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Response

to “Passionfruit from Vietnam: biosecurity import requirements draft report” (‘The Report’)

Contents

Objection Overview: virus risk

While there are numerous points of contention within the draft report, this submission will focus only on the issue that poses the most immediate and potentially devasting risk to the Australian passionfruit industry, the **introduction of viruses** for which exclusion is the only control.

There are at least three potyviruses causing passionfruit woodiness disease present and widespread in Vietnam, and all three are aphid transmitted potyviruses (as well as other insects for example thrips). In Vietnam, "*disease caused by virus infection has become a major constraint for passionfruit production in recent years*"[1] and *"…outbreaks of passionfruit woodiness disease (PWD) have become a serious threat to production."* All three viruses have been isolated from passionfruit in Vietnam and shown to cause woodiness disease.[2] None of these viruses are known to occur in Australia and all are a potential threat to Australian passionfruit.

The three potyviruses of most concern to the Australian passionfruit industry and domestic passionfruit production are Eastern Asian passiflora virus (EAPV), passiflora mottle virus (PaMoV) and telosma mosaic virus (TelMV). These viruses are not present in Australia which is acknowledged in 'The Report'[3] and in the 9th Australasian Plant Virology Workshop (2010),[4] as well as in the Archives of Virology article: Indigenous and introduced potyviruses of legumes and *Passiflora* spp. from Australia: biological properties and comparison of coat protein nucleotide sequences (2011).[5]

Woodiness-causing viruses are common in Vietnam and mixed infections of PaMoV and EAPV cause a more severe disease than either virus alone.[6] Thus, there is the possibility that these Vietnamese potyviruses could occur as a mixed infection with existing Australian passionfruit potyviruses with a "synergistic effect" (see appendix 6) similarly resulting in more severe disease symptoms.[7]

'The Report' states there is potential for these viruses to be imported into Australia in the fruit as "*there is a possibility of the virus being present in fruit…and fruit harvested from infected plants may not show obvious symptoms, therefore, infected fruit may not be removed during harvest and post-harvest processes and could potentially be exported*."[8] It is assumed freedom from viruses in the exported Vietnamese fruit will be based on visual assessment. Visual symptoms will be variable and probably seasonal, likely asymptomatic and may not always be apparent on the fruit or the plants.

'The Report' does not acknowledge the virus risks outlined above, a conclusion that is clear in the assessments of "No"[9] "Assessment not required" [10], "Assessment not required" [11] and "No" [12] for the final four steps of the importation pathway. The critical error has occurred in the "Potential for

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[1] *Do D-H et al. Characterisation and Detection of Passiflora Mottle Virus and Two Other Potyvirus Causing Passionfruit Woodiness Disease in Vietnam. The American Phytopathological Society (2021).*

[2] *Ibid.*

[3] *Appendix B: Initiation and categorisation for pests of passionfruit from Vietnam p112 - 118*

[4] *Parry J, Parameter K, Ballard E, Thomas J (2010) Passionfruit viruses in Eastern Australia. Paper presented at the 9th Australasian Plant Virology Workshop, Melbourne, Australia, 16-19 November 2010.*

[5] *Coutts BA., Kehoe MA., Webster CG. et al. Indigenous and introduced potyviruses of legumes and Passiflora spp. from Australia: biological properties and comparison of coat protein nucleotide sequences. Arch Virol **156**, 1757–1774 (2011). https://doi.org/10.1007/s00705-011-1046-4*

[6] *Do D-H et al. Characterisation and Detection of Passiflora Mottle Virus and Two Other Potyvirus Causing Passionfruit Woodiness Disease in Vietnam. The American Phytopathological Society (2021).*

[7] *Ibid.*

[8] *DAFF biosecurity import requirements report, Department of Agriculture, Fisheries and Forestry, Canberra, CC BY 4.0. Appendix B: Initiation and categorisation for pests of passionfruit from Vietnam p112.*

[9] *Ibid.*

[10] *Ibid.*

[11] *Ibid.*

[12] *Ibid.*

distribution" step which then negates the crucial final three steps of the pathway. 'The Report' is not reflective of an empirical analysis and exposes the Australian passionfruit industry to extreme risk for the following reasons:

1. Transmissibility
   a) Vectors of these PWD viruses (*Aphis gossypii* et al) are ubiquitous in Australia and have been proven to feed on passionfruit skins.
   b) These viruses exist in the fruit and remain alive in the skin until the skin is completely desiccated.

