RECENT TRENDS IN THE DISEASES OF IMPORTED BIRDS

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Two important trends have contributed greatly to the advancement of avian medicine in recent years. The first is the increase in popularity of pet birds and the second is the increased monetary value of these birds. In the past the owner of a sick bird felt it was less expensive to buy another bird than to attempt treatment of diseased birds. The increased value of pet birds has encouraged pet bird owners to seek health care and the veterinary profession has responded. The advancements in avian medicine in the last five years have been dramatic. There has also been a concurrent increase in understanding of the diseases of imported birds.

This paper presents some history and current trends in the most important diseases which are encountered. Any complete discussion of the diseases of imported birds would be beyond the scope of this paper. A table of the diseases commonly encountered in birds from the countries of frequent importation is included. This list is not intended to be all inclusive. In reviewing the list, I do however, continually refer to disease syndromes which have an unknown etiology. It should become evident that there is a tremendous potential for investigative work into the infectious diseases of pet birds.

NEWCASTLE DISEASE

Any discussion of the diseases of imported birds would most logically begin with Newcastle Disease as this is the disease of primary importance to the USDA and the reason for the quarantine of all imported birds. The quarantine program for imported birds was initiated in 1974 due to the tremendous demand for pet birds. Prior to this time, all imports were prohibited for two years. The incidence of Viscerotropic Velogenic Newcastle Disease (VVND) or Exotic Newcastle Disease positive lots of birds since 1974 has decreased dramatically. In 1974, 31.6% (6 of 19 lots) were infected with Viscerotropic Velogenic Newcastle Disease Virus (VVNDV) as opposed to 2.5% (10 of 404 lots) in 1982. Many reasons have been proposed for this decrease; however, the major one is probably economic. If an importer has a lot of VVNDV positive birds, he loses the entire lot of birds as well as all expenses invested in the birds. This fact makes the importer very cautious and selective. (Senne, et al. 1982)

Bird dealers have often speculated that the world-wide incidence of New castle Disease may be cyclic and this fact may have some bearing on the incidence of VVNDV positive lots of birds. A review of the data reveals peaks in the years 1974 and 1979. The high incidence of Newcastle world-wide in 1979 and 1980 was also reflected in many outbreaks of VVND in exotic birds within the U.S. during these years. VVND can be quite devastating when it does make its way into commercial channels. Unlike poultry, pet birds in commercial trade are highly mobile, have a longer incubation period, and some species are quite resistant to disease while

being capable of spreading the virus. These factors allow widespread dissemination of disease before it is detected. In one such outbreak, the disease spread to 23 states and ultimately involved more than 30,000 birds. (Clubb, et at. 1980; Levine, personal communication).

There are several areas of the world in which Newcastle is consistently more prevalent. Mexico and Central America, as well as Southeast Asia are areas of high risk. Newcastle Disease seems to have a seasonal incidence in some of these areas. For example, the incidence of VVND increases each year during the rainy season in Central America and most importers will avoid these areas during the months of March to June. Unfortunately this is the time of year when baby birds are available and often find their way into the U.S. illegally. (Levine, personal communication; Senne, et al. 1982).

Vaccination of psittacine birds for Newcastle Disease has been proposed; however, USDA import regulations forbid the vaccination of birds prior to importation. While vaccination may confer immunity in psittacine species, it will not eliminate the asymptomatic carrier and would make detection of these carriers in an immune flock difficult. In a susceptible flock, however, the spread of the disease increases the chances of detection. (Chew & Liow, 1974).

In recent years the study of VVND has been enhanced by the development of a chromatographic "finger printing" technique. (McMillan & Hanson, 1982) This technique allows defferentiation of strains of VVNDV aiding in accurate epidemiological tracebacks.

CHLAMYDIOSIS

Psittacosis (*Ornithosis*) has been recognized as a disease problem for many years, not only in pet birds, but one that is transmissible to humans. The etiological agent of psittacosis is *Chlamydia psittaci*, an organism which infects a wide variety of creatures in nature. Orignally named psittacosis due to the link with psittacine birds, it is now popularly referred to as Chlamydiosis.

