LIVING WITH EXOTIC DISEASES

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Summary

This paper reviews the early reports of important poultry diseases in Malaysia, the emergence of new diseases and how the country copes in terms of disease control. All the major infectious diseases of chickens reported in other countries, and the new diseases that arise as a result of intensive management systems, seem to find their way into Malaysia.

I. INTRODUCTION

“Exotic” as defined by The Oxford Advanced Learner’s Dictionary is “anything that is introduced from another country, not native, or unusual”. Longmans Active Study Dictionary of English, defined it as “(as if) from a distant country”. For the purpose of this review, the second definition is more appropriate mainly because nobody can be certain of the origin of poultry diseases we are seeing in Malaysia today. Postulates are made based on various evidence and reports. Living with exotic diseases simply means how these diseases are being handled. In this review, the history of major poultry diseases in Malaysia and their control are discussed.

II. POULTRY INDUSTRY

Among the early exotic breeds brought into Malaysia by English sailors in the early 1930s were White Leghorn, Rhode-Island Red, New Hampshire and Barred Plymouth Rock (Mann, 1941). This was the beginning of the expansion of poultry industry in Malaysia. Its development evolved almost on a similar pattern to those in the advanced countries. The introduction of superior breeds (mainly from European countries), vaccines for disease control, high quality feed, advanced technology and favourable government policy, contributed to the transformation of subsistence poultry farming to commercialised and advanced poultry industry with high breeding efficiency and high productivity (Aini, 1993). It is the most developed industry within the livestock sector, though traditional backyard subsistence poultry farming is still important in rural areas.

Among the factors that contribute to the rapid expansion of the poultry industry were: (1) effective control of major diseases through vaccination, (2) liberal policy on importation of breeding stock, (3) structural changes that allow setting up of feedmills, breeder farms and large integrated production units, (4) high domestic demand for poultry meat, (5) introduction of investment incentives by the Government in 1985.

Peninsular Malaysia has been self-sufficient in chicken meat production since 1960 and became a nett exporter in 1983. Poultry meat production increased from 21,300 tonnes in 1960 to 678,000 tonnes in 1997. Egg production showed a similar growth pattern, with 12,800 tonnes in 1961 to 360,000 tonnes in 1997 (Watt Poultry Statistical Year Book, 1998).

Other avian species that have been imported into Malaysia include ducks, turkeys, quails, pigeons, pet birds, and in the last three years, ostrich. They also contribute to the collection of exotic avian species in Malaysia.

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III. POULTRY DISEASES

Poultry diseases remain a great threat to Malaysian poultry farmers and are responsible for large economic losses to producers. These losses arise from one or more of the following outcomes: high mortality, retarded growth, reduced egg production, low fertility, poor hatchability, reduced product quality, and increased cost of treatment or vaccination. Due at least in part to the globalisation of the poultry industry and the widespread adoption of imported production systems, which give rise to large concentrations of stock, almost all known major poultry diseases have been reported in Malaysia (Aini, 1993). The common husbandry practices in Malaysia also readily facilitate transmission of diseases between flocks and farms. These practices include open type of housing, close proximity of poultry houses and farms, in many areas. Biosecurity measures and routine vaccination programmes are being practised in big commercial farms, especially breeder farms, as a means of controlling important poultry diseases (Aini, 1990). Many breeder farms now practise a closed house system with evaporative cooling.

IV. VIRAL DISEASES

(a) Newcastle disease (ND)

Newcastle disease is still a major threat to the poultry industry in Malaysia, though in general it is under control. The Mukteswar strain of ND virus, a mesogenic strain, was introduced into Malaysia in 1947 for vaccine production. Its introduction, followed by the F strain, was regarded as the greatest single factor that gave fresh impetus to poultry keeping in Malaysia. The velogenic viscerotrophic ND, which is the most virulent form of ND, is endemic in Malaysia. It can cause 100% mortality in susceptible birds and primarily affects the trachea, lungs, intestine, proventriculus and caecal tonsils (Lai et al., 1986).

The first case of ND in Malaysia was reported in 1934 (Anon, 1934, cited by Chandrasekaran and Aziz, 1989). This coincides with the introduction of exotic chickens from Europe by the English sailors. Since then, an abundance of reports on ND outbreaks has been documented in local and overseas publications. Outbreaks are usually encountered in small farms where vaccination is not carried out, improperly administered or there is mishandling of vaccine.

Velogenic viscerotrophic ND virus was also isolated from an outbreak in quails (Chandrasekaran and Aziz, 1989) and moustache parakeets (Heng and Lim, 1983). Other strains of ND virus have been isolated from wild birds (Mustaffa-Babjee, 1977; Heng and Lim, 1983; Awang et al., 1990).

