A SUBMISSION TO THE SENATE RURAL AND REGIONAL AFFAIRS AND TRANSPORT REFERENCES COMMITTEE

IMPORT RISK ANALYSIS PROCEDURES FOR SOILBORNE PATHOGENS

Background to this submission

On 23 October, 2012, I was a witness at a senate hearing into the provisional final import risk analysis report for fresh ginger from Fiji. I therefore had an opportunity to see how the risk analysis system operates, and hear views from industry, senators and DAFF Biosecurity.

I came away from the hearing convinced that Australia's agricultural industries are poorly served by the current system. It is unnecessarily bureaucratic, inordinately expensive, and demands too much from growers who are already fully occupied running their own businesses.

This submission contains suggestions as to how the current system could be improved. It is an individual submission, and was not prepared on behalf of any particular industry. Hopefully it will be seen as relevant to many of our small agricultural industries.

Problems with the current IRA system

The taxonomic unit for a pest

DAFF Biosecurity conducts pest risk assessments according to FAO standards, where the taxonomic unit for a pest is generally species. The use of a higher or lower taxonomic level is possible, but each case must be supported by scientifically sound rationale.

I would argue that the taxonomic unit for fungal, bacterial and nematode pathogens of plants should always be a level below species (e.g. race, biotype or pathotype). Pathogens vary, and most plant pathologists spend their careers trying to cope with that variability.

I suspect that the FAO definition of the standard taxonomic unit was proposed and supported by countries in the northern hemisphere, where pathogens are more variable than they are in Australia. The Europeans, for example, travelled the world in the 16th, 17th and 18th centuries, and introduced plants and pathogens from many areas of the world. Some of those pathogens eventually found their way here, but since Australia is an island nation and has had relatively strong quarantine procedures for many years, there has probably been only a single, or a limited number, of introductions of many of our pests. Thus, Australian pests and pathogens are generally much less diverse than in other countries. This applies particularly to soilborne organisms, which are not as easily dispersed as their above-ground counterparts.

The following are some examples of the limited diversity of some of our nematode pests:

- Cereal cyst nematode (*Heterodera avenae*) was the most important pest of cereals in Australia in the 1970s and 80s. Because Australia has only one of the three pathotypes that exist worldwide, the nematode has since been controlled with resistant cultivars (Vanstone *et al*., 2008). In Europe, China and elsewhere, resistance is not effective because several other variants (pathotypes) of the nematode also occur (Cook & Starr, 2006; Nicol & Rivoal, 2008).

- Potato cyst nematodes (*Globodera rostochiensis* and *G. pallida*) originated in South America, but have been spread around the world in the last few hundred years. However, bottlenecks of introduction have limited the nematode's genetic diversity in most countries. In Australia, we have only one species (*G. rostochiensis*), and only one of its five pathotypes, presumably because there have been a limited number of introductions into this country (Faggian *et al.* 2012). This lack of diversity improves the chances that the nematode can be controlled with resistant cultivars.
- Burrowing nematode (*Radopholus similis*) is an important pest of banana worldwide, and considerable genetic, physiological and pathogenic diversity has been detected in overseas populations (Elbadri *et al*., 2002; Gowen *et al*., 2005). DNA studies suggest that the nematode was introduced into Australia from a single source, most likely in south-east Asia, and this probably explains why Australian populations lack genetic diversity (Tan *et al*., 2010).

Cereals, potatoes and bananas are important crops worldwide, and so their nematode pests have been well studied. However, this is not the case for nematodes which attack crops that are not as widely grown. There are simply not enough nematologists in Australia or worldwide to address every issue, particularly situations where the nematode pest attacks a minor crop.

When nematodes (and other soilborne pests) are addressed in the IRA process, it is presumed that in the absence of scientific information, a pest is not a threat to Australian crops if the species is known to occur here. The probability that the overseas pest is likely to be genetically different, may have a wider host range, and may be a more severe pathogen, is ignored by DAFF Biosecurity.