2. Disposal in the Australian Environment – our unique vulnerability
   a) Passionfruit plants are commonly grown in backyards and in bushland throughout Australia, including every major Passionfruit production region.
   b) Composting and recycling of vegetable and food waste is routinely practiced in every local government area (LGA) in Australia as a community driven effort to reduce waste to landfill and reduce Greenhouse Gas emissions. Indeed, even if fruit waste is not composted or part of green waste many LGA's landfill waste lays open to the environment for extended periods of time (see appendix 1-2).
   c) Kitchen scraps dispensed to chook pens and backyards is of common practice in rural and urban areas (see appendix 3).

3. Lack of adherence to risk management measures
   a) There are questions as to Vietnam's adherence to current agreed pest control measures and there are no control measures to eliminate or even minimise risk once vines are infected.[13]

Transmissibility

We refer to The Passionfruit Growing Guide (2011) where it is stated that "*various aphid species are carriers of the viruses found in passionfruit… aphids are very common… the infection occurs so quickly*." [14] The three viruses would all be aphid-transmitted in the non-persistent manner, meaning that very short feeding times (seconds) are needed for virus acquisition and inoculation. A wide range of common aphid species are potential vector species. All tissues of infected plants (leaves, fruit, flowers, stem, tendrils) can harbour the virus and can be a source of viruses during the short aphid feeding probes.[15]

We accept the evidence given in 'The Report' that the viruses referred to above can be carried and present within the **fruit**, not limited to plant material (leaves, vine, tendrils), which aphids can feed upon. A potyvirus referred to above was found to be present in "*a fruit sample of passionfruit… randomly chosen from among infected samples*".[16]

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[13] *Rigden P. The Passionfruit Growing Guide: second edition (2011), The State of Queensland Department of Employment, Economic Development and Innovation. P135.*

[14] *Ibid.*

[15] *Ibid.*

[16] *Xie L, Gao F, Shen J, Zhang X, Zheng S, Zhang L, Li T. 2020. Molecular characterization of two recombinant isolates of telosma mosaic virus infecting Passiflora edulis from Fujian Province in China. PeerJ 8:e8576 https://doi.org/10.7717/peerj.8576*

Passionfruit Australia Inc., Horticulture Australia Limited and The Queensland Government Department of Primary Industries have provided in the Passionfruit problem solver field guide that "*control of the aphid vector is neither practical nor economic.*"[17] These viruses are transmitted by aphids in a non-persistent manner, with acquisition and inoculation times as short as seconds. Most aphid species will make the exploratory short probes on any plant species meaning that even aphids merely migrating through a passionfruit planting can act as vectors. Insecticide treatments can briefly promote plant to plant movement of aphids and consequent virus transmission before eventual death of the aphids.[18],[19] There are no risk management measures available to control viruses once they are established in the plantation. In the absence of control measures, the key to managing virus is **exclusion**. However, in 'The Report' it is conceded that "*infected fruit… may potentially be exported*"[20] to Australia.

Disposal in the Australian Environment – our unique vulnerability

We refute the conclusion given in 'The Report' that aphids are "*unlikely to feed on infected passionfruit waste should it be discarded into the environment."*[21] It is a reality that passionfruit skin will be thrown out of car windows and disposed of into the environments at picnic/lunch stops, especially in non-urban areas. It is stated in 'The Report' that "*most fruit waste would likely be disposed of via municipal waste facilities...*"[22] There is no data to support this statement, indeed it is contrary to the common practice of composting in Australia. Composting and recycling of vegetable and food waste is routinely practiced in every local government area (LGA) in Australia (see appendix 4-5), for example, Noosa (Qld) fact sheet states "*Kitchen scraps and garden waste can account for almost half of the domestic rubbish a household produces. Most of this material can be composted, reducing the amount of rubbish thrown away and easing the strain on landfill.*"[23] Lismore City Council (NSW) and regional waste group Northeast Waste periodically host composting workshops. This practice is widely encouraged to create nutrient-rich soil and prevent methane emissions from **rotting food in landfill.**[24]