The reported high incidence of human Chlamydiosis resulted in an import ban in the 1930's. The next step taken to allow importation of Chlamydia-free pet birds came in 1968 when a program was initiated to quarantine birds in the country of origin and feed Chlorotetracycline (CTC) for 45 days prior to the shipment of birds to the U.S. This program was abandoned in 1972 due to the suspicion that imported birds might be introducing VVND into the country. A sampling of imported birds revealed that they did in fact have a high incidence of VVND and an import ban was put into effect. No commercial shipments of birds were imported until the present program of quarantine for VVND was instituted in 1974. (Daft & Cooper, personal communication; Lukas, et al. 1980).

The ban and subsequent quarantine program resulted in a tremendous increase in the price of imported birds. This increase in prices encouraged the smuggling of exotic birds, especially from Mexico, with the resultant introduction of VVVND positive birds. In order to detect the birds with VVND, the State of California, in cooperation with the USDA, instituted a surveillance program for veterinarians in the state. In order to entice veterinarians to submit

samples, the Laboratory offered concurrent isolation of Chlamydia, Psittacine Herpes Virus (*Pacheco's Parrot Disease*) and Salmonella. The surveillance program diagnosed 53 cases or 33% Chlamydia infection rate in the first year of operation (1979). This finding and a reported increase in the diagnosis of Chlamydiosis in pet birds nationwide resulted in increased pressure on importers to feed chlorotetracycline in adequate amounts during quarantine. (Daft & Cooper, personal communication; Lukas, et al. 1980).

The California surveillance program is currently (December, 1982) reporting a much lower incidence of Chlamydia positive samples. Of approximately 60 samples cultured weekly, only 2-3 (3-5%) are positive. A decrease in the number of positive necropsy cases has also been observed from approximately 10-15% in 1981 to approximately half that rate in 1982. During this time an increased effort was made by the California Public Health Department to enforce the feeding of CTC in quarantine stations. (Daft & Cooper, personal communication).

The Chlamydial treatment program hung on the coattails of the VVND quarantine program for many years and enforcement of feeding of CTC was assumed but did not actually exist (enforcement was the duty of the public health service). Due to the very low incidence of human *Chlamydia psittaci* infections being reported and the relative urgency of other disease problems, the public health department (Center for Disease Control) indicated in 1980 that they were no longer pursuing an active interest in Chlamydia control and encouraged the USDA to absorb the enforcement of CTC feeding.

Prior to 1980, there was a widespread belief that the feeding of CTC was responsible for a large portion of the problems of imported birds. Even today, I continually hear claims of liver and kidney failure due to antibiotic use. However, to my knowledge, these effects have been poorly documented in the literature. This belief was promulgated by a basic ignorance of the diseases of these birds and in the absence of a definitive diagnosis, death or disease were easily blamed on the "excessive use of antibiotics in quarantine." The importer found himself in a "Catch 22" situation. He was told on the one hand to feed CTC to the birds to prevent human Psittacosis, and on the other hand was told that its use was killing his birds. Therefore,coupled with the expense of feeding CTC, the cumbersome feeding method prescribed by the public health service makes it not surprising that voluntary compliance with the regulation was very low. The controversy rages even today as to whether this treatment period should be extended to 45 days.

I believe it is undeniable that long term feeding of CTC can be injurious to the birds by the disruption of the normal flora and the resultant overgrowth of potentially pathogenic gram negative bacteria and fungi in the absence of normal competing flora. Speculation also exists that this flora may not be easily reestablished because in many cases species-specific bacilli may be required. The detrimental effects of feeding CTC, however, must be objectively weighed against the detrimental effects of Chlamydiosis.

The development and approval of palatable pelleted rations containing tetracycline is a significant step toward making compliance easier and, if necessary, enforceable. It must be kept in mind, however, that while most commonly imported species adapt readily to the pelleted foods, there are some difficult species which will starve rather than accept pellets.

