Disease risks associated with avian importation and exportation

WA Snowdon
176 Noble Street, Newtown Vic 3220

Introduction

Australia has played a leading role in the GATT Uruguay Round of trade negotiations, where quarantine controls and other non tariff barriers have been discussed. The GATT negotiations on Sanitary and Phytosanitary measures have emphasised that quarantine should not be used as a non tariff barrier to trade, and countries' decisions should be soundly based technically and be in accordance with international standards, guidelines or recommendations (Anon. 1991). Australia believes that quarantine decisions should be transparent and if countries are challenged by others they should provide justification for their decisions. These international developments are consistent with the Australian Government's policy as applied by the Australian Quarantine and Inspection Service (AQIS), and which is detailed in the Government's quarantine policy statement "Australian Quarantine Looking to The Future."

The Australian Quarantine and Inspection Service (AQIS) is continuing to develop quarantine procedures based on risk assessment. It has developed protocols for the importation of hatching eggs and live birds and importations of both have been made over the past two years. However the disease risks associated with these programs will years. However the disease risks associated with these programs will continue to be debated by people with different perceptions and interests, which include commercial, conservation, animal welfare, and other issues.

Objectives of Avian Importation Programs

There are five broad categories in which potential avian imports can be placed: commercial poultry, fancy breeds of poultry, pigeons, cage and aviary birds, and zoological specimens.

Commercial poultry (chickens, ducks, geese, turkeys, guinea fowl, pheasant, quail, and other game birds): The objective is to reduce smuggling by introducing new genotypes to improve the productivity and efficiency of meat and egg production

and allow greater competition in the industry by making available alternative sources of genotypes.

Fancy breeds of poultry: The objective is to reduce smuggling by introducing new genotypes to increase the genetic diversity of existing breeds and allow the importation of new breeds that have been developed in overseas countries during the period of the ban on avian importations.

Pigeons: The objective is to reduce smuggling by improving the performance of racing pigeons and improving the quality of existing fancy breeds, particularly in type and vigour, and widening the range of genetically influenced colours and patterns.

Zoological specimens: Zoos are involved in education, conservation, recreation and research. Their objectives are to make visitors aware of the diversity of species and highlight the plight of those that are endangered; prevent extinction of some populations of exotic birds held in zoos and wildlife parks in Australia and enable zoos to co-operate with overseas zoos in programs to preserve a range of threatened avian species. The importation program is aimed at assisting the zoos meet their objectives.

Cage and aviary birds: The objective is to reduce smuggling by improving the quality of existing species, providing greater species diversity, and improving the conservation status of species in danger of extinction.

It has been elicited that there is a community need for importations of avian genetic material in the above categories.

Objectives of Quarantine Control of Avian Importations

Besides quarantine controls, avian importations are subject to the provisions of the Wildlife Protection (Regulation of Exports and Imports) Act 1982. The import of birds and hatching eggs, other than those listed in Schedule 5 of the Act, is restricted and there are further controls in the case of birds in CITES lists.

The overall objectives of these controls are:

a. prevent the introduction of diseases that could have a deleterious effect on birds already in Australia
b. prevent the introduction of species that, should they escape, may result in the establishment of colonies with a high potential to become pests either to productive agricultural enterprises or the environment
c. control the trade in species included on CITES lists.

FACTORS AFFECTING THE DISEASE RISKS ASSOCIATED WITH THE IMPORTATION OF CAGE AND AVIARY BIRDS

a. Diseases in Birds in the Exporting Country

When importing birds it is necessary to consider not only the disease status of cage and aviary birds, but also that of wild native birds and domestic poultry in the exporting country. For instance, the presence of very virulent Newcastle disease in domestic poultry would be of concern when importing cage and aviary birds. Similarly the presence of paramyxovirus 1 in pigeons would be of concern when importing genetic material of domestic poultry

b. Wild Caught versus Captive Bred Birds for Export

For many years there has been a large trade in wild caught birds from Africa, Asia, and South America to USA, UK and Europe. This trade has resulted in the importation of disease agents of importance to domestic poultry and cage and aviary birds, e.g. Newcastle disease, and other paramyxoviruses, and avian influenza (Senne *et al*. 1983; Ashton and Alexander 1980), reoviruses (Meulemans *et al*. 1983, Ashton *et al*. 1984) and possibly a range of unrecognised disease agents.

