



# Pacific Horticultural and Agricultural Market Access Program (PHAMA)

Report to the Samoa Market Access Working Group

SAMOA12: Improved market access for Cordyline foliage into New Zealand

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## Abbreviations

<b>Abbreviation</b>	<b>Description</b>
IHS	Import Health Standard (of NZ MPI)
MAF	Ministry of Agriculture and Fisheries (Samoa)
MeBr	Methyl bromide
NPPO	National Plant Protection Organisation
NZ MPI	New Zealand Ministry for Primary Industries
PFA	Pest Free Area
PFPP	Pest Free Place of Production
SFA	Samoa Farmers Association
SMAWG	Samoa Market Access Working Group
SPC	Secretariat of the Pacific Community
SPS	Sanitary and Phytosanitary
WTO	World Trade Organization

## Executive Summary

Foliage of Cordyline (ti) and Dracaena (lauti) was identified by the SMAWG in November 2012 as a market access priority into New Zealand. This activity was to review the existing export requirements, identify any trials or surveys that may be required and, pending endorsement by the SMAWG, conduct the required trials or surveys and prepare a submission to NZ MPI. This interim report covers the desk-based analysis that was done to review the existing requirements and identify any trials or surveys that may be required.

The existing access into New Zealand allows for cut foliage and branches of Cordyline and Dracaena. It is understood that the market access priority for Samoa is for cut foliage only (that is, for leaves and attached petiole but no branches or stems). From the analysis done so far, the foliage of Cordyline and Dracaena for export from Samoa into New Zealand would need:

- Methyl bromide fumigation (under vacuum);
- Fungicide and possibly insecticide treatment (14 days and 5 days before export);
- Devitalisation treatment (e.g. dipped in herbicide);
- Inspection;
- Phytosanitary Certification; and
- Secure packaging.

A range of possible issues have been identified to implement the existing requirements relating to:

- Packaging materials;
- Inspection, monitoring and recording of pre-export activities;
- Fumigation, hot water, fungicide & insecticide treatment, and devitalisation; and
- Content of the pest list in the Import Health Standard.

Research trials would be needed for all of the treatment options to test their effects on quality and shelf-life of the foliage and, in some cases, their efficacy. Suitable equipment and procedures would also need to be developed and tested for each type of treatment. New pest surveys would be useful for the detailed planning of the research trials and to provide guidance for the phytosanitary inspections that MAF Quarantine Division would need to do.

It is recommended that the MAWG consider the issues that have been identified to implement the existing requirements for exporting Cordyline and Dracaena foliage to New Zealand and if it is a priority to try and resolve them. If confirmed as a priority, it is recommended that MAF Quarantine Division begin negotiations with NZ MPI to resolve the identified policy issues for the various treatment options and updating of the IHS.

Depending on progress of the negotiations between NZ MPI and MAF Quarantine Division, it is recommended that the components of the proposed research trials and pest survey work be prioritised and then started. It is recommended that the identified issues relating to packaging, inspection and monitoring & recording of pre-export activities be followed-up once it is clearer how the policy issues, trials and surveys have progressed.

## Background

Foliage of Cordyline (ti) and Dracaena (lauti) was identified by the SMAWG8 meeting in November 2012 as a market access priority into New Zealand following endorsement of the market access feasibility study conducted in October 2012 (PHAMA Technical Report 37). This activity was to be in two parts with the first part to include a review of the existing requirements for exporting to New Zealand and identification of any trials or surveys that may be required (see Appendix A for the scope of the activity). Pending endorsement by the SMAWG, the second part of this activity would include conducting any required trials or surveys and preparing a submission to NZ MPI.

This interim report covers the desk-based analysis done for the first part of this activity.

The existing access into New Zealand allows for cut foliage and branches of Cordyline and Dracaena. It is understood that the market access priority for Samoa is for cut foliage only (that is, for leaves and attached petiole but no branches or stems).

## Existing requirements to export Cordyline & Dracaena foliage to New Zealand

### 2.1 Overview of Import Health Standard

The requirements to export foliage of Cordyline (ti) and Dracaena (lauti) to New Zealand and specified in the *Import Health Standard Cut Flowers and Branches Cordyline and Dracaena species from All Countries*<sup>1</sup>. The Import Health Standard (IHS) was issued in March 2002 and it has not been changed or updated since then. The IHS was developed based on a risk analysis conducted by NZ MPI. The IHS<sup>2</sup> and risk analysis<sup>3</sup> were both publically released for comment in November 2001. The risk analysis was subsequently changed based on comments received but the IHS was not affected.

Like other IHS' that Samoa has for New Zealand, this IHS includes general requirements such as for packaging and labelling plus a range of specific requirements for a wide range of pests and diseases.

