SUBMISSION IN RELATION TO 'POMELO FRUIT FROM VIETNAM: BIOSECURITY IMPORT REQUIREMENTS DRAFT REPORT'

Submitted on 9 July 2024
To:
Have Your Say, Department of Agriculture, Fisheries and Forestry

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Citrus Australia and the Australian citrus industry

Citrus Australia appreciates the opportunity to comment on this draft report. Citrus Australia is the recognised industry representative body representing the nation's commercial citrus growers. Our membership also includes other members of the citrus value chain including citrus packers, exporters and transporters. There are currently over 30 000 hectares of citrus plantings spread across Australia with the main growing regions focused around South Australia's Riverland, the Murray Valley region of New South Wales and Victoria, the Riverina, region of New South Wales and the Central Burnett region of Queensland. There are plantings throughout Western Australia, coastal New South Wales, northern and central Queensland and the Northern Territory. The wide geographical spread of the industry reflects the importance of citrus production on the economic sustainability of rural Australia as a whole.

Citrus Australia is a leading horticultural industry in the area of biosecurity preparedness and response, through activities of the Citrus Pest and Disease Prevention Committee, the industry biosecurity program – CitrusWatch, partnerships in numerous other projects related to exotic pest preparedness and traceability, and representation on multiple national biosecurity committees and forums.

Prolific planting of citrus in urban environments throughout Australia, particularly within proximity of major Ports of Entry, increases the risk of exotic pest and disease establishment in these zones. Therefore, taking steps to reduce this risk is a major focus of citrus Australia.

Submission summary

- Citrus Australia agrees with the need to impose measures for the 19 pests and pathogens identified in the draft report.
- In Citrus Australia's view an improved understanding of the spectrum of pest and disease management measures currently employed across pomelo orchards, and across regions is required;
- There is a need to further consider orchard pest management practices that are incompatible or have a deleterious effect (e.g. use of entomopathogenic fungi and application of fungicides);
- We require confirmation that the Vietnamese harvesting technique for pomelo does not include leaf matter, and that transport to the packshed is without leaf matter (and what the enforcement procedure would be);
- Information on, and levels of compliance with, VietGap and GlobalGAP (and how compliance with these schemes limit pest and disease transmission risk), as well as use of disease-tested propagation material, is lacking;
- There is a need to collect further data on pest prevalence, pathogenicity, symptom expression, and effective controls, for a range of pests, which are outlined in this submission*;*
- Further risk assessment of citrus canker is required;
- Further investigation into hard scale species affecting citrus in Vietnam is required;
- Completion of assessments for those pests and diseases not found throughout all horticulture regions of Australia is required.
- Many of the proposed systems approach measures included in this report lack sufficient detail for comment or conflict with measures suggested for other pests and diseases.

General comments

Citrus Australia agrees with the need to impose measures for the 19 pests and pathogens identified in the draft report. However, there is a need to further scrutinise several more pests and diseases,

including three High Priority Pests identifies in the Citrus Biosecurity Plan, that may impact the Australian citrus industry, which we outline in the section below.

We note that there is limited detail provided in respect to prescribed or business-as-usual inspection and hygiene procedures undertaken by Vietnamese orchard and packshed businesses, as well as the information about the citrus nursery stock scheme. In order to draw a more confident conclusion on the risk posed, we request that the report also include data on:

- The proportion of pomelo orchards that use only disease-tested propagation material from the official Plant Protection Research Institute managed scheme, or from equivalent schemes;
- The proportion of pomelo orchards and packsheds that are registered under VietGAP or GlobalGAP;
- The exact harvesting practices and fruit transportation procedures required under VietGAP and GlobalGAP;
- Clarification on how stringently VietGAP and GlobalGAP procedures are enforced on Vietnamese pomelo orchards; and
- Further details about inspection protocols currently followed by Vietnamese citrus packsheds, and how inspections are enforced.

Overall, it is difficult to provide comment on the proposed systems approach measures included in the review as there is much more nuance and detail that would be included in an actual workplan for negotiating entry of pomelo from Vietnam.