Noosa and Lismore are both in major passionfruit production areas. However, passionfruit vines are very common in suburban backyards throughout Australia. There is also a range of *Passiflora* weed species which occur commonly in Australia, as well as edible passionfruit, which are widely grown in backyards and in weedy situations (see appendix 7-9) as well as commercial crops. It is clear there is a ready source of potential host plants of the viruses for aphid vectors throughout Australia.

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[17] *Rigden P, Newett S. Passionfruit problem solver field guide (2013). The State of Queensland and Horticulture Australia Limited. p112.*

[18] *Perring TM, Gruenhagen NM, Farrar CA (1999) Management of plant viral diseases through chemical control of insect vectors. Ann Rev Entomol 44:457-481*

[19] *Loebenstein G, Raccah B (1980) Control of non-persistently transmitted aphid-borne viruses. Phytoparasitica 8 (3):221-235.*

[20] *DAFF biosecurity import requirements report, Department of Agriculture, Fisheries and Forestry, Canberra, CC BY 4.0. Appendix B: Initiation and categorisation for pests of passionfruit from Vietnam p112.*

[21] *Ibid. p113.*

[22] *DAFF biosecurity import requirements report, Department of Agriculture, Fisheries and Forestry, Canberra, CC BY 4.0. p26.*

[23] *https://www.noosa.qld.gov.au/environment-waste/waste-recycling/garden-waste-composting*

[24] *https://www.lismore.nsw.gov.au/files/assets/public/v/1/1.-households/2.-waste-amp-recycling/documents/composting_at_home.pdf*

We submit the assertion that "*Assessment not required*"[25] in the 'Potential for establishment and spread' step of the risk assessment, is unfounded and will expose the Australian passionfruit industry to extreme risk.

Lack of adherence to risk management measures

The industry is concerned regarding the recent article in FreshPlaza where it is stated that "*harmful organisms have been found on exported fruit… that did not meet food safety requirements…*"[26] The Australian passionfruit industry is not likely to be confident in Vietnam's capability to adhere to import requirements, particularly those of managing risks associated with virus distribution.

Submission

We submit that it is scientifically unsound to discontinue the assessment on the claim of mere unlikeliness for disease distribution. The Australian passionfruit industry therefore respectfully requests this response be considered and that these three viruses be included in a new and full pest risk assessment process (PRA) including "Potential for distribution", "Potential for establishment and spread" and "Potential for economic consequences". We submit that a "Pest risk assessment" **IS** required. It is not a valid conclusion to claim the potential for spread is "unlikely"[27].

[25] *DAFF biosecurity import requirements report, Department of Agriculture, Fisheries and Forestry, Canberra, CC BY 4.0. Appendix B: Initiation and categorisation for pests of passionfruit from Vietnam p112.*

[26] *https://www.freshplaza.com/asia/article/9554305/vietnamese-fruit-exports-receive-warnings-due-to-surveillance-restrictions/*

[27] *DAFF biosecurity import requirements report, Department of Agriculture, Fisheries and Forestry, Canberra, CC BY 4.0. Appendix B: Initiation and categorisation for pests of passionfruit from Vietnam p113.*

References

Coutts BA., Kehoe MA., Webster CG. et al. Indigenous and introduced potyviruses of legumes and Passiflora spp. from Australia: biological properties and comparison of coat protein nucleotide sequences. Arch Virol **156**, 1757–1774 (2011).

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Rigden P. The Passionfruit Growing Guide: second edition (2011), The State of Queensland Department of Employment, Economic Development and Innovation.

