A SUBMISSION TO THE SENATE INQUIRY – IMPORT RISK ANALYSIS ON APPLES FROM NEW ZEALAND

June 24 2004

Prepared for

Batlow Fruit Co-operative Ltd

Prepared by

Ron Gordon
Horticultural Consultant

PO Box 42
BATLOW NSW 2730
AUSTRALIA

Tel – 0269491408
Fax – 02694912

INTRODUCTION

This submission identifies major scientific deficiencies in the Draft Import Risk Analysis process undertaken by Biosecurity Australia in their report dated February 2004.

Time available permits a review of only one disease, Fire Blight caused by the bacterial organism *Erwinia amylovora*, and no attempt has been made to review any of the other pests and diseases identified in the Draft Import Risk Analysis report.

This submission focuses on two broad themes; the over reliance on the use of scientific data derived from published research papers, which have not been technically refereed; and the interpretation of the research results by Biosecurity Australia as presented in the Draft Import Risk Analysis report.

USE OF NON - REFEREED SCIENTIFIC PAPERS

The normal publication procedure for research papers is one of rigorous technical review. The researcher would forward his or her research manuscript to the chosen scientific journal secretariat for refereeing, and if found to be scientifically robust, publishing rights are granted. The journal secretariat or administration would select another scientist to undertake, refereeing of the paper and the identity of the referee would remain anomous. The referee would be selected on the basis of his or her expertise in the particular scientific field. This process is undertaken by all major scientific journal publications and maintains scientifically integrity. This process ensures the reputation and professionalism of the scientific journal.

The process, potentially identifies any errors, which may have been made by the researcher and ensures the methodology and conclusions drawn are technically sound.

To illustrate this need for independent review of research papers used in the draft IRA, I offer the following example. An error was discovered in one of the papers where the results of an experiment published in a paper authored by Hale and Clark (1990) was later used in a paper by the same authors in 1993. However, a transcription error was made where a value of 8.7 % of mature apple fruit detected with Erwinia amylovia (Ea) was incorrectly stated as 87% in the later published paper. This would drastically change the final risk outcome. This mistake evaded the authors, publishers (Acta Horticulturae), Biosecurity Australia and stakeholders in the initial draft IRA of August 2001.

It is possible, an experienced scientific referee may also have overlooked the error, but one expects, given the significance of the influence of this data in the final outcome of the IRA, I would expect, it would have been discovered by an experienced referee.

My concern is what level of confidence in the current process can we place in the current draft IRA that there are no other such errors yet to be discovered.

It is too late after the disease/pest is established.

Management strategies proposed to manage the risk of introducing Fire Blight into Australia

Biosecurity Australia have identified three major strategies to manage the risk of introducing Fire Blight into Australia by the importing of mature apple fruit. These are; sourcing apples only from symptom free orchards and verified by several orchard inspections by regulatory authorities; cold storage of apple fruit for 26 days at $0^{o}C$ and drenching of apple fruit in a100ppm chlorine solution.

In the development of these risk management strategies, Biosecurity Australia have extensively relied upon published results of research undertaken by New Zealand researchers, much of which has not been subjected to the rigour of independent scientific review.

Much of the data used in the Draft Import Risk Analysis is derived from papers published in Acta Horticultrae. This publication is a proceedings of various papers presented at ISHS (International Society of Horticultural Science) conferences.

From my information sources, the papers are reviewed in-house and the process is limited to publishing rules mostly to do with formatting for consistency in Acta Horticultrae. The papers published in this journal are not subjected to independent technical review or referee process used in reputable scientific journals.

Given the emphasis placed on a “strictly scientific appraisal” of the Draft Import Risk Analysis by stakeholders in the process, I believe that at the very least, the research papers used in the IRA are required to be published in journals of scientific repute and independently reviewed.

Stakeholder access to all scientific papers used in the Draft IRA

One of the three pillars of the risk management strategies proposed to minimise the risk of introducing Fire Blight is the drenching of mature apples in a chlorine dip. In the Draft IRA, Biosecurity Australia has exclusively relied on an unpublished research report authored by Hale, C.N & Clarke, R.G. (1992). This paper is neither published nor refereed and the New Zealand authority has refused to release the paper for public scrutiny (current to p.m. 22nd June 2004). Biosecurity Australia apparently signed a non-disclosure or a denied public access to the report and is bound by this agreement.

I believe this raises serious doubts about the integrity of the Import Risk Analysis process, where stakeholders are denied access to all of the scientific information used in the risk analysis. It is my opinion that Biosecurity Australia should remove this paper and the subsequent pathway from the process and undertake a new risk assessment if the New Zealand Authority refuse to make the report publicity available.

INTERPRETATION OF RESEARCH RESULTS BY BIOSECURITY AUSTRALIA

Reliance of artificial inoculation over natural infection/infestation of fruit in NZ research.

It is well known that a mechanism of survival by the Fire Blight bacterium (Ea) protects itself from desiccation by developing a capsule of Exopolysaccharides under dry environmental conditions (Geider 2000) pp.111 Draft IRA report. This polysaccharide shell is readily rehydrated, enhancing the viability of the bacterial cells (Kest & Vander Zwet, 1972A pp. 111 draft IRA report) when favourable conditions return.

