Australian Senate

Rural and Regional Affairs and Transport References Committee

Inquiry into biosecurity risks associated with the importation of seafood and seafood products

Submission by the Australian Prawn Farmers Association

Concerning the outbreak of White Spot Disease on prawn farms in the Logan River area, Queensland, 2016.

April 2017

Summary

This submission asserts that, based on available evidence, the incursion of White Spot Disease (WSD) onto prawn aquaculture businesses around the Logan River should have been prevented.

This assertion is based on the following evidence:

i. The import control system for prawns has been manifestly overwhelmed, as evidenced by the large number (over 50%) of infected consignments that gained entry to the retail chain over at least six months prior to the incident.
ii. The Australian Government Department of Agriculture and Water Resources (DAWR) was aware of the system failure for six months prior to the detection of WSD on farms.
iii. In the Import Risk Assessment on which the biosecurity controls for prawn imports were based, a lower Appropriate Level of Protection (ALOP) was applied to the import controls for prawns compared to similar products, such as chicken, pork and salmon. The reason for this has never been explained.
iv. Even though the countries that import prawns to Australia have a high prevalence of serious prawn diseases that are exotic to Australia, the import controls depend on testing the 30,000 tonnes of imported product on arrival. This created a system that was bound to fail.
v. Some classes of products, erroneously referred to as "highly processed" are allowed entry without being tested, on the basis that potential exposure of the product to susceptible hosts is low. The evidence is now clear that the route of exposure is highly likely and that the "processing" is inadequate. Because the processing was never intended to be viricidal, this is a pathway by which 5,000 tonnes or more of diseased prawns can be legally imported.
vi. "Operation Cattai" conducted by the compliance section of DAWR identified 25 importers involved in circumvention of the import controls for prawns. The possibility of systemic corruption has been alleged.
vii. It has reported that some border inspection staff have not been following prescribed work procedures. This is hardly surprising; given the complexity of the task they have been set with respect to imported prawns.
viii. The most likely path of entry of WSD to prawn farms was through the use of imported raw prawns as bait by fishers. This was a known risk that was not effectively ameliorated by the import controls.

This disease incursion has caused at least $40 million direct losses to the industry and substantial financial losses to many other businesses along the supply chain. In addition, proposed multimillion dollar expansion of the industry in Northern Australia could impacted by the increased risk posed by WSD. As a result of the damages they have sustained, the members of the APFA feel justified in demanding that the rules for importation of prawns into Australia are thoroughly overhauled and strengthened.

The following changes are recommended.

1. *Dismantle the importation controls based on disease testing.* The predictive value of the testing standards set by the import risk assessment for imported prawns is too low to prevent an influx of diseased prawns. Also, testing cannot prevent the entry of the new exotic diseases of prawns that are continually emerging. A system whereby tens of thousands of tonnes of imported product, of which up to fifty percent might be infected, must be tested by specialist laboratories on arrival in Australia is bound to fail. The sheer volume of work, its enormous cost to the importer, the delay in clearance from customs, the time required by customs staff, the high proportion of test positive consignments, the

subjective interpretation of marginal test results, and the inevitable human errors associated with such a large volume of sample collection and testing all conspire to cause problems. Dismantling this system would achieve significant savings for government and industry throughout the supply chain. Post entry testing should be restricted to audits and investigations.

2. *Harmonise import conditions for prawns with other imported meats*. Prawn import controls should be set at the same Appropriate Level of Protection as chicken, pork and salmon. These products must be cooked before arriving in Australia or be cooked on arrival under approved arrangements.
3. *Eliminate the "Highly Processed" risk management option in the import controls*. This option, even if applied correctly, is a mechanism by which many tonnes of diseased prawns can be knowingly released into Australia's retail markets and should be eliminated immediately.
4. *Enhance inspection of Australian prawns that are processed in Asia then re-imported*. Any approved arrangements for reimporting of Australian prawns that have been processed overseas should involve direct inspection and ongoing audits of the overseas processing establishments by Australian authorities.
5. *Continued surveillance.* There is a proportion of importer/exporters that are willing to circumvent the law. It would be folly to think that prosecution of some people and introduction of new controls will completely solve the problem. Consequently, no matter what changes are made, ongoing surveillance of prawns in retail outlets is strongly recommended. Similarly, awareness of the possibility of corruption should be incorporated in any monitoring of the prawn import controls.

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Introduction

Basis of this Submission

This submission is based on input from APFA members and the key findings of the following reports commission by Fisheries R&D Corporation:

1. *Field observations and assessment of the response to an outbreak of White Spot Disease (WSD) in Black Tiger Prawns (Penaeus monodon) farmed on the Logan River in November 2016*. Digsfish Services Report DF 17-03, 16 February 2017. FRDC Report No. 2016-064.
2. *Assessing compliance and efficacy of import conditions for uncooked prawn in relation to White Spot Syndrome Virus (WSSV)*. Future Fisheries Veterinary Service, April 2017, FRDC Report No. 2016-066

Throughout this submission excerpts from these two reports will be reproduced in substantiation of statements made. They will be referenced as the "Digsfish Report" or the "Future Fisheries Report".

