Approaching Flock Problems in Cage and Aviary Birds

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Managing collections of birds is very different to dealing with individual pet birds. In the latter scenario, we are dealing with treatment of disease- ie reactive, fire-brigade medicine. In flock medicine, although the initial point of contact may be to deal with an existing disease outbreak, the long-term input is via a preventative program aimed at increased productivity and lower running costs.

The degree to which the avian veterinarian becomes involved in managing aviaries depends to a large extent on the wishes and finances of the aviculturist involved.

Aviary management should follow the basic principles used in herd health programs in production animals. In order to maximise the effectiveness of veterinary input; the veterinarian should aim to obtain as much background information as possible. Specifically, a mission statement (what does the aviculturist wish to achieve with his venture?); aviary map; traffic flow; basic finances and production records.

Defining the patient.

As mentioned previously, the focus of the veterinarian's attention is now the flock. This is the new patient. The flock is not just the collection of birds but also the aviary structure, its location within the collection and relative to surrounding areas, the staff involved and records. These should all be identified.

The aviculturist's mission statement.

This involves getting the client to define his goals in money and production terms and how he plans to achieve this. It is pointless coming up with management changes which will improve his profitability but which the client is unable or unwilling to implement.

Ensure that the goals are realistic. Be aware that these goals may change over time. This whole thing is a dynamic process whereby changes in one part of the plan can change the plan as a whole. As an example, we will take an aviculturist who has less than fifteen aviaries in which he breeds lovebirds and cockatiels to sell. The lovebirds are sold once bred and the cockatiels are hand reared for the pet industry. Birds produced are sold through local pet shops. He would like to expand into some more exotic species.

The Aviary Map.

This involves getting the aviculturist to draw a map detailing where each aviary is situated and in what relationship to each other, to the rest of the land and the land relative to its surrounding areas, what species are kept where and any buildings or physical features. The structure of each aviary should be noted including materials used, whether fully roofed, floor type, location of nest boxes, feeders, perches, waste disposal etc. Each aviary cage should be numbered. Attention should be given to identifying proximity to other livestock enterprises on the same or adjacent properties and access to the aviaries by other animals eg. dogs, wild birds etc. A veterinarian should visit the property where possible and visualise and ensure details provided by the client are accurate. There is no substitution for this. Also talk about the ideal aviary layout and potential pitfalls.

Traffic Flow Map.

Get the client to draw their daily movements around the aviary onto a copy of the aviary map. The map should show location of the kitchen, breeding aviaries, holding aviaries, incubation and hand rearing rooms, hospital areas, quarantine areas, any foot baths or any areas where clothes or shoes are changed. If more than one person is involved a separate traffic flow for each person is drawn separately. Equally, note movements of any domestic pets.

Again it is best for the veterinarian to follow the aviculturist on a typical daily routine to see that the client's record of traffic flow is accurate. It will become quite obvious that this map will become a bit of a mess. However it will pinpoint areas of heavy traffic and hence potential zones of disease and fomite transmission as well as poor time management.

It will soon be noted that most aviculturists have a relatively poor concept of traffic flow, quarantine and the closed aviary concept.

The *Closed Aviary Concept* aims to prevent the introduction of disease into an aviary or to minimise the impact of any disease arising from within the aviary by following strict traffic flow patterns. In this situation birds are not brought into a collection from the outside indiscriminately. Only birds deemed necessary for improving the genetics or profitability of the enterprise are purchased. Every bird entering the collection must undergo a quarantine period.

The quarantine area is where all the newly purchased birds are kept until they are deemed free of disease and suitable for introduction into the flock. Ideally, this should be a separate building or enclosure well away from the rest of the collection. Often in smaller enterprises and hobby situations it is just a cage situated in the corner of a shed.

The ideal features of a quarantine area are as follows:

1. It should be situated well away from other birds in a low traffic flow area.

2. It should be entirely self contained ie food and water supplies and dishes should not be mixed with the rest of the collection. Waste disposal should also be separated.

3. Cages/aviaries should be constructed so that they can be easily dismantled, cleaned and disinfected.

4. The location should be quiet to allow the new arrivals to settle down.

5. All testing procedures that are to be implemented should be done so during quarantine.

6. Under no circumstances should a bird leave quarantine at the end of the deemed quarantine period if it does not appear 100% healthy or if results of testing have not been received.

Any birds found ill during quarantine should be tested, treated or culled. If there are multiple birds being quarantined, it is essential that a full diagnostic work up be performed, including necropsies if required. Once ill birds are treated and appear to have recovered, the quarantine period then recommences from day one. This is very important. Most aviculturists are very impatient, usually wanting to pair up their newly purchased birds "before the breeding season is over." It is up to us as veterinarians to emphasise the importance of quarantine rather than risk disseminating infection throughout the collection. If they miss this mating season, they still have next year.

