

RECENT TRENDS IN PLANT QUARANTINE POLICY IN AUSTRALIA AND NEW ZEALAND AND THEIR IMPLICATIONS FOR FORESTRY

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ABSTRACT

Reviews have recently been conducted independently by Australia and New Zealand into various aspects of their plant quarantine policy and practice. Quarantine policy trends in the two countries are similar, being shaped largely by the same pressures and demands, both external (e.g., international moves towards trade liberalisation) and internal (e.g., financial stringencies). A key issue that has emerged from these reviews, and the most controversial, is the assessment of "acceptable risk" by means of bio-economic analysis. Such an approach must be extremely conservative when considering the interests of industries such as forestry because of the disproportionate impact the introduction of exotic pests and pathogens may have on forests and forest products, the special difficulties of early detection and control of such organisms, and the paucity of data on which to base risk assessment. Other issues of relevance to forestry are the establishment of databases on pests and diseases, pre-clearance, area freedom, privatisation of quarantine premises, "multiskilling" for border inspections, community consultation in policy formulation, and the promotion of public awareness of quarantine.

Keywords: quarantine; forest policy; insect pests; fungal pathogens

INTRODUCTION

Over the past decade in both Australia and New Zealand, there has been a number of enquiries and reports into various aspects of quarantine policy and practice, leading to some important changes, and suggestions for change, in existing systems. These reviews have sought to address pressures and demands that the quarantine system is expected to face in the future. These include increases in the volume of imports and passenger traffic, increasingly severe budgetary constraints, the increasing international attention being given to non-tariff trade barriers, technological advances, and changing attitudes to the use of chemical pesticides for control or eradication

measures. It has been generally recognised that no quarantine system can guarantee total exclusion of pests and diseases while there is trade, movement of people, natural movement of pests and diseases, and intentional or unintentional breaking of the law (Quarantine Review Committee 1988; New Zealand Ministry for the Environment 1988). What is being sought by each country is a system of risk management which will allow their quarantine system to be most effective within these constraints.

Several of the findings and recommendations of the reviews which have particular relevance for forestry interests are discussed in this paper.

BACKGROUND

The term “quarantine” is derived from the Latin *quadragesima* meaning forty. As outlined by Mathys & Baker (1980), it originally applied to the period of detention for ships arriving from countries where human diseases such as bubonic plague and cholera were endemic. An isolation period of 40 days was considered adequate to permit latent cases of disease in the ship’s crew to develop and be detected before anyone was allowed to land. The first quarantine of this type is thought to have been imposed in Venice in 1374.

In contrast, the imposition of plant quarantine is a relatively recent development. Some of the earliest laws passed were in Germany in 1873 and the United Kingdom in 1877 (after a series of catastrophic pest and disease epidemics in Europe, particularly of grape), and in Indonesia in 1877 to prevent the introduction of coffee rust from Sri Lanka. In the United States, Australia, New Zealand, and many other countries, the first plant quarantine laws were enacted only in the early part of this century. However, in the past, the geographic isolation of Australia and New Zealand has provided a natural barrier to the entry of pests and diseases, while the duration of sea travel produced an enforced period of quarantine on goods, people, and livestock. Both countries are also similar in that agriculture and forestry make a significant contribution to the national economy, and most of the plants that form the basis of these industries are exotic. Freedom from major pests and diseases which affect these plants in other countries is a prerequisite for access to many economically important markets. It also minimises costs of production for local industries and thus improves their competitive position. Effective quarantine is therefore essential to both the trading advantages and production methods of agriculture and forestry in these countries. As well, it is needed to protect the native flora and fauna which, because of the past isolation, are particularly unprepared to combat or compete with exotic organisms.

Pressure on the Australian and New Zealand quarantine systems for change to accommodate new situations is greater now than ever before. Natural defences are seen as being eroded by the ever-increasing volume and speed of people and cargo traffic. At the same time, the Governments of both countries are embarked on a course of economic “belt-tightening” resulting in demands for Government agencies, including those responsible for quarantine, to be more efficient and more accountable, and to reduce expenditure and staff levels. Internationally, there is a trend towards trade liberalisation which places an onus on trading nations to justify quarantine decisions which either actually or potentially act as barriers to international trade.