The IHS covers access for cut foliage and branches of Cordyline and Dracaena with these plant parts defined as:

- 1) *Fresh parts of plants intended for decorative use and not for planting.*
- 2) *For the purposes of this standard cut flowers and branches excludes roots or viable seeds.*

General requirements are that:

- Only inert/synthetic material may be used for the protection, packaging and shipping materials.
- The foliage must not be shipped or contained in free-standing water.
- The foliage must be packed and shipped in a manner to prevent infestation and/or contamination by regulated pests<sup>4</sup>.
- NZ MPI will check the documentation on-arrival and visually inspect the consignment for freedom from regulated pests, extraneous plant material (e.g. leaves, twigs, soil) and seeds.

Specific requirements are that:

- The NPPO must inspect the consignment for all the visually detectable regulated pests specified by NZ MPI.
- The NPPO must ensure that the foliage has been treated as specified by NZ MPI.
- A phytosanitary certificate issued by the NPPO must accompany the consignment.
- Consignments will be audited on-arrival (at the importers expense) to check that the devitalisation treatment has been successfully undertaken.

The acceptable treatment options are specified for each regulated pest and include one or more of:

- been sourced from a *pest free area* that is free from the regulated pest(s);

<sup>1</sup>Available on the NZ MPI website at [www.biosecurity.govt.nz/imports/plants/standards/cordyline-dracaena.htm](http://www.biosecurity.govt.nz/imports/plants/standards/cordyline-dracaena.htm)

<sup>2</sup> Draft Import Health Standard: Cut Flowers and Branches – *Cordyline* and *Dracaena* Species from all Countries. Publically released 8 Nov. 2001 via the WTO's SPS notification system: G/SPS/N/NZL/159.

<sup>3</sup> Import Risk Analysis of *Cordyline* and *Dracaena* Cut Flowers and Branches for the Development of a Generic Import Health Standard (96 pages). Publically released 9 Nov. 2001 via the WTO's SPS notification system: G/SPS/N/NZL/158.

<sup>4</sup> "Pests" is used in the IHS to include all types of pests and diseases including insects, mites, snails, fungi, bacteria etc.

- been sourced from a *pest free place of production* that is free from the regulated pest(s);
- *methyl bromide fumigation*, within 5 days of shipment the consignment, at a NZ MPI approved temperature/dosage/duration combination, under vacuum (88 kPa), gradually returning to atmospheric pressure by the end of the period;
- full immersion in *water* held at more than 50°C (120°F) for not less than 14 minutes, within 5 days of shipment the consignment;
- full exposure to *vapour heat* for not less than 1 hour at more than 46.6°C (116°F) and 90 to 98% relative humidity, within 5 days of shipment the consignment;
- been *sprayed to run off* (on all above-ground plant parts) with a NZ MPI approved fungicide and insecticide combination, 14 days AND 5 days prior to harvesting the foliage for export;

**AND**

- been *devitalised* (rendered non-propagable) using an effective devitalisation treatment or process.

If regulated pests are found by NZ MPI on the foliage or packaging during on-arrival inspection the action taken will depend on the pest that is found but would include treatment (where possible), re-shipment, destruction +/- suspension of trade. Trade would be suspended if any of the 16 pests with “high” risk level is intercepted on-arrival. Trade would also be suspended if consignments were found to contain material that was propagatable.

## 2.2 Overview of the pest list in the Import Health Standard

The pest list in the IHS includes a very large number of regulated and non-regulated pests that are potentially relevant for Cordyline and Dracaena foliage from Samoa. The pest list includes 16 “higher risk” regulated pests (1 fungus, 13 insects, 1 mite and 1 snail) and 203 “lower or unknown risk” regulated pests (110 fungi, 2 viruses, 84 insects, 5 mites, 1 snail and 1 nematode). Risk management measures are required for all of the regulated pests except for the nematode.

The important difference between “higher risk” and “lower or unknown risk” regulated pests is what happens if they are intercepted on-arrival in New Zealand:

- Higher risk pests: re-ship or destroy, trade suspended
- Lower or unknown risk pests: treatment, reshipping or destruction.

The pest list also includes risk management options that need to be applied pre-export for each regulated pest and include:

- Pest Free Area or Pest Free Place of Production
- Fumigation
- Heat
- Visual inspection
- Fungicide
- Devitalisation.



Different combinations of these options are offered depending on the pest. For example, visual inspection (to confirm freedom) may be acceptable; fumigation or heat may be required; or fumigation may be a mandatory requirement.

The pest list includes 105 non-regulated pests (65 fungi, 1 phytoplasma, 36 insects and 3 mites). Risk management measures are not required for the non-regulated pests but due to the large number of pests involved it could be difficult to easily decide during the export process if an intercepted pest was regulated or non-regulated. For example, the symptoms caused by many of the regulated and non-regulated fungi would be quite similar; the insects may be present as very small immature life-stages; and there are numerous closely related insects that are regulated (e.g. the mealybug *Planococcus minor*) or non-regulated (e.g. the mealybug *Planococcus citri*).