Despite the availability, many importers have chosen to feed corn and add CTC due to the lower cost; therefore, the feeding of tetracycline may not be uniformly applied to all loads. Perhaps it is not needed in all loads of birds. Perhaps a testing program can target infected loads which need treatment. Some strains of Chlamydia may be non-pathogenic and may, in fact, be normal flora. In dealing with Psittacosis we continually see problems in certain countries and certain species. A concentration of effort to treat these birds may do more to control Psittacosis than a blanket treatment program which is doomed to poor compliance.

AVIAN POX

Avian Pox in psittacines is one of the most devastating diseases which the importer has to deal with and one of the most difficult to control. Its importance in psittacine birds was not understood until relatively recently. Pox virus infections are common in groups of birds from South America and less so from Central America. Pox spreads rapidly in a susceptible group of birds and the morbidity and mortality rates can be very high. Species susceptibility to psittacine Pox is highly variable, and in a group of birds containing a variety of species, some may be resistant (such as blue and gold macaws) while some are very severely affected (such as blue fronted amazons). Transmission by vectors, in addition to fomites, and a rather long incubation period contribute to the difficulty of control of these diseases. (Boosinger, et al. 1982; Clubb, 1980; McDonald, et at. 1981).

In outbreaks of Avian pox in susceptible species, the importer not only encounters a large loss due to death, he is also faced with a long period of convalescence and a high incidence of permanent defects in the birds which do survive. Supportive treatment programs greatly increase the survival rate of affected birds and also decrease the incidence of severe defects. The time and expense involved in treatment coupled with less than desirable results, however, make handling susceptible species from problem countries impractical.

Control in the country of origin is difficult due to a combination of factors: 1. The virus is resistant to environmental conditions and improperly used disinfectants; 2. The virus cannot be eliminated from wooden surfaces (trappers continuously reuse contaminated boxes); 3. The disease can be spread by insect vectors which are continually present in environment in some tropical climates. A seasonal nature to the disease as it is seen in some countries may correspond to seasonal levels of vectors. (A higher incidence of Pox in the winter in the U.S. corresponds to the hot, moist summer in South America); 4. The reservoir of the virus in nature is unknown; and, 5. Education of the native trappers, and on up to the exporter, is very difficult.

The development of an effective pox vaccine could conceivably result in a tremendous savings to the pet bird industry. Development and use of a vaccine, however, will not be an easy feat. Finding a virus which could provide immunity in the absence of disease in a wide variety of species will be very difficult. In addition to this, the vaccine should ideally be given a few weeks prior to exposure to the disease. I believe that placing the vaccine in the hands of indians in the jungles of South America would result in less than desirable results.

Avian Pox is a particularly difficult problem primarily due to the nature of the virus. Avoidance of susceptible species from problem areas appears to be the only solution at this time. The Blue Fronted Amazon will probably continue to be imported because they are abundant, relatively inexpensive, and are popular in the U.S.

AVIAN HERPES VIRUS INFECTIONS

Pacheco's Disease, a herpes virus infection of psittacine birds, was first recognized in the United States in 1975. It was first described in psittacine birds from Brazil in 1930 and is most often associated with birds from Central and South America. The 1978 epiornitic of Pacheco's Parrot Disease was very devastating to importers and to aviculturists who unknowingly added infected birds to their aviaries. Since that year the incidence and severity of the disease has decreased dramatically. (Gaskin, et al. 1978; Levine personal communication; Simpson & Hanley, 1977; Simpson & Hanley, 1975).

Due to the relative ease of diagnosis and growth of the organism and the devastating effects of the virus, researchers were greatly interested in studying this disease. The resultant wealth of information that was generated allowed importers to pinpoint dangerous situations and to avoid them. Shortly after this devastating epiornitic, the industry responded by providing research funds to universities in order to develop vaccines. Vaccines were produced by at least three universities; however, we are still unable to protect our birds. . . Why?