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Xie L, Gao F, Shen J, Zhang X, Zheng S, Zhang L, Li T. 2020. Molecular characterization of two recombinant isolates of telosma mosaic virus infecting Passiflora edulis from Fujian Province in China. PeerJ 8:e8576.

Websites

https://doi.org/10.1007/s00705-011-1046-4 (Indigenous and introduced potyviruses of legumes and Passiflora spp. from Australia: biological properties and comparison of coat protein nucleotide sequences)

https://www.freshplaza.com/asia/article/9554305/vietnamese-fruit-exports-receive-warnings-due-to-surveillance-restrictions/ (Vietnamese-fruit-exports-receive-warnings-due-to-surveillance-restrictions)

https://www.lismore.nsw.gov.au/files/assets/public/v/1/1.-households/2.-waste-amp-recycling/documents/composting_at_home.pdf

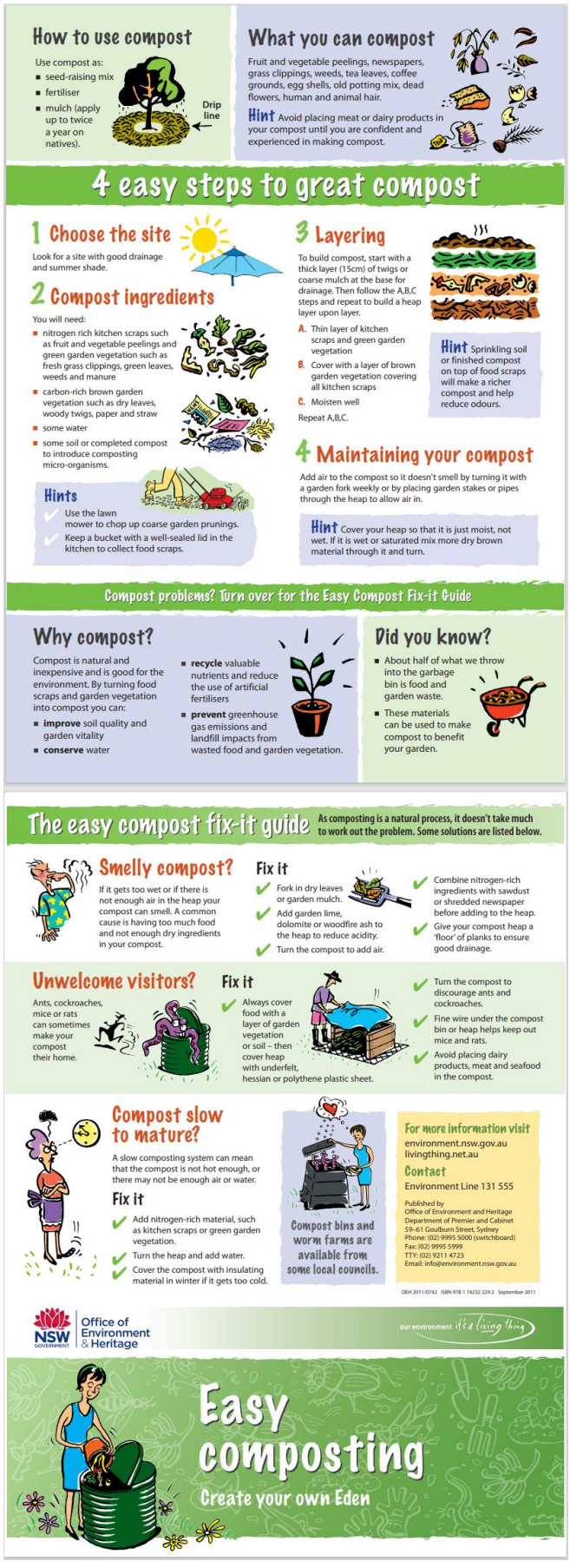
https://www.noosa.qld.gov.au/environment-waste/waste-recycling/garden-waste-composting (Garden Waste and Composting)

Appendices

Appendix 1 – Organic waste forms part of landfill waste open to the environment for extended periods. Regional NSW municipal dump.