Pest management in Vietnamese orchards

The draft report outlines standard Integrated Pest Management (IPM) practices undertaken for management of priority pests and diseases in Vietnamese pomelo orchards, however, an in-depth critical analysis of how effective these practices are in control of key pests is lacking. In addition, specific biological information for pests and diseases found in pomelo growing regions of Vietnam is omitted. The type of information relevant to both assessing risk and developing appropriate management measures includes: pest prevalence and seasonal occurrence, effectiveness of current management, pesticide resistance, strain/biotype/pathovar information according to region and varietals affected.

It is also unclear as to how the various control practices outlined in Table 2.2 would be developed into an orchard management program as many of the chemicals cited are incompatible with an Integrated Pest Management program. For example, the interaction of copper sprays (suggested to be applied every two weeks) and biopesticides (noted as a key strategy in Asiatic citrus psyllid management) are not compatible in an IPM approach.

Orchard management will have a very strong influence on the resulting risk posed by the pests and diseases identified as needing regulatory measures. It is the view of Citrus Australia that orchard and packshed practices cannot be described as ‘standard’ based on the limited number of site visits by the Department of Agriculture, Fisheries and Forestry (the Department) in one citrus growing region – this is unlikely to provide an accurate picture of the spectrum of pest management, harvesting and packing practices undertaken across each growing region. This review should provide a more extensive account of growing and packing operation procedures throughout pomelo growing regions in Vietnam, as well as a critique of whether or not these procedures would be effective or not in reducing the risk below Australia’s Appropriate Level of Protection (ALOP).

Transport and packing

We were concerned to see pictures included in the draft report of harvested pomelo fruit mixed with a high amount of leaf matter (figure 2.2). Based on the descriptor in the report, this fruit was ready for transport to the packshed. Even if this leaf matter is stripped off at the packshed, pest and disease contamination of the packshed receivals area and on the packline would be a risk unless stringent hygiene and decontamination procedures are enforced at an earlier stage of the supply chain (i.e. prior to transport from the orchard).

On page 68, Chlorine treatment is noted as a measure for reducing viable populations of *Xanthomonus citri* subsp. *citri.* However, the efficacy of chlorine as a packing line measure is influenced by pH and organic matter. Therefore, strict monitoring of pH and active chlorine, and records of monitoring and solution replacement, as well as processes which minimise organic material entering packing line, must be part of any approved treatment protocol.

Citrus Australia agrees with proposed conditions set out in section 4.2, which would instate a system of traceability, registration of packing houses and treatment facilities, shipment inspections and auditing of operations. However, data provided in section 4.1.1, which notes that remedial action was required for 11.9%-14.7% of pomelo consignments from other countries between 2015 and 2023, does raise concerns in relation to how stringently enforced pre-shipment inspection has previously been by the Department.

We note that there is no mention of procedures for mitigating the risk of post-packing contamination, e.g. by sealing or isolation of the product. This is an important consideration.

Pest specific comments

Citripestis sagittiferella

The full range of High Priority Citrus Pests, as ranked in the Citrus Industry Biosecurity Plan, has not been assessed. Of most concern is omission of *Citripestis sagittiferella* as a pest that requires risk management measures. *Citripestis sagittiferella* has an overall risk ranking of HIGH in the Australian Citrus Industry Biosecurity Plan. According to a recent risk assessment developed by the European Food Safety Authority (EFSA), after being first detected in 2011, *C. sagittiferella* is now present across pomelo growing regions of Vietnam (in particular, in the Mekong River Delta), and is still undergoing a geographic range expansion (EFSA, 2023). Fruit infestation has been reported to be as high as 40-70% (Le Quoc et al., 2021).

