Chapter 5

The proposed importation of fresh ginger from Fiji

5.1 As mentioned in Chapter 1, the terms of reference for this inquiry required the committee to examine, amongst other things, the scientific basis on which the Import Risk Analysis (IRA) for the importation of fresh ginger has been developed. While the committee focussed on the Provisional Final Import Risk Assessment (PFIRA) during much of its inquiry, the final IRA was published in late January 2013, and is therefore used as the main reference in this chapter.

5.2 The ginger industry is a very important industry to Australia, even though it is small when compared to a range of other agricultural crops. Therefore, the proposed importation to Australia of fresh ginger from Fiji could have a major impact.

5.3 The central issue for this inquiry has been to examine whether the IRA for fresh ginger from Fiji is adequate. This chapter covers the committee's examination and findings regarding the IRA process undertaken, and examines whether the consequences, likelihoods and risks have been appropriately estimated for the importation of fresh ginger from Fiji.

Australia's ginger industry

5.4 Ginger is thought to have originated in the southern Asian and Indian regions and was first grown commercially in Australia in South East Queensland in the early 1900s, mainly for the domestic fresh market. At that time, all processed ginger was imported from China. Imports of processed product were disrupted during World War II and, consequently, the first processing facility was built in Buderim in 1941. Ginger is now grown in areas in and around Caboolture, Nambour and Gympie.[1]

5.5 The Queensland Department of Agriculture, Fisheries and Forestry (DAFF Queensland) advises on its website that growing ginger requires relatively flat, well drained soils that are free of rocks, sunny aspects with wind protection, high-quality water and particular chemical conditions in the soil. The website also advises that it is important that growers spell the land for two years between crops to control nematodes.[2]

5.6 Australia is a relative small producer of ginger, contributing less than one per cent of global production. The global market is dominated by China and India, with Indonesia, Nepal and Nigeria also producing significant crops. Production of ginger is both labour and capital intensive. Of the 8000 tonnes produced annually in Australia, 45 per cent is supplied to the domestic fresh market, with much of the remainder destined for processing:

---

1 Queensland Government, Department of Agriculture, Fisheries and Forestry, *Ginger*, www.daff.qld.gov.au/26_18195.htm, (accessed 10 December 2012).

2 Queensland Government, Department of Agriculture, Fisheries and Forestry, *Ginger*, www.daff.qld.gov.au/26_18793.htm, (accessed 10 December 2012).

> Queensland Primary Industries and Fisheries (QPIF) estimates the current farm-gate value of the Australian ginger industry at approximately A$15.6 million. Ginger is also used as a vital ingredient in a wide range of semi-processed products for the food manufacturing sector and processed products for the retail sector. The value of these products, in which Australian ginger is a key ingredient, is estimated at over A$80 million.
>
> The Sunshine Coast region produces approximately 6075 tonnes of ginger annually. The Wide Bay-Burnett [the coastal and hinterland areas between Caloundra and Gladstone] is the second largest growing region, with production estimated at 1837 tonnes per year.
>
> Buderim Ginger is the largest ginger processor in Australia, taking over 95% (4200 tonnes) of the ginger produced for processing.[3]

5.7 Ginger is also exported from Australia in both raw and semi-processed forms to destinations including Japan, the United States, New Zealand and the United Kingdom. As with many other crops, the prices for fresh ginger vary with supply, demand, seasonal factors, product quality and levels of promotional activity.

> Growers indicated that during the 2006-2007 season the average price received from wholesalers purchasing fresh ginger was between $2.50 and $4.00 per kilogram, but prices have spiked as high as $12.00 and dropped as low as $1.50 due to fluctuations in supply capacity.[4]

5.8 At the inquiry hearing in October 2012, Mr Ashley Gill informed the committee that retail prices range between $2.50 for early-harvest ginger and $20 for old ginger.[5]

Pests and diseases

Previous outbreaks

5.9 The committee received evidence about previous outbreaks of pests and diseases in Australia's ginger industry during the inquiry. Buderim Ginger informed the committee, for example, that the pythium outbreak had significantly affected its processing operations:

> …since the outbreak of pythium in Australia in 2010, the ginger processed by Buderim has been sourced from within Australia, from its own operations in Fiji and from third party suppliers in China and other parts of Southeast Asia. [6]

---

3 Queensland Primary Industries and Fisheries (Department of Employment, Economic Development and Innovation), *The Australian Ginger Industry – Overview of market trends and opportunities*, November 2009, pp ix–x.

4 Queensland Primary Industries and Fisheries (Department of Employment, Economic Development and Innovation), *The Australian Ginger Industry – Overview of market trends and opportunities*, November 2009, p. x.

5 Mr Ashley Gill, *Committee Hansard*, 23 October 2012, p. 11.

6 Buderim Ginger, *Submission 1*, [p. 2].

5.10 Buderim Ginger added that:

> Any inadvertent introduction of other pest varieties into the Australian growing region that severely impacted the supply of ginger available would have the capacity to significantly disrupt these arrangements and adversely impact on Buderim's profitability and threaten the viability of the Australian ginger industry.[7]

5.11 The committee was also informed of a previous outbreak of bacterial wilt that was devastating for the industry. Templeton Ginger's submission noted that the company had seen:

> …the introduction of Bacterial Wilt Biotype IV which almost wiped out the industry in the 1960's. Bacterial Wilt Biotype IV can start in a small corner of a 2Ha field and spread across it in 3-5 days causing 100% loss. The only way to combat this was to quarantine any infected fields and either leave the infected equipment there or steam sterilize it thoroughly so as not to shift any infected soil particles elsewhere.[8]

Current pests and diseases

5.12 The ginger IRA identified over 60 pests for fresh ginger in Fiji, including beetles, hemiptera, butterflies, moths, nematodes, bacteria and viruses.[9] Of the 60 pests, nine were identified as requiring a pest risk assessment on the basis of:

- their potential to be imported;
- whether they were already present within Australia;
- the potential for them to establish and spread; and
- the potential for economic consequences.

5.13 These nine pests are shown in Table 5.1. Two of these nine pests – yam scale and burrowing nematode – required risk mitigation measures in order to fall below Australia's ALOP.

Table 5.1—Restricted and unrestricted[10] risk assessments for quarantine pests for fresh ginger from Fiji

Pest	Common name	Unrestricted risk assessment	Restricted risk
Arthropods			
Elytroteinus subtruncatus	Fiji ginger weevil	Negligible risk	
Aspidiella hartii	Yam scale[11]	Low risk[#]	Very low risk

7 Buderim Ginger, *Submission 1*, [p. 2].

8 Templeton Ginger, *Submission 5*, [p. 2].

9 Department of Agriculture, Fisheries and Forestry, *Provisional final import risk analysis report for fresh ginger from Fiji*, Appendix A, August 2012.

10 The unrestricted risk assessment is the risk assessment before any mitigation or control measures are applied.

Nematodes			
Radopholus similis – putative intraspecific ginger variant	Burrowing nematode[12]	Low risk[#]	Very low risk
Discocriconemella discolabia	Ring nematodes	Negligible risk	
Mesocriconema denoudeni			
Helicotylenchus egyptiensis	Spiral nematodes	Very low risk	
Helicotylenchus indicus			
Helicotylenchus mucronatus			
Sphaeronema sp.	Cystoid nematode	Very low risk	

Source: Department of Agriculture, Fisheries and Forestry, *Provisional final import risk analysis report for fresh ginger from Fiji*, August 2012, pp 21 and 54–56.

5.14 The draft IRA for fresh ginger from Fiji identified burrowing nematode as a pest that is present in Fiji. However, at that time it was concluded that a pest risk assessment was not required as burrowing nematodes had been recorded as being present in Australia – in Queensland, the Northern Territory and Western Australia.[13]

5.15 The committee notes that the presence of a Fijian variant of the burrowing nematode was brought to DA's attention by the ginger industry. The ginger IRA states that:

> Information was provided by the Australian Ginger Industry Association (AGIA) and Department of Agriculture Fisheries and Forestry Queensland (DAFF Queensland) researchers through stakeholder submissions on the draft IRA report and subsequent consultation that a new, yet to be described, intraspecific variant of burrowing nematode, (*Radopholus similis*), is likely present in Fiji.
>
> The characteristics of this putative intraspecific ginger variant, as described by the DAFF Queensland researchers, are: 1) The Fijian variant is highly pathogenic on ginger, while banana is a poor host. 2). In contrast, the Australian variant is highly pathogenic on banana, while ginger is a poor

11 Yam scale is an insect that can attack yams and a range of other crops including ginger. Adult female scales are pinkish-brown, roughly oyster-shaped, conical, with a white patch at the tip of the cone. Younger scales are relatively more white. Crawlers are yellow. Infestations of tubers and sometimes foliage cause poor growth. Stored yam tubers are particularly susceptible to attack and large numbers of scales cause shrivelling, Infonet-biovision, www.infonet-biovision.org/default/ct/146/crops, (accessed 12 March 2013).