Appendix 2 – Roadside fruit waste Clothiers Creek Road Tweed Valley NSW.

Appendix 3 – Supermarket and other retail outlets including restaurants, bakeries etc fruit waste is regularly discarded in open paddocks for livestock. Dungay NSW.



How to use compost

Use compost as:

- seed-raising mix
- fertiliser
- mulch (apply up to twice a year on natives).

Drip line

What you can compost

Fruit and vegetable peelings, newspapers, grass clippings, weeds, tea leaves, coffee grounds, egg shells, old potting mix, dead flowers, human and animal hair.

Hint Avoid placing meat or dairy products in your compost until you are confident and experienced in making compost.

4 easy steps to great compost

1 Choose the site

Look for a site with good drainage and summer shade.

2 Compost ingredients

You will need:

- nitrogen rich kitchen scraps such as fruit and vegetable peelings and green garden vegetation such as fresh grass clippings, green leaves, weeds and manure
- carbon-rich brown garden vegetation such as dry leaves, woody twigs, paper and straw
- some water
- some soil or completed compost to introduce composting micro-organisms.

Hints

- Use the lawn mower to chop up coarse garden prunings.
- Keep a bucket with a well-sealed lid in the kitchen to collect food scraps.

3 Layering

To build compost, start with a thick layer (15cm) of twigs or coarse mulch at the base for drainage. Then follow the A,B,C steps and repeat to build a heap layer upon layer.

A. Thin layer of kitchen scraps and green garden vegetation
B. Cover with a layer of brown garden vegetation covering all kitchen scraps
C. Moisten well

Repeat A,B,C.

Hint Sprinkling soil or finished compost on top of food scraps will make a richer compost and help reduce odours.

4 Maintaining your compost

Add air to the compost so it doesn't smell by turning it with a garden fork weekly or by placing garden stakes or pipes through the heap to allow air in.

Hint Cover your heap so that it is just moist, not wet. If it is wet or saturated mix more dry brown material through it and turn.

Compost problems? Turn over for the Easy Compost Fix-it Guide

Why compost?

Compost is natural and inexpensive and is good for the environment. By turning food scraps and garden vegetation into compost you can:

- **improve** soil quality and garden vitality
- **conserve** water
- **recycle** valuable nutrients and reduce the use of artificial fertilisers
- **prevent** greenhouse gas emissions and landfill impacts from wasted food and garden vegetation.

Did you know?

- About half of what we throw into the garbage bin is food and garden waste.
- These materials can be used to make compost to benefit your garden.

The easy compost fix-it guide

As composting is a natural process, it doesn't take much to work out the problem. Some solutions are listed below.

Smelly compost?

If it gets too wet or if there is not enough air in the heap your compost can smell. A common cause is having too much food and not enough dry ingredients in your compost.

Fix it

- Fork in dry leaves or garden mulch.
- Add garden lime, dolomite or woodfire ash to the heap to reduce acidity.
- Turn the compost to add air.
- Combine nitrogen-rich ingredients with sawdust or shredded newspaper before adding to the heap.
- Give your compost heap a 'floor' of planks to ensure good drainage.

Unwelcome visitors?

Ants, cockroaches, mice or rats can sometimes make your compost their home.

Fix it

- Always cover food with a layer of garden vegetation or soil – then cover heap with underfelt, hessian or polythene plastic sheet.
- Turn the compost to discourage ants and cockroaches.
- Fine wire under the compost bin or heap helps keep out mice and rats.
- Avoid placing dairy products, meat and seafood in the compost.

Compost slow to mature?

A slow composting system can mean that the compost is not hot enough, or there may not be enough air or water.

Fix it

- Add nitrogen-rich material, such as kitchen scraps or green garden vegetation.
- Turn the heap and add water.
- Cover the compost with insulating material in winter if it gets too cold.

Compost bins and worm farms are available from some local councils.

