, briefs and trains the Containment Team and the Field Controller for their tasks and targets and gives clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities.

- periodically monitors the operation to assess progress;
- suggests improvements to the Operations Manager;
- sources additional technical information for the Field Controller if required.

B 3.1.3 Monthly Review

The Chief Quarantine Officer (Plants), Financial Controller, Technical Adviser, Operations Manager and Field Controller meet on the set date to discuss progress and further action and set a date for the next review.

Options for further action are:

- to stop the operation because the pest cannot be contained and to decide if the surveillance should continue or not. Section 4 of this manual outlines points for consideration when activities are stopped. Arrangements for long-term management of the pest should be incorporated into the activities of the plant protection and quarantine service, the relevant extension service and other relevant bodies (e.g. research institutes);
- to continue the operation but make changes since progress is not as good as expected and discuss the effect of the changes during the next review;
- to continue the operation because of good progress and to set a date for the next review;
- to proceed to the eradication phase.

The Chief Quarantine Officer (Plants) advises the Chairperson of the outcome of the review. If the Chairperson deems it necessary he/she may call an ERM meeting to discuss the outcome.

The final decision on further action is made by the Chairperson with advice from this review team.

Based on the experience gained, the Chief Quarantine Officer (Plants) improves this section of the Emergency Response Plan.

B 3.2 Surveillance

Objective: Collect and record data on the presence or absence of the pest.

There are two types of surveillance:

1. Surveillance in the endangered area(s) as part of a containment operation to verify the absence of the pest;
2. Surveillance in the affected area as part of an eradication to assess the effect of the operation.

In the first case, the Chief Quarantine Officer (Plants) appoints a Nominee who will be responsible for the implementation of regular surveillance measures, since these measures may be conducted in the whole country.

In the second case, the Operations Manager will be responsible since he/she is based near the affected area.

B 3.2.1 Preparation

The Technical Adviser determines the best technical options for conducting surveillance.

The Technical Adviser develops the initial draft action plan and budget.

After approval by ERMIC, the Technical Adviser finalises the action plan and budget for approval by the Chairperson and, in consultation with the Financial Controller, Chief Quarantine Officer (Plants), Nominee for surveillance and Operations Manager (in case of eradication).

The Surveillance Plan should include the following (see example in Annex 10):

- specification of plants, plant products, or other articles that could be hosts or carry the pest;
- list of surveillance sites selected on the advice of the Technical Adviser;
- measures that achieve co-operation from owners of possibly infested plants, plant products or other articles in the infested area, growers' associations, traders, local extension officers and authorities;
- limited awareness measures (radio broadcasts, posters, sign boards, leaflets, public meetings) to inform the public about the pest and the operation;
- surveillance measures needed – trapping, collection of host plants, plant products, or other articles;
- instructions on how to:
 - set traps, collect and examine host plants or plant parts,
 - record data,
 - treat or destroy infested host plants or plant parts.
- state who would do the actual surveillance;
- specify who would be responsible for the maintenance and processing of data sheets because trading partners will request information to support claims of pest freedom;
- list of required surveillance and treatment equipment (preferably locally available); stockpiles of pesticides that can be used and replaced may be available with SPC or other organisations. Consideration should be given at an early stage to the registration of any pesticides that are not already registered;
- state that suspected specimens have to be collected and preserved as in Annexes 1-3 for identification by a local specialist (probably the Specialist or Technical Adviser) whose contact details have to be included in the plan;
- define further action if suspicious specimens are found. Options are cleaning, treatment or destruction, followed by immediate notification of the Operations Manager (eradication) or the Nominee (containment);
- establish a surveillance schedule with frequency depending on life cycle of the pest;

- ❑ contain a list of local traders (i.e. those dealing with the affected commodity) who may observe unusual damage by the pest and who should be contacted once a month;
- ❑ starting date for monthly reviews of the operation.

The surveillance plan should have the file on the pest and the relevant part of a legal provision attached.

Budget

Points to consider in the budget are, broadly speaking, expenses for human resources, transport, material and awareness measures or, in more detail:

<u>Human resources</u>	Salaries and wages Overtime payments Lunch allowances Costs of accommodation and per diem
<u>Transport</u>	Air or boat fares Hire of transport to move staff and/or plants or plant material Fuel, spare parts
<u>Material</u>	Inspection equipment Limited equipment to treat or destroy infested plants or plant material First aid kit Identification badges Stationery
<u>Public Awareness</u>	Radio programme Leaflets - design costs, number of leaflets
<u>Compensation</u>	Appropriate compensation for plants or plant parts that are destroyed

B 3.2.2 Implementation

The Chief Quarantine Officer (Plants):

- provides weekly reports to the ERM and answers queries;
- supplies the Containment Team with proof of their appointment and identification badges;

The Nominee / Operations Manager:

- reports to the Chief Quarantine Officer (Plants);
- implements regular surveillance measures;
- provides weekly reports to the Chief Quarantine Officer (Plants) and Technical Adviser;
- contacts the Chief Quarantine Officer (Plants) and/or Technical Adviser at any time to seek advice;
- is responsible for the purchase of all the required equipment;
- ensures that equipment is available when and where needed;
- maintains an inventory of issued equipment;
- organises transport and accommodation;
- selects and appoints a surveillance team of qualified officers. Names of team members must be provided to the Chief Quarantine Officer (Plants), who will gazette them as Plant Inspectors for the duration of the operation.
- together with the Technical Adviser, briefs and trains the surveillance team for their tasks and targets with clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities;
- supplies the surveillance team with:
 - surveillance plan and attachments,
 - surveillance equipment,
 - inspection, treatment and compensation forms (model in Annex 9),
 - limited material to treat and/or destroy infested plants or plant material,

- safety equipment and first aid kit,
- datasheets, notebooks, pens, markers.
- decides on improvements to the operation that are suggested by the Technical Adviser or Field Controller;
- manages operational funds on a day-to-day basis;
- reports expenses to the Financial Controller every week;
- requests new funds from the Financial Controller every week;
- decides on compensation payments according to regulations;
- issues compensation payments;
- once a month, contacts local traders (i.e. those dealing with the affected commodity) who may observe unusual damage by the pest.

The Nominee / Field Controller:

- organises surveillance schedules;
- is responsible for day to day implementation of the operation;
- ensures that:
 - appropriate procedures are followed,
 - infested products are disposed off or treated in the most appropriate way,
 - treatments are applied correctly.
- decides on improvements to the operation suggested by the surveillance team.
- suggests improvements to the Operations Manager and Technical Adviser.
- the Nominee would report to the Chief Quarantine Officer (Plants). The Field Controller would report to the Operations Manager;
- the Field Controller would forward resource requirements to the Operations Manager. The Nominee would deal with resource requirements himself/herself;
- the Field Controller would provide weekly summary reports to the Operations Manager with the record sheets attached. The Nominee would compile these reports for himself/herself.

The Financial Controller:

- reports to the Operations Manager;
- is in charge of administration and finance;
- establishes procedures that allow fast processing of payments;
- compiles weekly expenses reported by Nominee/Operations Manager;
- mobilises new funds requested by Nominee/Operations Manager every week.

The surveillance team:

- reports to the Nominee / Field Controller;
- follows the procedures outlined in the surveillance plan;
- collects plants or plant products at the surveillance points;
- examines collected samples in a secure laboratory to observe pest infestation;
- treats and if necessary destroys host materials;
- issues inspection, treatment and compensation forms;
- keeps records of trapped pests or collected plants or plant products;
- keeps records of inspected, treated, destroyed or released plants or plant material;
- keeps suspected samples and forwards them for identification;
- provides weekly summary reports to the Nominee/Field Controller with the record sheets and compensation claims attached;
- forwards resource requirements to the Nominee/Field Controller;
- suggests improvements to the Nominee/Field Controller and Technical Adviser.

The Technical Adviser:

- briefs and trains the surveillance team and, in the case of an eradication, also the Field Controller, on their tasks and targets. The briefing is conducted together with the Operations Manager in the case of an eradication, or together with the

Nominee in the case of a containment. The trainers need to make sure that everybody knows their positions and understands their responsibilities;

- devises and implements appropriate public awareness measures;
- periodically monitors the operation to assess progress;
- suggests improvements to the Nominee/Operations Manager;
- sources additional technical information for the Nominee/Field Controller if required.

B 3.2.3 Monthly Review

The Chief Quarantine Officer (Plants), Financial Controller, Technical Adviser, Operations Manager/Nominee and Field Controller meet on the set date to discuss progress and further action and set a date for the next review.

Options for further action are:

- to stop because the pest has been eradicated;
- to continue the operation because of good progress and to set a date for the next review;
- to continue the operation but make changes since progress is not as good as expected and discuss the effect of the changes during the next review;
- to stop the operation because the pest has to be declared established.

The Chief Quarantine Officer (Plants) advises the Chairperson of the outcome of the review.

Based on the experience gained, the Chief Quarantine Officer (Plants) improves this section of the Emergency Response Plan.

Section 4 of this manual outlines points for consideration when activities are stopped.

B 3.3 Eradication

Objective: to have operations in place that eliminate the pest from the infested area.

Prior to the eradication, an operating, containment and surveillance system needs to be in place. The ERMC may immediately recommend eradication of the pest, or eradication may be decided on following a review of the Containment Plan.

B 3.3.1 Preparation

With assistance from the Chief Quarantine Officer (Plants), the Technical Adviser investigates legal provisions for any future action. If the quarantine law does not provide this support, or if emergency regulations can not be put in place, there is no point starting the operation.