(b) Infectious bronchitis (IB)

The other important poultry disease is IB. The virus was first isolated in 1964 (Heng et al., 1980). Respiratory signs (Heng et al., 1980), nephrosis - nephritis syndrome (Heng et al., 1980; Azri et al., 1997; Aziz et al., 1996) and mortality reaching 40% (Heng et al., 1980) had been reported. The disease also adversely affected egg production in layer and breeder flocks.

Control of IB by vaccination has helped to reduce its prevalence in this country. However, recurrent outbreaks of IB in vaccinated flocks, especially those associated with kidney lesions, indicated that the vaccine virus does not provide the protection expected against current field strains of IB virus.
(c) Fowlpox (FP)

There is no specific date as to the first report of FP in Malaysia. It is however believed to be present since the 1930s. Dry pox, which is characterised by the formation of an extensive nodular scab-like lesions on the non-feathered parts of the skin, is more common than wet pox, which is characterised by a diphtheritic membrane in the upper respiratory tract of chickens. Pox infection has also been reported in pigeons (Loganathan et al., 1985), turkeys (Aini and Ibrahim, 1986a; Lim et al., 1986a) and ducks (Aziz and Mokhtar, 1989).

(d) Infectious Bursal Disease (IBD)

The presence of the disease was detected serologically in 1985, but later a classical strain of birnavirus was isolated. Outbreaks of clinical IBD with high mortality was first described in Malaysia in 1991 (Loganathan et al., 1992; Hair-Bejo, 1992). Since then, the disease has become one of the most important viral diseases in the country, mainly due to significant economic losses resulting from high mortality, impaired growth and profound immunosuppression. The infection causes necrosis of the lymphoid cells in the bursa of Fabricius, thus impairing its functions. Outbreaks of IBD continue to occur despite the importation of many types of IBD vaccines (Hair-Bejo et al., 1996; Sharifah et al., 1994), probably due to strain variations or improper vaccination regimes (Aini et al., 1996).

(e) Other viral diseases

(i) Marek's disease (MD). The paralytic form of MD in Malaysia was first reported by Wells in 1955 (Loganathan and Harizam, 1987). Subsequently more reports of the disease were published (Omar and Lim, 1968; Omar et al., 1973). To control the disease, layer and breeder chickens were vaccinated at day-old.

(ii) Avian encephalomyelitis (AE) was first confirmed in Malaysia in 1966 (Opitz et al., 1976). Since then sporadic occurrences have been reported (Mustaffa-Babjee, 1985). Avian encephalomyelitis is mainly observed in chicks less than three weeks of age with the signs of depression, head tremors and incoordination, leading to death.

(iii) Infectious laryngotracheitis (ILT) occurs sporadically and is more localised in nature (Mustaffa-Babjee, 1985). Cases have been reported mainly in adult birds.

(iv) Egg drop syndrome (EDS) has been detected serologically and isolated in embryonated duck eggs (Mustaffa-Babjee, 1985). Vaccination is practised by many breeder farms.

(v) Avian reovirus was isolated from tendons of broilers with leg weakness (Sharifah et al., 1989). The broilers, six to seven weeks of age, were observed to be dull, unthrifty, refused to walk and sat on their hocks. The birds had swollen hock joints.

(vi) Avian influenza (AV). The significance of AV in Malaysia is yet to be determined. Aini and Ibrahim (1986b) isolated nine H2N6 and five H4N6 subtype isolates from ducks. Influenza virus of H2N6 subtype caused a mild respiratory distress in experimental chickens (Aini and Ibrahim, 1986b), whereas isolate H4N6 was non-pathogenic for young chicks (unpublished data). Two isolates of H4N3 subtype have also been isolated from passerine birds (Ibrahim et al., 1990).

(vii) Reticuloendotheliosis/chicken anaemia virus (CAV). Antibodies against these viruses have been detected in Government poultry farms (Chai and Yuasa, 1989). Rozana et al. (1995) did a survey in broiler and breeder commercial farms in the southern states of Malaysia and detected chicken anaemia virus serologically. By also using dot-blot method they were able to detect CAV from the liver of chickens showing clinical signs of CAV infection.
(viii) Chick embryo lethal orphan virus. Azri and Mohd-Nor (1990) detected antibodies against this virus in poultry and pet birds, during a routine diagnostic tests on 3693 serum samples from 1985-1989. A variety of clinical signs were reported, including respiratory signs, drop in egg production and some mortality.