Industry demands for the importation of new genetic material to maintain and improve efficiency of crop production and competitiveness, and the advent of new technologies for treating or testing quarantinable items, also require constant review.

POLICY AND PRINCIPLES

These many pressures have led both countries to critically examine their quarantine system and to endeavour to set out clear policy guidelines for the future. Australian quarantine policy, as outlined by the Australian Ministry for Resources (1988), is "to aid safe, efficient production in Australia's plant and animal industries, and the conservation of its flora and fauna, in order to contribute to national economic and social welfare". The principles guiding interpretation and implementation of this policy are that it must:

- allow the most rapid and free entry possible of plants, animals and their products, including genetic material, consistent with safety to agriculture and the environment;
- adopt conservative responses to risk if available scientific or economic information is not adequate to assess the risk to agriculture or the environment, while seeking and encouraging the provision of such information through the application of further research, technology and biological surveys; and
- strenuously pursue technological opportunities to facilitate the greatest possible fulfilment of agricultural quarantine policy."

New Zealand's proposed plant quarantine policy (Mohamed *et al.* 1988) is to:

"Exclude potentially harmful pests, pathogens and plants from entering New Zealand by any other than natural means".

The rationale for this policy is based on market access for New Zealand's produce, maintenance of economic production costs for its plant industries, protection of the ecosystem, and trade facilitation. The stated underlying principle is "that New Zealand adopts a policy of managed risk whereby acceptable risk levels are calculated and plant products are only allowed to enter under conditions that minimise the risk of entry of potentially harmful pests, pathogens and weeds".

Specific issues relating to the practical application of such policy are discussed below.

Risk Assessment

Risk assessment has always been central to plant quarantine practice. Since the introduction of plant quarantine regulations in 1909, Australia has witnessed extremes in their application from the almost non-existent in the war years to the so-called "no risk" policy (i.e., total exclusion) which prevailed from the 1950s to the mid 1970s. This latter policy is referred to in the New Zealand report (Mohamed *et al.* 1988) as the "fortress concept". Both countries reject such policies and espouse a "managed risk" approach with emphasis on conservatism when there is inadequate information available to determine risk. A more systematic and structured approach to risk

assessment is to be adopted with bio-economic analysis (i.e., categorisation of risk on the basis of biological and socio-economic criteria) as its cornerstone.

Few would argue with the principle underlying this approach, that quarantine decision-making should become more objective, consistent, and informed. However, many people, particularly biologists, have expressed their reservations about the manner in which “acceptable risk” may be calculated and applied in practice. With forestry interests, there are three main areas of concern: (1) the disproportionate impact the introduction of exotic pests and pathogens may have on forests and forest products; (2) the special difficulties of early detection and control of such organisms; and (3) the paucity of data on which to base risk assessment.

Disproportionate impact

Just as in the past quarantine has been concerned more with issues relating to human and animal health than with agricultural considerations or environmental protection, so too have forestry needs been greatly overshadowed by those of agriculture. In the report of the Quarantine Review Committee (1988) in Australia, forestry and forest industries received only occasional mention and then usually as narrow-interest proponents of a “no risk” policy. However, in 1986–87 the various forest industries contributed \$2.3 billion to the Australian economy (i.e., 1% of Gross Domestic Product) and accounted for about 38 000 jobs. A further 50 000 jobs were located in the “downstream” industries of joinery, wood products, and furniture (Centre for International Economics 1988). Similarly, for New Zealand in 1987–88 forestry products made up 1.5% of the Gross Domestic Product, and for the calendar year 1988 accounted for 8.4% of the total New Zealand merchandise exports (P. Gadgil, pers. comm.). These figures do not take into account the enormous value of the standing crop or of timber in-service. Thus, there is much at stake and forestry has a strong claim for consideration of its interests distinct from those of agriculture.

One example presented by the Quarantine Review Committee (1988) in the general case against a “no risk” policy is that of the lucerne aphid in Australia. The text is quoted at length below since the example serves to highlight some of the major differences between agricultural and forestry crops and helps to explain, in part, the generally conservative, “minimal risk” approach to quarantine of those involved in forestry.