The Technical Adviser determines the best technical options to inspect, treat or destroy

infested products. Options may include:

- traps, lures or other physical control methods,
- host destruction – possibly by burning or burying,
- processing or consumption of infested crop,
- disinfestation of equipment and facilities,
- chemical or biological pesticide treatment,
- fumigation,
- soil sterilisation,
- leaving land fallow,
- the use of pest resistant cultivars,
- restriction of subsequent cropping.

The Technical Adviser develops the initial draft action plan and budget. After approval by ERM, the Technical Adviser finalises the action plan and budget in consultation with the Operations Manager, Financial Controller and Chief Quarantine Officer (Plants) for approval by the Chairperson.

The representative of the affected province or island devises appropriate public awareness measures in consultation with the Technical Adviser. This includes provision of information on the pest and on legal aspects of the eradication.

The Eradication Plan addresses the following points:

- definition of the infested area: which plants, plant products, or other articles need to be treated, destroyed or disinfested;
- measures that achieve co-operation from owners of possibly infested plants, plant products or other articles in the infested area, growers associations, traders, local extension officers and authorities;
- specific awareness measures (radio broadcasts, posters, sign boards, leaflets, public meetings) to inform the public about the pest and the operation;
- list of required equipment (preferably locally available). Stockpiles of pesticides for treatments that can be used and replaced may be available with SPC or other organisations. Consideration should be given at an early stage to the registration of any pesticides that are not already registered;
- contain instructions on how to treat, disinfest or destroy plants, plant products or other articles;
- maintenance and processing of work sheets and assignment of responsibility for this task because trading partners will request information to support claims of pest freedom;
- suspicious specimens have to be killed immediately;
- action if suspicious specimen are found. Options are cleaning, treatment or destruction;

- procedures for the release of plants, plant products, or other articles from the quarantine area after clearance by appointed officers;
- address the issue of compensation;
- specify under what conditions compensation needs to be paid to affected farmers when plants or plant products need to be destroyed;
- specify how much compensation is to be paid in accordance with current regulations;
- the local extension service can support the growing of crops that are not affected by the pest in the infested area;
- establish work schedules;
- obtain a list of local traders dealing with the affected commodity, who may observe damage by the pest and who have to be contacted once a month;
- identify and contact growers of the affected crop (and growers association [if any]) in the quarantine area;
- indicate how long the exercise should go on, which will depend on the size of the infested area and the life cycle of the pest;
- specify the period of time without finds of the pest and its damage that has to elapse before the pest can be declared eradicated depending on the biology of the pest, quality of detection methods, climate, and efficacy of treatment. It may be necessary to discuss this point with trading partners and relevant technical specialists;
- preferably use the already established operational control centre (3.1.1);
- starting date for monthly reviews of the operation.

The eradication plan has the file on the pest and the relevant part of the legal provisions attached.

Budget

Points to consider in the budget are, broadly speaking, expenses for compensation, human resources, transport, material and awareness measures or in more detail:

<u>Compensation</u>	Value of currently planted host plants depending on size of cultivated area and government rates Support for alternative crops
<u>Human resources</u>	Salaries and wages Overtime payments Lunch allowances Costs of accommodation or per diem Hiring of labour
<u>Transport</u>	Air or boat fares Hire of transport to move staff or plants or plant material Fuel, spare parts
<u>Material</u>	Equipment and material like pesticides or kerosene that are needed to treat or destroy infested plants or plant material; Safety equipment (helmets, rain-coats, gloves, etc.) and first aid kit Identification badges Stationery
<u>Public awareness measures</u>	Signboards - design costs, number of boards Radio programme Posters: design costs, number of posters, with or without lamination Leaflets: design costs, number of leaflets Cost of meetings in affected areas

B 3.3.2 Implementation

After consultation with the Chief Quarantine Officer (Plants), Operations Manager and Technical Adviser, the Chairperson briefs the media on the operation. The brief should include:

- ❑ objective of the operation;
- ❑ benefits in terms of crops saved versus cost and difficulties for affected farmers and general public;
- ❑ estimated chances of success versus estimated chances of failure.

The representative of the affected province or island and the extension officers discuss the further action with the local authorities, implement public awareness measures under consultation with the Head of Extension and inform the owners of possibly infested plants, plant products, or other material.

The Chief Quarantine Officer (Plants):

- provides weekly reports to the ERM and answers queries;
- oversees progress of operations and decides on improvements;
- supplies the Eradication Team with proof of their appointment and identification badges.

The Operations Manager:

- reports to the Chief Quarantine Officer (Plants);
- is responsible for the overall implementation of the eradication;
- provides weekly reports to the Chief Quarantine Officer (Plants) and Technical Adviser;

- contacts Chief Quarantine Officer (Plants) or Technical Adviser at any time to seek advice;
- is responsible for the purchase of all required equipment;
- ensures that equipment is available when needed and where needed;
- maintains an inventory of issued equipment;
- organises transport and accommodation;
- selects and appoints an Eradication Team of qualified officers including staff allocated from other institutions or departments with the power to stop the movement of and to treat and/or destroy host plants, plant products, or other material. Names of team members must be provided to the Chief Quarantine Officer (Plants), who will gazette them as Plant Inspectors for the duration of the operation.
- together with the Technical Adviser, briefs and trains the Containment Team and the Field Controller for their tasks and targets and give clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities;
- supplies the eradication Team with:
 - Eradication Plan including attachments,
 - inspection equipment,
 - inspection, treatment and compensation forms (example in Annex 9),
 - material to treat, destroy or disinfect plants or other material,
 - safety equipment and first aid kit,
 - datasheets, notebooks, pens, markers.
- decides on improvements to the operation that are suggested by the Technical Adviser or Field Controller;
- manages operational funds on a day-to-day basis;
- reports expenses to the Financial Controller every week;
- requests new funds from the Financial Controller every week;
- decides on compensation payments according to regulations;
- issues compensation payments.

The Field Controller:

- reports to the Operations Manager;
- is responsible for day- to-day implementation of the operation;
- organises the establishment of work teams and schedules;
- ensures that:
 - appropriate procedures are followed,
 - infested products are disposed off or treated in the most appropriate way,
 - treatments are applied correctly.
- if necessary, employs casual labour, writes contracts, keeps records of all casual labour employed and submits paysheets to the Operations Manager;
- forwards resource requirements to the Operations Manager;
- forwards compensation claims to Operations Manager;
- provides weekly summary reports to the Operations Manager with the record sheets and compensation claims attached;
- decides on improvements to the operation suggested by the eradication Team;
- suggests improvements to Operations Manager and Technical Adviser.

The Financial Controller:

- reports to the Operations Manager;
- is in charge of administration and finance;
- establishes procedures that allow fast processing of payments;
- compiles weekly expenses reported by the Operations Manager;
- mobilises new funds requested by the Operations Manager every week;

The Eradication Team:

- reports to the Field Controller;
- follows the procedures outlined in the eradication plan;

- treats, disinfects or destroys infested plants or plant material following the procedures outlined in the eradication plan;
- disposes of affected products;
- cleans affected sites;
- Carries out trapping and destruction of insects or other pests if specified in the eradication plan;
- issues inspection, treatment and compensation forms;
- keeps records of inspected, treated, destroyed or released plants or plant material;
- forwards resource requirements to the Field Controller;
- provides weekly summary reports to the Field Controller with the record sheets and compensation claims attached;
- suggests improvements to the Field Controller and Technical Adviser.

The Technical Adviser:

- together with the Operations Manager briefs and trains the eradication Team and the Field Controller for their tasks and targets and gives clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities;
- periodically monitors the operation to assess progress;
- suggests improvements to the Operations Manager;
- sources additional technical information for the Field Controller if required.

B 3.3.3 Monthly Review

The Chief Quarantine Officer (Plants), Financial Controller, Technical Adviser, Operations Manager and Field Controller meet on the set date to discuss progress and further action and set a date for the next review.

Options for further action are:

- to continue the operation because of good progress. To set a date for the next review;
- to continue the operation but make changes since progress is not as good as expected. To set a date for the next review and discuss the effect of the changes;
- to stop the operation because the pest cannot be eradicated; to decide if the containment and surveillance should continue or not; to incorporate long term management of the pest in the activities of the plant protection, quarantine and extension services. (Section 4 of this manual outlines points for consideration when activities are stopped).
- to stop eradication, containment and surveillance because the pest has been eradicated and to declare the pest eradicated. The latter should be done by an independent organisation if trading partners require this reassurance. Programme documentation and other relevant evidence supporting the declaration should be made available to trading partners.

The Chief Quarantine Officer (Plants) advises the Chairperson of the outcome of the review. If the Chairperson deems it necessary he/she may call an ERMC meeting to discuss the outcome.

The final decision on further action is declared by the Chairperson with advice from this review team.

Based on the experience gained, the Chief Quarantine Officer (Plants) improves this section of the Emergency Response Plan.

B 4 Stand-down

The stand-down comes into effect when:

- an eradication is successfully completed (Section 3.3.3);

- containment or eradication are unsuccessful and the program is stopped (Sections 3.1.3, 3.3.3).

B 4.1 Report

The Chief Quarantine Officer (Plants) will advise the Operations Manager, Technical Adviser and possibly Nominee to prepare a report on the whole operation and complete it within one week. The report will include:

- set-up of the operation;
- decisions made;
- results;
- costs;
- problems encountered;
- recommendations.

The Chairperson discusses the report with Chief Quarantine Officer (Plants), Technical Adviser and Operations Manager. The Operations Manager, Technical Adviser and possibly Nominee finalise the report.

This report will be submitted to the Minister (Agriculture & Livestock) who will advise the National Government.

B 4.2 Notifications

The Chief Quarantine Officer (Plants) will prepare the necessary instruments to lift the existing emergency regulations. The Minister (Agriculture & Livestock) will effect this through the National Gazette. Appointments of temporarily gazetted Plant Inspectors should be revoked.