There are significant animal welfare problems in importing large numbers of wild caught birds. Large losses of birds from diverse causes are usually associated with this trade. For example, 176,000 exotic birds representing 400 different species were imported into the UK in 1990. Deaths on arrival totalled 2% and deaths in quarantine 12.3% (Anon. 1992). If losses that occurred after capture of wild caught birds, but before export, are also taken into consideration, the total losses could have been of the order of 20-25%. By comparison, under the Australian policy of importing only captive bred birds, the losses in four consignments of budgerigars totalling 1900 birds, after 45 days in pre-export quarantine in the UK, followed by transportation to Australia and 45 days in quarantine at Spotswood, totalled 4.1%.

c. Importation of Live Birds or Fertile Eggs

Some diseases of birds are transmitted via the embryo whereas others are not. Some domestic chicken diseases that are egg transmitted are: salmonellosis (*S. pullorum*, *S. gallinarum*, *S. enteriditis* and less frequently *S. hadar* and other paratyphoid organisms such as *S. typhimurium*), mycoplasmosis (*M. gallisepticum* and *M. synoviae*), egg drop syndrome (haemagglutinating adenovirus), avian encephalomyelitis (picornavirus), infectious bronchitis (coronavirus), and reticuloendothelosis (retrovirus). Important diseases that are not considered to be egg transmitted, or where it rarely occurs, are Newcastle disease (paramyxovirus), avian influenza (orthomyxovirus), infectious bursal disease (birnavirus), Marek's disease (herpesvirus), and fowlpox (pox virus).

In general, parasitic, protozoan and some bacterial diseases such as pasteurellosis, can be introduced with live chickens but are readily excluded by importing fertile eggs.

Although little definitive work has been carried out on the transmission of diseases in cage and aviary birds, it would appear that egg transmission is not important in the spread of parasitic, protozoan, and most bacterial diseases, Pacheco's disease (herpesvirus), paramyxovirus infections, poxvirus infections, chlamydiosis, Newcastle disease and avian influenza. Polyoma virus (papovavirus) infections and psittacine beak and feather disease (circodna virus - Ritchie *et al*. 1989, Todd *et al*. 1991) appear to be egg transmitted; psittacine reovirus infections, mycoplasmosis, and salmonellosis, would be potential candidates for egg transmission, whilst there is no evidence to indicate whether proventricular dilatation syndrome (a putative togavirus Gaskin *et al*. 1991) is egg transmitted or not.

d. **Effectiveness of Quarantine and Testing Procedures for Disease Exclusion**

There are three steps in the legal importation of avian genetic material into Australia; quarantine and testing procedures in the exporting country, transportation from the exporting country to Australia, and quarantine and testing procedures in Australia.

The efficiency of veterinary services, particularly laboratory services and disease control capability, in the exporting countries, plays an important role in determining whether birds can be imported safely. Dunn (1991) reviewed the criteria for the evaluation of veterinary services in international trade. He stated that the key elements in this process include resource adequacy, management capability, legislative and administrative infrastructure and performance history. He also stated that competency, consistency and honesty are qualities on which others base their confidence in individuals or organisations, and that mutual confidence between relevant official services of trading partner nations contributes fundamentally to stability in international trade.

Hatching eggs and live birds can be imported into Australia from countries in which clinical Newcastle disease has not been reported in the previous six months. The source flocks providing the hatching eggs and the live birds for export must not have been vaccinated against Newcastle disease. Countries currently approved for export to Australia are New Zealand, Ireland, Iceland, Canada, Denmark, Norway, Sweden and the United Kingdom.

The current health protocols for the importation of live birds require that each bird in the source flock be captive bred in the country of export, and be resident in the flock since hatching, or during the six month period immediately prior to entry into pre-export quarantine. And during this six month period the following diseases were not diagnosed on any premises where the birds for export had been located: chlamydiosis, infectious laryngotracheitis, avian poxvirus infections, avian mycoplasmosis, avian papovavirus infections, avian encephalomyelitis, avian herpes virus infections and salmonellosis.

Birds being exported spend 45 days in pre-export quarantine in premises that are discrete and isolated from birds, animals and animal products; the premises are run on an all in, all out basis; equipment is either new, or is able to be sterilised or disinfected before use; staff have no contact with other birds; the premises are approved by AQIS, and all matters relating to the health, disease testing, and quarantine of the birds, are under the control and supervision of a Government Approved Veterinarian.