This interpretation threatens all our agricultural industries, particularly those where scientific information on pests is limited. Given the biological diversity issues discussed above, Australia should regard any new introduction of a soilborne pest or pathogen as a potential threat. The situation is not likely to be as clear cut for above-ground pathogens, which are moved around the world more readily.

Costs to industry of the IRA process

There are three major cost issues associated with the current IRA process:

Firstly, our knowledge of many pests of minor crops is poor, and obtaining the data required to satisfy IRA protocols is expensive. Undertaking molecular, pathogenicity and host range studies can take years, and so the project costs are a major economic burden on industries asked to provide that information. Projects may cost as much as $500,000 over three years, and small industries cannot afford the costs, particularly if they are faced with several IRAs.

Secondly, Australian industries not only have to pay the costs of the science required to export their produce into overseas markets, but also the costs of countries who stand to gain by selling produce in our markets. I am not a lawyer, but I fail to see the natural justice in that situation.

Thirdly, the requirements of the current IRA process mean that scientists are diverted from their most important role: helping Australian farmers manage pests and diseases more effectively and sustainably. There are only four Australian nematologists with experience in Australian horticulture, for example, and using a large percentage of their time to obtain the data necessary to support the current IRA process is not in the national interest.

Recommendations for improvement

Australia is an affluent country, and so there will always be attempts to gain access to our markets. However, the current IRA process puts an unbearable burden on Australian agriculture, particularly our small industries. Since this will be a continuing problem, the following is suggested as a solution.

Recommendation 1

- ***Fund a serious scientific review which compares the pathogenic and genetic diversity of Australia's soilborne pathogens (fungi, bacteria and nematodes) with their overseas counterparts***
- ***If that review confirms that our pathogens are generally less variable than the same species overseas, then the Australian government should indicate to FAO that it plans to deal with future import risk assessments in the following way:***
    - ***The taxonomic unit for soilborne pathogens will be at the level of race/pathotype/biotype***
    - ***Those wishing to bring material into Australia must provide scientific evidence to demonstrate that the trade will not add to the diversity of pathogens already here***
    - ***The cost of obtaining the above evidence must be borne by the entity making the application to import***

Australia is poorly served by the current IRA process, which is biased towards countries which already have a wide diversity of pests and pathogens. The Australian government therefore needs to take a strong stand in international forums, and argue that because of our unique situation, we will be taking the above approach in future. Although there will be alternative points of view within the world community, Australia is a sovereign nation with a good reputation across the world, and it should be possible to get our point of view accepted.

Since this is not a party-political issue, the Rural and Regional Affairs and Transport References Committee is ideally placed to move this issue forward.

The role of DAFF Biosecurity

Although the salaries of DAFF Biosecurity staff are paid by Australian taxpayers, I came to the conclusion that their main commitment is to FAO and our international agreements rather than Australian agriculture. However, that criticism is not personal. Biosecurity staff are public servants, and are currently constrained by legislation which is not in Australia's best interests.

At present, we have a situation where public servants with a very narrow view of the world (our international legal obligations), little knowledge of practical agriculture, and no expertise in some areas of plant pathology (e.g. nematodes) make decisions that affect the livelihoods of thousands of people in rural communities. They not only make the initial pest risk assessments and the final decision, but also develop pest mitigation procedures with other governments in areas where they have no expertise or practical experience.