“A ‘no risk’ policy previously applied to host material of the lucerne aphid so that industry, feeling secure behind this supposed shelter, relied on a single variety of lucerne. The aphid eventually (perhaps inevitably) entered Australia and decimated the national crop. The outcome, after the initial impact, was nevertheless a positive one. The ban which had been in place was lifted because it was no longer relevant and this meant that new varieties of lucerne could be introduced. Australia now benefits from varieties suited to a range of agricultural conditions and that pest threat is no longer very relevant”.

Unlike agricultural crops, most tree crops require decades to mature and cannot be quickly modified to control or resist new pests or diseases. Direct control measures

such as spraying or dusting, which would be employed for problems in agricultural crops, are usually not logistically, environmentally, or economically practicable in forests (either plantation or natural). The potential impact of some of the more serious exotic pests and diseases of forests, if introduced, could therefore be not just the loss of a few season's crops (as in the lucerne aphid example) but the loss of decades of effort and investment in plantations and irreparable damage to the native flora and timber resource.

Another message promoted in this example, which may be broadly applicable to agriculture but has less relevance for forestry, is that industry is seriously disadvantaged by lack of access to new (imported) genetic material. As outlined in a submission from the Forest Industries Association of Tasmania (Quarantine Review Committee 1988), "The research and development effort applied to available species has been an important scientific employer and has kept Australia up with the rest of the world in genetic improvements. In many cases, Australian work in this area leads the world".

Difficulties of early detection and control

Some of the special difficulties associated with the early detection and control of exotic organisms which may affect trees and timber in Australia are outlined by Walker (1987), Wylie & Peters (1987), and Eldridge & Simpson (1987). For forest pests and diseases these include the vastness and isolation of much of the forest estate, the infrequency and difficulty of inspections (compared to that for intensively managed, easily accessible agricultural crops), and the limited options for control measures in a forest situation. Past experience has been that by the time an exotic disease (particularly) or pest is detected in forests it is usually well established and beyond eradication. For forest products pests, the cryptic habits and often extended life-cycles of many borers may greatly delay their detection and make survey and control difficult. In New Zealand, the situation is similar although the system employed there of regular forest health monitoring greatly increases the likelihood of early detection of exotic organisms (Hosking & Gadgil 1987).

Paucity of data for risk assessment

One of the expectations of bioeconomic analysis is that a body of reliable data exists or can soon be gathered on which to base assessment of risk. This assumption may have some validity for agricultural crops but generally does not for forest trees and native flora. Knowledge of the pests and pathogens of much of the forest flora of the world is far too inadequate at present to allow realistic prediction and ranking of risk species. As discussed later, this situation is unlikely to change in the short or medium term. While to some extent it may be possible to define risks, based on the overseas data, for the exotic softwood species (*Pinus*) used in plantations in Australia and New Zealand, this is not so for indigenous tree species. Coupled with this is the well-known difficulty of predicting just how an organism will behave outside its native environment. For example, the wood wasp *Sirex noctilio* F. which has devastated *P. radiata* D. Don plantations in Australia and New Zealand is of only minor importance in its native southern Europe. Similarly, a major pathogen in these plantations, *Dothistroma septosporum* (Doroguin) Morelet, is not significant in natural *Pinus* forests in countries where the fungus is indigenous (Eldridge & Simpson 1987).

The application of cost-benefit analysis for risk to forest crops is complicated by factors such as the long rotation length, the uncertainty of the market value of the crop during most of this time, and the compounding of costs over many years. The magnitude of such a task is put into perspective when we consider how difficult it is to quantify losses and costs for even currently occurring pests or diseases (Eldridge & Simpson 1987; Mathys & Baker 1980). As well, there are many difficulties involved in determining the adequacy and effectiveness of quarantine procedures, a key element in risk assessment. The greatest of these is the fact that we cannot prove or disprove that the absence of any particular pest or disease is due to its exclusion by means of quarantine vigilance (Quarantine Review Committee 1988). Therefore, in many respects, judgements may continue to be largely subjective. This highlights one of the limitations of the cost-benefit approach, that it may convey a misleading aura of precision or objectivity despite being based on a broad range of assumptions. Such limitations need to be recognised and an appropriate level of caution applied. This does not always occur, as evidenced by the permitted entry into Australia over the past several years of *Eucalyptus* foliage from Japan for koala feeding trials. Although such import was vigorously opposed by forest pathologists, it was nevertheless allowed on the basis that the literature indicated an absence of any significant eucalypt diseases in Japan and also in the interests of “koala diplomacy”. However, the subsequent finding by Old & Kobayashi (1988) that eucalypts are susceptible to the chestnut blight fungus *Cryphonectria parasitica* (Murr.) Barr which occurs in Japan shows that there was indeed a high risk involved. Such import against the advice of specialists does little to dispel fears about how “acceptable risk” may be applied in practice.