Many vaccine companies feel that the need is not adequate to support the capital outlay needed to perfect the vaccine and get USDA approval for vaccines for pet birds. An extensive testing program would be necessary to clear a vaccine as being safe and efficacious for a large variety of species. The most susceptible populations are birds being imported rather than individual pet birds. The companies would be unable to make as much per unit of product unless pet owners could be convinced that they need to vaccinate their pet birds.

In one study, virus was isolated from three outbreaks and found to be antigenically similar, leading to the conclusion that a monovalent vaccine may be effective. (Gaskin, et al. 1978) However, in recent years, at least two types of psittacine herpes hepatitis have been recognized which are clinically quite distinct. The Bolivian strain which is commonly seen today is much less virulent than the original strain from Paraguay and Argentina. This Bolivian strain is characterized by a longer incubation period, longer course, slower rate of spread, and a higher affinity for the spleen. This virus may in addition be antigenically distinct and polyvalent vaccines may be required.

There is significant evidence that some infected susceptible birds can survive the clinical disease and not become carriers. This has been observed clinically and experimentally in macaws. In the meantime, importers have made attempts to protect themselves from the ravages of psittacine herpes viruses by taking the following steps: 1. Avoid species from countries known to be carriers. Sentinel birds such as quaker parakeets can be used to detect carrier groups in quarantine; 2. Separation of susceptible and resistant species (separate quarantines of macaws and conures.); 3. Quarantine in cages rather than flights and elevation

of food and water supplies in order to reduce contact with feces; 4. Use of chlorhexidine in drinking water in the face of an outbreak. It is not known whether chlorhexidine kills the virus in the drinking water or in the birds' intestinal tract; however, it is effective in slowing the spread of the disease in an outbreak; 5. Recognition of other possible carrier species Blue Crown Conure (*Aratinga acuticauda*); Green Cheeked Conure (*Pyrrhura molinae*); Sun Conure (*Aratinga solstitialis*); Painted Conure (*Pyrrhura picta*); Mitred Conure (*Aratinga mitrata*) in addition to the well known carrier species, the Patagonian conure (*Cyanoliseus patagonus*) and Nanday Conure (*Nandayus nenday*).

Despite its reputation, Pacheco's Parrot Disease is more easily controlled than Psittacine Pox Virus infections. Rapid diagnosis, excellent sanitation and careful planning, however, is vital in dealing with outbreaks of Pacheco's Parrot Disease.

SALMONELLOSIS AND OTHER ENTERIC BACTERIAL INFECTIONS

In 1979, Salmonella was the most commonly encountered disease problem in birds imported from Guyana and was often found in birds from other areas. We have, however, seen a decreased incidence of Salmonellosis in shipments from some countries. I believe improved sanitation procedures are at least partially responsible for this trend. Exporters are learning the value of caging birds off the ground and attempting to eliminate wood and other porous surfaces which defy disinfection from their holding cages. We have seen a corresponding decrease in Salmonellosis as foreign holding facilities are modernized.

Investigative work in Salmonellosis, however, is greatly needed for several reasons. Birds which recover from the acute phase of the disease very often become carriers. The shedding of the bacterium is intermittent, so detection of infection is difficult. Stress can bring on acute death due to septicemia at almost any time in an asymptomatic carrier. If the commonly occurring Salmonellas could be serotyped, perhaps an effective serological test could be developed to detect carriers. If egg transmission can be ruled out, these birds could be used as breeders if the young were artificially incubated and raised.

One thing that is of concern to me is the high incidence of antibiotic resistant bacteria observed in recently imported birds. I believe that these organisms, primarily coliforms, make their way into these birds by way of poorly treated drinking water supplies in some countries. It is commonplace in these countries to obtain antibiotics over the counter for any mild ailment, and with inadequate sanitation of drinking water, or the use of unclean well water, the resultant antibiotic resistant coliforms are fed to highly susceptible, tree dwelling birds which are probably naive of coliforms. This problem can be very difficult to deal with and in many cases we must rely on treatments with chemicals such as chlorine or chlorohexidine. The boiling and/or chlorination of the birds drinking water prior to shipment is helpful in some cases.