The only information found in the draft report that relates to *C. sagittiferella* risk mitigation is a brief example of management procedures included in table 2.2 on page 19: *"Collect and dispose of all infested fruit. Cover (bagging) fruit after fruit setting, combined with removal of damaged and inferior quality fruit. Strategic release of Trichogramma parasitic wasps at the time of egg laying. Apply petroleum oil spray."* (Table 2.2 includes examples of pest management tactics that could be used in pomelo orchards, but includes no indication of how commonly these tactics are employed.) We question the practicality and economy of fruit bagging on the tree, and also note that parasitic wasp release is at odds with measures suggested for other pests that involve broad spectrum pesticide application. Without further information provided about the extent of proactive *C. sagittiferella* management in Vietnam, it cannot be determined if current practices are sufficient for risk mitigation.

In the same vein, the assessment on the potential for importation in appendix B is simplistic in nature and disregards *C. sagittiferella* as a threat to Australia on the basis that infested fruit would be removed during harvest, and eggs and early larvae would be removed by washing and waxing

procedures in the packhouse. It is entirely conceivable that a larval entry site on the surface of the fruit may go unnoticed, and the larva may enter the rind before the fruit is subjected to packhouse washes and treatments. Oviposition occurs on the outside of the fruit, and after hatching, larvae will then bore into the fruit pulp. Several larvae may be found in one fruit, and detection of infested fruit at the packshed stage would require visual or ocular robotic inspection of the fruit for larval entry holes. The EFSA notes that "*In some cases, infested fruit may be discarded already in the orchard, but it is unclear how the inspection is done in the countries where the pest is present*." If such fruit were to enter Australia it would likely be discarded on compost heaps on arrival at the importer distribution centre, or by the consumer once purchased.

Before proceeding with development of entry requirements for pomelo from Vietnam, it will be of crucial importance for the Department to verify orchard and packshed procedures that are currently undertaken for the detection of discard of *Citripestis sagittiferella* infested fruit, and enforce further measures if required, such as cold treatment or irradiation. During a recent investigation, the European Union found no information specific for *C. sagittiferella* relating to effectiveness of cold treatment. However, data are available for several other citrus pests such as the false codling moth, *Thaumatotibia leucotreta* and the Mediterranean fruit fly, *Ceratitis capitata* (EFSA, 2023).

Citrus canker

The risk posed by citrus canker is of concern, especially since trade in fruit from canker affected regions and reliance on post-harvest treatments appears to be becoming normalised globally. A recent study by Volkers et al. (2024) involved testing of citrus fruit that had been imported into the Netherlands for *Xanthomonas citri* pv. *citri* and pv. *aurantifolii.* This study detected *Xanthomonas citri* pv. *citri* in 97 imported fruit lots between 2013 and 2022, with the citrus lots having originated in South America and several Asiatic countries. With these recent findings in mind, we encourage the Department to more closely examine the current incidence and management measures for citrus canker in Vietnamese pomelo growing regions.

We note that in the case of the citrus canker outbreak in Emerald (2004), fruit from affected areas was prohibited from movement to other regions from Australia. In the case of the citrus canker incursion in the Northern Territory and Western Australia (2018) mitigation measures developed for import of Japanese citrus were used as a basis for allowing fruit movement from affected regions. These measures were stringent, and included:

- Surveying commercial citrus properties by an Authorised Officer at least three times per year;
- Registration as a property free from citrus canker, and approval of registration;
- Treatment of trees with a copper-based fungicide;
- Monitoring for citrus leafminer, and application of an appropriate insecticide treatment for citrus leafminer as required;
- Post-harvest treatment of fruit with sodium hypochlorite or sodium ortho-phenylphenate tetrahydrate, and treatment maintained at a set pH;
- Packshed auditing and registration;
- Consignment inspection by an Authorised Officer.

In the US, packsheds that pack citrus fruit from citrus canker affected regions must enter into a compliance agreement with the federal government, must separate these lots from citrus originating from non-citrus canker affected regions, and must also comply with the following packline procedures: washing, brushing, surface disinfection, treatment with a prescribed product, and waxing (USDA, 2022). Notably, on page 21 of the draft report a treatment step is not mentioned as standard practice in packsheds. We recommend that the Department include a treatment step in the

measures. Such a step is crucial – depending on the pathotype and environmental conditions, citrus canker symptoms can take longer than 60 days to manifest, and therefore, infected fruit may not be triaged before transport to the packshed.