Information in this submission is also drawn from two Commonwealth of Australia documents:

3. The Hansard record of the Senate Rural and Regional Affairs and Transport Legislation Committee Estimates hearing on 28 February 2017.
4. *Generic Import Risk Analysis Report for Prawns and Prawn Products*, Final Report, October 2009, Biosecurity Australia.

References to these documents are cited as "Hansard, Page number", and "IRA2009, page number".

Background to Australian Prawn Farmers Association

The Australian Prawn Farmers Association (APFA) was formed in 1993 to represent the interests and foster the development of the Australian prawn farming industry. The Association is a key contact for investors, new farmers and firms wishing to do business with the Australian prawn farming sector.

The Australian prawn farming industry now produces up to 5,000 tonnes (2014) of product annually with a farm gate value estimated to be in excess of $63 million and currently provides up to 300 full time equivalent jobs. The Australian industry is one of the smaller volumetric producers in the world but leads the world in productivity with an average yield of more than 9,000 kg per hectare. Farms are currently located in two Australian states – New South Wales and Queensland.

The industry's potential economic and environmental contribution to our community is substantial and prawn farming is now one of the largest aquaculture sectors in Australia behind tuna and salmon. Enormous opportunity remains for new areas of development and growth in grow-out, hatchery, processing, marketing and service sectors.

The Association provides the link for communications between growers and related sectors including infrastructure suppliers, the finance sector, retailers and exporters, technologists, researchers and all levels of government.

The Association's President and Executive Officer have been the primary industry contact point for government officials from the outset of this incident, when the Executive Officer relocated to the control centre in the offices of the Queensland Department of Agriculture and Fisheries (QDAF).

Brief description of the incident

Until late 2016 Australia was one of the few prawn farming countries in the world that was free of White Spot Disease (WSD) in prawns. However, this changed when WSD was officially diagnosed on a prawn farm adjacent to the Logan River in Queensland on 1 December 2016. The disease subsequently spread to all eight prawn farms in the area. This diagnosis set in motion a series of events that have had wide ramifications for Australian businesses and governments. These include:

- Destruction of prawns on all affected farms and decontamination of those farms
- Cessation of commercial fishing around the Logan River
- Suspension of uncooked prawn imports to Australia
- Restrictions on recreational fishing around the Logan River
- Cessation of trade in and uncooked crustacean commodities and prawn bait between Queensland and other states
- Very significant financial losses incurred by prawn farmers, fishers, importers, and a wide range of companies that supply those industries
- The likelihood of further losses by these businesses if farms cannot return to production by September 2017.
- The possibility that some farms may be forced to sell up.
- Loss of the low risk biosecurity status for Australia's prawn farms, meaning all farms, not just those affected by this incident, will need to implement expensive capital improvements to enhance biosecurity.
- Extensive testing of imported prawn products, bait and the environment to determine the extent and source of the infection
- Massive redirection of effort of human resources in Queensland and Australian government departments.
- Loss of confidence by existing and potential investors in the industry.
- Significant impacts on the personal wellbeing of many of the people involved

Most of these outcomes are consequences of procedures implemented, with industry support, by Queensland Department of Agriculture and Fisheries (QDAF) in response to the diagnosis of WSD, to attempt to **Eradicate** the disease. There is good justification for this action being taken. If WSD was to take a hold in Australia as it has done in most other countries, the cost of prawn farming would rise substantially due to mortalities caused by the disease and the cost of implementing strong biosecurity measures. In addition, there is the risk that the infection might spread to other species that sustain commercial fisheries, such as crabs, rock lobster, Moreton Bay Bugs and to wildlife. There would also certainly be impacts on Australia's international trade in prawns.

The WSD incident is ongoing. Detection of WSSV in a small proportion of prawns collected from the Logan River and northern Moreton Bay leads to the possibility of persistence of the disease in the environment that would cause the Eradication strategy to be revised to one of Control and Containment. This would greatly increase the risk of prawn aquaculture continuing in the area.

The ideal outcome would be for affected prawn farms to restock their properties at the start of the new production season, which begins in September 2017. If restocking is to occur, modifications to the farms to improve biosecurity must begin immediately.

With the uncertainty of timing to finish the compulsory disposal and decontamination process, and the time needed to implement new infrastructure according to mandated minimum biosecurity standards, it is likely there is no alternative but for government and industry to agree that farms in the control zone cease production for a year. This will enable more extensive decontamination while WSSV surveillance continues. However, this would be at great cost to the businesses. If this occurs, affected farmers will not receive any income for two successive production seasons due to the loss of this year's prawn crop and have lost all the expenses incurred to produce that crop and restarting production will require costly modifications infrastructure and practices to strengthen biosecurity on their farms.

Economic Impact

The cost of this incident has been reported in detail by Ridge Partners (2017).