The Chairperson:

- informs stakeholders and funding agencies about the stopping of the operation.

- briefs the media about:
 - the objective of the operation,
 - costs and benefits,
 - further action.

The Chief Quarantine Officer (Plants):

- informs SPC about the stopping of the operation. After verification, SPC will inform the regional stakeholders;
- distributes copies of the final report to the ERM, all stakeholders, funding agencies and SPC.

The representative of the affected province or island and the extension officers inform the local authorities and growers, in consultation with the Head of Extension, about the stopping of the operation.

B 4.3 Disbandment of response team(s)

The Chief Quarantine Officer (Plants) informs the Operations Manager and possibly the Nominee that the emergency response operation has been concluded. The Operations Manager and possibly the Nominee advise their team members.

The Operations Manager arranges for seconded officers to return to their host institutions and for all outstanding entitlements to be settled. The Operations Manager, Nominee and Field Controller call a meeting with their staff or labourers, review their performance and thank them for their work.

The Operations Manager, in consultation with the Chief Quarantine Officer (Plants) and Financial Controller, makes arrangements for return or disposal, as appropriate, of specifically acquired equipment.

The Operations Manager returns all record sheets to the Chief Quarantine Officer (Plants) for filing and future reference.

The Financial Controller settles all payments and accounts.

Based on the experience gained, the Chief Quarantine Officer (Plants) improves this section of the Emergency Response Plan.

B 5 Avoiding the same problem in the future

As soon as there is time, the Chief Quarantine Officer (Plants) must determine the pathway by which the pest may have entered.

The Head of Quarantine needs to put in place systems that avoid a repetition of the incident.

Annex 1. Sampling and shipment of insects for identification

Selection of specimens

Generally, specimens of adult insects are required for identification purposes, but there are exceptions, which are indicated in the section on preservation. Specimens need to be in good condition with all appendages (wings, legs, and antennae) intact, as identification of broken or incomplete specimens is difficult or impossible.

Specimens could be killed by leaving them in a freezer for half an hour or longer depending on their size. Many smaller insects can be directly killed and preserved in ethyl alcohol.

They should be preserved and sent with other stages (eggs, larvae, nymphs, pupae, and pupal cases), as the immature stages of many species are still not well known. In the case of whiteflies, pupal stages are essential.

A sample that is sent for identification should consist of about five specimens to allow a sure identification.

Some specimens should be kept for reference and possible future use as samples.

Preservation

All specimens should be handled with great care to avoid distortion, breakage and loss of antennae, legs, wings, heads, scales, setae or other parts that may be essential for identification.

Specimens should be as clean as possible. The preferred killing agent for adult insects is the vapour of ethyl acetate as this leaves the specimen relaxed. If adult insects and other arthropods are to be preserved in 70% or 80% ethyl alcohol (not formalin) they can be killed in this fluid also.

Many immature insects, because of their softer structure, are normally killed and preserved in alcohol. However, larvae and pupae should be killed in boiling water (for one minute).

Adult stages of small insects like aphids, whiteflies, thrips, scale insects, mealybugs, ants and mites and larvae and pupae should be preserved in ethyl alcohol (70-80%) or in other fluid preservatives (but not formalin) in glass or plastic tubes. These tubes should not be too large as this makes searching for very small specimens, like mites, very difficult. The tubes should be completely filled with fluid, to exclude air bubbles (moving air bubbles can do a lot of damage during transit), and should be securely sealed, preferably with screw-on caps, but not with corks as these may soon deteriorate.

Adult stages of larger insects may be preserved on dry pins, preferably stainless steel pins that do not rust and damage the specimen. Do not stack specimens on the same pin with one data label because the weight may become too heavy for the pin and you may include several species under one label. Do not put lepidoptera and other insects in the same box because the scales of the wings from the lepidoptera will stick to small insects and hide their taxonomic characters.

It is also possible to preserve larger adult insects dry in paper envelopes or packets, or loosely packed between layers of cellulose wadding or tissue paper (but not cotton wool) in boxes, but these methods should only be used when there is no alternative. It is essential to dry specimens thoroughly before storage; this is especially important in the Pacific to prevent the growth of moulds and the development of mites and other organisms that will rapidly destroy specimens.

Labelling

All specimens submitted for identification should be clearly labelled with basic information on:

- country;
- locality (including the nearest place likely to be recorded on maps);
- altitude (if appropriate);
- English and preferably scientific names of host plant(s);
- other relevant information e.g. feeding on leaf or on fruit;
- result of problem – e.g. plant dying, fruit or tuber inedible, leaves fall off or lose colour;
- date collected; name of collector and organisation; reference number.

Labels should not be too large, and should be neatly written with a pencil or permanent ink (but not with a ballpoint pen whose ink will dissolve).

Packing

Specimens must be packed carefully before dispatch because inadequate packing may result in severe damage or total loss.

Pinned specimens should be sent in strong but light cardboard boxes with secure bases of cork or Plastazote into which the pins are deeply and firmly inserted. Expanded polystyrene should not be used as a base because it has insufficient grip to hold pins in place.

Large specimens should be secured with several long pins to prevent any movement of the specimen or their labels and placed in a box for shipment.

Tubes containing specimens in alcohol or other fluids should be checked for leaks, and if necessary sealed with molten candle wax, then be carefully packed in cellulose wadding, tissue paper, cotton wool, newspaper or other packing material and placed in a box for shipment.

Boxes containing pinned specimens, slides or tubes should be sealed with tape and packed in strong cardboard cartons with a thick layer (at least 5cm) of polystyrene chips, crumpled paper, or other resilient packing material surrounding them on all sides to absorb any shocks or vibrations that might otherwise cause damage in transit.

Posting

The Australian Customs Service no longer allows the shipment of specimens in alcohol solutions for safety reasons. Other countries may follow. Therefore, the sender needs to enquire about such or similar restrictions in the country of destination prior to shipment and then prepare the specimens so that they conform to both the national and international safety requirements.

Specimens should be sent by the fastest and most reliable method.

Specimens are to be accompanied by a phytosanitary certificate and an import permit if required

A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen. The box needs to be wrapped in brown paper. The package needs to show the sender's address and the correct address of the specialist who identifies the sample. The package should also state the following: 'Dead Insects Preserved for Scientific Use, of No Commercial Value' and the wording 'Fragile' or 'Handle with Care'.

ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.

Annex 2. Sampling and shipment of disease specimens for identification.

Care should be taken when packing disease specimens. When collecting, the specimen should not be kept in the heat, especially in direct sunlight. Plastic bags should be AVOIDED at all costs, as they cause the specimen to “sweat” and this encourages the growth of other organisms that may hide the real disease-causing organism. Try not to collect disease specimens that are wet. Ensure that, with each specimen, some diseased and some healthy tissue is included; the two should be packed separately. If you know whether the disease is fungal, bacterial or viral, the following instructions can be used:

Fungal

Specimens can be collected and wrapped in newspaper. The sheets of newspaper can then be put into a paper envelope and placed in a cardboard box with polystyrene or other packaging material that will protect the specimen from damage.

Bacterial

Bacterial disease specimens often deteriorate rapidly, leaving the plant bacteriologist receiving the sample with an oozing mess. If the specimen dries out, the bacteria will die and it will not be possible to identify the disease. Ideally, specimens should reach the plant bacteriologist within 12 – 24 hours of collection to be of use.

Slope cultures in miniature vials of fungal and bacterial pathogens may be prepared and sent instead of fresh samples. This method has been shown to be very successful.

Viral

Filter papers or thick tissue paper should be soaked in 50% glycerol so they are totally wet but not dripping. The specimens should be placed between the papers and the whole sample placed in a plastic bag.

Nematodes

Specimens collected from plants suspected of attack by nematodes must include both roots and soil, packed separately in plastic bags. Nematodes can also be extracted and placed in 25% glycerol or 5% formaldehyde in miniature vials and sent for identification. Alternatively, nematode extracts may be embedded in glycerine and the cover slip sealed with nail polish on a slide and sent.

Unknown

Follow fungal specimen instructions.

Collection details to include with specimen:

- a) Common name and preferably scientific name of host plant(s);
- b) affected part of plant;
- c) country, state, locality;
- d) map references and altitude (if possible);
- e) collection date (very important if isolations from the tissue are to be attempted);
- f) collector's name;
- g) tentative identification by symptoms and morphology of organisms;
- h) disease severity, e.g. number of plants affected (is it one plant on the edge of a field or is the whole area affected; this will help to identify the importance of the problem).
- i) reference number.

Posting

Specimens should be sent by the fastest and most reliable way.

A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen.

Pack the container with brown paper.

A declaration form obtainable at Post Offices must be completed and stuck on the parcel containing the samples.

Samples should be sent to their destination as soon as possible. Label the box clearly and state:

"Perishable biological material. Keep material cool but DO NOT refrigerate - no commercial value;"

"Fragile" or "Handle with care".

<p>ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.</p>
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Annex 3. Instructions for the sampling and shipment of weed specimens for identification

Weed specimens must be pressed and dried, and accompanied by appropriate information. There are weeds that have similar characteristics and correct preparation of appropriate specimens will ensure that the identification received is accurate.