We are in agreement with the Department on the necessity of re-assessing the likelihood that *X. citri* subsp. *citri* will arrive in Australia in a viable state on the pathway, as mentioned on page 65 and in appendix B, however we do not believe that the pathway assessment included in section 3.12 is as yet sufficient to make a confident determination of risk. For example, given the upswell in local council support across Australia for composting of food waste, we do not agree that spread via the unregulated waste (composting) pathway in urban and peri-urban areas would be unlikely – possibly it would be low. Likelihood of distribution should also consider the probable consumers of pomelo; purchasers are likely to already have a special interest in less common citrus varieties and would have citrus plants at their residence. We are of the opinion that further investigation is required in relation to the risk posed by citrus canker infected pomelo and suggest that the Department confirm the pathovar and pathotype with Vietnamese researchers, the susceptibility of citrus varieties, and disease incidence data from pomelo growing regions. This will further provide an indication of the realistic risk, and is relevant in relation to how the disease would manifest across pomelo cultivars, timeline for inset of symptoms, and the effectiveness of the management practice included in table 2.2 ("*remove and dispose of infected branches on detection*").

Other comments relating to citrus canker

Table 2.2 refers to use of disease-free plant material to reduce the risk from this disease. However, it is unclear what specific citrus nursery stock scheme (or schemes) are in use by Vietnamese pomelo growers, and if use of disease tested material is common practice. Grafting pomelo trees with home grown budwood and rootstocks may occur, however the draft report does not mention this as a possibility. The draft report also does not provide any relevant information relating to citrus production nurseries and the practices employed by them to ensure disease-free stock. The details of the propagation scheme/s should be supplied as these details bear relevance to the relative risk posed by High Priority diseases that may be transported on fruit, such as citrus canker.

The draft report refers to application of fungicide foliar sprays as another example of management for citrus canker. Here, we emphasise the importance of ensuring that consignments to the packhouse are free from leaf matter – copper products are quite effective for preventing fruit infection but are much less effective for reducing leaf infection by citrus canker (IFAS, 2023). Concerningly, figure 2.4 shows baskets of harvested pomelo fruit in an orchard row, and pomelo fruit ready for transport to the packshed heavily interspersed with leaf matter. Even if this leaf matter is triaged out at the packing stage, it is possible that pathogens on the leaf matter may contaminate the packing line. Import of leaves or peduncles is prohibited in many countries, as they present a higher risk from a wider range of pests than fruits (EPPO, 2020). The Australian citrus industry requires assurance that packline procedures are scrutinised and enforced, and that product is not transported to the packhouse with leaf matter or peduncles.

Diaphorina citri and Huanglongbing disease

Citrus Australia agrees with the allocation of both *Diaphorina citri* and Huanglongbing disease as pests that require risk management measures. This pest/disease complex has heavily impacted on Vietnamese citrus production since the mid 1990's (Chau et al. 1994). Current management practices on Vietnamese orchards for *Diaphorina citri* and Huanglongbing requires a greater level of scrutiny within the report, especially considering that the Mekong delta in particular has been reported to have high populations of *Diaphorina citri* (Beattie et al. 2010). As it stands, the draft report has submitted very general statements in describing orchard and packshed operations, which most likely do not reflect actual practices across the majority of the industry.

For instance, the draft report makes reference to the use of entomopathogenic fungi, *Beauveria bassiana* and *Metarhizium* spp., for the control of *Diaphorina citri* in Vietnamese citrus orchards. It refers to Loc et al. (2010) and emphasises that these entomopathogenic fungi are highly effective in the control of the psyllid. However, in the study reported by Loc et al. (2010) use of these biocontrol agents in the citrus industry was not a common practice at that time. The draft report should include more recent evidence that these biocontrols are in common usage within Vietnam citrus orchard Integrated Pest Management (IPM) strategies.