Recommendation 2

- ***Establish an expert panel consisting of scientists with a background in pest and disease management and allow it to co-opt expertise in taxonomy or other areas, if required.***
- ***Empower the panel to 1) assess the final IRA and industry's comments on that document; 2) provide recommendations to DAFF Biosecurity on the final form of the IRA and 3) oversee pest mitigation procedures taken by overseas countries to ensure that that they are effective***

Literature cited

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Dr. Graham Stirling is a Director and Principal Scientist with Biological Crop Protection Pty Ltd. (www.biolcrop.com.au), a Brisbane-based company providing research and diagnostic services in nematology, plant pathology and soil biology to Australia's agricultural and horticultural industries. Dr. Stirling specialises in soil-borne diseases and in recent years has been involved in the development of integrated pest management (IPM) alternatives to the toxic and environmentally-damaging soil fumigants and nematicides that are widely used in some horticultural industries. He has determined the economic threshold for root-knot nematode on pineapples, ginger and various vegetable crops and is using this knowledge to offer nematode monitoring services to those industries. He has also been involved in the development and validation of DNA techniques for quantifying fungal pathogens such as *Fusarium* and *Verticillium* in soil, and has shown that sudden wilt of capsicum is the result of heat-stressed plants being attacked by *Pythium* species that are active at high temperatures. He has also published work on the etiology of rhizome rot of ginger caused by *Pythium myriotylum*. Dr. Stirling was a member of a research team (the Sugar Yield Decline Joint Venture) that recently developed a new farming system for the Australian sugar industry that is based on crop rotation, controlled traffic, residue retention and minimum tillage. He showed that nematodes were an important component of the yield decline syndrome and that retaining organic matter was important in enhancing biological mechanisms of suppressing these pests. Dr. Stirling also has an interest in soil health and has assessed the value of using free-living nematodes as an indicator of the biological status of soils used for cereal, pasture and sugar production.

Dr Stirling was born in South Australia in 1947, graduated with a B.Ag.Sc.(Hons) degree from the University of Adelaide in 1969, received his Masters degree from the same university in 1975 and a PhD in Plant Pathology from the University of California, Riverside in 1978. Prior to establishing Biological Crop Protection, Dr. Stirling was employed by the South Australian Department of Agriculture (1970-1983) and the Queensland Department of Primary Industries (1983-1996). During his 42 years as a nematologist/plant pathologist he has produced more than 100 refereed papers and numerous extension publications. Dr Stirling has also worked on most aspects of the ecology and control of plant-parasitic nematodes and has experience with a variety of crops, including wheat, rice, lucerne, clover and other pasture species, sugarcane, grapes, stonefruit, apples, citrus, pineapples, bananas, papaya, turf, ginger, tomato and potatoes. In 2003 he was made a Fellow of the Australasian Plant Pathology Society for his contribution to plant nematology and in 2008 he received a similar award from the Society of Nematologists in the USA.

Dr. Stirling has a general interest in all aspects of plant disease control but most of his research has been directed towards the development of non-chemical controls for plant-parasitic nematodes. During the 1970's he played a key role in introducing nematode-resistant rootstocks to the South Australian grape industry and this work now saves Australian grape growers hundreds of thousands of dollars each year by reducing losses from nematodes. Dr. Stirling was the first to demonstrate that needle nematode could cause serious damage to rice and went on to devise a number of non-chemical strategies to control the nematode. More recently, his work on nematode monitoring, crop rotation, cultivar resistance and organic amendments has ensured that alternatives to chemical nematicides are available to horticulturists in tropical and sub-tropical regions of Australia.

Dr. Stirling is interested in the epidemiology of plant pathogens and the role that microorganisms play in their ecology. This specific interest is reflected in his work on biological control of nematodes, for which he has gained international recognition. He has considerable experience working with both fungal and bacterial parasites of nematodes and his 1991 book entitled `Biological Control of Plant-Parasitic Nematodes' remains the standard reference book on the subject. In the 1980's he developed a mass production system for a bacterial parasite of nematodes that has since been commercialised, while more recently his work with formulations of fungal biocontrol agents overcame some of the impediments that have limited the commercialisation of biological control. At present Dr. Stirling is attempting to manipulate the beneficial soil biota by modifying cropping systems, and has found that a soil foodweb suppressive to plant-parasitic nematodes can be produced by reducing soil disturbance and using organic inputs to maintain a food supply for predators.