Collection. It is not often possible to identify a weed specimen from leaves alone, so other representative portions must be collected. What constitutes an adequate specimen varies with the type of weed concerned:

- Grasses and small herbaceous plants. Grasses and small herbaceous plants should be collected, complete with roots, basal leaves, stems and flowers and/or seed heads. Bulky plants may be divided and a portion sent, provided this portion includes the basal shoots and a complete flowering stem. Long stems can be folded back and forth before pressing. Plants that have underground runners, tubers, bulbs or stems should be sent with at least some of these portions still attached.
- Shrubs, trees and other larger herbaceous plants. Specimen of these plants should consist of a portion of branch or stem up to 30 cm long. Leaves, flowers and/or fruits (both flowers and fruit if possible) should be provided still attached to the stem.
- Vines. Appropriate vine samples include buds, fruit and mature leaves. A description of the vine is also necessary. A photograph of the vine showing the growth characteristics can be very useful if buds or fruits are scarce.
- Others. When collecting ferns, make sure the rhizome (root-like structure) is attached to the frond. With tree ferns, include the scales or hairs at the base of the frond stalk. These are essential for identification.

When plants have large flowers or leaves, it is important to describe the dimensions of the whole flower or leaf and collect the tips and base of each. Photographs should also be taken in the field.

Preparation of specimens. Before being sent for identification, weed specimens should be pressed between sheets of newspapers and dried, if possible in a drying oven, under moderate pressure. During humid weather and when pressing succulent or water plants, the paper should be changed each day. In dry areas, there is less urgency to change papers although specimens should be checked daily. Fresh plant material should not be sent for identification in plastic bags without first wetting the newspaper with alcohol. Such specimens deteriorate quickly, become mouldy and make identification impossible. When sending fresh specimens pressed in newspaper, they should be sprinkled with 70% alcohol, with as much air removed as possible, and sealed with sticky tape to prevent evaporation. Specimens sent as dried specimens each in a sheet of newspaper, and packed flat between cardboard are preferred, because with certain plants, the alcohol can destroy some characteristics.

Always collect at least three specimens of the weed sample. Make sure they are labelled correctly. Information to accompany the sample should include:

- Collector's name, date of collection, country, province, personalised collection number,
- Location: longitude and latitude, distance and direction from the nearest town or property and local name of the site of collection.
- Habitat type: type of area, soil type and associated dominant vegetation.

- ❑ Plant description. It is useful to describe anything which cannot be seen from the pressed specimen such as the weed's growth habit (tree, grass, vine, herb) and approximate height, flower colour (flowers often fade or change colour when dried), growth description of the weed.

Posting. Specimens should be sent by the fastest and most reliable method. A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen. Pack the container with brown paper. Specimens should be sent to their destination as soon as possible and the recipient informed by telephone, fax or e-mail to expect the samples. Label the box clearly and write: "Perishable biological material. No commercial value. Handle with care."

ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.

Annex 4. International contacts for pest identification

Insect identification

- Dr. Guenther Rapp, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733 Ext. 224, Fax: (679) 370 021, E-mail: guentherr@spc.int
- Mr. Paul D. Hillyard, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, U.K , Phone: (44) (0) 207 942 5127, Fax: (44) (0) 207 942 5190, E-mail: pdh@nhm.ac.uk, <http://www.nhm.ac.uk/science/>, Costs/sample: GBP 58 + 17% VAT
- Mr. Kimberi R. Pullen, Identification & Advice Officer CSIRO Entomology, GPO Box 1700, Canberra, ACT 2601, Australia, Phone: (61) 2 6246 4263, Fax: (61) 2 6246 4364, E-mail: ident@ento.csiro.au, Web: <http://www.ento.csiro.au/research/natres/id.htm>, Costs/sample: +- A\$ 85
- Dr. Trevor K. Crosby, Landcare Research, Private Bag 92170, Auckland, New Zealand, Phone: (64) 9 8493660, Fax: (64) 9 849 7093, E-mail: crosbyt@landcare.cri.nz

Diseases

- Dr. Jacqui Wright, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733 Ext. 223, Fax: (679) 370 021, E-mail: JacquiW@spc.int
- Dr. Eric McKenzie, Plant Pathologist, Landcare Research, Private Bag 92170, Auckland, New Zealand, Phone: (64) 9 815 4200, Fax: (64) 9 849 7093, E-mail: MckenzieE@landcare.cri.nz
- Ms. Barbara Ritchie, Plant Clinician, Diagnostic & Advisory Laboratory, CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY, United Kingdom, Phone: (44) 1491 829 069, Fax: (44) 1491 829100, E-mail: plant.clinic@cabi.org, Costs/sample: possibly free.

Weeds

- Dr. Guenther Rapp, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733 Ext. 224, Fax: (679) 370 021, E-mail: guentherr@spc.int.
- Mr. Marika Vuli Tuiwawa, Acting Curator South Pacific Regional Herbarium, Institute of Applied Sciences, P O Box 1168, Suva, Fiji. Phone: (679) 212 874, Fax: (679) 300 373, E-mail: Tuiwawa.M@usp.ac.fj, Costs/sample: common weeds free, less common depending on overseas charges.
- Mr. Tim Flynn, Curator of the Herbarium, National Tropical Botanical Garden, 3530 Papalina Road, Kalaheo, Hawaii HI 96741, USA, Phone: (1) 808 332 7324 Ext. 137, Fax: (1) 808 332 9765, E-mail: tflynn@ntbg.org, Costs/sample 0\$ or possibly small fee.
- Plant Identification Service, Landcare Research, Canterbury Agriculture & Science Centre, PO Box 69, Lincoln 8152, New Zealand, Phone: (64) 3 325 6700, Fax: (64) 3 325 2418, E-mail: breitwieseri@landcare.cri.nz, Costs/sample NZD 100.
- Mrs. Lynn Raulerson, Biology Program DNS UOG Station Mangilao, Guam, Phone: (1) 671 735 2791 Fax: (1) 671 7341299 E-mail: lraulerson@netpci.com, Costs/sample 0\$ or 50USD/hour with large numbers of samples.

Annex 5. Costs of an incursion to private and public sector

	Cost arising in	
	Infested area	Endangered area
To farmers, exporters:		
value of crop lost to farmers		
cost of control measures applied by farmers		
social damage to the community ¹		
cost of replacing host plants with other plants that are not damaged by the pest		
loss of export market		
cost of export treatments		
To government:		
development of control options		
development of quarantine treatments		
costs of additional extension activities		
Other factors		
Total		

¹For example cost of buying the crop for social occasions since farmers can not grow the plant anymore

Annex 6. Quarantine pests – expert contacts

Fruit Flies

- Mrs. Ema Tora Vueti, Coordinator, Mr. Luc Leblanc, Entomologist, Management of Fruit Flies in the Pacific, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 384 379, Fax: (679) 385 480, E-mail: emat@spc.int
- Prof. R. A. I. Drew, Tropical Fruit Fly Research Group Australian School of Environmental Studies, Nathan Campus, Griffith University, Brisbane, Queensland 4111, Australia, Phone: (07) 3875 3696, Fax: (07) 3875 3697, E-mail: D.Drew@mailbox.gu.edu.au

Giant African Snail

- Mr. Konrad Englberger, Plant Protection Trainer, Plant Protection Micronesia, POBox 2299 Palikir, Pohnpei 96941, Federated States of Micronesia, Phone: (691) 320 7523, Fax: (691)320 5854, E-mail: ppmicronesia@mail.fm

Soft Scale Insects (Coccidae)

- Mr. C. J. Hodgson, Department of Biodiversity and Systematic Biology, National Museum of Wales, Cardiff, CF1 3NP Wales, UK, E-mail: HodgsonCJ@cardiff.ac.uk
- Mr. R.C Henderson, Landcare Research, Private Bag 92170, Auckland, New Zealand, E-mail: HendersonR@landcare.cri.nz

Annex 7. Quarantine and plant protection officers in the region

American Samoa: Ms. Elisapeta Sualevai, Senior Quarantine Officer Plant & Animal, Quarantine Service, Department of Agriculture, POBox 930, Pago Pago 96799, Fax: (684) 699 4031, Phone: (684) 699 9272, E-mail: elsualevai@samoatelco.com

Australia:

Dr. Bill Roberts, Chief Plant Protection Officer, Agriculture, Fisheries & Forestry Australia, GPO Box 858, Canberra ACT 2601, Australia, Fax: (61) 2 6272 5835, Phone: (61) 2 6271 6534, (61) 2 6254 7482, E-mail: bill.roberts@affa.gov.au

Mr. Michael Cole, Senior Manager, Plant Protection Branch, National Office of Animal and Plant Health, GPO Box 858, Canberra ACT 2601, Australia, Fax: (61) 2 6272 5835, Phone: (61) 2 6272 5399, E-mail: michael.cole@affa.gov.au

Cook Islands: Mr. Poona Samuel, Chief Quarantine Officer, Ministry of Agriculture, POBox 96, Rarotonga, Fax: (682) 21881, Phone: (682) 28720, E-mail: cimoa@oyster.net.ck

Cook Islands: Mr. Brian Manaariki Tairea, Research Officer Plant Protection, Ministry of Agriculture, POBox 96 RAROTONGA, Phone: (682) 28720, Fax: (682) 21881, E-mail: cimoa@oyster.net.ck

Federated States of Micronesia: Mr. Konrad Englberger, Plant Protection Training Officer, Secretariat of the Pacific Community, c/- Division of Agriculture, POBox PS-12, Palikir Ponphei FM 96941, Fax: (691) 320 5854, Phone: (691) 320 7523, E-mail: ppmicronesia@mail.fm

Fiji: Mr. Aisea Waqa, Principal Quarantine Officer, Ministry of Agriculture, Fisheries & Forests, Private Mail Bag, Post office Raiwaqa, Suva, Fiji, Phone: (679) 312 512, Fax: (679) 305 043, E-mail: Quarantine@Suva.is.com.fj

Fiji: Mr. Moti Lal Autar, Principal Research Officer Plant Protection, Koronivia Research Station, Ministry of Agriculture, Fisheries & Forests, Box 77, Nausori, Fiji, Phone: (679) 477 044, Fax: (679) 400 262, E-mail: plantprotect@homer.is.com.fj