7. Each lot of newly purchased birds is treated as a separate quarantine unit. If more birds are purchased whilst other birds are still being quarantined, they should be kept separately from the initial quarantine flock. The length of quarantine will depend on each individual situation, ie the wishes of the client, vet advise, species involved and diseases deemed to be important. The incubation of some diseases may take years which is too long for most aviculturists. The standard recommended period is six weeks. Some people choose only two weeks. As far as disease prevention is concerned, the longer the period, the less chance of undetected disease slipping through.

What type of testing or treatment should be done during quarantine? Again this will depend on the finances available and the species concerned. As a minimum a physical examination just after purchasing should be performed by a veterinarian with avian experience. Educate clients to buy only healthy birds from healthy aviaries. Pet shops by their very nature are potential reservoirs of infection so pay particular attention here.

Multiple faecal flotations to look for endoparasites are very useful. For very susceptible species eg neophemas, *Polytelis* parrots, some may choose to treat prophylactically with anthelmintics to prevent introduction into aviaries. Faecal Gram stains give indication as to the intestinal health status. Crop washes may identify protozoal infection in susceptible species eg. pigeons, budgies, lorikeets. *Chlamydia* testing eg

Antigen (PCR or ELISA) or Antibody (Immunocomb) are very important in trying to determine chlamydia status. For parrots, Psittacine Beak and Feather disease (PBFD), also known as Psittacine Circovirus Diseases (PCD) and polyomavirus testing are available and may be indicated for expensive birds or those highly susceptible eg cockatoos.

Any bird that leaves the collection should only re enter via quarantine. Bird shows and loans to other breeders are all potential sources of breakdown of the quarantine system.

Ideally, traffic flow should be unidirectional from the cleanest most immunologically naive to the potentially most contaminated. In real terms this is from the incubator room ☞ nursery ☞ breeding aviaries ☞ hospital ☞ Quarantine. There should be no or minimal backflow. If there is, then foot baths and/or changes of clothes and hygiene precautions such as washing hands carefully in

appropriate disinfectants must be undertaken. Breaches in quarantine and traffic flow are the two commonest reasons for biosecurity breaches and disease introduction into an existing collection.

Financials

Obtaining financial information from the client can be a sensitive matter and can make the veterinarian also feel uncomfortable. It is important to make the client feel at ease with you. Try to engender a feeling of a united attempt to better the operation as a whole. More will be achieved if the breeder trusts you rather than eyeing you warily as he would a tax agent! Information required includes breakdown of expenses and all sources of income from bird sales. Expenses include food, cage construction (material and labour), purchases, medical costs and salaries. Most aviculturists fail to factor in their own labour input.

The information gathered can be used to determine where the major areas of expenditure lie and together with breeding and sales records, identify birds which are not providing an adequate return. Once identified, then management changes can be implemented to improve their productivity or a decision can be made whether to cull them from the operation. Enlist the help of other professionals eg accountants if the avian vet is not trained in management.

Production Records

This information provides the nitty gritty as to the performance of the bird breeding operation. Despite this many aviculturists have very poor record keeping systems and hence have a very poor handle as to their productivity and profitability. This is the single most important area that can be improved. There are several good computerised record keeping systems available eg "Aviary Manager" which can make record keeping more efficient.

Records need to be divided into adult breeding records, incubator records, paediatric records and medical records. Adult breeding records should be analysed as a whole, then broken up into species or aviary location. Information should include diet, egg production, fertility, chicks produced per fertile egg and chick survival rates from each hen or pair.

Incubation records should include incubator type, date eggs laid, source off eggs, egg weight, expected and actual hatching date, incubator temperature and humidity, turning rate and degree of movement, intraclutch hatching intervals, date fertility determined, date of embryonic mortalities, weight loss over the incubation period, any hatching problems and quality of eggs laid (eg shell porosity and texture, any ridging, shell thickness problems etc).

Paediatric records should include parentage, hatch date, hatch weight, progressive weight records (preferably measured daily before feeding), date eyes opened, age banded, I.D type (leg ring or microchip), size of ring, peak weight and age of bird at peak weight, date of weaning, weaning period, what foods used, fledging, sexing dates and results. Any diseases identified should be noted and as well as treatments used. The level of detail recorded will depend largely on whether a breeder artificially incubates and hand rears chicks or whether the eggs and chicks are left with adult breeding pairs, in which case the aviculturist may be loathe to disturb pairs for fear of nest desertion.