## 2.3 Likely quarantine pests and diseases for foliage from Samoa

At least 30 of the regulated pests are present in Samoa including at least five “higher risk” pests. The table below lists these five “higher risk” pests and examples of the other likely quarantine pests to show the range of pre-export treatment options currently available in the IHS. The likely quarantine pests and diseases include fungi, insects (e.g. beetle, borer, mealybugs, scales, weevil, whitefly) and a snail. From the analysis done so far, only one of the likely quarantine pests (ti scale - *Pinnaspis buxi*) has specifically been recorded on Cordyline or Dracaena in Samoa.

Scientific name	Common name	Treatment options*
<b>HIGHER RISK PESTS</b>		
<i>Planococcus minor</i>	Pacific mealybug	PFA, Fumigation, Heat
<i>Pseudococcus jackbeardsleyi</i>	mealybug	PFA, Fumigation, Heat
<i>Xyleborus ferrugineus</i>	Ambrosia beetle	PFA, PFPP, Fumigation
<i>Xyleborus perforans</i>	island pinhole borer	PFA, PFPP, Fumigation
<i>Bradybaena similaris</i>	white snail	PFA, PFPP, Fumigation, Heat
<b>LOWER OR UNKNOWN RISK PESTS</b>		
<i>Phyllosticta cordylines</i>	leaf spot (fungal)	PFA, Fungicide & Devitalisation
<i>Aleurodicus dispersus</i>	spiralling whitefly	PFA, PFPP, Visual inspection
<i>Dysmicoccus brevipes</i>	pineapple mealybug	PFA, Fumigation, Heat
<i>Pinnaspis buxi</i>	ti scale	PFA, Fumigation, Heat

\*PFA = Pest Free Area; PFPP = Pest Free Place of Production; see the next sections for more details on what the treatment options involve.

## 2.4 Likely risk management requirements for foliage from Samoa

From the analysis done so far, the foliage would need:

- Methyl bromide fumigation;
- Fungicide and possibly insecticide treatment (14 and 5 days before export);
- Devitalisation treatment (e.g. dipped in herbicide);
- Inspection;
- Phytosanitary Certification; and
- Secure packaging.

Some of the quarantine pests have the option of fumigation or heat treatment but two of the “higher risk” pests only have the fumigation option. The PFA and PFPP options for the likely quarantine pests are not considered feasible for this commodity (see the *Issues for implementing existing requirements* section).

## Issues for implementing existing requirements

This section describes the possible issues that have been identified for growers, exporters and the NPPO to implement the existing requirements for exporting Cordyline and Dracaena foliage to New Zealand. The issues are described for each component of the existing requirements and then summarised. Issues have also been identified on the content of the pest list that is included in the IHS and these are also described.

### 3.1 General requirements

The general requirements for packaging and labelling will need some investigation for what materials are needed and available, how to apply them and the costs but these are practical issues that should be able to be overcome jointly by exporters and MAF Quarantine Division.

The requirement that NZ MPI will check the documentation and visually inspect the foliage on-arrival is a standard requirement for all imports and emphasises the importance of only exporting consignments that comply.

### 3.2 Specific requirements

The requirement that the NPPO must inspect the consignment for all the visually detectable regulated pests is relatively complex but is an activity that MAF Quarantine Division has been increasing their capability in recent years. Complexities include: how to sample and handle the foliage; appropriate techniques and equipment to be able to detect the relatively small pests; knowledge of what the symptoms of diseases are; determining if a pest is alive or dead; being able to adequately identify any live pests that are detected; and any health and safety issues associated with handling foliage that has been treated with pesticides.

The requirement that the NPPO must ensure that the foliage has been treated will need to be included as part of a system that MAF Quarantine Division will need to develop to monitor and record the pre-export activities. For example, it could include registration/approval of exporters, guidelines or other awareness material on how to conduct the treatments, audits, monitoring of treatments and a record keeping system.

The requirement that NZ MPI will sample consignments on-arrival to audit the devitalisation treatment may affect the profitability of the exports (as it would be done at the importers expense) and emphasises the importance of developing and using a treatment that is effective.

### 3.3 Treatment options

#### 3.3.1 Pest Free Area and Pest Free Place of Production

Pest Free Area is an option for all of the regulated pests in the IHS. In practice, this could be applied because the pest is absent from Samoa completely or it is absent from certain areas in Samoa. Due to the potential to freely move foliage or other host material within Samoa it is not considered feasible to try and establish pest free areas within Samoa for this commodity. Using the Pest Free Area option would also require strict systems to ensure that the foliage for export was sourced from one of the designated areas and protected from infestation if it was transported through other areas.