French Polynesia: Mr. Djeen Cheou, Head of Plant Protection Branch, Department de la Protection des Végétaux, Ministry of Agriculture, BP 100 Papeete, French Polynesia, Phone: (689) 544 588, Fax: (689) 410 530, E-mail: sdr.dpv@mail.pf

Guam: Dr. Russell Campbell, Entomologist & Chief Plant Protection & Quarantine, Department of Agriculture, POBox 2950 Agana, 96910 Guam, Fax: (671) 734 6569, E-mail: rcampbell@netpci.com

Kiribati: Mr. Manate Tenang, Chief Agricultural Officer, Division of Agriculture, Ministry of Natural Resources Development, POBox 267, Bikenibeu, Tarawa, Phone: (686) 28096, Fax: (686) 28121, E-mail: [vet@tskl.net.ki](mailto:veter@tskl.net.ki)

Northern Marianas: Mr. Joaquin Tenorio, Secretary Department of Lands and Natural Resources, Lower Base, POBox 10007, 96950 Saipan, Phone: (670) 1 322 9830 , Fax: (670) 1 322 2633

Nauru: Mr. Joseph Cain, Director of Industry and Economic Development, Department of Island Development and Industry, Yaren District Nauru, Fax: (674) 444 3791, Phone: (674) 444 3181/3891, E-mail: joseph_cain@hotmail.com

New Zealand: Mr. Richard Ives, Director Plants, Biosecurity Authority, Ministry of Agriculture & Forestry, POBox 2526, Wellington, New Zealand, Tel.: (64) 4 474 4127, Fax: (64) 4 474 4240, E-mail: ivesr@maf.govt.nz - or Nominee

New Caledonia: Dr. Didier Carton, Chef du service veterinaire et de la protection des végétaux, BP 256, 98845 Noumea, Phone: (687) 24 37 45, Fax: (687) 251 112, E-mail: svpv@gouv.nc

Niue: Mrs. Crispina Fakanaiki, Senior Quarantine Officer, Department of Agriculture, Forestry & Fisheries, POBox 74, Alofi, Niue, Fax: (683) 4079, E-mail: daff@mail.gov.nu

Palau: Mr. Herman Francisco, Chief of Agriculture & Mineral Resources, Bureau of Natural Resources & Development, POBox 460, 96940 Koror, Fax: (680) 488 1475, Phone: 680 488 250/1517, E-mail: DAMR@palaunet.com

Papua New Guinea: Dr. John Kola, Managing Director, National Agriculture Quarantine & Inspection Authority (NAQIA), POBox 417, Konedobu NCD, Phone: (675) 311 2100, Fax: (675) 325 1674, E-mail: naqia@dq.com.pg

Papua New Guinea: Mr. Roy Masamdu, Research Officer, National Agricultural Research Institute (NARI), POBox 4415 Lae, Morobe Province, Phone: (675) 475 1189, Fax: (675) 475 1034, Email: spctaro@datec.com.pg

Samoa: Mr. Asuao Kirifi Pouono, Assistant Director Quarantine and Regulatory, Quarantine & Regulatory of the Quarantine Division, Ministry of Agriculture, Fisheries & Meteorology, POBox 1874, ACP Building, Apia, Phone: (685) 22561, Fax: (685) 20103, E-mail: kpouono@lesamoa.net

Samoa: Mr. Albert Peters, Assistant Director Crops, Nu'u Crop Development Centre, Ministry of Agriculture, Forests, Fisheries & Meteorology, POBox 1874, Apia, Phone: (685) 23416 / 20605/ 22561, Fax: (685) 22171, E-mail: apeters@lesamoa.net

SPC: Dr. Mick Lloyd, Plant Protection Adviser, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733, Fax: (679) 370 021, E-mail: mickl@spc.int

Solomon Islands: Mr. Cameron Eta, Director of Quarantine, SIAQS, Ministry of Agriculture & Fisheries, POBox G13, Honiara, Solomon Islands, Phone: (677) 21327, Fax: (677) 21955, E-mail: dirsiags@welkam.solomon.com.sb

Tokelau: Mr. Katieli Peleti Plant Protection & Quarantine Officer Department of Natural Resources & Environment, C/o Tokelau Apia Liaison Officer, POBox 865, Savalalo TOKELAU, Phone: (690) 3127, Fax: (690) 3103/3108

Tonga: Mr. Sione Foliaki, Head Quarantine & Quality Management Division, Ministry of Agriculture & Forestry, POBox 14, Nuku'alofa, Tonga, Phone: (676) 24257, Fax: (676) 24922, E-mail: maf-qgmd@kalianet.to

Tuvalu: Mr. Uatea Vave, Quarantine Officer, Department of Agriculture, Ministry of Natural Resources, Private Mail Bag, Government Building, Vaiaku Funafuti, Phone: (688) 20186/20825, Fax: (688) 20826, E-mail: vaveuatea@hotmail.com

Vanuatu: Mr. Benuel Tarilongi, Director Quarantine & Inspection Service, Department of Agriculture and Horticulture, Plant Protection and Quarantine Division, Private Mail Bag 095, Port Vila, Phone: (678) 23519/ 23130, Fax: (678) 23185/ 24653, E-mail: vgisvila@vanuatu.com.vu

Wallis and Futuna: Mr. Atoloto Malau, Quarantine and Plant Protection Officer, Services de L'Economie rurale et de la Peche, B P 19, MATA-UTU, Wallis and Futuna, Phone: (681) 722 606, Fax: (681) 722 544, E-mail: a-malau@netcourrier.com

Annex 8. Example of an emergency regulation (Fiji, 1984)

Short title

1. These Emergency Regulations may be cited as the Plant Quarantine (Taro Beetle) Emergency Regulations.

Interpretation

2. In these Emergency Regulations, unless the contrary intention appears "host plant" means plants belonging to the order, arales, zingiberales, bromeliales, pandanales and solanales; "infested area" means the area specified in Schedule 1; "taro beetle" means the beetle *Papuana huebneri* at any stage in its life cycle.

Restriction of Movement of plants, plant material and planting

3. A person shall not without the written approval of the Director of Agriculture
(a) remove fresh vegetable material, soil or compost from the infested area;
(b) plant any host plant within the infested area.

Removal of taro beetle

4. Live taro beetle shall not be removed from the infested area.

Powers of inspectors to search property, etc.

5.(1) An inspector may, during daylight hours, enter any property (except a dwelling house) for purposes in connection with the eradication or prevention of the spread of taro beetle,

5.(2) Where an inspector enters any property under subregulation (1) he may
(a) search for any host plant or taro beetle he reasonably suspects to be on the property; and
(b) destroy or cause to be destroyed, by such means as he considers appropriate, any host plant and taro beetle he may find on the property.

5.(3) In the course of a search under subregulation (2) an inspector may do anything he considers appropriate for the purpose of carrying out such search.

5. (4) In the course of a search under subregulation (2) an inspector may do anything he considers appropriate for the purpose of
(a) destroying host plants;
(b) eradicating taro beetle; and
(c) preventing the spread of host plants or taro beetle.

5.(5) An inspector may give directions to the owner or occupier of any property to take such measures on that property as the inspector considers appropriate to destroy host plants, eradicate taro beetle and prevent the spread of taro beetle.

Powers of inspectors to stop and inspect vessels, aircraft, vehicles, etc.

6.(1) For the purpose of searching for taro beetle an inspector may stop a vessel, aircraft or vehicle at a place specified in Schedule 2.

6.(2) An inspector may inspect a vessel, aircraft or vehicle stopped under subregulation (1) and any article carried or conveyed through a place specified in Schedule 2 whether or not carried or conveyed in a vessel, aircraft or vehicle.

6.(3) The person in charge of a vessel, aircraft or vehicle stopped under subregulation (1) shall not move that vessel, aircraft or vehicle unless and until permitted to do so by an inspector.

6.(4) In the course of an inspection under subregulation (2) an inspector may do anything he considers reasonably necessary for the purpose of

(a) carrying out the inspection; and

(b) destroying taro beetle he knows or reasonably suspects to be present in the vessel, aircraft, vehicle or article.

6.(5) An inspector may direct the owner of a vessel, aircraft or vehicle inspected inter subregulation (2) to cause the vessel, aircraft or vehicle to undergo such treatment as the inspector may specify for the purpose of eradicating or preventing ie spread of taro beetle.

Restriction on vessels, aircraft and vehicles leaving infested area

7.(1) A person shall not remove a vessel, aircraft or vehicle from the infested area without the approval of an inspector.

7.(2) In the case of a vessel

(a) the master of the vessel shall-give an inspector at least one hour's notice of the intended departure of the vessel from the infested area; and

(b) the approval under subregulation (1) shall be in writing.

Powers of inspectors to inspect vessels

8.(1) An inspector may board and inspect a vessel

(a) that he reasonably suspects to be about to depart on a voyage from the infested area;

(b) that he reasonably suspects to be in the course of a voyage from the infested area to another place; or

(c) that he reasonably suspects to have within the previous 48 hours completed a voyage from the infested area.

8.(2) In the course of an inspection under subregulation (1) an inspector may do anything he considers reasonably necessary for the purpose of

(a) carrying out the inspection; and

(b) destroying taro beetle he knows or reasonably suspects to be on the vessel.

8.(3) When requested to do so by an inspector the master or person in charge of a *vessel referred to* in subregulation (1) shall produce to the inspector any approval granted under regulation 7 in *respect of* the vessel's voyage or intended voyage.