During pre-export quarantine cloacal swabs are collected from all birds at least 14 days after commencement of quarantine, and are tested for haemagglutinating agents (Newcastle disease, influenza type A, and avian paramyxoviruses types 1, 2, and 3); *S. pullorum*, *S. gallinarum* and other salmonella serotypes as specified, and *Chlamydia psittaci*. The birds are also treated with a broad spectrum anthelmintic and an external parasiticide effective against lice and mange mites.

On arrival in Australia birds spend 45 days in quarantine at Spotswood, Victoria, and the tests and treatments undertaken in pre-export quarantine are repeated. In addition psittacine birds and pigeons are treated for chlamydiosis. Specific pathogen free sentinel chickens are also housed with the imported birds, are inoculated 7, 14 and 21 days after the commencement of quarantine with a pooled suspension of faeces collected from the imported birds, and are tested at 28 days for the presence of antibodies to Newcastle disease virus, influenza type A virus, and *S. pullorum* and *S. gallinarum*.

As at February 1992, ten consignments of birds had been imported through the Spotswood Quarantine Station. These included four consignments of racing pigeons and four consignments of budgerigars from the UK, one consignment of fancy pigeons from Canada, and a consignment of Kiwis from New Zealand. Total deaths in each consignment during pre-export quarantine, transportation and quarantine at Spotswood ranged from 1.3-21.7% for pigeons and 3.3-4.6% for budgerigars. The 21.7% deaths in pigeons occurred in the first importation of birds and was the result of smothering during transportation. There were no deaths in the Kiwis.

The most commonly observed lesions seen at autopsy of birds dying in pre-export or post-arrival quarantine were lung congestion, hepatomegaly, fluid faeces with or without enteritis, splenomegaly, and traumatic injuries. Group B salmonellae, e.g. *S. typhimurium*, were isolated from three consignments and chlamydia from four consignments. No haemagglutinating agents were recovered from any of the consignments.

A number of disease conditions has been reported in imported budgerigars, following their release from quarantine, or their progeny, by veterinary surgeons specialising in avicultural medicine. These are best summarised by (Macwhirter, P. 1991, personal communication),

i. Abnormal feather formation on the wings and tail, sometimes referred to as "French Moult", and often associated with budgerigar fledgling disease and psittacine beak and feather disease. Both of these diseases occur in budgerigars of Australian origin.

ii. Red chicks; a condition affecting chicks less than three weeks of age. Chicks are stunted and red. It is caused by papovavirus infection.

iii. Yellow belly; a yolk sac infection causing deaths in newly hatched chicks and caused by infection with salmonellae or other bacteria.

iv. Diarrhoea and ill health associated with infection by Gram-negative and megabacteria.

There appears to have been no disease problems associated with imported pigeons over and above those that already exist in Australian born pigeons (Walker, C. 1991, personal communication).

Some importers believed that some deaths occurred in birds after release from quarantine, resulting from the toxic effects of the treatment of birds in quarantine with chlortetracycline for chlamydiosis, and panacur for internal parasites.

e. **Implications of Introducing Diseases with Imported Birds**

The significance of introducing disease agents with imported birds will depend upon whether they are pathogenic, whether they are already endemic, whether they are more virulent strains or are antigenic variants of disease agents already present in Australia, or whether they are exotic to Australian birds. The impact of any disease introductions will first be seen in the cage and aviary bird industry.

Perhaps the two most important questions surrounding the introduction of disease

agents with imported birds relate to native bird populations. Firstly, what is the risk of infecting native bird populations with diseases present in cage and aviary birds, and secondly, if infection spreads to native birds what would be the likely outcome?

Whetether or not a infectious agent will spread from cage and aviary birds to native birds, will depend upon the degree of interaction between the two; the nature of the disease agent, i.e. infectiousness, resistance to environmental factors such as sunlight, temperature and desiccation; route of infection such as respiratory, oral or by arthropod vectors; and the presence or absence of inapparent carriers of infection in clinically normal birds.