Medical records include results of any routine or diagnostic testing, treatments and cleaning protocols and to which birds these were allocated.

General records should include food types and where purchased, how stored, ingredients and recipes for any home prepared diets eg lorikeet nectars or soft foods, aviary construction and materials, cleaning system used- method and frequency, and who performs what task within the aviary.

Once this information is collated and analysed, problem areas can be identified and solutions can be devised that are consistent with the limitations placed by the mission statement. A tier of solutions can be provided from the most comprehensive to the least expensive and disruptive. Armed with this information, short-term goals for the coming year or breeding season can be devised. This can be in the form of correcting management deficiencies in nutrition, hygiene or incubation. Success in the short term will then make the aviculturist more likely to be receptive to implementation of long term management plans, eg species selection, changing housing locations etc.

Specific Areas of Management Improvement:

1. Understanding the Closed Flock Concept and the importance of quarantine.

2. Importance of record keeping.

3. On-site visits are invaluable.

Specific Issues with Different Types of Bird Collections.

Pet Shops:

The greatest problem with pet shops is that they house various species of birds from multiple sources which are concentrated in a confined area, without quarantine. Smaller pet shops usually only have low numbers of the common pet species. Larger bird suppliers, however, often buy from interstate (where birds are collected from many different breeders before being shipped.) or from many local breeders. They keep a broad range of species, both aviary bred and legally wild – caught birds which are often stressed. This is the perfect environment for pathogen transmission and disease multiplication.

Diseases of concern are as follows:

Finches: Gizzard worm transmission, to a lesser extent other internal parasites. Lice and mite infestations. Air sac mite (*Sternostoma tracheacolum*) is also of concern in confined spaces.

If vermin are a problem – yersiniosis, salmonellosis need to be considered. Chlamydiosis can also occur in finch flocks. Protozoal infections eg coccidiosis, *Cochlosoma* infections.

Overcrowding can also lead to feather picking.

Parrots: Chlamydia, PBFD, polyomavirus, other bacterial diseases especially of the upper respiratory tract – eg mycoplasma.

External parasites eg lice, mites, *Knemidocoptes* mites especially in budgies; internal parasites particularly ascarids and *Capillaria*.

Megabacteriosis particularly in budgies. Trichomoniasis in budgies. The area of biggest concern is the annual influx of young, wild trapped Sulphur-crested Cockatoos, Galahs and Corellas brought in for the pet trade. The incidence of PBFD is very high in these birds and secondary pathogens such as enterovirus, polyomavirus, chlamydia, bacterial and fungal infections are commonly found and spread to other in contact birds in the establishment. Wild caught birds should be kept separately from captive-bred birds and traffic flow between the two should be eliminated or minimised.

Pigeons and Doves:

Chlamydia, mycoplasmas, salmonellosis, trichomoniasis; internal parasites (*Capillaria* sp and ascarids).

External parasites (lice and mites). Herpesvirus, adenovirus and circovirus.

In order to control these diseases, the pet shop owner and staff need to fully understand the risks involved and how to perform their daily routines to minimise the impact of these diseases.

By their very nature, pet shops have high levels of bird input and output. Their profitability is maximised by on-selling birds as quickly as possible. This means less feeding and less risk of succumbing to disease whilst sitting in a pet shop or dying before the bird can be sold. In this situation it is very difficult to implement a quarantine program- the extended time required may well eat into the retailers profits. Therefore, some opt for prophylactic medicine. This can be fraught with danger. Prophylactic for what? Psittacosis?- Doxycycline on tap leads to carriers which break down when sold. Are we promoting resistance??.

Suggestions:

1. Purchase stock from known sources.
2. Decrease the density of birds in cages, have adequate feeding and watering stations. Ensure adequate perching space for each bird in an enclosure.
3. Adequate ventilation.
4. Separate wild caught birds from other species; even multiple rooms are ideal.
5. Keep hand reared pets separately and don't buy chicks from multiple sources to hand rear together.
6. Practice all in- all out management with each aviary.

In the case of disease outbreak, a good rapport with the local veterinarian is important. This allows a diagnosis to be made, sick birds can be quickly treated. Affected and in contact birds should be identified and isolated.A decision as to whether treatment or euthanasia is appropriate can be made. It is important for the pet shop not to sell any treated birds until the disease has been deemed controlled.

The pet shop must be fully cognisant of potential zoonotic risks to clients and workers of diseases such as chlamydiosis and also understand the problems of being able to accurately diagnose the disease status of an individual bird or flock.