12 Burrowing nematodes (*Radopholus similis*) are parasites that attack a range of crops including bananas and ginger. Burrowing nematodes are around 0.55 to 0.88 mm in length and have a life cycle of around 21 days. They attack and enter the roots of host plants, causing damage and impeding the function of the plants roots. They are known to be widespread in most banana growing regions of the world, Wikipedia, *Radopholus Similis*, http://en.wikipedia.org/wiki/Radopholus_similis, (accessed 13 March 2013).

13 Department of Agriculture Fisheries and Forestry, *Draft import risk analysis report for fresh ginger from Fiji*, April 2012, p. 64.

host (Mike Smith, Jenny Cobon, DAFF Queensland, *personal communication*).[14]

The import risk analysis for fresh ginger from Fiji

5.16 The proposed importation of fresh ginger from Fiji has been a long-standing issue, with a formal request from Fiji received in 2003. Fiji currently exports fresh mature ginger to a number of countries including New Zealand, Canada and Hawaii for direct retail in supermarkets. The DA Biosecurity report on its field visit to Fiji in 2007 noted that:

> Fiji previously exported fresh mature ginger to the United States but the export program has since ceased due to a reduction in prices following China's access for ginger to the United States. This has further elevated the importance of the access for baby ginger to Australia for the Fiji Government.
>
> Fresh mature ginger for further processing is currently permitted from Fiji to Australia subject to specific import requirements. The import requirements stipulate that the imported fresh mature ginger is to be processed commercially in an AQIS Approved Premises.
>
> Fiji also exports processed ginger (preserved in sugar, preserved in brine, and ginger powder etc) to Australia. [15]

5.17 Table 5.2 below provides a timeline of events in relation to the Fijian ginger IRA.

Table 5.2—Timeline of Fijian ginger IRA

November 2003	Biosecurity Australia[16] received a formal request from Fiji, seeking market access for fresh ginger to Australia.[17]
2004 and 2007	Further information was provided on the Fiji ginger production system, land preparation, pest management, pre- and post-harvest handling.[18]
23 – 29 September 2007	DA Biosecurity officers observed ginger production, cultivation and harvesting practices in Fiji.[19]
2008	The Import Market Access Advisory Group (IMAAG) allocated priority A to the IRA for fresh ginger from Fiji.[20]

14 Department of Agriculture Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 32.

15 Department of Agriculture, Fisheries and Forestry, *Field Visit Report – Ginger Production and Processing in Fiji*, September 2007, p. 4.

16 DA Biosecurity was formerly known as Biosecurity Australia.

17 Department of Agriculture, Fisheries and Forestry Biosecurity, *Draft import risk analysis report for fresh ginger from Fiji*, April 2012, p. 1.

18 Department of Agriculture, Fisheries and Forestry Biosecurity, *Draft import risk analysis report for fresh ginger from Fiji*, April 2012, p. 1.

19 Department of Agriculture, Fisheries and Forestry, *Draft import risk analysis report for fresh ginger from Fiji*, April 2012, p. 15.

2008	DA Biosecurity work program adjusted to include Fiji ginger.[21]
13 August 2010	Commencement of the IRA for the import of ginger from Fiji.
September 2011	DA Biosecurity met with the Australian Ginger Industry Association to discuss the IRA process and the pests of quarantine concern.[22]
March 2012	The IMAAG advised DA that ginger from Fiji was Priority A.[23]
16 April 2012	Release of the draft IRA for the importation of fresh ginger from Fiji.
25 May 2012	Field trip report on ginger production and processing in Fiji, made available to industry.[24]
10 August 2012	PFIRA report released by DA.
10 September 2012	No appeals were received by the IRA Appeals Panel during the regulated timeframe. The Chair has confirmed that no IRAAP will be convened.[25]
22 January 2013	Final IRA for fresh ginger from Fiji released.[26]

Source: Department of Agriculture, Fisheries and Forestry, www.daff.gov.au/ba/ira/current-plant/ginger_from_fiji, (accessed 10 December 2012).

Reasons for the IRA

5.18 In advancing the IRA process, the Department of Agriculture (DA) has undertaken some background work including a field trip to Fiji. In 2008, the request was allocated 'priority A' by IMAAG and work on the request commenced under the department's work program. DA advised the committee that the importation of fresh ginger from Fiji was discussed a number of times during bilateral discussions and official government-to-government representations.[27]

5.19 DA further advised that it provided the following written advice to IMAAG for its consideration of the priority for fresh ginger imports from Fiji. DA Biosecurity recommended that Fiji be allocated priority A:

---

20 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 4, 20 December 2012.

21 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 4, 20 December 2012.

22 Department of Agriculture, Fisheries and Forestry, *Draft import risk analysis report for fresh ginger from Fiji*, April 2012, p. 3.

23 Department of Agriculture, Fisheries and Forestry, *Import Market Access Advisory Group*, www.daff.gov.au/about/contactus/governance/import-market-access-advisory-group#plant, (accessed 11 December 2012).

24 Peasley Horticultural Services, *Submission 7*, p. 1.

25 Department of Agriculture, Fisheries and Forestry, Import Risk Analysis Appeals Panel, *Latest News*, www.daff.gov.au/about/contactus/governance/import-risk-analysis-appeals-panel, (accessed 11 December 2012).

26 Department of Agriculture, Fisheries and Forestry, *Final Import Risk Analysis Report for fresh ginger for consumption from Fiji*, 22 January 2013.

27 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 4, 20 December 2012.

Top priority for Fiji. Preliminary pest list sent to Fiji for comment in 2004. Main activity for AusAID-funded IRA officer for the South Pacific.[28]

Committee comment

5.20 It is unclear to the committee why importing fresh ginger from Fiji was the main activity for Commonwealth-funded AusAID officer. It is also unclear to the committee why the importation of fresh ginger from Fiji was given priority A status, particularly when, in response to questions from this committee, DA Biosecurity confirmed that there is no avenue for a formal appeal of an IMAAG decision to assign a specific priority.[29]

5.21 The confirmation by DA Biosecurity that Australian taxpayers have been funding an AusAID IRA officer to assist with the Fijian ginger import proposal (amongst others) is troubling, given that DA Biosecurity has steadfastly refused to commission research that would clarify the level of risk posed by the Fijian burrowing nematode variant to the Australian ginger industry. It would appear that the Government has been providing funding to assist importers, while denying the Australian ginger industry appropriate access to the resources needed to properly determine the risks arising from importing fresh ginger from Fiji.

5.22 The committee is concerned by the lack of transparency and opportunity for review of the decisions made by IMAAG. The committee therefore recommends that the full reasons and relevant supporting documentation for IMAAG's decisions should be made publicly available.

Recommendation 12

5.23 The committee recommends that the full reasons and relevant supporting documentation of the Import Market Access Advisory Group should be made publicly available within 30 days of a decision being taken.

Risk and consequences of importation

5.24 Industry witnesses provided the committee with evidence about the risks and consequences of the importation of fresh ginger for Australian industry. As noted above, ginger crops have already been adversely affected by pythium and bacterial wilt. The industry's concerns centred on any inadvertent importation of a pest which could threaten the viability of the Australian ginger industry.

5.25 The committee was particularly interested in the issues surrounding pests such as nematodes and their propensity to spread and the substantial crop loss of up to 70 per cent reported in some instances in Fiji.[30] Dr Graham Stirling, informed the

28 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 4, 20 December 2012.

29 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No.4, 20 December 2012.