Once again, in light of the pictures presented in figure 2.4, and the potential for both *Diaphorina citri* and *Candidatus* Liberibacter asiaticus movement through this pathway, the need to eliminate all leaf matter from consignments from the orchard to the packshed is of high importance. If this is not achieved, pack shed receival areas will likely become a holding yard for populations of *Diaphorina citri* (and other insects).

***Candidatus* Phytoplasma aurantifolia**

The draft report maintains that there is no evidence for *Candidatus* Phytoplasma aurantifolia transmission through seed in citrus, and therefore there is no risk of transmission without a vector. However, the study that forms the basis of this prediction (Faghihi et al. 2011) acknowledges that findings relating to phytoplasma transmission through seed are extremely varied. We encourage the Department to further investigate the potential for *Candidatus* Phytoplasma aurantifolia to be transmitted by seed.

Phyllosticta citriasiana

The causal agent of citrus tan spot, *Phyllosticta citriasiana,* is a recently described species (Wulandari et al. 2009). Most likely owing to its relatively recent identification, it has not been the subject of any occurrence, pathogenicity, or management research in Vietnam. This species has previously been intercepted on pomelo imported from Asia to Europe, even though the consignment was imported under phytosanitary measures for the related species, *Phyllosticta citricarpa* (Wulandari et al. 2009). Limited host range studies have been conducted on the pathogen, and therefore, it cannot be said with confidence that the species is limited to pomelo as a host. Indeed, Wulandari et al. (2009) notes that surveys and host range testing is required as there remains much that is unknown about this species. The study by Zeng et al. (2021), which tested for *Phyllosticta citricarpa* infection of pomelo across several regions of China, also emphasises the need for further investigation into *Phyllosticta citricarpa* biological variation and reproduction across regions. Therefore, the assessment of *Phyllosticta citriasiana* potential for spread (p. 163) requires further consideration and perhaps an in-field trial in Vietnam to confirm that chlorine washing, application of fungicides and waxing will mitigate the risk from this species. The assessment should also re-consider the distribution of pomelo in Australia as a limiting factor in potential spread, as the abundance of dooryard pomelo is unknown.

Phytophthora mekonggensis

Phytophora mekongensis was identified in 2017 as a causal agent of citrus brown rot. Pathogenicity testing showed that *P. mekongensis* from pomelo fruits may infect other *Citrus* species and induce both fruit brown rot and gummosis of twigs and stems (Puglisi et al. 2017). We note that assessment of risk has been based largely on findings relating to other *Phytophora* species: "*Symptoms on fruit are visible, and symptomatic fruit are likely to be removed during harvest, grading and sorting. Fruit with early stages of brown rot infection may not be detected during harvest and postharvest processes. However, pathogen numbers and viability are likely to be reduced by pressure washing and disinfection at the packing house*" (p. 55). In order to verify assumptions included under the 'likelihood of importation' section, we encourage the Department to gain information from the

Vietnamese authorities and researchers in relation to how (and when) symptoms manifest on fruit and what has been found in relation to current packshed procedures to suppress the pathogen, in order to adequately consider the risk posed by this pathogen.

Erysiphe quercicola

Erysiphe quercicola (causal agent of Citrus powdery mildew) has been found on Mandarin in Northern Vietnam (Tam et al. 2016). Since this is a High Priority Pest for the Australian citrus industry, the Department should investigate observed impact on pomelo, and status of the disease in southern pomelo growing areas, with consideration to imposing mitigation measures on pomelo grown in the Northern Mountainous region.

Cryptoblabes gnidiella

Cryptoblabes gnidiella, described in the report as honeydew moth, is also known as Rind boring orange moth and citrus pryalid. It has the potential to impact a range of plant industries, including citrus, pome fruit, summerfruit, grape, avocado, persimmon, forestry, sugarcane, grain, mango, and rice. In the Citrus Industry Biosecurity Plan (updated during 2023), this pest has an overall risk rating of HIGH. However, the report notes on page 131 that it is considered a secondary pest of citrus fruit. Based on this information, and the prediction that infested fruit would be undersized and triaged out prior to packing, the Department has failed to complete a risk assessment on the pest. We believe that this species requires further consideration.