Pest Free Place of Production is an option for 8 of the 16 regulated pests with “high” risk level and approximately 30 other regulated insect pests. It is not available for any of the fungal diseases. As for pest free areas, it is not considered feasible to try and establish pest free places of production within Samoa for this commodity.

The Pest Free Area option is relevant for regulated pests that are known not to occur in Samoa. Some information is available on the pests that are associated with Cordyline and Dracaena foliage but specific survey work has not been done. General and specific surveys would be needed to provide more evidence on which of the regulated pests are considered to be absent from Samoa (rather than just not recorded yet). This issue is covered in more detail in the *Possible surveys required on pests and diseases of foliage* section.

It is important to note that even if the Pest Free Area option is used for some pests, there are other regulated pests that mandatory treatment is currently required for. For example, the two mealybugs *Planococcus minor* and *Pseudococcus jackbeardsleyi*.

### 3.3.2 Methyl bromide fumigation

The option for methyl bromide fumigation included in the IHS requires that the treatment is done under vacuum (88 kPa) according to one of the following schedules:

Temperature	Initial dosage	Exposure time
10-14°C	50 g/m <sup>3</sup>	3 hours
15-25°C	50 g/m <sup>3</sup>	2 hours
>25°C	32 g/m <sup>3</sup>	2 hours

These dosages are relatively high (e.g. compared to the NZ MPI approved treatment FVT1 for fruit, vegetables or foliage found to be infested with regulated insects on-arrival into NZ) but the greater concern is that the treatment has to be done under vacuum. Conducting fumigations under vacuum is more complex than under normal atmospheric pressure and the required equipment is not currently available in Samoa. It is also not known what affect the treatment would have on the quality or shelf-life of the foliage.

Negotiation with NZ MPI would be needed on acceptance of alternative fumigation schedules that could be done under normal atmospheric pressure. A starting point for the negotiations (e.g. as part of a technical submission) are the treatments approved by NZ MPI for material that requires treatment on-arrival (e.g. if found to be infested). These treatments are specified in the *Approved Biosecurity Treatments for Risk Goods Directed for Treatment standard*<sup>5</sup> and some of the relevant treatments are given in Appendix B. The standard includes several fumigation options such as treatment FVT1 (MeBr) and NST6 (MeBr + phosphine) and they are all applied at normal atmospheric pressure.

If NZ MPI was willing to consider alternative fumigation schedules, research would be required to test a range of dose/time combinations as well as developing suitable equipment and procedures.

### 3.3.3 Hot water

The option for hot water treatment included in the IHS requires that the foliage is fully immersed for not less than 14 minutes in water that is held at more than 50°C. Hot water has been successfully used for quarantine treatment of foliage and flowers exported from Hawaii and it is potentially a viable

<sup>5</sup> Available on the NZ MPI website at <http://www.biosecurity.govt.nz/border/transitional-facilities/bnz-std-abtrt>

option to develop in Samoa. As was needed for the export of limes from Samoa, research would be required to test a range of temperature/time combinations as well as developing suitable equipment and procedures. For example, building and testing water baths that are large enough to fit the foliage and capable of holding water at suitable temperatures; testing the effect of the hot water on the quality and shelf-life of the foliage. Depending on the results of the trials, negotiation may be required with NZ MPI for acceptance of alternative temperature/time combinations.

Hot water is not currently approved for some of the “higher risk” pests so their only pre-export treatment option would be fumigation. Negotiation with NZ MPI to add the heat treatment option for these pests would be worth pursuing so it could be used against all of the insect pests.

### 3.3.4 Vapour heat

The option for vapour heat included in the IHS requires that the foliage is treated for not less than 1 hour at more than 46.6°C and 90 to 98% relative humidity. Vapour heat treatments are normally conducted on fresh fruit and in specialised chambers, for example mangoes exported from a range of countries to New Zealand and Japan. The concept is similar to the High Temperature Forced Air (HTFA) treatments used in the Pacific region. The required equipment is not currently available in Samoa and it is not known what effect the treatment would have on the quality of the foliage.

The required treatment schedule is similar to what is required for mangoes exported to New Zealand (e.g. 48°C/20mins from India, 46°C/10 or 70mins from Philippines, 46.5°C/30mins from Vietnam).

### 3.3.5 Fungicide and insecticide sprays

The option for fungicide and insecticide sprays included in the IHS requires that the foliage is sprayed to run off (on all above-ground plant parts) with a NZ MPI approved fungicide and insecticide combination, 14 and 5 days prior to harvesting the foliage for export. It is also noted in the IHS that additional applications of the treatment may be required in high rainfall areas.