For more information visit
environment.nsw.gov.au
livingthing.net.au

Contact
Environment Line 131 555

Published by
Office of Environment and Heritage
Department of Premier and Cabinet
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OEH 2011/0742 ISBN 978 1 74232 229 2 September 2011

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our environment it's a living thing

Easy composting

Create your own Eden

Appendix 4 – Lismore City Council Composting Guide

Organics recycling

Organic materials make up more than 50% of the waste we throw away each week. This includes food scraps, garden waste, paper and cardboard. When disposed of in landfill, these organic materials decompose under anaerobic (no oxygen) conditions, producing the greenhouse gas methane, which contributes to climate change.

For this reason, we need to reduce the amount of organics sent to landfill. We can do this by collecting our kitchen scraps, garden waste, newspapers and cardboard to recycle them in our own backyards. Mulching, composting, or feeding these materials to a worm farm helps keep them out of landfill and creates a free resource to improve our soil and gardens at home.

Composting

Composting is the breaking down of large organic matter into small pieces. When micro-organisms in the soil are combined with the right organic materials, warm temperatures, sustained moisture levels, and are well aerated, the decomposition process creates compost. The created compost is useful in the garden as a nutrient-rich soil conditioner, containing the full range of nutrients needed for plant growth. Composting can be carried out in your backyard with a composting system.

Composting tips

- First, ensure compost system is set up where it is in direct sunlight. Begin with a layer of twigs or sticks at the bottom to assist aeration and drainage.
- Feed your compost system with a balance of rapidly decomposing materials, 'greens' or nitrogen rich foods, e.g. vegetable and fruit scraps, green garden waste, or manure. Follow this with a layer of slow decomposing materials, 'browns' or carbon rich products, e.g. dry leaves, dry grass, shredded paper, or cardboard. Create layers with these materials.
- DO NOT feed your compost system meat products, dairy products, fats and oils, or cat and dog faeces. They will attract pests, create strong odours when they decompose, and may carry harmful pathogens.
- Water and aerate your compost system weekly to speed up the decomposition. Keep it damp, not wet, and use a garden fork or compost corkscrew to turn it
- Compost will take anywhere from 2-6 months to be created, but is ready when it has a fine crumbly texture. Use compost as a soil conditioner, part of a potting mix, top up dressing for the lawn or as a fertilizer in your garden.

Composting trouble shooting

Taking too long to break down
Causes: Too dry, not enough air, not the right mix of browns and greens.
Solutions: Add water, turn regularly, balance greens and browns.

Smelly
Causes: Too wet or acidic, not enough air.
Solutions: Rebuild with dry brown layers, add egg shells or dolomite to neutralise, turn regularly.

Flies or rats/mice
Causes: Vinegar flies are harmless, but house/blow flies and rats/mice may be attracted by meat or dairy products.
Solution: Cover mix with layer of browns or soil; do not feed compost with meat or dairy products.

Too wet
Causes: Too much water or moist green organics.
Solution: Only dampen mix, do not saturate, and add brown organics for drainage.

Lots of ants
Cause: Compost is too dry.
Solutions: Add water to moisten, and mix in moist greens.

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Appendix 5 – Noosa Council organics recycling guide

A field survey conducted in 2017 to 2020 revealed high incidences of PWD in passionfruit plantations in Northern and Southern Vietnam, with symptoms of severe foliar mosaic, stunted growth, and small, woody, and distorted fruits. Detection by RT-PCR with