30 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 18.

committee how easily other nematodes had spread and impacted farming across wide areas:

> We have a major nematode problem in our cereal industry. In 1965 there was a paper published that showed this nematode occurred on five farms within 20 kilometres of Toowoomba—that is 1965. Now, 45 or 50 years later, it is in every field just about in Queensland, New South Wales and everywhere. Once you introduce it, it gets taken around in soil to other places, and so what might start off as a minor problem because of soil transmission can finish up everywhere.[31]

Unrestricted risk assessment for quarantine pests for fresh ginger from Fiji

5.26 DA Biosecurity explained how the risk analysis process works:

> The risk analysis looks at the unconstrained risk: what would happen if you just allowed this into the country? Then we look at what we can do to prevent this happening, to reduce the risk of this happening to a very low level but not zero. Those are the measures we put in place. This is the process. It is a very repetitive and simple process.[32]

5.27 As discussed previously in this report, DA Biosecurity uses a risk management process to derive the unconstrained risk of an event, such as an outbreak of a particular disease or pest. A key feature of the process is the use of a risk estimation matrix (REM) to combine the likelihood and consequences of an event to obtain a risk assessment.

5.28 The pests considered in the ginger IRA and the unrestricted and restricted risk assessments for fresh ginger from Fiji are listed in Table 5.1. The 'low' unrestricted risk assessed for yam scale and burrowing nematode exceeded Australia's ALOP of 'very low'. The ginger IRA includes additional phytosanitary measures (discussed later in this chapter), which DA argued are effective in reducing these 'low' risks to 'very low'.[33]

5.29 The AGIA was not convinced that the overall risk estimate was correct for several pests, based on specific research it had conducted in relation to one of the pests – the burrowing nematode:

> Given that several pests could be potentially imported and could wipe out the industry, the risks presented by those pests should not be assessed as any lower than moderate. Independent advice in relation to the risk matrix should be conducted. Industry has shown this test case with the evidence provided through *Radopholus similis.* This potentially could be the case for other pests and diseases. We believe it is up to the Fijian ginger industry to

---

31 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 19.

32 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 45.

33 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 54–61.

> conduct further research to really examine their own industry and their own pests.[34]

Assessment of likelihood of entry, establishment and spread

5.30 The ginger IRA sets out how the overall likelihood of pest entry, establishment and spread is estimated using the likelihood of importation, distribution, establishment and spread individually and then combining those likelihoods using a set of matrix rules.[35] This section examines those assessments in some detail for the two pests that did not initially achieve Australia's ALOP: yam scale; and Fijian burrowing nematode variant.

Yam scale

5.31 In relation to yam scale, the likelihoods of entry establishment and spread are as follows:

Table 5.3—Likelihoods of entry, establishment and spread by yam scale

Entry – Importation	High
Entry – Distribution	High
Entry – Overall	High
Establishment	High
Spread	High
Overall entry, establishment and spread	High

Source: Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 54–55.

5.32 The ginger IRA states that, in relation to yam scale:

> The major risk from *Aspidiella hartii* is the importation of live scales on ginger rhizomes that are subsequently diverted from their intended use for human consumption and used as planting material. Infested rhizomes could also be discarded in the vicinity of suitable host plants, although most life stages are immobile and unlikely to establish.[36]

5.33 The risk management measure proposed is pre-export phytosanitary inspections by the Biosecurity Authority of Fiji (BAF) to ensure that infested ginger is

---

34 Mr Anthony Rehbein, President, Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 15.

35 Department of Agriculture, Fisheries and Forestry, *Provisional final import risk analysis report for fresh ginger from Fiji*, August 2012, pp 7–10.

36 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 55.

identified and subjected to appropriate remedial action.[37] This action is aimed at achieving Australia's ALOP of very low risk.

5.34 The committee heard evidence, however, about the ineffectiveness of visual inspections for the presence of yam scale:

> Yam scale is another thing that can decrease yields on ginger and leave unmarketable parcels of ginger. The yam scale can get that small that it is undetectable by the eye. So I do not know how having Biosecurity Fiji just physically inspect for yam scale is going to stop the yam scale coming into the country.[38]

5.35 Concerns were also raised about the proposed arrangements in relation to fumigation treatments – specifically, whether they were compulsory:

> Page 55 of the Provisional Final IRA also notes fumigation for Burrowing Nematode (ginger variant) will also be effective for Yam Scale. This is correct if it was compulsory, but it is not so how can this statement [be] made?[39]

Recommendation 13

5.36 The committee recommends that the Department of Agriculture review its assessment of the likelihood of entry, establishment and spread of yam scale. If a risk above Australia's ALOP were to emerge from the review, then the committee expects stronger risk management measures would be required. If such risk management measures were not sufficient to reduce the risk to Australia's ALOP, then imports of Fijian ginger to Australia should not be permitted.

Burrowing nematode

5.37 Burrowing nematode is the second pest with an unrestricted risk above the ALOP. The likelihood, entry, establishment and spread set out in the ginger IRA in relation to this pest are as follows:

Table 5.4—Likelihoods of entry, establishment and spread by burrowing nematode

Entry – Importation	Medium
Entry – Distribution	High
Entry – Overall	Medium
Establishment	High

37 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 55.

38 Mr Shane Templeton, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 5.

39 Templeton Ginger, *Submission 5*, [p. 6].

Spread	High
Overall entry, establishment and spread	Medium

Source: Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 54–55.

5.38 The ginger IRA states that in relation to the burrowing nematode:

> The major risk from *Radopholus similis* – putative intraspecific ginger variant is the importation of live nematodes on ginger rhizomes that are subsequently diverted from their intended use for human consumption and used as planting material. Infested rhizomes could also be discarded in the vicinity of suitable host plants. The use of clean seed, application of manure and rotation of crops have been shown to reduce burrowing nematode populations to undetectable levels (Turaganivalu *et al*. 2012).[40]

5.39 Combining the 'medium' probability of entry, establishment and spread, with the 'low' consequence for burrowing nematode results in the IRA with the unrestricted risk of 'low'. DA Biosecurity informed the committee that:

> We have said that there is a risk. The unrestricted risk would be too high. We are, therefore, going to place measures upon the introduction of ginger from Fiji into Australia and those measures, as has been indicated in reports and today in evidence, will work if applied appropriately. We will require it to be applied appropriately. This is standard process. We do it over and over again.[41]

5.40 Industry stakeholders disputed DA Biosecurity's view and provided the committee with evidence to suggest that:

- there is potential for nematodes to reside in remnant soil;
- nematodes have the capacity to reside within ginger and remain undetectable and possibly untreatable;
- there is the potential for burrowing nematode to spread from residential use ginger to farms;[42] and
- the Fijian burrowing nematode variant has greater pathogenicity.

Soil contamination

5.41 One mitigation measure proposed by DA Biosecurity involved inspections to confirm that ginger is 'visually free of soil'.[43] Industry stakeholders noted, however,

---

40 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 55–56.

41 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 37.

42 Australian Ginger Industry Association, *Submission 9*, [p. 2].

43 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 34.

that it was very difficult to clean all the soil off ginger because of its complex shape. Mr Shane Templeton of Templeton Ginger stated that:

> When we wash ginger to send to the fresh markets, we have always got those little crevices that it is very hard to get the soil out of. [44]

5.42 Concerns about the ineffectiveness of visual inspections were also raised by Peasley Horticultural Service:

> The PFIRA also minimises the potential risk of soil as a vector of a range of pests. It is well understood that soil is a hitchhiker on a wide range of commodities entering Australia however the PFIRA fails to concede that the ginger rhizome is not a smooth conventional shape and contains crevices which commonly trap soil clods which cannot be effectively removed by conventional high pressure water treatment.[45]

5.43 The Botanical Food Company outlined its experience in trying to ensure ginger is free from soil and argued that:

> Given BFC's considerable experience in this field, BFC totally supports the findings of the AGIA submission Appendix 1 June 2012: Due to the morphology of the ginger rhizome it is not possible to remove all traces of soil from ginger destined for the fresh market in a commercial operation.
>
> In fact BFC experience has proven 100% removal of soil and other potential contaminants can only be removed from fresh ginger by slicing, sorting and sanitising.[46]

5.44 The committee was also told that tiny amounts of remnant soil could contain large numbers of nematodes:

> Ginger has a complex morphology with lots of crevices allowing soil to hide in corners and between rhizomes. A study conducted by Deedi showed soil less than 1 gram in weight still contained up to 17 nematodes. Free from soil must be just that, free from soil. A few grains of soil is all it would take to introduce Burrowing Nematode. Otherwise other risk mitigation measures are required.[47]

5.45 Given that nematodes can remain in small amounts of soil, industry stakeholders have ongoing concerns about how the issue of soil contamination will be managed and exactly how much soil would be allowed. The AGIA told the committee that:

> Throughout the IRA process, the issue of soil has been debated and to this point the goal posts consistently vary when the topic is discussed. Australia has a zero tolerance of soil. From documented minutes between industry and DAFF Biosecurity, we are constantly told that perhaps a cup of soil will

---

44 Mr Shane Templeton, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 4.

45 Peasley Horticultural Service, *Submission 7*, p. 2.

46 Botanical Food Company, *Submission 12*, [p. 4].

47 Templeton Ginger, *Submission 5*, [p. 3].

> be allowed. It is then up to AQIS to deal with it and make a line call decision if the product does not meet its import guidelines.[48]

5.46 The AGIA further questioned information provided by DA Biosecurity regarding the amount of soil that leads to the introduction of burrowing nematodes:

> Dr Colin Grant stated in 'Official Committee Hansard, Senate, Rural and Regional Affairs and Transport Legislation Committee Estimates Monday, 21 May 2012' that 'A few grains of soil will not be a medium sufficient to maintain nematodes. You would have to have clumps of soil—fairly small clumps, admittedly'. However, data supplied in the AGIA's response to the Draft IRA (pp. 12–13 and Table A.1 on p. 66) show that even extremely small amounts of soil can harbour nematodes. Up to 17 nematodes were extracted from each of 10 samples of less than 1 gram of soil hidden in crevices on ginger rhizomes.[49]

Burrowing nematode present inside ginger

5.47 Industry stakeholders told the committee that, even if it were possible to remove all the soil from imported ginger, it was still likely that the Fijian burrowing nematode variant could exist inside the ginger and thereby be imported into Australia.[50] AGIA noted, for example, that the burrowing nematode reproduces internally in the ginger rhizome.[51]

5.48 The evidence offered in the ginger IRA that 'the experience of Fiji's ginger exports to other markets over a number of years does not suggest a high likelihood that *Radopholus similis* would be present in export-quality ginger'[52] is not particularly convincing. This position is reinforced by an answer to a question on notice which indicated that there have been three consignments (to New Zealand) over a period of 10 years where nematodes have been intercepted.[53]

Burrowing nematode entry with other host and non-host crops

5.49 Burrowing nematodes are able to live and multiply on a number of other host crops, such as bananas, carrots, citrus, lettuce, mango, rice, tomatoes, black peppercorn, coconuts, coffee, pineapples, sugarcane and tea.[54]

---

48 Mr Anthony Rehbein, President, Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 14.

49 Australia Ginger Industry Association, *Submission 9*, [p. 2].

50 Mr Shane Templeton, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 4.

51 Mr Anthony Rehbein, President, Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 15.

52 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 34.

53 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 15, 20 January 2013.

54 http://plpnemweb.ucdavis.edu/nemaplex/taxadata/G111S2.HTM, (accessed 13 March 2013).

5.50 However, in response to questions from the committee, DA Biosecurity indicated that:

> Rice, black pepper, coconuts, coffee and tea can be imported from Fiji. None of these imported products are considered a viable pathway for the burrowing nematode to enter and establish in Australia.[55]

5.51 DA Biosecurity also acknowledged that in conducting the IRA on fresh ginger from Fiji it did not assess the likelihood of the Fijian burrowing nematode variant being imported into Australia via other crops from Fiji. Crops including – but not limited to – carrots, citrus, lettuces, mangoes, rice, tomatoes, bananas, black peppers, coconuts, coffee, pineapples, sugarcane and tea.[56]

5.52 The committee is aware that taro (as a non-host crop for burrowing nematodes) is often grown in rotation with ginger in Fiji and sought to explore whether there were any risks associated with the import arrangements for taro from Fiji.

5.53 When questioned by the committee, DA Biosecurity confirmed that nematodes had been found on taro imported from Fiji [57] however, to date, the Fijian burrowing nematode variant had not been found on taro.[58] In addition, DA Biosecurity confirmed that fresh taro from Fiji is moved into ginger growing regions:

> Fresh taro from Fiji is imported into Brisbane on a regular basis. DAFF does not monitor the movement of goods once they are released from quarantine control.[59]

5.54 As discussed in Chapter 4, DA Biosecurity has indicated that it is unable to control what happens to imported produce once quarantine clearance is given at the border. The committee is aware, therefore, that in the same way as fresh pineapple from Malaysia could pass Australian border controls and not be restricted in its distribution, there would be no restrictions placed on the distribution of fresh ginger from Fiji. The committee notes that once border clearance is provided, the distribution of that product ceases to be relevant from the biosecurity perspective:[60]

---

55 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 7, 20 January 2013.

56 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 8, 20 January 2013.

57 Mr Bill Magee, Assistant Secretary, Department of Agriculture, Fishers and Forestry, *Committee Hansard*, 23 October 2013, p. 42.

58 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 21, 20 January 2013.

59 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 21, 20 January 2013.

60 Ms Rona Mellor, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 13 March 2103, p. 20.

> If they have cleared the border, and we are satisfied that they have met our conditions, they can go wherever.[61]

Committee comment

5.55 The committee considers that the ginger IRA does not adequately address the difficulties associated with ensuring that soil containing burrowing nematodes is removed from ginger being imported from Fiji. The level of difficulty in ensuring that very small amounts of soil are not present is not adequately reflected in the 'medium' likelihood of entry prior to mitigation measures, or the lower likelihood of entry after the mitigation measures.

5.56 The committee therefore considers that for the purposes of the unrestricted risk assessment, the likelihood that the Fijian burrowing nematode variant would be imported into Australia with fresh ginger from Fiji is 'almost certain'. This likelihood was estimated in the ginger IRA as 'moderate' with a probability of 0.3 to 0.7, but the committee considers this is not a credible assessment for an event that is 'almost certain' to occur. The three cases of nematodes detected in ginger consignments to other countries over the past decade highlight for the committee the very high likelihood of nematodes being imported. The committee notes that these are the detected cases and that there may have been cases where nematodes went undetected by quarantine inspection.

5.57 The committee notes that if the likelihood of importation had been rated as 'high' which would be more appropriate for an event that is 'almost certain' to occur, the overall probability of entry, establishment and spread would also be 'high'.

5.58 The committee is concerned that it has identified a significant shortcoming in the ginger IRA as it did not consider that the more pathogenic Fijian burrowing nematode variant could be imported from Fiji on other host crops, such as rice, black pepper, coconuts, coffee and tea.

5.59 In addition, the committee remains concerned about the potential for the Fijian burrowing nematode variant to be imported on taro which is grown in rotation with ginger in Fiji. While the committee acknowledges that Fijian burrowing nematode variant have not been found on taro imported from Fiji to date, DA Biosecurity has admitted that other nematodes have been found on taro from Fiji. The committee considers that this demonstrates that the burrowing nematode could also be imported and thus pose a threat to Australian ginger crops.

5.60 The committee therefore considers the likelihood of entry, establishment and spread of the Fijian burrowing nematode should be reassessed.

Recommendation 14

5.61 The committee recommends that the Department of Agriculture review its assessment of the likelihood of entry, establishment and spread of the Fijian burrowing nematode variant. If a risk above Australia's ALOP were to emerge

---

61 Dr Vanessa Findlay, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 12 March 2103, p. 19.

from the review, then the committee expects stronger risk management measures would be required. If such risk management measures were not sufficient to reduce the risk to Australia's ALOP, then imports of Fijian ginger to Australia should not be permitted.

Assessment of consequences

5.62 As discussed in previous chapters, the assessment of the consequences that may arise from a pest incursion is a key part in determining the risks associated with importation of ginger from Fiji.

5.63 The IRA sets out how the consequences are assessed over four geographic levels: local, district, regional and national, against the following six criteria:

- plant life or health;
- other aspects of the environment;
- eradication, control;
- domestic trade;
- international trade; and
- environment.[62]

5.64 The magnitude of the potential consequence at each geographic level is put into one of four categories: indiscernible, minor, significant, and major significant. The magnitudes for the six criteria are then combined into overall consequence ratings for each pest through two sets of decision rules.[63]

Burrowing nematodes and yam scale

5.65 The consequences for both yam scale and burrowing nematode are both assessed by DA Biosecurity as 'low'. Both pests were given an impact score of 'D' meaning 'significant at the district' level for plant life or health.[64] In relation to the burrowing nematode, the ginger IRA states that:

> *Radopholus similis* – putative intraspecific ginger variant may have an impact on ginger production where poor crop management and production practices are in place. *Radopholus similis* – putative intraspecific ginger variant was not detectable in crops that employed crop rotation with non-host crops and which used hot water treated seed planting material (Turaganivalu *et al*. 2009). Infestation results in stunted, chlorotic low

62 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 10.