The costs to prawn farmers in the Logan River area were determined from actual farm records and are summarised as follows:

- Cost of raising the 2016-17 crop, which either died or was destroyed $8.1 million
- Value of lost hatchery and breeding stock $5million
- Cost of new biosecurity infrastructure to recommence farming $12.6 million
- Cost of shutting down for another season $11.9 million

A total of 122 people are employed by the affected farms. All these jobs are now at risk.

In addition, there are consequential losses for other companies along the supply chain, including feed suppliers, fuel and service suppliers, marketing companies and retailers.

Prawn farming is still a developing industry in Australia. Major expansion of prawn farms is planned for Northern Australia by private and public investors (Mitris 2017, Seafarms 2017). These have the capacity to double the size of the industry. These investments appear to have withstood this shock to date, but increased biosecurity and border protection will be critical if future investments are to be secured.

Epidemiology

The APFA is of the opinion that the cause of the WSD incident is most likely to be the importation of WSSV in uncooked prawns that were subsequently used for bait by fishers in the Logan River.

The Digsfish Report provides a detailed analysis of the course of the disease. The key details from that report are summarised below.

> The fundamental question that underpins this entire incident is how did White Spot Syndrome Virus (WSSV) get into Logan River prawn farms in the first place? Four incursion pathways, have been considered by QDAF, namely:
>
> 1. WSSV enters the Logan River via infected imported prawns being used as bait/burley.

2. WSSV is endemic in broodstock – vertical transmission through Post Larvae (PLs).
3. WSSV has been present in QLD waters for some time.
4. WSSV entered in imported feed/products.

Of these, pathway 3 appears least likely, as if this were true, WSSV outbreaks would have been observed on the Logan River and elsewhere before November 2016. Pathway 2 also appears extremely unlikely as many farms outside the Logan River that were stocked by Rocky Point hatchery remain WSSV negative, and several of the farms affected on the Logan River obtained PLs from different sources. Furthermore, under translocation protocols, all wild brood stock have been tested for WSD over many years without any positive results. A recent survey of prawn diseases by CSIRO also did not detect any WSD (Crowley et al, 2015).

Pathway 4 appears equally unlikely, as sources of feed varied between farms and Ridley feed that was fed on the first infected property immediately before the outbreak is extruded at temperatures of 85+°C for more than30 minutes, which would inactivate the virus, and those products are fed to many farms outside the zone that remain uninfected. Jim Thompson from Biosecurity QLD stated in a meeting on 2 February 2017 at Yatala that "*The most likely pathway of introduction appears via imported prawns used as bait*". This is the most logical and likely pathway, for the following reasons:

a. Despite biosecurity protocols requiring testing of 100% of shipments of frozen green prawns imported into Australia, there is evidence of a biosecurity failure allowing WSSV-infected frozen green prawns to transit through border quarantine in Australia.

b. Data from enhanced surveillance testing at the international border resulted in a rejection rate of 70.3% (26/37) of green prawn shipments that were WSSV positive. This is slightly higher than the 66% batch prevalence detected by researchers in the EU who surveyed imported green *P. vannamei* prawns at British supermarkets (Bateman et al. 2012), but probably represents the "normal prevalence" of WSSV in commodity prawns today.

c. The bait and burley pathway has been consistently identified as a high risk pathway for dissemination of aquatic animal diseases by several risk analysts (Durand et al. 2001, Hasson et al. 2006, Diggles 2011, Oidtmann and Stentiford 2011, Jones 2012). Furthermore, there is evidence produced by DAWR that the number of people using prawns sold for human consumption as bait in Australia has increased (Kewagama Research 2007), representing increasing risk of WSSV introduction over time via this pathway (Oidtmann and Stentiford 2011).

d. Since the Logan River crustacean fishing area closure has been implemented, fisheries officers have reportedly detected at least six groups of recreational fishers near the Alberton Boat ramp using imported raw prawns as bait. Of the six bait samples confiscated and tested, two (33%) returned "strong positive" results for WSSV infection.

e. Recreational fishers were observed fishing in the intake canal of the first infected property and there is evidence of regular fishing in that water body including right up to within a few meters of the intake pipes. These canals have limited water exchange, low dilution factors,

and are frequented by large numbers of potential hosts and vectors (crabs, prawns, plankton) and hence they represent semi-isolated environments that are perfect for establishment of WSSV infection in wild reservoir hosts and vectors. All that is needed is for water to be pumped from the intake up into the intake canal where wind forcing would direct and concentrate particle associated virus or vectors near the end of the channel near index pond 12 and pond 13. Around the time of the suspected introduction (Nov 15-20) water intakes into pond 12, but not pond 13 (Luke Rossman, personal communication to BKD, 6 Jan 2017) could explain disease emergence in this pond first.

f. Introduction of WSSV via bait or burley would explain the detection of the single infected mud crab in the outlet canal of the seventh infected property on 23 December 2016, at a time well before nearby farms became infected. The location where the crab was detected was near the road in an area frequently fished by recreational fishers.

It is possible that DNA sequencing of the WSSV isolates obtained from various locations during this incident will contribute more useful information in the search to understand the source and routes of transmission of WSSV in the Logan River area. This work is underway but it is not known when it will be reported.