The IHS specified three NZ MPI approved fungicide and insecticide combinations and noted that other combinations may be approved on application to NZ MPI. The three approved combinations are:

- Benomyl and Methomyl, or
- Captan and Cypermethrin, or
- Thiram and Cypermethrin.

The IHS specifies that treatment with fungicide is an option for all of the regulated fungi but treatment with insecticide does not appear to be an option for any of the regulated insects. Clarification from NZ MPI is needed on what regulated pests the insecticide treatment can be used for.

In practice it would be difficult to ensure that the foliage for export has been appropriately treated 14 and 5 days before harvest (and potentially more depending on rainfall). Depending on acceptance by NZ MPI, it would be more practical to have a single application done post-harvest and at a central facility. Approval for other treatment options (e.g. see FNS6 in Appendix B) could also be requested depending on the pesticides readily available in Samoa. Research would be required to test a range of pesticide combinations as well as developing suitable equipment and procedures.

### 3.3.6 Devitalisation

The mandatory requirement for devitalisation requires that the foliage has been rendered non-propagable using an effective treatment or process. No specific devitalisation treatments are specified in the IHS but treatments approved by NZ MPI for on-arrival use (see FNS9 in Appendix B) require that stems are dipped in herbicide solution (Glyphosate or Oryzalin) for 20 minutes. It is not known if these treatments would be effective to devitalise Cordyline or Dracaena foliage or what the effect would be on the quality and shelf-life. Practical issues would also need to be investigated on how to apply the treatment including suitable equipment and procedures.

A possible alternative approach is to request that NZ MPI approve that devitalisation treatment is not required if only leaves (i.e. leaf blade and petiole but no stem) are exported.

### 3.4 Details of the pest list in IHS

From the initial review of the pest list in the IHS it is clear that the content could be updated and made more consistent with the risk management measures applied for other commodities. This could include: updating which pests are now known to be present in NZ (so should be non-regulated instead of regulated), confirming that the most up-to-date scientific names are used, continuing checking existing records of which pests are present in Samoa and on what hosts, and comparing the required risk management measures with other relevant IHS.

This work would need to be done in collaboration with NZ MPI to ensure that there was agreement on the technical details and that the IHS could be updated and re-issued.

For example, pests that are listed as regulated in the IHS but known to occur in New Zealand or are alternative names for other pests on the list include:

<i>Botryosporium longibrachiatum</i> , <i>Nectria flavolanata</i> (fungi)	Present in NZ <sup>6</sup> ; not included in BORIC <sup>7</sup>
<i>Ceratocystis paradoxa</i> , <i>Curvularia brachyspora</i> , <i>Fusarium phyllophilum</i> (fungi)	Listed as non-regulated in BORIC
<i>Fusarium proliferatum</i> var. <i>minus</i> (fungus)	Is a synonym of <i>Fusarium phyllophilum</i>
<i>Leucaspis cordylinidis</i> (scale insect)	Listed as non-regulated in BORIC

For example, pests that are listed as “higher risk” in the IHS and would result in the consignment being re-shipped or destroyed and trade being suspended if intercepted on-arrival but have less stringent options in other IHS:

<i>Planococcus minor</i>	Samoa eggplant IHS (2005): treat, reship or destroy
<i>Pseudococcus jackbeardsleyi</i>	Taiwan litchi IHS (2007): treat, reship or destroy

<sup>6</sup>NZFUNGI database, available at <http://nzfungi2.landcareresearch.co.nz/default.aspx?NavControl=home>

<sup>7</sup>NZ MPI Biosecurity Organisms Register for Imported Commodities (BORIC) database which records organisms and whether they are regulated or non-regulated. Available at <http://www.mpi.govt.nz/biosecurity-animal-welfare/pests-diseases/boric>

### 3.5 Summary

In summary, the possible issues that have been identified to implement the existing requirements for exporting Cordyline and Dracaena foliage to New Zealand are:

- Packaging materials: investigation of what packaging materials are needed and available, how to apply them and the costs.
- Inspection: development of procedures for how to sample and handle the foliage; techniques and equipment to detect and identify pests and determine if they are alive or dead; investigation of any health and safety issues associated with handling foliage that has been treated with pesticides.
- Monitoring and recording of pre-export activities: development of a system by MAF Quarantine Division possibly including registration/approval of exporters, guidelines or other awareness material on how to conduct the treatments, audits, monitoring of treatments and a record keeping system.
- Fumigation: negotiation with NZ MPI on acceptance of alternative fumigation schedules that could be done under normal atmospheric pressure; research to test the effect of a range of dose/time combinations on the quality and shelf-life as well as developing suitable equipment and procedures.
- Hot water treatment: research to test a range of temperature/time combinations including efficacy to control pests and effect on quality and shelf-life; development of suitable equipment and procedures; negotiation with NZ MPI to approve heat treatment for all insect pests and potentially for acceptance of alternative temperature/time combinations.
- Insecticide treatment: clarification from NZ MPI on what regulated pests the insecticide treatment can be used for.
- Fungicide and insecticide treatment: negotiation with NZ MPI for acceptance of a single post-harvest application rather than two pre-harvest applications; identification of other pesticide options and approval by NZ MPI; research to test a range of pesticide combinations including effect on quality and shelf-life, potentially the efficacy to control pests and developing suitable equipment and procedures.
- Devitalisation: research to test a range of treatments including efficacy and effect on quality and shelf-life; development of suitable equipment and procedures; negotiation with NZ MPI for acceptance of acceptance of suitable treatments and/or an exemption from treatment if only leaf material is exported.
- Pest list in IHS: collaborative work with NZ MPI to review and update the pest list and associated risk management measures.