Databases on Pests and Diseases

The adoption of structured bio-economic analysis requires the establishment of detailed and comprehensive databases for risk identification and assessment. As outlined by Mohamed *et al.* (1988) and the Quarantine Review Committee (1988), such databases would cover biological aspects (e.g., known pest status, host range, biology, epidemiology, geographical distribution, likely mode of entry, and ease of detection and control) and socio-economic aspects (e.g., effects on market access; expected losses in crop production; the potential costs of exclusion, containment, eradication, and control; likely effects on native flora and fauna; and environmental hazards of control measures). Suggestions have also been made for collaborative work between Australia, New Zealand, and other countries in the region, and a linking with international databases (Quarantine Review Committee 1988).

It has been recognised in the various reviews that the gathering of such information will require considerable additional resources for research, economic analysis, surveys, and monitoring of pests and diseases, and for compilation and management of the database. Efficiencies alone will not create the extra capacity needed. Herein lies the gap between principle and practice — where will the additional resources come from? As mentioned earlier, the Governments of both Australia and New Zealand are currently seeking to reduce their expenditure and staff levels, and forest services have been included in this rationalisation. In Australia, for example, there has been a net loss of forest entomologist positions in the State services in the past few years. Yet it is just such staff on whom the Government purportedly will rely for scientific input into

the database and into quarantine decision-making. The building of a database sufficiently reliable for forestry needs will therefore be a very slow process if present circumstances prevail. In the meantime, for the reasons outlined earlier, there will be strong pressure for decision-making which will necessarily be based on inadequate information.

Pre-clearance and Area Freedom

Australia and New Zealand are active participants in the international trend towards pre-clearance and accreditation (i.e., mutually agreed pre-export procedures designed to greatly streamline quarantine inspection and clearance in the country of destination). "Elite" nursery stock (i.e., plants from a source accredited as free of specified pests and diseases) can be imported with minimal post-entry quarantine requirements and in larger quantities than is usual. Pre-clearance arrangements involving timber are now common. For example, lumber products which have been treated in New Zealand in compliance with Australian quarantine standards require only a tailgate inspection on import.

Area freedom arrangements, whereby one country accepts that a defined area within another country has a pest and disease status different to that of the country as a whole (and likely to remain different), are also being increasingly adopted. They enable items to be imported under less-demanding conditions of entry.

It is envisaged that pre-clearance and area freedom arrangements between Australia and New Zealand will be extended in the future. Both countries have a similar interest in their trading partners' pest and disease status and both have protocols that are identical in intention for some pests, diseases, and products. There is thus considerable scope for co-operation (e.g., shared pre-clearance protocol negotiations also help dispel accusations of quarantine standards being inconsistent or too high — Quarantine Review Committee 1988).

The prime requirement for pre-clearance and area freedom arrangements is that they present no greater risk of entry of pests and diseases (and possibly less) than the standard protocols. However, the principal caveat is that such arrangements assume a knowledge of pest and pathogen host ranges, reliability of identifications, and an intensity of pest and disease survey that is currently lacking for most countries and certainly for most forest species.

Privatisation of Quarantine Premises

Private involvement in the provision and operation of quarantine premises (particularly in the low and medium security categories, which includes most plants) is likely to increase in the future with increasing demand for space in such facilities. This arrangement is expected to allow a more flexible and rapid response to changing demand and at the same time relieve pressure on strained Government resources. The need to ensure that greater private involvement would not lead to greater quarantine risks is generally recognised, and it is proposed that there be adequate Government standards, supervision, and penalties to enforce compliance. However, as with other aspects of risk assessment already discussed, it is essential to make sure that quality of supervision is not compromised by the present trend in both countries for Government staff cuts.