Failure of Biosecurity Controls on Imported, Uncooked Prawn Products

Details of the controls as they are supposed to apply

The risk management requirements for all imported prawn and prawn products are meant to achieve an Appropriate Level of Protection (ALOP). The current import controls are described in IRA2009, page 175 and are reproduced below.

> To achieve Australia's ALOP with respect to the pathogenic agents identified in this risk analysis, all imported prawns or prawn products would need to be:
>
> - sourced from countries or zones determined to the satisfaction of Australian government authorities to be free of white spot syndrome virus (WSSV), yellowhead virus (YHV), and Taura syndrome virus (TSV), and in addition, necrotising hepatopancreatitis bacterium (NHPB) if the product is not frozen (i.e. the product is chilled);
>
> OR
>
> - cooked in premises approved by and under the control of an appropriate Competent Authority to a minimum time and temperature standard where all the protein in the prawn meat is coagulated and no uncooked meat remains;
>
> OR
>
> - highly processed, that is with the head and shell removed (the last shell segment and tail fans permitted) and coated for human consumption as follows:
>   - breaded (crumbed) or battered, or
>   - marinated to a minimum standard, or
>   - processed into dumpling, spring roll, samosa, roll, ball or dimsum-type product
>
> OR
>
> - have had the head and shell removed (the last shell segment and tail fans permitted) and each batch tested on arrival in Australia and found to be free of WSSV and YHV:

testing is based on the polymerase chain reaction (PCR) tests in the current version of the World Organisation for Animal Health (OIE) Manual of Diagnostic Tests for Aquatic Animals or equivalent, and a sampling regimen that would provide 95% confidence of detecting the agent if present at 5% prevalence.

Testimony by Mr Chapman at Hansard page 87 was that every batch in every consignment had to be sampled randomly by collecting thirteen samples of five prawns each. Subsequent advice issued by the DAWR prawn liaison officer was that 25 per cent of "highly processed" products were tested at entry.

The IRA also recommended that uncooked prawns imported for human consumption that are not considered to be highly processed be marked with the words *for human consumption only* and *not to be used as bait or feed for aquatic animals.*

Details of apparent failures of the border biosecurity controls

High levels of WSSV in prawns available at retail outlets

It is beyond dispute that there has been a catastrophic failure of the border controls designed to minimise the risk of WSSV entering Australia.

This resulted in a formal determination by the Director of Biosecurity under the powers of the Biosecurity Act to suspend the importation of uncooked prawns and prawn products for six months as from 6 January 2017.

Although the impetus for the suspension was the outbreak of WSD on the Logan River farms, it was also justified by the finding of unacceptably high levels of WSSV in prawn products available for retail sale. This is confirmed by the following facts:

a. Testing conducted on behalf of APFA that found 85 per cent of 174 samples collected at retail stores throughout Australia were positive for WSSV (Future Fisheries Report).

b. Testimony by Ms O'Connell (Hansard page 81) that 14 of 19 retail samples collected in the Logan area at the start of the incident were positive for WSSV, despite those prawns being derived from batches that had passed testing at the border.

c. Testimony by Mr Chapman and Mr Terpstra (Hansard pages 113 – 114) that in mid-2016 retail testing had revealed much higher than expected entry of white spot positive prawns into the country. Specific figures were not provided.

d. Action taken by DAWR in February 2017 to secure all uncooked prawns covered by an approved arrangement and imported prior to the suspension taking effect. These prawns were withdrawn from sale and brought back under biosecurity control for retesting. (DAWR Prawn Liaison Officer Notice, 17 March 2017).

e. Over fifty per cent of prawn consignments in transit have been found to be infected with WSSV. Action taken by DAWR in relation to over 100 consignments of prawns which were already in transit to Australia when the suspension took effect. These consignments are being subjected to an enhanced inspection and testing at the border. The most recently published WSSV results for tests undertaken for uncooked prawns as part of the enhanced border measures were reported as follows (DAWR Prawn Liaison Officer Notice, 17 March 2017):

Summary	Number of batches fully tested	Number of batches released	Number of batches refused	Percentage of batches refused
Total	72	33	39	54%

The known factors that contributed to this situation are explained below.

DAWR officers not following work procedures

Testimony by Ms Vivian, DAWR head of compliance (Hansard page 87) revealed that although officers themselves were supposed to select cartons of prawns to sample, in some cases they were being handed the carton. The implication being that importers may have provided samples they knew to be negative for WSSV.

Evidence pointing to systemic corruption

During the Senate Estimates hearing on 28 February, the following exchange occurred between the Chair and Mr Terpstra, DAWR Assistant Secretary responsible for enforcement (Hansard page 99):

> Chair: So by now you are starting to form the view that you have potentially systemic corruption across the importing community that would manifest itself potentially in infected prawns making their way from our border into retail outlets across the country?
> Mr Terpstra: Correct.

Some of the salient testimony leading up to this exchange is set out below.