Omitted pests

Dao et al. (2018) surveyed hard scale in citrus growing regions of Vietnam and recorded 21 species – many of which were found on the fruit and stems of pomelo. In 2023, Dao et al. identified one additional species in Vietnam. The authors note that distributions of the hard scale species recorded during surveys were much broader than is indicated in the CABI, EPPO and ScaleNet databases. As Vietnam has a high diversity of diaspidid scale species that use citrus as a host, and hard scale species are effective at invading new ranges via long-range transmission on fruit, we encourage the Department to investigate and assess this pest group further.

Lack of assessment

There are pests and diseases included in appendix B that are not distributed across Australia (e.g. *Phylosticta citricarpa* (black spot) is not found in Western Australia). In these cases, further assessment was not deemed necessary as the pest or disease is already found in Australia – however, we argue that assessment is necessary, as an incursion would still have management consequences for some citrus growing regions that are currently free of the species.

Ground truthing assumptions and filling knowledge gaps

We note that the visit to Vietnam pomelo growing regions by Department officials informed this analysis, however, the visit was confined to the Mekong region and involved visits to a small number of growing and packing operations. For future in country assessments, we encourage the Department to visit several growing regions across different ecoclimates to gain a more comprehensive view of the current pest and disease situation in orchards, and to visit a spectrum of growing and packing operations. We also encourage the Department to invite an industry member or industry researcher to participate in the visit, and to discuss pest and disease statuses with in-country field consultants and researchers. We note that previous risk assessments concerning import of citrus fruit from other countries has included industry representation and consultation with agricultural researchers based in the country proposing to export. One such example is assessment of citrus fruit from Florida, whereby AQIS requested that the citrus industry send a delegation to Florida to consult with the industry and researchers. The visit enabled the delegation

to fill knowledge gaps and yielded important information that influenced the outcome of the import risk assessment.

Risk mitigation measures

Citrus Australia assumes that risk mitigation measures will be developed in line with International Plant Protection Convention standards, as is required of Australian growers who export to protocol markets. This would include:

- Lot identification (likely addressed through registration with Vietnamese Ministry of Agriculture and Rural Development);
- General visual sampling of citrus fruit consignments, with the sample number being based on ISPM 31;
    - Specific (targeted) visual inspection of citrus fruit consignments;
    - Random destructive sampling of asymptomatic fruit; and
- Sampling of symptomatic fruit for laboratory diagnostics.

Conclusion

In this submission we have highlighted areas of concern and topics that require further investigation by the Department. In summary, issues and areas of additional action include:

- Gaining an improved understanding of the spectrum of pest and disease management measures currently employed across pomelo orchards, and across regions;
- Identifying what best-practice measures are less commonly employed and would require enforcement by the Vietnamese National Plant Health Organisation;
- Further consideration of orchard pest management practices that are incompatible or have a deleterious effect (e.g. use of entomopathogenic fungi and application of fungicides);
- Confirmation that the Vietnamese harvesting technique for pomelo does not include leaf matter, and that transport to the packshed is without leaf matter (and the enforcement procedure for this);
- Confirming uptake of, and levels of compliance with, VietGap and GlobalGAP, and how compliance with these schemes limit pest and disease transmission risk, as well as confirming the level of disease-tested propagation material usage;
- Gaining further insight into pest prevalence, pathogenicity, symptom expression, and effective controls, particularly for *Citripestis sagittiferella, Erysiphe quercicola, Phytophthora mekonggensis* and *Phyllosticta citriasiana;*
- Conducting a further assessment of citrus canker after gaining information on pathovar and pathotype with Vietnamese researchers, the susceptibility of citrus varieties, as well as disease incidence data from pomelo growing regions;
- Investigation into stringent packline procedures for citrus canker, and the procedure for auditing and enforcement of packshed operations;
- Further investigation into hard scale species affecting citrus in Vietnam; and
- Completion of assessments for those pests and diseases endemic in a state but not found throughout all horticulture regions of Australia.

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