The bacteria can also form dry strands of polysaccharide material. These are present mainly during blossom and are considered important in dissemination of the disease (Ivanoff & Keill, 1937).

Much of the New Zealand research results used in justifying the protocol to manage the potential risk are based on artificially inoculated fruit. It is known that the process of preparing the inoculum is known to remove the natural protective shell of the Ea bacterium and is therefore artificially exposes the bacterium to the elements reducing the life of the cell to just hours. Results of research undertaken using artificial inoculation should be held in serious doubt and reviewed by independent scientists.

Furthermore, where naturally infested fruit has been used as a control in some of the experiments, there are no weather data records to indicate weather conditions were favourable or unfavourable for infection during the flowering periods. Without this information, value judgements cannot be made about the merit of the research results.

Minimum Populations of Bacteria Required for Detection and infection/infestation.

Under favourable conditions, bacteria may divide every 20 minutes by binary fission, at this rate, one bacterium could produce 1 million bacteria in 10 hours (Agrios, 1997).

There is ongoing debate throughout the international literature about the reliability of the current technology to detect small numbers of bacteria (<100cfu). According to Hale and Clark et al., it is not possible to detect the presence of Ea (*Erwinia amylovora*) from mature apple fruit by the use of conventional bacteriological techniques. As a result, Hale & Clarke developed a DNA hybridisation technique, which is claimed could detect Ea to 100 cfu in the calyx of immature inoculated fruit, Hale & Clarke (1990 Acta Horticultrae). While this appears as an improvement on conventional isolation methods, the question remains is this new technique sensitive enough as there remains considerable disagreement about the number of bacterium required to create infestation/infection.

It is of great concern that the underlying assumption held by NZ researchers, Hale et.al and accepted by Biosecurity Australia, that Ea population counts of less than 10^6 cfu will not proceed to an infection/infestation (Taylor,Hale,Gunson,Marshall, 2003). In some seasons, only 5 bacteria and in another, 5000 bacterium cells were sufficient to cause blossom infection/infestation (Vander DA Zwet, 1994) This issue is of such importance and so poorly understood, there is every chance the risk assumed in the IRA could be seriously understated. A more thorough investigation is required.

Host Free – Orchard Buffer Zones

It is significant that the studies conducted by Hale & Clarke on the presence of Ea on mature apple fruit, found that Ea could not be detected on fruit sourced from symptomless orchards except where alternative host plants were nearby, (Hale & Clarke, 1993) Acta Horticulturae. This gives validity to minimising the risk by sourcing fruit only from registered orchards with host free buffer zones. This provision was removed from the original Draft IRA of August 2001. It is my opinion that this inclusion should be revisited in view of the scientific deficiencies of the current draft IRA identified in this submission.

Isolation Methods

In the latest paper by Hale & Clarke, reference is given to the PCR technique in which according to Hale & Clarke, provide much lower levels of detection to be researched.

The Presence of Trash on Imported Fruit

Another risk, which has not been addressed by Biosecurity Australia is the risk associated with importation of trash, being leaves and stem nodes attached to the fruit, which are known vectors of Fire Blight. The reason provided by Biosecurity Australia for not considering this in the Draft IRA, was because the New Zealand authority claim that they will provide only mature apples free from trash.

This, I believe this is a serious deficiency because of the lack of understanding and commercial reality of packing fruit. It is not commercially practical to avoid some leaf or nodes in the packed product. What we don't know is what happens if trash is detected at inspection as it enters Australia or leaves New Zealand and what are the reject thresholds?

CONCLUSION & RECOMMENDATIONS

- ***I recommend that an appropriately skilled and independent scientist must scientifically review all research results used in the risk analysis process.***

- ***Reject research findings based on artificial inoculation of fruit until it can be proven that bacterium derived from artificial inoculation behaves in a similar manner to natural bacterium cells.***

- ***Recommendation - Biosecurity not accept results of research using natural infestations/infections without appropriate weather records during and after flowering.***

- ***Recommendation: That Biosecurity Australia reject the current draft IRA application until it can be shown conclusively that bacterium levels below the limit of detection of 100 cfu cannot cause infestations on mature fruit.***

- ***Recommendation:* that *Biosecurity* Australia reject all research results used in IRA's unless they are published in a reputable scientific journal, which is refereed and made available for public and scientific scrutiny.**

- ***Review the decision not to include a risk analysis on trash in the Draft IRA protocol.***

In conclusion, this evaluation is confined to only one disease - Fire Blight. If the standard of scientific evaluation of this IRA applies to the other pests and diseases, within this protocol and to other IRA's generally, the process does lacks scientific credibility.

Given the scientific deficiencies identified in the current Draft IRA, the rigour of the process should be independently reviewed. Urgently.

I recommend to the senate committee that the Australian Government reject the protocol until New Zealand Biosecurity can provide a greater level of assurance that Fire Blight will not be introduced into Australia with the importation of apple fruit from New Zealand.