Ms Vivian, DAWR head of compliance, testified as follows:

- Some importers were suspected of substituting banana prawns for vannamei prawns (Hansard page 88).
- In some containers most cartons would be bound with plastic straps of one colour and a small proportion bound with straps of a different colour. In some cases the cartons had different markings. (Hansard page 90). This was alleged to enable importers to select cartons that they knew to be WSSV negative for testing at the border.
- In some cases, containers would arrive in Australia with a few empty prawn cartons inside which the importers would fill with Australian WSSV-free prawns before inspectors arrived. (Hansard page 91).
- In late 2015 and the first half of 2016 DAWR received intelligence reports that some importers were undertaking non-compliant activities with respect to prawn imports (Hansard page 88).
- On 16 March 2016 the compliance section of DAWR initiated Operation Cattai into suspected non-compliant activity of prawn importers (Hansard page 95).

Mr Terpstra testified that the first stage of Operation Cattai involved investigation of 40 importers, of whom 25 required active targeting in the second stage of the operation. Subsequently briefs have been prepared for the Commonwealth Director of Public Prosecutions and the investigation is ongoing (Hansard page 99 - 100).

The "Highly Processed" Loophole

The inclusion of the highly processed option in the import controls for prawns was based on the assumption in IRA2009 that recreational fishers would not use marinated and breadcrumbed prawns as bait (IRA2009 page 168).

However, it has not been possible to prove that breadcrumbing or marinating prawns will make them less likely to be used as burley or bait. In fact, the survey by Kewagama Research (2002) found that when recreational fishers used prawns purchased as seafood for bait or burley, it was due to convenience, cost or unintentional change (7-12% of respondents intended to eat the prawns but did not for various reasons and used them for bait or burley. There is also the possibility that people eating outdoors will dispose of prawn waste directly into the sea.

There is no suggestion in the IRA that the "highly processed" risk management option was included in the IRA as a means to eliminate viruses from imported prawns. No scientific evidence that breadcrumbing will inactivate prawn viruses has been found.

Examination of retail packages in January 2017 found numerous incidents of breadcrumbed, uncooked prawns so lightly breadcrumbed as to appear no different from uncooked product. In addition, some packages are clearly not compliant with the requirement for marinades to constitute twelve per cent by weight of the product (Future Fisheries Report).

Consequently, there is now a strong case that the "highly processed" risk management option is not feasible as a method of preventing use of imported prawns as bait or as a virus elimination technique.

Problems with the 2009 Import Risk Assessment

The significance of potential use of imported prawns as bait by fishers

The IRA contains an extensive analysis of the likelihood of WSSV entering Australia through the use of imported prawns as bait by fishers. The report quotes surveys of fishers conducted by DAWR, published references and consultant's advice. The report noted that:

> *The potential also exists for recreational bait-use to lead to direct exposure of farmed crustaceans through fishing in farm inlet channels. Although a potentially significant exposure pathway, the IRA team considered the risks associated with such practices would be limited as much of this bait is likely to be taken by non-susceptible finfish species* (IRA2009 page 79).

Eight years on, the most likely method of entry of WSV into prawn farms on the Logan River is through the water intake channel of the index farm, which had been frequented by recreational fishers using bait shown to be infected with WSSV (Digsfish Report).

The assumption that most of the bait would be taken by finfish could well be correct, but it is equally likely that infected bait debris would be ingested by common crustaceans that are known WSSV carriers. These include inshore scavenging crabs present in northern Australia such as *Scylla serrata* and *Uca* sp, and microscopic, planktonic crustaceans. Proliferation of WSSV in zooplankton is well documented (DigsFish Report). Plankton may be the main reservoir for WSSV when environmental virus levels are low (Esparza-Leal et al. 2009, Callinan et al. 2013, Mendoza-Cano et al. 2014.

The IRA conclusion was that:

> *…..there is potential for infected prawn tissues to be introduced direct into crustacean grow-out systems via whole uncooked prawns used as feed in broodstock maturation ponds and, to a lesser extent, use of imported prawns as bait for recreational fishing in farm inlet channels* (IRA2009 page 85)..

Based on all the above evidence, APFA now asserts that introduction of viral diseases into prawn farms is highly likely to occur through the use of uncooked prawns as bait by recreational fishers.

Over optimistic assessment of risk management strategies

After considering the potential routes of WSSV introduction, the likelihood of its spread in wild and farmed prawn populations and the economic impact of an incursion, the overall risk determination in relation to WSSV was:

> *The unrestricted risk associated with WSSV is determined …. to be high. The unrestricted risk exceeds Australia's Appropriate Level of Protection and, therefore, risk management is deemed necessary* (IRA2009 page 107).

Ten risk management options were considered in the IRA. In the case of uncooked and unprocessed prawns a combination of two risk reduction strategies was proposed:

1. Testing for viral diseases on entry, and
2. Requirement for prawns to have the head and shell removed.

In relation to testing, the report made the following important comment:

> *Given uncertainty about the sensitivity of available tests for prawn pathogens, this option alone is not expected to reduce the likelihoods of entry and exposure sufficiently to reduce the overall risk to an acceptable level, but may be effective in combination with other measures* (IRA2009 page 168).