Wild caught birds in particular tend to be stressed due to capture, crowded during transport and so are the most likely to shed pathogens. Wild caught young cockatoos are particularly prone to Psittacine Circovirus Disease (PCD) or Psittacine Beak and Feather Disease

(PBFD), which is usually diagnosed several months after sale. Wild caught parrots eg 28 Parrots and Red Capped Parrots from Western Australia also often carry PBFD and should be treated cautiously. Gold Finches suffer high mortality due to coccidial infections and often respond to trimethoprim-sulphur medicine in water.

7) Encouraging even a basic quarantine program, separate hospital area and traffic flow practices are all important.

Pigeon Lofts

Racing birds from different lofts are transported, kept together and share common food and water and therefore are at high risk of disease exposure and transmission. Big problems are circovirus, adenovius and herpesvirus, trichomonads, chronic respiratory disease complex (combination of chlamydia, mycoplasma and other bacteria), endoparasites ascarids and capillaria and coccidia.

Optimum nutrition is important. Housing to minimise access to faeces and ensuring good ventilation to minimise transmission and the effect of respiratory diseases are also important. Perhaps the most important issues in racing pigeon lofts are quarantine and heavy culling for disease resistance. Birds with poor resistance will be naturally culled due to poor racing performance. The veterinarian has to be aware of medicines which will affect racing performance or which can't be used during breeding seasons.

Stocking density should be a minimum of 0.25 sqm floor space per young bird, with lower densities for adult birds. Various types of flooring are used. Solid floors may be scraped daily, but this will not remove coccidial oocysts. Deep litter systems favour the survival of nematode eggs, whilst slatted floors can attract vermin through feed spillage and faecal accumulation. Lofts should be sunny, dry and well ventilated .There should be 10-20 % more perches than the number of birds housed and the perches should be arranged in horizontal rows rather than be stacked vertically, as dominant birds will invariably seek the highest perches and stress less dominant birds. It will be found through trial and error what the optimal stocking density for each loft is. The stock loft houses the breeding birds which are usually confined, but they ideally should have access to an outside aviary. Often cocks and hens are kept separately until the
breeding season. There are large nesting boxes which contain nesting bowls. Stock birds are not observed as often as the flyers, so subclinical disease can progress unnoticed.

Racing lofts contain the racing birds. These birds are performance athletes. Therefore subclinical disease will impact heavily on their racing performance. Often poor racing times or poor rate of return to the loft are the reason why these birds are being presented to the veterinarian. All aspects of management and disease need to be assessed in these flocks.

Young bird lofts house current year banded birds, often of mixed ages, and possibly of differing sources. Watch for overcrowding and stress which together with an immature immune system can lead to morbidity and mortality.

Feeding practices vary with each racer. Some feed measured volumes of feed once or twice daily whilst others feed ad lib. During racing, many racers will feed cereals early in the week increasing the protein content as race day approaches. Feed can be a mixture of legumes and cereals with some smaller seeds or even pellets. Water is usually supplied communally and various tonics and vitamins etc may be added. Grit, mineral salts and clay supplements also need to be fed. Greens and animal proteins can be provided but intake of these varies. The birds should be fed to be in optimum body condition for the rigours of racing.

Birds to be raced are usually subjected to a regular routine of feeding, exercise and basket training. Many additives in the form of vitamins, minerals, "tonics", herbs as well as antibiotics and steroids (to retard moult in young birds when racing) may unfortunately be used. The latter in particular may cause premature reproductive problems and "burn out". Many fliers use prophylactic medications pre racing season such as antibiotics and antiprotozoals, but are reluctant to use them during racing as they can effect performance. The key is to eliminate any problems before racing commences. Remember also that intramuscular injections into the pectoral muscles should not be used in the racing bird. Instead, the leg muscle can be used or the subcutaneous route chosen. Oral administration of tablets or capsules is easy, but liquids are best given by crop gavage. In- food or in-water medications can also be given but birds may reject strong tasting solutions and all other sources of water /food should be removed from the enclosure during treatment.

Conclusion

In order to successfully manage a collection of birds, the birdkeeper must have a good knowledge of the requirements of his birds and should be proactive in ensuring that these requirements are met in an efficient manner. This requires knowledge, planning and good record keeping skills. It is the veterinarian's task to assist the breeder by targeting areas of management breakdown. In particular, by impressing upon the breeder the importance of such concepts as "closed flock", "quarantine" &, "traffic flow" and by analysing production records, the veterinarian's role can change from reactive fire-brigade medicine to preventative productivity based advice. This can only be achieved by trust on both sides and in depth investigation and analysis by the veterinarian in the areas described above.

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