(ix) Swollen head syndrome (SHS). An upper respiratory tract infection of chickens was confirmed to be present in Malaysia, (Azri et al, 1997; Lim et al., 1994). Recently outbreaks of SHS were reported in a breeder farm, in which the egg production was affected. The syndrome began with sneezing and conjunctivitis, followed by swelling of lachrymal glands, around the eyes, over the head, sub-mandibular region and finally subcutaneous oedema of the head.

(f) Duck diseases

(i) Duck virus hepatitis (DVH). Outbreak of DVH was first reported in 1986 in Peninsular Malaysia. The virus caused enlarged and necrotic livers in ducklings under two to three weeks old (Lim et al., 1986b). The first outbreak occurred in a broiler farm of Muscovy cross (imported from Taiwan) and Pekin ducks. High mortality (80%), opisthotonus and paddling of legs before death were observed in Pekin ducks under 10 days old, while Muscovy cross ducklings of the same age were unaffected.

(ii) Duck virus enteritis (DVE) was first reported in 1992 (Sharifah et al., 1994), in flocks of commercial Pekin ducks of various ages, ranging from 18 days to 18 months old. The infected ducks developed diarrhoea and mortality of the ducks reached as high as 80-100% within 1-5 days. Subsequently vaccines for both diseases were imported into the country.

V. BACTERIAL DISEASES

(a) Pullorum

Pullorum disease was first reported in West Malaysia in 1956 (Shanta, 1958). The disease then became widespread in this country especially among large commercial flocks. The survey carried out between 1965-1968 showed a particularly high incidence of the disease in birds originally imported from the United States (Osman, 1968). The implementation of National Disease Control and Eradication Scheme for Salmonella pullorum has brought the prevalence of this disease to a very low incidence or eradicated in many farms.

(b) Fowl Cholera (FC)

The first report of FC outbreak in Malaysia was in 1935 (Whitmore, 1936). The second outbreak was reported in 1949, after a lapse of fourteen years (Lancaster, 1951), with deaths in chicken and ducks. The outbreaks were successfully controlled with the use of sulphamethazine. Sporadic outbreaks occurred after that, until the early 1990s when outbreaks were reported in village chickens, resulting in heavy mortalities. Besides using antibiotics, the farmers resorted to imported vaccines from Taiwan. The Veterinary Research Institute now produces fowl cholera bacterin with a combination of three serotypes (Types A, D and untypeable).
(c) Others

(i) Infectious coryza (IC). Sporadic outbreaks of IC have been reported mainly in replacement pullets. *H. paragallinarum* was earlier isolated from chickens with respiratory signs (Chong, 1960). This disease is controlled by using antibiotics.

(ii) Mycoplasmosis is an important chronic respiratory disease, especially in broilers. Mycoplasma was first isolated from a case of avian coryza in 1960 (Thuraiasingham, 1963). Since then, *M. gallisepticum*, *M. gallinarum*, *M. gallinaceum* and *M. synoviae* have been isolated from commercial chickens.

(iii) Colibacillosis is also an important disease, usually occurring together with mycoplasmosis.

VI. PROTOZOAN DISEASES

(i) Coccidiosis. In spite of advances in nutrition, chemotherapy and management practices, coccidiosis still remains one of the major economic losses to the poultry industry in Malaysia. The disease causes damage to the intestinal tract, interruption in feeding and digestive processes, dehydration, blood loss, and increased susceptibility to other diseases and death. *Eimeria tenella* and *E. necatrix* are the most commonly isolated species which caused the most severe outbreaks.

The anticoccidials used in Malaysia include monensin, salinomycin, halofuginone, lasalocid, sulphaquinoxaline, narasin, toctrazuril and amprolium. Another ionophore, semduramicin, was introduced into Malaysian poultry recently.

(ii) Leucocytozoan (LU). Kuppusamy (1936) was the first to record the presence of LU in chicken in Peninsular Malaysia. Subsequently, Omar (1968) recognised in 1961 that the disease was caused by *A. caulleryi* with *Culicoides arakawae* as the vector. LU occurs sporadically in areas with marshy ground and is usually associated with stress. Clinically affected birds appear pale and can lead to high mortality. On post-mortem, petechial haemorrhages are usually observed on the thigh and breast muscles, and sometimes the kidneys are haemorrhagic.

VII. FOODBORNE PATHOGENS

Joseph *et al.* (1988) reported that, from 1981-1985, *S. sofia* was commonly isolated and from 1991-1995, *S. Enteritidis* (SE) was the most frequently isolated serotype (Mohktar *et al.*, 1996). Infections caused by SE remains a problem of great concern. The impact of the disease on trade was very much felt by the export farms in particular.