The stated aim of the testing of imported prawns is to provide 95% confidence of detecting an agent if it is present at a prevalence of 5% (IRA2009 page 168). Even assuming perfect testing and sampling effectiveness, with 20,000 tonnes of raw prawns being imported each year, an infectious agent at a prevalence less than 5% might still be present be present in 1,000 tonnes of frozen green prawns that pass testing and are distributed to retail outlets. In addition to the consideration of test sensitivity and specificity, any risk analysis involving testing should also consider the *Predictive Value* of the test being used. The predictive value translates percentages into absolute numbers which will vary according to the size of the population being tested and the prevalence of the disease. An assessment of the impact of a false negative or false positive test can then be made.

Based on an import volume of 20,000 tonnes, the predictive value of testing at the levels relied upon in the IRA is insufficient for the reasonable reduction of risk.

Combining the testing and head/shell removal is meant to reduce risk of entry of virus diseases to an acceptably low level. This assumes that removal of the head and shell will significantly reduce the viral load in a prawn infected with WSD and thereby reduce the amount of virus to which potential hosts are exposed.

However, when considering the principles of Infective Dose, the IRA itself states that there is insufficient knowledge about prawn viral disease to make any judgements, and relies heavily on the effect of dilution to reduce the amount of infectious agent that might be presented to a susceptible host animal in the wild (IRA2009 page 87).

In addition, under the heading of tissue tropism, the IRA notes that for systemic viral infections removal of head will have little consequence:

> *Infection by many bacterial or viral pathogenic agents may result in a bacteraemia or viraemia, so that the agent will be present throughout the body. In such cases, the removal of haemolymph-rich organs by removing the head would reduce the amount of agent. However, an amount of agent sufficient to cause infection in a susceptible host could still remain* (IRA2009 page 80).

Scientific literature available in 2003 confirms this in the case for WSSV. Durand et al. (2003) demonstrated that removal of the head section does little to reduce WSSV viral load on a per weight basis, as viral load in individual prawns is nearly identical in the head (49% of total virus) and tail (51% of total virus). If the prawns are further processed to include peeling, the virus load of the peeled shell represents approximately 55% of the total viral load remaining in the tail. Hence full processing of green prawn products as per the recommendations of IRA2009 only reduces WSSV load by around half, which is not at all sufficient to prevent establishment of carrier state infections via *per-os* route (Bateman et al. 2012).

In conclusion, the APFA contends that the combination of testing at port of entry and head/shell removal has proven to be an inadequate strategy for the reduction of the risk of introduction of prawn diseases to Australia through imported prawns.

Failure to consider the probability of corruption in the import trade

Every business involved in trade with Asian countries is aware of the risk of fraud and corruption.

The department of Foreign Affairs and Trade openly acknowledges the significance of corruption in Asia and works with governments to reduce it See http://dfat.gov.au/aid/topics/investment-priorities/effective-governance/law-and-justice/Pages/law-and-justice-initiatives.aspx.

Australian businesses are regularly reminded of the penalties under the Bribing Foreign Officials Act. Austrade provides regular public warnings to businesses about corruption in Asia and provides advice to businesses on how to avoid it. https://www.austrade.gov.au/Australian/Export/Guide-to-exporting/Legal-issues/Bribery-of-foreign-public-officials

Fraud is such a significant issue in China that the President Xi Jinping has made its reduction a key policy initiative, with major policing activity to reduce it. Newspaper articles appear regularly in the Chinese press describing the arrests of people involved in fraudulent import and export of seafood. https://www.undercurrentnews.com/2016/12/02/nine-arrested-in-china-for-allegedly-smuggling-seafood-worth-millions/,

http://www.seafoodsource.com/news/supply-trade/chinese-authorities-bust-huge-seafood-smuggling-ring

The existence of the "grey market" for expensive seafood commodities is well known and Chinese customs have engaged in formal dialogue with Australian government officials and industry representatives about methods of combatting the problem.

Against this background, it is notable that the IRA does not include corruption as a potential risk. It is likely that in 2009, diplomatic protocol, and regulations applied by the WTO to trade prevented the use of potential for corruption in trade risk assessments. This may now have changed with the inclusion of anti-corruption provisions in the proposed Trans Pacific Trade Agreement. It now seems clear that the prawn import/export trade contains elements of corruption. This could have been anticipated.

Why the Import Risk Assessment must be updated

Proven failure of the existing arrangements

The identification of WSSV in high prevalence and high intensity infections in samples of prawn products taken from retail outlets is *prima facie* evidence that the current arrangements have failed comprehensively – repeatedly and on a large scale.

Australia is facing a wave of infected prawn products approaching the border, with detection levels greater than fifty percent in consignments in transit.

Officials from DAWR have confirmed the scale of the problem through their own testimony to Senate Estimates. The problem was sufficiently concerning for DAWR to launch Operation Cattai into alleged corrupt behaviour, and prosecutions are pending as a result.