## Possible trials for risk management options

Based on the issues that have been identified to implement the existing requirements for exporting Cordyline and Dracaena foliage to New Zealand, research trials would be needed on aspects of methyl bromide fumigation, hot water treatment, fungicide & insecticide treatment, and devitalisation. The trials would need to test a range of treatment combinations (dose, temperature, time etc) as well as developing suitable equipment and procedures.

Before doing detailed planning any trials for methyl bromide fumigation it would need to be confirmed with NZ MPI that treatment at normal atmospheric pressure would be acceptable. Potential dose/time combinations to test could then be agreed between MAF Quarantine Division and NZ MPI.

Before doing detailed planning any trials for hot water treatment it would need to be confirmed with NZ MPI that this treatment option could be approved for all insect pests and that treatment schedules other than what is in the IHS could be considered.

Before doing detailed planning any trials for insecticides it would need to be confirmed with NZ MPI what regulated pests this treatment can be used for.

As described in the previous section, the trials would need to:

- Fumigation: test the effect of a range of dose/time combinations on the quality and shelf life of the foliage; develop and test suitable equipment and procedures. Only dose/time combinations already approved by NZ MPI (or considered equivalent) should be considered so the potential need for more complex trials to test efficacy is avoided.
- Hot water treatment: test a range of temperature/time combinations including efficacy to control pests and effect on quality and shelf-life.
- Fungicide and insecticide treatment: test a range of pesticide products and single or multiple applications including for effect on quality and shelf-life and potentially the efficacy to control pests. The need to test the efficacy of these treatments would depend on whether they were already approved by NZ MPI or not.
- Devitalisation: test a range of treatments including various herbicides and hot water.

Suitable equipment and procedures would also need to be developed and tested for each type of treatment.



## Possible surveys required on pests and diseases of foliage

The analysis done so far has found that there is only limited information available on the pests and diseases of Cordyline and Dracaena in Samoa. Having more information on the types of pests and diseases that are likely to be present on the foliage would be useful for the detailed planning of the trials for the treatment options and to provide guidance for the phytosanitary inspections that MAF Quarantine Division would need to do.

Gathering information on the pests (insects, mites, snails etc) is considered to be a higher priority than the diseases. This is because the mandatory fungicide and devitalisation treatments would need to be effective against all of the diseases and it is unlikely that different diseases could be distinguished during the phytosanitary inspections or determined to be alive or dead.

New survey work should initially focus on gathering foliage samples from locations that may be involved with supplying the export market. This may allow pests to be collected from foliage while it is still growing, as it is being selected for harvest and any material that is discarded due to blemishes or other quality issues.

The foliage should be thoroughly inspected, including under magnification, to determine where the pests may be present. For example, motile pests that could occur anywhere on the material, eggs that may be present in protected sites and immobile pests that may be more common in particular locations such as the underside of the leaf or on the stem area. This may result in a greater range of pests being collected and will also inform MAF Quarantine Division on what the phytosanitary inspections need to focus on.

Collaboration with SPC and NZ MPI (Plant Health and Environment Laboratory, Auckland) should be requested to assist with collection of samples and confirmation of the identifications.

## Recommendations

It is recommended that the MAWG consider the issues that have been identified to implement the existing requirements for exporting Cordyline and Dracaena foliage to New Zealand and if it is a priority to try and resolve them.

If confirmed as a priority, it is recommended that MAF Quarantine Division begin negotiations with NZ MPI to resolve the identified policy issues for the various treatment options and updating of the IHS.

Depending on progress of the negotiations between NZ MPI and MAF Quarantine Division, it is recommended that the proposed research trials and pest survey work is started.

It is recommended that the identified issues relating to packaging, inspection and monitoring & recording of pre-export activities be followed-up once it is clearer how the policy issues, trials and surveys have progressed.