8.(4) An inspector may direct the master or person in charge of a vessel inspected under subregulation (1) to cause the vessel to undergo such *treatment* as the inspector may specify for the purpose of eradicating or preventing the spread of taro *beetle*.

Powers of inspectors to carry out general inspection

9.(1) For the purpose of searching for taro *beetle* an inspector may inspect any basket, bag or other container, any mat or any agricultural produce or other article carried or conveyed by any person or in the possession of any person.

9.(2) In the course of an inspection under subregulation (1) an inspector may do anything he considers reasonably necessary for the purpose of

(a) carrying out the inspection; and

(b) destroying taro beetle he knows or reasonably suspects to be present

Power of inspectors to request production of host plants in dwelling houses

10. A person in charge of a dwelling house within the infested area shall, when *requested* to do so by an inspector, produce to that inspector any host plant kept or stored in or about the dwelling house.

Seizure, quarantine, and destruction

11.(1) A plant, plant material or other matter contaminated or reasonably suspected by an inspector to be contaminated by taro *beetle* may be seized by a; inspector and may be disinfected or placed under quarantine conditions for further inspection and treatment.

11.(2) *Where an* inspector considers it necessary to do so he may destroy or otherwise dispose of anything seized under subregulation (1) but in any other case shall return it to the person from whom it was *seized*.

Obstruction, etc. of inspectors etc.

12.(1) A person shall not obstruct or hinder an inspector carrying out his powers and duties under *these Emergency Regulations*.

12.(2) A person shall not obstruct or hinder a person acting for or under instructions given by an inspector under *these Emergency Regulations*.

12.(3) A person shall comply with any directions given to him by an inspector acting in accordance with these Emergency Regulations.

12.(4) A person shall, when requested to do so by an inspector, give to that! inspector such help and assistance as he may reasonably *require* to enable him to carry out his powers and duties under these Emergency Regulations.

Penalty

13. A person who fails to comply with these Emergency *Regulations* is guilty of an *offence* and liable on conviction to

(a) a fine not exceeding \$2000; or

(b) imprisonment for a term not *exceeding* 2 years, or to both such fine and imprisonment. and in the case of a continuing offence to further fine of \$100 for *every day* on which the offence is continued.

Schedule 1 (Regulation 2)

Infested area: The area stretching 5 miles inland from the coast between Tamavua River and Deuba River, and the sea area for 1 mile immediately off that strip of coast all as note particularly shown on the plan annexed* to these Emergency Regulations.

Schedule 2 (Subregulation 6 (1))

Inspection points:

1. Any point affording entry to or exit from the infested area
2. Naitonitoni, Navua Town (for boats leaving Beqa, Vatulelc and Yanuca)
3. Deuba Airstrip.
4. Deuba Hotel Jetty

Missing in the regulation was the following:

Appointment of Inspectors

The Minister of Agriculture or his Nominee hereby appoints in relation to this emergency regulation the following quarantine officers, extension officers and plant protection officers as inspectors:.....

The Ministry or his Nominee is to provide the inspectors immediately with identification cards. The inspectors are to produce these identification cards if requested to do so.

Please also note that the fine of FJD 2,000 mentioned in the regulation is too low. Fines have to be in line with the damage that can be done if the regulation is breached.

Annex 9. Specimen inspection, treatment and compensation form

Inspection, Treatment and Compensation Form	
Details of items:	
Description of items:	_____
Amount/volume:	_____
Please tick where appropriate:	
The items were	
<input type="checkbox"/>	not infested
<input type="checkbox"/>	infested and
<input type="checkbox"/>	treated. The items are now declared free from _____
<input type="checkbox"/>	Cleaned. The items are now declared free from _____
<input type="checkbox"/>	Destroyed. Compensation may be considered.
Owner's address	
First and Last Name	_____
Postal Address	_____
Street Address	_____
Town	_____
Phone	_____
Signature	_____
Name\Signature Officer in charge:	
Location:	_____
Date:	_____

Annex 10: Example of a surveillance programme

FAO/AusAID/UNDP/SPC PROJECT RAS/97/331
REGIONAL MANAGEMENT OF FRUIT FLIES IN THE PACIFIC

FIELD INSTRUCTIONS FOR COUNTRIES STARTING A FRUIT FLY QUARANTINE SURVEILLANCE PROGRAMME

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Communications to:

**Chief Technical Adviser
Regional Management of Fruit Flies in the Pacific
Secretariat of the Pacific Community
Private Mail Bag
Suva, Fiji Islands
Phone (679) 370 733
FAX (679) 385 480**

Authorisation

These are preliminary instructions to assist staff setting out to establish fruit fly traps and undertake host survey fruit collections. During this work, some consideration should be given to the longer-term requirements of a sustainable and comprehensive fruit fly quarantine surveillance system. This is a particularly important area of work for Project RAS/97/331 Regional Management of Fruit Flies in the Pacific. Under this project, technical assistance is available to countries who are served by the Secretariat of the Pacific Community (SPC), to assist them protect their fruit and vegetable production by building a sustainable quarantine surveillance system for detection of economically important species of fruit fly.

Allan Allwood
(Chief Technical Adviser,
Regional Management of Fruit Flies in the Pacific)

OVERVIEW

Importance of Fruit Fly Quarantine Surveillance

Most Pacific Island countries are free from serious fruit fly pests that can devastate fruits and fleshy vegetables grown for home consumption and for market. There is potential for many of these countries to develop significant export trade in these commodities and in order to do this, a well managed fruit fly surveillance system is required to show that these pests are not present. This system will also act as an early warning system, which may detect newly arrived species of fruit fly in time for them to be eradicated, with benefits for both local production and export.

A fruit fly quarantine surveillance system consists of trapping and fruit collection in areas at risk from exotic fruit fly establishment.

Trapping

Fruit fly trapping consists of:

- Two modified Steiner traps placed at every site
 - One trap at each site baited with Cue Lure and the other trap baited with Methyl Eugenol. Each lure attracts different fruit flies.
 - Routine collection of flies caught in traps at between 12 - 16 day intervals
 - Labelling and drying samples
 - If not available, forwarding samples to a person trained and approved to identify fruit flies
 - Examining all flies in samples and checking for presence of exotic fruit flies
 - Re-luring traps at three monthly intervals

Fruit Collections

This work consists of:

- Collection of samples of fruit in areas at risk from exotic fruit fly establishment between 2 - 4 times a year
- Incubation of these samples to rear out adult flies from any infested fruit

- Examination of these flies and checking for exotic species as above.

Description of Steiner Fruit Fly Trap

The Steiner trap is made from a one litre plastic kitchen food container. It has a 3 cm hole drilled in the centre of both the lid and base; lure applied to cotton wicks inside the traps slowly evaporates and is released through these holes, which are also the points of entry into the trap for flies attracted by the scent. The trap lies horizontally when hung from a wire fixed to one side of the pot.

Inside the trap, lure together with malathion insecticide is applied to a cotton wick which hangs by a short length of wire from the top of the trap. The lure attracts flies, and insecticide kills them so they fall to the floor for collection. Malathion has very low toxicity to people, and quantities used in the traps are safe, particularly if direct contact with the wicks is avoided.

Also placed inside the trap is a wire mesh floor which fits snugly with the sides. This prevents flies from soaking in any puddles of water that may collect in the bottom and thus helps to keep them dry. A line of 2 mm diameter holes is drilled along the bottom to allow any such rain water to drain away.

List of contents in quarantine surveillance kits

The following items are required for quarantine surveillance. Items marked with an asterisk are provided in kits forwarded to countries by project RAS/97/331. Numbers of traps in kits are adjusted according to an estimate of the number of sites immediately appropriate for a country, with additions provided as spares. These estimates are based on land area, number of islands and population of people. Please store these materials securely until they are used.

Trapping	Items in kits	Fruit Collection	Items in kits
Steiner Traps: between 20 - 30 units	*	Paper bags: 100 bags	*
Gauze for floors	*	4 litre ice cream containers: 20 units	*
Cotton wicks (dental rolls)	*	2 litre ice cream containers: 20 units	*
Cue Lure 500 ml	*	500 ml flat plastic containers: 10 units	*
Methyl Eugenol 500 ml	*	Plastic "food take-away" pots: 10 units	*
Malathion 50% EC 250 ml	*	Fine gauze cloth	*
Pipettes	*	Sugar	
Wire for hangers	*	Toilet tissue roll	
Birdstop for application to hangers	*	Chicken wire	*
Trapping data sheet.	*	Permanent marker pens, black	*
Cardboard specimen boxes	*	Masking tape for labeling containers	*
Thymol	*	Cardboard specimen boxes	*
Soft nose forceps	*		
Permanent markers, red, blue, black	*		

Guide for establishing trap sites

Trapping strategy

If traps have not been established before, traps placed virtually anywhere with vegetation and fruiting trees will provide basic and valuable information about fruit flies that are present. First trap sites are likely to be located in the gardens of Government employees whose work is associated with fruit fly management in some way (eg. agricultural quarantine/border protection or research) or who have some connection, such as work colleagues or friends.

In most countries that want to develop export trade in fruit and vegetables, it is desirable to establish baseline information on the fruit fly species present. To do this, a network of traps needs to be deployed throughout the major land areas to cover main towns, villages and typical rain forest. Total numbers of trap sites may range from approximately five to ten in a small country to more than fifty in a larger place. Between one to two years input should obtain data on the abundant lure responsive species that are present, and separation and counts of the different species of fly present in each trap will indicate their relative abundance at different times of the year.

Irrespective of above, it is important that progress towards establishing a permanent and sustainable network of traps for quarantine surveillance is made as quickly as possible. To achieve this, regularly serviced traps are required in places where there is risk of exotic fruit fly establishment.