It would be folly to suppose that detection and prosecution of a few wrong doers will resolve this problem. While the only real defence applied by Australia is to require testing of prawns on arrival, there will always be breakdowns in the system due to human error, test failure, sampling errors and deliberate fraud.

The potential for human error was noted by the Interim Inspector General of Biosecurity Dr Kevin Dunn in his report of November 2010 where, in relation to inadvertent release of a consignment of WSSV infected prawns into Australia, he stated that (Dunn 2010):

- human error and/or oversight was the most likely cause that led to prawns being released, and
- under existing clearance arrangements, a similar error could occur again.

The report also noted that it was not possible to recall all the incorrectly released product because trace-back mechanisms were in adequate. The same situation exists today.

After the incident in 2010, a range of measures were implemented to reduce the risk of human error, however these were clearly not sufficient to prevent a major biosecurity failure six years later.

The APFA contends that two system failures are sufficient justification for the import control procedures for prawns to be simplified and strengthened.

Inconsistency in assessment of the Appropriate Level of Protection for prawns compared to other products

The Appropriate Level of Protection (ALOP) applied to prawns by DAWR is much lower than the level applied to the arrangements for importation of salmon, chicken and pork. All these products must be cooked in approved premises in the country of origin or be cooked at approved premises on arrival in Australia. Product testing for infectious diseases is not part of the protocol for these commodities. More detailed analysis of these inconsistencies is provided in the Future Fisheries Report.

There does not appear to be any compelling reason why prawns must be imported to Australia in an uncooked state. Also, it has not been possible to find an explanation for the difference in ALOP applied to prawns. This is clearly an inconsistency of policy application that has resulted in substantial damage to Australia's prawn industry. This whole incident is unlikely to have occurred if a consistent ALOP had been applied and prawns had to be cooked prior to entering Australia.

The current import protocol offers no protection from newly emerging diseases of prawns

The table below lists nine prawn diseases that were not included in, or have emerged since, the 2009 Import Risk Assessment. The data is collated from Thitamadee et al. 2016, Li et al. 2016, Bateman and Stentiford 2017 and is not an exhaustive list (Digsfish Report).

Prawn diseases that were not included in, or have emerged since, the 2009 Import Risk Assessment

Disease name	**Date emerged**	**Disease agent**
Acute Hepatopanceatic Necrosis Disease (AHPND)	2009 (China)	Bacterium w. toxic plasmid
Secret Death Disease	?	Possibly AHPND or mixed aetiology
Empty Stomach Disease	?	?
Aggregated transformed microvilli (ATM)	2009 (China)	Vermiform gregarine-like bodies
Covert Mortality Disease (CMD)	2009 (China)	Nodavirus
Hepatopancreatic microsporidiosis	2009 (Thailand)	Microsporidian (*Enterocytozoon hepatopenaei*)
Hepatopancreatic haplosporidosis	2009 (Indonesia)	Unnamed haplosporidian
New strains of Yellow Head Disease Virus	2013 (China)	*Okavirus*
Pandalus montagui bacilliform virus	2007 (North Sea)	*Nudivirus*

At least three of these diseases are systemic infections for which the risk of transmission would not be sufficiently reduced by de-heading and shelling imported prawns. Testing is not carried out for any of these diseases as part of the import controls.

Furthermore, it is well known that many important diseases of crustaceans became widely dispersed before they were identified and tests became available (Lightner 1999, Thitamadee et 2016). A very recent example is the time taken to identify the cause of early mortality syndrome, now known as AHPND, which devastated many Asian prawn farming areas in 2013-14.

Failure to account for emerging diseases in the 2009 IRA and the current import controls is a very substantial risk for the Australian prawn industry in the face of continuing emergence of new, pandemic disease of farmed prawns.

Reimporting Australian prawns processed in Asia

The business practice of exporting Australian raw prawns to Thailand and Vietnam for shelling and de-heading then reimporting them for retail sale has grown over recent years The practice was not mentioned in the IRA2009 and its risk was not assessed.

A logical risk that must be considered for these products in future is the possibility of accidental cross contamination with domestic, infected prawns in the processing country. Deliberate substitution of Australian prawns with those of the processing country is also a possibility.

Based on the apparent preparedness of some importers to circumvent legal requirements for imports it would be expected that any approved arrangements for reimporting would involve direct inspection by Australian authorities and ongoing audits of the overseas processing establishments involved.

The “Highly Processed” Loophole

The IRA2009 concluded that marinated or breadcrumbed prawns would be unlikely to be used as bait by fishers or as food for other fish and crustaceans. Based on this assumption, these products are allowed entry to Australia without being tested for viral diseases. The term “highly processed” is a misnomer because it implies some form of heat or energy has been applied to the product, which would reduce or eliminate pathogens. As mentioned above, there is no scientifically validated evidence that breadcrumbing or marinating will inactivate prawn viruses or other diseases of prawns.

Consequently, by this mechanism, infected prawns can legally enter Australia. This is such a contradiction as to be almost unbelievable. We now know that in some instances the marinade or breadcrumbing does not meet the required standard, which is bad enough. But there is plenty of anecdotal evidence of marinaded and crumbed prawns being washed and used as raw prawns in cooking and fishing.