## Limitations

URS Corporation Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of AusAID and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 18 April 2013.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between 19 April and 20 August 2013 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

## Appendix A

### Appendix A Scope of activity SAMOA12

**ACTIVITY TITLE:** Improved market access for Cordyline foliage into New Zealand

**BACKGROUND:** Commercial growers in Samoa have expressed interest in developing exports of Cordyline (ti) foliage to New Zealand. A generic Import Health Standard (IHS) for foliage of Cordyline and the closely related Dracaena into New Zealand was released in 2002 but to PHAMA's knowledge no trade is occurring. The IHS includes an extensive list of pests and diseases and associated risk management options. There has previously been considerable interest in New Zealand in the possible quarantine risks of these commodities as Cordylines, such as the cabbage tree, are endemic to New Zealand.

Pursuing improved access for Cordyline foliage was agreed at the SMAWG8 meeting in November 2012 following endorsement of the feasibility study that evaluated the potential for exporting foliage, pineapples and lemons to New Zealand (PHAMA Technical Report 37). The study concluded that Samoa was well placed to establish a small but viable export trade in foliage to New Zealand and recommended:

- To proceed with the development of the required pest list for the identified foliage products.
- To obtain funding for a SFA Field Officer to meet with the identified NZ buyer to discuss the specifics of exporting foliage to NZ and to test market samples of Samoan foliage.
- To facilitate quarantine clearance for samples of Samoan foliage to be taken to NZ by a SFA Field Officer.

On further review of the IHS, it has become clearer that a detailed assessment on the presence or absence of the identified pests and diseases in the IHS for Samoa is needed, what the applicable risk management option/s would be and if it would be feasible implementing these.

Progressing the recommendations for a SFA Field Officer to visit New Zealand is subject to the outcomes of this work and would be part of the expected phase 2 of PHAMA.

**SCOPE OF WORK:** In co-operation with Samoa MAF and industry, review the existing import requirements for Cordyline and Dracaena to New Zealand to:

- i) confirm quarantine pests and diseases for Samoa from NZ's list of quarantinable pests and diseases affecting Cordyline and Dracaena (as per NZ's 2002 generic IHS) and identify which of the existing risk management option/s would be required;
- ii) identify any other pests that may have entered Samoa since 2002 and are pests of Cordyline and Dracaena by screening the SPC PPD database and any other records, as required;
- iii) assess the feasibility of implementing the existing risk management option/s;
- iv) prepare requirements for any trials required to test the existing +/- alternative risk management option/s and oversee implementation of the trials;
- v) prepare requirements for any new survey work to determine the presence/absence of the pests and diseases listed in the IHS and oversee survey work;
- vi) prepare submission to NZ MPI detailing quarantine pests and intended risk management options.

## Appendix A

Assessment of the likely quarantine pests and potential issues in implementation of the applicable risk management option/s is to be a desk-based exercise. The in-country presence of the NMAC will support the consultations and collation of information during this stage.

Planning for the survey work is to include assisting MAF Quarantine to investigate options for collaboration with experts from New Zealand MPI's Plant Health & Environment Laboratory and survey participation by previous Samoan participants in MPI's diagnostics training program.

Assessing the feasibility of the risk management option/s is to include the practicalities of implementing these in Samoa and assisting MAF Quarantine to negotiate with NZ MPI on acceptable alternatives (e.g. fumigation at atmospheric pressure rather than under vacuum; devitalisation treatments).

### **DELIVERABLES:**

Interim report to SMAWG documenting:

- i) the likely quarantine pests for Samoan Cordyline and Dracaena foliage to New Zealand and what existing risk management option/s would be required;
- ii) identified likely issues for implementing the applicable risk management option/s.

In the event that the applicable risk management options require further investigation on their appropriateness or efficacy, then;

- iii) design of possible trials to test risk management option/s (fumigation, devitalisation);
- iv) recommended next steps including possible pest surveys and the design thereof.

If recommendations of the interim report are endorsed by SMAWG, provision of a final report documenting:

- v) results of any trials to test risk management option/s and survey work to determine the presence/absence of the pests and diseases listed in the IHS;
- vi) submission to NZ MPI with quarantine pests and intended risk management;
- vii) any recommended additional next steps.

**CONSULTATION WITH:** Key stakeholders that should be consulted in the process of undertaking this assignment include:

- i) Samoa MAF Quarantine and MAF Crops staff
- ii) New Zealand MPI
- iii) Relevant industry representatives including the Samoan Farmers Association.

**DURATION AND TIMING:** Up to 40 days in total, including travel and report writing. Input to commence approximately mid April 2013. Interim report to be completed by 30 May and subject to endorsement by the SMAWG the remaining deliverables to be completed during the expected phase 2 of PHAMA.