63 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 10–12.

64 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 30, 36.

> yielding crops (Vilsoni *et al*. 1976). Rhizomes can be completely destroyed (Turaganivalu *et al*. 2009).[65]

5.66 However, key industry stakeholders were not convinced that the consequence of an infestation of burrowing nematode should be assessed as 'low'. Rather, it was argued that the ginger IRA has underestimated the risks. The AGIA stated for example:

> ...that DAFF Biosecurity has significantly underestimated the risks posed by the introduction of various pest and disease organisms and has not provided for adequate risk mitigation measures...[66]

5.67 Similarly, Buderim Ginger submitted its concerns about the level of risk assigned to yam scale and burrowing nematode:

> Buderim supports the industry position that DAFF Biosecurity has significantly underestimated the risk posed by the potential introduction of these two pests.
>
> …the assumption that it is possible to rely on farm management practices alone without the mandatory fumigation of the imported ginger to control the pests identified is impractical and ill-conceived.[67]

5.68 Templeton Ginger told the committee that if burrowing nematode were to enter Australia, it would be as devastating to the ginger industry as Foot and Mouth disease would be to the cattle industry.[68] It was also submitted that:

> Burrowing Nematode has been found to be pathogenic on ginger in Fiji, with losses of up 70% of their crop. It could not only affect our yields but would affect our access to overseas markets like Japan.[69]
>
> This import request is to deliver ginger into Australia, anywhere! It is not limited to 1or 2 places with strict quarantine restrictions. It can be bought by anyone, anywhere for almost any use. Any piece of ginger can be used as planting material intentionally or unintentionally.[70]

Impact of geographic scale in the assessment of consequences for ginger

5.69 The committee is concerned that because the highly specialised growing conditions for ginger limit its production to a relatively small geographic area, the DA Biosecurity decision rules in Tables 2.3 and 2.4 of the ginger IRA mean that

---

65 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 36.

66 Mr Anthony Rehbein, President Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 14. For other examples see: Botanical Food Company, *Submission 12*, [pp 2 and 6]; Mr David Gibson MP, *Submission 13*, [p. 1]; and Murray Bros., *Submission 14*, p. 1.

67 Buderim Ginger, *Submission 1*, [pp 1 and 3].

68 Templeton Ginger, *Submission 5*, [p. 2].

69 Templeton Ginger, *Submission 5*, [p. 2].

70 Templeton Ginger, *Submission 5*, [p. 3].

regardless of how serious the impact of a specific pest would be on the ginger industry, the consequences could never be rated above 'moderate'.[71]

5.70 As noted previously, ginger requires light shade, a well-drained soil, frost-free climate and 1500 mm of rain annually or supplementary irrigation. Ginger grows well in loamy or alluvial fertile soils and likes the addition of well-rotted manure or compost. It cannot stand waterlogging.[72] The Queensland Government's 2009 overview of the Australian ginger industry states:

> Ginger is a tropical crop and therefore grows particularly well in the wet tropics and subtropics. It also grows well in areas that experience a dry season, provided there is irrigation. Areas that are too windy or too exposed may cause issues for growers as crops perform best in more sheltered areas. For this reason, the majority of Queensland's ginger farms are located along coastal areas such as the Sunshine Coast that experience high temperatures and humidity, and high rainfall during summer.[73]

Committee comment

5.71 The committee is concerned that the IRA does not allow 'high' or even 'extreme' consequences to be determined when, for example, the entire or large proportion of the area capable of growing a crop such as ginger is under a threat of 'major significance'.

5.72 The committee notes that Mr Peace identified this limitation in his report to the committee on the DA Biosecurity REM. Mr Peace suggested several alternatives to crude geographic levels, including percentage of national crop at risk, or viable planting area at risk.[74] The committee has made a recommendation on the broader issue of geographic level in Chapter 3.

Assessment of consequences for other crops

5.73 The committee was informed that in addition to ginger crops, yam scale can also affect other crops:

> Yam Scale has been determined as a quarantine pest. Yam Scale Pest Risk Management measures are Phytosanitary inspection by BAF.
>
> Yam Scale could affect Australian grower's yields and leave pieces unmarketable if introduced into Australia. It should also be noted that Yam Scale has many other host crops…[75]

---

71 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 10–11.

72 Greenharvest, www.greenharvest.com.au/Plants/Information/Ginger.html, (accessed 25 March 2013).

73 Queensland Government, *The Australian Ginger Industry – Overview of market trends and opportunities*, 2009, p. 11.

74 Peace, C., *Advice on the risk estimation matrix used by DAFF Biosecurity as part of the Import Risk Analysis process*, January 2013, p. 22.

75 Templeton Ginger, *Submission 5*, [p. 6].

5.74 The committee notes that the ginger IRA drew on references regarding a range of tropical root crops as potential hosts of yam scale.[76]

5.75 For the burrowing nematode, the IRA acknowledges a wide range of other potential host crops, including bananas, black peppers, coconuts, coffee, ginger, pineapples, sugarcane and tea. However, bananas are the only other host crop explicitly considered in terms of the Fijian burrowing nematode variant that is highly pathogenic for ginger. While bananas in Fiji are shown to be a poor host,[77] it is less clear whether the Fijian burrowing nematode variant is pathogenic to Australian bananas.

5.76 DA Biosecurity indicated in an answer to a written question on notice that, in its view, it was not applicable for the Chief Executive to use the powers available under regulation 69G(1) of the Quarantine Regulations 2000 to obtain further information regarding the impact of the Fijian burrowing nematode variant on other host crops grown in Australia.[78]

5.77 The committee observes that DA Biosecurity appears to consider it unnecessary to seek further information on the consequences of the Fijian burrowing nematode variant. The committee assumes that this is because it has put in place mitigation measures to reduce the risk below Australia's ALOP. However, as discussed elsewhere in this chapter, the committee is not convinced that the mitigation measures are effective, or that the risk is below Australia's ALOP.

5.78 The committee sought information on whether in conducting the IRA, DA Biosecurity explicitly considered the extent and consequences of the Fijian burrowing nematode variant to the particular species of other known host crops grown in Australia, including, but not limited to carrots, citrus, lettuces, mangoes, rice, tomatoes, bananas, black peppers, coconuts, coffee, pineapples, sugarcane and tea. DA Biosecurity responded:

> The key attribute of *Radopholus similis* intraspecific variant is its postulated pathogenicity on ginger. As there is no published information available on the pathogenicity of the *Radopholus similis* intraspecific variant on crops other than ginger, the pest risk assessment took a conservative approach in rating the consequences of this pest on plant life or health, including other crops. The report specifically recognised the putative intraspecific strain on ginger and addressed those risks.[79]

---

76 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 30.

77 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 32–36.

78 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 5, 20 January 2013.

79 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 5, 20 January 2013.

Baby ginger versus mature harvest ginger

5.79 Dr Graham Stirling, a consultant to the AGIA, clarified that if the Fijian burrowing nematode variant escaped into Australian ginger growing areas, it may not prevent all ginger growing, but would affect the higher quality ginger that is obtained by leaving the crop in the ground for longer:

> If we got this pest in Australia, we would be able to grow early-harvest ginger, which only grows in the ground for four or five months. The problem will come after that. We would lose these two-year plantings... They would be destroyed. We would lose, probably, a large percentage of our market, but we would still be able to grow ginger provided we harvested it early, before the nematodes did the damage.[80]

5.80 DA Biosecurity informed the committee that the IRA covered both immature and mature ginger, but that different harvest times were not assessed.[81]

Committee comment

5.81 The committee acknowledges that the IRA's assessment of consequences is inherently prone to a degree of subjectivity. Nevertheless, the committee considers that the language used by industry stakeholders indicates that the magnitude of the consequence of the entry of Fijian burrowing nematode variant is likely to be of 'major significance'. The IRA defines major significance as:

> …expected to threaten the economic viability through a large increase in mortality/morbidity of hosts, or a large decrease in production. Expected to severely or irreversibly damage the intrinsic 'value' of non-commercial criteria.[82]

5.82 However, in the ginger IRA, DA Biosecurity appear to consider that if Australian farmers use crop rotation and hot water treatment of seed ginger, the magnitude of the consequences of burrowing nematode will only be 'significant'.[83] As discussed later in this chapter, the committee has concerns about both the effectiveness of the proposed mitigation measures and whether the consequences have been correctly assessed.