The evidence presented above shows that this loophole simply must be closed.

The recreational fishing pathway from retail outlets to prawn farm for WSSV

The IRA2009 recognised that WSSV could enter prawn farms through the use of imported prawns as bait, but rated the risk of this happening as low. In contrast, the risk to research or commercial

crustacean hatcheries, and wild crustaceans was rated as high. This was reported as the Partial Likelihood of Exposure (PLE) (IRA2009 page 101):

PLE (farms)	Low
PLE (hatcheries)	High
PLE (wild)	High

The contention that infected prawns used as bait in farm intake channels would be taken by fin fish rather than other crustaceans was the basis on which the risk to farms was lowered. However, this ignores the fact that the farm intake channels are relatively small volumes of water that are often closed and can be teeming with crabs and microscopic crustaceans in the form of zooplankton.

The risk rating for farms should now be upgraded to very high in the face of the epidemiological findings relating to the current incident.

Recommended Changes to the Import Risk Assessment

We will not allow the resumption of importation of uncooked prawn product unless we are sure that the biosecurity risk is acceptably low

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Australia meets World Trade Organisation standards by setting biosecurity controls on food imports based on science and evidence. The current import controls for prawns were implemented in 2009 despite opposition from the prawn industry and the Queensland government at the time. There is now clear evidence that those controls are inadequate and the prawn industry is justified in seeking to have them strengthened. The evidence that is now available from the current incident and the changes that have occurred since 2009 must be fed into a science based, new risk analysis in which there is a low tolerance for future risks of disease incursion.

The following recommendations are provided for consideration.

Dismantle the importation controls based on disease testing

The most significant flaw in the current import controls is that Australia is not protected from the new exotic diseases of prawns that continue to emerge in Asia. It is well known that many important diseases of crustaceans became widely dispersed before they were identified and tests became available (Lightner 1999, Thitamadee et 2016).

A risk mitigation system based on testing that focuses only on known threats and does not consider unknown (but highly likely) threats is no longer acceptable to the Australian prawn industry. It is only a matter of time before another serious exotic disease will impact on the industry.

A system whereby tens of thousands of tonnes of imported product must be tested for diseases by specialist laboratories on arrival in Australia is bound to fail at some point. The sheer volume of work, its enormous cost to the importer, the delay in clearance from customs, the time required by customs staff, the high proportion of test positive consignments, the subjective interpretation of marginal test results, and the inevitable human errors associated with such a large volume of sample collection and testing all conspire to cause problems. The risk of this system failing is just as great as the risk of importation of the diseases it intends to prevent.

Additionally, a biosecurity approach that allows products to enter Australia from countries known to have widespread, endemic prevalence of serious diseases exotic to Australia, and to be tested once the product is in Australia can hardly be regarded as best practice. This approach is not used with other imported meats.

Even if the testing achieved the desired standard of 95% confidence of detecting an agent if it is present at a prevalence of 5%, with 20,000 tonnes of raw prawns being imported each year, an infectious agent at a prevalence less than 5% might still be present be present in 1,000 tonnes of frozen green prawns that pass testing and are distributed to retail outlets. As the prawn imports grow the risk of disease entry also grows.

A different system is needed and the use of post entry testing should be restricted to audits and emergencies.

Harmonise import conditions for prawns with other imported meats

Prawn import controls should be set at the same Appropriate Level of Protection as chicken, pork and salmon. These products must be cooked before arriving in Australia or be cooked on arrival under approved arrangements.

Implementation of this single change would solve most of the biosecurity risk and result in considerable cost savings along the supply chain. It will also significantly reduce the risk of new diseases entering Australia before they are recognised.

Some objection to this recommendation is expected from the restaurant industry, which would prefer to buy raw prawns. However, once the new determination is made, it is highly likely that new product formats will be developed using a range of processing techniques to satisfy the market demand.

Eliminate the "Highly Processed" risk management option

This option, even if applied correctly, is a mechanism by which many tonnes of diseased prawns can be knowingly released into Australia's retail markets. These products are not tested for the presence of disease and are allowed entry on the assumption that the risk of them being exposed to wild or farmed prawns is low. The evident reality is that this pathway is highly likely. Consequently, this risk management option should be removed from the import controls for prawns.

Re-importation of Australian prawns processed in Asia

Any approved arrangements for reimporting of Australian prawns that have processed overseas should involve direct inspection and ongoing audits of the overseas processing establishments by Australian authorities.

Continued surveillance

The gaps in the design and execution of the import control system for prawns that have been identified by this incident will take some time to repair. The sheer volume of infected product headed towards the Australian border indicates that there is a proportion of importer/exporters that are willing to circumvent the law. It would be folly to think that prosecution of some people and introduction of new controls will completely solve the problem. Consequently, no matter what changes are made, ongoing surveillance of prawns in retail outlets is strongly recommended. Similarly, awareness of the possibility of corruption should be incorporated in any monitoring of the prawn import controls.

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