It is preferable to use an approved entomologist to help with long term establishment of a trap network, to assist with selecting the best locations for each site, and to provide training in sorting and identification of flies.

Selecting Trap Sites

1. Establish principle objectives for sites (ie initial appraisal of fruit fly species present, or detailed determination of lure responsive species present and their relative abundance, or quarantine surveillance, or all of these).
2. Select appropriate localities for each trap site to meet needs of above objectives. If this is the first time traps have been placed, research farms, office gardens or properties belonging to staff will suffice given considerations provided in 3 - 5 below.
3. For quarantine surveillance, traps should be placed within 1 km of the following:
 - Tourist hotels and resorts

- Rubbish dumps
- Housing areas with international travellers and consumers of imported fruit (urban and suburban areas and some villages)
- International wharves and airports
- Yacht anchorages
- Places where imported fruit is sold if this hasn't been subjected to adequate quarantine security protocols.

4. Within localities, select the best sites using local knowledge and field visits. Preferred sites are where there is an abundance of fruit, particularly:

- Guava
- Pacific almond
- Mango
- Papaya
- Citrus
- Rainforest

Places where there is a mixture of these fruit are excellent, particularly if banana, plantain, chilli, capsicum, eggplant, squash, gourd are also within 500 meters.

5. Select sites which will be easy and cheap to visit: as stated previously staff member's gardens or office grounds are often ideal, as are places that are visited frequently (eg church, school, friend's house).

6. Avoid places where people will interfere with and vandalise the traps.

7. Obtain permission from landholders, occupiers or village chiefs. Explain the purpose and importance of the traps and ask them to tell children and visitors not to play with them.

8. Place methyl eugenol and cue lure traps on the same site, preferably separated by a minimum of 5 metres.

Mixing lures

Care is required with the next actions to avoid contamination of lures and prevent skin contact with undilute Malathion EC.

1. Obtain a supply of small jars with metal lids and intact liquid-tight seals. Baby food jars (about 100 - 250 ml) are ideal
2. Take two of these jars and using masking tape and blue and red permanent marker, label one “**Cue lure**” and the other “**Methyl eugenol**”. The Fiji Fruit Fly Project uses blue for cue lure and red for methyl eugenol, and adoption of this practice by other countries will assist standardisation.
3. Repeat this for the measuring cylinders or cups: label one “**Cue lure**” (blue), the other “**Methyl eugenol**” (red) and the third “**Malathion**” (black). Don’t obscure the measuring marks! **Ensure these never get mixed and used for the wrong product, as this will cause major contamination.**
4. Use the table below to help with mixing appropriate volumes of lure for the traps to be established or serviced. Mix cue lure in the jar labelled “**Cue lure**” and repeat for methyl eugenol in the “**Methyl eugenol**” jar. The table provides mixing ratios for different volumes of lure, with a small amount extra to prevent running out at the last site.

No of traps	Volume of lure – malathion mixture required (ml)	Volume of lure (ml) 4 parts	Volume of malathion (ml) 1 part
5	15	12	3
10	25	20	5
15	35	28	7
20	45	36	9
25	55	44	11
30	65	52	13
35	75	60	15
40	85	68	17
45	95	76	19
50	105	84	21

6. Place the lids firmly on the jars and ensure they don’t leak. When removing lure from jars, avoid any spillage or drips down the outsides: these will cause contamination.
7. Check the seals on jars periodically to ensure they have not deteriorated: the lure and insecticide mixture will cause rubber compounds and some plastics to deteriorate.

Preparing wicks

If wicks haven't been made up, take three lengths of 4 cm long dental roll and a 15 cm length of wire. Bundle the rolls together with the ends in line, and then bind them in the middle with the wire. Twist the ends of the wire together into a loop and use this to hang the wick inside the trap, using the two wires from the roof of the trap as a hook.

Dental rolls may also be supplied in 12 cm lengths, in which case use a single one for each wick and bend it three ways, then bind as above.

Setting up traps

1. Check trap is complete and nothing is broken:

- Lid and pot
- Hanger and wire to loop around tree branch
- Wick for lure, placed in wire hanger inside trap
- Mesh floor.

2. Care is required with management of lures and their application to traps:

- Trap surfaces, particularly the outside, must not be contaminated with any lure
- Avoid spillages inside traps and contact of charged wicks with sides, as this will reduce the risk of contamination and will increase their life in the field
- Malathion is a low toxicity insecticide, however, still avoid getting lure on hands, and wash immediately if contact occurs
- Lure must not be spilt on the ground.
- Cross contamination of lures and traps must not occur.

3. Plan how cross contamination is to be prevented. Options in order of preference are:

With 2 people available

- Use one person to manage cue lure traps and the other for methyl eugenol traps.

With only 1 person available

- Service traps for one lure (eg cue lure) first, and then the others (eg methyl eugenol) after washing thoroughly, possibly on the same or the following day.
- Take soap and plenty of water into the field, and at each site wash hands thoroughly after servicing each trap.

4. Become familiar with lure containers and dispensers, and develop skills to handle these which prevent spillage and cross contamination:

- **Ensure the droppers are labelled or colour coded and don't mix them up (Fiji standard: blue = cue lure, red = methyl eugenol).**
- Place droppers in a holder when not in use to prevent stray drops of lure causing contamination.

5. Once the method of managing cross contamination has been selected, apply lure to wicks in the field at each trap site:

- Remove trap lid.
- Use the droppers to apply 2 ml of lure to the wick in each trap without any spillage on the ground or in the trap
- Once lure has been applied, do not let the wick touch trap sides.

Replace lid and hang trap in selected tree.

Trap Placement

1. Hang trap in tree using the wire hanger, preferably no less than 2 metres from the ground, minimum height 1.5 metres.

2. Loop wire hanger over branch, bend wire and twist to secure firmly.
3. Bend wire to form a hook, and hang trap from this to enable easy removal if required during servicing. Set up hooks so that wind cannot blow trap off.
4. Ensure the trap hangs freely and the only point of contact with the tree is via the wire hanger. Any other contact will provide access for ants.
5. Apply ant protectant (sticky or greasy paste) as supplied to wire hanger: this stops the ants and other scavengers from crawling down the wire.
6. Mark down days when the traps are to be visited on a wall planner (1998 planner appended) or in a diary. Mark in days when flies are collected (once every 12 - 16 days), and days when traps are to be re-lured (once every 12 weeks). Update regularly!

Trap Clearance

1. At specified times, visit sites.
2. Prepare labels for samples specifying:
 - Clearance date
 - Trap site (unique code or name)
 - Lure type
 - Collector's name.

Eg **23 May 1997, Allwood's House, Suva, Cue Lure, Ema Vueti and Laisa ralulu.**

3. Avoid contamination using systems detailed in "**Setting up Traps**" - ie use two people to clear traps, or clear cue lure and methyl eugenol traps at different times, or wash hands thoroughly after clearing each trap.
4. Empty flies from traps into cardboard specimen box without any spillage, select correct label, place inside with flies together with a pinch of thymol to prevent growth of fungi, and close lid securely.
5. Instead of labels, it is also acceptable to write the collection data on each specimen box. Either way, use biro or pencil and avoid water-based inks, and ensure this information is always provided for each sample.

Postage of Flies for identification.

1. Pack specimen boxes inside a cardboard carton, using crumpled paper as packaging to prevent crushing.
2. Wrap carton and post flies to:

Regional Management of Fruit Flies in the Pacific
Secretariat of the Pacific Community (SPC)
Private Mail Bag, Suva, Fiji
Attention Ema Tora Vueti

The SPC Fruit Fly Entomologist will provide feedback reports on species identifications, condition of flies and occurrence of lure responses that indicate contamination of traps has occurred.

Trap Maintenance

1. Every 12 weeks, maintain traps
2. Check trap for damage, and repair/replace if broken:
 - Broken hangers: repair by replacing wire
 - Brittle traps with cracks: use again if still fly-tight, note problem and schedule in replacement
 - Brittle traps broken beyond re-use: discard and replace.
3. Discarded traps must be placed inside a plastic bag which is then tied off, removed and destroyed, otherwise they will interfere with operation of new traps. Burn the old traps or bury them at 0.5 metres deep.
4. Re-apply 2 ml of lure to wicks. Take specified precautions regarding contamination of surfaces and mixing lures (ie either use 2 people, relure at different times or wash hands thoroughly after each trap)
5. Re hang traps in trees in same location, and ensure they hang freely without touching leaves or branches.
6. Apply ant protectant as provided to wires.

INSTRUCTIONS FOR QUARANTINE SURVEILLANCE FRUIT COLLECTIONS

Fruit collection strategy

If fruit has not been collected before, fruit collected from any unsprayed situation in vegetated areas will provide basic information about fruit flies that are present. As with trapping, first collections are likely to come from office grounds, research farm orchards, or the gardens of people who either work on fruit flies or who have some connection.

To detect non-lure responsive species and also to establish baseline information on the host range and pest status of fruit flies in a country, fruit collections covering main towns, villages and typical rain forest are required. It is likely that it will be most convenient to conduct this work in association with trapping. As with trapping, sites where fruit collections are taken may range from approximately ten in a small country to more than fifty in a larger place. Between one to two years input will obtain data on the abundant species that are present, and records providing data on percentage of infested samples and numbers of flies reared from samples will indicate host range, relative abundance and pest status.

As with trapping, it is important that progress towards establishing a permanent and sustainable fruit collection programme for quarantine surveillance is made as quickly as possible. To achieve this, regular fruit collections are required in places where there is risk of exotic fruit fly establishment (eg from locations around quarantine surveillance trapping sites), so that any exotic species that don't respond to lure can be detected.