5.83 The committee observes that if the percentage of the national crop at risk or the proportion of the possible growing area were used instead of geographic size, the consequences would possibly be assessed as 'moderate' or higher for both yam scale and burrowing nematode. As a result, the unrestricted risk may be 'moderate' or higher.

---

80 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 24.

81 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 14, 20 January 2013.

82 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 11.

83 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 36.

5.84 Even if the proposed mitigation measures reduced the likelihood of entry, establishment and spread of yam scale and burrowing nematode to 'low', the restricted risk assessment for both pests would be 'low risk' and therefore above the ALOP and fresh Fiji ginger would not be able to be imported without the application of further mitigation measures.

5.85 The committee also observes that if the same adjustments to assessment consequences were made for some of the other seven quarantine pests associated with fresh ginger from Fiji, the unrestricted risk may also be higher than what was previously assessed and additional mitigation measures may be required.

5.86 The committee therefore reiterates the importance of the recommendation made in Chapter 3 in relation to the way in which geographic impacts are taken into consideration in the IRA process.

5.87 The committee is concerned at the assessment of potential consequences of the Fijian burrowing nematode variant spreading in Australia as 'low', in spite of the fact that there does not appear to be any information on the consequences for crops other than ginger.

5.88 The statement by DA that a conservative approach had been taken regarding the consequence for other crops does not appear to be consistent with plant life or health impact score given in the ginger IRA of 'D—significant at the district level'.[84] The other host crops are grown in areas extending far beyond the district level in which ginger is grown.

5.89 In addition, as noted above, the ginger IRA appears to assess consequences as 'significant' on the basis that crop rotation and hot water treatment can be used to manage the Fijian burrowing nematode variant in Australian ginger crops. However, it is not at all clear to the committee that crop rotation and hot water treatment are effective against the Fijian burrowing nematode variant for other host crops in Australia. Again, this draws into question the assertion by DA Biosecurity that a conservative approach was taken in rating the consequence for other host crops.

5.90 The committee considers that based on the above, and using Table 2.3 of the IRA, the plant life or health impact score for the Fijian burrowing nematode variant should be at least 'E' and quite possibly 'F'. Hence, the overall consequence rating based on Table 2.4 of the ginger IRA would then be 'moderate' or 'high'. The corresponding unrestricted risk based on Table 2.5 of the IRA would then be 'moderate' or 'high'. Even if the entry mitigation measures were as effective as DA Biosecurity propose, the restricted risk would be 'low' or 'moderate' and therefore above the ALOP.

5.91 The committee considers this to be a significant flaw in the IRA, particularly given that the Fijian burrowing nematode variant has been shown to be so much more pathogenic for ginger.

---

84 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 36.

5.92 The committee therefore considers that the consequences of the Fijian burrowing nematode variant entering Australia should be reassessed.

Recommendation 15

5.93 The committee recommends that the Department of Agriculture review its assessment of the consequences of the establishment of the Fijian burrowing nematode variant in Australia. If a risk above Australia's ALOP were to emerge from the review, then the committee expects stronger risk management measures would be required. If such risk management measures were not sufficient to reduce the risk to Australia's ALOP, then imports of Fijian ginger to Australia should not be permitted.

Adequacy and effectives of quarantine conditions and arrangements

Requirements for mitigation measures

5.94 The identification and assessment of risk management measures is a key part of any IRA process. If the risks associated with an import proposal are determined through an IRA process to exceed Australia's ALOP, there are two possible paths. First, risk management measures are proposed to reduce the risks to a level that achieves Australia's ALOP; or secondly where it is not possible to reduce the risks to below the ALOP, trade will not be allowed.[85]

5.95 In the case of fresh ginger from Fiji, the ginger IRA identified two pests (yam scale and the Fijian burrowing nematode variant) for which the unrestricted risk is 'low' and above Australia's ALOP of 'very low'.[86]

Yam scale

5.96 The IRA proposed the following mitigation measures in relation to yam scale:

> ...pre-export phytosanitary inspection by BAF for *Aspidiella hartii* [yam scale] to ensure that infested ginger rhizomes are identified and subjected to appropriate remedial action.[87]

5.97 Stakeholders raised concerns about the proposed mitigation measures and raised questions about whether inspections for yam scale would be effective given the size of yam scale.[88]

5.98 The ginger IRA also suggests that the proposed methyl bromide fumigation for burrowing nematode would also be effective for yam scale.[89] However, it was

---

85 Biosecurity Australia, *Import Risk Analysis Handbook*, 2011, p. 5.

86 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 54.

87 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 55.

88 See, for example, Mr Shane Templeton, Director, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 5.

89 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 55.

pointed out that the fumigation would only work if it is compulsory and the ginger IRA currently lists it as an optional treatment.[90]

Fijian burrowing nematode variant

5.99 The IRA proposed the mitigation measures set out below for the Fijian burrowing nematode variant:

> It is proposed that the risk of *Radopholus similis* – putative intraspecific ginger variant in ginger exported to Australia be managed by either:
>
> 1) a systems approach, such as, but not limited to: the use of clean seed certified as nematode-free, or seed dipped in hot water at 51°C for ten minutes, and either:
>
> - a crop rotation program using non-crop hosts and fallow period, or
> - production in a recognised area of low pest prevalence.
>
> or
>
> 2) methyl bromide fumigation or other suitable treatment of rhizomes, either in Fiji or on arrival in Australia.[91]

5.100 DA Biosecurity informed the committee that in general, systems approaches are quite commonly used[92] and summarised the systems approach as follows:

> We have talked about the use of clean seed certified as nematode free or seed dipped in hot water at 51 degrees for 10 minutes and either a crop rotation program using non-crop hosts and fallow period or production in a recognised area of low pest prevalence.
>
> That is a combination that would give us our systems approach. We would also consider other systems approaches that might be proposed to us by the Fijian government, and we would make some assessment of those. The alternative to that systems approach for *Radopholus similis* is a methyl bromide fumigation or other suitable treatment, either in Fiji or on arrival in Australia.[93]

5.101 The ginger IRA asserts that the objective of the mitigation measures is to reduce the likelihood of importation for the Fijian burrowing nematode variant to at least 'low'.[94] The committee sought further information on two key points in relation to the proposed mitigation measures – including the systems approach. Firstly,

---

90 Department of Agriculture, Fisheries and Forestry *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 56.

91 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, pp 55–56.

92 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 32.

93 Mr Rob Schwartz, Senior Director, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, pp 34–35.

94 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 56.

whether there is scientific evidence that properly implemented mitigation measures would guarantee elimination of the nematodes, and secondly, whether the mitigation measures would be implemented correctly.

Evidence for the effectiveness of mitigation measures

5.102 Stakeholders informed the committee of their concerns that the proposed management approaches were not sufficient[95] and the scientific basis of the systems approach was queried by some submitters. For example, Peasley Horticultural Services stated that:

> The risk management measures proposed in the PFIRA are scientifically and commercially unproven and have not been technically or practically demonstrated.[96]

5.103 The Chairman of the AGIA also argued that:

> The Provisional Final IRA (PFIRA) had implemented mitigation measures for *Radopholus similis* [burrowing nematodes]. These measures are simply inadequate. Based on my industry experience as a seed grower, my conclusion is that heat treating, certified seed and crop rotation are not adequate measures.[97]

5.104 Templeton Ginger raised concerns about the hot water treatment part of the risk management approach, and suggested that it may not eliminate burrowing nematodes:

> From what I can see it has been taken from the ACIAR [Australian Centre for International Agricultural Research] report and it has taken sections out of it so that it says using a clean seed scheme with hot water treatment will do. It also says in that report that hot water treatment is not being done well in Fiji, and there is no science around that says that that will eliminate burrowing nematode. It also says in that report, where it is taken out, that there is crop rotation and retillering of ginger. So you have affected plants once again as well as other weed hosts that actually come in.[98]

5.105 In its submission on the draft IRA, the AGIA asserted that the guidelines for hot water treatment are aimed at controlling rather than eliminating nematodes:

> …most guidelines for hot-water treatment are aimed at reducing pest populations rather than eliminating them. For most pests, protocols have not been developed to eliminate organisms; this would likely require higher temperatures or longer treatment times, and these may affect the resultant quality of ginger rhizomes. Where required for particular organisms, methods