The fact that many of these diseases, and many which have not been discussed, are stress related is undeniable. Due to economic pressures involved, crowding is inevitable. In an area of close confinement of susceptible birds, the spread of any pathogen which is present is also inevitable. In view of these factors, the importer is often labeled as the perpetrator of avian

atrocities. With some reflection, however it is easy to see that the importer has to yield to the basic laws of supply and demand. In a country where thrift continues to be a virtue, we are always compelled to shop price rather than quality. The dealer who can sell for lower price will, in most cases, be the one who has invested the least in his birds in feed care, and housing. It is also impractical to believe that U.S. hatches will meet the demand for pet birds in the near future.

The care of imported birds is constantly improving, primarily due to industry self-improvement. Attempts at government regulation would be difficult, if not impossible. Regulations are useless unless enforced, and in a time of national budgetary constraints, such a project would be difficult to put into action. The national cage and aviary bird improvement plan to improve the industry will take years to implement, but is a step in the right direction.

The aviculturist can also help to improve the industry by being an informed consumer. Buy your birds from a reputable dealer. Bargain birds are rarely a bargain. Quarantine all new arrivals at least thirty days before introducing them into your collection. Many diseases have a long incubation period and ill birds are often hard to detect. You may, during this quarantine time, elect to have the birds cultured for bacteria and Chlamydia, and checked by your veterinarian for signs of disease or parasites.

Support organizations which are working toward the advancement of aviculture, avian medicine, and the advancement of the pet bird industry. Avian medicine is advancing at a tremendous rate. However, the more we learn, the more we realize how much more we need to know.

DISEASES OF IMPORTED BIRDS AS RELATED TO COUNTRY OF ORIGIN

CENTRAL AMERICA AND MEXICO

Newcastle Disease
Chlamydiosis
Pox
Mycoplasma
Tracheal disease of unknown etiology
Coliform bacterial infections
Coccidiosis
Uveitis of unknown etiology
Keratitis of unknown etiology

GUYANA AND SURINAM

Pox
Salmonellosis
Resistant coliforms

Sinusitis of unknown etiology
Bronchitis and Pneumonia of unknown etiology
Malnutrition
Airsac mites - Conures
Ascarids
Lice
Papovavirus suspected

BOLIVIA

Pox
Sub-acute herpes hepatitis and splenitis
Coliform bacterial infections
Candidiasis
Newcastle Disease
Salmonellosis
Aspergillosis
Tapeworms
Lice
Conjunctivitis of unknown etiology
Proventricular hypertrophy and ileus of Blue & Gold Macaw - unknown etiology
Macaw sinusitis - unknown etiology
Trypanosomes

ARGENTINA AND PARAGUAY

Acute herpes hepatitis
Pox
Chlamydiosis
Candidiasis
Newcastle Disease
Aspergillosis

PERU

Coliform bacterial infections
Candidiasis
Coccidiosis
Newcastle Disease
Salmonellosis
Enteritis - suspected viral etiology
Shipping problems

AFRICA, TANZANIA AND GHANA

Salmonellosis

Hepatitis of unknown etiology
Aspergillosis
Tapeworms
Coliforms
Long transient time - malnutrition
Opthalmitis - unknown etiology

SOUTH AFRICA - Captive Born

Chlamydiosis
Sinusitis conjunctivitis complex - suspected mycoplasmal etiology
Coliforms
Giardia
Candidiasis
Ascarids
Adenovirus

TAIWAN - Captive Born

Bacterial contamination - coliforms and pseudomonas
Salmonellosis
Lovebird eye disease of unknown etiology
Coccidia
Candida
Fighting among canaries
Airsac mites - finches and canaries

INDONESIA AND MALAYSIA

Newcastle Disease
Chlamydiosis
Salmonellosis
Pneumonia - unknown etiology
Cockatoo feather loss syndrome
Airsac mites - Lories
Haemoproteus and microfilaria - Cockatoos
Tapeworms

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