“Multiskilling” for Border Inspections

The term “border operations” is used to describe a wide range of activities undertaken at airports, seaports, and mail exchanges to intercept materials of quarantine interest, whether introduced in accordance with quarantine procedures, as a result of illicit activity, or unintentionally (Quarantine Review Committee 1988). From the forestry viewpoint, the application of stringent quarantine measures at these borders is considered to be the best means of preventing problems with exotic pests in forests and in timber (Gadgil & Flint 1983; Wylie & Yule 1977; Wylie & Peters 1987). In Australia, it has been proposed that a number of routine quarantine duties be ceded to customs officers in the interests of more efficient use of human resources. Such a proposal is being approached cautiously because of the risk of reduced quality of inspections due to deficiencies of training and commitment. For example, one of the responsibilities it has been proposed to cede is the inspection of packaging of cargo that otherwise has no quarantine interest (industrial and general commerce). However, wooden packaging has been shown to be a major mode of entry for exotic timber borers (Wylie & Peters 1987), and a skilled eye is required to detect borer evidence. Customs officers would require considerable training to match inspection standards presently provided by specialist quarantine staff. As well there is the question of commitment, and a commonly expressed concern is that customs officers may give more attention to drugs and contraband (their traditional interests) than to pests and diseases.

Community Consultation and Public Awareness

An important recommendation of the Quarantine Review Committee (1988) is for the establishment of a formal consultative process to allow greater access by all interested parties into quarantine decision-making. Communication between these parties is to be maintained by means of a regular quarantine “bulletin” to notify procedures, seek comments, and publish decisions. This recommendation has been welcomed by the forestry sector in Australia which has been disadvantaged in the past by lack of formal representation and recognition of its needs. In this regard, forestry in New Zealand appears to have fared much better, and has had considerable input into quarantine decision-making over the years (Hosking 1979; Hosking & Gadgil 1987).

The promotion of public awareness and public conscience was identified by the Quarantine Review Committee (1988) as one of the most effective weapons available to quarantine. Reference was made in that report to a recently completed survey which found that 87% of Australians know “nothing or very little” about quarantine operations and importance. The chances of an unwitting offence against quarantine regulations are therefore high. A very recent example of forestry relevance is the finding in February 1989 of the elm leaf beetle *Galerucella luteola* Mueller (which occurs in Europe and North America) on elms (*Ulmus glabra* Huds. ‘Pendula’) in a suburb of Melbourne. The suspected mode of entry of the insect was as eggs on leaf specimens probably collected for personal interest and brought into Australia undeclared by a returning traveller (F. Neumann pers. comm.). It is interesting that Morschel (1972) classified the risk of introducing the pest into this country, except for a deliberate introduction, as minimal. Australian Government funding for public

education on such quarantine matters, which had substantially declined over the period 1980 to 1988, is now to be greatly increased to boost the level of public understanding and co-operation.

CONCLUSIONS

Current trends in plant quarantine policy in Australia and New Zealand are similar, being influenced by similar international and domestic pressures for change to accommodate new situations. Both countries are committed to a more systematic and structured approach to risk assessment based on bio-economic analysis. This move is welcomed, provided a conservative response to risk is adopted when available scientific or economic data are inadequate for meaningful assessment. Such is likely to be true for most forestry pests and diseases, at least in the short to medium term. The pace of development of the proposed databases on pests and diseases will greatly depend on the provision of additional resources. It is here that a gap arises between principle and practice with the Governments of both countries currently seeking to reduce their expenditure and staff levels. The need for adequate staffing to ensure compliance is also an issue in the trend towards greater privatisation of quarantine premises. There is increasing use by Australia and New Zealand of pre-clearance and area freedom arrangements. However, a limiting factor from the forestry viewpoint is again the lack of detailed and reliable information on pest organisms in most countries. An Australian proposal to cede responsibility for some border inspections from quarantine to customs staff should be approached cautiously, the key considerations being the degree of training and commitment of inspectors. However, proposals to make quarantine decision-making more open and consultative and for an expansion of public education programmes on quarantine are strongly supported. There is considerable scope for co-operation between Australia and New Zealand on a range of quarantine matters.

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