95 Mr John Allen, *Submission 2*, [p. 1]; Mr Barry Gill, *Submission 3*, [p. 1].

96 Peasley Horticultural Services, *Submission 7*, p. 3.

97 Australian Ginger Growers Association, *Submission 4*, [p. 2].

98 Mr Shane Templeton, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 2.

> must be developed to achieve elimination without affecting the quality of ginger rhizomes intended for human consumption.[99]

5.106 The committee notes that in relation to the effectiveness of dipping in hot water, the ginger IRA itself states that 'steps such as hot water dipping do not guarantee the rhizomes will be pest free'.[100]

5.107 Mr John Allen from Oakland Farms also expressed concerns about the proposed protocols:

> The protocols that DAFF Biosecurity required for their containment of burrowing nematodes will not work here, and I am sure that Fiji will not be much different. In my view, unless very definite and stringent protocols are put in place, this pathogen will enter Australia.[101]

5.108 One of the risk mitigation measures proposed by DA Biosecurity for use against burrowing nematode was methyl bromide – a measure widely considered by stakeholders as being largely ineffective The committee notes, however, that the AGIA did consider methyl bromide fumigation 'potentially effective' against the Fijian burrowing nematode variant.[102]

5.109 Dr Stirling stated that:

> It is a question about what rate of methyl bromide. We do not even have the research to actually know that it will actually do the job. So it may very well be okay but, as far as I am aware, I have not seen any literature which actually indicates that it is effective.[103]

5.110 Mr Shane Templeton informed the committee that when a burrowing nematode burrows into ginger, the wounds will heal over and the methyl bromide might not effectively get to those burrowing nematodes.[104] Similarly the Australian Ginger Growers Association (AGGA) argued that:

> Methyl bromide was put forward by DAFF B as the alternative control measure. Due to the reproductive system of *Radopholus similis* [burrowing nematode], will this fumigant be 100% affective when the burrowing nematode reproduces internally in the ginger rhizome? Methyl bromide is not systemic. One must question whether this mitigation measure requires further research before ginger is imported. How long and at what rate and at

---

99 Australian Ginger Industry Association, *Response to: 'Draft import risk analysis report for fresh ginger from Fiji'*, June 2012, pp 22 and 44.

100 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 84.

101 Mr John Allen, Owner/Manager, Oakland Farms, *Committee Hansard*, 23 October 2012, p. 9.

102 Dr Mike Smith, Technical adviser to the ginger industry, *Committee Hansard*, 23 October 2012, p. 23.

103 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 18.

104 Mr Shane Templeton, Templeton Ginger, *Committee Hansard*, 23 October 2012, p. 2.

> what temperature will methyl bromide be used? Who will be required to conduct this operation?[105]

5.111 While willing to admit the potential effectiveness of methyl bromide fumigation, the AGIA expressed similar concerns in relation to fumigation in respect of internal organisms:

> However, there is little information available on the effectiveness of fumigation on organisms living inside plant tissue. As *R. similis* is an endoparasitic nematode, reproducing inside the rhizome, we believe that further work is needed to determine the effect of methyl bromide fumigation on nematodes contained within rhizomes.[106]

5.112 The AGIA also informed the committee of the area freedom requirements for export of Australian ginger to Japan and suggested that this would be a suitable measure for fresh ginger coming into Australia:

> *R. similis* is not found in Australian ginger, yet area freedom is the requirement for export of Australian ginger to Japan. Therefore, importation of ginger from Fiji, where *R. similis* is found extensively, should require measures no less stringent than area freedom and/or methyl bromide fumigation.
>
> The AGIA proposes that the minimum suitable risk mitigation strategy for *R. similis* on ginger imported from Fiji includes area freedom *and* fumigation with methyl bromide.[107]

5.113 The Biosecurity Authority of Fiji also questioned the scientific validity of the proposed mitigation measures:

> …the Provisional Final IRA has recommended measures for the burrowing nematode without validated scientific evidence to support these measures. The evidence that has been provided is insufficient and flawed. Fiji looks forward to the removal of these unjustified measures in the near future.[108]

5.114 The committee notes that in response to questions from the committee, DA Biosecurity admitted that 'no quarantine treatment can guarantee total elimination of any pest in practice.'[109] In addition DA stated that:

> Methyl bromide is an effective quarantine treatment used by many countries. In practical application it is possible that low numbers may survive a quarantine treatment.[110]

---

105 Australian Ginger Growers Association, *Submission 4*, [p. 2].

106 Australian Ginger Industry Association, *Submission 9*, [p. 4].

107 Australian Ginger Industry Association, *Submission 9*, [p. 4].

108 Biosecurity Authority of Fiji, *Submission 11*, p. 2.

109 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 18, 20 January 2013.

110 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 19, 20 January 2013.

5.115 The committee sought further information from DA Biosecurity on what mitigation measures are applied in other countries including Japan, Britain, the United States, New Zealand, Canada, China and the European Union. In response, DA Biosecurity noted that some countries use only inspections, however, information was not available on countries including Japan, the United Kingdom, China and the European Union.[111]

Implementation of the mitigation measures

5.116 A closely associated further issue explored by the committee was the extent to which the mitigation measures, even if capable of being effective, would be likely to be effective if not properly implemented. The committee took specific evidence on the likelihood of full and correct implementation of measures in Fiji, and took evidence which suggested that, in the past, mitigation measures have been poorly implemented. Dr Stirling explained the systems approach to the committee and in doing so, informed them of a range of problems with the implementation of the systems approach in Fiji:

> Dr Smith and I did some research in Fiji... Basically we showed…that they have got serious *Radopholus* problems. They grow taro and cassava as rotation crops. If you grow taro and cassava that are non-hosts for the nematode, the population will drop. What we found was that the nematode was being carried over on volunteer ginger. There are still a few ginger plants that come up in the field, or weeds. Providing you grow cassava and taro properly and keep all your weed and your volunteer ginger down, you can get quite a low population of nematodes in three years time when you come back to plant ginger. That is the first part of the systems approach, to get that right. Then they plant dirty seed that has already got the nematode in it and they have completely wasted their time. So the second part of the system is to hot water treat the seeds and eliminate the nematodes. If that was done properly, it would not completely eliminate the nematode but it has a good chance of reducing the populations to more manageable levels. That is what we call the systems approach. We saw no evidence in Fiji that they are capable of doing it properly.[112]

5.117 Dr Stirling also pointed out that there had been issues with implementing the hot water dipping approach correctly:

> If you have to hot-water treat to 51 degrees for 10 minutes, that does not mean 50 degrees for nine minutes. It has to be done properly. We actually measured temperatures in tanks over there, and they were 42 degrees. That is not going to do anything.[113]

---

111 Department of Agriculture, Fisheries and Forestry Biosecurity, Answer to question on notice No. 6, 20 December 2012.

112 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 23.

113 Dr Graham Stirling, Independent consultant assisting the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 16.

5.118 The committee queried DA Biosecurity in relation to how the hot water treatment would work in practice, including how the temperature would be maintained above 51 degrees. At the time of the hearing, DA Biosecurity were not clear on how it would work, or how appropriate temperatures would be maintained.[114]

5.119 The field trip to Fiji undertaken by DA Biosecurity in 2007 also uncovered evidence of poor implementation of mitigation measures and varying practices:

> The results from farmers who follow the ginger production procedures (such as dipping in hot water) are mixed, and do not conclusively indicate that a single factor (pests and diseases or environmental conditions, or both) is responsible for the loss of the ginger for some farmers. This raises the question of whether factors other than nematodes are affecting the ginger during its growth.
>
> For example, the ginger planted on the slopes where the soils are well drained has high yields (approx less than 3 per cent loss of total crop) despite avoiding the dipping of the planting material in hot water. On the other hand, the farmers on relatively flat land who did not follow the hot water treatment suffered losses of around 70 per cent due to rotting of the rhizomes.[115]

5.120 DA Biosecurity acknowledged that the details of how the mitigation measures would be put in place through an appropriate work plan were still to be worked out. DA Biosecurity also told the committee that making the work plans available to the committee and the Australian ginger industry was subject to the willingness of Fijian authorities.[116]

Committee comment

5.121 The ginger IRA notes that for yam scale, the 'risk management measure is consistent with Australia's quarantine policy for scale species on other imported commodities.'[117] While consistency with other policy is potentially useful, the committee considers that it is necessary for DA Biosecurity to reference appropriate scientific evidence that the proposed inspections regime is effective.