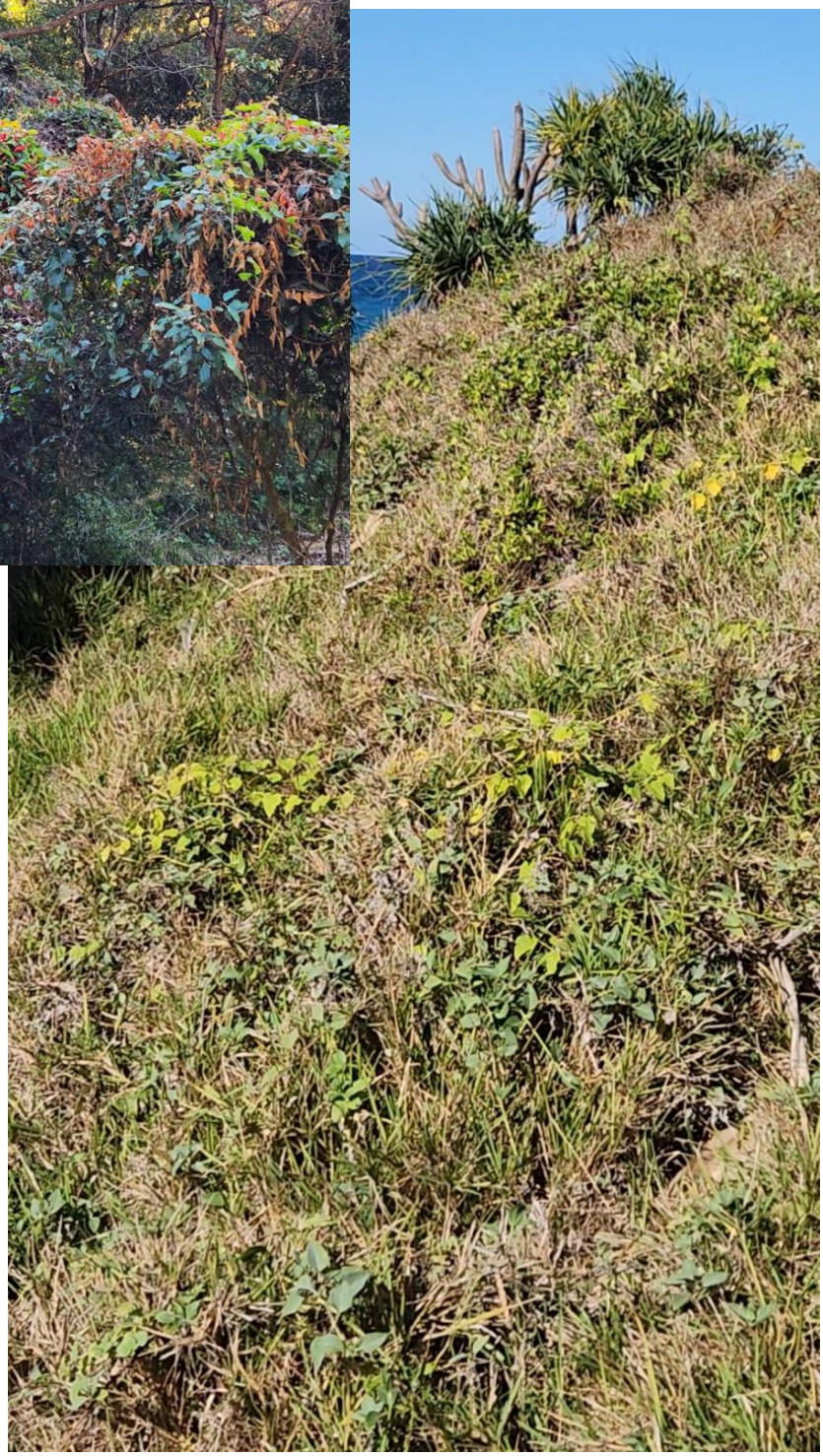
were infected with potyviruses. Back-inoculation to passionfruit plants verified the causal roles of the five isolates for PWD. More-

Based on the inoculation assay, we have demonstrated that PaMoV is capable of infecting EAPV-infected yellow passionfruit plants and vice versa. The mixed infection resulted in extremely severe symptoms of stunted plant growth or tip necrosis followed by plant death (data not shown), causing a dramatic decrease in fruit production. This phenomenon indicates no cross-protection between the two viruses, and a synergistic effect occurred in PaMoV and EAPV mixed infection. Because cross-protection abil-

Appendix 6 – Extracts from Do et al. (2021).

Appendix 7 – Passiflora on roadsides in far northern NSW.

Appendix 8 – Backyard passionfruit Kingsliff NSW.



Appendix 9 – Passiflora in weedy situations far north coast NSW.