In Malaysia, *Campylobacter*, particularly *C. jejuni*, were found not only in broiler (Joseph, *et al.*, 1983) and village chickens (ranging from 72.6-97.1%) but also in ducks (18.4-75.0%). Puthucheary *et al.* (1994) stated that though published reports in Malaysia gave a low isolation rate in man (about 3%), the true incidence may be 5-10 times greater.

VIII. RECENTLY REPORTED DISEASES

Hypoglycaemia spiking mortality syndrome (Mohd-Haas *et al.*, 1998), Chlamydiosis (Phong *et al.*, 1996; Phong *et al.*, 1997) and *Ornithobacterium rhinotracheitis* (Raymond, 1998), are among the new diseases reported in Malaysia.
IX. DISEASE CONTROL

Most of the major diseases mentioned earlier are under control, through routine vaccination programmes, prophylactic medication, eradication and other control programmes, and most importantly, farmers’ education. Strict biosecurity measures are being practised especially in the grandparent and parent stock farms (Aini, 1993).

Vaccination programmes and procedures may differ from one farm to another, depending on the type of vaccines used, source of vaccines, disease situations and risks, and local conditions (Aini, 1993). In the case of coccidiosis, though vaccines are available, the main method of control is by prophylactic medication, through feed or drinking water. Vaccination is not very popular in controlling coccidiosis in Malaysia. Similarly, for mycoplasmosis, chemotherapy is more commonly practised than routine vaccination.

For coccidiosis, more than 30 anticoccidial drugs have been introduced to the broiler industry and their long extensive use in chickens has resulted in the decline in sensitivity of the coccidia to the anticoccidials. More and more anticoccidials are being brought into the country to combat this disease.

Various antibiotics are imported into the country for the control and treatment of most bacterial diseases. The use of antibiotics in intensive farming system has become an integral part of poultry management. Antibiotics are used for prevention as well as for treatment of diseases and also used in feed as growth promoters. The concern by farmers over many clinical diseases has led to indiscriminate use of antimicrobial agents and illegal vaccines. Reports of failures in treatment of respiratory diseases have mounted in recent years.

The Department of Veterinary Services (DVS) Malaysia has approved vaccines for 14 poultry diseases (nine viral, one protozoan and four bacterins) and two for duck diseases. The vaccines are for the following diseases: ND, IB, IBD, MD, ILT, EDS, FB, viral arthritis, AE, IC, FC, colibacillosis, mycoplasmosis, coccidiosis, DVE and DVH. Up to June 1993, a total of 280 vaccines with different trade names have been approved for importation, sale and use in Malaysia subjected to certain rules and regulations as specified by DVS.

Two types of approval are given to imported vaccines, namely provisional approval and final approval. All applications for registration of veterinary vaccines are subjected to “provisional approval” for a one-year period. These provisionally approved vaccines shall be considered for “final approval” when all the requirements stated have been fully and satisfactorily complied by the importer, and the vaccine is found to be justified for use in the country. The justification is based on the potency, efficacy and safety of the vaccine. The final approval is valid for four years and subjected to renewal of the registration at the end of that period (DVS, 1992).

A local vaccine company, Malaysian Vaccines and Pharmaceuticals Sdn. Bhd., was established in 1992. To date the company has produced ND, FP, IB and ND-IB vaccines.

X. CONCLUSION

As the years go by, more and more diseases are being added to the list of poultry diseases reported in Malaysia. The availability of more efficient and reliable tests makes diagnosis of diseases an easier task. Couples with advanced molecular techniques, diseases that were difficult to diagnose before and were therefore not attempted, now can be determined with confidence. Molecular techniques tool enable researchers to differentiate different strains of the organisms and also differentiate vaccine strains from field strains. Genetic variations among various isolates can now be determined using the more sensitive and rapid methods, such as polymerase chain reaction (PCR), followed by restriction fragment length polymorphism (RFLP) and PCR-sequencing. Mankind’s ability to
manipulate DNA has opened new doors that will ultimately lead to new changes and opportunities, such as the discovery of new diseases and molecular control of existing diseases. With the advancement of these molecular techniques, perhaps one day we can truly determine exotic pathogens being brought into the country. Meanwhile, we have to satisfy with the efforts in preventing the new diseases and controlling the existing diseases.

Strict regulations, continuous and sustainable surveillance and monitoring programmes will still be carried out throughout the country, especially when the diseases are still present in neighbouring countries or still prevalent in other parts of the world. Malaysia needs more well trained and experienced poultry veterinarians, efficient reporting systems for disease statistics, efficient and reliable laboratory and field services and of course well established control procedures.

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