**TRAVEL SCHEDULE:** Canberra – Apia (return) pending endorsement of interim report.

## Appendix B

### Appendix B Extract of relevant treatments from the NZ MPI *Approved Biosecurity Treatments standard*

Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	
Insects only	FVT1	MeBr	Atm	48 g/m <sup>3</sup>	10-15	2 hrs	
		MeBr	Atm	40 g/m <sup>3</sup>	16-21	2 hrs	
		MeBr	Atm	32 g/m <sup>3</sup>	22- 27	2 hrs	
		MeBr	Atm	24 g/m <sup>3</sup>	28 – 32	2 hrs	
		MeBr	Atm	35 g/m <sup>3</sup>	10-15	3 hrs	
		MeBr	Atm	26.5g/m <sup>3</sup>	16-21	3 hrs	
Only for ants, aphids, earwigs, moths, psocids, thrips	FNS6	Pestigas (pyrethrum + CO2) + ECO2 Fume (Phosphine + CO2).		See Note 1 below	15 +	15 hrs	
Mites& insects		extend FNS6 to 24hrs		See Note 1 below	15 +	24 hrs	
Mites& insects	NST6	Phosphine+ CO2 + MeBr	Atm	3g/m3+5% CO2 13g/m3	15	4 hrs	
		Phosphine+ CO2 + MeBr	Atm	3g/m3+5% CO2 13g/m3	20	3hrs	
Insects only	FNS7	<u>Contact insecticides:</u> (Choose one, plus a systemic insecticide)		See Note 2 below.			
		800 g/L diazinon		0.5 ml/litre of water		15 mins	
		100 g/L dichlorvos		4 ml/litre of water		15 mins	
		25 g/L permethrin		1 ml/litre of water		15 mins	
		475 g/L primiphos methyl		1 ml/litre of water		15 mins	
		240 g/L taufluvallinate		0.4 ml/litre of water		15 mins	
		<u>Systemic insecticides:</u> (Choose one, plus a contact insecticide)					
		195 g/L acephate (soluble concentrate)		0.8 g/litre of water		15 mins	
970 g/kg acephate (water soluble granule)		1 ml/litre of water		15 mins			
500 g/L dimethoate		0.4 ml/litre of water		15 mins			

## Appendix B

Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time
		600 g/L methamidaphos 350 g/L imidacloprid Mineral spraying oils or surfactants		1.6 ml/litre of water 0.45 ml/litre of water See Note 3 below		15 mins 15 mins
Snails (molluscs) (except Giant African Snail)	FNS4 NST5	MeBr Methiocarb	Atm	48g/m <sup>3</sup> 0.75 g a.i./L	12 +	24 hrs 5 mins
Giant African Snail & Mediterranean White snail	VCE2	MeBr	Atm	118g/m <sup>3</sup> 105g/m <sup>3</sup> 86g/m <sup>3</sup>	10-15 16-20 21-25	24 hrs 24 hrs 24 hrs
Spiders	NST6	Details given above for mites & insects				
Fungi only	FNS8	thiophanate-methyl (e.g. Greenguard) <b>OR</b> 250 g/L chlorothalonil & 250 g/L thiophanate-methyl (e.g. Taratek 5F) <b>OR</b> Other treatments as approved by NZ MPI Mineral spraying oils or surfactants		6 ml/litre of water 3 ml/litre of water See Note 4 below See Note 3 below		15 mins
Devitalisation	FNS9	0.5 % a.i. Glyphosate <b>OR</b> 0.75% a.i. Oryzalin		See Note 5 below	15 +	20 min

Note 1: Spray with Pestigas (synergised pyrethrum with carbon dioxide as a carrier gas) at 4.4 g/m<sup>3</sup> (within an airtight enclosure or fumigation cell) and hold for 10 minutes. This is followed by a spray with ECO2 Fume (Phosphine with carbon dioxide as a carrier gas) to give a concentration of 700 ppm a.i./m<sup>3</sup> of PH<sub>3</sub> and hold for 15 hours at a minimum air temperature of 15°C.

Note 2: Contact and systemic insecticidal dips may be used instead of fumigation but only if the packaging material is separately fumigated or destroyed. Two chemicals (active ingredients) must be used for any treatment; one contact insecticide and one systemic insecticide must be used. Plants are to be immersed completely in the chemicals. The chemicals, if compatible, may be combined as a single treatment.

## Appendix B

Note 3: If a compatible (refer NZ Agrichemical Manual) adjuvant oil or a surfactant (improves wetting, penetration, adhesion) is used in the dip(s), the dipping time may be reduced from 15 min to 5 min but all air bubbles must have dispersed from the flower/foilage surface.

Note 4: All plants to be treated are to be immersed completely in the chemicals.

Note 5: Immerse the stems etc to within 50 mm of the flowers for 20 minutes. The temperature should be a minimum of 15°C high enough to ensure transpiration is taking place to render the consignment non-propagatable.





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