5.122 The committee also considers that, to allow appropriate scrutiny, scientific evidence in relation to the effectiveness of fumigation for yam scale should be set out in the ginger IRA.

---

114 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 39.

115 Department of Agriculture, Fisheries and Forestry Biosecurity, *Field Visit Report – Ginger Production and Processing in Fiji*, September 2007, pp 7–8.

116 Dr Colin Grant, First Assistant Secretary, Plant Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 33.

117 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 55.

Recommendation 16

5.123 The committee recommends that before an import license is granted, the Department of Agriculture make available to stakeholders the scientific evidence used as the basis for the effectiveness of the proposed mitigation measures for yam scale.

Recommendation 17

5.124 The committee recommends that if the Department of Agriculture cannot produce such scientific evidence, the mitigation measures for yam scale must be reassessed.

Committee comment

5.125 The committee notes that while some other countries appear to use only inspections, DA Biosecurity was not able to inform the committee of what mitigation measures are used in key markets, including Japan, China, the United Kingdom and the European Union. In the committee's view this indicates that DA Biosecurity has not adequately benchmarked their proposed mitigation measures against international best practice. The committee observes that this is a further example of IRAs being completed without taking sufficient information into account.

5.126 The committee acknowledges that the mitigation measures for the Fijian burrowing nematode variant do have some utility in controlling and reducing the populations of the nematode and that there is scientific evidence to support that.

5.127 However, the committee is not convinced by the information in the ginger IRA, or evidence provided by DA Biosecurity that there is scientific evidence that the mitigation measures will be effective in the elimination of the Fijian burrowing nematode variant. As a result, Fijian burrowing nematodes are almost certain to be present in fresh ginger from Fiji. The committee therefore considers that the 'low' likelihood of entry stated in the IRA[118] cannot possibly be credible or correct.

5.128 The committee remains concerned that significant systems upgrades and compliance monitoring would have to occur in Fiji for there to be confidence that the mitigation measures would be implemented correctly. In this regard, the committee considers that it is essential that the work plan be made publicly available in Australia, so that the Parliament, the public and the ginger industry can apply appropriate scrutiny to it.

5.129 However, the committee notes that, as discussed in the previous section, even if the mitigation measures are implemented fully, an appropriate standard of evidence has not been provided to ensure confidence as to their effectiveness. This is especially concerning in relation to the Fijian burrowing nematode variant, as DA Biosecurity has not examined the effectiveness of the measures relative to the previously unknown burrowing nematode variant.

118 Department of Agriculture, Fisheries and Forestry, *Final import risk analysis report for fresh ginger from Fiji*, 22 January 2013, p. 56.

Recommendation 18

5.130 The committee recommends that the draft work plan for importing ginger from Fiji be made available to the Parliament and industry for appropriate scrutiny over a suitable period of time, prior to it being finalised.

5.131 The above examination of the ginger IRA's likelihoods, consequences, unrestricted and restricted risks has identified a number of serious flaws.

5.132 The committee has persistent concerns regarding the IRA framework as discussed in Chapter 3. When combined with the additional flaws and concerns discussed above that have arisen in relation to the ginger IRA, the committee does not have confidence that the IRA for fresh ginger from Fiji is credible or viable in its current form. The committee therefore recommends DA Biosecurity repeat the IRA, taking account of the issues set out in the recommendation below.

Recommendation 19

5.133 The committee recommends that the Import Risk Analysis for fresh ginger from Fiji be recommenced. In recommencing the IRA, DA Biosecurity should ensure that particular attention is paid to:

- **(a) the likelihood of the Fijian burrowing nematode variant being imported given:**
  - **(i) the potential for the Fijian burrowing nematode variant to be imported via other host crops; and**
  - **(ii) the potential for the Fijian burrowing nematode variant to be imported via other non-host crops grown in the same fields as ginger.**
- **(b) the consequences of importing the Fijian burrowing nematode variant when the following are taken into account:**
  - **(i) the suggestions made in the Peace Report regarding geographic scale for crops that are limited to particular districts or regions due to climatic conditions;**
  - **(ii) the greater geographic scale for other host crops grown in Australia that could be susceptible to the Fijian burrowing nematode variant;**
  - **(iii) proper consultation with stakeholders for other host crops, who should be fully informed of the Fijian burrowing nematode variant and its unknown pathogenicity to those other host crops; and**
  - **(iv) whether there are any effective management measures for the Fijian burrowing nematode variant in other host crops that are grown in Australia.**
- **(c) the effectiveness of the proposed mitigation measures, taking into account:**

(i) the scientific evidence for the limited effectiveness of methyl bromide treatment when the Fijian burrowing nematode variant is resident inside ginger rhizomes;

(ii) the assessment of the import likelihood, given that the mitigation measures do not guarantee elimination of the Fijian burrowing nematode variant and that inspections will not detect nematodes resident inside the ginger;

(iii) the relative effectiveness of the mitigation measure for the Fijian burrowing nematode variant compared to the more common variant; and

(iv) a comprehensive examination of overseas practices.

Other Pests and Diseases

5.134 While the report in relation to the ginger IRA has largely focussed on yam scale and the burrowing nematode, the committee also received evidence in relation to other pests of concern.

5.135 DA Biosecurity indicated that it had investigated bacterial wilt in Fiji and that:

> In conducting the IRA we looked for any signs of bacterial wilt or other pests of concern. There was no evidence that bacterial wilt was in Fiji. To our knowledge there is still no knowledge that bacterial wilt is in Fiji.[119]

5.136 However, the AGIA noted that DA Biosecurity's field report 'claimed that further work was required to ensure bacterial wilt in Fiji is researched appropriately'.[120] Mr David Peasley also argued that there were still some questions to be answered in relation to this particular disease:

> For instance, bacterial wilt—is it there or is it not? That is the basic question and it was highlighted in the trip report. They said there was up to 70 per cent death of rhizomes in Fijian ginger.
>
> They did not know whether it was waterlogging, *Pythium*, bacterial wilt or nematodes. You cannot start a risk analysis until you know what you are looking at.[121]

5.137 The AGIA raised concerns that other pests and diseases – in addition to burrowing nematode – may have different variants in Fiji. The AGIA also raised the possibility that these pests may have different pathogenicity to ginger and other crops:

> The AGIA is also concerned about the risk of importing Fijian strains of the fungal pathogens *Pythium graminicola*, *P. vexans* and *Fusarium oxysporum* f.sp. *zingiberi* on ginger rhizomes and that these may differ from Australian

119 Mr Rob Schwartz, Senior Director, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 23 October 2012, p. 35.

120 Australia Ginger Growers Association, *Submission 4*, [p. 1].

121 Mr David Peasley, Consultant/Service Provider to the Australian Ginger Industry Association, *Committee Hansard*, 23 October 2012, p. 20.

> strains in their pathogenicity and host range. We believe that evidence outlined in our response to the Draft IRA and some preliminary experimental data (pp. 30–3, 76) cast sufficient doubt and support our view that further research is required to compare Australian and Fijian isolates of these pathogens.[122]

5.138 As with the burrowing nematode, submitters raised concerns about risks being assessed at low levels, nut that the assessment was made without reference to relevant information:

> The DAFF Biosecurity position (PFIRA pp. 88–90) is that these species are present in Australia and, therefore, without 'published peer reviewed literature', it will not accept that there is evidence of differences between Australian and Fijian isolates of these fungi. The AGIA finds it difficult to accept that an argument of lack of information implies no risk. We believe therefore that, before the IRA is finalised, there should be research to compare the pathogenicity and host ranges of Australian and Fijian strains of these fungi.
>
> Of particular concern is the fact that, if not for research done by the Australian ginger industry, DAFF Biosecurity would not have known of the threat caused by *R. similis* (it was not discussed as a quarantine pest in the Draft IRA). The AGIA is concerned that other Fijian pests may pose significant threats to the Australian ginger industry and considers that all major pests should be fully investigated before the IRA is finalised.[123]

Committee comment

5.139 The committee has largely focussed its attention on the Fijian burrowing nematode variant in order to demonstrate the inadequacy of the Fiji ginger IRA. Given the various flaws identified in the ginger IRA process, the committee considers that the threat posed by other pests should be also be reassessed.

Recommendation 20

5.140 The committee recommends that when the IRA is recommenced for fresh ginger from Fiji, all relevant pests and diseases should be reassessed.

122 Australian Ginger Industry Association, *Submission 9*, [p. 4].

123 Australian Ginger Industry Association, *Submission 9*, [p. 4].