Discussion

The quarantine and testing requirements for live bird importations are biased towards preventing the introduction of diseases that could be transmitted to domestic poultry. Although there is a number of specific diseases of cage and aviary birds which must not have been diagnosed on the premises from where the birds for export have been obtained, there is little testing for diseases specific to cage and aviary birds. This has been of concern to some because of the danger of introducing suspected exotic diseases such as Pacheco's disease, psittacine proventricular dilatation syndrome, psittacine reovirus infection, psittacine internal papillomatous disease, and psittacine poxvirus diseases, which might be introduced into the many native psittacine species that occur in Australia. Then there are others, particularly some aviculturists, who believe that the importation process is too restrictive both in the number of species that can be imported, and the quarantine and testing procedures.

The original concept of providing quarantine facilities for the importation of live birds, was to enable the importation of altricial species. However there is anecdotal evidence to indicate that there is an increasing illegal trade in the importation of eggs of altricial species, which has accompanied an increase in the expertise and success of rearing these species artificially in captivity. The importation of fertile eggs will not prevent the introduction of egg transmitted diseases, but it would provide a way of preventing the introduction of those diseases that are not egg transmitted. Perhaps it is now time to consider the legal importation of hatching eggs for some cage and aviary birds.

With the restrictions imposed by the National Parks and Wildlife on the species of birds that can be imported, and the limited number of live birds of permitted species that can be legally imported through the Spotswood Quarantine Facility, or could be imported as fertile eggs, the demands of aviculturists for particular species of birds are going to continue, and the prices offering for the rarer species will provide the temptation to
smuggle. Although the activities of the Quarantine and Customs Services will deter some potential smugglers, and some smugglers will be apprehended, it must be expected that some avian genetic material will be successfully smuggled into Australia, thereby providing the risk of introducing unwanted diseases. After all, the innovativeness and ingenuity of human beings knows no bounds when overcoming the legal obstacles to satisfying their greed.

Acknowledgments

I am indebted to Dr. Kevin Doyle, Senior Assistant Director, Animal Quarantine and Exports Branch, Animal Quarantine and Inspection Service, Department of Primary Industries and Energy, Canberra for permission to quote details of the importation of live birds, and to Dr. Hugh Miller, Principal Veterinary Officer, Quarantine and Inspection Services, Department of Food and Agriculture, Victoria for making the information available. I am also indebted to Dr. Patricia Macwhirter, Highbury Veterinary Clinic, Burwood, Victoria for her written and oral comments on aspects of the live bird importation program.

References

Anon. (1991). A Discussion Paper: The Application of Risk Management in Agricultural Quarantine Import Assessment. Australian Quarantine and Inspection Service, Department of Primary Industries and Energy.

Anon. (1992). MAFF Report; Importation of Birds; Mortality Statistics from Quarantine Returns; Year Ended 1990. Cited by *Traffic Bulletin* (1992) **13**, 1: 4.

Ashton, WLG and Alexander, DJ (1980). A two year survey of the importation of captive birds into Great Britain. *Veterinary Record* **114**: 80-83.

Ashton, WLG, Randall, CJ, Dagless, MD, and Eaton, TM (1984). Suspected reovirus-associated hepatitis in parrots. *Veterinary Record* 114 : 476-477.

Dunn, KJ (1991). Assessment of veterinary services. *Office International Des Epizootics*.

Gaskin, JM, Homer, BL, and Eskelund, KH (1991). Preliminary findings in avian viral serositis: a newly recognized syndrome of psittacine birds. *Journal of the Association of Avian Veterinarians*, **5**, 1: 27-34.

Meulemans, G, Dekegel, D, Charlier, G, Froyman, R, Van Tilburg, J, and Halen, P (1983). Isolation of orthoreoviruses from psittacine birds. *Journal of Comparative Pathology* **93**: 127-134.

Ritchie, BW, Niagro, FD, Lukert, PD, Steffens, WL, and Latimer, KS (1989). Characterization of a new virus from cockatoos with psittacine beak and feather disease. *Virology* **171**: 83-88.

Senne, DA, Pearson, JE, Miller, LD, and Gustafson, GA (1983). Virus isolations from pet birds submitted for importation into the United States. *Avian Diseases* **27**: 731-744.

Todd, D, Niagro, FD, Ritchie, BW, Curran, W, Allan, GM, Lukert, PD, Latimer, KS, Steffens, WL, and McNulty, MS (1991). Comparison of three animal viruses with circular single stranded DNA genomes. *Archives of Virology* **117**: 129-135.