General Activities

1. Depending on strategy as above, fruit is collected from convenient locations. For quarantine surveillance, this is likely to be around or close to quarantine surveillance trapping sites.
2. Fruit collection consists of walking through the locality, identifying trees with fruit and collecting from them. Sound (not rotten) windfall fruit is collected as well as fruit on trees. Full sized fruit are preferred, both unripe and ripe.
3. As far as possible, fruit at different stages of maturity are kept separate: this is easily achieved with large fruit, and difficult with small berries.
4. Collected fruit are placed in paper bags and labelled.

5. Every effort is taken to avoid exposing fruit to extreme temperatures, particularly to the sun.
6. As soon as possible after collection, fruit are taken to an incubation facility for further processing.
7. Depending on its location in relation to fruit sources, this facility is a potential quarantine risk and without precautions could result in undesirable establishment of a pest fruit fly in an area that was previously free from this species.

Specific Details

A fruit incubation facility

Before collecting fruit, make arrangements for a room with adequate ant-free surface to hold plastic containers of fruit. Either a table or shelving will suffice for this. The room needs to be cool (below 30 °C, maximum temperature 32 °C), free from rodents, and well shaded for most of the day, as direct sunlight will heat samples and kill any fruit flies present. Ant free shelving can be organised relatively cheaply by placing table or shelf legs in water or oil filled pots, and ensuring there is no contact with walls.

Quarantine security needs to be taken into account if samples are to be processed from islands or places that are some distance away (eg more than 200 km away), as these locations may have undesirable species of fruit fly that should not be spread. Basic quarantine security would consist of fly tight walls and doors, screened windows and ventilation ducts, and a procedure to govern entry and exit and method of operating in the room.

Preparations for field work

1. Select sites for fruit collections bearing in mind above considerations about purpose of collection ie initial appraisal, capture of biological information or quarantine surveillance.
2. Assemble supplies of approx. 30 large paper bags, 10 plastic supermarket carrier bags, and permanent marker pens.
3. If collecting in gardens of people who are not acquaintances, prior to collections, either consult with occupiers to obtain approval and support for fruit collection, or else obtain a letter of authority (from the chief quarantine or plant protection officer or person with appropriate standing in the community) which will assist with obtaining permission during the field work.

4. Arrange helpers to gather and carry samples. For the first collection in a location, 1 - 2 helpers would be adequate for an initial trial, and these numbers can then be increased or reduced as appropriate for later collections.
5. Brief helpers about tasks to be carried out, using these instructions as the basis.

Collecting Fruit

1. Collect any fruit available at the time of collection and within easy access, particularly:
 - Mature and ripe guava
 - Mature and ripe Pacific almond
 - Mature and ripe mango
 - Green, mature and ripe papaya
 - Green, mature and ripe citrus
 - Mature and ripe avocado
 - Mature and ripe chilli and capsicum
 - Mature and ripe eggplant and tomato
 - Mature and ripe squash, gourd, marrow, zucchini etc
 - Green and ripe banana, green plantain
 - Mature and ripe rainforest fruit.
2. Walk through the locality, identify fruiting trees and collect fruit from them, including fruit on tree and unrotten windfalls.
3. Avoid taking more than 5 - 10 % of the fruit on a tree to avoid any conflict with owners, unless approval has been provided; do not damage trees.
4. Collection methods include hand picking from the ground or climbing the tree if safe to do so, using long sticks to prod or twist off fruit, and throwing sticks to knock fruit off. Care is required with thrown sticks to ensure no one is hit and injured.
5. Place fruit in paper bags only and label the bags with permanent marker; put different stages of maturity in different bags as far as possible: this is easy for large fruit, and difficult for small berries. Do not put fruit into plastic bags.
6. Use supermarket bags for carrying samples: place a number of samples in one bag, but take care to ensure that soft and delicate fruits are not squashed and that each paper bag is tightly sealed so maggots cannot escape or contaminate other samples. Avoid overloading, and put soft fruit on top.

7. If it is raining it may be necessary to repack later in dry paper bags and re-label. Dry out the wet bags if still intact for re-use.
8. Keep fruit cool, and do not leave bags of fruit in the sun. Cover samples in vehicles with eg banana leaves.
9. As a general guide, aim to collect a variety of fruit to produce a total collection per day of 20- 35 kg, depending on availability, and spread between 20 - 40 samples of as many different types as possible.

Labelling samples

1. A sample consists of fruit collected from one tree, all fruit at one stage of development, excepting small berries where separation is difficult. Where large samples are taken, more than one bag may be required. Label each bag with the following information:
 - If known, the name of the fruit
 - Maturity stage
 - Location where collected
 - Collection date: day, month
 - Collector(s), in case person needs to be contacted for information about the location of a tree.
2. Maturity stages of fruit are as follows:
 - G Immature, on tree
 - M Full size, unripe, on tree
 - R Ripe on tree
 - FM Fallen, full size but unripe
 - FR Fallen, ripe.

Incubating fruit

1. Ensure availability of :
 - Plastic containers, between 2 – 4 litre, and smaller sized ones (approx 500 ml) for small samples and collecting juice from large fruit; these are provided in the kit,
 - Lids for these containers with centres cut out and removed to leave an intact rim,
 - Nylon gauze cut into squares to fit over the top of containers and be fixed in place with the lid rims,
 - Chicken wire squares to fit over small plastic trays,
 - Sieved (2 mm mesh sieve) sterilized sawdust from untreated timber obtained from the local saw mill, or if not available, washed sand (preferably not from the beach, and if so, needs thorough washing to remove all salt),
 - Photocopies of data sheets (single sheet attached to be used for copying) held in hard back ring binder or equivalent secure filing system.
2. Allocate each sample a unique number and label container; masking tape stuck to container with information written on in permanent marker is ideal.
3. Record data: sample number, location where collected, collectors, date and plant identification (common name adequate until scientific name obtained)..
4. If plant cannot be identified, retain sample of fruit, leaves and flowers and place to dry in the sun inside a labelled paper bag. These samples will enable later identification.
5. Place fruit on a small quantity of untreated sawdust (approx 50 – 100 ml) inside the labelled container for any larvae to pupate in.
6. Large soft fruit (eg pawpaw) that break down and produce large amounts of juice must be placed over plastic trays: bend a square of chicken wire over the tray, place nylon gauze on this to stop

larvae from passing through, and then sit the fruit on top of all this. The tray and fruit are then placed on sawdust in a large 4 litre container.

7. After 14 days remove fruit, carefully check for any pupae present (these look like brown seeds about 3 mm long) and then incubate these in the container in the sawdust to emerge.
6. Keep the sawdust moist but not wet until flies emerge. The pupae will most probably have died if there is no emergence within one month.
7. Leave emerging flies in the container for three days, and feed them by placing a small amount of sugar and a 6 cm x 6 cm square of wet sponge on top of the gauze. This allows colouration to develop. Keep the sponge wet.
8. Kill flies by placing them in a freezer for an hour, count them and record information on data sheets.
9. Place all flies (parasites are required as well as fruit flies) in cardboard specimen boxes with some thymol and label them with sample number, collection date and host identification.
10. Post flies to SPC Entomologists for identification along with flies collected from traps.
11. Update data sheets once identifications of flies have been obtained: record species name and initial the entry. The entomologist will also indicate presence of parasites, and record this information as well.
12. Ensure that correspondence concerning identifications of new recordings (ie first identification of a new species to the country) are filed securely.

Annex 11. Definitions and abbreviations (adapted from FAO Guidelines for pest eradication programmes)

Area	An officially defined country, part of a country or all or parts of several countries
AQIS	Australian Quarantine Inspection Service
CAB	Commonwealth Agricultural Bureau
CABI	CAB International, see www.cabi.org
Containment	The application of phytosanitary measures in and around an infested area to prevent the spread of a pest.
CSIRO	Commonwealth Scientific Industrial Research Organisation
Delimiting survey	Survey conducted to establish the boundaries of an area. In this case to establish the boundaries of an area infested by a pest.
Endangered area	An area where a pest can become established and cause an important loss.
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled

Eradication	Application of phytosanitary measures to eliminate a pest from an area
ERMC	Emergency Response Management Committee
ERP	Emergency Response Plan
Establishment	A pest will remain for the foreseeable future within an area after entry.
National exotic pest list	The list of pests that a country or territory does not have and will consider eradicating or managing, if detected.
NGO	Non government organisation
Occurrence	The presence in an area of a pest officially reported to be indigenous or introduced and/or not officially reported to have been eradicated.
Outbreak	An isolated pest population, recently detected and expected to survive for the immediate future.
Pacific Island Countries and Territories (PICTs)	The Pacific island nations and Territories that are member countries of the Secretariat of the Pacific Community.
Pest	Any species, strain or biotype of plant, animal or pathogenic agent, injurious to plants, or plant products.

Pest free area	An area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained.
Phytosanitary measure	Any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of pests.
PICTs	Pacific Island Countries and Territories
PPS	(National) Plant Protection Service
Quarantine pest	A pest of potential economic importance to an endangered area. The pest is either not yet present there, or present but not widely distributed and being officially controlled.
Regulated article	Any plant, plant product, storage place, packaging, conveyance, container, soil and any other organism, object or material capable of harbouring or spreading pests, deemed to require phytosanitary measures, particularly where international transportation is involved.
SPC	Secretariat of the Pacific Community
Spread	Expansion of the geographical distribution of a pest within an area.
Suppression	The application of phytosanitary measures in an infested area to reduce pest populations and thereby limit spread.

Surveillance	An official process which collects and records data on pest occurrence or absence by survey, monitoring or other procedures.
Survey	An official procedure conducted over a defined period of time to determine the characteristics of a pest population or to determine which species occur in an area.
Treatment	Officially authorised procedure for the killing, removal or rendering infertile of pests.